Oregon
Kate Brown, Governor

Oregon Coastal Management Program
Department of Land Conservation and Development
635 Capitol Street, Suite 150
Salem, Oregon 97301-2540
Phone (503) 373-0050
FAX (503) 378-6033
www.oregon.gov/LCD/OCMP

October 27, 2017

Ms. Meagan Masten
Pembina Pipeline Corporation
5615 Kirby Drive, Suite 500
Houston, TX 77005

Re: Jordan Cove Energy Project and Pacific Connector Gas Pipeline
U.S. Army Corps of Engineers NWP-2017-41
Federal Energy Regulatory Commission CP17-494-000 and CP17-495-000

Dear Ms. Masten:

The Oregon Coastal Management Program within the Department of Land Conservation and Development (DLCD) received notice of the above referenced project on October 23, 2017 from the U.S. Army Corps of Engineers with a federal consistency certification completed by the applicant. The project filed an application with the Federal Energy Regulatory Commission on September 21, 2017. The federal Coastal Zone Management Act (CZMA) of 1972, as amended, requires that activities permitted by federal licenses and permits, and which affect any use or resource of a state's coastal zone, be consistent with that state's coastal management program. This process is known as "federal consistency." Your project is proposed to occur within the boundaries of Oregon's coastal zone, and will affect coastal uses and resources. DLCD will be reviewing the project under the federal consistency provisions of the CZMA. The regulations applicable to this project are available at 15 CFR Part 930, Subpart D and Oregon Administrative Rule (OAR) chapter 660, division 35. DLCD plans to initiate one federal consistency review process for the federal permits/licenses listed above.

DLCD's review will determine whether the applicant has established that the proposed project is consistent with the Oregon Coastal Management Program (OCMP). To be consistent with the OCMP, the proposed project must comply with enforceable policies contained in: 1) the statewide land use planning goals; 2) the applicable acknowledged city or county comprehensive plan and land use regulations; and 3) selected state authorities (*e.g.* those governing removal-fill, water quality, and fish & wildlife protections).

This letter is to communicate that your review ***has not*** been initiated. To initiate federal consistency review, applicants must provide DLCD with the necessary data and information required by 15 CFR § 930.58 and OAR 660-035-0050, including:

1. A copy of the applications for each federal license or permit.
2. If not included in a federal application, a detailed description of the proposed activity, its associated facilities, the coastal effects, and any other information the applicant relied on to make the certification.
3. An evaluation that includes a set of findings relating the coastal effects of the proposal and its associated facilities to the relevant enforceable policies of the management program.

4. Draft National Environmental Policy Act (NEPA) documents, except for when a federal statute requires a federal agency to initiate CZMA consistency review prior to its completion of NEPA compliance.

Once all necessary data and information have been received, DLCD will begin the federal consistency review that will start the 180 day review schedule.

Not necessary to initiate review, but still needed in order to arrive at a federal consistency decision, are copies of local and state permits obtained for the project. DLCD has previously provided the applicant with a draft summary of state permits/authorizations that will likely be needed for the project and which are necessary for our review.

Once we have the necessary information, if DLCD has not issued a decision within three months, we will notify you of the status of the federal consistency review and the basis for delay.

If DLCD has not issued a decision within six months, we may ask that you agree to extend our federally mandated six-month review period. An extension may be necessary because the OCMP is a "networked" program that integrates authorities of local governments and other state agencies, and DLCD will not concur that a proposed project is consistent with the OCMP until the applicant has obtained the necessary approvals from local government and state agencies with regulatory authority for the project per OAR 660-035-0050 (4).

If you have any questions or comments regarding the federal consistency review process or the Oregon Coastal Management Program, please contact Elizabeth Ruther at (503) 934-0029 or by e-mail at elizabeth.j.ruther@state.or.us.

Sincerely,

Patty Snow
Coastal Program Manager

Email cc: Tyler Krug, USACE
John Peconom, FERC
Steve Shipsey, ODOJ
Elizabeth Ruther, DLCD

Jordan Cove
Energy Project, L.P.

May 6, 2019

VIA ELECTRONIC MAIL AND FILE TRANSFER

Elizabeth Ruther
Coastal State-Federal Relations Coordinator
Oregon Coastal Management Program
Oregon Department of Land Conservation and Development
635 Capitol Street NE, Suite 150
Salem, OR 97301-2540

Re: Jordan Cove Energy Project L.P. Supplement to CZMA Application

Dear Ms. Ruther:

Oregon Department of Land Conservation and Development is currently in the process of reviewing Jordan Cove Energy Project L.P.'s ("JCEP's") Coastal Zone Management Act Certification ("CZMA") Application, submitted April 12, 2019. Please find attached a Supplemental Resource Report ("Supplemental Report"), which was submitted to the Federal Energy Regulatory Commission on May 2, 2019, in association with JCEP's pending application for authorization to site, construct, and operate certain liquefied natural gas facilities (the "LNG Terminal") under Section 3(a) of the Natural Gas Act. See FERC Docket No. CP17-495-000. The information contained in the Supplemental Report does not alter the conclusions of the JCEP's existing CZMA Application, but provides additional information related to certain minor modifications to components of the LNG Terminal. It is therefore relevant and submitted as supplemental information in support of the CZMA Application.

The Supplemental Report will also be provided electronically as Exhibit B.1.

Should you have any questions, please contact me at neades@pembina.com or 832-255-3841.

Sincerely,

Natalie Eades

Natalie Eades
Jordan Cove Energy Project L.P.

Enclosure

cc: Patty Snow
Jesse D. Ratcliffe
Steve Shipsey
Matt Spangler

Jordan Cove Energy Project, L.P.

May 2, 2019

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: *Jordan Cove Energy Project L.P.*
Docket No. CP17-495-000
Supplemental Information

Dear Ms. Bose:

On September 21, 2017, Jordan Cove Energy Project L.P. ("JCEP") filed an application pursuant to Section 3(a) of the Natural Gas Act, as amended,[1] and Parts 153 and 380 of the regulations of the Federal Energy Regulatory Commission ("Commission"),[2] for authorization to site, construct, and operate certain liquefied natural gas facilities ("LNG Terminal"). JCEP provides supplemental information related to certain minor modifications to components of the LNG Terminal in the attachment hereto.

Should you have any questions, please contact me at neades@pembina.com or 832-255-3841.

Sincerely,

/s/ Natalie Eades
Natalie Eades
Jordan Cove Energy Project L.P.

Enclosures

cc: John Peconom (FERC)
John Crookston (Tetra Tech)

[1] 15 U.S.C. § 717b(a) (2012).
[2] 18 C.F.R. Pts. 153 and 380 (2018).

JORDAN COVE ENERGY PROJECT L.P.

RESOURCE REPORT SUPPLEMENT

FERC DOCKET NO. CP17-495-000

May 2019

CONTENTS

OVERVIEW AND DESCRIPTION 4
RESOURCE REPORT 1 – GENERAL PROJECT DESCRIPTION 5
1.3.8.13 Electrical Systems 5
RESOURCE REPORT 13 - ENGINEERING AND DESIGN MATERIAL 5
13.28 Electrical 5
13.28.1 Electrical System Design 5
13.28.1.1 Power Requirements 6
13.28.1.2 Main Power Supply, Utility/Generated 6
13.28.1.3 Electrical Equipment Layout Drawings 6
13.28.1.4 Cable Routing Drawings 6
13.28.1.5 Main Power Generators Type 6
13.28.1.6 Number of Main Power Generators, including Black-start Generators 6
13.28.1.7 Main Power Supply Voltage 6
13.28.1.8 Main Power Supply Capacity 7
13.28.1.9 Emergency Power Supply, Utility/Generated 7
13.28.1.10 Emergency Power Generators Type 7
13.28.1.11 Number of Emergency Power Generators 7
13.28.1.12 Emergency Power Voltage 7
13.28.1.13 Emergency Power Capacity 7
13.28.1.14 UPS Services, Voltage, Size, and Capacity 7
13.28.1.15 Transformer Type 7
13.28.1.16 Number of Transformers 7
13.28.1.17 Electrical Distribution System 7
13.28.1.18 Distribution and Voltage Levels 7
13.28.1.19 Uninterruptible Power Supply and Battery Backup Systems 8
13.28.1.20 Electrical Cable Schedule/List 8
13.28.1.21 Electrical Cable Design and Specification 8
13.28.1.22 Cathodic Protection 8
13.28.1.23 Hazard Area Classifications 8
13.28.1.24 Ignition Control Setbacks and Separations 8
13.28.1.25 Electrical Pass-through Seals and Vents to the Atmosphere 8

ACRONYMS

DEIS	Draft Environmental Impact Statement
FERC	Federal Energy Regulatory Commission; also Commission
HRSG	Heat Recovery Steam Generator
JCEP	Jordan Cove Energy Project, L.P.
kV	Kilovolts
LNG	Liquefied Natural Gas
LV	Low Voltage
MW	Megawatts
MV	Medium Voltage
PCGP	Pacific Connector Gas Pipeline, LP
SORSC	Southwest Oregon Regional Safety Center
STG	Steam Turbine Generator
UPS	Uninterruptible Power System

OVERVIEW AND DESCRIPTION

Jordan Cove Energy Project L.P. ("JCEP") is seeking authorization from the Federal Energy Regulatory Commission ("FERC" or "Commission") under Section 3 of the Natural Gas Act to site, construct, and operate a natural gas liquefaction and liquefied natural gas ("LNG") export facility ("LNG Terminal"), located on the bay side of the North Spit of Coos Bay, Oregon. JCEP will design the LNG Terminal to receive a maximum of 1,171 Million Standard Cubic Feet Per Day of natural gas and produce a maximum of 7.8 million tons per annum of LNG for export. The LNG Terminal will turn natural gas into its liquid form via cooling to about -260°F, and in doing so it will reduce in volume to approximately 1/600th of its original volume, making it easier and more efficient to transport.

In order to supply the LNG Terminal with natural gas, Pacific Connector Gas Pipeline, LP ("PCGP") is proposing to contemporaneously construct and operate a new, approximately 235-mile-long, 36-inch-diameter natural gas transmission pipeline from interconnections with the existing Ruby Pipeline LLC and Gas Transmission Northwest LLC systems near Malin, Oregon, to the LNG Terminal ("Pipeline," and collectively with the LNG Terminal, the "Project").

This Supplemental Resource Report ("Supplemental Report") includes details of Project design enhancements for the power generation system of the proposed LNG Terminal described in the FERC Application documents filed as part of Docket No. CP17-495-000. During detailed design, JCEP will implement the minor modification described in this Supplemental Report without increasing the overall environmental impacts associated with the Project. This Supplemental Report maintains the section numbers and section headings of the original Resource Reports. As a result, section numbers in this Supplemental Report may not be sequential. Text included in this Supplemental Report is intended to update the sections of the original Resource Reports that have corresponding section numbers and headings.

These design enhancements will maintain or reduce the duty of the Heat Recovery Steam Generators ("HRSGs") and Auxiliary Boiler and therefore will not result in additional environmental impacts for air quality and noise compared to those described in information filed in FERC Docket CP17-495-000 and in FERC's Draft Environmental Impact Statement for the Project", issued March 29, 2019 ("DEIS"). While the power supply is modified, the LNG Terminal layout and operations will not change, and, as a result, the reliability and safety analysis presented in the DEIS will not be affected. The import power feeder described in this Supplemental Report will be routed within the footprint of the LNG Terminal facilities displayed on Figure 2.1-2 of the DEIS; therefore, there will be no additional impacts to geological; soil and sediment; water and wetland; upland vegetation; wildlife and aquatic; threatened, endangered, and other special status species; land use; recreation and visual; socioeconomic; transportation; and cultural resources beyond those documented in the DEIS. The engineering documentation detailing these design enhancements will be submitted to FERC prior to construction of final design.

RESOURCE REPORT 1 – GENERAL PROJECT DESCRIPTION

1.3.8.13 Electrical Systems

JCEP plans to obtain power from the regional electric grid for the Southwest Oregon Regional Safety Center (SORSC) and temporary construction activities as described in Section 1.9. A portion of the electric power for operations of the LNG Terminal facilities will be generated on-site with the balance imported from the regional electric grid owned and operated by PacifiCorp ("Pacific Power"). Pacific Power distributes electric power to other industrial users within the region including the Roseburg Forest Products Company, Southport Lumber Company, LLC and DB Western. No means for exporting power to the grid are considered in the LNG Terminal design.

The total power requirements for the LNG Terminal are 39.2 MW (holding mode) and 49.5 MW (loading mode). Electric power will be via three on-site steam turbine generators ("STGs") generating up to a total maximum of 24.4 MW and imported power capacity ranging from 15 to 26 MW. The steam for the STGs is efficiently generated by HRSGs using exhaust from the refrigerant compressor combustion turbine drivers. The rated electric output of the STGs will be finalized during the detail design phase of the Project. An auxiliary boiler will be used to generate steam for power when gas turbines are not in operation.

Imported electric power to the LNG Terminal will be provided via an underground 12.47 kV connection point at the north-east corner of the South Dunes site. The 12.47 kV feeder will then be routed underground from the connection point through the South Dunes site and the Access and Utility Corridor to the Auxiliary Powerhouse Enclosure located to the north of Ingram Yard near the STGs. The approximate length of the underground cable run is 10,500 feet through the LNG Terminal property.

Two medium voltage ("MV") switchgear buses within the Auxiliary Powerhouse Enclosure will be connected to the STGs and the 12.47 kV power supply, MV switchgear breakers and capacitor banks will be provided at the switchgear to integrate the import power feeder. The MV buses will feed a plant distribution 12.47 kV switchgear, 6.9 kV switchgear and motor control center, and 480-volt switchgears and motor control center buses located throughout the plant.

Black start power supply for the STGs will be available from the grid. However, during the detail design phase of the Project, JCEP will consider installing one standby diesel generator to provide redundant black start power supply. There are two standby diesel generators for the SORSC.

RESOURCE REPORT 13 - ENGINEERING AND DESIGN MATERIAL

13.28 Electrical

13.28.1 Electrical System Design

Information on the electrical design is provided in the Electrical Basis of Design (J1-000-ELE-BOD-KBJ-50001-00) included in Appendix B.13.1, the Electrical Power Generation Study and System Description (J1-000-ELE-RPT-KBJ-50001-00) included in Appendix B.13.2, the Electrical Specifications included in Appendix F.13.3, and the electrical design information included in Appendix N.13.

Updated engineering documentation detailing the final design electric power generation and distribution system will be submitted to FERC prior to construction of final design.

13.28.1.1 Power Requirements

No change.

13.28.1.2 Main Power Supply, Utility/Generated

JCEP will generate up to a total maximum of 24.4 MW of electric power on-site via three STGs and import the balance of electric power, up to 26 MW, from the local electrical distribution facility owned and operated by Pacific Power. More information on the main power supply is provided in the Electrical Basis of Design (J1-000-ELE-BOD-KBJ-50001-00) included in Appendix B.13.1 and the Electrical Power Generation Study and System Description (J1-000-ELE-RPT-KBJ-50001-00) included in Appendix B.13.2.

Updated engineering documentation detailing the final design electric power generation and distribution system will be submitted to FERC prior to construction of final design.

13.28.1.3 Electrical Equipment Layout Drawings

No change.

13.28.1.4 Cable Routing Drawings

No change.

13.28.1.5 Main Power Generators Type

The main on-site power generators are STGs driven by steam generated by HRSG units located at each liquefaction train by an auxiliary boiler during black-start, or by a combination of HRSGs and auxiliary boiler when two or more HRSGs are offline for maintenance. The balance of electric power required for normal operation of the LNG Terminal will be imported from the local electrical distribution facility owned and operated by Pacific Power.

13.28.1.6 Number of Main Power Generators, including Black-start Generators

The LNG Terminal electrical system will be supplied from three STGs, up to a total maximum of 24.4 MW, and imported from the local electrical distribution facility owned and operated by Pacific Power, up to 26 MW. With import power available, standby diesel generators are not required. JCEP will consider installing one standby diesel generator to provide redundant black start power supply for the STGs pending the outcome of a power grid transmission reliability study that will be completed during the detail design phase of the Project.

More information on the main power generators is provided in the Electrical Power Generation Study and System Description (J1-000-ELE-RPT-KBJ-50001-00) included in Appendix B.13.2 and the MV & Low Voltage (“LV”) One-Line Diagrams included in Appendix N.13.3.

Updated engineering documentation detailing the final design electric power generation and distribution system will be submitted to FERC prior to construction of final design.

13.28.1.7 Main Power Supply Voltage

Each STG will produce electricity at 12.47 kV. Imported electric power from the local electrical distribution facility will be provided at 12.47 kV.

13.28.1.8 Main Power Supply Capacity

No change.

13.28.1.9 Emergency Power Supply, Utility/Generated

No change.

13.28.1.10 Emergency Power Generators Type

No change.

13.28.1.11 Number of Emergency Power Generators

No change.

13.28.1.12 Emergency Power Voltage

No change.

13.28.1.13 Emergency Power Capacity

No change.

13.28.1.14 UPS Services, Voltage, Size, and Capacity

No change.

13.28.1.15 Transformer Type

No change.

13.28.1.16 Number of Transformers

No change.

13.28.1.17 Electrical Distribution System

The power distribution system will include: a 12.47 kV electrical system for the plant main supply, a 6.9 kV electrical system to supply the plant's MV loads, a 480 V/motor control center electrical system to supply the plant's LV loads, a UPS system, and direct current battery systems. More information on the electrical distribution system is provided in the Electrical Basis of Design (J1-000-ELE-BOD-KBJ-50001-00) included in Appendix B.13.1, the Electrical Power Generation Study and System Description (J1-000-ELE-RPT-KBJ-50001-00) included in Appendix B.13.2, the Electrical Load List (J1-000-ELE-LST-KBJ-50001-00) included in Appendix N.13.1, and the MV & LV One-Line Diagrams included in Appendix N.13.3.

Updated engineering documentation detailing the final design electric power generation and distribution system will be submitted to FERC prior to construction of final design.

13.28.1.18 Distribution and Voltage Levels

Information on the electrical distribution and voltage levels is provided in the Electrical Basis of Design (J1-000-ELE-BOD-KBJ-50001-00) included in Appendix B.13.1, the Electrical Power Generation Study and System Description (J1-000-ELE-RPT-KBJ-50001-00) included in Appendix B.13.2, the Electrical Load List (J1-000-ELE-LST-KBJ-50001-00) included in Appendix N.13.1, and the MV & LV One-Line Diagrams included in Appendix N.13.3.

Updated engineering documentation detailing the final design electric power generation and distribution system will be submitted to FERC prior to construction of final design.

13.28.1.19 Uninterruptible Power Supply and Battery Backup Systems

No change.

13.28.1.20 Electrical Cable Schedule/List

No change.

13.28.1.21 Electrical Cable Design and Specification

Information on the electrical cable design is provided in the Electrical Basis of Design (J1-000-ELE-BOD-KBJ-50001-00) included in Appendix B.13.1, and relevant electrical specifications included in Appendix F.13.3.

Updated engineering documentation detailing the final design electric power generation and distribution system will be submitted to FERC prior to construction of final design.

13.28.1.22 Cathodic Protection

No change.

13.28.1.23 Hazard Area Classifications

No change.

13.28.1.24 Ignition Control Setbacks and Separations

No change.

13.28.1.25 Electrical Pass-through Seals and Vents to the Atmosphere

No change.

CERTIFICATE OF SERVICE

I hereby certify that I have this 2nd day of May, 2019, served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

/s/ Victoria R. Galvez
Victoria R. Galvez
Attorney for
Jordan Cove Energy Project L.P.

APPENDIX 5.C.

Oregon
Kate Brown, Governor

Department of Land Conservation and Development
635 Capitol Street NE, Suite 150
Salem, Oregon 97301-2540
Phone: 503-373-0050
Fax: 503-378-5518
www.oregon.gov/LCD

May 13, 2019

Ms. Natalie Eades
Jordan Cove Energy Project, LP
Pacific Connector Gas Pipeline, LP
Email: neades@pembina.com

Project: Jordan Cove Energy Project/Pacific Connector Gas Pipeline
US Army Corps Federal Permit No.: NWP-2017-41
FERC Docket Nos: CP17-495-000 and CP17-494-000
Applicants: Jordan Cove Energy Project, LP and Pacific Connector Gas Pipeline, LP
Location: Coos Bay, Oregon and Pipeline Route within Coastal Zone
Necessary Data and Information: Complete
Review Deadline: October 12, 2019

Dear Ms. Eades:

On April 12, 2019, the Department of Land Conservation and Development (DLCD) received the federal consistency application package from Jordan Cove Energy Project LP and Pacific Connector Gas Pipeline Project, LP (Applicants).

The federal Coastal Zone Management Act (CZMA) of 1972, as amended, requires that activities permitted by federal licenses and permits, and which affect any use or resource of a state's coastal zone, be consistent with that state's coastal management program. This process is known as "federal consistency." Your project is proposed to occur within the boundaries of Oregon's coastal zone, and will affect coastal uses and resources. The 1987 Oregon Legislature designated DLCD as the state agency that implements the Oregon Coastal Management Program (Program) and undertakes the CZMA federal consistency review in Oregon. The federal regulations applicable to this project are available at 15 CFR Part 930, Subpart D. DLCD is reviewing two major federal permits/licenses needed for the proposed project: the Army Corps Section 404/Section 10 permit and the Federal Energy Regulatory Commission's energy siting certificate. In the case of multiple federal permits for one project, per 15 CFR § 930.59, DLCD has asked the Applicants for one federal consistency application so that these two federal permits/licenses can be reviewed together.

DLCD's review will determine the proposed project's consistency with the

Program. To be consistent with the Program, the proposed project must comply with enforceable policies contained in: 1) the statewide land use planning goals; 2) the applicable acknowledged city or county comprehensive plan and land use regulations; and 3) selected state authorities (*e.g.* those governing removal-fill, water quality, and fish & wildlife protections). The enforceable policies for the project have been identified. More enforceable policies will apply as more information is available from the local jurisdictions reviewing the Applicant's local applications.

Per 15 CFR § 930.60(a)(1), before consistency review occurs as described above, DLCD has 30 days to review whether the application includes all necessary data and information (NDI). To initiate federal consistency review, applicants must provide DLCD with the NDI required by 15 CFR § 930.58.

Your consistency review has been initiated. The NDI required has been submitted and is described in Table 1.

Table 1. Necessary data and information for the proposed project.

List of Necessary Data and Information	NDI Requirement Satisfied
Coastal Effects Evaluation (Resource Reports and DEIS)	Yes
Enforceable Policies Analysis	Yes
Consistency Certification Statement	Yes
Federal Application: FERC	Yes
Federal Application: Corps	Yes

Not necessary to initiate review, but still needed in order to come to a federal consistency decision, are copies of local and state permits obtained for the project that relate to some of the enforceable policies of the program. DLCD has listed outstanding, incomplete, or denied state and local permits and authorizations and the related enforceable policies in Table 2. Applicants will need to supply DLCD the following local and state permits to establish consistency of the project with the identified enforceable policies of the Program in Table 2.

Table 2. Additional information necessary to determine consistency.

Permits and Authorizations	Status of Permit Process	Related Enforceable Policies of the OCMP
STATE		**Oregon Revised Statutes**

ODEQ: Air Contaminant Discharge Permit (JC)	Application received October 16, 2017. In administrative review.	(2013) 468.936; 468.939; 468.941; 468.951; 468A.005; 468A.010; 468A.020; 468A.025; 468A.040; 468A.045; 468A.050; 468A.055; 468A.060; 468A.070; 468A.075
ODEQ: CWA Section 401 Water Quality Cert (JC and PCGP)	Denied without prejudice on May 6, 2019. Applicant may submit a new application.	(2013) 468.943; 468.946; 468.949; 468.951; 468B.005; 468B.015; 468B.020;
ODEQ: 1200-C Construction Stormwater (JC Terminal)	Application not yet submitted.	468B.025; 468B.048; 468B.050; 468B.052;
ODEQ: 1200-C Construction Stormwater (Kentuck Slough)	Application not yet submitted.	468B.055; 468B.060; 468B.075; 468B.080;
ODEQ: 1200-C Construction Stormwater (US HWY 101/TPP)	Application not yet submitted.	468B.085; 468B.120; 468B.125; 468B.130;
ODEQ: NPDES General Permit 1200C (PCGP)	Application received January 4, 2019. In administrative review.	468B.135; 468B.150; 468B.155; 468B.160; 468B.300;
ODEQ: 1200-C Construction Stormwater (APCO)	Application not yet submitted.	468B.305; 468B.310; 468B.315;
ODEQ: Individual WPCF- Hydrostatic Testing (PC) -CZ	Application received February 6, 2019. In administrative review.	468B.320; 468B.337; 468B.345; 468B.350; 468B.355; 468B.360; 468B.365;

		468B.370; 468B.375; 468B.380; 468B.385; 468B.390; 468B.450; 468B.460; 468B.475; 468B.485
ODEQ: NPDES-Wastewater Treatment Plant	Application received January 31, 2019. In administrative review.	(2013) 454.605; 464.607; 454.610; 454.655; 454.657
ODFW Fish Passage Plans Kentuck/APCO	Application received March 1, 2019 incomplete.	(2013) 509.580; 509.585; 509.600; 509.610; 509.625
ODFW Fish Passage Plan Access Road Steam Crossing in CZ;	Application received March 29, 2019 incomplete.	
ODFW Fish Passage Plans Pipeline Stream Xings in CZ	Application received April 24, 2019 incomplete.	
DSL Removal-Fill Authorization (All)	Application received November 7, 2018. DSL requested additional info on April 10, 2019.	(2013) 196.682; 196.687; 196.800; 196.805; 196.810; 196.815; 196.818; 196.825; 196.830; 196.845; 196.855; 196.880; 196.905
DSL Proprietary Authorizations: Easements JC	Applications not yet submitted.	(2013) 274.005; 274.025; 274.040; 274.043; 274.060; 274.400; 274.402; 274.550; 274.705; 274.710; 274.860; 274.905; 274.920; 274.940
DSL Proprietary Authorizations: Sand and Gravel Licenses JC	Applications not yet submitted.	
DSL Proprietary Authorizations: Waterway Use JC	Applications not yet submitted.	
DSL Proprietary Authorizations: Mitigation JC	Applications not yet submitted.	

DSL Proprietary Authorizations: State-owned land xings PC	Applications not yet submitted.	
DSL Proprietary Authorizations: Special Use	Applications not yet submitted.	
OWRD: Limited License: Coos River	Applications not yet submitted.	(2013) 536.220; 536.700; 536.710; 537.010; 537.110; 537.120; 537.130; 537.135; 537.140; 537.150; 537.160; 537.170; 537.240; 537.400; 537.410; 537.420; 537.440; 537.445; 537.450; 537.505; 537.515; 537.525; 537.535; 537.545; 537.575; 537.585; 537.595; 537.605; 537.610; 537.615; 537.620; 537.625; 537.630; 537.635; 537.680; 537.685; 537.690; 537.695; 537.705; 537.730; 537.780; 537.795
OWRD: Limited License: East Fork Coquille	Applications not yet submitted.	
OWRD: Limited License: Middle Fork Coquille	Applications not yet submitted.	
OPRD/SHPO: State Archeological Permits(Various) JC Terminal	Active applications and permits. Additional applications necessary.	(2013) 390.010; 390.235; 390.237
OPRD/SHPO: State Archeological Permits (Various) PCGP-CZ	Active applications and permits. Additional applications necessary.	
ODOE Energy Facility Siting Certificate	Application not yet submitted.	(1987) 469.300; 469.310; 469.320; 469.500; 469.510

LOCAL		Land Use Regulations
Coos County: Omnibus 1	Active application. Remand findings submitted to county on March 14, 2019. Consideration by Board of County Commissioners pending.	CCCP Volume 1 Section 5.2, Strategies 2, 14; Section 5.3, Strategies 1, 10, 12, 13; Section 5.4, Strategies 1, 3, 9; Section 5.5, Strategies 1, 2, 4; Section 5.6 Strategies 1, 6; Section 5.7, Strategy 3; Section 5.10, Strategies 1, 2, 3, 5, 7, 8, 9, 10, 11; Section 5.11, Strategies 1, 4, 6, 7; Section 5.18 Strategies 4, 4a, 5, 6; Section 5.22 Strategy 2; CCCP Volume 2 Section 3.3, Policy 4, 5, 8, 9, 14, 16, 18, 19, 20, 22, 30; Section 5 All mgmt units; ZO Chapter 2, Sections 2.1.100-2.1.200; Section 4.3.200; Section 3.2.100; Section 3.2.175; Section 3.2.180; Section 3.2.201, Section 3.2.202; Section 3.2.240; Section 3.2.241; Section 3.2.245;
Coos County: Combo App: Transpacific Pkwy items	Active application. First hearing was February 1, 2019.	
Coos County: Combo App: PCGP early works items	Active application. First hearing was February 22, 2019.	

Coos County: Combo App: Nav Reliability Improv (NRI)- Channel mods	Active application. First hearing was March 8, 2019.	Section 3.2.246; Section 3.2.255; Section 3.2.256; Section 3.2.260; Section 3.2.261; Section 3.2.265; Section 3.2.266; Section 3.2.275; Section 3.2.276; Section 3.2.280; Section 3.2.281; Section 3.2.285; Section 3.2.286; Section 3.2.290; Section 3.2.291; Section 3.2.335; Section 3.2.336; Section 3.2.370; Section 3.2.371; Section 3.2.400; Section 3.2.401; Section 3.2.402; Section 3.2.425; Section 3.2.426; Section 3.2.440; Section 3.2.441; Section 3.2.445; Section 3.2.446; Section 3.2.450; Section 3.2.451; Section 3.2.455; Section 3.2.456; Section 3.2.525; Section 3.2.526; Section 4.11.217; Section 4.11.125.1-.7; Section 4.6.100; Section 4.6.140; Section 4.6.200; Section 4.6.210; Section 4.6.230

Coos County: Omnibus 2	Application received April 12, 2019 incomplete. County requested additional info.	Additional EPs will be identified when county application complete and applied to review.
Coos County: Conditional Use: PCGP Blue Ridge Route	Permit issued. Time extension granted by County. Under appeal to Board of County Commissioners.	EPs will be identified when appeal concluded and applied to review.
Coos County: Conditional Use: PCGP Alternate Routes	Permit issued. Time extension granted by County. Affirmed by Land Use Board of Appeals April 25, 2019.	EPs to be identified.
Coos County: Conditional Use: PCGP Original Route	Permit issued. Time extension granted by County. Affirmed by Land Use Board of Appeals April 25, 2019.	EPs to be identified.
City Coos Bay: Estuarine Activity in 52-NA	Previous order expired. Application not yet submitted.	Additional EPs will be identified when city application complete and applied to review.
City Coos Bay: Combo App: Nav Reliability Improv	Active application. First hearing was March 21, 2019.	CBCP Section 7.10, ER.1; Dev Ord 17.352.010-17.352.080; CBEMP Lower/Upper Bay DA all requirements, aquatic unit/deep-draft nav channel; 52-NA All requirements; 54-DA All requirements; 55-CA All requirements

City North Bend: Combo App: Floodplain Dev and CB Estuary Permit PCGP	Active application. First hearing was March 18, 2019.	ZO Sections 59-61; 64-69; CBEMP 47-DA All requirements; 47-UW all requirements; 48-CA All requirements; 48-CS All requirements; 50-NA All requirements; 51-CA All requirements
City North Bend: Combo App: DMD at APCO site Floodplain Dev and CB Estuary Permit	Application received April 9, 2019 incomplete. City requested additional info.	Additional EPs will be identified when city application complete and applied to review.
Douglas County: Conditional Use Application PCGP in CZ	Application received April 8, 2019 incomplete. County requested additional info.	RLUP-RRD-Criteria for Designating rural resource lands; RLUP-OZ-Table specifies overlay zone designations; Ch1 Section 1.010-1.090; Ch3 Article 3.1; Article 3.2; Article 3.3; Article 3.5; Article 3.6; Article 3.32; Article 3.39

If DLCD has not issued a decision by July 12, 2019, we will notify you of the status of the federal consistency review and the basis for delay. Under 15 CFR § 930.60(b), Applicants and DLCD may mutually agree in writing to stay our federally mandated six-month review period which ends October 12, 2019. A stay may be beneficial because the Program is a "networked" program that integrates authorities of local governments and other state agencies, and DLCD will not concur that a proposed project is consistent with the Program until the applicant has obtained the approvals from local government and state agencies with regulatory authority for the project listed in Table 2.

If DLCD issues an objection because the proposed project is not consistent with Program enforceable policies the federal permits cannot be issued. If you have

any questions or comments regarding the consistency review process or the Program, please contact our Coastal Program Manager, Patty Snow, at (503) 934-0052 or by e-mail at: patty.snow@state.or.us.

Sincerely,

Jim Rue
Director
Department of Land Conservation and Development

Cc: Jason Miner, Governor's Office
Annette Liebe, Governor's Office
Steve Shipsey, DOJ
Jesse Ratcliffe, DOJ
Patty Snow, OCMP
Elizabeth Ruther, OCMP
Matt Spangler, OCMP
Hui Rodomsky, OCMP
Sean Mole, ODOE
Mary Camarata, ODEQ
Mary Bjork, OWRD
Sarah Reif, ODFW
John Pouley, OPRD/SHPO
Bob Lobdell, DSL
Gerry Hutson, DSL
Jill Rolfe, Coos County
Chelsea Schnabel, City of North Bend
Carolyn Johnson, City of Coos Bay
Joshua Shaklee, Douglas County
John Peconom, FERC
Tyler Krug, USACE

Oregon
Kate Brown, Governor

Department of Land Conservation and Development
Oregon Coastal Management Program
635 Capitol Street NE, Suite 150
Salem, Oregon 97301-2540
Phone: 503-373-0050
Fax: 503-378-6033
www.oregon.gov/LCD

July 12, 2019

Ms. Natalie Eades
Jordan Cove Energy Project, LP
Pacific Connector Gas Pipeline, LP
Email: neades@pembina.com

Project:	Jordan Cove Energy Project/Pacific Connector Gas Pipeline US Army Corps Federal Permit No.: NWP-2017-41 FERC Docket Nos: CP17-495-000 and CP17-494-000
Applicants:	Jordan Cove Energy Project, LP and Pacific Connector Gas Pipeline, LP
Location:	Coos Bay, Oregon and Pipeline Route within Coastal Zone
Re:	**Three-month Notification and Information Request**

Dear Ms. Eades:

As indicated in a letter sent May 13, 2019, the Oregon Department of Land Conservation and Development (DLCD) is reviewing the above referenced project for consistency with the Oregon Coastal Management Program (Program). To be consistent with the Program, the proposed project must comply with enforceable policies contained in: 1) the statewide land use planning goals; 2) the applicable acknowledged city or county comprehensive plans and land use regulations; and 3) selected state authorities (e.g. those governing removal-fill, water quality, and fish & wildlife protections).

This letter serves as the three-month notification, pursuant to 15 CFR § 930.62(b), of the status of the review and the basis for further delay. As indicated in the May 13th letter, the federal consistency review period began on April 12, 2019 and DLCD is reviewing the project for consistency with the Program. Because the Program is "networked" and integrates authorities of local governments and other state agencies, DLCD will not concur that a proposed project is consistent with the Program until the applicant has obtained the necessary approvals from local government and state agencies with regulatory authority for the project. The authorizations help demonstrate consistency with the enforceable policies of the Program. This project will require the following authorizations from coastal partner agencies:

Table 1. Permits and authorizations that demonstrate consistency with the OCMP.

Permits and Authorizations	Related Enforceable Policies of the OCMP
STATE	**Oregon Revised Statutes**
ODEQ: Air Contaminant Discharge Permit (JC)	(2013) 468.936; 468.939; 468.941; 468.951; 468A.005; 468A.010; 468A.020; 468A.025; 468A.040; 468A.045; 468A.050; 468A.055; 468A.060; 468A.070; 468A.075
ODEQ: CWA Section 401 Water Quality Cert (JC and PCGP)	(2013) 468.943; 468.946; 468.949; 468.951; 468B.005; 468B.015; 468B.020; 468B.025; 468B.048; 468B.050; 468B.052; 468B.055; 468B.060; 468B.075; 468B.080; 468B.085; 468B.120; 468B.125; 468B.130; 468B.135; 468B.150; 468B.155; 468B.160; 468B.300; 468B.305; 468B.310; 468B.315; 468B.320; 468B.337; 468B.345; 468B.350; 468B.355; 468B.360; 468B.365; 468B.370; 468B.375; 468B.380; 468B.385; 468B.390; 468B.450; 468B.460; 468B.475; 468B.485
ODEQ: 1200-C Construction Stormwater (JC Terminal)	
ODEQ: 1200-C Construction Stormwater (Kentuck Slough)	
ODEQ: 1200-C Construction Stormwater (US HWY 101/TPP)	
ODEQ: NPDES General Permit 1200C (PCGP)	
ODEQ: 1200-C Construction Stormwater (APCO)	
ODEQ: Individual WPCF-Hydrostatic Testing (PCGP) in CZ	
ODEQ: NPDES- Wastewater Treatment Plant	(2013) 454.605; 464.607; 454.610; 454.655; 454.657
ODFW Fish Passage Plans Kentuck/APCO	(2013) 509.580; 509.585; 509.600; 509.610; 509.625
ODFW Fish Passage Plan Access Road Steam Crossing in CZ;	
ODFW Fish Passage Plans Pipeline Stream Xings in CZ	

DSL Removal-Fill Authorization (All)	(2013) 196.682; 196.687; 196.800; 196.805; 196.810; 196.815; 196.818; 196.825; 196.830; 196.845; 196.855; 196.880; 196.905
DSL Proprietary Authorizations: Easements JC	(2013) 274.005; 274.025; 274.040; 274.043; 274.060; 274.400; 274.402; 274.550; 274.705; 274.710; 274.860; 274.905; 274.920; 274.940
DSL Proprietary Authorizations: Sand and Gravel Licenses JC	
DSL Proprietary Authorizations: Waterway Use JC	
DSL Proprietary Authorizations: Mitigation JC	
DSL Proprietary Authorizations: State-owned land Xing's PCGP	
DSL Proprietary Authorizations: Special Use	
OWRD: Limited License: Coos River	(2013) 536.220; 536.700; 536.710; 537.010; 537.110; 537.120; 537.130; 537.135; 537.140; 537.150; 537.160; 537.170; 537.240; 537.400; 537.410; 537.420; 537.440; 537.445; 537.450; 537.505; 537.515; 537.525; 537.535; 537.545; 537.575; 537.585; 537.595; 537.605; 537.610; 537.615; 537.620; 537.625; 537.630; 537.635; 537.680; 537.685; 537.690; 537.695; 537.705; 537.730; 537.780; 537.795
OWRD: Limited License: East Fork Coquille	
OWRD: Limited License: Middle Fork Coquille	
OPRD/SHPO: State Archeological Permits(Various) JC Terminal	(2013) 390.010; 390.235; 390.237
OPRD/SHPO: State Archeological Permits (Various) PCGP in CZ	

ODOE Energy Facility Siting Certificate	(1987) 469.300; 469.310; 469.320; 469.500; 469.510
LOCAL	**Land Use Regulations**
Coos County: Omnibus 1	CCCP Volume 1 Section 5.2, Strategies 2, 14; Section 5.3, Strategies 1, 10, 12, 13; Section 5.4, Strategies 1, 3, 9; Section 5.S, Strategies 1, 2, 4; Section 5.6 Strategies 1, 6; Section 5.7, Strategy 3; Section 5.10, Strategies 1, 2, 3, S, 7, 8, 9, 10, 11; Section S.11, Strategies 1, 4, 6, 7; Section 5.18 Strategies 4, 4a, 5, 6; Section 5.22 Strategy 2; CCCP Volume 2 Section 3.3, Policy 4, 5, 8, 9, 14, 16, 18, 19, 20, 22, 30; Section 5 All mgmt units; ZO Chapter 2, Sections 2.1.100-2.1.200; Section 4.3.200; Section 3.2.100; Section 3.2.175; Section 3.2.180; Section 3.2.201, Section 3.2.202; Section 3.2.240; Section 3.2.241; Section 3.2.24S; Section 3.2.246; Section 3.2.255; Section 3.2.256; Section 3.2.260; Section 3.2.261; Section 3.2.265; Section 3.2.266; Section 3.2.27S; Section 3.2.276; Section 3.2.280; Section 3.2.281; Section 3.2.285; Section 3.2.286; Section 3.2.290; Section 3.2.291; Section 3.2.335; Section 3.2.336; Section 3.2.370; Section 3.2.371; Section 3.2.400; Section 3.2.401; Section 3.2.402; Section 3.2.425; Section 3.2.426; Section 3.2.440; Section 3.2.441; Section 3.2.445; Section 3.2.446; Section 3.2.450; Section 3.2.451; Section 3.2.455; Section 3.2.456; Section 3.2.525; Section 3.2.526; Section 4.11.217; Section 4.11.125.1-.7; Section 4.6.100; Section 4.6.140; Section 4.6.200; Section 4.6.210; Section 4.6.230
Coos County: Combo App: Transpacific Pkwy items	
Coos County: Combo App: PCGP early works items	
Coos County: Combo App: Nav Reliability Improv (NRI)-Channel mods	
Coos County: Omnibus 2	
Coos County: Conditional Use: PCGP Blue Ridge Route	EPs will be identified when appeal concluded and applied to review.
Coos County: Conditional Use: PCGP Alternate Routes	EPs to be identified.
Coos County: Conditional Use: PCGP Original Route	EPs to be identified.

City Coos Bay: Estuarine Activity in 52-NA	CBCP Section 7.10, ER.1; Dev Ord 17.352.010-17.352.080; CBEMP Lower/Upper Bay DA all requirements, aquatic unit/deep-draft nav channel; 52-NA All requirements; 54-DA All requirements; 55-CA All requirements
City Coos Bay: Combo App: Nav Reliability Improv	
City North Bend: Combo App: Floodplain Dev and CB Estuary Permit PCGP	NBCC 18.44; NBCC 18.48; CBEMP 47-DA All requirements; 47-UW all requirements; 48-CA All requirements; 48-CS All requirements; 50-NA All requirements; 51-CA All requirements
City North Bend: Combo App: DMD at APCO site Floodplain Dev and CB Estuary Permit	
Douglas County: Conditional Use Application PCGP in CZ	RLUP-RRD-Criteria for Designating rural resource lands; RLUP-OZ-Table specifies overlay zone designations; Ch1 Section 1.010-1.090; Ch3 Article 3.1; Article 3.2; Article 3.3; Article 3.5; Article 3.6; Article 3.32; Article 3.39

In addition, DLCD has been reviewing the applicant's necessary data and information supplied to DLCD on April 12, 2019 including the federal permit applications and the FERC draft environmental impact statement (DEIS). Currently, and consistent with the comments the state provided to the FERC for the DEIS comment period, per 15 CFR § 930.63(c), in Table 2 DLCD formally requests the information missing from the federal permit applications, the DEIS and associated reports, and the enforceable policies analysis regarding mitigation for fish and wildlife impacts. If the applicant fails to provide the information necessary to determine consistency, DLCD may object because of insufficient information. Table 2 focuses only on information missing to meet fish and wildlife enforceable policies. Additional information requests will be forthcoming as the review continues. The information should be submitted to DCLD to comply with federal consistency regulations and should also be submitted to the expert natural resource coastal partner agency for technical analysis.

Table 2. Missing information necessary to determine consistency is listed, the coastal partner agency and related enforceable policies identified.

Missing Information	Coastal Partner	Applicable OCMP Enforceable Policy (not exhaustive)
Please provide a comprehensive upland mitigation plan for all land ownerships within the pipeline and terminal project areas that address temporal and permanent impacts to fish and wildlife habitats. The ODFW Fish and Wildlife Habitat Mitigation Policy is the	ODFW	ORS 496.004; ORS 496.012; ORS 496.171; ORS 496.182; ORS 506.011; ORS 506.016; ORS 506.028; ORS 506.109; ORS 509.112

state's assessment tool to determine whether the mitigation for associated habitat impacts is sufficient. Please provide: • Updated categorization of federal and non-federal habitats in the coastal zone and survey/data that supports the categorization for the FERC's preferred alternative in the DEIS for the pipeline route and terminal. • Proposed offsets that demonstrate no net loss and net benefit in habitat quantity and quality, with particular attention paid to the estuarine environment, snowy plover, marbled murrelet, northern spotted owl, coastal martens, vernal pools, oak woodlands, native fish bearing streams, and riparian habitats. • Clarify whether ODFW should use 2015 categories for pipeline alignment.		
Please demonstrate avoidance of Category 1 habitat (see ODFW's discussion of Category 1 habitat in the State of Oregon's FERC DEIS Comments submitted July 3, 2019) and provide evidence via spatial analysis and other surveys/data including: • Marbled Murrelet: o Maps of area surveyed o Maps of occupied stands, and presumed occupied stands, crossed by the project o Simple summaries of acres temporarily and permanently impacted, for all land ownerships • Northern spotted owl: o Maps of area surveyed o Maps of occupied nesting areas (70-acre area around nest), and nesting-roosting-foraging habitat	ODFW	ORS 496.004; ORS 496.012; ORS 496.171; ORS 496.182

○ Simple summaries of acres temporarily and permanently impacted, for all land ownerships.		
Please provide mitigation proposals for all T&E plant species, for impacts at the terminal site and the pipeline route within the coastal zone.	ODA	ORS 564.115; ORS 564.120
Please provide in-water blasting plans referenced in the FERC DEIS.	ODFW	ORS 509.001; ORS 509.112; ORS 509.122; ORS 509.130; ORS 509.140; ORS 509.505; ORS 506.011; ORS 506.109
Please provide screening plans for hydrostatic testing identified in the FERC DEIS.	ODFW	ORS 498.301; ORS 498.306; ORS 498.316 ORS 506.011; ORS 506.109
Please provide the following information in order to comply with fish passage requirements for crossings (roads and pipeline) in the coastal zone: • Streambed and stream bank restoration best management practices at high risk pipeline sites • Fish passage engineering design details for the high risk sites (as determined by ODFW) • Short and long term post project monitoring, evaluation and reporting for all project sites associated with pipeline and restoration actions • Temporary water management and fish passage during pipeline installation at sites determined "high risk" by ODFW • Fish passage plans for construction sites where dam and pumping water management strategies will be implemented. • Design details for Kentuck mitigation site including: ○ Ownership, long-term operational and maintenance responsibilities, water management plans, final	ODFW	ORS 509.580; ORS 509.585; ORS 509.610; ORS 509.625

engineering design details of East Bay Drive Bridge and tide gage, temporary water management, work area isolation, fish salvage and removal and fish passage during project implementation		
Please provide fish salvage plans as identified in the FERC DEIS.	ODFW	ORS 496.004; ORS 496.012; ORS 496.171; ORS 496.182 ORS 506.011; ORS 506.016; ORS 506.028; ORS 506.109

Based on the above reasons including outstanding state and local approvals, missing information regarding mitigation for the proposed project, and the absence of an NDA to review sensitive, but necessary, information to determine consistency, DLCD has not been able to complete the federal consistency review. The review will remain ongoing until the above coastal partners have completed their reviews and issued final decisions. DLCD will provide additional requests for missing information necessary to determine consistency while we continue review. Under 15 CFR § 930.60(b), Applicants and DLCD may mutually agree in writing to stay our federally mandated six-month review period which ends October 12, 2019. A stay may be beneficial because of the networked structure of the Program.

If DLCD issues an objection because the proposed project is not consistent with Program enforceable policies the federal permits cannot be issued. If any provisional federal permits/licenses are issued, they will not be valid. If you have any questions or comments regarding the consistency review process or the Program, please contact our Coastal Program Manager, Patty Snow, at (503) 934-0052 or by e-mail at: patty.snow@state.or.us.

Sincerely,

Jim Rue
Director
Department of Land Conservation and Development

Cc: Jason Miner, Governor's Office
Annette Liebe, Governor's Office
Steve Shipsey, DOJ
Jesse Ratcliffe, DOJ

Patty Snow, OCMP
Elizabeth Ruther, OCMP
Hui Rodomsky, OCMP
Sean Mole, ODOE
Mary Camarata, ODEQ
Mary Bjork, OWRD
Sarah Reif, ODFW
John Pouley, OPRD/SHPO
Bob Lobdell, DSL
Gerry Hutson, DSL
Jill Rolfe, Coos County
Chelsea Schnabel, City of North Bend
Carolyn Johnson, City of Coos Bay
Joshua Shaklee, Douglas County
John Peconom, FERC
Tyler Krug, USACE

Oregon
Kate Brown, Governor

Oregon Coastal Management Program
Department of Land Conservation and Development
635 Capitol Street, Suite 150
Salem, Oregon 97301-2540
Phone (503) 373-0050
FAX (503) 378-6033
www.oregon.gov/LCD/OCMP

Coastal Project Notice

Date: July 23, 2019

NOTICE is hereby given that the Department of Land Conservation & Development (DLCD), as provided in Section 307(c) of the Coastal Zone Management Act, is reviewing the following federal activity for consistency with the Oregon Coastal Management Program (Program).

FEDERAL AGENCY/AUTHORITY/PERMIT:

- U.S. Army Corps of Engineers /Authority-Section 404 of the Clean Water Act/ Section 10 & 14, Rivers and Harbors Act; Corps of Engineers Permit #NWP2017-041.
- Federal Energy Regulatory Commission/Authority-Section 3(a) of the Natural Gas Act; FERC Docket #CP17-494-000 and #CP17-495-000

PROJECT LOCATION: The Jordan Cove Liquefied Natural Gas export terminal would be located on the North Spit of Coos Bay, near North Bend, Coos County, Oregon. The Pacific Connector Gas Pipeline would originate outside of the Coastal Zone near Malin, Klamath County and terminate at the facility. Approximately 53 miles of the pipeline are in Oregon's coastal zone. The terminal is located at: 43.432238, -124.267136.

PROPOSED PROJECT: The project would construct a 7.8 million ton per annum (mtpa) natural gas liquefaction and deep-water export terminal capable of receiving and loading ocean-going LNG carriers, in order to export natural gas.

COMMENTS DUE TO DLCD: ***Saturday, September 21, 2019***

COMMENTS: DLCD has started the coastal consistency review of this proposed activity and is soliciting comments on project consistency with the Oregon Coastal Management Program. Written comments may be submitted to Coastal Management Program-DLCD, 635 Capitol St. NE, Suite 150, Salem, OR 97301-2540. Comments may also be e-mailed to coast.permits@state.or.us. ***If you send comments to another email address, comments will not be recorded.*** All comments must be received by midnight on September 21, 2019. Please contact DLCD if you require additional information or have questions.

COASTAL ZONE REVIEW CRITERIA: Comments should address consistency with the applicable policies of the Program. The policies triggered by this project that will used during this review to determine whether the proposed project is consistent with the Program are posted with this Notice and can also be accessed on the Federal Consistency webpage.

<u>INCONSISTENT</u>? If you believe this project is inconsistent with the Program, your comments should explain why you believe the project is inconsistent & should identify the Program policies in question. You should also describe how the project could be modified, if possible, to make it consistent.

Jordan Cove LNG
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

July 31, 2019

VIA Electronic Mail and File Transfer

Mr. Jim Rue, Director
Oregon Department of Land Conservation and Development
635 Capitol Street NE, Suite 150
Salem, OR 97301-2540

Re: Response to Three-month Notification and Information Request dated July 12, 2019

Dear Mr. Rue:

Jordan Cover Energy Project L.P. and Pacific Connector Gas Pipeline, LP (referred together as Jordan Cove) received your letter dated July 12, 2019 providing the Department of Land Conservation and Development's (DLCD) three-month notification regarding the status of its Coastal Zone Management Act (CZMA) consistency review, along with a request for certain information described in Table 2 of the letter, entitled "Missing information necessary to determine consistency." Consistent with the prescribed Oregon and federal information requirements outlined below, this letter provides responses to the information requested in Table 2.

Jordan Cove understands that, as an applicant seeking a state consistency determination, it must submit necessary data and information comprising: "A copy of the application for the federal license or permit[;] . . . [a]ll material relevant to a State's management program provided to the Federal agency in support of the application; and . . . a detailed description of the proposed activity, its associated facilities, the coastal effects, and any other information relied upon by the applicant to make its certification[, including m]aps, diagrams, and technical data . . . when a written description alone will not adequately describe the proposal." 15 C.F.R. § 930.58(a)(1). In addition, Oregon may require that Jordan Cove submit additional "specifically identified information" to support its consistency certification. 15 C.F.R. § 930.58(a)(2).[1]

[1] There are certain limits to what additional information a state may specifically identify and require as additional necessary data and information. For example, a state may require information comprising "completed State or local government permit applications which are required for the proposed activity," but "not . . . the issued State or local permits." *Id.* Neither may a state require "confidential and proprietary material," *id.*, nor information related to permit activities outside of its coastal zone without seeking additional approval from NOAA. 15 C.F.R. §§ 930.53(a)(2), .54. A state may consider NEPA documents when making its consistency determination, but it may not "require that the consistency certification and/or the necessary data and information be included in NEPA documents." 15 C.F.R. § 930.58(a)(2).

DLCD has adopted by reference the federal consistency "requirements and procedures" set forth in 15 CFR Part 930, Subpart D. OAR 660-035-0050(1). Accordingly, DLCD's federal consistency rules require that applicants "submit to the department a consistency certification and the necessary data and information described in 15 CFR §930.58(a)." OAR 660-035-0050(2).

Respectfully, Jordan Cove believes aspects of DLCD's information requests exceed the scope of this state and federal framework or have already been provided to DCLD as noted. Nevertheless, to the extent the requested information is properly within the scope of DLCD's federal consistency review, Jordan Cove provides the following responses to the items listed in DLCD's Table 2. The text from the "missing information" column in Table 2 is included in bold below, with Jordan Cove's response provided immediately after.

1. **Please provide a comprehensive upland mitigation plan for all land ownerships within the pipeline and terminal project areas that address temporal and permanent impact to fish and wildlife habitats. The ODFW Fish and Wildlife Habitat Mitigation Policy is the state's assessment tool to determine whether the mitigation for associated habitat impacts is sufficient.**

Response

Jordan Cove is preparing a comprehensive mitigation plan (CMP) for all land within the pipeline and terminal project areas to address temporal and permanent impacts to fish and wildlife habitats to the extent required by applicable federal and state statutes and regulations. The plan includes numerous voluntary mitigation measures that will be undertaken by Jordan Cove. In some cases, such as the mitigation at Kentuck, Jordan Cove is going beyond what is required by the regulations. The CMP will cover lands both within and outside of the coastal zone. However, the CMP will not differentiate between the coastal and non-coastal lands. The CMP will describe required and voluntary measures that will be undertaken by Jordan Cove to offset temporary and permanent impacts to natural resources that are disclosed in the Biological Assessment (BA) and the Draft Environmental Impact Statement (DEIS). Mitigation described in the CMP will address impacts from the construction of the LNG Terminal, the Pipeline, and post-construction operation of those facilities for the life of the proposed Project. The CMP will summarize impacts and follow the steps of avoidance, minimization and mitigation that were or will be taken to offset impacts. It will outline Best Management Practices (BMPs), along with onsite, and offsite strategies to offset Project impacts. The CMP will address impacts and mitigation to the following resources: threatened and endangered species of plants, fish, and wildlife; migratory birds; marine mammals; fish and wildlife habitat; estuarine, freshwater, and wetland habitats. It will address mitigation for specific construction activities such as pile driving, and operation of heavy equipment. A major focus of the BMPs will be avoiding degradation of water quality. In sum, the CMP is a compilation of the numerous conservation measures contained in dozens of reports and assessments, all designed to meet state and federal statutory and regulatory requirements that were written to protect natural resources. Once completed, the CMP will be provided to both the Oregon Department of Fish and Wildlife (ODFW) and DLCD, along with the

Fish and Wildlife Service and the National Marine Fisheries Service. We expect to provide the final document by the end of August 2019.

In this request, DLCD characterizes the Habitat Mitigation Policy as an "assessment tool". We respectfully disagree with this characterization. First, the statutory provision contained in Oregon Revised Statutes 496.012 is the enforceable policy not the cited OAR, and the statute states that "...wildlife shall be managed to prevent serious depletion of any indigenous species...". Whereas, the purpose of the implementing regulation (OAR 635-415-000) is to establish "consistent goals and standards to mitigate impacts to fish and wildlife *habitat*" (emphasis added). The policy provides recommendations for categorizing habitats based on standardized conceptual objectives and articulates goals for mitigation according to habitat categorization. In addition, we note that "sufficient" is not defined in the Fish and Wildlife Habitat Mitigation Policy. Whether or not mitigation is sufficient is based on whether proposed mitigation would satisfy the conceptual goals as defined in the Habitat Mitigation Policy for "no net loss" and "net benefit" as appropriate by category. We will continue to work with ODFW to ensure the CMP meets applicable state regulatory requirements.

1A. Please provide:

- **Updated categorization of federal and non-federal habitats in the coastal zone and survey/data that supports the categorization for the FERC's preferred alternative in the DEIS for the pipeline route and terminal.**

Response

Jordan Cove is coordinating with ODFW regarding updating categorization of federal and non-federal habitat in the coastal zone. In addition, results of field work in 2019 are needed to inform updated mapping and categorization. Updated habitat mapping and categorization will be provided upon resolution of our habitat categorization discussion with ODFW. We are currently working with them regarding habitat for the northern spotted owl and the marbled murrelet. Updated information will account for certain route changes noted in the DEIS and changes to habitats as a result of timber harvest. However, this will not include FERC's preferred route alternative identified in the DEIS. Providing updated categorization of federal and non-federal habitats in the coastal zone for the FERC preferred alternative in the DEIS would be premature. FERC's preferred alternative was a draft recommendation that has yet to be accepted by the Jordan Cove or finalized by FERC. In addition, Jordan Cove does not yet have access to all of the lands in FERC's preferred alternative route and therefore cannot obtain some of the information requested. We have attached for your information Jordan Cove's comments on the DEIS which document why FERC should not adopt the Blue Ridge variation as the preferred route. Attachment "A", pages 5 -21.

1B. Please provide:

- **Proposed offsets that demonstrate no net loss and net benefit in habitat quantity and quality, with particular attention paid to the estuarine environment, snowy plover, marbled murrelet, northern spotted owl, coastal**

martens, vernal pools, oak woodlands, native fish bearing streams, and riparian habitats.

Response:

Jordan Cove understands this data request to reflect ODFW's comments on the DEIS, focusing on ODFW's request that FERC make completion of a CMP a condition of the FERC permit. As detailed above, Jordan Cove is drafting a CMP that will be provided once complete. It will address concerns noted by DLCD in this data request, concerns raised by ODFW in their comments on the DEIS, and issues listed at the bottom of page 81 of ODFW's DEIS comments.

Jordan Cove is committed to completing the Forest Service (FS) projects listed in Appendix F.2 of the DEIS. In addition, Jordan Cove is voluntarily committing to a list of BLM projects that will be listed in the CMP that will address offsite Project impacts to the extent required by applicable state and federal regulations. The CMP is organized around the mitigation hierarchy as identified in ODFW's DEIS comments on page 81 and will outline a suite of best management practices, and identify on-site mitigation, off-site mitigation, and funding for programs that would benefit listed species. Most notably, Jordan Cove has secured an option to acquire and preserve approximately 1,500 acres of forest land to offset removal of late-successional and old growth habitat (LSOG), and this will be reflected in the CMP.

- **1C. Clarify whether ODFW should use 2015 categories for pipeline alignment.**

Response:

ODFW should not use the 2015 categories for pipeline alignment. Jordan Cove provided GIS files with habitat mapping and classifications for the Pipeline to ODFW in June 2018. These are the most currently available files that depict habitat categories for the pipeline alignment. As previously stated, Jordan Cove is coordinating with ODFW to update categorization of habitats along the pipeline alignment.

2. **Please demonstrate avoidance of Category 1 habitat (see ODFW's discussion of Category 1 habitat in the State of Oregon's FERC DEIS Comments submitted July 3, 2019) and provide evidence via spatial analysis and other surveys/data including:**

- **Marbled Murrelet**
  - **Maps of area surveyed**
  - **Maps of occupied stands, and presumed occupied stands, crossed by the project**
  - **Simple summaries of acres temporarily and permanently impacted, for all land ownerships**
- **Northern spotted owl:**
  - **Maps of area surveyed**
  - **Maps of occupied nesting areas (70-acre area around nest), and nesting-roosting-foraging habitat**

- **Simple summaries of acres and temporarily and permanently impacted, for all land ownerships.**

Response

In response to the request to demonstrate avoidance of Category 1 habitat and provide evidence via spatial analysis and other surveys/data, Jordan Cove is attaching copies of Section 3.3.3 Marbled Murrelet and Section 3.3.4 Northern Spotted Owl from the Applicant Prepared Draft Biological Assessment (APDBA) enclosed herein as Attachment "B". The Marbled Murrelet and Northern Spotted Owl Avoidance and Minimization Plan incorporated into the ESA Avoidance plan, Appendix V of the APDBA, enclosed herein as an Attachment "C". Please note Appendix V contains confidential information and is subject to the terms of the Non-Disclosure Agreement between Jordan Cove and DLCD. Tables and Maps in Appendix Q of the APDBA provide specific details and spatial data related to DLCD's data request. Maps in Appendix Q of the APDBA were transmitted to ODFW via electronic transmission on May 2, 2019 and are enclosed herein as Attachment "D".

Project effects on the marbled murrelet are summarized in 18 tables in Section 3.3.3 of the APDBA. Please review *Table 3.3.3-10 Summary of Marbled Murrelet Suitable, Recruitment, and Capable Habitat Impacted during Pipeline Project Construction and Operation (30-foot Corridor) within Marbled Murrelet Inland Zones 1 and 2, Recovery Plan Conservation Zones, and within/outside Marbled Murrelet* [Suitable Habitat Units] *SHUs by Landowner* and *Table 3.3.3-13 Suitable Nesting Habitat Removed from Occupied and Presumed Occupied Stands Affected by the Proposed Action.*

As noted above, Jordan Cove is coordinating with ODFW regarding the appropriate categorization of occupied and presumed occupied stands of marbled murrelet habitat. We will provide DLCD with updates of these discussions.

Project effects on the northern spotted owl (NSO) are summarized in 21 tables in Section 3.3.4 of the APDBA. In particular, please review *Table 3.3.4-10 Amount (acres) of Nesting, Roosting, and Foraging Habitat (acres) within 0.25 mile of Pipeline Project Activities that Could Directly Impact NSO during the Breeding Season (March 1 through September 30), Table 3.3.4-20 Summary of High* [nesting, roosting, and foraging] *NRF, NRF, Dispersal, and Capable NSO Habitat Impacted within* [Northwest Forest Plan] *NWFP Late-Successional reserves (LSRs) and Unmapped LSRs, Including Area within and outside NSO Groups*, and *Table 3.3.4-21 Estimates for Losses of Northern Spotted Owl Nesting, Roosting, and Foraging Habitat on Non-Federal Land within the Provincial Analysis Area by 2020, with Pipeline Project-Related Effects on Non-Federal Land in Relation to the Expected Cumulative Effects.*

3. **Please provide mitigation proposal for all T&E plant species listed by the Oregon Department of Agriculture, for impacts at the terminal site and the pipeline route within the coastal zone.**

Response

With respect to state listed species, only one State endangered plant is present in a location that could be affected by construction of the Terminal or Pipeline within the coastal zone - Point Reyes bird's-beak. According to a survey conducted in 2017, approximately 30 plants were located near MP 0.9. This portion of the pipeline would be constructed by Horizontal Directional Drilling (HDD); therefore, any plants observed at this location will not be affected.

Other T&E plants and species are either outside the range of the Project, will not be affected by the Project or are outside of the coastal zone. T&E plant mitigation was addressed in Appendix V.2 of the APDBA, enclosed herein as an Attachment "C".

4. **Please provide in-water blasting plans referenced in the FERC DEIS.**

Response

No in-water blasting is proposed within the coastal zone. Therefore, we do not believe the blasting plans are applicable to DLCD's consistency review.

5. **Please provide screening plans for hydrostatic testing identified in the FERC DEIS.**

Response

Screening plans for hydrostatic testing are found within the Hydrostatic Test Plan. The PCGP Hydrostatic Testing Plan is Appendix U in the APDBA. The most recent version of the Hydrostatic Test Plan submitted to FERC is dated October 2018 and is attached herein as Attachment "E".

6. **Please provide the following information in order to comply with fish passage requirements for crossings (roads and pipeline) in the coastal zone:**
    - **Streambed and stream bank restoration best management practices at high risk pipeline sites**
    - **Fish passage engineering design details for the high risk sites (as determined by ODFW)**
    - **Short and long-term post project monitoring, evaluation and reporting for all project sites associated with pipeline and restoration actions**
    - **Temporary water management and fish passage during pipeline installation at sites determined "high risk" by ODFW**
    - **Fish passage plans for construction sites where dam and pumping water management strategies will be implemented.**
    - **Design details for Kentuck mitigation site including:**
        - **Ownership, long-term operational and maintenance responsibilities, water management plans, final engineering design details of East Bay Drive Bridge and tide gage, temporary water management, work area isolation, fish salvage and removal and fish passage during project implementation**

Response:

Most of the material responsive to this request was previously submitted to DLCD and ODFW. To the extent it was not submitted, it is either not required by ODFW and is the subject of on-going discussions with ODFW. The Fish Passage Application for the Kentuck and APCO Bridge sites, Fish Passage Application for Access-Road Stream Crossings within the Coastal Zone, and Fish Passage Application for Pipeline Crossings within the Coastal Zone may be found in Exhibits K.1, K.2, and K.3, respectively of Jordan Cove's CZMA application submitted to DLCD on April 12, 2019.

Best management practices for yellow streams (moderate risk) may be found in Appendix B of the Stream Crossing Risk Analysis Addendum. The Stream Crossing Risk Analysis Addendum is in Appendix 6 of the Application for Pipeline Crossings within the Coastal Zone, Exhibit K.3 of the CZMA application. Site-specific details for orange streams (high risk) may be found in Appendix C of the Stream Crossing Risk Analysis Addendum.

Monitoring is described on page 22 of the Stream Risk Analysis and on pages 13 to 14 of the Stream Crossing Risk Addendum (Appendix 6 of the Fish Passage Application for Pipeline Crossings within the Coastal Zone). The following provides a general outline for post-construction monitoring of stream crossings.

Long term monitoring of the stream crossings along the pipeline route will be completed by PCGP to ensure channel erosion or migration does not destabilize or expose the pipeline. The monitoring will consist of:

- Quarterly site visits for 2 years post construction to monitor, among other things, re-vegetation success and evidence of channel migration, erosion, head-cutting, or incision that could influence stream or pipeline stability.
- Annual reporting is required in Years 1, 2, 3, 5, 7, and 10 following construction to outline observations of stream crossings and any remedial action taken to restore site conditions.
- Aerial photos are taken annually for the life of the pipeline and reviewed for major landscape changes such as channel migration and excessive erosion. Potential problem areas are subsequently visited by PCGP operators.

As stated in Section 2.2.1.2 of the Fish Passage Application for Pipeline Crossings within the Coastal Zone, fish passage would be temporarily blocked for a period of approximately one week during the in-water work window at streams where the dam and pump method is employed.

On July 19, 2019 Jordan Cove held a telephone conversation with ODFW outlining a plan for a future meeting in mid-August to discuss outstanding issues needed to comply with fish passage requirements. Design details for the Kentuck mitigation site will be a topic of discussion with ODFW once this meeting is scheduled.

7. **Please provide fish salvage plans identified in the FERC DEIS.**

Response

The PCGP Fish Salvage Plan was filed as Appendix T in the APDBA and is attached herein as Attachment "F". It was also submitted to DLCD as Appendix 5 to the Fish Passage Application Pipeline Crossings within the Coastal Zone. See, Exhibit K.2 of the CZMA application. The fish salvage plan drafted for the Road CZMA and Pipeline CZMA is being adapted to address site specific issues at the Kentuck Project site. The fish salvage plan is being adapted to address site specific issues for the Fish Passage Application Kentuck and APCO Bridge sites. Fish salvage plans for the Kentuck site are conceptually the same as those submitted for Fish Passage Application-Roads within the Coastal Zone. Fish Salvage Plans for Kentuck-APCO will be submitted with revised Kentuck-APCO Fish Passage Plans following further coordination with ODFW in mid-August 2019.

8. Finally, DLCD in its three-month notice also suggests that it will require an Energy Facility Siting Certificate from the Oregon Department of Energy's Energy Facility Siting Council (EFSC) prior to issuing its consistency determination. See 3-Month Notification Letter at 4.

As Jordan Cove previously represented in its CZMA consistency application, and maintains today, the ODOE-implemented enforceable policies do not apply to the Jordan Cove LNG Terminal because the facility is not a "thermal power plant" subject to EFSC jurisdiction under ORS 469.500(1) (1987) (the approved statutory edition in the OCMP) because it will not have a nominal generating capacity of more than 25,000 kilowatts. See Exhibit Q to CZMA Consistency Certification, Letter from Mike Koski, Jordan Cove Energy Project, to Todd Cornett, ODOE (April 12, 2019). As such, the enforceable policies implemented through ORS 469.300-.320, .500-510 (1987) do not apply. Because these enforceable policies do not apply, the requested authorization does not constitute necessary data and information required for DLCD's review. In addition, Jordan Cove previously provided to DLCD a copy of the Supplemental Resource Report provided to the Federal Energy Regulatory Commission detailing the design measures that have been undertaken by Jordan Cove to limit nominal generation capacity of the plant to no more than 25 MW. See Letter to Elizabeth Ruther, Jordan Cove Energy project L.P. Supplement to CZMA Application from Natalie Eades (May 6, 2019).

Jordan Cove appreciates DLCD's extensive efforts in conducting this CZMA consistency review. We remain committed to working closely with DLCD to coordinate DLCD's review of our request for a consistency determination. We believe the monthly meetings that we have set up to date have provided an opportunity for open discussions and issue resolution. Given DLCD's cancelation of our scheduled August 1st meeting, we have included more detailed information beyond what was requested in DLCD's July 12th letter. For example, we had planned to review in more detail with you the information regarding ODOE and EFSC as well as your comments on the DEIS. We remain available to have this discussion and will wait for you to schedule such a meeting as stated in your email of July 29th cancelling our August 1st meeting.

Should you have any questions, please contact me at neades@pembina.com or 832-255-3841.

Sincerely,

Natalie Eades

Natalie Eades
Manager, Regulatory & Environment
Jordan Cove Energy Project L.P.
Pacific Connector Gas Pipeline, LP

Attachments (6)

Attachment "A" – Jordan Cove's comments on the DEIS
Attachment "B" – APDBA Section 3.3.3 and 3.3.4
Attachment "C" – APDBA Appendix V.1 and V.2 (CONFIDENTIAL SUBJECT TO NDA)
Attachment "D" – APDBA Appendix Q
Attachment "E" - Pacific Connector Gas Pipeline Project Hydrostatic Test Plan
Attachment "F" – Pacific Connector Gas Pipeline Project Fish Salvage Plan

cc: Patty Snow
Jesse D. Ratcliffe
Steve Shipsey
Matt Spangler
Liz Ruther

Oregon
Kate Brown, Governor

Department of Land Conservation and Development
Oregon Coastal Management Program
635 Capitol Street NE, Suite 150
Salem, Oregon 97301-2540
Phone: 503-373-0050
Fax: 503-378-6033
www.oregon.gov/LCD

August 15, 2019

Ms. Natalie Eades
Jordan Cove Energy Project, LP
Pacific Connector Gas Pipeline, LP
Email: neades@pembina.com

Project:	Jordan Cove Energy Project/Pacific Connector Gas Pipeline US Army Corps Federal Permit No.: NWP-2017-41 FERC Docket Nos: CP17-495-000 and CP17-494-000
Applicants:	Jordan Cove Energy Project, LP and Pacific Connector Gas Pipeline, LP
Location:	Coos Bay, Oregon and Pipeline Route within Coastal Zone
Re:	**Second Information Request and Clarification**

Dear Ms. Eades:

As indicated in a letter sent May 13, 2019, the Oregon Department of Land Conservation and Development (DLCD) is reviewing the above referenced project for consistency with the Oregon Coastal Management Program (Program). To be consistent with the Program, the proposed project must comply with enforceable policies contained in: 1) the statewide land use planning goals; 2) the applicable acknowledged city or county comprehensive plans and land use regulations; and 3) selected state authorities (*e.g.* those governing removal-fill, water quality, and fish & wildlife protections).

DLCD continues to review the applicant's necessary data and information supplied to DLCD on April 12, 2019 including the federal permit applications and the FERC draft environmental impact statement (DEIS). By letter dated July 12, 2019, DLCD requested information necessary to determine consistency with the Program. Thank you for supplying some additional information in the July 31, 2019 response letter and attachments. The information was helpful, particularly related to the impacts to some wildlife of the state. We are encouraged to hear the progress on the Compensatory Mitigation Plan as well. DLCD both renews its July 12, 2019 information request and requests additional information related to other enforceable policies of the Program. DLCD also provide some clarification for the Applicants regarding our consistency review process.

Clarification and Questions

The Applicants' July 31, 2019 letter explains that the Applicants believe aspects of DLCD's July 12, 2019 request exceeds the scope of information necessary for review. DLCD clarifies that we requested the information not under 15 CFR § 930.58 or the state's supporting OARs as referenced in the Applicants' letter on pages 1-2. DLCD makes information requests following 15 CFR § 930.63(c), as is stated above and also in the July 12, 2019 letter. The regulation provides in part that "a State agency objection may be based upon a determination that the applicant has failed, following a written State agency request, to supply the information required pursuant to § 930.58 **or other information necessary for the State agency to determine consistency**." [Emphasis added]. DLCD's May 13, 2019 letter indicated that necessary data and information to start review was provided, however the completeness review of the necessary data and information is not a substantive review as explained in 15 CFR § 930.58. In the July 12, 2019 letter and this information request letter, DLCD seeks additional information that is absent from the necessary data and information documents, but needed to demonstrate consistency with the enforceable policies of the Program in order to come to a decision. The applicable enforceable policies for the request are listed in the information request tables in the July 12, 2019 letter and this letter in Table 1 below.

The Applicants' July 31, 2019 letter respectfully disagrees with the Habitat Mitigation Policy as a state assessment tool or framework to satisfy fish and wildlife enforceable policies of the Program. DLCD reminds the applicant that wildlife and the habitat upon which they depend are not mutually exclusive. However, we have advised the Applicants that submitting an alternative framework for impacts is acceptable, however to-date none has been submitted. Regardless of framework used, the project must be consistent with fish and wildlife policies and ODFW is the coastal partner with the expertise to help determine consistency with the ODFW policies of the Program.

DLCD renews the requests for the information related to fish passage because the information provided to ODFW and DLCD was not sufficient. The Applicants response in the July 31, 2019 did not provide engineering drawings for high-risk sites nor is that information in the Appendices listed. Similar issues exist for the other requested items in the information request.

As a networked Program, it is necessary to submit data to the expert coastal partners whom the Applicants report they are working with throughout the July 31, 2019 letter. Currently, DLCD has natural resource data not yet supplied to ODFW for technical review.

The Applicants' Prepared Draft Biological Assessment (APDBA) originally submitted to FERC in 2018 was not complete. FERC submitted the revised Biological Assessment (BA) to the US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NOAA-NMFS) on July 29, 2019. DLCD would like confirmation that the information in the attachment sent with the July 31, 2019 letter is not that of an incomplete APDBA that the applicant submitted last year, but the most recent and complete information that the Services are now reviewing. It is necessary to have the most recent information to base a determination of the consistency of the

activity on the same information as that being considered by the USFWS, NOAA-NMFS, FERC, the Corps, and expert coastal partners.

Second Information Request

This letter constitutes our second information request, and consistent with the comments the state provided to the FERC for the DEIS comment period, per 15 CFR § 930.63(c), in Table 1 below DLCD formally requests the information missing from the federal permit applications, the DEIS and associated reports, and the enforceable policies analysis regarding water quality impacts, wetlands and waterbodies impacts, and energy generation. If the Applicant fails to provide the information necessary to determine consistency, DLCD may object because of insufficient information. Additional information requests may be forthcoming as our review continues. The necessary information should be submitted to DCLD to comply with federal consistency regulations *and should also be submitted to the expert natural resource coastal partner agency for technical analysis.*

Table 1. Missing information necessary to determine consistency is listed, the coastal partner agency and related enforceable policies identified.

Missing Information	Coastal Partner	Applicable OCMP Enforceable Policy (not exhaustive)
• Provide the information supplementing the Corps federal permit application #NWP2017-41 that is the basis for Corps Supplemental Notice dated July 26, 2019.	n/a	Request pursuant to 15 CFR § 930.58(a)(1)(i) and 15 CFR § 930.63(c)
• Analysis demonstrating avoidance/minimization of wetland impacts at individual wetland/waterway scale. • Alternatives to selected dredge material disposal sites and methods. • Alternative analysis for size and shape of slip and access channel.	DSL	ORS 196.800; ORS 196.805; ORS 196.810; ORS 196.815; ORS 196.818; ORS 196.825; ORS 196.830; ORS 196.845; ORS 196.855; ORS 196.880; ORS 196.905
• Identification of sources and release sites of hydrostatic testing water to avoid out-of-basin diversions, impacts, and identify alternatives. • Identification of water sources for project needs like dust control to understand impacts and identify alternatives.	WRD	Policies highlighted in ORS chapters 536 and 537 here.

• Identification of water sources that may result in changes to established diversion locations.		
• Explain the ability of project to meet water quality standards such as turbidity, thermal, biocriteria, and applicable statewide narrative criteria. • Provide details and adequate plans for turbidity, sedimentation, dredge material management, thermal impacts, baseline stream surveys, dewatering of trenches, construction and post construction stormwater. • Provide plans for monitoring stormwater controls and discharges, and road inspection and maintenance. • Provide mitigation plans for thermal impacts, stream restoration, and high landside risk areas related to impacts from pipeline construction	DEQ	Policies highlighted in ORS chapter 468B here.
• Engineering designs that demonstrate the facility will include hardware or software that will limit energy generation below regulatory thresholds.	ODOE	(1987) ORS 469.300; ORS 469.310; ORS 469.320; ORS 469.500 (*currently numbered 469.507*); ORS 469.510 (*currently numbered 469.501 and 469.504*)

DLCD may provide additional requests for missing information necessary to determine consistency while we continue review. Under 15 CFR § 930.60(b), Applicants and DLCD may mutually agree in writing to stay our federally mandated six-month review period which ends October 12, 2019. A stay may be beneficial because of the networked structure of the Program, multiple potential project modifications, and uncompleted mitigation proposals stated in the July 31, 2019 letter. DLCD will be able to accept new information that helps the project demonstrate consistency until September 12, 2019, 30 days before the decision deadline if the Applicants are not willing to sign a stay agreement that would provide more time for both parties to handle the outstanding information related to the project.

We appreciate the response to the July 12, 2019 information request and regret the Applicants disappointment with the August 1 meeting cancellation. DLCD is available to meet on August 19, September 10, and October 1 as scheduled. We emphasize that with the short review time left

and the Applicants reluctance to sign a stay agreement, continuing to provide outstanding information to DLCD and coastal partner agencies is the single most effective action that the Applicants can take in order to complete the review. If you have any questions please contact our Coastal Program Manager, Patty Snow, at (503) 934-0052 or by e-mail at: patty.snow@state.or.us.

Sincerely,

Jim Rue
Director
Department of Land Conservation and Development

Cc: Jason Miner, Governor's Office
Annette Liebe, Governor's Office
Steve Shipsey, DOJ
Jesse Ratcliffe, DOJ
Patty Snow, OCMP
Heather Wade, OCMP
Hui Rodomsky, OCMP
Sean Mole, ODOE
Mary Camarata, ODEQ
Mary Bjork, OWRD
Sarah Reif, ODFW
John Pouley, OPRD/SHPO
Bob Lobdell, DSL
Gerry Hutson, DSL
Jill Rolfe, Coos County
Chelsea Schnabel, City of North Bend
Carolyn Johnson, City of Coos Bay
Joshua Shaklee, Douglas County
John Peconom, FERC
Tyler Krug, USACE

DLCD CZMA First and Second Information Requests and Jordan Cove Responses

August 20, 2019

Table 1. Information Identified as Missing in DLCD's July 12, 2019 First Information Request, with Jordan Cove Response and Status

Missing Information	Coastal Partner	Applicable OCMP Enforceable Policy (not exhaustive)	Jordan Cove Response	Status
DLCD July 12, 2019 Letter - Please provide a comprehensive upland mitigation plan for all land ownerships within the pipeline and terminal project areas that address temporal and permanent impacts to fish and wildlife habitats. The ODFW Fish and Wildlife Habitat Mitigation Policy is the state's assessment tool to determine whether the mitigation for associated habitat impacts is sufficient. Please provide: • Updated categorization of federal and non-federal habitats in the coastal zone and survey/data that supports the categorization for the FERC's preferred alternative in the DEIS for the pipeline route and terminal. • Proposed offsets that demonstrate no net loss and net benefit in habitat quantity and quality, with particular attention paid to the estuarine environment, snowy plover, marbled murrelet, northern spotted owl, coastal martens, vernal pools, oak woodlands, native fish bearing streams, and riparian habitats. • Clarify whether ODFW should use 2015 categories for pipeline alignment.	ODFW	ORS 496.004; ORS 496.012; ORS 496.171; ORS 496.182; ORS 506.011; ORS 506.016; ORS 506.028; ORS 506.109; ORS 509.112	• *Jordan Cove Response July 31, 2019* - Jordan Cove is in the process of preparing a comprehensive mitigation plan (CMP) addressing both required and voluntary mitigation measures to offset temporary and permanent impacts as identified in the DEIS and BA. Mitigation described in the CMP will address impacts from LNG Terminal and Pipeline construction, and postconstruction operation for the life of the Project. The CMP will outline BMPs; on- and offsite offset strategies; impacts and mitigation to threatened and endangered species of plants, fish, and wildlife, migratory birds, marine mammals, fish and wildlife habitat, estuarine, freshwater, and wetland habitats; and mitigation for specific construction activities, including pile driving and operation of heavy equipment. Collaboration with ODFW remains ongoing. • Jordan Cove is coordinating with ODFW on updating categorization of habitat within the coastal zone. Results of 2019 field work are pending, and forthcoming information will address certain route changes noted in the DEIS and changes due to timber harvest. • Jordan Cove does not have access to all of the lands in FERC's preferred alternative route and therefore cannot obtain some of the information requested. Moreover, categorizing habitats along this route would be premature as comment with FERC remains ongoing. See Attachment A to July 31 submittal, Jordan Cove comments to DEIS.	Upon submittal of the CMP at the end of August, DLCD will advise as to whether additional information is required.

Missing Information	Coastal Partner	Applicable OCMP Enforceable Policy (not exhaustive)	Jordan Cove Response	Status
			• As to net habitat loss and benefit for the enumerated species, this information, too, will be provided in the forthcoming CMP. See also Forest Service (FS) projects listed in Appendix F.2 of the DEIS. • ODFW should use the most recent habitat maps and classifications for the Pipeline, supplied to ODFW in June 2018. Jordan Cove continues to work with ODFW to update habitat categorization along the Pipeline alignment.	
DLCD July 12, 2019 letter -Please demonstrate avoidance of Category 1 habitat (see ODFW's discussion of Category 1 habitat in the State of Oregon's FERC DEIS Comments submitted July 3, 2019) and provide evidence via spatial analysis and other surveys/data including: • Marbled Murrelet: ○ Maps of area surveyed ○ Maps of occupied stands, and presumed occupied stands, crossed by the project ○ Simple summaries of acres temporarily and permanently impacted, for all land ownerships • Northern spotted owl: ○ Maps of area surveyed ○ Maps of occupied nesting areas (70-acre area around nest), and nesting-roosting-foraging habitat ○ Simple summaries of acres temporarily and permanently impacted, for all land ownerships.	ODFW	ORS 496.004; ORS 496.012; ORS 496.171; ORS 496.182	*Jordan Cove July 31, 2019 Response* - See Sections 3.3.3 (Marbled Murrelet) and 3.3.4 (Northern Spotted Owl) of the APDBA, and the Marbled Murrelet and Northern Spotted Owl Avoidance and Minimization Plan attached thereto.	DLCD to advise whether information satisfies the request.
DLCD July 12, 2019 letter - Please provide mitigation proposals for all T&E plant species, for impacts at the terminal site and the pipeline route within the coastal zone.	ODA	ORS 564.115; ORS 564.120	*Jordan Cove July 31, 2019 Response* - See APDBA, Appendix V.2, discussing T&E plant mitigation.	Closed
DLCD July 12, 2019 letter - Please provide in-water blasting plans referenced in the FERC DEIS.	ODFW	ORS 509 .001; ORS 509.112; ORS 509.122; ORS 509 .130;	*Jordan Cove July 31, 2019* - No in-water blasting is proposed within coastal zone. See DEIS at 4-289 ("Blasting may occur in uplands	Closed.

Missing Information	Coastal Partner	Applicable OCMP Enforceable Policy (not exhaustive)	Jordan Cove Response	Status
		ORS 509.140; ORS 509.505; ORS 506.011; ORS 506.109	adjacent to streams or in dry streambeds, and Pacific Connector does not anticipate conducting any in-water blasting.")	
DLCD July 12, 2019 - Please provide screening plans for hydrostatic testing identified in the FERC DEIS.	ODFW	ORS 498.301; ORS 498.306; ORS 498.316 ORS 506.011; ORS 506.109	*Jordan Cove July 31, 2019 Response* - See Hydrostatic Test Plan (October 2018), APDBA, Appendix U.	Closed
Please provide the following information in order to comply with fish passage requirements for crossings (roads and pipeline) in the coastal zone: • Streambed and stream bank restoration best management practices at high risk pipeline sites • Fish passage engineering design details for the high risk sites (as determined by ODFW) • Short and long term post project monitoring, evaluation and reporting for all project sites associated with pipeline and restoration actions • Temporary water management and fish passage during pipeline installation at sit es determined "high risk " by ODFW • Fish passage plans for construction sites where dam and pumping water management strategies will be implemented. • Design details for Kentuck mitigation site including: o Ownership, long-term operational and maintenance responsibilities, water management plans, final engineering design details of East Bay Drive Bridge and tide gage, temporary water management, work area isolation, fish salvage and removal and fish passage during project implementation	ODFW	ORS 509.580; ORS 509.585; ORS 509.610; ORS 509.625	See Fish Passage Application for the Kentuck and APCO Bridge sites, Fish Passage Application for Access-Road Stream Crossings within the Coastal Zone, and Fish Passage Application for Pipeline Crossings within the Coastal Zone, provided as Exhibits K.1, K.2, and K.3, respectively, to Jordan Cove's April 12, 2019 CZMA consistency certification; Stream Crossing Risk Analysis Addendum, provided as Appendix 6 within Exhibit K.3 of April 12, 2019 CZMA consistency certification.	Closed except for design details for Kentuck mitigation site. Design details have not yet been finalized

Missing Information	Coastal Partner	Applicable OCMP Enforceable Policy (not exhaustive)	Jordan Cove Response	Status
Please provide fish salvage plans as identified in the FERC DEIS.	ODFW	ORS 496.004; ORS 496.012; ORS 496.171; ORS 4 96.182 ORS 506.011; ORS 506.016; ORS 506.028; ORS 506.109	See PCGP Fish Salvage Plan, provided as Appendix T to the APDBA and as Appendix 5 to the Fish Passage Application for Pipeline Crossings within the Coastal Zone (provided as Exhibit K.2 to the April 12, 2019 CZMA consistency certification). Fish salvage plans for the Kentuck site conceptually mirror those submitted in the PCGP Salvage Plan. Fish Salvage Plans for Kentuck-APCO will be submitted with revised Kentuck-APCO Fish Passage Plans following further coordination with ODFW.	Closed.

Table 2. Information Identified as Missing in DLCD's August 15, 2019, Second Information Request, with Jordan Cove Response

Missing Information	Coastal Partner	Applicable OCMP Enforceable Policy (not exhaustive)	Jordan Cove Response	Status
• Provide the information supplementing the Corps federal permit application #NWP2017-41 that is the basis for Corps Supplemental Notice dated July 26, 2019.	n/a	Request pursuant to 15 CFR §§ 930.58(a)(l)(i) and 930.63(c)	See the information enclosed with this response.	
• Analysis demonstrating avoidance/minimization of wetland impacts at individual wetland/waterway scale. • Alternatives to selected dredge material disposal site s and methods. • Alternative analysis for size and shape of slip and access channel.	DSL	ORS 196.800; ORS 196.805; ORS 196.810; ORS 196 .815; ORS 196.818; ORS 196 .825; ORS 196.830; ORS 196.845; ORS 196.855; ORS 196.880; ORS 196.905	Jordan Cove has completed the majority of the wetland delineation for the Project and is working with DSL to resolve some outstanding issues. Additionally, the avoidance and minimization and alternatives analysis for water body crossings will be addressed in the water body crossing plans, on which the 401 certification will be conditioned. DEQ has agreed to this approach, and Jordan Cove is working with DEQ on a new 401 application that will be submitted in October 2019. Because these issues will be addressed in the context of the 401 certification, they may be better addressed through imposition of an appropriate condition. The remainder of the information sought will be provided by the end of August after responses to similar requests are provided to DSL.	

Missing Information	Coastal Partner	Applicable OCMP Enforceable Policy (not exhaustive)	Jordan Cove Response	Status
• Identification of sources and release sites of hydrostatic testing water to avoid out-of-basin diversions, impacts, and identify alternatives. • Identification of water sources for project needs like dust control to understand impacts and identify alternatives. • Identification of water sources that may result in changes to established diversion locations.	WRD	Certain policies within ORS chapters 536 and 537	The October 2018 Hydrostatic Test Plan submitted with the July 31, 2019 response (and incorporated and provided as Appendix U to the July 2019 BA) remains the most recent source of information. Because limited water use licenses cannot be submitted until the water year in which the water is to be used, specific sourcing information is not yet available. As discussed in Jordan Cove's April 12, 2019 CZMA consistency certification, Jordan Cove proposes that DLCD condition its determination on the issuance of these licenses. See CZMA Consistency Certification at Section 1.2.6, Table 2-2.	
• Explain the ability of project to meet water quality standards such as turbidity, thermal, biocriteria, and applicable statewide narrative criteria. • Provide details and adequate plans for turbidity, sedimentation, dredge material management, thermal impacts, baseline stream surveys, dewatering of trenches, construction and post construction stormwater. • Provide plans for monitoring stormwater controls and discharges, and road inspection and maintenance. • Provide mitigation plans for thermal impacts, stream restoration, and high landside risk areas related to impacts from pipeline construction.	DEQ	Certain policies within ORS chapter 468B	This requested information is also in process of being addressed through ongoing discussions with DEQ regarding 401 certification. Accordingly, to avoid redundancy and inconsistent information, these points, too, may be best addressed through imposition of a condition. For example, Jordan Cove will be developing an outline for a thermal mitigation plan with DEQ. This document will be included in the 401 application, and DEQ will impose a condition in its 401 certification requiring, once the FERC certificate is issued, development and approval of a thermal mitigation plan consistent with the outline. With respect to stormwater, like the limited water use licenses, 1200-C permits cannot be issued until construction-level detail is available. Preliminary stormwater management information has been provided by substantially complete 1200-C applications for (1) the LNG Terminal site, (2) the Kentuck Slough mitigation site, (3) APCO, and (4) the Pipeline within the coastal zone; submitted as Exhibits I.1-5 to the CZMA consistency certification.	
• Engineering designs that demonstrate the facility will include hardware or software that will limit energy generation below regulatory thresholds.	ODOE	(1987) ORS 469.300; ORS 469.310; ORS 469.320; ORS 469.500 (*currently numbered 469.507*); ORS 469.510 (*currently numbered 469.501 and 469.504*)	DLCD's information request refers to an Aug. 1, 2019 letter from ODOE, in which the Department confirmed that the Project is not subject to EFSC jurisdiction if either hardware or software is utilized to limit energy generation below regulatory thresholds. See Aug. 1 2019 ODOE Letter (noting, "[o]nce final design has been determined, there are two scenarios where the [generators]	

Missing Information	Coastal Partner	Applicable OCMP Enforceable Policy (not exhaustive)	Jordan Cove Response	Status
			associated with the Jordan Cove project will not be within EFSC jurisdiction.") Jordan Cove has opted to develop software designs consistent with ODOE's Aug. 1 determination. See Jordan Cove's response dated August 19, 2019.	

Jordan Cove LNG
A Pembina Company

Jordan Cove LNG
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

Pacific Connector
GAS PIPELINE

August 23, 2019

VIA ELECTRONIC MAIL AND FILE TRANSFER

Heather Wade
Coastal State-Federal Relations Coordinator
Oregon Coastal Management Program
Oregon Department of Land Conservation and Development
635 Capitol Street NE, Suite 150
Salem, OR 97301-2540

Re: Jordan Cove Response Summary and Response to Department of Land Conservation and Development's Aug. 15, 2019 Second Information Request

Dear Ms. Wade:

Oregon Department of Land Conservation and Development ("DLCD") is currently in the process of reviewing Jordan Cove Energy Project L.P.'s ("JCEP's") and Pacific Connector Gas Pipeline, LP's (PCGP and together with JCEP "Jordan Cove") Coastal Zone Management Act Certification ("CZMA") Application, submitted to DLCD on April 12, 2019. On July 12, 2019, DLCD issued a Three-Month Notification and Information Request ("First Information Request") to Jordan Cove. Jordan Cove responded on July 31, 2019, providing narrative explanations, citing references to previously submitted relevant information, and supplemental materials to address the requested information.

On August 15, 2019, DLCD sent a Second Information Request and Clarification ("Second Information Request"). As discussed during our August 19, 2019 coordination meeting between DLCD, Jordan Cove, and representatives of five Oregon Coastal Management Program networked agencies, Jordan Cove is providing as part of its response a comprehensive summary of DLCD's First Information Request and Jordan Cove's July 31, 2019 Responses to that request noting where in Jordan Cove's opinion a request has been resolved. Further, a second table provides the status of Jordan Cove's responses to DLCD's Second Information Request. Use of the tables will allow DLCD and Jordan Cove to clearly track the status of any information requests.

DLCD in its August 15, 2019 letter stated it "…has natural resource data not yet supplied to ODFW for technical review" and requested that Jordan Cove submit that data to DLCD's networked partners. As conveyed during our meeting on August 19, 2019, we are not aware of any natural resources data that has been submitted only to DLCD and not ODFW. In the event DLCD specifically identifies such information, Jordan Cove will promptly provide it to ODFW.

DLCD also requested that Jordan Cove clarify that the information submitted with its July 31, 2019 Response to DLCD's first information request is "the most recent and complete information that [USFW, NOAA-NMFS, FERC and the Corps] are now reviewing. As stated during our August 19th meeting, the information from the Applicant Prepared Draft Biological Assessment included with our response had been provided to FERC. In turn, FERC used that information to prepare its biological assessment (BA), which was released at approximately the same time as our response. For your convenience, we provided a link to the BA via a separate email and included ODFW on that email.

Should you have any questions, please contact me at neades@pembina.com or 971-940-7834.

Sincerely,

Natalie Eades

Natalie Eades
Jordan Cove Energy Project L.P.
Pacific Connector Gas Pipeline, LP

Enclosure

cc: Jim Rue
Patty Snow
Jesse D. Ratcliffe
Steve Shipsey

Jordan Cove LNG
A Pembina Company

Jordan Cove LNG
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

August 20, 2019

Todd R. Cornett
Assistant Director, Siting Division
Oregon Department of Energy
550 Capitol Street N.E., 1st Floor
Salem, OR 97301
todd.cornett@oregon.gov

Re: Jordan Cove Energy Project

Dear Mr. Cornett:

Jordan Cove Energy Project (JCEP) is in receipt of your letter dated August 1, 2019. In your letter you state that JCEP has two options for demonstrating that the JCEP facility will not be subject to Energy Facility Siting Council (EFSC) jurisdiction. The first is to demonstrate that the combination of nameplate capacities of the steam turbine generators (STGs) is less than 25 megawatts (MW). The second is to install operational limiters (software or hardware governors) that reduce the combined STG output to less than 25 MW.

This letter is to inform you that JCEP intends to employ the second of your two options. Specifically, the facility will install operational limiters (software or hardware governors) to ensure that the combined STG output is less than 25 MW. We do not object to a periodic electrical output reporting to the Oregon Department of Energy (ODOE) so that staff can verify the effectiveness of these measures. We similarly do not object to entering into a reasonable reimbursement agreement with ODOE to allow for recovery of costs associated with reviewing these reports and any necessary site visits. We anticipate that we will finalize such an agreement as we get closer to project completion. Please let me know if you prefer that we memorialize the reimbursement agreement at an earlier date.

We appreciate your working with us to develop a practical means of demonstrating that the JCEP facility will not fall within EFSC jurisdiction. Please let me know if you have any questions after reviewing this letter.

Sincerely,

Mike Koski P.E.

Vice-President, External Affairs

Jordan Cove LNG SM
A Pembina Company

Jordan Cove LNG LLC
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

June 13, 2019

Tyler Krug, Regulatory Project Manager
North Bend Field Office, Portland District
U.S. Army Corps of Engineers
2201 N. Broadway, Suite C
North Bend, OR 97459

RE: Jordan Cove Section 404/10 Additional Application Information (NWP-2017-41)

Dear Mr. Krug,

Jordan Cove Energy Project L.P (JCEP) and Pacific Connector Gas Pipeline, LP (PCGP), collectively referred to as Jordan Cove, are submitting the enclosed additional information for the above-referenced joint permit application (JPA) submitted to the U.S. Army Corps of Engineers (USACE) in October 2017.

- Attachment 1: Pipeline Culvert Improvement Summary – Jordan Cove is providing updated design information for 13 culvert improvements along the Pacific Connector Gas Pipeline (PCPG or Pipeline). The culvert information was originally detailed in Map Series 3 (Figures, Part 2 of 2017 JPA) and Table A.2-6 Waterbodies Crossed by or within 100 feet of Temporary and Permanent Access Roads and Existing Access Roads Needing Improvement Proposed for Use (Attachment C (RR2), Part 2 of 2017 JPA):
    - Attachment 1a – Culvert Narrative, which further details type, location, and methodology of new culverts,
    - Attachment 1b – New Culvert General Location Map,
    - Attachment 1c – Table 1 New Access Road Culverts Fill Estimate Summary,
    - Attachment 1d– Table 2 Waterbodies Affected by Existing Access Roads – Culvert Improvements,
    - Attachment 1e – Map Series 3, New Culvert Replacement Locations,
    - Attachment 1f – New Culvert Existing Conditions Photos,
    - Attachment 1g – Culvert Crossing BMPs,
    - Attachment 1h – Culvert Typical.

- Attachment 2: FERC PCGP Route Variations – FERC identified three pipeline variations in the Draft Environmental Impact Statement (DEIS) issued on March

29, 2019: Pacific Crest Trail (PCT) Modified Route, East Fork Cow Creek (EFCC) Modified Route, and Blue Ridge Variation. Jordan Cove proposed the PCT and EFCC modified route in the May 4, 2019 response to an earlier FERC data request and therefore proposes to add two modified routes to the Section 10/404 permit record. Jordan Cove maintains that the proposed route along the Blue Ridge segment (as provided in the 2017 JPA) is the optimal route and Jordan Cove will be reiterating this point in comments to FERC during the DEIS public comment period. However, for Section 10/404 permitting, Jordan Cove requests that the USACE include in its analysis the Blue Ridge Variation as identified in the DEIS, and that any supplemental public notice include those land owners along the Blue Ridge Variation as recipients. The following materials compare the proposed versus modified routes and provide additional details on waterbody crossing features, crossing impacts, and construction methodology:

- Attachment 2a – PCGP Supplemental Response to FERC,
- Attachment 2b – Waterbodies Affected by Pacific Crest Trail Alternative Table,
- Attachment 2c – Waterbodies Affected by East Fork Cow Creek Alternative Table,
- Attachment 2d – Waterbodies and Wetlands Affected by Blue Ridge Proposed Route and Blue Ridge Variations Alternative,
- Attachment 2e – FERC Blue Ridge, EFCC, PCT Route Variation Figures from DEIS
- Attachment 2f – Land owner mailing list for Blue Ridge Variation and new culverts. The mailing list provided in the 2017 JPA covers the PCT modified route, EFCC modified route, and Blue Ridge proposed routes.

Please contact Derik Vowels at 971-940-7800 if you have any questions about this submittal.

Sincerely,

/s/ Natalie Eades
Natalie Eades
Manager, Environment & Regulatory
Jordan Cove Energy Project L.P.
Pacific Connector Gas Pipeline, LP

Jordan Cove LNG SM
A Pembina Company

Jordan Cove LNG LLC
5615 Kirby Drive, Suite 500
Houston, TX 77005
T (713) 400-2800

www.jordancovelng.com

September 4, 2019

VIA FAX AND FIRST-CLASS MAIL

Ellen F. Rosenblum
Attorney General
Oregon Department of Justice
1162 Court Street, NE
Salem, OR 97301-4096

Re: Follow-up from Meeting with Oregon State Agencies regarding Conditioning of Coastal Zone Management Act Consistency Concurrence for the Jordan Cove Project

Dear Attorney General Rosenblum:

As you may be aware, on April 12, 2019, Jordan Cove Energy Project LP and Pacific Connector Gas Pipeline, LP (collectively, "Jordan Cove") submitted to the Oregon Department of Land Conservation and Development ("DLCD") a Consistency Certification and a request for concurrence that the Jordan Cove Project is consistent with the enforceable policies of the Oregon Coastal Management Program ("CMP"). On August 19, 2019, representatives Jordan Cove, including Jordan Cove's legal counsel, met with representatives of DLCD, various state networked agencies, and the Oregon Department of Justice ("DOJ") to discuss DLCD's outstanding information requests, and a path forward for the Jordan Cove Project to obtain a Coastal Zone Management Act ("CZMA") consistency determination in a timeframe consistent with the permitting schedule for the Project established by the Federal Energy Regulatory Commission ("FERC").

Our legal counsel has informed us that at the August 19 meeting, Steve Shipsey and Jesse Ratcliffe, representing Oregon DOJ, stated that it was the opinion of Oregon DOJ that DLCD lacked authority to condition its CZMA consistency determination on the subsequent receipt of state and local authorizations implementing enforceable policies of the Oregon CMP, except, for example, in circumstances where the State was granting an authorization for a proprietary interest, such as a Water Resources Development license that had to be issued in the year of water use. Moreover, Oregon DOJ stated its position is that DLCD lacks authority to condition a CZMA consistency determination absent "substantial evidence" of current compliance with the substantive terms and conditions of any required future state and local authorizations.

For the reasons explained below, our counsel has advised us that Oregon DOJ's position, as stated at our meeting, conflicts with applicable federal regulations governing a state's CZMA

Jordan Cove LNG LLC
5615 Kirby Drive, Suite 500
Houston, TX 77005
T (713) 400-2800

www.jordancovelng.com

authority in the context of activities requiring federal licenses and permits, and is inconsistent with applicable Oregon regulations as well.

Under the CZMA, applicants seeking a federal license or permit to conduct an activity that affects resources in the coastal zone must obtain a certificate from the state that the activity complies with the enforceable policies of the state's coastal management program and will be constructed in a manner consistent with the program.[1] When the state makes this consistency determination, it need not be based solely on the circumstances that exist at the moment of concurrence; rather, the United States Department of Commerce's regulations implementing the CZMA expressly contemplate consistency determinations that are conditioned on future actions.[2]

These regulations encourage federal agencies and applicants to "cooperate with State agencies to develop conditions that, if agreed to during the State agency's consistency review period and included in a Federal agency's final decision [or approval]...would allow the State agency to concur with the federal action."[3] Oregon's CZMA implementing regulations incorporate the conditioning authority under the federal regulations above:

> When reviewing any consistency certification submitted by an applicant for a federal license or permit activity affecting any coastal use or resource for consistency with the enforceable policies of the OCMP, the department *shall conform to the requirements and procedures provided in 15 CFR Part 930, Subpart D.*[4]

The 15 C.F.R. Part 930, Subpart D requirements and procedures referenced in Oregon's implementing regulations govern consistency determinations for "Activities Requiring a Federal License or Permit," and expressly provide that "the applicant and the State agency should attempt, if necessary, to agree upon conditions, which, if met by the applicant, would permit State agency concurrence."[5] DLCD has published guidance confirming that concurrences containing conditions are permissible and can be issued by the State. Guidance on the Oregon CMP website notes that an applicant may receive "a concurrence letter with standard conditions attached" or "a concurrence letter with standard conditions and specific conditions that would align the project with the Program's enforceable policies."[6] Therefore,

---

[1] *See* 16 U.S.C. § 1456(c)(3)(a).
[2] *See* 15 C.F.R. § 930.4.
[3] 15 C.F.R. § 930.4(a).
[4] Or. Admin. R. 660-35-0050(1) (emphasis added).
[5] 15 C.F.R. § 930.62(d).
[6] Oregon Department of Land Conservation and Development, *Guidance for Federal Permit Applicants*, Oregon Coastal Management Program, *available at* https://www.oregon.gov/lcd/OCMP/Pages/Federal-Permit.aspx (last accessed August 26, 2019).

Jordan Cove LNG SM
A Pembina Company

Jordan Cove LNG LLC
5615 Kirby Drive, Suite 500
Houston, TX 77005
T (713) 400-2800

www.jordancovelng.com

both the applicable federal regulations and Oregon's program implementing the federal regulations expressly authorize the use of conditional CZMA consistency determinations.

Moreover, as was discussed in the August 19 meeting, CZMA consistency determinations with conditions are common for activities requiring federal licenses and permits affecting the coastal zone, such as pipeline and liquefied natural gas ("LNG") projects authorized by FERC under the Natural Gas Act. As Jordan Cove explained, these long-lead development projects often require numerous state and local authorizations to demonstrate consistency with the enforceable policies of a state's coastal management program, and those authorizations oftentimes cannot be issued for many years into the future as project design is refined, access to various sites is obtained following issuance of a FERC certificate, and those authorizations become due over a multiyear construction schedule. In the case of the Jordan Cove Project, construction of the terminal is scheduled to occur over an estimated five-year period, while construction of the pipeline will take approximately three years. As a result, terminal construction must commence years before construction of the pipeline will begin, and final design of certain segments of the pipeline could be delayed for years as access to various land parcels necessary to the final design is obtained.

Jordan Cove provided DLCD and Oregon DOJ numerous recent examples of FERC-jurisdictional projects obtaining conditioned CZMA consistency determinations, include the following:

- In 2018, the Louisiana Department of Natural Resources issued a CZMA consistency determination for Driftwood LNG LLC conditioned on, among other things, implementation of certain erosion/sediment control measures prior to construction and the revision of the existing, or receipt of a separate, coastal use permit for removal activities when required.[7]

- In 2017, the Virginia Department of Environmental Quality issued a conditional consistency determination for the Atlantic Coast Pipeline ("ACP").[8] The state issued this consistency determination before ACP received its Section 401 Water Quality Certification for the project,[9] and the consistency determination was conditioned on ACP's receiving and then complying with the Section 401 Water

[7] Louisiana Department of Natural Resources, Office of Coastal Management, Coastal Use Permit/Consistency Determination No P20170501, at 3–4 (May 29, 2018).
[8] *See generally* Commonwealth of Virginia Department of Environmental Quality, Environmental Impact Review and Long Range Priorities Program, Coastal Zone Consistency Concurrence (June 8, 2017).
[9] *Compare id. with* Commonwealth of Virginia Department of Environmental Quality, State Water Control Board, Issuance 401 Water Quality Certification No. 17-002 (Dec. 20, 2017).

Jordan Cove LNG SM
A Pembina Company

Jordan Cove LNG LLC
5615 Kirby Drive, Suite 500
Houston, TX 77005
T (713) 400-2800

www.jordancovelng.com

Quality Certification.[10] Furthermore, the Section 401 Water Quality Certification was itself conditioned on the approval and implementation of other requirements, such as certain mitigation and management plans.[11]

- In 2016, the Georgia Department of Natural Resources issued a consistency determination for the Elba Island Southern LNG Company Terminal Wareyard subject to various conditions, including that the applicant "must obtain all licenses and permits prior to commencement of construction."[12]

- In 2014, the Texas Railroad Commission issued a consistency determination for the Freeport LNG Development, L.P. Liquefaction Project that imposed multiple specific conditions.[13]

As these examples demonstrate, it is commonplace for states to issue CZMA consistency determinations with conditions for complex FERC-jurisdictional projects.

Finally, at our meeting, DLCD and Oregon DOJ questioned the legality of FERC's practice of issuing project certificates conditioned on subsequently obtaining CZMA consistency determinations from the relevant states. As we explained at that meeting, in a recent case the United States Court of Appeals for the District of Columbia Circuit upheld FERC's practice of doing so, and explained:

> "[P]etitioners contend that FERC violated the Coastal Zone Management Act, which provides that a federal permit "to conduct an activity . . . affecting . . . the coastal zone" shall not be granted "until the state . . . has concurred with the applicant's certification." 16 U.S.C. § 1456(c)(3)(A). But FERC's certificate order allows Algonquin to begin construction only after obtaining approval from Massachusetts. Accordingly, it does not authorize the "activity" to which petitioners objected before

[10] *See* Commonwealth of Virginia Department of Environmental Quality, Environmental Impact Review and Long Range Priorities Program, Coastal Zone Consistency Concurrence, at 8 (June 8, 2017).
[11] *See* Commonwealth of Virginia Department of Environmental Quality, State Water Control Board, Issuance 401 Water Quality Certification No. 17-002, at 3 (Dec. 20, 2017). *See also* Commonwealth of Virginia Department of Environmental Quality, Water Permitting Division, 401 Water Quality Certification No. 17-002 Final Report (Oct. 19, 2018).
[12] Georgia Department of Natural Resources, Coastal Resources Division, Consistency Certification of SAS-2012-01038, Southern LNG Company , Elba Island SLNG Company Terminal Wareyard, Savannah, Chatham County, at 4 (Feb. 11, 2016).
[13] Railroad Commission of Texas, Oil and Gas Division, Consistency Determination regarding USACE Permit Application SWG-2013-00147, Freeport LNG Development, L.P. Liquefaction Project, Phase II Project, Phase II Modification Project, Pretreatment Facility, and Pipeline/Utility Line System, Quintana Island, Freeport Harbor Channel, Brazoria County, Texas, at 3 (June 5, 2014).

Jordan Cove LNG SM
A Pembina Company

Jordan Cove LNG LLC
5615 Kirby Drive, Suite 500
Houston, TX 77005
T (713) 400-2800

www.jordancovelng.com

FERC until after the state "has concurred." *See Del. Riverkeeper Network v. FERC*, 857 F.3d 388, 399 (D.C. Cir. 2017)."[14]

Jordan Cove's expectation, consistent with federal and state law, has always been that DLCD could issue a CZMA consistency determination for the Project conditioned upon subsequently obtaining state and local authorizations that implement enforceable policies under the Oregon CMP. In fact, in light of the unusually large number of state and local authorizations incorporated into the Oregon CMP, there is virtually no practical alternative to doing so for the Jordan Cove Project because many of these authorizations cannot be obtained for years into the future. As stated at our August 19 meeting, however, Oregon DOJ's legal advice to DLCD is to the contrary and precludes DLCD from issuing consistency determinations with conditions except in very limited circumstances, and then only after Jordan Cove has provided "substantial evidence" of compliance with the substantive terms and conditions of those future authorizations. We believe this position conflicts with applicable federal law and is inconsistent with Oregon regulations. We request that you provide a response in writing within 10 days explaining the basis for Oregon DOJ's legal position.

Please do not hesitate to contact me if you have any questions or if you would like to discuss this further. I look forward to your response.

Sincerely,

Chris S. Scherman
VP, General Counsel & Corporate Secretary

Cc Senator Arnie Roblan
Senator Betsy Johnson
Representative Caddy McKeown
Representative David Brock Smith
Representative Brian Clem
Jason Miner, Natural Resources Policy Manager
Dr. Neil Jacobs, Acting Head, National Oceanic and Atmospheric Administration
Wilbur Ross, United States Secretary of Commerce

[14] *Town of Weymouth, Mass. v. FERC*, No. 17-1135 (D.C. Cir. Dec. 27. 2018).

STAY AGREEMENT

This STAY AGREEMENT is made between Jordan Cove Energy Project, LP and Pacific Connector Gas Pipeline L.P. (collectively, "Jordan Cove") and the Oregon Department of Land Conservation and Development ("DLCD"), an agency of the State of Oregon.

RECITALS

1. DLCD is Oregon's lead coastal zone management agency pursuant to the federal Coastal Zone Management Act ("CZMA").

2. Jordan Cove proposes to construct and operate a liquefied natural gas receiving terminal and associated pipeline and facilities (the "Project"), portions of which are located within Oregon's approved coastal zone under the CZMA.

3. Jordan Cove has submitted applications for several federal permits or other approvals for the Project, including applications to the Federal Energy Regulatory Commission ("FERC") for approval of the Project under sections 3 and 7 of the Natural Gas Act and an application to the U.S. Army Corps of Engineers for approval of the Project under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Appropriations Act of 1899.

5. Jordan Cove submitted to DLCD a certification, dated April 12, 2019, that the Project complies with the enforceable policies of the Oregon Coastal Management Plan ("OCMP") and will be conducted in a manner consistent with the approved OCMP ("Consistency Certification").

6. DLCD, in a letter dated May 13, 2019, stated that the Consistency Certification included all necessary data and information required by 15 CFR § 930.58(a) and that DLCD's six-month period for reviewing the Consistency Certification under the CZMA had commenced on April 12, 2019.

7. The six-month period for DLCD's review of the Consistency Certification, if not stayed, will end on October 12, 2019.

8. DLCD has recommended, in coordination meetings with Jordan Cove and in an August 15, 2019 letter and information request to Jordan Cove, that a stay may be beneficial.

9. Jordan Cove wishes to provide sufficient time for DLCD to review the consistency information provided in making its CZMA consistency determination.

TERMS AND CONDITIONS

THEREFORE, in consideration of the mutual covenants and promises contained herein, Jordan Cove and DLCD agree and represent as follows:

1. Stay. Pursuant to 15 CFR. § 930.60(b), the six-month consistency review period for the Project's Consistency Certification is stayed for one hundred forty (140) days. This stay

begins on October 1, 2019 and ends on February 17, 2020. With this stay, DLCD's decision is due on or before February 28, 2020, the day the amended six-month review period ends.

2. Extension of Stay. The stay set forth in this Stay Agreement may be further extended by the written agreement of the parties.

3. Counterparts. This Stay Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together will constitute one and the same instrument.

IN WITNESS WHEREOF, Jordan Cove and DLCD enter into this Stay Agreement. Each person signing this Stay Agreement represents and warrants that he or she has been duly authorized to enter into this Stay Agreement by the party or parties on whose behalf it is indicated the person is signing.

Oregon Department of Land Conservation and Development

By: _____

Name: Jim Rue

Title: Director

Date: 10.03.19

Jordan Cove Energy Project, LP
Pacific Connector Gas Pipeline L.P.

By: _____

Name: MICHAEL KOSKI

Title: VP EXTERNAL AFFAIRS

Date: 10/7/19

Oregon Department of Land Conservation & Development

MEMORANDUM

Date: November 4, 2019
To: Natalie Eades, Jordan Cove Energy Project
From: Oregon Department of Land Conservation & Development

The Oregon Coastal Management Program (OCMP) within the Department of Land Conservation and Development (DLCD) has drafted a table consisting of applicable state and local authorizations and their associated enforceable policies for the Jordan Cove Energy Project (Project). Each of these have been categorized as "hypothetically willing to condition" or not, and any specific requirements for those conditions. This draft table is subject to change upon continued coordination with state agency partners.

It is important for the applicant to understand that the development and sharing of this draft conditions table is not legally binding and does not imply an agreement between DLCD and the applicant. This table is subject to change and is still under review by the State of Oregon. **This correspondence does not imply a decision of conditional concurrence, concurrence, or objection, as the federal consistency review for the Project is still ongoing**.

DLCD reminds the applicant that DLCD's substantive review of the Project includes an evaluation of statewide planning goals, Oregon revised statutes, and local comprehensive plans and land use regulations. DLCD can only concur with the project if and when the applicant can demonstrate compliance with all applicable enforceable policies of the OCMP. DLCD's federal consistency determination will be made based on the record that exists at the time of our decision. This record includes information provided by the applicant, public comment, state agency partners, local jurisdictions, and other sources.

If you have any additional questions regarding the CZMA Federal Consistency Review for this Project, please forward all correspondence via email to Heather Wade, Coastal Policy Specialist, at heather.wade@state.or.us.

635 CAPITOL STREET NE, SUITE 150 | SALEM, OR 97301-2540
T 503-373-0050 U WWW.OREGON.GOV/LCD

Draft Table Last Updated November 4, 2019

Permits and Authorizations	Related Enforceable Policies of the OCMP	Hypothetically Willing to Condition	Condition Requirements
STATE	**Oregon Revised Statutes**		
ODEQ: Air Contaminant Discharge Permit (JC)	(2013) 468.936; 468.939; 468.941; 468.951; 468A.005; 468A.010; 468A.020; 468A.025; 468A.040; 468A.045; 468A.050; 468A.055; 468A.060; 468A.070; 468A.075	No	n/a
ODEQ: CWA Section 401 Water Quality Cert (JC and PCGP)	(2013) 468.943; 468.946; 468.949; 468.951; 468B.005; 468B.015; 468B.020; 468B.025; 468B.048; 468B.050; 468B.052; 468B.055; 468B.060; 468B.075; 468B.080; 468B.085; 468B.120; 468B.125; 468B.130; 468B.135; 468B.150; 468B.155; 468B.160; 468B.300; 468B.305; 468B.310; 468B.315; 468B.320; 468B.337; 468B.345; 468B.350; 468B.355; 468B.360; 468B.365; 468B.370; 468B.375; 468B.380; 468B.385; 468B.390; 468B.450; 468B.460; 468B.475; 468B.485	No	n/a
ODEQ: 1200-C Construction Stormwater (JC Terminal)		No	n/a
ODEQ: 1200-C Construction Stormwater (Kentuck Slough)		No	n/a
ODEQ: 1200-C Construction Stormwater (US HWY 101/TPP)		No	n/a
ODEQ: NPDES General Permit 1200C (PCGP)		No	n/a
ODEQ: 1200-C Construction Stormwater (APCO)		No	n/a
ODEQ: Individual WPCF-Hydrostatic Testing (PC) -CZ		No	n/a
ODEQ: NPDES- Wastewater Treatment Plant	(2013) 454.605; 464.607; 454.610; 454.655; 454.657	No	n/a
ODFW Fish Passage Plans Kentuck/APCO	(2013) 509.580; 509.585; 509.600; 509.610; 509.625	No	n/a
ODFW Fish Passage Plan Access Road Steam Crossing in CZ;		No	n/a
ODFW Fish Passage Plans Pipeline Stream Xings in CZ		No	n/a
DSL Removal-Fill Authorization (All)	(2013) 196.682; 196.687; 196.800; 196.805; 196.810; 196.815; 196.818; 196.825; 196.830; 196.845; 196.855; 196.880; 196.905	No	n/a
DSL Proprietary Authorizations: Easements JC	(2013) 274.005; 274.025; 274.040; 274.043; 274.060; 274.400; 274.402; 274.550; 274.705; 274.710; 274.860; 274.905; 274.920; 274.940	No	n/a
DSL Proprietary Authorizations: Sand and Gravel Licenses JC		No	n/a
DSL Proprietary Authorizations: Waterway Use JC		No	n/a

DRAFT

DSL Proprietary Authorizations: Mitigation JC		No	n/a
DSL Proprietary Authorizations: State-owned land xings PCGP		No	n/a
DSL Proprietary Authorizations: Special Use		No	n/a
OWRD: Limited License: Coos River	(2013) 536.220; 536.700; 536.710; 537.010; 537.110; 537.120; 537.130; 537.135; 537.140; 537.150; 537.160; 537.170; 537.240; 537.400; 537.410; 537.420; 537.440; 537.445; 537.450; 537.505; 537.515; 537.525; 537.535; 537.545; 537.575; 537.585; 537.595; 537.605; 537.610; 537.615; 537.620; 537.625; 537.630; 537.635; 537.680; 537.685; 537.690; 537.695; 537.705; 537.730; 537.780; 537.795	Yes	OWRD must agree to condition and condition language in writing
OWRD: Limited License: East Fork Coquille		Yes	OWRD must agree to condition and condition language in writing
OWRD: Limited License: Middle Fork Coquille		Yes	OWRD must agree to condition and condition language in writing
OPRD/SHPO: State Archeological Permits(Various) JC Terminal	(2013) 390.010; 390.235; 390.237	Yes	OPRD/SHPO must agree to condition and condition language in writing
OPRD/SHPO: State Archeological Permits (Various) PCGP-CZ		Yes	OPRD/SHPO must agree to condition and condition language in writing
ODOE Energy Facility Siting Certificate	(1987) 469.300; 469.310; 469.320; 469.500; 469.510	No	n/a
LOCAL	**Land Use Regulations**		
Coos County: Omnibus 1	CCCP Volume 1 Section 5.2, Strategies 2, 14; Section 5.3, Strategies 1, 10, 12, 13; Section 5.4, Strategies 1, 3, 9; Section 5.5, Strategies 1, 2, 4; Section 5.6 Strategies 1, 6; Section 5.7, Strategy 3; Section 5.10, Strategies 1, 2, 3, 5, 7, 8, 9, 10, 11; Section 5.11, Strategies 1, 4, 6, 7; Section 5.18 Strategies 4, 4a, 5, 6; Section 5.22 Strategy 2; CCCP Volume 2 Section 3.3, Policy 4, 5, 8, 9, 14, 16, 18, 19, 20, 22, 30; Section 5 All mgmt units; ZO Chapter 2, Sections 2.1.100-2.1.200; Section 4.3.200; Section 3.2.100; Section 3.2.175; Section 3.2.180;	No	n/a
Coos County: Combo App: Transpacific Pkwy items		No	n/a
Coos County: Combo App: PCGP early works items		No	n/a

DRAFT

Coos County: Combo App: Nav Reliability Improv (NRI)- Channel mods	Section 3.2.201, Section 3.2.202; Section 3.2.240; Section 3.2.241; Section 3.2.245; Section 3.2.246; Section 3.2.255; Section 3.2.256; Section 3.2.260; Section 3.2.261; Section 3.2.265; Section 3.2.266; Section 3.2.275; Section 3.2.276; Section 3.2.280; Section 3.2.281; Section 3.2.285; Section 3.2.286; Section 3.2.290; Section 3.2.291; Section 3.2.335; Section 3.2.336; Section 3.2.370; Section 3.2.371; Section 3.2.400; Section 3.2.401; Section 3.2.402; Section 3.2.425; Section 3.2.426; Section 3.2.440; Section 3.2.441; Section 3.2.445; Section 3.2.446; Section 3.2.450; Section 3.2.451; Section 3.2.455; Section 3.2.456; Section 3.2.525; Section 3.2.526; Section 4.11.125.1-.7; Section 4.11.235; Section 4.6.100; Section 4.6.140; Section 4.6.200; Section 4.6.210; Section 4.6.230	No	n/a
Coos County: Omnibus 2		No	n/a
Coos County: Conditional Use: PCGP Blue Ridge Route	EPs will be identified when appeal concluded and applied to review.	No	n/a
Coos County: Conditional Use: PCGP Alternate Routes	Coos County Zoning and Land Development Ordinance(CCZLDO) Section 4.6.110(1)(h); Section 4.6.130; Section 4.6.140; Section 4.6.220(1)(f)(iii); Section 4.6.230.3; Section 4.6.240; Section 3.2.180; Section 3.2.545; Section 3.2.546(15)(a) ; Section 3.2.550; Section 3.2.551(9)(a) ; Section 4.11.235 ; Section 4.11.252; Coos County Comp Plan Appendix 3 Coos Bay Estuary Management Plan (CBEMP) Policies 14, 18, 22.	No	n/a

DRAFT

Coos County: Conditional Use: PCGP Original Route	CCZLDO Section 2.1.200; Section 7.4.200; Section 4.11.125(3)(b)(ii); Section 4.2.100; Section 4.2.200; Section 4.2.300; Section 4.2.400; Section 4.2.500; Section 4.2.600; Section 4.11.213 (Floodplain Statement of Purpose) ; Section 4.11.300 (Airport Surface Floating Zone Purpose); Section 3.3 Shoreland Segment and Aquatic Unit descriptions; Section 4.3.210; Section 4.3.225; Section 4.3.230.2; Section 4.3.230.5; Section 4.3.230.6; Section 3.2.100; Section 3.2.175; Section 3.2.180; Section 3.2.275; Section 3.2.276; Section 3.2.285; Section 3.2.286; Section 3.2.370; Section 3.2.371; Section 3.2.375; Section 3.2.376; Section 3.2.405; Section 3.2.406; Section 3.2.400; Section 3.2.401; Section 3.2.425; Section 3.2.426; Section 3.2.480; Section 3.2.481; Section 3.2.535; Section 3.2.536; Section 3.2.540; Section 3.2.541; Section 3.2.550; Section 3.2.551; Section 3.2.545; Section 3.2.546; Section 3.2.595; Section 3.2.596; Section 3.2.600; Section 3.2.601; Section 3.2.690; Section 3.2.691; Section 4.11.232; Section 4.11.235; Section 4.11.252; Section 4.6.110; Section 4.6.130; Section 4.6.140; Section 4.3.210.23; Section 4.6.220(1)(d)(ii); Section 4.6.220(1)(f)(iii); Section 4.6.220(1)(p); Section 4.6.220(1)(q); Section 4.6.230.3; Section 4.6.240; CBEMP Policies 14, 16, 18, 20, 30	No	n/a
City Coos Bay: Estuarine Activity in 52-NA	CBCP Section 7.10, ER.1; Dev Ord 17.352.010-17.352.080; CBEMP Lower/Upper Bay DA all requirements, aquatic unit/deep-draft nav channel; 52-NA All requirements; 54-DA All requirements; 55-CA All requirements	No	n/a
City Coos Bay: Combo App: Nav Reliability Improv		No	n/a
City North Bend: Combo App: Floodplain Dev and CB Estuary Permit PCGP	NBCC 18.44; NBCC 18.48; CBEMP 47-DA All requirements; 47-UW all requirements; 48-CA All requirements; 48-CS All requirements; 50-NA All requirements; 51-CA All requirements	No	n/a
City North Bend: Combo App: DMD at APCO site Floodplain Dev and CB Estuary Permit		No	n/a
Douglas County: Conditional Use Application PCGP in CZ	RLUP-RRD-Criteria for Designating rural resource lands; RLUP-OZ-Table specifies overlay zone designations; Ch1 Section 1.010-1.090; Ch3 Article 3.1; Article 3.2; Article 3.3; Article 3.5; Article 3.6; Article 3.32; Article 3.39	No	n/a

DRAFT

Jordan Cove LNG
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

December 20, 2019

Director Jim Rue
Oregon Department of Land Conservation and Development
635 Capitol Street NE, Suite 150
Salem, Oregon 97301
Via email

Dear Director Rue,

Thank you for participating in our meeting last week and your participation in the meeting between staff from the Oregon Department of Land Conservation and Development ("DLCD" or the "Department"), Oregon Department of Justice ("DOJ"), National Oceanic and Atmospheric Administration ("NOAA") and Jordan Cove on November 15, 2019.

We ultimately found the meetings to be productive. However, we remain concerned that certain DLCD representatives may have predetermined the outcome of our Consistency Determination as evidenced by their obstructive and often misleading representations. Additionally, we have been navigating what be believe are unnecessary and unexplained delays in the process, coupled with an ongoing lack of clarity as to the applicable DLCD standards and approval processes, including DLCD's transference of its mandate for review by deferring almost completely to other networked agency processes.

As you are aware, Jordan Cove provided DLCD a draft copy of our Coastal Zone Management Act ("CZMA") consistency determination application on April 29, 2018, and then worked with DLCD for almost an entire year to ensure the application addressed all required information. Jordan Cove submitted a final copy of its application to DLCD on April 12, 2019. This submission was made in collaboration and agreement with DLCD, and was deemed complete, with all necessary data and information, by your Department on May 13, 2019. Since that time, we have been meeting monthly, or more often as needed, to work collaboratively with you and your staff. Our November 15, 2019 meeting was specifically set out to discuss the yet unresolved matter of the appropriate use of "conditions" in Jordan Cove's CZMA consistency determination. Including NOAA in this meeting was necessary as a result of the following previous communications with DLCD which were, in part, focused on understanding, discussing and resolving this issue:

- Meetings with DLCD on May 2, June 13, July 16, August 19, September 5, October 1 and October 7, 2019.

Jordan Cove LNG
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

- Phone calls or emails with DLCD on May 6, July 25, August 16, September 17 and October 17, 2019.
- Letter from Jordan Cove to Oregon Attorney General on September 4, 2019, and subsequent response from Oregon Attorney General on September 6, 2019.

Through the above communications, DLCD staff have expressed to Jordan Cove staff on numerous occasions their position that our CZMA consistency determination could not be conditioned for a variety of reasons, most of which centered around the Department's assertion that federal regulations prohibited the conditioning of the consistency determination. When asked for the basis of this belief, DLCD and DOJ staff initially indicated that in a staff training session conducted by NOAA, it had been communicated to the Departments that NOAA advised against conditioning. In the face of this information, which contradicted our understanding of the applicable statutes and regulations, we spoke with representatives from NOAA who confirmed there was no regulatory or legal impediment to conditioning, but rather that conditioning was at the discretion of the State.

In our meeting on November 15, 2019, NOAA again conveyed its position, stating there was no legal or regulatory impediment to conditioning. For clarity, NOAA did convey that States could not condition based on local land use permits, a point with which we concur. The remainder of the conditioning decisions, NOAA communicated, were a matter of State discretion. DLCD then acknowledged that the previous communication was in error, acknowledging the Department's "unfortunate" choice of words in previous meetings with Jordan Cove, and finally confirmed that conditioning Jordan Cove's CZMA consistency determination was not a matter of whether they could condition, but whether they chose to. While we appreciate the final clarification, after over six months and seven meetings spent trying to understand the State's position on this issue, we find it deeply troubling that the Department essentially conceded misrepresenting the federal policy position and then attempted to recharacterize this misrepresentation as an errant word choice.

Following this confirmation, we proceeded to discuss DLCD's November 4, 2019 Memo Regarding JCEP Federal Consistency Review, which detailed the Department's view on which permits could be included as conditions in the CZMA consistency determination. Through this conversation, DLCD staff indicated they were currently discussing conditioning with various partner agencies, and that for some permits, DLCD believed they were beholden to other agencies to agree to including those permits as conditions. Additionally, DLCD indicated that some of the permits that your November 4, 2019 Memo had indicated could not be conditioned, were actually "maybes" based on these

Jordan Cove LNG
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

ongoing discussions. Conditioning a CZMA consistency determination removes no authority from these partner agencies or DLCD. As such, it is unclear to us why this is a concern for DLCD. However, in a further effort to work collaboratively with DLCD, we have agreed to a meeting with DLCD and the Oregon Department of Environmental Quality DEQ) during the first week in January to resolve any conditioning issues with respect to DEQ permits. A list of the DEQ permits and attendees from Jordan Cove was emailed to you on December 13, 2019. We look forward to a resolution of this matter at the upcoming meeting.

We also discussed at our November 15, 2019 meeting the list of Enforceable Policies and Permits, which required Jordan Cove working for over a year with DLCD to resolve prior to submission of our final application on April 12, 2019. In fact, obtaining the list from DLCD was the result of over 30 individual meetings, phone calls and emails. In the course of our discussion on November 15, DLCD staff made representations that the list of non-permit Enforceable Policies, or State-wide Planning Goals, was still subject to change, notwithstanding the current decision date for our application of February 28, 2020. As certainty of regulatory requirements and process is crucial for any project applicant, we greatly appreciated confirmation from DLCD that the previously provided list of Enforceable Policies was now deemed to be the final list, but are still left with no explanation of why it took a year and more than 30 meetings to produce. As noted during our December 12, 2019 meeting, we are unclear as to DLCD's purpose in stating in its November 4, 2019 Memo that the EPs applicable to the Coos County Blue Ridge conditional land use approval "will be identified when appeal concluded and applied to review." DLCD committed during our December 12, 2019 meeting to provide an explanation for this language as it contradicts earlier statements made by DLCD.

As we have explained on numerous occasions, the nature of our project prohibits us from obtaining certain permits relevant to the CZMA consistency determination until we are much closer to construction, or in some instances, until well after the start of construction. Further, our ability to obtain certain other permits is contingent on significant capital expenditure. Additional expenditure at this juncture is simply not a responsible financial decision – this is common practice for developments such as Jordan Cove at this stage in the regulatory process. We expect that the Department would appreciate the enormous environmental and economic benefit that Jordan Cove will bring to Oregon.

Our experience working with DLCD is that your response to this communication will attempt to distract from discussing substantive issues. To that end, we expect your response to raise the following concerns that do not contribute to constructively resolving the only outstanding issue between us, which is conditioning of the CZMA

Jordan Cove LNG
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

consistency determination. We offer the following to preemptively address such concerns.

Concern: our application as submitted was incomplete and/or missing information required by DLCD to make a fulsome assessment of our consistency with the CZMA.
Response: our application was deemed complete by DLCD on May 13, 2019. If our application was indeed not complete, the Department should not have deemed it such.

Concern: our application should not have been submitted prior to receipt of all other state permits. Jordan Cove should have waited to receive all other permits until submitting our CZMA consistency determination application. Had this been done, the issue of conditioning, which is the only remaining substantive issue to be resolved, would not exist.
Response: Not only is DLCD's position inconsistent with federal law, *see* 15 C.F.R. § 930.58(a)(2), but our application was submitted in collaboration with DLCD, subsequently deemed complete, and the Department was well aware of the status of our other permits. Further, and most importantly, as we have shared with DLCD previously, it is common practice in other states for applicants to submit CZMA consistency determination applications in parallel with other required state permit applications. To suggest that an applicant must expend significant capital resources in order to obtain all other required permits in advance of applying for a CZMA consistency determination, and then effectively leave the fate of a ten billion dollar investment in the hands of one state Department, defies not only common practice in virtually every other state, but any reasonable, sound business practice on development projects of this magnitude that are subject to oversight from Boards of Directors and accountable to company shareholders. And as noted above, this position conflicts with federal law.

Concern: Jordan Cove did not respond to DLCD information requests in a timely and/or complete manner.
Response: after submitting our application on April 12, 2019, Jordan Cove received our first request for information from DLCD three months later on July 12, 2019. We responded to this request fully on July 31, 2019. Jordan Cove received our second request for information from DLCD on August 15, 2019. We responded to this request fully on August 23, 2019 and included a table to further confirm our responsiveness to the Department's two information requests. Our responses to DLCD were timely and complete, notwithstanding the fact that some of the information requested by DLCD stood well outside of the Department's mandate and regulatory authority. Since providing these responses, DLCD has provided no indication of further need for additional information to conduct their review.

Jordan Cove LNG
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

After our joint meeting with NOAA, and the Governor's recent public statements about ensuring a fair process based on science and not activism, we hope you can assure us moving forward that certainty of process and communication from DLCD will improve. We thank DLCD and the networked agencies of the Oregon Coastal Management Program for their efforts on our CZMA consistency determination and remain committed to working collaboratively and productively on this endeavor. As Department Director, we hope we can work productively to resolve the outstanding issues before us through your leadership.

We do look forward to our future meetings with DLCD and partner agencies such as the Oregon Department of Environmental Quality and the Oregon Department of State Lands to reach resolution on the conditioning of our CZMA consistency determination.

Sincerely,

Mike Koski
Vice President, External Affairs

Cc: Jason Miner, Natural Resources Policy Manager, Office of Governor Kate Brown
Nik Blosser, Chief of Staff, Office of Governor Kate Brown
Senator Arnie Roblan
Senator Betsy Johnson
Representative Caddy McKeown
Director Curt Melcher, Oregon Department of Fish and Wildlife
Director Richard Whitman, Oregon Department of Environmental Quality
Director Vicki Walker, Oregon Department of State Lands
Adam Dilts, Chief, Oceans and Coasts Section, Office of the General Counsel, National Oceanic and Atmospheric Administration
David Kaiser, Senior Policy Analyst, Office for Coastal Management, National Oceanic and Atmospheric Administration
Kerry Kehoe, Federal Consistency Specialist, National Oceanic and Atmospheric Administration

Oregon
Kate Brown, Governor

Department of Land Conservation and Development
Oregon Coastal Management Program
635 Capitol Street NE, Suite 150
Salem, Oregon 97301-2540
Phone: 503-373-0050
Fax: 503-378-6033
www.oregon.gov/LCD

January 10, 2020

Mr. Mike Koski
Jordan Cove Energy Project, LP
Pacific Connector Gas Pipeline, LP
Email: MKoski@pembina.com

Project:	Jordan Cove Energy Project/Pacific Connector Gas Pipeline US Army Corps Federal Permit No.: NWP-2017-41 FERC Docket Nos: CP17-495-000 and CP17-494-000
Applicants:	Jordan Cove Energy Project, LP and Pacific Connector Gas Pipeline, LP
Location:	Coos Bay, Oregon and Pipeline Route within Coastal Zone
Re:	**Response to Letter Dated December 20, 2019**

Dear Mr. Koski:

Thank you for your letter to the Department of Land Conservation and Development (DLCD), dated December 20, 2019, regarding your concerns about the federal consistency review of the Jordan Cove Energy Project (JCEP). The goal of DLCD's response to your letter is to communicate DLCD's position on conditioning state permits and to provide clarification to several inaccuracies and misconstrued points from you letter. DLCD hopes that this response will provide you with the clarity you are seeking so that DLCD may continue and complete the unbiased review of the proposed project.

DLCD plans to honor the agreement to condition state permits under the authority of the Oregon Water Resources Department and State Historic Preservation Office, due to the recognition that these permits cannot be issued until closer to construction. These permits include three limited licenses and four state archeological permits. However, DLCD is under no obligation to condition any other state permits as part of the JCEP federal consistency review and doing so would be in direct conflict with state administrative rules. DLCD maintains that issued state permits or authorizations are the only acceptable evidence demonstrating consistency with the enforceable policies that the permit or authorization covers (OAR 660-035-0050). **DLCD's final position is that no other state permits shall be conditioned as part of the JCEP federal consistency review.**

To be clear, the following state permits and authorizations must be issued to JCEP and Pacific Connector Gas Pipeline (PCGP) in order to proceed to a decision of concurrence from DLCD:

- ODEQ: Air Contaminant Discharge Permit (JC)
- ODEQ: CWA Section 401 Water Quality Cert (JC and PCGP)
- ODEQ: 1200-C Construction Stormwater (JC Terminal)
- ODEQ: 1200-C Construction Stormwater (Kentuck Slough)
- ODEQ: 1200-C Construction Stormwater (US HWY 101/TPP)

- ODEQ: NPDES General Permit 1200C (PCGP)
- ODEQ: 1200-C Construction Stormwater (APCO)
- ODEQ: Individual WPCF- Hydrostatic Testing (PCGP) in CZ
- ODEQ: NPDES- Wastewater Treatment Plant
- ODFW Fish Passage Plans Kentuck/APCO
- ODFW Fish Passage Plan Access Road Steam Crossing in CZ
- ODFW Fish Passage Plans Pipeline Stream Xings in CZ
- DSL Removal-Fill Authorization (All)
- DSL Proprietary Authorizations: Easements (JC)
- DSL Proprietary Authorizations: Sand and Gravel Licenses (JC)
- DSL Proprietary Authorizations: Waterway Use (JC)
- DSL Proprietary Authorizations: Mitigation (JC)
- DSL Proprietary Authorizations: State-owned land Xing's (PCGP)
- DSL Proprietary Authorizations: Special Use
- ODOE Energy Facility Siting Certificate or Executed Memorandum of Agreement

DLCD believes that it is in the State of Oregon's best interest to not condition the above listed permits. In addition to the fact that doing so is in direct conflict with administrative rules, it is also unclear how such conditions could be enforced and subsequently litigated in the event of a lack of enforcement by the Federal Energy Regulatory Commission (FERC). It is DLCD's understanding that DLCD may have very little recourse in the event that an applicant does not receive all conditioned state permits. DLCD exercises its authority under the CZMA to not condition any additional state permits or authorizations. DLCD and the State have deemed the above list of state permits and authorizations as critical, and believe conditioning these permits would not be a responsible environmental and public welfare decision.

Further, DLCD would like to clarify some of the inaccuracies or misrepresentations provided in your letter, as follows:

- DLCD disagrees with JCEP that the agency has not provided clarity about the standards and process of federal consistency review. DLCD has communicated clearly on the process, provided recommendations on how that process should go, what actions the applicant should or should not take, and why it was in the applicant's best interest to sign a stay agreement.
- There is a misunderstanding on what is required for an application to be deemed complete and the ability of the agency to request additional information as necessary to complete its review. While "necessary data and information" are required to deem an application complete and initiate review, it is important to distinguish that this information is the *minimum* amount of information required to do so. However, federal regulations also provide for a coastal program to request additional information as necessary. These are not one and the same. Because DLCD's review is closely tied to other state agency authorizations and subject matter expertise, DLCD coordinates with those state agencies on information needs they have in order for them to provide recommendations to DLCD on the project's compliance with the enforceable policies of the Program. DLCD has been diligently coordinating with state agency partners on

information requests because there have been clear information deficits that prevented the agencies from being able to conduct their reviews and offer recommendations to DLCD.

- DLCD disagrees that staff acknowledged that the department "essentially conceded misrepresenting the federal policy position and then attempted to recharacterize this misrepresentation as an errant word choice". DLCD never communicated that NOAA had an explicit policy position regarding concurrence with conditions. DLCD has never and will never speak on behalf of a federal agency, especially as it relates to a policy stance of said agency. DLCD has also never misrepresented federal regulation and refutes JCEP's claim that the agency did so. DLCD performs a multitude of federal consistency reviews annually and conveys the same regulatory information to all applicants, and provides further context on regulations as requested by the applicant.
- As it relates to JCEP's comment that "DLCD believed they were beholden to other agencies to agree to including those permits as conditions", DLCD agrees with this comment. DLCD is not the entire Oregon Coastal Management Program (OCMP). While DLCD is the lead state agency for the OCMP, the OCMP includes ten additional state agencies
    - Oregon Department of State Lands
    - Oregon Parks and Recreation Department
    - Oregon Department of Fish and Wildlife
    - Oregon Water Resources Department
    - Oregon Department of Energy
    - Oregon Department of Agriculture
    - Oregon Department of Forestry
    - Oregon Department of Environmental Quality
    - Oregon Department of Geology and Mineral Industries
    - Oregon Watershed Enhancement Board

    DLCD is the lead agency responsible for conducting independent and individual federal consistency reviews, and takes project assessments done by our state agency partners extremely seriously. DLCD leaves each state agency to exercise their own respective authorities with their own staff because they hold the subject matter expertise to determine compliance with their respective programs and policies. The networked nature of our program enables us to rely on our state agency partners' expertise and authorities.

- JCEP's comment that "*conditioning a CZMA consistency determination removes no authority from these partner agencies or DLCD*" is inaccurate. DLCD is under no obligation to issue a consistency determination with conditions. DLCD in coordination with agency partners and the Oregon State Governors Office has the right to determine whether or not conditioning its decision on the issuance of a state permit is in the best interest of the State of Oregon. DLCD would not be doing its job if it did not proceed with this request cautiously and understand all pros and cons to conditioning and to weigh those carefully.

- DLCD must clarify that non-permit enforceable policies include policies that come from statewide planning goals, statute, and local plans and regulations. DLCD has always communicated that the list of enforceable policies was subject to change in the event that new information was provided to the agency or if the applicant made substantial changes to the project and that these changes implicated existing enforceable policies that were not previously identified. DLCD has never implied that the agency was changing the standards or criteria that DLCD would use for federal consistency review. If no new information becomes available and the applicant does not make substantial changes to the project, this should not be an issue. It is unreasonable for the JCEP to expect DLCD to take any other stance. Federal regulation provides that any application for a federal license or permit must be fully consistent with all of the enforceable policies of the state coastal management program. Therefore, although the list of applicable enforceable policies is determined in consultation with applicants, all projects must be consistent with all state enforceable policies.
- JCEP states that "we expect that the Department would appreciate the enormous environmental and economic benefit that Jordan Cove will bring to Oregon". DLCD would expect that JCEP would appreciate that DLCD must weigh all impacts from the project, not just perceived benefits. DLCD is required under the CZMA to review the project as it relates to not only the enforceable policies of the OCMP, but also the associated coastal effects. Coastal effects include direct, secondary, and cumulative impacts of the project.
- In regards to DLCD's communications with the JCEP, DLCD communications have been clear and vetted by the Department of Justice (DOJ). Additionally, DLCD has met its communication requirements as outlined in the federal regulations and have communicated above and beyond what is legally required.
- Federal law does not prevent DLCD from recommending that applicants wait to submit for federal consistency until they have the necessary permits and authorizations in hand. DLCD recommends this approach to all applicants, JCEP did not receive an exception. While DLCD makes this recommendation in order to create a more efficient review process for both the agency and the applicant, we cannot enforce it under federal law, which is why the JCEP review was, in fact, initiated. DLCD has no obligation to make exceptions to an applicant because our process does not align with the timeline needs or business purposes of the applicant or their board of directors. It is unreasonable for an applicant to expect such from a state agency.
- DLCD staff have been transparent with the applicant about the federal consistency review process. It is unclear why the applicant is implying that the process of federal consistency review is "uncertain". Further, all work by DLCD is based on science and regulations, and not, as you suggest, activism. DLCD's federal consistency review is based on the best available information, subject matter expertise, and peer-reviewed science. It includes a policy analysis and coastal effects analysis. If the process does not seem clear or certain to the JCEP, it is likely due to the fact that the applicant is requesting DLCD to change how it implements its federal consistency review.

- It is unclear why the JCEP is implying that communication from DLCD needs to improve. DLCD continues to coordinate with its networked agency partners and has continued to go above and beyond to meet with the applicant, provide additional documentation to the applicant upon request, and move forward within the review. DLCD suggests that JCEP continue to put any requests of DLCD in writing and to specify what exactly is being requested in an effort to eliminate any possible confusion. To date, DLCD has responded to all of the JCEP's requests. If there are outstanding requests, DLCD requests that JCEP explicitly list those and provide the list to DLCD.

In light of these clarifications, DLCD recognizes that timelines for other state agency permits do not align with the current schedule of the JCEP federal consistency review, of which DLCD's decision is due on or before February 28, 2020. Under 15 CFR § 930.60(b), applicants and DLCD may mutually agree in writing to stay our federally mandated six-month review period.

DLCD is committed to making science-based decisions that are in the best interest of Oregonians and Oregon's natural resources. The agency appreciates you communicating your concerns and that we have been able to provide you with more clarification. Please provide me with any further questions in writing to jim.rue@state.or.us.

Sincerely,

Jim Rue
Director
Department of Land Conservation and Development

Cc: Jason Miner, Natural Resources Policy Manager, Office of Governor Kate Brown
Nik Blosser, Chief of Staff, Office of Governor Kate Brown
Senator Arnie Roblan
Senator Betsy Johnson
Representative Caddy McKeown
Director Curt Melcher, Oregon Department of Fish and Wildlife
Director Richard Whitman, Oregon Department of Environmental Quality
Director Vicki Walker, Oregon Department of State Lands
Adam Dilts, Chief, Oceans and Coasts Section, Office of the General Counsel, NOAA
David Kaiser, Senior Policy Analyst, Office for Coastal Management, NOAA
Kerry Kehoe, Federal Consistency Specialist, NOAA
Kris Wall, Coastal Management Specialist, NOAA
Steve Shipsey, Oregon Department of Justice
Jesse Ratcliffe, Oregon Department of Justice
Patty Snow, Oregon Coastal Program Manager, DLCD
Heather Wade, Coastal Policy Specialist, DLCD
Deanna Caracciolo, State-Federal Relations Coordinator, DLCD
Hui Rodomsky, South Coast Regional Representative, DLCD

APPENDIX 5.O.

Oregon
Kate Brown, Governor

Department of Land Conservation and Development
Oregon Coastal Management Program
635 Capitol Street NE, Suite 150
Salem, Oregon 97301-2540
Phone: 503-373-0050
Fax: 503-378-6033
www.oregon.gov/LCD

January 29, 2020

Mr. Mike Koski
Jordan Cove Energy Project, LP
Pacific Connector Gas Pipeline, LP
Email: MKoski@pembina.com

Project:	Jordan Cove Energy Project/Pacific Connector Gas Pipeline US Army Corps Federal Permit No.: NWP-2017-41 FERC Docket Nos: CP17-495-000 and CP17-494-000
Applicants:	Jordan Cove Energy Project, LP and Pacific Connector Gas Pipeline, LP
Location:	Coos Bay, Oregon and Pipeline Route within Coastal Zone
Re:	**Clarification to Letter Dated January 10, 2020**

Dear Mr. Koski:

This letter serves as the Department of Land Conservation and Development's (DLCD) clarification to the January 10, 2020 letter submitted to you regarding your concerns about the federal consistency review of the Jordan Cove Energy Project (JCEP) and the clarification on specific Department of Environmental Quality (DEQ) permits you requested at our January 22, 2020 meeting with DEQ. The goal of DLCD's clarification is to communicate DLCD's position on conditioning state permits and to provide clarification as to why DLCD will not condition any DEQ permits, including 1200-C and Water Pollution Control Facilities (WPCF) Hydrostatic Testing Permit authorizations. DLCD hopes that this response will provide you with the clarity you are seeking so that DLCD may continue and complete the unbiased review of the proposed project.

As stated previously, DLCD is under no obligation to condition any state permits as part of the JCEP federal consistency review and doing so would be in direct conflict with state administrative rules and the best interest of the State of Oregon. The authority for the state to determine conditionality of state permits and authorizations in a consistency decision was also explicitly clarified by NOAA at a meeting requested by the applicant on November 15, 2019. DLCD maintains that issued state permits or authorizations are the only acceptable evidence demonstrating consistency with their corresponding enforceable policies (OAR 660-035-0050). **DLCD's final position has not changed and will still require all 1200-C and WPCF permits be issued to JCEP in order to demonstrate consistency with the associated enforceable policies of the Oregon Coastal Management Program (OCMP).**

As stated previously, DLCD exercises its authority under the CZMA to not condition any additional state permits or authorizations. DLCD and the State have deemed the list of state permits and authorizations provided to you on January 10, 2020 as critical, and believe conditioning these permits would not be a responsible environmental and public welfare decision. DLCD reminds JCEP that the agency is under no obligation to make exceptions to an

applicant because our process does not align with the timeline needs or business purposes of the applicant. Federal law does not prevent DLCD from recommending that applicants wait to submit for federal consistency review until they have the necessary permits and authorizations in hand. DLCD recommends this approach to all applicants.

I apologize for any confusion or perceived misrepresentations on the agency's position regarding conditioning of the specified DEQ permits. As stated in the November 5, 2019 memo and conditioning matrix (attached), DLCD does not view these DEQ permits as being in the same category as permit authorizations required from the Oregon Water Resources Department (OWRD) and the State Historic Preservation Office (SHPO). We provide further clarification on the agency's position below. As a friendly reminder, DLCD plans to honor the agreement to condition state permits under the authority of the OWRD and SHPO, due to the recognition that these permits cannot be issued until closer to construction. These permits include three limited licenses and four state archeological permits.

As requested, below is clarification on DLCD's decision to not condition 1200-C or WPCF permits:

1. 1200-C Permits

The 1200-C Construction Stormwater General Permit is a five-year permit and does not restrict the applicant to wait to submit the permit application. Once a project is covered under the 1200-C Construction Stormwater General Permit, coverage will continue until the registrant terminates coverage or renews coverage with the next issued General Permit. DLCD and OCMP networked state agency partners have determined that there are significant foreseeable effects to surrounding coastal resources, including those activities that take place closer to and during construction phases of the project. DLCD has determined that it is in the best interest of the State of Oregon and its coastal resources that JCEP obtain its 1200-C permits prior to the potential issuance of a federal consistency concurrence to ensure activities are, in fact, consistent with the OCMP's enforceable policies and meet the corresponding State standards. The 1200-C permit requires an approved Erosion and Sediment Control Plan (ESCP) and the incorporation of approved Best Management Practices (BMPs) into a project's land-disturbing construction work. BMPs are used on the project site to prevent or minimize erosion and control sediment runoff from the site. This is critical for preventing pollution from erosion and runoff.

2. WPCF Permits

The WPCF permit is a state requirement for the discharge of wastewater to the ground; discharge to surface water is not allowed. The WPCF permit is good for ten years and does not restrict the applicant to wait to submit the permit application. WPCF permits are issued for land irrigation of wastewater, wastewater lagoons, onsite sewage disposal systems, other disposal systems, and underground injection control systems. The primary purpose of a WPCF permit is to authorize the land application or disposal of wastewater and to prevent discharges to surface waters and to protect groundwater from contamination. This permit is also used to prevent nuisance conditions such as odors and disease vectors. DLCD has determined that it is in the best interest of the State of Oregon and its coastal resources that JCEP obtain its WPCF permits prior to the potential issuance of a federal consistency

concurrence to ensure activities are, in fact, consistent with the OCMP's enforceable policies and meet the corresponding State standards.

In addition to the fact that conditioning the above permits is in direct conflict with Oregon's Administrative Rules, how such conditions could be enforced and subsequently litigated in the event of a lack of enforcement by the Federal Energy Regulatory Commission (FERC) puts the State of Oregon at risk, as stated in DLCD's January 10, 2020 letter to JCEP. Again, DLCD may have very little recourse in the event that an applicant does not receive all conditioned state permits. **DLCD has determined that this decision is in the best interest of the State of Oregon, and fully within the authority of the State to determine as provided for under the CZMA.**

Again, DLCD suggests that JCEP put any requests of DLCD in writing and to specify what exactly is being requested in an effort to eliminate any possible confusion. DLCD is committed to making science-based decisions that are in the best interest of Oregonians and Oregon's natural resources. The agency believes this clarification answers your outstanding questions regarding conditioning state permits as part of the JCEP federal consistency review. Please provide me with any further questions in writing to jim.rue@state.or.us.

Sincerely,



Jim Rue
Director
Department of Land Conservation and Development

Cc: Jason Miner, Natural Resources Policy Manager, Office of Governor Kate Brown
Nik Blosser, Chief of Staff, Office of Governor Kate Brown
Senator Arnie Roblan
Senator Betsy Johnson
Representative Caddy McKeown
Director Curt Melcher, Oregon Department of Fish and Wildlife
Director Richard Whitman, Oregon Department of Environmental Quality
Director Vicki Walker, Oregon Department of State Lands
Adam Dilts, Chief, Oceans and Coasts Section, Office of the General Counsel, NOAA
David Kaiser, Senior Policy Analyst, Office for Coastal Management, NOAA
Kerry Kehoe, Federal Consistency Specialist, NOAA
Kris Wall, Coastal Management Specialist, NOAA
Steve Shipsey, Oregon Department of Justice
Jesse Ratcliffe, Oregon Department of Justice
Patty Snow, Oregon Coastal Program Manager, DLCD
Heather Wade, Coastal Policy Specialist, DLCD
Deanna Caracciolo, State-Federal Relations Coordinator, DLCD
Hui Rodomsky, South Coast Regional Representative, DLCD

Oregon Department of Land Conservation & Development

MEMORANDUM

Date: November 4, 2019
To: Natalie Eades, Jordan Cove Energy Project
From: Oregon Department of Land Conservation & Development

The Oregon Coastal Management Program (OCMP) within the Department of Land Conservation and Development (DLCD) has drafted a table consisting of applicable state and local authorizations and their associated enforceable policies for the Jordan Cove Energy Project (Project). Each of these have been categorized as "hypothetically willing to condition" or not, and any specific requirements for those conditions. This draft table is subject to change upon continued coordination with state agency partners.

It is important for the applicant to understand that the development and sharing of this draft conditions table is not legally binding and does not imply an agreement between DLCD and the applicant. This table is subject to change and is still under review by the State of Oregon. **This correspondence does not imply a decision of conditional concurrence, concurrence, or objection, as the federal consistency review for the Project is still ongoing**.

DLCD reminds the applicant that DLCD's substantive review of the Project includes an evaluation of statewide planning goals, Oregon revised statutes, and local comprehensive plans and land use regulations. DLCD can only concur with the project if and when the applicant can demonstrate compliance with all applicable enforceable policies of the OCMP. DLCD's federal consistency determination will be made based on the record that exists at the time of our decision. This record includes information provided by the applicant, public comment, state agency partners, local jurisdictions, and other sources.

If you have any additional questions regarding the CZMA Federal Consistency Review for this Project, please forward all correspondence via email to Heather Wade, Coastal Policy Specialist, at heather.wade@state.or.us.

Draft Table Last Updated November 4, 2019

Permits and Authorizations	Related Enforceable Policies of the OCMP	Hypothetically Willing to Condition	Condition Requirements
STATE	**Oregon Revised Statutes**		
ODEQ: Air Contaminant Discharge Permit (JC)	(2013) 468.936; 468.939; 468.941; 468.951; 468A.005; 468A.010; 468A.020; 468A.025; 468A.040; 468A.045; 468A.050; 468A.055; 468A.060; 468A.070; 468A.075	No	n/a
ODEQ: CWA Section 401 Water Quality Cert (JC and PCGP)	(2013) 468.943; 468.946; 468.949; 468.951; 468B.005; 468B.015; 468B.020; 468B.025; 468B.048; 468B.050; 468B.052; 468B.055; 468B.060; 468B.075; 468B.080; 468B.085; 468B.120; 468B.125; 468B.130; 468B.135; 468B.150; 468B.155; 468B.160; 468B.300; 468B.305; 468B.310; 468B.315; 468B.320; 468B.337; 468B.345; 468B.350; 468B.355; 468B.360; 468B.365; 468B.370; 468B.375; 468B.380; 468B.385; 468B.390; 468B.450; 468B.460; 468B.475; 468B.485	No	n/a
ODEQ: 1200-C Construction Stormwater (JC Terminal)		No	n/a
ODEQ: 1200-C Construction Stormwater (Kentuck Slough)		No	n/a
ODEQ: 1200-C Construction Stormwater (US HWY 101/TPP)		No	n/a
ODEQ: NPDES General Permit 1200C (PCGP)		No	n/a
ODEQ: 1200-C Construction Stormwater (APCO)		No	n/a
ODEQ: Individual WPCF-Hydrostatic Testing (PC) -CZ		No	n/a
ODEQ: NPDES- Wastewater Treatment Plant	(2013) 454.605; 464.607; 454.610; 454.655; 454.657	No	n/a
ODFW Fish Passage Plans Kentuck/APCO	(2013) 509.580; 509.585; 509.600; 509.610; 509.625	No	n/a
ODFW Fish Passage Plan Access Road Steam Crossing in CZ;		No	n/a
ODFW Fish Passage Plans Pipeline Stream Xings in CZ		No	n/a
DSL Removal-Fill Authorization (All)	(2013) 196.682; 196.687; 196.800; 196.805; 196.810; 196.815; 196.818; 196.825; 196.830; 196.845; 196.855; 196.880; 196.905	No	n/a
DSL Proprietary Authorizations: Easements JC	(2013) 274.005; 274.025; 274.040; 274.043; 274.060; 274.400; 274.402; 274.550; 274.705; 274.710; 274.860; 274.905; 274.920; 274.940	No	n/a
DSL Proprietary Authorizations: Sand and Gravel Licenses JC		No	n/a
DSL Proprietary Authorizations: Waterway Use JC		No	n/a

DSL Proprietary Authorizations: Mitigation JC		No	n/a
DSL Proprietary Authorizations: State-owned land xings PCGP		No	n/a
DSL Proprietary Authorizations: Special Use		No	n/a
OWRD: Limited License: Coos River	(2013) 536.220; 536.700; 536.710; 537.010; 537.110; 537.120; 537.130; 537.135; 537.140; 537.150; 537.160; 537.170; 537.240; 537.400; 537.410; 537.420; 537.440; 537.445; 537.450; 537.505; 537.515; 537.525; 537.535; 537.545; 537.575; 537.585; 537.595; 537.605; 537.610; 537.615; 537.620; 537.625; 537.630; 537.635; 537.680; 537.685; 537.690; 537.695; 537.705; 537.730; 537.780; 537.795	Yes	OWRD must agree to condition and condition language in writing
OWRD: Limited License: East Fork Coquille		Yes	OWRD must agree to condition and condition language in writing
OWRD: Limited License: Middle Fork Coquille		Yes	OWRD must agree to condition and condition language in writing
OPRD/SHPO: State Archeological Permits(Various) JC Terminal	(2013) 390.010; 390.235; 390.237	Yes	OPRD/SHPO must agree to condition and condition language in writing
OPRD/SHPO: State Archeological Permits (Various) PCGP-CZ		Yes	OPRD/SHPO must agree to condition and condition language in writing
ODOE Energy Facility Siting Certificate	(1987) 469.300; 469.310; 469.320; 469.500; 469.510	No	n/a
LOCAL	**Land Use Regulations**		
Coos County: Omnibus 1	CCCP Volume 1 Section 5.2, Strategies 2, 14; Section 5.3, Strategies 1, 10, 12, 13; Section 5.4, Strategies 1, 3, 9; Section 5.5, Strategies 1, 2, 4; Section 5.6 Strategies 1, 6; Section 5.7, Strategy 3; Section 5.10, Strategies 1, 2, 3, 5, 7, 8, 9, 10, 11; Section 5.11, Strategies 1, 4, 6, 7; Section 5.18 Strategies 4, 4a, 5, 6; Section 5.22 Strategy 2; CCCP Volume 2 Section 3.3, Policy 4, 5, 8, 9, 14, 16, 18, 19, 20, 22, 30; Section 5 All mgmt units; ZO Chapter 2, Sections 2.1.100-2.1.200; Section 4.3.200; Section 3.2.100; Section 3.2.175; Section 3.2.180;	No	n/a
Coos County: Combo App: Transpacific Pkwy items		No	n/a
Coos County: Combo App: PCGP early works items		No	n/a

Coos County: Combo App: Nav Reliability Improv (NRI)- Channel mods	Section 3.2.201, Section 3.2.202; Section 3.2.240; Section 3.2.241; Section 3.2.245; Section 3.2.246; Section 3.2.255; Section 3.2.256; Section 3.2.260; Section 3.2.261; Section 3.2.265; Section 3.2.266; Section 3.2.275; Section 3.2.276; Section 3.2.280; Section 3.2.281; Section 3.2.285; Section 3.2.286; Section 3.2.290; Section 3.2.291; Section 3.2.335; Section 3.2.336; Section 3.2.370; Section 3.2.371; Section 3.2.400; Section 3.2.401; Section 3.2.402; Section 3.2.425; Section 3.2.426; Section 3.2.440; Section 3.2.441; Section 3.2.445; Section 3.2.446; Section 3.2.450; Section 3.2.451; Section 3.2.455; Section 3.2.456; Section 3.2.525; Section 3.2.526; Section 4.11.125.1-.7; Section 4.11.235; Section 4.6.100; Section 4.6.140; Section 4.6.200; Section 4.6.210; Section 4.6.230	No	n/a
Coos County: Omnibus 2		No	n/a
Coos County: Conditional Use: PCGP Blue Ridge Route	EPs will be identified when appeal concluded and applied to review.	No	n/a
Coos County: Conditional Use: PCGP Alternate Routes	Coos County Zoning and Land Development Ordinance(CCZLDO) Section 4.6.110(1)(h); Section 4.6.130; Section 4.6.140; Section 4.6.220(1)(f)(iii); Section 4.6.230.3; Section 4.6.240; Section 3.2.180; Section 3.2.545; Section 3.2.546(15)(a) ; Section 3.2.550; Section 3.2.551(9)(a) ; Section 4.11.235 ; Section 4.11.252; Coos County Comp Plan Appendix 3 Coos Bay Estuary Management Plan (CBEMP) Policies 14, 18, 22.	No	n/a

Coos County: Conditional Use: PCGP Original Route	CCZLDO Section 2.1.200; Section 7.4.200; Section 4.11.125(3)(b)(ii); Section 4.2.100; Section 4.2.200; Section 4.2.300; Section 4.2.400; Section 4.2.500; Section 4.2.600; Section 4.11.213 (Floodplain Statement of Purpose) ; Section 4.11.300 (Airport Surface Floating Zone Purpose); Section 3.3 Shoreland Segment and Aquatic Unit descriptions; Section 4.3.210; Section 4.3.225; Section 4.3.230.2; Section 4.3.230.5; Section 4.3.230.6; Section 3.2.100; Section 3.2.175; Section 3.2.180; Section 3.2.275; Section 3.2.276; Section 3.2.285; Section 3.2.286; Section 3.2.370; Section 3.2.371; Section 3.2.375; Section 3.2.376; Section 3.2.405; Section 3.2.406; Section 3.2.400; Section 3.2.401; Section 3.2.425; Section 3.2.426; Section 3.2.480; Section 3.2.481; Section 3.2.535; Section 3.2.536; Section 3.2.540; Section 3.2.541; Section 3.2.550; Section 3.2.551; Section 3.2.545; Section 3.2.546; Section 3.2.595; Section 3.2.596; Section 3.2.600; Section 3.2.601; Section 3.2.690; Section 3.2.691; Section 4.11.232; Section 4.11.235; Section 4.11.252; Section 4.6.110; Section 4.6.130; Section 4.6.140; Section 4.3.210.23; Section 4.6.220(1)(d)(ii); Section 4.6.220(1)(f)(iii); Section 4.6.220(1)(p); Section 4.6.220(1)(q); Section 4.6.230.3; Section 4.6.240; CBEMP Policies 14, 16, 18, 20, 30	No	n/a
City Coos Bay: Estuarine Activity in 52-NA	CBCP Section 7.10, ER.1; Dev Ord 17.352.010-17.352.080; CBEMP Lower/Upper Bay DA all requirements, aquatic unit/deep-draft nav channel; 52-NA All requirements; 54-DA All requirements; 55-CA All requirements	No	n/a
City Coos Bay: Combo App: Nav Reliability Improv		No	n/a
City North Bend: Combo App: Floodplain Dev and CB Estuary Permit PCGP	NBCC 18.44; NBCC 18.48; CBEMP 47-DA All requirements; 47-UW all requirements; 48-CA All requirements; 48-CS All requirements; 50-NA All requirements; 51-CA All requirements	No	n/a
City North Bend: Combo App: DMD at APCO site Floodplain Dev and CB Estuary Permit		No	n/a
Douglas County: Conditional Use Application PCGP in CZ	RLUP-RRD-Criteria for Designating rural resource lands; RLUP-OZ-Table specifies overlay zone designations; Ch1 Section 1.010-1.090; Ch3 Article 3.1; Article 3.2; Article 3.3; Article 3.5; Article 3.6; Article 3.32; Article 3.39	No	n/a

DAVID EVANS AND ASSOCIATES INC.

February 6, 2018

Mary Camarata
Department of Environmental Quality (DEQ)
Western Region - Eugene
165 East 7th Avenue, Suite 100
Eugene, OR 97401-3049

SUBJECT: Jordan Cove Energy Project / Pacific Connector Gas Pipeline - 401 Water Quality Package (NWP-2017/41)

Dear Ms. Camarata,

Jordan Cove LNG, LLC hereby submits a combined electronic Section 401Water Quality Package to DEQ for the Jordan Cove Energy Project (JCEP) and Pacific Connector Gas Pipeline (PCGP) projects. This package is a supplement to the Section 404/10 permit application provided to the U.S. Army Corps of Engineers (USACE) on October 23, 2017.

The two projects are interconnected and will be developed under the same ownership but will be designed and constructed under separate contracts. Per discussions with DEQ at the pre-application meeting and subsequent conversations, the two projects have been combined into a single application as it pertains to the 401 Water Quality Certification permit with two parts: (1) JCEP and (2) PCGP.

This package contains new documents as well as previously submitted documents to provide a stand-alone submittal for the convenience of public and agency review.

Part 1: JCEP 401 Package – The following documents are new to the public record and where applicable replace previous submittals.

- 401 Water Quality Memorandum
- Appendix A: Table 2, Project Activities with the Potential to Impact Water Quality
- Appendix B: Spill Prevention, Control, and Countermeasure Plan – Construction
- Appendix C: Erosion and Sediment Control Plan
- Appendix D: Storm Water Management Plan
- Appendix E: Hydrodynamic Analysis Technical Memorandum
- Appendix F: Impacts to Salinity Technical Memorandum
- Appendix G: Turbidity Analysis Technical Memorandum
- Appendix H: Sediment Transport Analysis Technical Memorandum
- Appendix I: Propeller Wash Analysis Technical Memorandum
- Appendix J: Vessel Wake Impacts Technical Memorandum
- Appendix K: Spill Prevention, Control, and Countermeasure Plan – Operations
- Appendix L: LNG Cooling Water Discharge Analysis Technical Memorandum

The remaining items were submitted to USACE and the Federal Energy Regulatory Commission (FERC) in 2017:

- Attachment A: Figures from JCEP Section 404 Permit Application
- Attachment B: Figure from JCEP Resource Report 1
- Appendix M: JCEP Section 404 Permit Application, Part 1 – October 2017
- Appendix N: Section 404-10 Permit Application, Responses to USACE Data Requests

Part 2: PCGP 401 Package – The Plan of Development water quality related documents, provided in Appendix E, have been submitted as part of the Right-of-Way Grant application to the BLM, U.S. Forest Service, and Bureau of Reclamation.

All other documents related to PCGP below were previously submitted to USACE and FERC in 2017.

- Appendix A - 401 Water Quality Summary Table – Attachment G from Part 2 of 404 Application for PCGP
- Appendix B – PCGP Section 404 Joint Permit Application, Part 2 – October 2017
- Appendix C - FERC Resource Report 6
- Appendix D - PCGP Wetland Delineation Report

Please call me should you have any questions regarding the enclosed application materials. I can be reached at (503) 223-6663 and via email at derik.vowels@deainc.com. Thank you for your involvement and feedback thus far, and we look forward to continuing our collaborative approach in securing the permit authorizations for the JCEP and PCGP projects.

Sincerely,

DAVID EVANS AND ASSOCIATES, INC.



Derik Vowels
Project Manager / Regulatory Specialist

Copies: Tyler Krug – USACE; Caroline Burda - JCLNG

Jordan Cove LNG	Water Quality Considerations – Implications for Clean Water Act Sections 401 and 404 Permitting	DAVID EVANS AND ASSOCIATES INC.
	Document Number: JI-000-RGL-PMT-DEA-00004-00	
	Rev.: B | Rev. Date: April 15, 2018	

TECHNICAL MEMORANDUM

DATE:	February 2, 2018
ATTENTION:	Mary Camarata and Chris Stine
COMPANY:	Oregon Department of Environmental Quality
ADDRESS:	West Region- Eugene 165 East 7th Avenue, Suite 100 Eugene, OR 97401-3049
FROM:	Sarah Betz and Derik Vowels
SUBJECT:	Water Quality Considerations – Implications for Clean Water Act Sections 401 and 404 Permitting
DEA PROJECT NAME:	Ad Hoc Permitting Support
DEA PROJECT NO:	JLNG0000-0003
DOCUMENT #	J1-000-RGL-PMT-DEA-00004-00
COPIES TO:	DEA File

1. INTRODUCTION

This memorandum informs the Oregon Department of Environmental Quality's (ODEQ) review of the Jordan Cove Energy Project's (JCEP) Clean Water Act (CWA) Section 404/10 Permit Application (application), and CWA Section 401 Water Quality Certification (WQC) process.

The following sections address the applicable State of Oregon's Administrative Rules (OARs) governing water quality, potential water quality impacts resulting from the JCEP, as well as the avoidance, minimization or mitigation measures proposed by the JCEP to limit water quality impacts. Water quality considerations addressed herein relate to potential water quality impacts resulting from in-water work, impacts to jurisdictional wetlands and waterways, and construction and operational discharges from JCEP facilities, including stormwater.

2. PROJECT DESCRIPTION

Jordan Cove Energy Project, LP (JCEP) is seeking authorization from the Federal Energy Regulatory Commission (FERC) under Section 3 of the Natural Gas Act (NGA) to site, construct, and operate a natural gas liquefaction and liquefied natural gas (LNG) export facility (LNG Terminal), located on the bay side of the North Spit of Coos Bay, Oregon. JCEP will design the LNG Terminal to receive a maximum of 1,200,000 dekatherms (a unit of energy used to measure natural gas, approximately equal to one thousand cubic feet) per day (dth/d) of natural gas and produce a maximum of 7.8 million tons per annum (mtpa) of LNG for export. The LNG Terminal will turn natural gas into its liquid form via cooling to about -260 degrees Fahrenheit (F), and in doing so, it will reduce in volume to approximately 1/600th of its original volume, making it easier and more efficient to transport.

The LNG Terminal, related facilities, temporary construction sites, and other sites/actions associated with LNG Terminal construction are collectively referred to as the "JCEP Project Area". The JCEP Project Vicinity encompasses the Project Area and the general area beyond, as detailed in Figure 1.1 of the 404 Application (Attachment A: Figures from the 404 Application).

In order to supply the LNG Terminal with natural gas, Pacific Connector Gas Pipeline, LP (PCGP) is proposing to contemporaneously construct and operate a new, approximately 229-mile-long, 36-inch-diameter natural gas transmission pipeline from interconnections with the existing Ruby Pipeline LLC and Gas Transmission Northwest LLC (GTN) systems to the LNG Terminal (Pipeline, and collectively with the LNG Terminal, the Project). PCGP will address the potential effects of constructing the Pipeline in a separate 404/10 Permit Application and, therefore, a separate 401 WQC. Potential water quality impacts addressed in this memorandum are limited to those associated with the JCEP.

3. PROJECT COMPONENTS

The JCEP is comprised of the following components:

- LNG Terminal site
- Slip and Access Channel
- Materials Offloading Facility (MOF)
- Navigation Reliability Improvements (NRIs)
- Meteorological Station
- Industrial Wastewater Pipeline (IWWP)
- Trans Pacific Parkway (TPP) / US 101 Widening
- APCO Sites 1 and 2
- Kentuck Site
- Eelgrass Mitigation Site
- Temporary Construction Areas
- LNG Carrier Operation

Aspects of the construction and/or operation of the above Project components that have the potential to impact water quality are described in this memorandum. For a detailed description of all project components and activities, refer to the JCEP Resource Report in Appendix A.2 of the 404 Application (JCEP 2017g; Appendix M). Activities associated with these project components and with the potential to impact water quality are also discussed as they relate to the applicable Division 41 OARs in subsequent sections of this document.

3.1 LNG TERMINAL

The LNG Terminal is comprised of the Ingram Yard and South Dunes site, as well as the Access and Utility Corridor and the Roseburg Forest Products (RFP) property, as detailed in Figure 6.1-2 of the 404 Application (Attachment A). The LNG Terminal includes all building infrastructure, machinery, utilities and other Project components associated with the receipt, liquefaction, storage and loading of LNG onto ocean-going LNG carriers for export.

Ingram Yard will house permanent and temporary LNG Terminal facilities, including LNG tanks and liquefaction equipment. The South Dunes site will house temporary construction and permanent facilities including a Workforce Housing Facility, metering station, administrative building and the Southwest Oregon Regional Safety Center (SORSC). The Access and Utility Corridor connects Ingram Yard and the South Dunes site, which will provide temporary construction and permanent access roads and facilities, and will include underground gas feed to the LNG Terminal, underground utilities, and the fire department. The western portion of the Access and Utility Corridor, between the LNG Terminal and Jordan Cove Road, will be paved and provide primary permanent access. The remainder of the corridor, east of Jordan Cove Road, will consist of a crushed rock track for infrequent maintenance access. The RFP property will serve as a temporary construction staging area and upland dredge disposal site. The dredge disposal area will be contained within an on-site berm and decant water will be discharged to the Slip while still isolated from Coos Bay, where it will be filtered through the existing medium.

The main operational components of the LNG Terminal include a connection to the PCGP metering station, gas inlet facilities, a gas conditioning plant, liquefaction facilities, two full-containment LNG storage tanks, an LNG loading line, LNG loading facilities, and a marine slip and access channel for LNG carriers. The Slip and Access Channel are discussed in greater detail below. Paved access roads between the South Dunes site and the western portion of the Access and Utility Corridor will be provided by the existing Jordan Cove Road. A two-lane access road to the northwest of Ingram Yard will be constructed to provide emergency, marine terminal and occasional maintenance access from TPP. Sufficient parking will also be provided for operations personnel at the South Dunes and Ingram Yard sites.

Construction and operation of the LNG terminal site are expected to consist of the following activities that may affect water quality:

- Upland site preparation and facilities construction
- Placement of permanent infrastructure
- Construction and operational stormwater runoff
- Potential construction and operational fuel and chemical spills
- Hydrostatic testing
- Wastewater discharge
- Dredge soil disposal and dewatering/decanting
- Operation of construction vehicles and equipment

3.2 SLIP AND ACCESS CHANNEL

3.2.1 Access Channel

A newly constructed Access Channel will connect the marine slip (Slip) to the Federal Navigation Channel (FNC) at approximately Channel Mile (CM) 7.3, near the confluence in the Channel of the Jarvis Turn and the Upper Jarvis Range A, as detailed in Figure 6.1-4 of the 404 application (Attachment A). The Access Channel will flare from the narrowest portion of the mouth of the Slip, with a minimum width of 800 feet, to the intersection with the FNC, with an approximate width of 2,200 feet. The proposed Access Channel will allow for the safe transit of vessels between the berth and the FNC and allow for the safe turning of vessels during inbound transit, so that the LNG carrier can be backed into the slip and berthed bow out, according to industry best practice requirements.

The Access Channel will cover a total of approximately 22 acres below the Highest Measured Tide (HMT) elevation of 10.26 feet (NAVD88). The walls of the Access Channel will be sloped to meet the existing bottom contours at an angle of approximately 2.5 to 3 feet horizontal to 1-foot vertical (2.5:1) (Moffatt & Nichol 2017i). Both the Slip and Access Channel will have a minimum depth of -45 feet below mean lower low water (MLLW) to ensure minimum under-keel clearance is achieved for the safe maneuvering and berthing of loaded LNG carriers.

3.2.2 Slip

The majority of the Slip will be constructed by excavating an existing upland area owned by JCEP, as detailed in Figure 6.1-4 of the 404 Application (Attachment A). A portion of the Slip will be constructed in Waters of the State within Coos Bay to the Mean Low Water (MLW) line, for which the Port of Coos Bay has obtained an easement from the Oregon Department of State Lands (ODSL). The Slip will be bounded to the east and west by sheet pile walls, which will support mooring structures. The northern portion of the Slip will be sloped to meet existing bottom contours at a 2.8:1 ratio. The dimensions of the Slip will measure 800 feet between the east and west pile walls, at the toe of the slope, and approximately 1,500 feet and 1,200 feet along the western and eastern boundaries, respectively. The Slip is sized to allow for the safe maneuvering of a LNG carrier into the Slip when another carrier is already berthed, and to allow for tugs to move a disabled vessel away from the loading berth.

The dredging methodology, dredge disposal location, dewatering process, and volume of material dredged are further detailed in the Dredged Material Management Plan (DMMP), provided as Attachment E of the 404 Application (Moffatt & Nichol 2017g; Appendix M). Dredging will occur as part of the construction of the Slip and Access Channel. Dredging of the Slip and Access Channel will be accomplished with a combination of mechanical dredging, via clamshell or excavator, and use of a hydraulic cutter suction dredge. Dredge spoils will be distributed to upland disposal sites, as detailed in the DMMP (Moffatt & Nichol 2017g; Appendix M). Table 1, below, details the dredging volumes and disposal sites for each phase of the Slip and Access Channel dredging.

Table 1. Proposed Dredged Material Management for Construction Activities

Area	Construction Phase	Volume (mcy)	Placement Location
Freshwater Dredging Phase 1			
Slip	Land-Based Excavation	1.40	LNG Terminal Site
Slip	Dredging in Pocket Behind Berm	2.40	LNG Terminal Site and Roseburg Site
Saltwater Dredging Phase 2			
Access Channel	Dredging from Bay	1.40	LNG Terminal Site and Roseburg Site
Slip	Removal of Berm	0.20	LNG Terminal Site
Slip	Removal of Berm	0.30	Kentuck Project Site
Total		**5.70**	
Eelgrass Mitigation Dredging		0.04	APCO Site 1 and 2
Navigation Reliability Improvements		0.59	APCO Site 1 and 2

3.2.3 Berths

The slip includes a product loading berth, an emergency lay berth and tug berth slip, as detailed in Figure 6.1-4 of the 404 Application (Attachment A). Each berth will consist of a sheet pile wall, mooring structures, and breasting structures, as detailed in Resource Report 1 (JCEP 2017e).

LNG spill containment will be accomplished through the construction of a concrete curbed and sloped area that will contain any LNG spillage and allow the spill to safely flow away from the loading area to the marine area LNG impoundment basin through a spill collection trench.

Construction and operation of the Slip and Access Channel is expected to consist of the following activities that may affect water quality:

- Placement of permanent infrastructure
- Upland site preparation and facilities construction
- Potential construction and operational fuel and chemical spills
- Slip excavation
- Dredging
- Dredge spoil disposal and dewatering/decanting
- Aquatic vegetation removal
- Operation of construction vehicles and equipment

3.3 MATERIALS OFFLOADING FACILITY (MOF)

The MOF will deliver components of the LNG Terminal that are too large or heavy to be delivered by road or rail. The MOF will receive equipment, large modules (upwards of 6,000 tons) and other bulk materials delivered by bulk cargo carriers, roll on-roll off cargo carriers and barges. The MOF will cover approximately three acres on the southeast side of the Slip, as detailed in Figure 6.1-4 of the 404 Application (Attachment A). The MOF will be constructed using the same sheet pile wall system as the LNG loading and emergency lay berths. Post-construction, the MOF will be retained as a permanent facility to support maintenance and replacement of large equipment components.

The MOF cannot be completed within a single in-water work window. In order to reduce the impacts to the local community and environment due to hauling materials and supplies to the Project site by road, a Temporary Material Barge Berth (TMBB) will be constructed in the existing shoreline within the footprint of the future Slip. The TMBB will be utilized until the MOF is able to receive materials and will be removed when the berm in which it sits is excavated.

Construction and operation of the MOF is expected to consist of the following activities that may affect water quality:

- Placement of permanent infrastructure
- Upland site preparation and facilities construction
- Construction and operational stormwater runoff
- Potential construction and operational fuel and chemical spills
- Dredging
- Aquatic vegetation removal
- Placement of fill waterward of the HMT
- Operation of construction vehicles and equipment

3.4 NAVIGATION RELIABILITY IMPROVEMENTS

In order to improve the navigation reliability of the LNG carriers transiting the FNC, the JCEP proposes to excavate four submerged areas lying adjacent to the FNC. These improvements will allow for the transit of LNG carriers through the FNC under a broader weather window than currently allowable, and provide greater navigational efficiency and reliability, allowing the JCEP to export the full capacity of optimized design production from the LNG Terminal.

Excavation of capital dredge material is expected to total approximately 584,300cubic yards (CY). The dredge areas are denoted as Dredge Areas 1 through 4, and located adjacent to the FNC between approximately River Mile (RM) 2 and RM 7, as detailed in Figure 6.1-12 in the 404 application (Attachment A).

The dredging methodology, disposal location, and volumes of capital and maintenance dredging are detailed in the DMMP in Attachment E of the 404 application (Moffatt & Nichol 2017g; Appendix M). Dredging of the NRIs will be accomplished either mechanically via clamshell or excavator, or hydraulically using a cutter suction dredge. Dredge spoils from the NRIs will be placed at either the APCO 1 or APCO 2 sites (see below for additional description of disposal sites). Dredge spoils will be placed either by discharging hydraulically dredged slurry from a temporary dredge transfer line, or by pumping dredged material to the site from a scow.

The NRIs are expected to consist of the following activities, components that may affect water quality:

- Potential construction fuel and chemical spills
- Dredging
- Dredge spoil disposal and dewatering/decanting
- In-water dredge slurry pipeline and pipeline cradle

3.5 METEOROLOGICAL STATION

The meteorological station will consist of a tower located on the west side of the lagoon on the North Spit and will be used to measure wind speed, direction, and other weather data, which will be provided to the LNG Terminal facility to support ship navigation, as detailed in Figure 1.1 of the 404 application (Attachment A). Construction and operation of the Meteorological Station are expected to consist of the following activities that may affect water quality:

- Upland site preparation and facilities construction
- Placement of permanent infrastructure
- Operation of construction vehicles and equipment
- Construction stormwater runoff
- Potential construction fuel and chemical spills

3.6 INDUSTRIAL WASTEWATER PIPELINE

As part of the JCEP, portions of an existing IWWP will be relocated or abandoned in place in order to construct the LNG Terminal. Currently, the IWWP carries water from two existing bio-solids ponds to an existing ocean outfall via the lagoon located southwest of the proposed LNG Terminal. The IWWP would be relocated to an easement along TPP to connect the Lagoon site to both Ingram Yard and the South Dunes site. Several connections would be made to the relocated IWWP to serve LNG Terminal construction and LNG Terminal, SORSC, and Fire Department operation, as detailed in Figure 6.1-2 of the 404 Application (Attachment A).

Portions of existing Coos Bay North Bend Water Board (CBNBWB) potable water and raw water pipelines would be relocated to easements along the TPP or abandoned in place in order to construct the LNG Terminal. In addition, an interconnection to an existing CBNBWB potable water pipeline would be used for all normal operational water needs in the LNG Terminal, SORSC, and the Fire Department, as well as most construction water needs. The tie-point to the 12-inch-diameter potable water pipeline would be located near the northwest corner of the LNG Terminal, along the south side of the TPP. A connection to an existing CBNBWB 8-inch-diameter raw water pipeline would also be used for construction water,

including LNG tank hydrotesting. The raw water pipeline tap, to be located near the northwest corner of the LNG Terminal on the north side of the TPP, would remain connected after construction; however, there are no normal operational uses anticipated for this raw water supply.

Construction and operation of the IWWP are expected to consist of the following activities that may affect water quality:

- Placement of permanent infrastructure
- Upland site preparation and facilities construction
- Construction stormwater runoff
- Potential construction fuel and chemical spills
- Operation of construction vehicles and equipment

3.7 TRANS PACIFIC PARKWAY/HIGHWAY 101 IMPROVEMENTS

Traffic studies conducted for the Project have determined that the intersection of Highway 101 and TPP will need to be improved in order to accommodate Project activities. A turning lane and automatic traffic control is currently proposed to manage traffic entering Highway 101 from the west. The proposed improvements would provide a wider turning radius from southbound US-101 onto TPP, two 12-foot travel lanes, a 14-foot left-turn lane, 6-foot shoulders with guardrail, and a 2-foot gravel shoulder on the north side of the guardrail. The existing gravel shoulder on the south side of the parkway would remain as currently configured, as detailed in Figure 6.1-12 of the 404 Application (Attachment A).

Embankment widening on the north side of the causeway at TPP/US-101 would extend for approximately 650 feet and would be constructed on a grid of untreated timber piling driven in the soft bay mud. No treated timbers would be used. To drive the pile grid, the contractor would construct a work access bridge as pile driving is progressed parallel to TPP. The grid of piling would then be capped with riprap embankment, providing a foundation to widen the roadway to the north. Construction would be isolated from Coos Bay with a temporary sheet pile work isolation containment system and turbidity curtain. These measures to isolate the work area would minimize fill impacts.

Improvements to TPP and Highway 101 are expected to consist of the following activities that may affect water quality:

- Placement of permanent infrastructure
- Upland site preparation and facilities construction
- Construction staging and temporary equipment laydown
- Construction and operational stormwater runoff
- Potential construction and operational fuel and chemical spills
- Placement of fill waterward of the HMT
- Operation of construction vehicles and equipment
- In-water work associated with road widening

3.8 APCO SITES 1 AND 2

Dredge material from the NRIs and Eelgrass Mitigation site will be placed at the APCO 1 and APCO 2 upland disposal sites, or placed entirely at APCO 2, if feasible, as detail in Figure 6.1-10 of the 404 Application (Attachment A). Permanent dredge disposal material will be managed by JCEP.

The placement of dredge material at the APCO 1 and APCO 2 sites will require the construction of a single-lane permanent bridge, and a temporary bridge to construct the permanent bridge, in order for heavy equipment such as excavators, dump trucks, and bulldozers to access both sites. The permanent bridge will be approximately 200 feet long and 40.5 feet wide and will span a tidal mudflat between the two APCO sites. The bridge will include two concrete abutments on pile-supported footings and will be placed above the HMT. No fill material will extend below the HMT. The temporary work bridge that will be used to construct the permanent bridge will be approximately 280 feet long and 30 feet wide, with seven 40-foot spans. JCEP anticipates using three steel piles per bridge bent. The temporary bridge will begin and end on dry land, with the end bents falling outside the HMT boundary. Approximately 15 steel piles will be installed below HMT.

Two horizontal directional drill (HDD) boring locations associated with the PCGP will intercept at the APCO 1 site. Details related to potential water quality impacts from the boring locations will be provided in a separate PCGP submittal.

APCO Sites 1 and 2 are expected to support the following activities and components that may affect water quality:

- Placement of permanent infrastructure
- Upland site preparation and facilities construction
- Construction and operational stormwater runoff
- Potential construction fuel and chemical spills
- Dredge spoil disposal and dewatering/decanting
- In-water dredge slurry pipeline and pipeline cradle
- Construction staging, temporary equipment laydown
- Operation of construction vehicles and equipment

3.9 KENTUCK SITE

The Kentuck Project is an approximately 100-acre wetland mitigation and coho salmon habitat rehabilitation project for the JCEP and PCGP. The Kentuck site is located on the eastern shore of Coos Bay, at the mouth of Kentuck Slough, as detailed Figure 6.1-13 of the 404 Application (Attachment A). Construction of the Kentuck Project will require importing dredge material to build up elevations at the site due to the subsidence of approximately two to three feet from the Kentuck Slough's historical profile that has occurred since the site was diked off from Coos Bay. Approximately 300,000 CY of dredge material will be transported to the Kentuck site from the LNG Terminal and Slip and Access Channel construction sites using temporary dredge or conveyance lines, potential booster pumps and transport barges. Raising elevations at the site will create a profile that is more conducive to establishing estuarine and some freshwater habitats, including tide channels, mudflat, salt marsh, and fringing freshwater wetlands.

The Kentuck Project will also include the construction of a new bridge within East Bay Drive that will allow tidal exchange between Kentuck Inlet and the Kentuck Project, improving the existing dike separating the site from Kentuck Slough. A fish friendly tide gate ("muted tidal regulator or MTR") will also be constructed in the upper portion of the Project site to redirect a portion of Kentuck Slough flow into the Kentuck Project. The profile of East Bay Drive will also be raised so that approximately 1,900 lineal feet of Golf Course Land will be above the zone of tidal influence. A fish friendly culvert will also be constructed within Golf Course Land to allow fish passage into the drainage above the former gold course irrigation sump pond.

A HDD boring location associated with the PCGP will traverse the Kentuck site from east to west. Details related to potential water quality impacts from the boring location will be provided in a separate PCGP submittal.

Construction of the Kentuck site is expected to consist of the following activities and potential sources:

- Placement of permanent infrastructure
- Upland site preparation and facilities construction
- Construction staging and temporary equipment laydown
- Construction and operational stormwater runoff
- Potential construction fuel and chemical spills
- Dredge spoil disposal and dewatering/decanting
- Placement of fill waterward of the HMT
- Breaching of a dike
- Operation of construction vehicles and equipment
- Vessel transit in estuarine and marine analysis areas
- In-water work associated with road widening

3.10 EELGRASS MITIGATION SITE

The Eelgrass Mitigation site will be located in Coos Bay, adjacent to the Southwest Oregon Regional Airport and will comprise approximately 9.3 acres of open water and bay bottom that is currently classified as unvegetated shallow subtidal habitat, as detailed in Figure 6.1-13 of the 404 Application (Attachment A). Construction of the Eelgrass Mitigation site will require dredging of a high spot in Coos Bay down to elevations that support eelgrass establishment and similar to elevations of adjacent eelgrass beds. Dredge material from the Eelgrass Mitigation site will be placed at the APCO 1 and APCO 2 upland disposal sites, or placed entirely at APCO 2, if feasible. Dredge material will be transported either using temporary dredge or conveyance lines, potential booster pumps or transport barges.

The resulting habitat increase from development of the Eelgrass Mitigation site will offset losses at the LNG Terminal site and provide benefits to fish and marine organisms that utilize this habitat by increasing the natural cover and forage production in Coos Bay. Construction of the Eelgrass Mitigation site is expected to consist of the following activities, components and potential sources:

- Potential construction fuel and chemical spills
- Dredging
- Dredge spoil disposal and dewatering/decanting
- In-water dredge slurry pipeline and pipeline cradle

3.11 TEMPORARY CONSTRUCTION AREAS

Temporary facilities and construction laydown areas will be required during construction of the LNG Terminal to house construction offices, crafts lunchrooms, warehousing, equipment maintenance, and laydown of materials after delivery to the site. These facilities have been localized to maximize the use of land owned by the JCEP within the overall site boundary and minimize impacts on wetland environments through the use of brownfield-designated land that is suitably zoned for industrial purposes at the Box Car Hill, and the Port Laydown Site. Two temporary off-site parking lots will also be constructed for commuting workers not residing at the Workforce Housing Facility on the South Dunes site. One approximately six-acre site will be located at the Mill Casino in North Bend. Another approximately six-acre lot will be located at the Myrtlewood Facility along Highway 101, near the community of Hauser, as detailed in Figure 6.1-12 of the 404 Application (Attachment A).

Temporary construction area expected to support the following activities and components that may affect water quality:

- Upland site preparation and facilities construction
- Construction stormwater runoff
- Potential construction fuel and chemical spills
- Concrete Batch Plant (Box Car Hill only)
- Construction staging, temporary equipment laydown
- Operation of construction vehicles and equipment

3.12 LNG CARRIER OPERATION

LNG will be exported from the LNG Terminal in carriers specifically designed and built for that task. JCEP expects 110 to 120 LNG carriers to call on the LNG Terminal per year. LNG carriers calling on the Terminal would not exceed 950 feet in length, 150 feet in breadth and 40-foot loaded drafts (nominal 148,000 m^3 capacity).

LNG carriers will access the LNG Terminal via a waterway designated for LNG marine traffic, which is defined by the U.S. Coast Guard (USCG) as extending from the outer limits of U.S. territorial waters, 12 miles off the coast of Oregon, up the existing FNC approximately 7.5 miles to the LNG Terminal as detailed in Figure 1.3-7 from RR1 (Attachment B: Figure from JCEP Resource Report 1). High bollard pull tractor tugs and pilots will be required to handle the planned number of LNG carriers transiting the FNC.

LNG Carrier Operation is expected to support the following activities and components that may affect water quality:

- Potential operational fuel and chemical spills
- Vessel transit in estuarine and marine analysis areas
- Ballast water discharge
- Cooling water intake and discharge

3.13 CONSERVATION MEASURES

Throughout the construction of the JCEP, conservation measures will be implemented to avoid and/or minimize impacts to the environment, including water quality. Conservation measures for the Project are discussed in detail in the following plans and procedures:

- Project-specific Erosion and Sediment Control Plan (ESCP) (JCEP 2017c; Appendix C)
- Site Restoration Plan (JCEP 2017g; Attachment I of the 404 application, Appendix M)
- Construction Spill Prevention Control and Countermeasure Plan (Construction SPCCP) (JCEP 2017a; Appendix B)
- Operations Spill Prevention Control and Countermeasures Plan (Operations SPCCP) (JCEP 2017b; Appendix K)
- Storm Water Management Plan (SWMP) (JCEP 2017d; Appendix D)
- Dredge Material Management Plan (DMMP) (JCEP 2017g; Attachment E of the 404 application, Appendix M)
- Compensatory Wetland Mitigation Plan (JCEP 2017f)

Measures related to maintaining water quality are discussed in the relevant Division 41 OARs in the following sections.

4. OREGON ADMINISTRATIVE RULES, DIVISION 41 WATER QUALITY STANDARDS: BENEFICIAL USES, POLICIES, AND CRITERIA FOR OREGON

The following sections outline Project specific activities that have the potential to affect water quality, as well as the plans and best management practices being employed to minimize potential affects. Table 2 cross-references the activities, Project components and plans to manage water quality in relation to the specific Oregon water quality standards.

4.1 OREGON ADMINISTRATIVE RULE 340-041-0004 ANTIDEGRADATION

"The purpose of the Antidegradation Policy is to guide decisions that affect water quality such that unnecessary further degradation from new or increased point and nonpoint sources of pollution is prevented, and to protect, maintain, and enhance existing surface water quality to ensure the full protection of all existing beneficial uses (OAR 340-041-0004)."

In keeping with the intent of ODEQ's Antidegradation policy, construction and operation of the JCEP is not anticipated to result in the degradation of water quality in Coos Bay, its tributaries, or other Waters of the State within the Project vicinity. Some potential short-term and localized impacts to water quality will likely occur as a result of construction-related activities in or immediately adjacent to jurisdictional waterbodies; however, these activities are not expected to adversely impact water quality and Best Management Practices (BMPs) will be implemented throughout the duration of the Project to avoid and/or minimize impacts wherever practicable.

Construction-related activities in or adjacent to jurisdictional waters could result in discharges to those waterbodies. Construction-related discharges will be temporary, short-term and localized, and will be authorized in accordance with the Project's 1200-C permit(s). BMPs will be employed to isolate work areas to protect the surrounding environment and permitted discharges will be treated prior to entering a waterbody to prevent contaminated or sediment-laden water from reaching receiving waters.

Operational stormwater and wastewater discharges at the LNG Terminal will also be authorized under the Project's NPDES permit(s) and comply with local, state and federal requirements. Stormwater and wastewater will be managed on site and treated before being discharged to receiving waters. Stormwater treatment will remove sediment and contaminants and prevent the discharge of stormwater that would adversely impact the water quality of receiving waters. Wastewater will likewise be treated to remove contaminants such as bacteria and toxic substances through the use of an oily water separator and pocket sewage treatment plant to prevent adverse impacts to the water quality of receiving waters.

JCEP does anticipate some impacts to water quality as they relate to the water quality parameters addressed in OAR Division 41. However, these impacts are not expected to substantially or adversely affect the overall quality of waterbodies within the Project area or Project vicinity. Some Project activities will likely result in the loss of habitat due to the placement of permanent infrastructure. These impacts will be mitigated so that JCEP does not result in any overall loss of habitat, habitat function or species. Given the nature of Project activities with the potential to impact water quality – primarily associated with

construction in or adjacent to waterbodies, dredging, construction and operational stormwater discharges, operational wastewater discharges, and discharge of vessel cooling water – impacts to temperature, if any, are anticipated to be insignificant per OAR 340-041-0004(3)(c), and would therefore not be considered a reduction in water quality. Similarly, reductions to dissolved oxygen, if any, are not anticipated to exceed a decrease of up to 0.1 mg/l per OAR 340-041-0004(3)(d). Any Project activities with the potential to affect dissolved oxygen will be managed to avoid and minimize impacts and will adhere to the conservation measures and BMPs outlined in Project plans and protocols. Therefore, a reduction in water quality is not expected.

While the JCEP does not anticipate substantial or adverse impacts to water quality as a result of the Project, any unanticipated reduction in water quality would be outweighed by the necessity of the proposed action, pursuant to OAR 340-041-0004(9)(a)(B). The purpose of and need for the JCEP have been documented extensively; an Alternatives Analysis detailing the evaluations conducted to arrive at the proposed action is provided as an attachment to the Project's 404/10 application to the USACE.

In addition to the conservation measures and BMPs that will be implemented to prevent impacts to water quality and mitigation for impacts to Endangered Species Act-listed species and habitat, the JCEP will be constructing the Kentuck Project, which will restore tidal exchange and provide tide channels, mudflat, salt marsh, and fringing water wetlands habitats at a former golf course. In all, the Kentuck Project will result in approximately 100 acres of construction to reconnect currently diked off wetlands to tidal estuarine and freshwater floodplain wetlands. Part of the Kentuck Project will be constructed to mitigate for permanent impacts from the construction of the JCEP and PCGP. Another portion of the Project will be constructed to provide additional environmental benefit, which will support water quality and fish habitat, among other benefits, in the Coos Bay Watershed.

4.2 OREGON ADMINISTRATIVE RULE 340-041-0007 STATEWIDE NARRATIVE CRITERIA

As stated in OAR 340-041-0007(1), "the highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels."

As is discussed throughout this document, the JCEP does not anticipate adverse impacts to water quality in general, or the water quality parameters addressed in Division 41 of the OARS, as a result of Project activities. The majority of impacts resulting from Project activities will be temporary, short-term and localized. Those impacts that are considered permanent are not expected to result in adverse impacts. BMPs and conservation measures will be implemented throughout the Project to prevent impacts to water quality as a result of Project activities to the maximum extent practicable, and the best practicable treatment will be employed when discharging to jurisdictional waters. For impacts that cannot be avoided, mitigation will be provided through restoration projects that will address the loss of habitat area and function and result in improved water quality within the Project area and Project vicinity.

4.3 OREGON ADMINISTRATIVE RULE 340-041-0009 BACTERIA

Construction and operation of the JCEP is not anticipated to have permanent and/or adverse impacts to water quality through the introduction of bacteria to Waters of the State.

Wastewater discharges at the LNG Terminal have the potential to impact bacterial concentrations in adjacent and receiving waters if not treated properly. In order to avoid and/or minimize these potential impacts, the JCEP will obtain a National Pollutant Discharge Elimination System (NPDES) permit from ODEQ to discharge wastewater to the IWWP and process and treat all sanitary waste to meet permit requirements. Sanitary waste from the northwest guard house and the tug building will be directed to a holding tank and a sanitary waste contractor will remove the contents of the tank, as necessary, for disposal at an authorized disposal site under the waste contractor's permits. In addition to other NPDES permit requirements, the Project will use an oily water separator and pocket sewage treatment plant to properly process and treat wastewater prior to discharging to Waters of the State. Therefore, wastewater discharges associated with the Project are not expected to contribute to elevated levels of fecal coliform bacteria in Coos Bay.

While stormwater discharges have the potential to introduce bacteria in Waters of the State, all construction and operational stormwater will be managed to meet applicable treatment standards. Construction stormwater discharges will be authorized under a 1200-C Construction Stormwater permit from ODEQ and in accordance with the Project's ESCP (JCEP 2017c; Appendix C). Operational stormwater discharges will comply with the Project's NPDES permit and in accordance with its ODEQ-approved SWMP (JCEP 2017d; Appendix D). Thus, no increase in bacteria concentrations are anticipated from stormwater or other discharges to jurisdictional waters. The Project does not anticipate increases in bacteria concentrations as a result of any other Project activities.

4.4 OREGON ADMINISTRATIVE RULE 340-041-0011 BIOCRITERIA

According to OAR 340-041-0011, "[w]aters of the State must be of sufficient quality to support aquatic species without detrimental changes in resident biological communities."

JCEP Project activities have the potential to affect biological communities within the Project area. Potential impacts to biological communities are anticipated as a result of dredging; the use of an in-water dredge slurry pipeline and pipeline cradle; the placement of permanent infrastructure associated with several Project components; wastewater discharge, ballast water discharge and cooling water intake and discharge associated with LNG carrier operation; the potential for construction and operational fuel and chemical spills; the placement of fill waterward of the HMT; vessel transit in estuarine and marine analysis areas; hydrostatic testing; aquatic vegetation removal; upland site preparation and facilities construction; and in-water work associated with road widening. These potential impacts would be primarily associated with construction activities that are short-term and localized, and are not expected to result in adverse impacts on a community scale.

Dredging will be conducted as part of the construction of the Slip and Access Channel, implementation of the NRIs and to construct the Eelgrass Mitigation Site. In the case of the NRIs, dredging will be conducted using a hydraulic cutter suction dredge and mechanical clamshell. Dredge material will be transported either via a submerged dredge pipe to be placed directly at the APCO 1 and APCO 2 sites or hydraulically pumped from a scow to the APCO sites. The temporary dredge transfer line will be elevated and supported by temporary steel piles before discharging material to the APCO sites, in order to avoid impacts to eelgrass habitat and associated biological communities near the APCO shoreline.

Construction of the Eelgrass Mitigation Site will require the dredging of a high spot within Coos Bay down to elevations that will support the establishment of eelgrass. The site will be excavated using a long reach excavator and shallow deck barge. The barge will be offloaded at a designated dredge offloading area and hydraulically placed at APCO Site 2.

While constructing the Slip, a two-phase construction approach will be implemented to minimize the impacts from construction on the biological community, specifically fisheries. The majority of the Slip area will be excavated (either wet or dry) behind a natural physical barrier that isolates the excavation area from Coos Bay. This approach will serve to reduce the total period of estuary turbidity and provide a physical barrier to protect fisheries and other biological communities from construction activities and impacts associated with increased turbidity and potential localized changes to dissolved oxygen and total dissolved solids concentrations. Prior to berm removal, slope protection will be provided in the Slip area, installed using a land-based crane and a crawler crane mounted on a barge, to minimize the amount of material entering the Bay and potentially impacting biological communities.

The remaining excavation and dredging work to construct the Access Channel and MOF will occur in open water. The Access Channel and MOF will be excavated using a clamshell dredge or hydraulic cutter suction dredge, removing the necessary material between the Slip berm and the FNC. Dredge material will be loaded onto barges and towed to shore for transfer to trucks and placement at available upland Project sites or will be hydraulically pumped via pipeline to upland Project sites.

Potential impacts to biological communities may occur during active dredging of the NRIs and the Slip and Access Channel, as increased turbidity generation could affect fish and other organisms in the immediate vicinity of dredging activities. Dredging work will be conducted during the in-water work window from October 1st to February 15th to avoid impacting sensitive life stages of fish. Turbidity will be monitored during dredging to ensure activities do not exceed 10% of existing levels within Coos Bay. Should this threshold be exceeded, corrective measures will be implemented until turbidity concentrations return to background levels and additional BMPs will be applied to dredging activities to prevent future exceedances. Direct habitat removal is also anticipated to result from dredging the Access Channel and MOF. Dredging for the NRIs and Slip and Access Channel will result in the direct removal of deep subtidal habitat that will impact biological communities occupying the substrate. This impact is expected to be temporary and will not adversely impact biological communities over the long-term, because the re-establishment of organisms in dredged areas is expected to occur within one year of dredging. Also, deep subtidal habitat is not a limited habitat type within Coos Bay; therefore, dredging in deep subtidal areas would not be expected to adversely impact organisms on a community scale (Newell, et al. 1998).

The hydraulic slurry pipeline and the decant water return pipeline employed during excavation of the Slip have the ability to span wetlands and waterbodies without the placement of any additional structures. The pipelines will be placed along areas to be developed for the Project, such as the Access and Utility Corridor. At any point along the slurry pipeline route where the line could rupture and its contents could enter Coos Bay, secondary containment will be provided. Once the pipelines are removed post-construction of the Slip and Access Channel, pipeline placement areas will be restored, including reseeding of formerly grassed areas. These measures will serve to avoid and minimize impacts to biological communities.

The placement of permanent infrastructure such as sheet pile walls and steel piles will require in-water work that could temporarily impact biological communities in the immediate vicinity during installation. Pile driving for the construction of marine facilities will be conducted in the dry behind the Slip berm to the maximum extent possible to limit impacts to biological communities in the vicinity. For example, pile driving to construct the tug dock, LNG loading foundation, and all mooring and berthing structures for the LNG and emergency berths will be driven on dry land. For the placement of permanent infrastructure that cannot be done in the dry and requires in-water work, this work will be conducted during the ODFW in-water work window from October 1st to February 15th. In addition, BMPs will be employed to isolate in-water work from the surrounding environment to minimize impacts to biological communities, which could include the use of sheet pile containment systems and turbidity curtains.

Wastewater discharges at the LNG Terminal have the potential to impact biological communities in adjacent and receiving waters if not treated properly. In order to avoid and/or minimize these potential impacts, the JCEP will obtain a NPDES permit from ODEQ to discharge wastewater to the IWWP and process and treat all sanitary and wastewater discharges to meet permit requirements. Sanitary waste from the northwest guard house and the tug building will be directed to a holding tank and a sanitary waste contractor will remove the contents of the tank, as necessary, for disposal at an authorized disposal site under the waste contractor's permits. In addition to other NPDES permit requirements, the Project will use an oily water separator and pocket sewage treatment plant to properly process and treat wastewater prior to discharging to Waters of the State. Therefore, wastewater discharges associated with the Project are not expected to impact biological communities in Coos Bay.

Ballast water will be discharged by LNG carriers at the Slip. Ballast water exchange will occur in the open sea, at least 200 miles from U.S. waters, as mandated by the U.S. Coast Guard. Therefore, the ballast water discharged at the Slip will have originated in the open sea, rather than a foreign port, greatly minimizing the potential for disturbance to endemic biological communities from the introduction of foreign or invasive species. The ballast water discharge velocities within the Slip will be low enough that larger organisms, including fish, marine mammals, reptiles and amphibians, will be not adversely affected. Some smaller organisms may be temporarily displaced by the discharge flow, but this displacement should be negligible within the confines of the Slip (JCEP 2017h).

Engine cooling water intake and discharge associated with LNG carrier operation is not anticipated to adversely impact biological communities. The discharge of heated engine cooling water has the potential to affect organisms within the Regulatory Mixing Zone (RMZ), where cooling water discharge mixes with the surrounding waterbody and where water temperatures may exceed 0.3° C above ambient temperatures. As documented in Moffatt & Nichol's Vessel Cooling Discharge Analysis Technical Memorandum (2017h; Appendix L), modeling conducted to determine the extent of the RMZ demonstrated that the RMZ may extend up to a maximum of 79.2 feet in depth, 22.1 feet in width and 12.1 feet in vertical rise for a Steam Turbine (ST) vessel under peak summer temperature conditions. For a Dual Fuel Diesel Electric (DFDE) vessel, the RMZ may extend up to a maximum of 36.5 feet in depth, 6.9 feet in width and 1.3 feet in vertical rise under stratified winter conditions. While cooling water discharge from ST vessels results in a larger RMZ, these vessels are older and are being phased out over time. The JCEP anticipates that 40% of LNG vessels calling on the LNG Terminal will be ST vessels, and this percentage will continue to decrease over time as the industry continues to shift toward using DFDE vessels. Therefore, the majority of vessels calling on the LNG Terminal are anticipated to be DFDE vessels, which will result in a smaller RMZ and fewer impacts to biological communities in the immediate vicinity. While temperatures within the RMZ will exceed 0.3° C above ambient temperatures, the cooling discharge water will quickly dissipate when mixed with the surrounding water in the Slip and considering the tidal mixing that occurs in Coos Bay. Thus, impacts to organisms would be short-term and localized, and would not occur on a community scale. The intake of cooling water is likewise not anticipated to impact biological communities. While the entrainment of individual organisms could occur during the intake of cooling water, this activity would not impact organisms on a community scale. Cooling water intake will only occur when LNG vessels are docked at the LNG terminal, which will not exceed 120 vessels per year, with an average vessel port time of approximately 36 hours. In addition, the natural mortality of aquatic organisms in the bay is comparatively 363 times greater than the expected mortality of aquatic organisms from cooling water intake by an LNG vessel (Shanks et al. 2011).

The potential for construction or operational fuel spills exists for this Project due to the use of construction equipment and the transit of LNG carriers and other vessels during operation. To minimize the risk of fuel spills and their impact on biological communities, the Project has developed a Construction SPCCP (JCEP 2017a; Appendix B) and an Operations SPCCP (JCEP 2017b, Appendix K) to address the potential for spills as a result of Project activities, identify measures to prevent spills, and develop plans and procedures for responding to spills to minimize the extent and impact of an occurrence. As outlined in the Project's SPCCPs, hazardous substances, including chemicals, oils and fuels, will not be stored within 100 feet of a waterbody or wetland boundary to prevent the release of toxic substances into jurisdictional waters. Secondary containment or diversionary devices will be required for all areas with containers 55 gallons or larger. Dikes, retaining walls, curbing, weirs, booms, and diversions/retention ponds may all be employed to prevent the discharge of toxic substances. To prevent fuel oil or other hazardous material spills from construction equipment and vehicles, vehicles will be parked inside the loading/offloading containment area, if applicable, and all precautions shall be taken to safely load and offload shipments. All equipment will be parked overnight and/or fueled at least 100 feet from a waterbody or an upland area at least 100 feet from a wetland boundary.

As documented in the Project's SPCCPs for construction and operation (JCEP 2017a; JCEP 2017b; Appendices B and K), in the event of an oil spill incident, immediate action will be taken to contain the spill and limit its impacts to the surrounding area. Spilled material will be diverted away from outfalls and waterbodies with absorbent booms or trenches. If the spill does reach a waterbody, oil booms and hay bales will be used to prevent further spread. Countermeasures will also be implemented to contain, clean up and mitigate the effects of a spill that could impact navigable waters. Trenching, diking and the use of filter fences and booms may all be used to contain the spill. Once contained, pumps, sorbents, skimmers, vacuum trucks and shovels may all be used to clean up the spill.

Fill will be placed waterward of the HMT to support the construction of the MOF, restoration at the Kentuck site and improvements to the TPP and Highway 101. The placement of fill will likely result in the removal of habitat that could temporarily impact biological communities in those locations. However, permanent or adverse impacts to biological communities are not anticipated, as the habitat areas affected, such as mudflat and shallow subtidal, are not limited within Coos Bay. Mitigation for impacts to these habitats will also be provided. Additionally, measures will be implemented to isolate work areas where fill is being placed to minimize impacts to the surrounding area. Construction of the MOF will require the placement of fill waterward of the HMT to create an upland work area to allow for the majority of MOF construction to be conducted in the dry. Construction of the MOF will result in the filling of intertidal mudflat/sand, shallow subtidal habitat and a small portion of eelgrass habitat waterward of the HMT. Once the construction of the MOF is complete, a portion of the fill will be removed, and the excavated area will become deep subtidal habitat. Construction on the TPP and Highway 101 will result in the filling of mudflat/sand areas to install rip rap to provide a foundation for roadway widening. Fill activities will be isolated from Coos Bay using a temporary sheet pile containment system and turbidity curtain. Fill may be placed waterward of the HMT at the Kentuck site during the construction of the bridge and culvert, however, this has not been definitively determined. Should fill be placed waterward of the HMT, work area isolation measures will be employed at the site, which could include the use of a sheet pile containment system and turbidity curtain, and all fill activities will follow the measures outlined in the Project's ESCP (JCEP 2017c; Appendix C) and 1200-C permit.

Hydrostatic testing will require discharging water to the local stormwater system following testing and approval by ODEQ, or to the IWWP according to NPDES requirements. While hydrostatic test water may contain chemicals and has the potential to discharge toxic substances into the stormwater or IWWP systems, this water will be treated prior to being discharged to the appropriate system to meet ODEQ and NPDES requirements. Additionally, the test water will be discharged into a large system in which it will be quickly diluted. Therefore, no impacts to biological communities are anticipated as a result of the discharge of hydrostatic test water.

The removal of aquatic vegetation, such as eelgrass habitat, associated with Project activities could impact biological communities. Eelgrass beds within Coos Bay support invertebrate food sources for adult and juvenile fish, as well as providing shelter for bottom-dwelling invertebrates and fish. The construction of the Slip and Access Channel and MOF will result in the removal of eelgrass habitat, while the placement of dredge lines related to work at the NRIs, Eelgrass Mitigation Site and Kentuck site will result in potential impacts to eelgrass habitat. Impacts to eelgrass and, consequently, biological communities, are not anticipated to be adverse because the areas affected are small in comparison to the overall availability of eelgrass in Coos Bay. In addition, any impacts resulting from dredging activities is anticipated to be short-term, as these areas would recover to pre-dredging conditions within one year (Newell et al. 1998). Impacts to aquatic vegetation will be mitigated at the Eelgrass Mitigation Site, which will result in a long-term benefit to eelgrass and the biological communities that depend on this habitat.

Upland site preparation will involve the removal of topsoil, cut (excavation and dredging), fill (placement of excavated material), and grading of material to the appropriate elevations. Site preparation activities could impact biological communities in the absence of appropriate isolation and containment measures that would prevent material from entering adjacent jurisdictional waters. Site preparation activities for all Project components will adhere to the Project's ESCP (JCEP 2017c; Appendix C) and 1200-C permit to avoid and/or minimize the discharge of site material to Waters of the State that could impact nearby biological communities. Sediment protection devices will be set on all storm drains, catch basins and other conveyance structures that are susceptible to sediment collection to prevent this material from entering nearby waters. Temporary seeding will be performed to re-establish vegetative cover on disturbed areas and prevent the erosion of exposed soils. Compost wood chips or peat cover will also be placed on disturbed areas to absorb wind and rain forces and to develop an adequate growing medium for vegetation.

In-water work during road widening for the Kentuck Project and the TPP/Highway 101 improvements could result in potential impacts to biological communities. BMPs will be employed to avoid and/or minimize impacts to organisms in the vicinity of in-water work, which will include the use of a temporary sheet pile work isolation containment system and turbidity curtain. Work area isolation measures will serve to protect the surrounding environment and prevent the discharge of material into Waters of the State that could otherwise impact biological communities.

A number of Project activities have the potential to impact biological communities within the Project area. The majority of potential impacts would occur during the construction phase of the Project and would be short-term, localized, temporary, and are not expected to impacts on a community scale. Conservation measures and BMPs will be employed throughout the life of the Project to avoid and/or minimize impacts to biological communities.

4.5 OREGON ADMINISTRATIVE RULE 340-041-0016 DISSOLVED OXYGEN

Potential impacts to dissolved oxygen (DO) concentrations may result from JCEP Project activities such as the placement of permanent infrastructure, upland site preparation and facilities construction, restoration activities at the Kentuck site, in-water work associated with road widening and the exchange of ballast waters by LNG carriers.

Wastewater discharges and stormwater runoff are not anticipated to result in adverse impacts to DO concentrations. Construction stormwater discharges will be short-term, temporary, treated, authorized under the Project's 1200-C permit and in accordance with the Project's SWMP (JCEP 2017d; Appendix D) and ESCP (JCEP 2017c; Appendix C). Operational wastewater and stormwater discharges will be treated and authorized under the Project's NPDES permits and, in the case of stormwater, according to the Project's SWMP (JCEP 2017d; Appendix D).

Similarly, the placement of dredge spoils at various sites within the Project area is not anticipated to contribute to a change in DO concentrations. Dredge spoils will be contained within berms constructed of dry material. Containment areas and berms will be sized appropriately to accommodate the dredge material delivery method and Project schedule. Wet material delivered by truck will be allowed to dry or decant within the containment area. Material delivered from the cutter suction dredge will be suspended in water and pumped to the containment area. At a low point within the containment area, a vertical riser will be installed to allow decant water to leave the spoils area by pipe. This water will then be collected and pumped back to the slip via a decant return line. Sufficient settling times will be provided for decanted water prior to being pumped to the Slip to prevent discharging sediment-laden water that could impact DO concentrations.

The placement of permanent infrastructure could result in temporary and localized impacts to DO when construction activities result in the release of material into Waters of the State or an increase in turbidity levels. In order to prevent impacts to DO, appropriate work area isolation measures will be employed to prevent the discharge of material into adjacent waters. For example, the construction of the Slip and associated marine facilities will be conducted in the dry, behind an existing berm, as much as possible to limit the exposure and discharge of material into adjacent water. Some infrastructure construction, such as the installation of sheet pile walls and steel piles, will require in-water work that could temporarily impact DO in the immediate vicinity during installation. For the placement of permanent infrastructure that cannot be done in the dry, BMPs will be employed to isolate in-water work from the surrounding environment to minimize impacts to biological communities, which could include the use of sheet pile containment systems and/or turbidity curtains.

Upland site preparation will involve the removal of topsoil, cut (excavation and dredging), fill (placement of excavated material), and grading of material to the appropriate elevations. These site preparation activities have the potential to impact DO concentrations in adjacent jurisdictional waters in the absence of appropriate isolation and containment measures that would prevent material from entering these waters. Site preparation activities for all Project components will adhere to the procedures in the Project's ESCP (JCEP 2017c; Appendix C) and 1200-C permit to avoid and/or minimize the discharge of site material to Waters of the State. For example, sediment protection devices will be set on all storm drains,

catch basins and other conveyance structures that are susceptible to sediment collection to prevent this material from entering nearby waters. Temporary seeding will be performed to re-establish vegetative cover on disturbed areas and prevent the erosion of exposed soils. Compost wood chips or peat cover will also be placed on disturbed areas to absorb wind and rain forces and to develop an adequate growing medium for vegetation.

In-water work during road widening for the Kentuck Project and the TPP/Highway 101 improvements, as well as the breaching of the dike at the Kentuck site could result in temporary impacts to DO as a result of erosion and resulting increases in turbidity. BMPs will be employed to avoid and/or minimize impacts to DO during in-water work. For example, in-water work area isolation measures will be installed to isolate and protect the surrounding environment and prevent the discharge of material into Waters of the State that could lead to increases in turbidity and, consequently, decreases in DO.

Ballast water discharged into the Slip by LNG carriers would be composed of open ocean water with a physio-chemical composition very similar to that which occurs in Coos Bay. However, the ballast water contained within the ship does have the potential to influence DO concentrations in the Slip when discharged. While this ballast water is not expected to be anoxic, it will likely have lower DO levels than water in the Slip since this water will have been contained in the ballast of the ship without exposure to sunlight or mixing from wind, waves and currents. Despite the potentially lower DO levels in the ballast water, this water will be discharged near the bottom of the Slip, where DO levels are naturally lower than near the surface. In addition, the Slip is immediately adjacent to Coos Bay and is exposed to some degree of mixing that will likely serve to dissipate any localized decreases in DO. Therefore, no significant impacts to DO are likely to occur as a result of ballast water exchange.

4.6 OREGON ADMINISTRATIVE RULE 340-041-0019 NUISANCE PHYTOPLANKTON GROWTH

The Project does not anticipate conducting any activities, either during construction or operation, that would lead to increased phytoplankton growth in waterbodies within the Project area. Wastewater will be treated prior to discharge and comply with the Project's NPDES permit; therefore, these discharges are not expected to contribute to increased phytoplankton growth. Construction-related discharges will be temporary, short-term, and in accordance with the Project's 1200-C permit(s). In-water work areas will be isolated to protect the surrounding environment and prevent increases in turbidity and/or the release of pollutants or other constituents that could contribute to phytoplankton growth.

4.7 OREGON ADMINISTRATIVE RULE 340-041-0021 PH

The Project activities with the potential to affect pH are associated with the concrete batch plant at the Box Car Hill site and pouring of a cast-in-place concrete deck of the bridge between APCO 1 and 2, which can generate high pH wastewater. A concrete washout area will also be located adjacent to the batch plant to allow for the containment and disposal of wastewater related to concrete batching operations. This wastewater will be disposed of according to local, state and federal requirements and the concrete batch plant operator's mobile 1200-A permit. Therefore, JCEP does not anticipate that the utilization of a concrete batch plant will result in adverse impacts to pH in adjacent Waters of the State.

The pouring of concrete for the APCO bridge will be managed in accordance with the 1200-C permit issued for the development of APCO Sites 1 and 2. In general, all water that comes in contact with green concrete during pouring of the concrete bridge deck will be pumped into tanks for disposal at an approved off-site location.

As with many of the water quality parameters discussed in this memorandum, impacts to the pH of jurisdictional waters within the Project area are not anticipated as a result of construction or operational stormwater and wastewater discharge. Construction-related discharges to waterbodies will be authorized in accordance with the Project's 1200-C permit(s). Discharges will be managed and treated in accordance with the site specific ESCP (JCEP 2017c; Appendix C) before entering a waterbody and will not contain contaminated or sediment-laden water that could affect the pH of the receiving water. Operational stormwater and wastewater will likewise be treated prior to discharge and will comply with the Project's NPDES permits. In addition, in-water work will be isolated to protect the surrounding environment and prevent the release of pollutants or other constituents that could affect the pH of the waterbody.

4.8 OREGON ADMINISTRATIVE RULE 340-041-0028 TEMPERATURE

Potential impacts to temperature could result from the following Project activities: hydrostatic testing, ballast water discharge, LNG vessel cooling water discharge and stormwater runoff. Hydrostatic testing at the LNG Terminal has the potential to affect temperatures; however, since this test water will be discharged to the local stormwater system or IWWP upon review and approval by ODEQ and in accordance with an NPDES permit and quickly diluted, the JCEP anticipates that test water disposal will not adversely impact the temperatures of receiving waters.

Ballast water discharge is not anticipated to impact temperatures with Coos Bay. The water contained within the ballast will have been taken up in the open ocean and stored in the ship's hull below the waterline. Therefore, ballast water temperatures are unlikely to deviate much from ambient temperatures in the surrounding water.

Engine cooling water intake and discharge associated with LNG carrier operation is also not anticipated to impact temperatures. Modeling conducted by Moffatt & Nichol (2017h; Appendix L) suggests that the release of heated engine cooling water into the Slip when LNG carriers are docked would result in temperature increases above 0.3° C within a RMZ of 79.2 feet in depth, 22.1 feet in width and 12.1 feet in vertical rise for ST vessels, and 36.5 feet in depth, 6.9 feet in width and 1.3 feet in vertical rise for DFDE vessels. The majority of vessels calling on the LNG Terminal will be DFDE vessels, which have a smaller RMZ extent. In addition, temperatures would continue to decrease with distance from the point of discharge. Considering the volume of water in the Slip and tidal mixing in Coos Bay, the release of heated engine cooling water would not significantly increase water temperatures. Any increases that do occur would be temporary, localized and short-term.

Wastewater and stormwater discharges have the potential to affect the temperature of receiving water; however, impacts to temperature are not expected. These discharges will be treated prior to entering receiving waters, comply with all local, state and federal requirements, and will not be discharged at temperatures substantially different than that of the receiving waters.

4.9 OREGON ADMINISTRATIVE RULE 340-041-0031 TOTAL DISSOLVED GAS

Construction and operation of the Project is not anticipated to result in an increase in total dissolved gases in waterbodies within the Project area. No construction- or operation-related activities will result in discharges that increase total dissolved gas concentrations. Construction-related discharges to waterbodies will be treated and authorized in accordance with the Project's 1200-C permit(s). Operational wastewater and stormwater discharges will also be treated prior to entering receiving waters and will comply with the Project's NPDES permits.

4.10 OREGON ADMINISTRATIVE RULE 340-041-0032 TOTAL DISSOLVED SOLIDS (TDS)

According to the water quality standards and policies for the South Coast Basin, in which Coos Bay is located, total dissolved solids (TDS) may not exceed 100.0 mg/L. While temporary increases in TDS could result from Project activities, adherence to the protocols outlined in the Project's ESCP (JCEP 2017c; Appendix C) and SWMP (JCEP 2017d; Appendix D) will limit TDS concentrations, which are not expected to exceed the 100.0 mg/L threshold. The placement of permanent infrastructure, upland site preparation and facilities construction, construction and operational stormwater runoff, dredging, placement of fill waterward of the HMT, use of an in-water dredge slurry pipeline and pipeline cradle, and breaching of the dike at the Kentuck site could result in the release or exposure of particulates that could increase TDS concentrations in adjacent or surrounding waters. Many of these potential construction-related discharges will be authorized under the Project's 1200-C permit and will be avoided and/or minimized to the maximum extent practicable through the employment of BMPs.

Construction-related stormwater discharges will be managed and treated in accordance with the site specific ESCP (JCEP 2017c; Appendix C) and will be discharged according to the Project's 1200-C permit requirements, which will prevent the discharge of contaminated or sediment-laden water that could increase TDS concentrations. Operational stormwater discharges will also be treated and discharged according to the conditions of the Project's NPDES permit to prevent increases in TDS concentrations.

Certain Project activities, such as dredging and placement of fill waterward of the HMT, will result in unavoidable temporary increases in TDS concentrations. While these increases may be unavoidable, the impacts will be short-term and localized, and BMPs will be employed to limit the extent of exposure. For example, cutter head suction dredges will be used wherever conditions allow to minimize the release of sand and rock in surrounding waters during dredging activities. Sheet pile containment systems and turbidity curtains will be used to isolate in-water work and fill placement activities to limit the exposure of material to surrounding waters and reduce TDS concentrations.

Upland site preparation and facilities construction at the LNG Terminal and other temporary construction areas could cause increases in TDS in adjacent waterbodies. To avoid and/or minimize increases in TDS, construction areas will be stabilized with temporary erosion controls until construction is complete to prevent site material from entering adjacent waterbodies as detailed in the site-specific ESCP (JCEP 2017c; Appendix C). Following construction, the site will be brought up to final grade and BMPs will be employed throughout the life of the Project to prevent erosion at the site.

In-water work during road widening for the Kentuck Project and the TPP/Highway 101 improvements, as well as the breaching of the dike at the Kentuck site could lead to temporary increases in TDS as a result of site erosion and the discharge of fill materials into Waters of the State. BMPs will be employed to avoid and/or minimize increases in TDS during in-water work. For example, in-water work area isolation measures will be installed to isolate and protect the surrounding environment and prevent the discharge of material into surrounding waters.

Upland site preparation will involve the removal of topsoil, cut (excavation and dredging), fill (placement of excavated material), and grading of material to the appropriate elevations. These site preparation activities have the potential to increase TDS in adjacent jurisdictional waters in the absence of appropriate isolation and containment measures that would prevent material from entering these waters. Site preparation activities for all Project components will adhere to the procedures in the Project's ESCP (JCEP 2017c; Appendix C) and 1200-C permit to avoid and/or minimize the discharge of site material to Waters of the State. For example, sediment protection devices will be set on all storm drains, catch basins and other conveyance structures that are susceptible to sediment collection to prevent this material from entering nearby waters. Temporary seeding will be performed to re-establish vegetative cover on disturbed areas and prevent the erosion of exposed soils. Compost wood chips or peat cover will also be placed on disturbed areas to absorb wind and rain forces and to develop an adequate growing medium for vegetation.

4.11 OREGON ADMINISTRATIVE RULE 340-041-0033 TOXIC SUBSTANCES

Construction and operation of the Project is not anticipated to result in the release of toxic substances to jurisdictional waters. However, there is the potential for toxic substances to impact water quality in association with the following activities: placement of permanent infrastructure, stormwater runoff during construction and operation, fueling and chemical spills during construction and operation, temporary construction areas, operation of construction vehicles and equipment and during LNG vessel transit. BMPs will be implemented across the Project to prevent pollutants from entering waterbodies. Containment measures will be employed to isolate work and storage areas and prevent sediment, fuel and other hazardous substances from entering waterbodies.

During site preparation activities, existing functional and redundant infrastructure will be cleared and removed from the LNG Terminal site to enable earthwork to progress. The South Dunes site contains small areas of known hydrocarbon contaminated soils that remain at the site after the decommissioning of the former Weyerhaeuser paper mill. The contaminated areas are located in the vicinity of the proposed location of permanent buildings and will likely be disturbed during soil improvement activities in those areas. Additionally, there are known areas of contaminated sediment in the bottom of the former Kentuck golf course irrigation sump pond. Further delineation work will be performed by JCEP at both the South Dunes and Kentuck sites to further characterize the areas of contamination and develop an ODEQ-approved disposal plan that will remove existing contaminated soils and prevent further contamination of the site.

Within the Slip and Access Channel, the PLF will support a number of elements that facilitate the safe transfer of LNG between the LNG facility and the LNG carriers. The PLF will support four marine loading arms, which are designed with swivel joints and fitted with a hydraulically interlocked double ball valve and powered emergency release coupling to isolate the arm and the LNG carrier in the event of an emergency in which rapid disconnection is required. LNG spill containment will be accomplished through the construction of a concrete curbed and sloped area that will contain any LNG spillage and allow the spill to safely flow away from the loading area to the marine area LNG impoundment basin through a spill collection trench.

Hydrostatic testing of Project infrastructure such as the LNG storage tanks will use freshwater sources from the CBNBWB. Water used in hydrostatic testing will be discharged locally to the stormwater system following testing and approval by ODEQ or to the IWWP according to NPDES requirements. In order for the disposal of hydrostatic test water to be approved, the JCEP will submit a formal request to ODEQ, containing information on the testing to be conducted, the chemical (if any) to be added to the hydrotest water, the potential for the water to acquire contaminants during the hydrotest, and the types of chemical analyses that will be conducted on the test water prior to discharge to ensure that the JCEP meets ODEQ requirements. While hydrostatic test water may contain chemicals, and has the potential to discharge toxic substances into the stormwater or IWWP systems, this water will be treated prior to discharge to meet ODEQ and NPDES requirements. Additionally, the test water will be discharged into a large system in which it will be quickly diluted. Therefore, no adverse impacts to water quality are anticipated as a result of the discharge of hydrostatic test water.

As outlined in the Project's SPCCPs (JCEP 2017a; JCEP 2017b; Appendices B and K), to prevent potential fuel or other hazardous material spills on the Project storage areas within the Project sites will be clearly marked and designated as such. Containers will be properly labeled to indicate the contents and accumulation dates and kept closed when not in use. Hazardous substances, including chemicals, oils and fuels, will not be stored within 100 feet of a waterbody or wetland boundary to prevent the release of toxic substances to jurisdictional waters. Secondary containment or diversionary devices will be required for all areas with containers 55 gallons or large. These areas will be inspected regularly to check for leaks and container deterioration. Dikes, retaining walls, curbing, weirs, booms, and diversions/retention ponds may all be employed to prevent the discharge of toxic substances.

To prevent fuel oil or other hazardous material spills resulting from construction equipment and vehicles, the Project will comply with Oregon Department of Transportation (ODOT) requirements for tank truck loading/offloading. For example, vehicles will be parked inside the loading/offloading containment area, if applicable, and all precautions shall be taken to safely load and offload shipments. All equipment will be parked overnight and/or fueled at least 150 feet from a waterbody or an upland area at least 150 feet from a wetland boundary.

As documented in the Project's SPCCPs (JCEP 2017a; JCEP 2017b; Appendices s B and K), in the event of an oil spill incident, immediate action will be taken to notify the primary contacts listed in the emergency contacts section of the plan and to implement spill control procedures to contain the spill and limit its impacts to the surrounding area. For example, spilled material will be diverted away from outfalls and waterbodies with absorbent booms or trenches. If the spill does reach a waterbody, oil booms and hay bales will be used to prevent further spread. Countermeasures will also be implemented to contain, clean up and mitigate the effects of a spill that could impact navigable waters. Trenching, diking and the use of filter fences and booms may all be used to contain the spill. Once contained, pumps, sorbents, skimmers, vacuum trucks and shovels may all be used to clean up the spill.

Construction-related stormwater discharges will be authorized in accordance with the Project's 1200-C permit(s) and will be managed and treated in accordance with the site specific ESCP (JCEP 2017c; Appendix C) and SWMP (JCEP 2017d; Appendix D), and will not contain contaminated or sediment-laden water that could introduce toxic substances to waterbodies above background concentrations. Operational stormwater will be treated in a similar manner and in accordance with the Project's NPDES permit to prevent sediment-laden or polluted water from entering receiving waters.

4.12 OREGON ADMINISTRATIVE RULE 340-041-0036 TURBIDITY

The following activities have the potential to affect turbidity: LNG vessel transit; dredging and dredge spoil placement; temporary dredge line and dredge transfer line placement and operation in-water work associated with road widening; construction at the Kentuck site; placement of permanent infrastructure, upland site preparation and construction, stormwater runoff during construction and operation, placement of fill waterward of HMT, the use of temporary construction areas, and the operation of construction vehicles.

Vessel transit within the FNC has the potential to increase erosion along the Coos Bay shoreline and, consequently, turbidity, as a result of propeller wash from LNG carriers and tug boats, as well as ship wakes (waves) breaking on shore. In addition, the use of shallow draft tugboats to assist LNG carriers in mooring and departure could cause some resuspension of bottom sediments and increased turbidity. Impacts associated with these activities are anticipated to be temporary and short-term. Modeling conducted by Moffatt & Nichol (2006; 2017c; Appendix I) and CHE (2011) indicates that turbidity caused by propeller wash would be slight within the FNC because the increased velocity would be similar to maximum tidal currents. Increased erosion from ship wakes is also anticipated to be minor. Increased wave action from the transit of LNG vessels would result in wave heights at the shoreline of approximately 0.2 feet, a negligible difference when compared to existing conditions. Wave heights associated with the transit of tugboats would be approximately 0.2 to 0.8 feet, depending on vessel speed. Importantly, LNG vessels and tugboats associated with the JCEP will transit the FNC on an infrequent basis (maximum of 120 vessels per year), minimizing the potential impact on shoreline erosion and turbidity. Also, the wave heights associated with LNG vessel traffic are significantly smaller than those generated by existing bulk carriers transiting the FNC, and the wave heights generated by tugboats would fall within the normal magnitude of wind-generated waves that naturally occur within the bay (Moffatt & Nichol 2017f; Appendix J).

Propeller wash within the Slip will be minimized because LNG carriers will not use a thruster or the ship's power in docking operations, but will instead be maneuvered with the assistance of tugboats. For undocking operations, carriers may use the ship's power; however, undocking would occur during high tide to increase the vertical separation between the vessels and the bay bottom and minimize turbidity generation. CHE (2011) conducted modeling to understand the effects of sediment scour at the Slip from tugboat operations and determined that these operations would be unlikely to erode the shoreline. In addition, the Slip will be armored to minimize erosion. Bottom disturbance of approximately 2 inches could occur in the Slip over an area of approximately 50 feet by 100 feet during docking. Turbidity increases resulting from this bottom disturbance would be infrequent, localized, and would settle once the tugboat propellers stopped.

Temporary increases in turbidity generation will occur during active dredging and could affect fish and other organisms in the immediate vicinity of dredging activities, as detailed in the Turbidity Analysis Technical Memorandum (Moffatt & Nichol 2017d; Appendix G). A turbidity monitoring plan will be developed for the Project and the provisions of this plan will be followed during all dredging activities. Turbidity concentrations will be monitored throughout active dredging to ensure that concentrations do not increase 10% above background turbidity levels in Coos Bay. Should this threshold be exceeded, dredging will be suspended until turbidity concentrations return to background levels and additional BMPs will be applied to dredging activities to prevent future exceedances. In order to minimize turbidity during dredging, environmental controls will be implemented whenever possible, which could include the use of a cutter suction dredge or closed clamshell bucket to minimize turbidity generation at the dredging site. In addition, dredging activities will be conducted during the in-water work window from October 1st to February 15th to limit potential impacts to sensitive life stages of fish.

In-water work during restoration activities at the Kentuck site and road widening for the TPP/Highway 101 improvements, as well as the placement of fill waterward of the HMT to support construction of the MOF, Kentuck site and improvements to the TPP and Highway 101, could result in temporary increases in turbidity. BMPs will be employed to avoid and/or minimize turbidity during in-water work. For example, in-water work area isolation measures will be installed to isolate and protect the surrounding environment and prevent the discharge of material into Waters of the State that could lead to increases in turbidity. Work areas will be isolated using temporary sheet pile containment systems and/or turbidity curtains to prevent and/or minimize increases in turbidity. Fill placement for the construction of the MOF will result in temporary increases in turbidity within the bay. Following fill placement during the in-water work window, the use of concrete pillow blankets, launch ramp mats and/or rip rap will temporarily protect the fill material from tidal erosion. During a second in-water work window, a sheet pile wall will be driven into the fill area and the temporary protection measures will be removed. A portion of the fill material will be dredged as part of the Access Channel dredging, which will likely result in increased turbidity in the vicinity. Turbidity generation from MOF construction activities is anticipated to be temporary and localized and will occur in an area where increased turbidity would not deviate substantially from ambient turbidity levels.

Upland site preparation will involve the removal of topsoil, cut (excavation and dredging), fill (placement of excavated material), and grading of material to the appropriate elevations. These site preparation activities have the potential to lead to erosion and an increase in turbidity concentrations in adjacent jurisdictional waters in the absence of appropriate isolation and containment measures that would prevent material from entering these waters. Site preparation activities for all Project components will adhere to the procedures in the Project's ESCP (JCEP 2017c; Appendix C) and 1200-C permit to avoid and/or minimize the discharge of site material to Waters of the State. For example, sediment protection devices will be set on all storm drains, catch basins and other conveyance structures that are susceptible to sediment collection to prevent this material from entering nearby waters. Existing vegetation will be preserved wherever possible and vegetative erosion control practices will be used wherever existing vegetation cannot be preserved. Temporary seeding will be performed to re-establish vegetative cover on disturbed areas and prevent the erosion of exposed soils. Compost wood chips or peat cover will also be placed on disturbed areas to absorb wind and rain forces and to develop an adequate growing medium for vegetation. Following final grade development, areas designated for vegetation will be hydroseeded and mulched with tackifier or stabilized with sod (JCEP 2017c; Appendix C).

During upland site preparation, the placement of permanent infrastructure, and at temporary construction areas, sediment controls will be provided to prevent material from leaving these sites. Sediment controls will be placed along the site perimeters and all storm drain inlets and outlets during construction. Sediment fences, straw wattles, filter socks or other similar control measures will be used to filter sediment-laden stormwater. Earthen dikes, drainage swales and check dams and sediment basins will also be used to prevent sediment from entering adjacent waters. Permanent sediment basins and buried infiltration chambers will be constructed to manage stormwater during operation of the Project. In the event that significant amounts of sediment or turbidity are observed downstream of permitted activities in the Project's conveyance system, or in surface water near the permitted activity, corrective actions will be taken to prevent or control the discharges. Additional BMPs will be implemented to prevent further discharges and ODEQ will be notified of the corrective actions.

4.13 OREGON ADMINISTRATIVE RULE 340-041-0046 WATER QUALITY LIMITED WATERS

In ODEQ's Oregon's 2012 Integrated Report, Coos Bay is included on the Section 303(d) list for not meeting the criteria for shellfish growing since 2004, due to elevated fecal coliform levels. The Integrated Report classifies Coos Bay as a Category 5 – Water Quality Limited waterbody that is in need of a Total Maximum Daily Load. As described in detail in previous sections of this document, including, but not limited to, sections addressing bacteria; biological criteria; dissolved oxygen; temperature; and toxic substances, the Project does not anticipate adverse impacts to water quality that would further increase fecal coliform levels in the bay and impact shellfish growing.

4.14 OREGON ADMINISTRATIVE RULE 340-041-0340 THROUGH 0345 BASIN-SPECIFIC CRITERIA (SOUTH COAST BASIN)

The basin-specific criteria for the South Coast Basin identify the beneficial uses to be protected in the basin as water quality, designated fish uses, coastal water contact recreations and shellfish harvesting. Permanent impacts will be relatively small and are not expected to impact the overall water quality within the basin or adversely impact beneficial uses. Some temporary, short-term, and localized impacts will likely occur; however, these impacts will not permanently or adversely affect water quality or designated uses in Waters of the State.

4.15 OTHER REQUIREMENTS OF STATE LAW

In addition to the water quality standards outlined in Division 41 of the OARs, effects to water quality parameters from the JCEP, including salinity and groundwater, warrant discussion.

Salinity

As documented in Moffatt & Nichol's Salinity Technical Memorandum (2017e; Appendix F), impacts to salinity levels within Coos Bay are not anticipated as a result of the Project, and are primarily influenced by fluvial inflow rather than channel depth or width. Sampling conducted in Coos Bay by the Oregon Institute of Marine Biology (OIMB) (Shanks et al. 2010, 2011) indicates a great amount of variability in the physical oceanographic data for the waters of Coos Bay. A wide range in salinity was observed within Coos Bay, which varies both seasonally and tidally from a low of 16 practical salinity units (psu) at low tide in winter, to 33 psu during high tide in May and September. On average, ocean seawater has a salinity of approximately 35 psu. Project activities evaluated for the potential to affect salinity included stormwater discharges and ballast water discharges from LNG vessels. No changes to salinity are anticipated from the discharge of stormwater, as the volume of discharges will be small relative to the volume of water in Coos Bay. Any increase in salinity from ballast water discharge would be negligible and is not anticipated to affect salinity levels within the larger Coos Bay. The estimated volume of water passing through Coos Bay in the vicinity of the LNG Terminal during one complete tidal cycle is 106-million cubic meters. Therefore, any increase in salinity from the estimated 9.2-million gallons (34,825 m^3) of ballast water discharged into the slip would constitute only 0.3 percent of the water passing by the LNG Terminal (Shanks et al. 2010, 2011). Consequently, no change in salinity within in Coos Bay is expected.

Groundwater

The LNG Terminal site is located at the southern edge of the Dune-Sand Aquifer, a 19.5-square-mile unconsolidated-deposit aquifer composed primarily of loosely compacted and uncemented fine- to medium-grained sand, with areas of discontinuous silt and clay (USGS 1992). The aquifer collects surface water that percolates through dunes on the North Spit and settles on harder substrates below. The aquifer ranges from 0-200 feet, and is approximately 160 feet below sea level at the LNG Terminal site. Depth to groundwater in Coos County typically ranges from 10-110 feet below ground surface. Within the JCEP Project area, groundwater elevations range from 1-18 feet NAVD88. Groundwater levels fluctuate tidally and seasonally in response to rainfall (JCEP 2017h).

The primary water quality issues associated with groundwater and the Dune-Sand Aquifer are saltwater intrusion and iron (GSI 2017a). The aquifer is bounded on three sides by saltwater bodies (Pacific Ocean, Coos Bay, North Slough), creating hydraulic flow boundaries with a saltwater/freshwater interface. Long-term monitoring by the CBNBWB indicates the location of this interface is stable. However, should a substantial decline in natural recharge or over pumping of the aquifer occur, the saltwater interface could migrate landward. In addition to saltwater intrusion concerns, high concentrations of iron in shallow groundwater occur from leaching as rainwater percolates through vegetative litter into the underlying dunal sands (GSI 2017a). Once the percolated water reaches the water table, iron remains dissolved in shallow groundwater and can migrate deeper into the aquifer.

The CBNBWB has 18 groundwater wells located within the Oregon Dunes National Recreation Area (ODNRA) to the north of the LNG Terminal site. These wells range in depth from 90 to 120 feet below ground surface (bgs), from which non-potable water is withdrawn from the Dune-Sand Aquifer. The closest CBNBWB well to the LNG Terminal site is located approximately 3,500 feet north. Construction and operation of the LNG Terminal site is not anticipated to directly impact the structure of the CBNBWB wells, nor result in saltwater intrusion or iron contamination. Previous studies have concluded that groundwater withdrawals of up to 10 million gallons per day (mgd) would pose little risk of saltwater intrusion, and projected JCEP pumping needs for construction and operation will occur at much lower rates. In addition, JCEP does not plan to pump from wells that were previously documented as containing elevated iron concentrations; therefore, no increases in iron contamination in CBNBWB wells are expected (GSI 2017a).

In addition to the wells within the ODNRA, five domestic supply wells at the Kentuck site were assessed to determine their vulnerability to saltwater intrusion resulting from restoration activities at the site. Evaluations conducted by GSI (2014) concluded that two wells, the Lower Kerwin Well and the Webb Well, are vulnerable to saltwater intrusion. JCEP is currently in discussions with the Kerwin and Webb families regarding compensations for impacts to these wells.

Construction and operation of the LNG Terminal site have the potential to affect groundwater resources due to the shallow depth to surface groundwater and the permeability of sand and gravel soils across the site. Construction of permanent infrastructure and ground improvements have the potential to mobilize contaminants into groundwater and spills or leaks of hazardous materials could also impact groundwater. JCEP will adhere to federal and state water quality regulations, as well as the Project's SPCCPs (JCEP 2017a; JCEP 2017b) to ensure that no adverse impacts to groundwater resources occur during the construction or operation of the Project.

The construction of the Slip could cause the saltwater/freshwater interface of the aquifer to move northward approximately 1,650 feet. However, this shift in the interface is not expected to impact the CBNBWB well field on the North Spit, nor would it impact water table elevations, which should remain at approximately 18 feet above mean sea level at the northern boundary of the LNG Terminal site (GSI 2017a, 2017b).

5. CONCLUSION

JCEP does not anticipate adverse impacts to the overall water quality of jurisdictional waters within, adjacent to, or in the vicinity of the Project area. The vast majority of anticipated impacts to water quality will be temporary, short-term and localized, and will occur during the construction phase of the Project. All Project activities, during both the construction and operation phases, will comply with environmental permits issued for the Project and will follow the standards outlined in Project plans and protocols. Conservation measures and BMPs will be implemented throughout the Project to prevent and/or minimize impacts to water quality to the maximum extent practicable.

6. REFERENCES

Coast & Harbor Engineering (CHE). 2011. Coastal Engineering Modeling and Analysis Draft Technical Report, Volume 2, Jordan Cove Energy Project and Pacific Connector Gas Pipeline. March 9, 2011.

GSI Water Solutions, Inc. (GSI). 2017a. Potential Effects of Pumping from CBNBWB Water Supply Wells to Meet Water Demands at the Jordan Cove LNG Terminal (Coos Bay, Oregon). Porcello, J., Livesay, D., Burt, W. August 24, 2017.

GSI. 2017b. Potential Hydrological Impacts from Ground Stabilization Dewatering Under an Updated Project Design at the Jordan Cove LNG Terminal.

GSI. 2015. Alternatives for Replacement of Domestic Water Supply Wells for the Kerwin and Webb Residences, Kentuck Slough Mitigation Project Area, North Bend, Oregon.

GSI. 2014. Characterization of Existing Hydrogeologic Conditions and Evaluation of the Vulnerability to Five Residential Water Wells from Saltwater Intrusion, Kentuck Slough Proposed Mitigation Area, North Bend, Oregon.

Jordan Cove Energy Project (JCEP). 2017a. Jordan Cove LNG Spill Prevention, Control and Countermeasure Plan (SPCCP) – Construction. November 15, 2017. J1-000-CIV-RPT-KBJ-00004-00

JCEP. 2017b. Jordan Cove LNG Spill Prevention, Control and Countermeasure Plan (SPCCP) – Operation. November 15, 2017. J1-000-CIV-RPT-KBJ-00005-00

JCEP. 2017c. Jordan Cove LNG Erosion and Sediment Control Plan (ESCP). November 15, 2017. J1-000-CIV-RPT-KBJ-00003-00

JCEP. 2017d. Jordan Cove LNG Storm Water Management Plan (SWMP). November 15, 2017. J1-000-CIV-RPT-KBJ-00002-00

JCEP. 2017e. Jordan Cove Energy Project L.P Resource Report No. 1, General Project Description. Prepared for the Jordan Cove Energy Project. September 2017. J1-000-RGL-RPT-JCL-00001-00

JCEP. 2017f. Jordan Cove Compensatory Wetland Mitigation Plan. October 2017. JCLNG Document No. J1-000-TEC-PLN-DEA-00002-00

JCEP. 2017g. Jordan Cove Section 404/10 Permit Application. October 2017. JCLNG Document No. J1-000-RGL-PMT-DEA-00002-00

JCEP. 2017h. Jordan Cove Energy Project L.P Resource Report No. 2, Water Use and Quality. Prepared for the Jordan Cove Energy Project. September 2017. J1-000-RGL-RPT-JCL-00002-00

Newell, R.C; L.J. Seiderer; D.R. Hitchcock. 1998. The impact of dredging works in coastal waters: a review of the sensitivity of disturbance and subsequent recovery of biological resources on the sea bed. Oceanography and Marine Biology: An Annual Review 36: 127-178.

Moffatt and Nichol. 2006. Report on Turbidity Due to Dredging. Jordan Cove LNG Terminal, Coos Bay, Oregon. Houston, Texas.

Moffatt and Nichol. 2017a. Jordan Cove LNG Hydrodynamic Analysis Technical Memorandum. November 2017. J1-000-MAR-TNT-DEA-00008-00

Moffatt and Nichol. 2017b. Jordan Cove LNG Sediment Transport Analysis Technical Memorandum. November 2017. J1-000-MAR-TNT-DEA-00003-00

Moffatt and Nichol. 2017c. Jordan Cove LNG Propeller Wash Analysis Technical Memorandum. November 2017. J1-000-MAR-TNT-DEA-00007-00

Moffatt and Nichol. 2017d. Jordan Cove LNG Turbidity Analysis Technical Memorandum. November 2017. J1-000-MAR-TNT-DEA-00006-00

Moffatt and Nichol. 2017e. Jordan Cove LNG Project Impacts to Salinity Technical Memorandum. November 2017. J1-000-MAR-TNT-DEA-00009-00

Moffatt and Nichol. 2017f. Jordan Cove LNG Vessel Wake Impacts Technical Memorandum. November 2017. J1-000-MAR-TNT-DEA-00005-00

Moffatt and Nichol. 2017g. Jordan Cove LNG Dredged Material Management Plan. September 2017. J1-000-TEC-PLN-DEA-00001-00

Moffatt and Nichol. 2017h. Jordan Cove LNG Vessel Cooling Discharge Analysis Technical Memorandum. November 2017. J1-730-MAR-TNT-DEA-00001-00

Shanks, A., S. Schroeder, and B. Dlouhy. 2011. January 2011: Report on the Zooplankton Sampling Adjacent to the Proposed Jordan Cove LNG Terminal. Oregon Institute of Marine Biology. Charleston, Oregon. (Note: This report was provided as Appendix F.3 to Resource Report 3 in the May 2013 filing.)

Shanks, A., S. Schroeder, and B. Dlouhy. 2010. June 2010: Report on the Zooplankton Sampling Adjacent to the Proposed Jordan Cove LNG Terminal. Oregon Institute of Marine Biology. Charleston, Oregon.

U.S. Geological Survey (USGS). 1992. Groundwater Availability from a Dune-Sand Aquifer Near Coos Bay and North Bend, Oregon. U.S. Geological Survey Open-File Report 90-563.

Jordan Cove Energy Project, L.P.

Pacific Connector GAS PIPELINE

January 31, 2019

Ms. Mary Camarata
Oregon Department of Environmental Quality
165 East 7th Avenue, Suite 100
Eugene, Oregon 97401

Re: NPDES Permit Modification - Jordan Cove Energy Project L.P., Permit Number: 101499

Dear Ms. Camarata,

Please find attached an application to modify the existing National Pollutant Discharge Elimination System (NPDES) Permit 101499. This request for a modification is being submitted to account for a change in waste streams to be discharged. This modification is necessary for the discharge of waste streams associated with development of the liquefied natural gas terminal to be built by Jordan Cove Energy Project L.P. (JCEP).

This application package includes:

- EPA Form 1;
- EPA Form 2D;
- Land use compatibility statement (LUCS)
- NPDES Industrial Discharge Permit Modification Application Report; and
- Payment of applicable fees ($6,604, based on the rating as a Tier 2 discharger with major modification)

Should you have any questions regarding this application, please do not hesitate to contact me at dvowels@pembina.com or (971) 940-7800.

Sincerely,

Natalie Eades

Natalie Eades
Manager, Environment & Regulatory

Cc: Casey Anderson, JCEP
Derik Vowels, JCEP
Steve Hammer, SLR International

Attachment 1:

NPDES Permit Forms

Please print or type in the unshaded areas only.

Form Approved. OMB No. 2040-0086.

FORM 1 GENERAL

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

S		T/A	C
F	OR0002119		D
1	2 — 13	14	15

LABEL ITEMS

- I. EPA I.D. NUMBER
- III. FACILITY NAME
- V. FACILITY MAILING ADDRESS
- VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

SPECIFIC QUESTIONS	Mark "X" YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.**? (FORM 2A)	16	X 17	18
B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge** to **waters of the U.S.**? (FORM 2B)	19	X 20	21
C. Is this a facility which currently results in **discharges** to **waters of the U.S.** other than those described in A or B above? (FORM 2C)	X 22	23	24
D. Is this a proposed facility *(other than those described in A or B above)* which will result in a **discharge** to **waters of the U.S.**? (FORM 2D)	X 25	26	27
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	28	X 29	30
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)	31	X 32	33
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	34	X 35	36
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	37	X 38	39
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	40	X 41	42
J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5)	43	X 44	45

III. NAME OF FACILITY

C 1 SKIP: Jordan Cove Energy Project, L.P.

15 | 16 – 29 | 30 — 69

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
C 2: Vowels, Derik Supervisor, Federal and State Permitting	(971) 940-7800
15 | 16 — 45	46 48 | 49 51 | 52- 55

V. FACILTY MAILING ADDRESS

A. STREET OR P.O. BOX

C 3: 111 SW 5th Ave, Suite 1100

15 | 16 — 45

B. CITY OR TOWN	C. STATE	D. ZIP CODE
C 4: Portland	OR	97204
15 | 16 — 40	41 42	47 — 51

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

C 5: 92770 Trans Pacific Lane

15 | 16 — 45

B. COUNTY NAME

Coos

46 — 70

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
C 6: North Bend	OR	97459	
15 | 16 — 40	41 42	47 — 51	52 -54

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

VII. SIC CODES *(4-digit, in order of priority)*

A. FIRST	B. SECOND
4922 (specify) Natural Gas Transmission	(specify)

C. THIRD	D. FOURTH
(specify)	(specify)

VIII. OPERATOR INFORMATION

A. NAME	B. Is the name listed in Item VIII-A also the owner?
Jordan Cove Energy Project, L.P.	☑ YES ☐ NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other," specify.)*

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC *(other than federal or state)*
O = OTHER *(specify)*

P (specify)

D. PHONE *(area code & no.)*: A

E. STREET OR P.O. BOX: 111 SW 5th Ave, Suite 1100

F. CITY OR TOWN	G. STATE	H. ZIP CODE	IX. INDIAN LAND
Portland	OR	97204	Is the facility located on Indian lands? ☐ YES ☑ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*	D. PSD *(Air Emissions from Proposed Sources)*
N OR0002119	P

B. UIC *(Underground Injection of Fluids)*	E. OTHER *(specify)*
U	(specify)

C. RCRA *(Hazardous Wastes)*	E. OTHER *(specify)*
R	(specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers, and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS *(provide a brief description)*

The facility is a liquefied natural gas export processing facility and export terminal. The facility receives natural gas from a pipeline, the gas is treated and liquefied to produce LNG which is then stored in storage tanks until loaded into LNG carriers at the marine terminal.

XIII. CERTIFICATION *(see instructions)*

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE *(type or print)*	B. SIGNATURE	C. DATE SIGNED
Natalie Eades Manager, Environment & Regulatory	Natalie Eades	7/31/18

COMMENTS FOR OFFICIAL USE ONLY

EPA Form 3510-1 (8-90)

Form Approved. OMB No. 2040-0086. Approval expires 8-31-98.

Please print or type in the unshaded areas only	EPA I.D. NUMBER (*copy from Item 1 of Form 1*) OR0002119	

Form 2D NPDES

New Sources and New Dischargers Application for Permit to Discharge Process Wastewater

I. Outfall Location

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

Outfall Number (*list*)	Latitude			Longitude			Receiving Water (*name*)
	Deg.	Min.	Sec.	Deg.	Min.	Sec.	
001a	43	25	46.71	124	18	29.88	Pacific Ocean
001b							Pacific Ocean
002	43	25	10.5	124	17	29.0	Pacific Ocean and Coos Bay
003	43	26	7.0	124	14	37.2	Coos Bay

II. Discharge Date (When do you expect to begin discharging?)

to be determined

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

Outfall Number	1. Operations Contributing Flow (*List*)	2. Average Flow (*Include Units*)	3. Treatment (*Description or List codes from Table 2D-1*)
001a	RO Backwash	4 gpm	4-B
	RO Reject	17 gpm	4-B
	Polisher condensate	0.1 gpm intermittent	4-B
	Air chiller condensate	40 gpm	4-B
	HRSG quench blowdown	51 gpm	4-B
	Hydrostatic test water	intermittent	1-R, 4-B
	Plant and equipment wash water	intermittent	OWS, 4-B
	Treated sanitary (2 units)	7.5 gpm	specific treatment to be determined
	Treated contact stormwater	30 gpm	OWS, 4-B
001b	pipe has been capped - does not discharge, to be removed from Permit		
002	Seepage from Deflation plain - no change from current Permit status. Will no longer be used post construction		
003	Seepage from North and South Ponds - no change from current Permit status. Will no longer be used post construction		
	OWS = oily water separator; no code available from Table 2D-1		

B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in Items III-A be intermittent or seasonal?

[x] YES (*complete the following table*) [ ] NO (*go to Section IV*)

Outfall Number	1. Frequency		2. Flow		
	a. Days Per Week (*specify average*)	b. Months Per Year (*specify average*)	a. Maximum Daily Flow Rate (*in mgd*)	b. Maximum Total Volume (*specify with units*)	c. Duration (*in days*)
001 - polisher condensate residuals	1/mo	12/yr	0.1 gpm		1 day
hydrostatic test water	varies - to be determined				
plant and equipment wash water	varies - to be determined				
air chiller condensate	varies - only during warmer summer season		40 gpm		

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet).

Year	A. Quantity Per Day	B. Units Of Measure	c. Operation, Product, Material, etc. *(specify)*
NA			

CONTINUED FROM THE FRONT	EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	Outfall Number
	OR0002119	001

V. Effluent Characteristics

A and B: These items require you to report estimated amounts (*both concentration and mass*) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See table 2D-2 for Pollutants)*
Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
For Outfall 001:			
Estimated effluent quality is provided in Appendix J. End-of-pipe effluent characteristics for the combined discharge of facility wastewater and groundwater were estimated using a flow-weighted average of the facility discharge and the raw groundwater.			
Facility wastewater and groundwater characteristics used in the flow-weighted calculations are provided in Appendix H and E, respectively.			
For Outfalls 002 and 003, no change in effluent quality from current Permit			

CONTINUED FROM THE FRONT	EPA I.D. NUMBER (*copy from Item 1 of Form 1*) OR0002119	

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge
none	

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐ Report Available ☐ No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location
none	

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
OR0002119

VII. Other Information *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

see Executive Summary of the Application

VIII. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name and Official Title (*type or print*)	B. Phone No.
Natalie Eades Manager, Environment & Regulatory	970-440 7800
C. Signature	D. Date Signed
Natalie Eades	4/31/19

Attachment 2:

Land Use Compatibility Statement (LUCS)

Oregon Department of Environmental Quality

Land Use Compatibility Statement

State of Oregon Department of Environmental Quality

What is a land use compatibility statement?

A LUCS is a form developed by DEQ to determine whether a DEQ permit or approval will be consistent with local government comprehensive plans and land use regulations.

Why is a LUCS required?

DEQ and other state agencies with permitting or approval activities that affect land use are required by Oregon law to be consistent with local comprehensive plans and have a process for determining consistency. DEQ activities affecting land use and the requirement for a LUCS may be found in Oregon Administrative Rules (OAR) Chapter 340, Division 18.

When is a LUCS required?

A LUCS is required for nearly all DEQ permits and certain approvals of plans or related activities that affect land use prior to issuance of a DEQ permit or approval. These permits and activities are listed in section 1.D on p. 2 of this form. A single LUCS can be used if more than one DEQ permit or approval is being applied for concurrently.

Permit modifications or renewals also require a LUCS when any of the following applies:

1. Physical expansion on the property or proposed use of additional land;
2. Alterations, expansions, improvements or changes in method or type of disposal at a solid waste disposal site as described in OAR 340-093-0070(4)(b);
3. A significant increase in discharges to water;
4. A relocation of an outfall outside of the source property; or
5. Any physical change or change of operation of an air pollutant source that results in a net significant emission rate increase as defined in OAR 340-200-0020.

How to complete a LUCS:

Step	Who Does It?	What Happens?
1	Applicant	Applicant completes Section 1 of the LUCS and submits it to the appropriate city or county planning office.
2	City or County Planning Office	City or county planning office completes Section 2 of the LUCS to indicate whether the activity or use is compatible with the acknowledged comprehensive plan and land use regulations, attaches written findings supporting the decision of compatibility, and returns the signed and dated LUCS to the applicant.
3	Applicant	Applicant submits the completed LUCS and any supporting information provided by the city or county to DEQ along with the DEQ permit application or approval request.

Where to get help:

For questions about the LUCS process, contact the DEQ staff responsible for processing the permit or approval. DEQ staff may be reached at 1-800-452-4011 (toll-free, inside Oregon) or 503-229-5630. For general questions, please contact DEQ land use staff listed on our Land Use Compatibility Statement page online.

***CULTURAL RESOURCES PROTECTION LAWS**: Applicants involved in ground-disturbing activities should be aware of federal and state cultural resources protection laws. ORS 358.920 prohibits the excavation, injury, destruction, or alteration of an archeological site or object or removal of archeological objects from public and private lands without an archeological permit issued by the State Historic Preservation Office. 16 USC 470, Section 106, National Historic Preservation Act of 1966 requires a federal agency, prior to any undertaking, to take into account the effect of the undertaking that is included on or eligible for inclusion in the National Register. For further information, contact the State Historic Preservation Office at 503-378-4168, ext. 232.*

Land Use Compatibility Statement

SECTION 1 - TO BE COMPLETED BY APPLICANT

1A. Applicant Name: Pacific Connector Gas Pipeline, L.P. Jordan Cove Energy Project, L.P.	**1B. Project Name:** Jordan Cove Energy Project
Contact Name: Derik Vowels	**Physical Address:** See Attached Figure 1.1 for Project Location
Mailing Address: 111 SW 5th Ave, Ste 1100	**City, State, Zip:**
City, State, Zip: Portland, OR, 97204	**Tax Lot #:** See Attached Figures 1.2-1 to 1.2-10 for tax lots and figure 1.1-1 and Sheets 1-11 for PCGP project location
Telephone: 971-940-7800	**Township:** 25S **Range:** 13W & 14W **Section:** Various
Tax Account #:	**Latitude:** See Attached Figure 1.1 for Project Location
	Longitude: See Attached Figure 1.1 for Project Location

1C. Describe the project, include the type of development, business, or facility and services or products provided (attach additional information if necessary):

The overall Project involves the construction of a natural gas liquefaction and deep-water export terminal capable of receiving and loading ocean-going Liquefied Natural Gas (LNG) carriers, in order to export natural gas transported from a new 230 mile pipeline commencing at a point near the intersections of the GTN Pipeline system and Ruby Pipeline system in Malin, Oregon.

Project activities within Coos County include the construction of the LNG Terminal on the bay side of the North Spit of Coos Bay, Navigation Reliability Improvements to the Federal Navigation Channel involving dredging at four locations in Coos Bay, the widening of the intersection between Trans Pacific Parkway and Highway 101, specific multiple alignments of the PCGP pipeline within the Coastal zone of Coos County and a proposed new alternate alignment of the Pipeline extending from Kentuck to the terminal site at South Dunes..

1D. Check the type of DEQ permit(s) or approval(s) being applied for at this time.

- ☐ Air Quality Notice of Construction
- ☒ Air Contaminant Discharge Permit *(excludes portable facility permits)*
- ☐ Air Quality Title V Permit
- ☐ Air Quality Indirect Source Permit
- ☐ Parking/Traffic Circulation Plan
- ☐ Solid Waste Land Disposal Site Permit
- ☐ Solid Waste Treatment Facility Permit
- ☐ Solid Waste Composting Facility Permit (includes Anaerobic Digester)
- ☐ Conversion Technology Facility Permit
- ☐ Solid Waste Letter Authorization Permit
- ☐ Solid Waste Material Recovery Facility Permit
- ☐ Solid Waste Energy Recovery Facility Permit
- ☐ Solid Waste Transfer Station Permit
- ☐ Waste Tire Storage Site Permit
- ☐ Pollution Control Bond Request
- ☐ Hazardous Waste Treatment, Storage, or Disposal Permit
- ☐ Clean Water State Revolving Fund Loan Request
- ☐ Wastewater/Sewer Construction Plan/Specifications *(includes review of plan changes that require use of new land)*
- ☒ Water Quality NPDES Individual Permit
- ☒ Water Quality WPCF Individual Permit *(for onsite construction-installation permits use the DEQ Onsite LUCS form)*
- ☒ Water Quality NPDES Stormwater General Permit *(1200-A, 1200-C, 1200-CA, 1200-COLS, and 1200-Z)*
- ☐ Water Quality General Permit *(all general permits, except 600, 700-PM, 1700-A, and 1700-B when they are mobile.)*
- ☒ Water Quality 401 Certification for federal permit or license

1E. This application is for: ☐ Permit Renewal ☒ New Permit ☒ Permit Modification ☐ Other:

SECTION 2 - TO BE COMPLETED BY CITY OR COUNTY PLANNING OFFICIAL

Instructions: Written findings of fact for all local decisions are required; written findings from previous actions are acceptable. For uses allowed outright by the acknowledged comprehensive plan, DEQ will accept written findings in the form of a reference to the specific plan policies, criteria, or standards that were relied upon in rendering the decision with an indication of why the decision is justified based on the plan policies, criteria, or standards.

2A. The project proposal is located: ☐ Inside city limits ☐ Inside UGB ☒ Outside UGB

2B. Name of the city or county that has land use jurisdiction (the legal entity responsible for land use decisions for the subject property or land use): Coos County

SECTION 2 - TO BE COMPLETED BY CITY OR COUNTY PLANNING OFFICIAL	
Applicant Name: Pacific Connector Gas Pipeline, L.P. Jordan Cove Energy Project, L.P.	**Project Name:** Jordan Cove Energy Project

2C. Is the activity allowed under Measure 49 (2007)? ☒ No, Measure 49 is not applicable ☐ Yes; if yes, then check one:

☐ Express; approved by DLCD order #:

☐ Conditional; approved by DLCD order #:

☐ Vested; approved by local government decision or court judgment docket or order #:

2D. Is the activity a composting facility?
☒ No ☐ Yes; Senate Bill 462 (2013) notification requirements have been met.

2E. Is the activity or use compatible with your acknowledged comprehensive plan as required by OAR 660-031?
Please complete this form to address the activity or use for which the applicant is seeking approval (see 1.C on the previous page). If the activity or use is to occur in multiple phases, please ensure that your approval addresses the phases described in 1.C. For example, if the applicant's project is described in 1.C as a subdivision and the LUCS indicates that only clearing and grading are allowed outright but does not indicate whether the subdivision is approved, DEQ will delay permit issuance until approval for the subdivision is obtained from the local planning official.

☐ The activity or use is specifically exempt by the acknowledged comprehensive plan; explain:

☐ **Yes,** the activity or use is pre-existing nonconforming use allowed outright by *(provide reference for local ordinance)*:

☐ **Yes,** the activity or use is allowed outright by *(provide reference for local ordinance)*:

☐ **Yes,** the activity or use received preliminary approval that includes requirements to fully comply with local requirements; findings are attached.

☐ **Yes,** the activity or use is allowed; findings are attached.

☐ **No,** see 2.C above, activity or use allowed under Measure 49; findings are attached.

☒ **No,** *(complete below or attach findings for noncompliance and identify requirements the applicant must comply with before compatibility can be determined)*:

Relevant specific plan policies, criteria, or standards:

Provide the reasons for the decision:
See attached discussion regarding required land use authorizations and pending review status for plan compatibility.

Additional comments (attach additional information as needed):

Planning Official Signature: Jill Rolfe **Title:** Planning Director

Print Name: Jill Rolfe **Telephone #:** 541-396-7770 **Date:** 12-7-18

If necessary, depending upon city/county agreement on jurisdiction outside city limits but within UGB:

Planning Official Signature: **Title:**

Print Name: **Telephone #:** **Date:**

The Jordan Cove Energy Project L.P. and the Pacific Connector Gas Pipeline (the "Project") will require the following land use authorizations from Coos County. Each requested authorization described below is allowed under applicable acknowledged provisions of the Coos County Zoning and Land Development Ordinance ("CCZLDO"), which implements the acknowledged Coos County Comprehensive Plan, subject to County review and approval consistent with the applicable review procedures established under the CCZLDO. As of this date, applications associated with each of the requested land use authorizations noted below have been submitted:

1. PCGP - Kentuck to South Dunes Re-Alignment:

The project includes a proposed new alternate alignment of the Pacific Connector Gas Pipeline extending from East Bay Drive at Kentuck to the City of North Bend via boring and from the City of North Bend at APCO to the metering station at South Dunes. This activity and improvement will require conditional use approval and a text amendment applicable to the CBEMP DDNC-DA designation to allow low intensity utilities within the district. A pre-application conference has been conducted with the Applicant and the Accessory application has been filed. County review proceeding will commence in early 2019.

2. PCGP - Existing Approvals Including Approved Extensions:

The proposed project includes multiple alignments of the Pacific Connector Gas Pipeline ("PCGP") within the coastal zone of Coos County. Coos County has approved and permitted the Original Alignment of the PCGP (HBCU-10-01) and two alternate alignments, including Three Minor Alternate Alignments (HBCU-13-04), and the Blue Ridge Alternate Alignment (HBCU-13-06). The table below documents the current status of these approved permits including extensions and the period of continued validity as of the effective date of this LUCS.

List of Coos County Land Use Approvals for PCGP

Original Alignment. September 8, 2010 - HBCU-10-01 - County Ordinance No. 10-08-045PL (Approving Pacific Connector Gas Pipeline, County File No. HBCU-10-01). Appealed to LUBA and Remanded.

March 13, 2012 REM-11-01 - Final Decision and Order No. 12-03-018PL (re: Pacific Connector Order No. 10-08-045PL Remand HBCU-10-01) Amended Original decision to address remand but was approved.

May 12, 2014 ACU-14-08 - Planning Director's Decision to grant an extension of application (HBCU-10-01/REM-11-01) was approved for Pacific Connector Gas Pipeline.

April 14, 2015 ACU-15-07 - Planning Director's Decision to grant an extension of application (HBCU-10-01/REM-11-01) was approved for Pacific Connector Gas Pipeline. This was appealed (AP-15-07) and the appeal upheld the approval (Order # 15-08-039PL, October 6, 2015).

April 11, 2016 ACU-16-013 - Planning Director's Decision to grant an extension of application (HBCU-10-01/REM-11-01) was approved for Pacific Connector Gas Pipeline.

May 18, 2017 EXT-17-005 - Planning Director's Decision to grant an extension of application (HBCU-10-01/REM-11-01) was approved for Pacific Connector Gas Pipeline. This was appealed (AP-17-004) and the appeal upheld the approval (Order # 17-11-064PL, December 19, 2017). Permit to expire on April 2, 2019.

Brunschmid/Stock Slough Minor Alternate Alignments. February 4, 2014 - HBCU-13-04 - PCGP request for approval of a segment of pipeline, approved (Final Order No. 14-01-007PL).

April 11, 2016 - ACU-16-003 an extension request for HBCU-13-04 was approved.

May 17, 2017 - EXT-17-002 an extension request for HBCU-13-04 was approved by the Planning Director. AP-17-004 - An appeal was filed on Planning Director's decision but upheld by the Board of Commissioner on December 19, 2017. No further appeal.

May 21, 2018 - EXT-18-001 an extension request for HBCU-13-04 was approved by the Planning Director. AP-18-001 - An appeal was filed on Planning Director's decision. The Board of Commissioner took action on October 24, 2018 to reject the appeal and affirm the permitted extension. Permit to expire on February 25, 2019.

Blue Ridge Alternate Alignment. October 21, 2014 - HBCU-13-06 - PCGP request for approval of a segment of pipeline.

December 28, 2016 - EXT-16-007 Extension to HBCU-13-06 approved.

February 26, 2018 - EXT-17-015 Extension to HBCU-13-06 approved. Based upon expiration on November 11, 2018 absent an extension, a timely application for extension has been filed and local review is pending.

3. JCEP - TransPacific Parkway Widening:

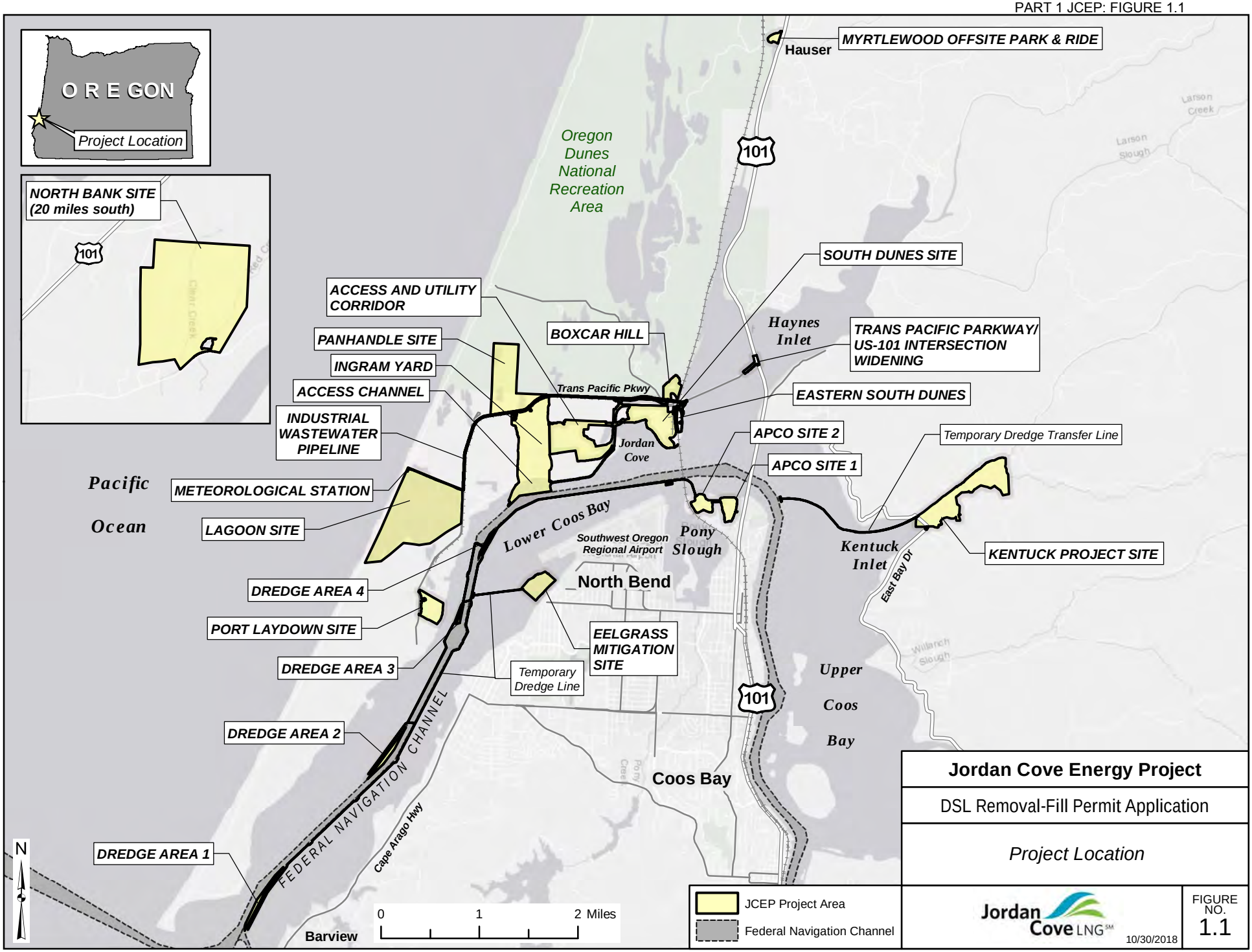
The Project is required to undertake a limited (northern) portion of intersection widening of TransPacific Parkway and Highway 101, which will require a comprehensive plan, zone map amendment and conditional use to authorize limited fill and structural support via re-zoning from 10-NA to 11-RS CBEMP. A pre-application conference has been conducted with the Applicant and the complete application has been filed consistent with applicable CCZLDO requirements.

4. JCEP - Navigation Reliability Improvements:

The Project includes Navigation Reliability Improvements to the Federal Navigation Channel involving dredging at four locations in Coos Bay. Coos County CBEMP map and text will require amendment to a Goal 16 development designation at three locations and a conditional use approval for dredging activity. A pre-application conference has been conducted with the Applicant.

5. JCEP - LNG Terminal:

JCEP applied for conditional use authorization in 2015 to construct the LNG export terminal component of the proposed project under County land use regulations. On August 30, 2016, the Board of Commissioners issued a final decision (HBCV-15-05/FP-15-09) granting such approval. The Board's decision was appealed to LUBA, which issued a remand decision on November 27, 2017. The LUBA order was appealed to the Oregon Court of Appeals by the appellants before LUBA, and the court affirmed the earlier LUBA order by written opinion dated April 4, 2018 and issued the final appellate judgment on September 20, 2018. With the completion of the appellate review, JCEP and the County will initiate review proceedings to address the remand issues identified by LUBA for the purpose of a revised decision on the initial conditional use application filed in 2015, which remains on file and effective. Upon written request from JCEP anticipated in early 2019, the Board shall issue a new decision within 120 days.



Jordan Cove Energy Project

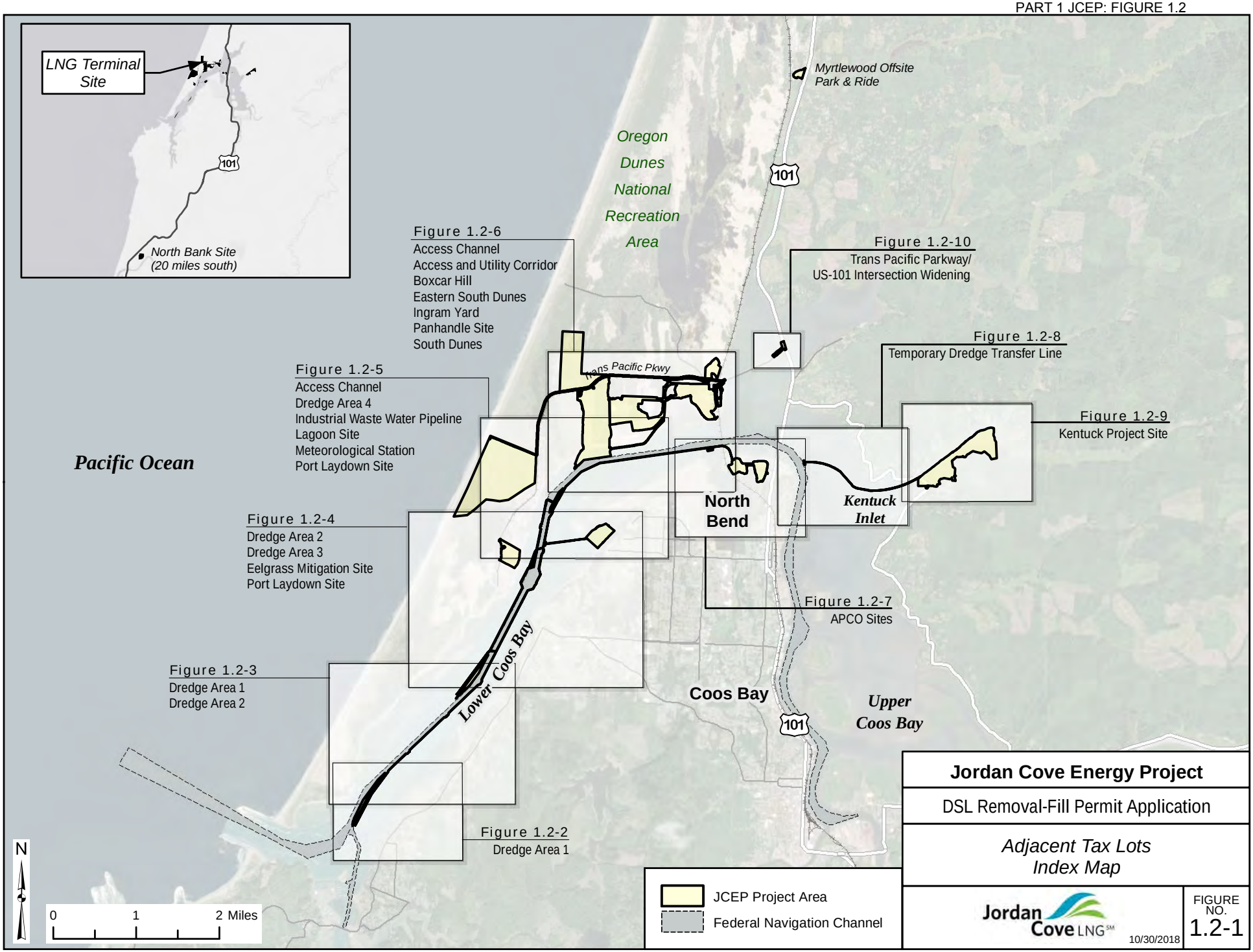
DSL Removal-Fill Permit Application

Project Location

Jordan Cove LNG℠

10/30/2018

FIGURE NO. 1.1



Jordan Cove Energy Project

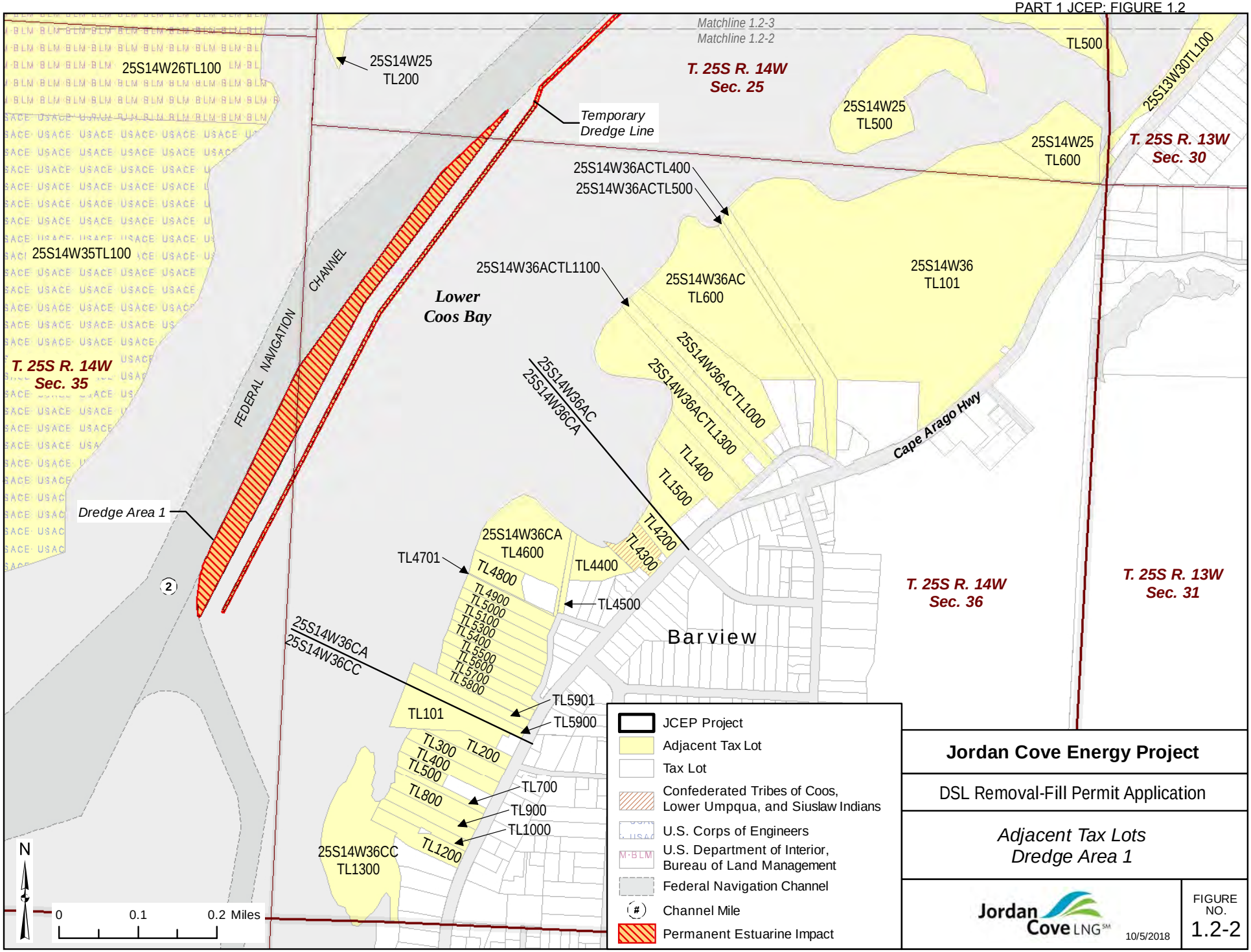
DSL Removal-Fill Permit Application

Adjacent Tax Lots
Index Map

Jordan Cove LNG

10/30/2018

FIGURE NO. 1.2-1



Jordan Cove Energy Project

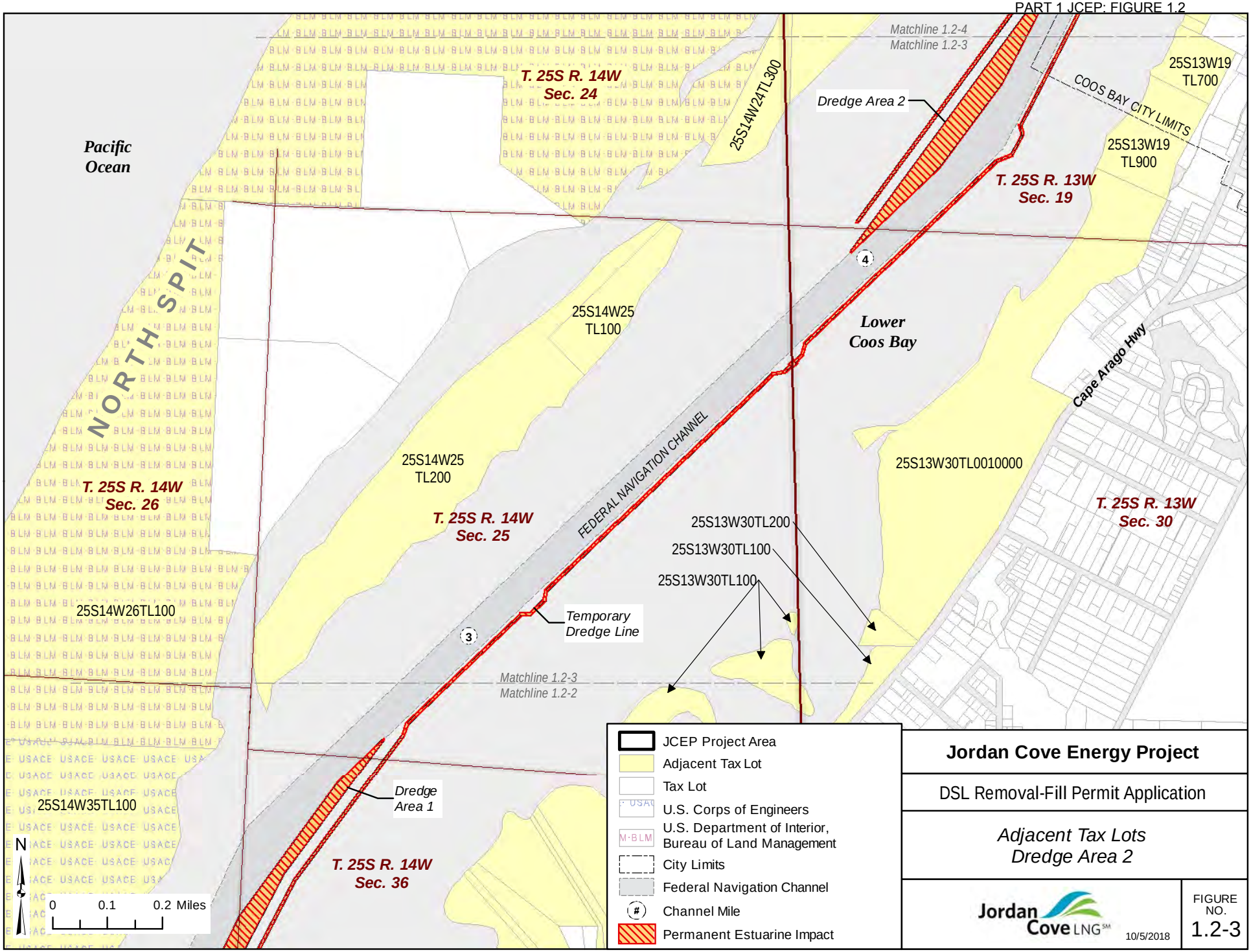
DSL Removal-Fill Permit Application

Adjacent Tax Lots
Dredge Area 1

Jordan Cove LNG℠

10/5/2018

FIGURE NO. 1.2-2



Jordan Cove Energy Project

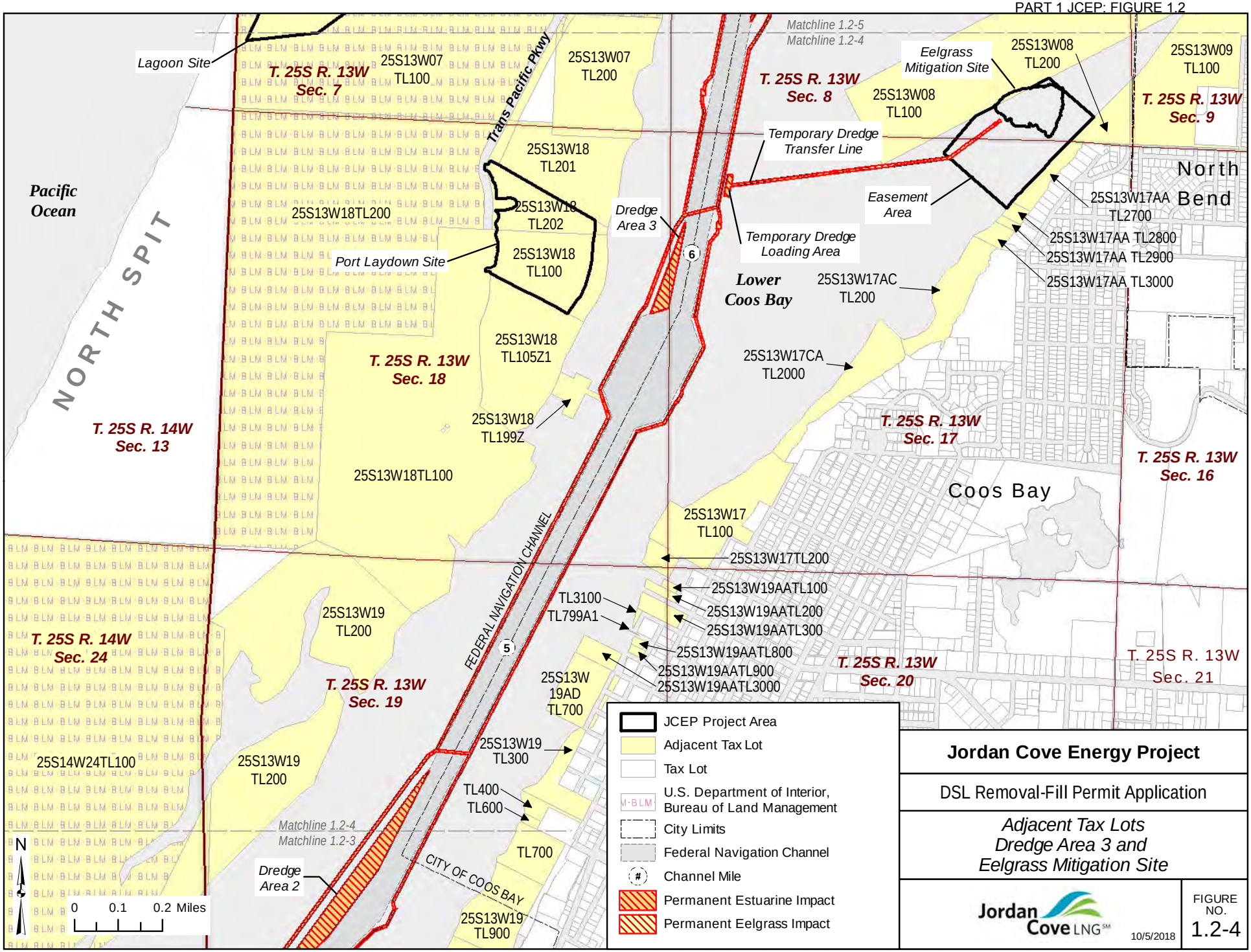
DSL Removal-Fill Permit Application

Adjacent Tax Lots
Dredge Area 2

Jordan Cove LNG

10/5/2018

FIGURE NO. 1.2-3



Jordan Cove Energy Project

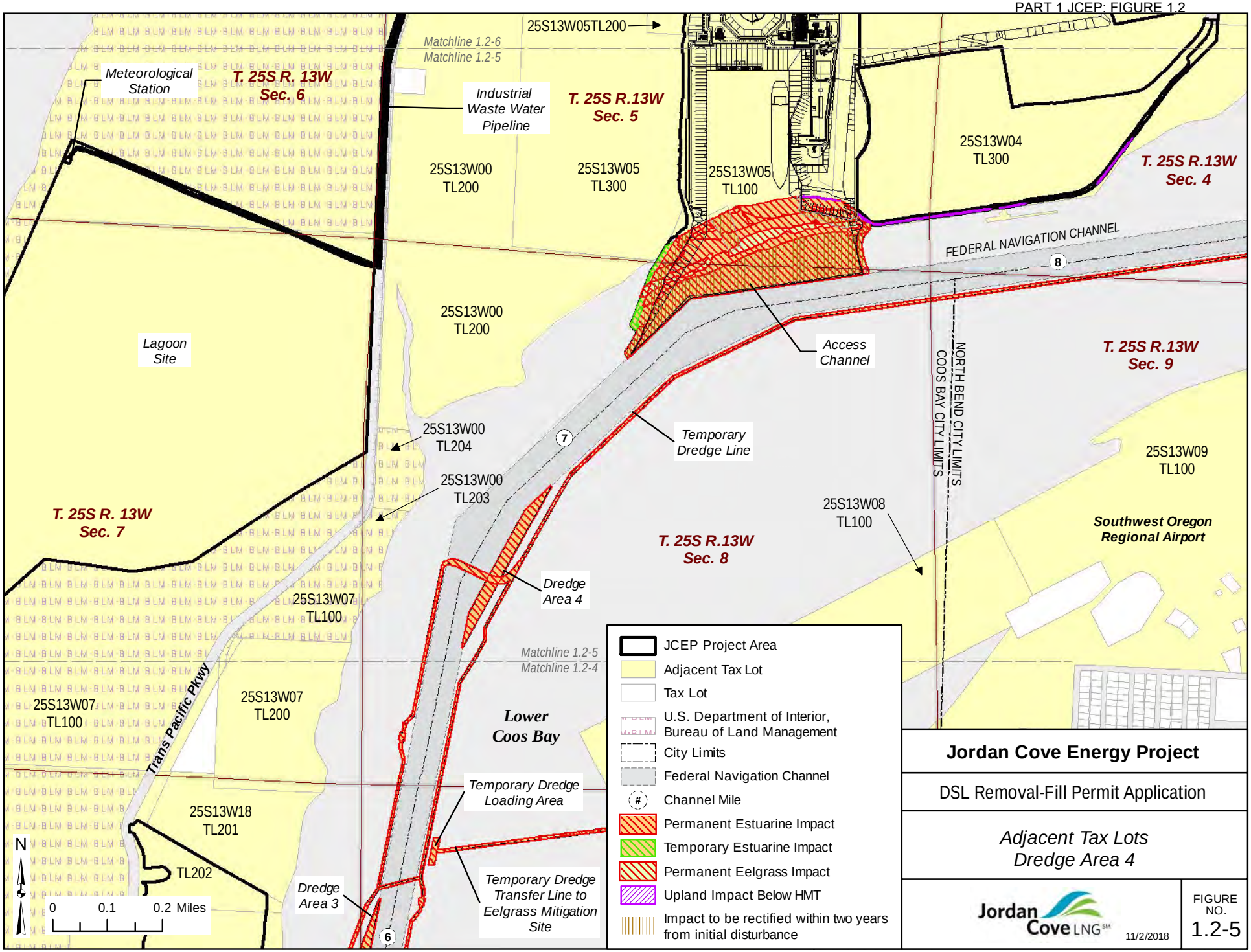
DSL Removal-Fill Permit Application

Adjacent Tax Lots Dredge Area 3 and Eelgrass Mitigation Site

Jordan Cove LNG

10/5/2018

FIGURE NO. 1.2-4



Jordan Cove Energy Project

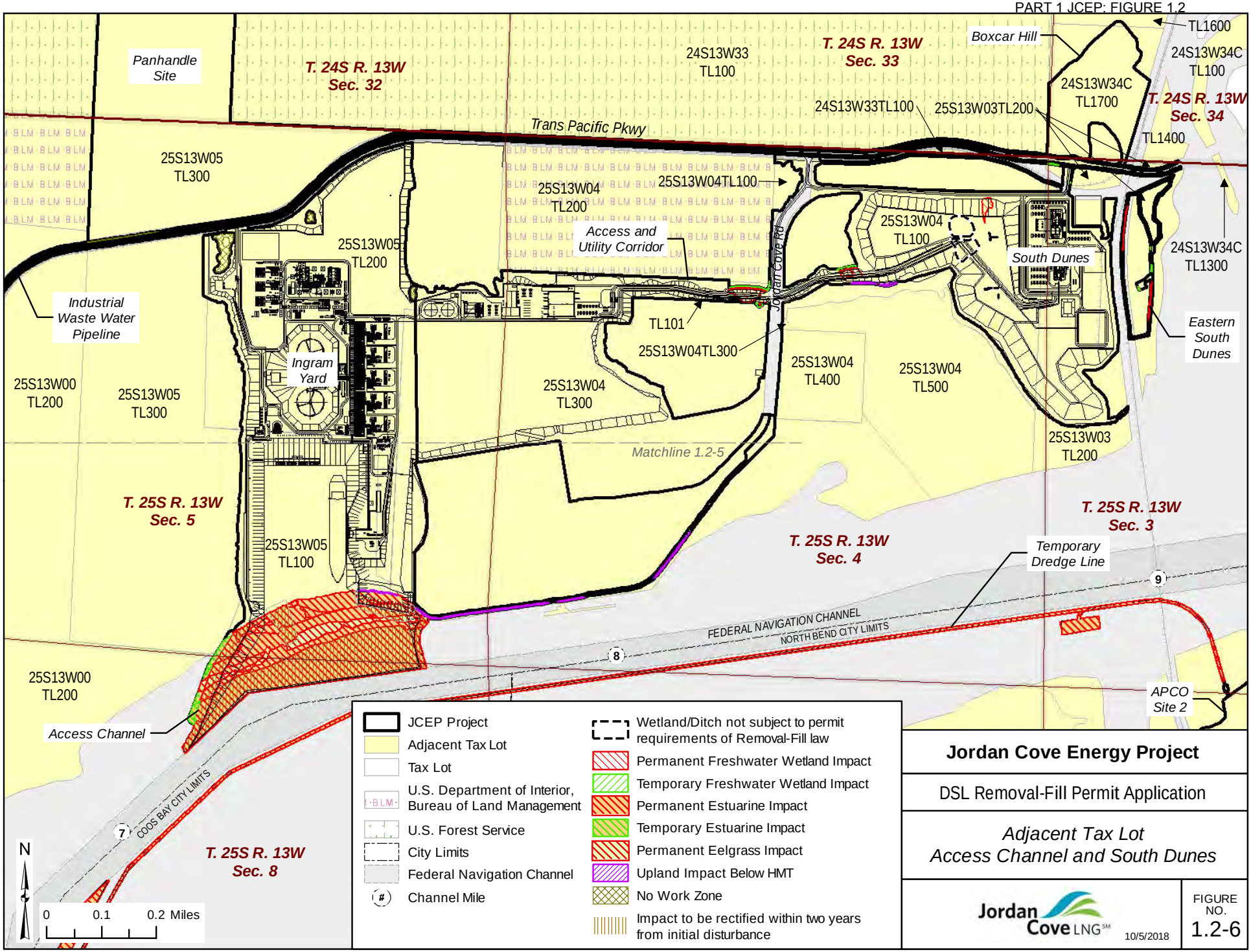
DSL Removal-Fill Permit Application

Adjacent Tax Lots
Dredge Area 4

Jordan Cove LNG SM

11/2/2018

FIGURE NO. 1.2-5



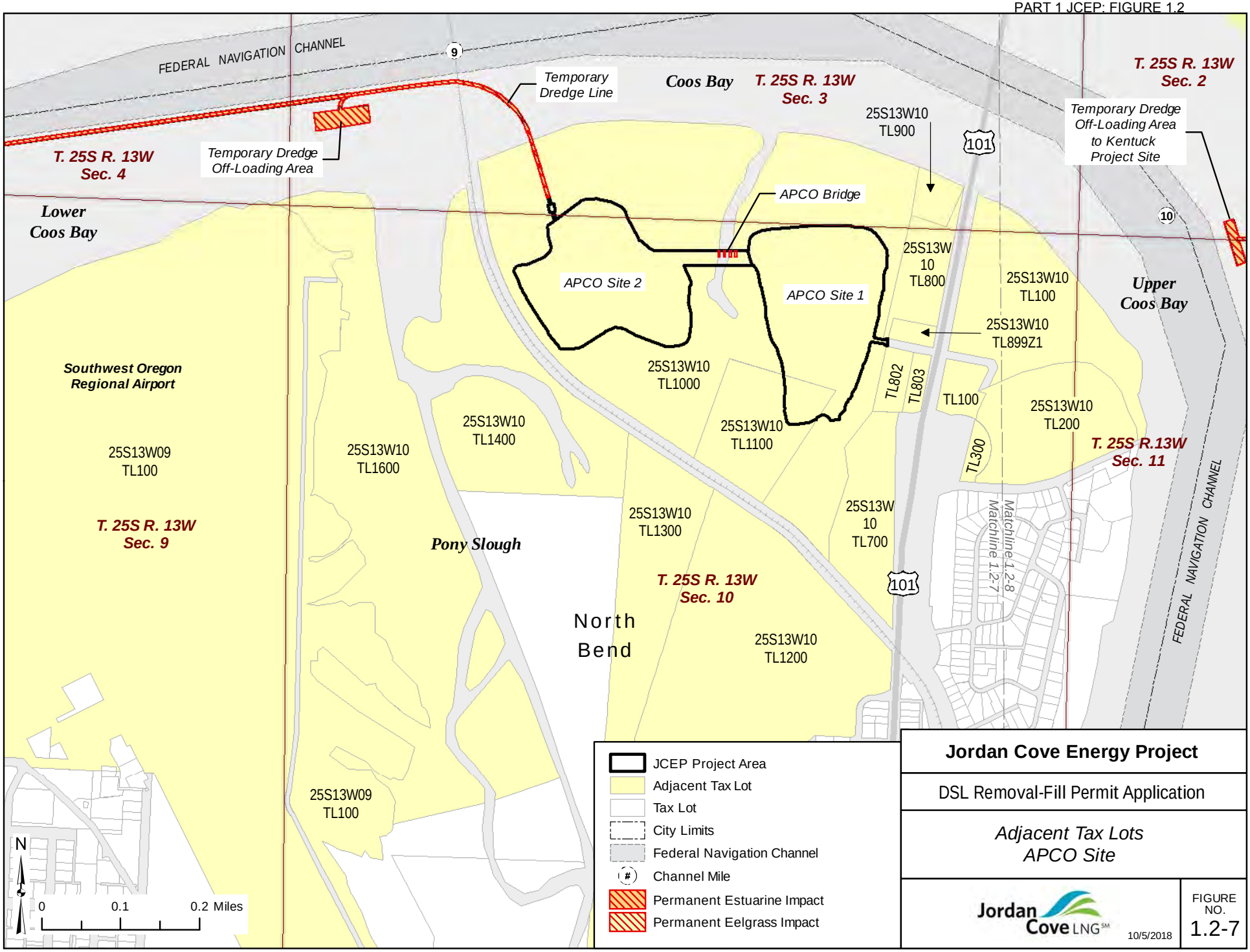
Jordan Cove Energy Project

DSL Removal-Fill Permit Application

Adjacent Tax Lot
Access Channel and South Dunes

Jordan Cove LNG℠ 10/5/2018

FIGURE NO. 1.2-6



Jordan Cove Energy Project

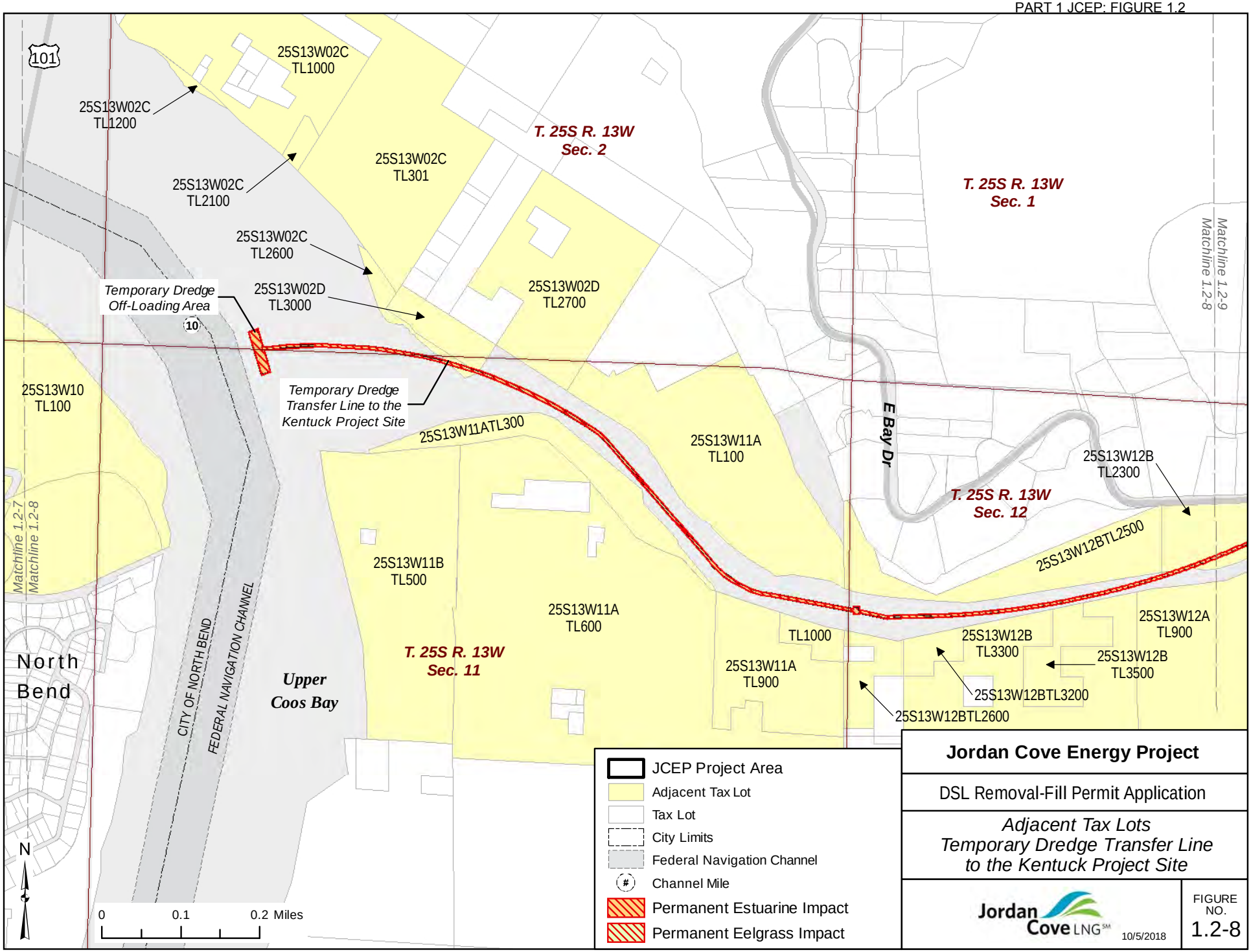
DSL Removal-Fill Permit Application

Adjacent Tax Lots
APCO Site

Jordan Cove LNG

10/5/2018

FIGURE NO. 1.2-7



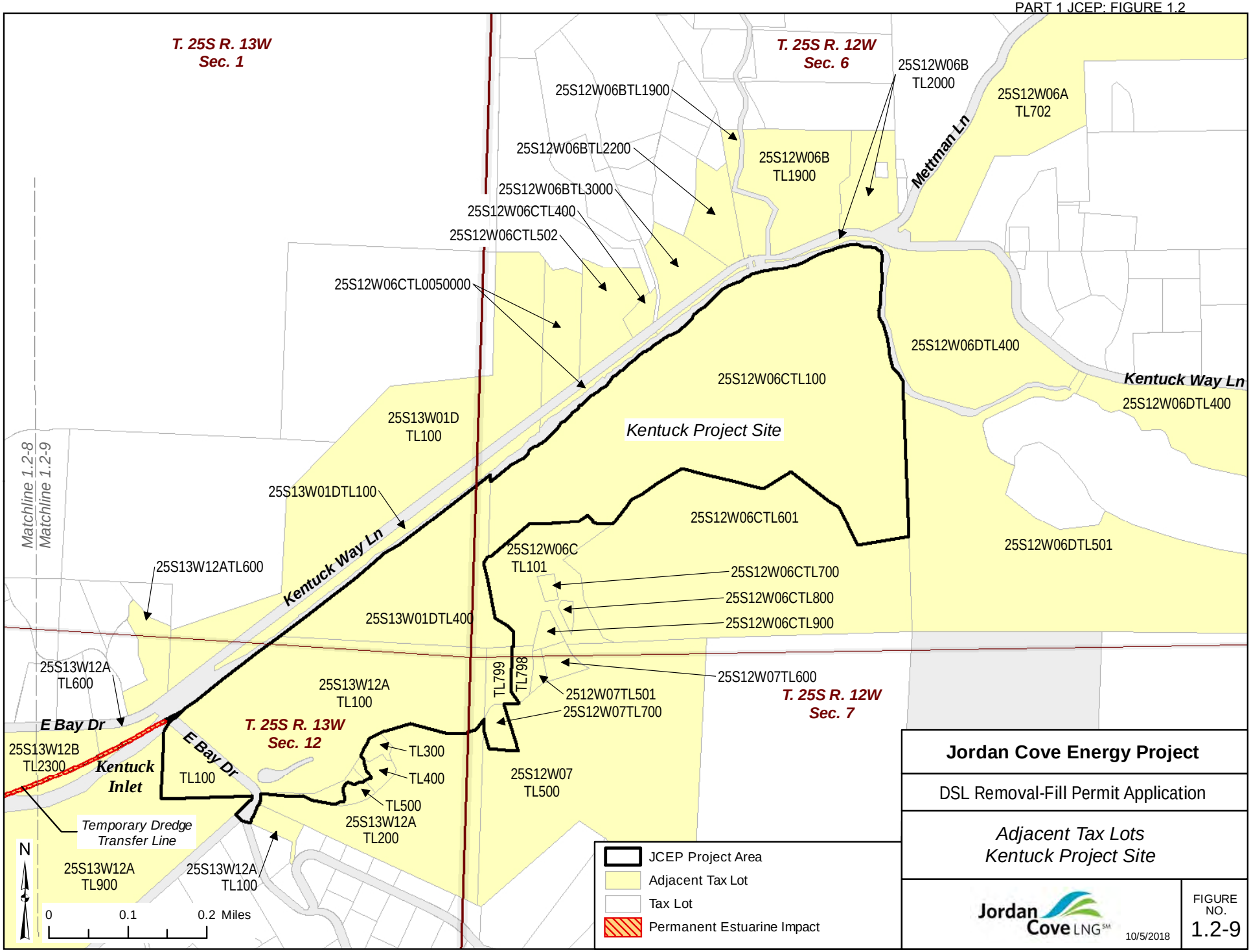
Jordan Cove Energy Project

DSL Removal-Fill Permit Application

Adjacent Tax Lots
Temporary Dredge Transfer Line to the Kentuck Project Site

Jordan Cove LNG℠ 10/5/2018

FIGURE NO. 1.2-8



Jordan Cove Energy Project

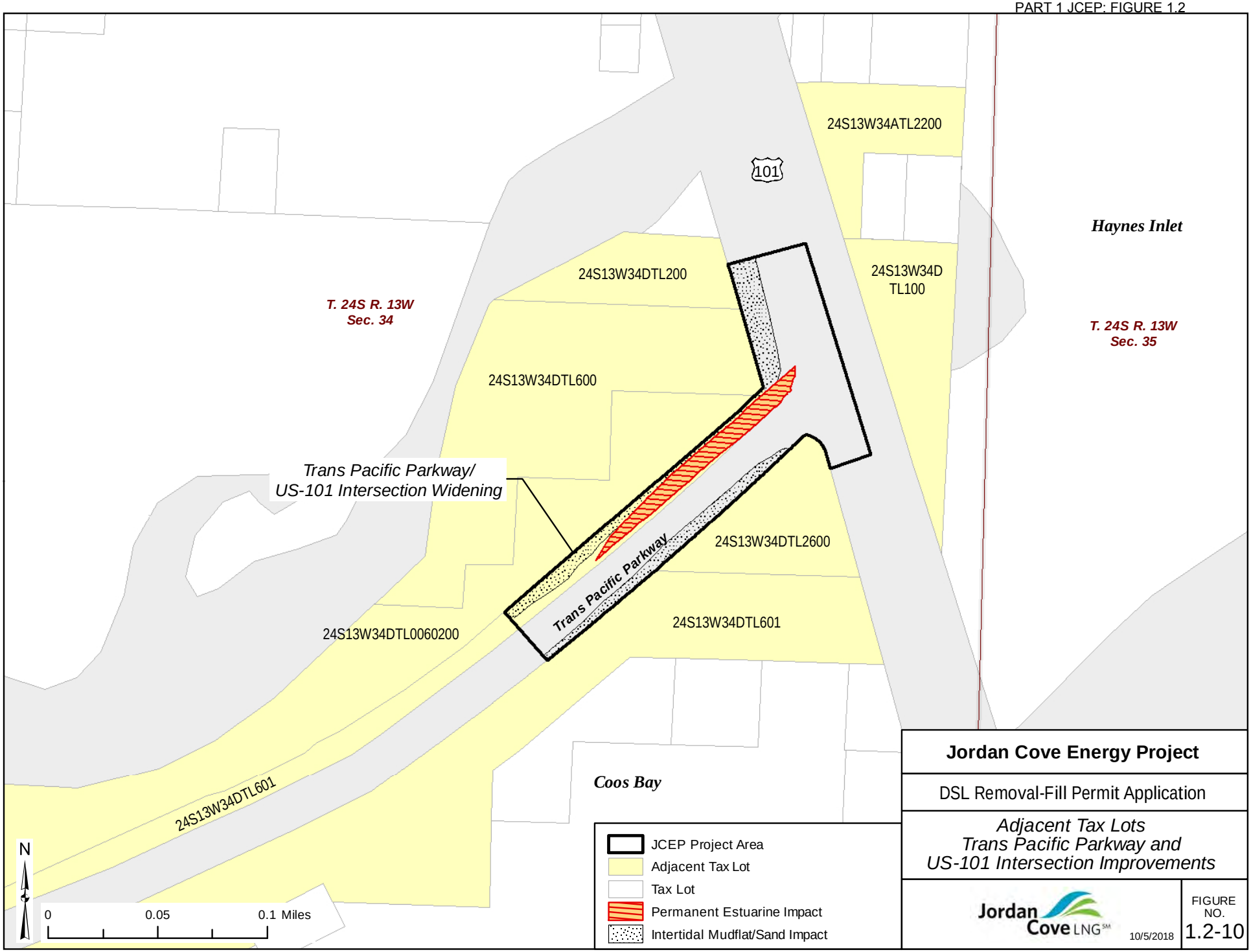
DSL Removal-Fill Permit Application

Adjacent Tax Lots
Kentuck Project Site

Jordan Cove LNG℠

10/5/2018

FIGURE NO. 1.2-9



Jordan Cove Energy Project

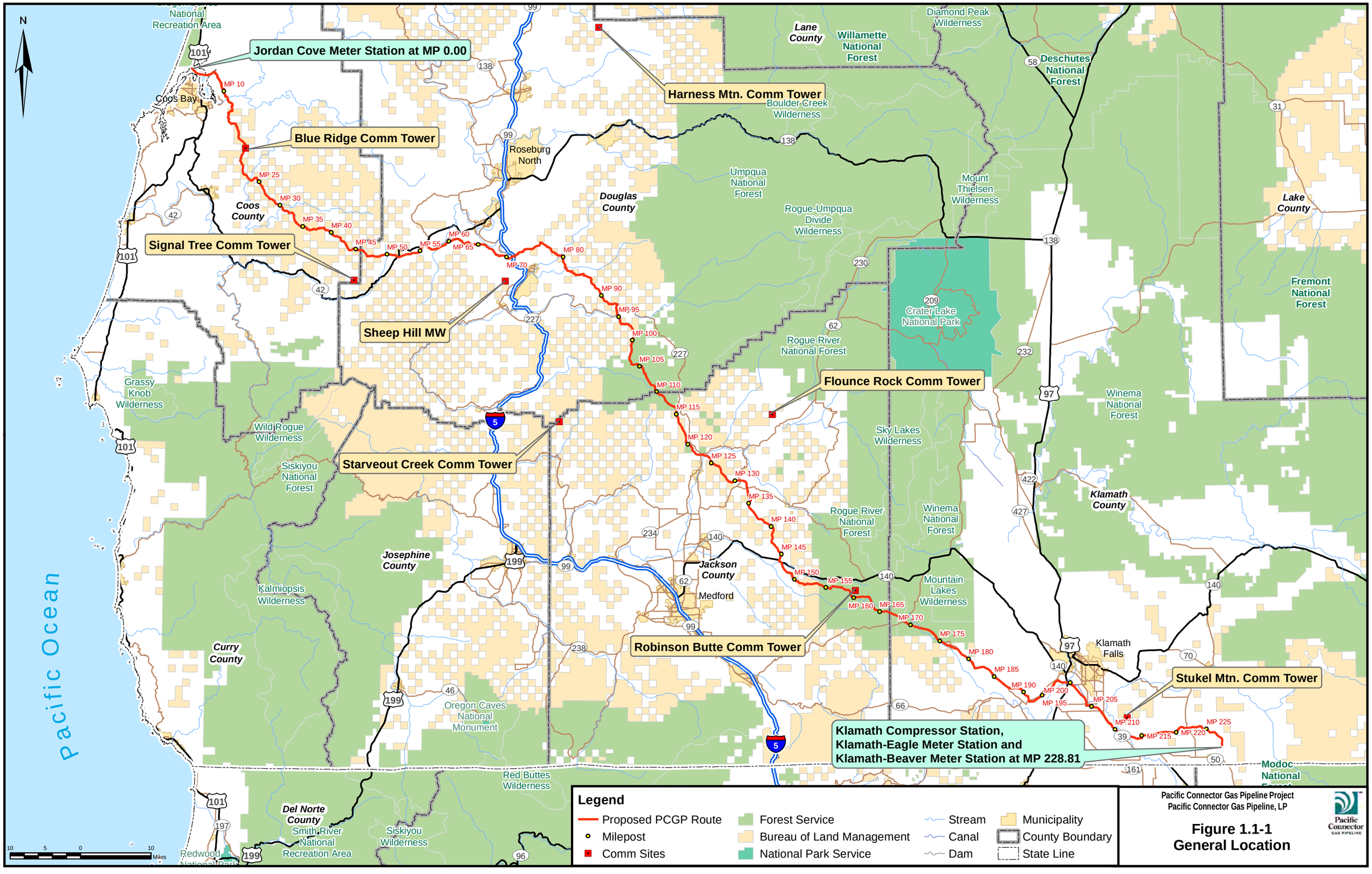
DSL Removal-Fill Permit Application

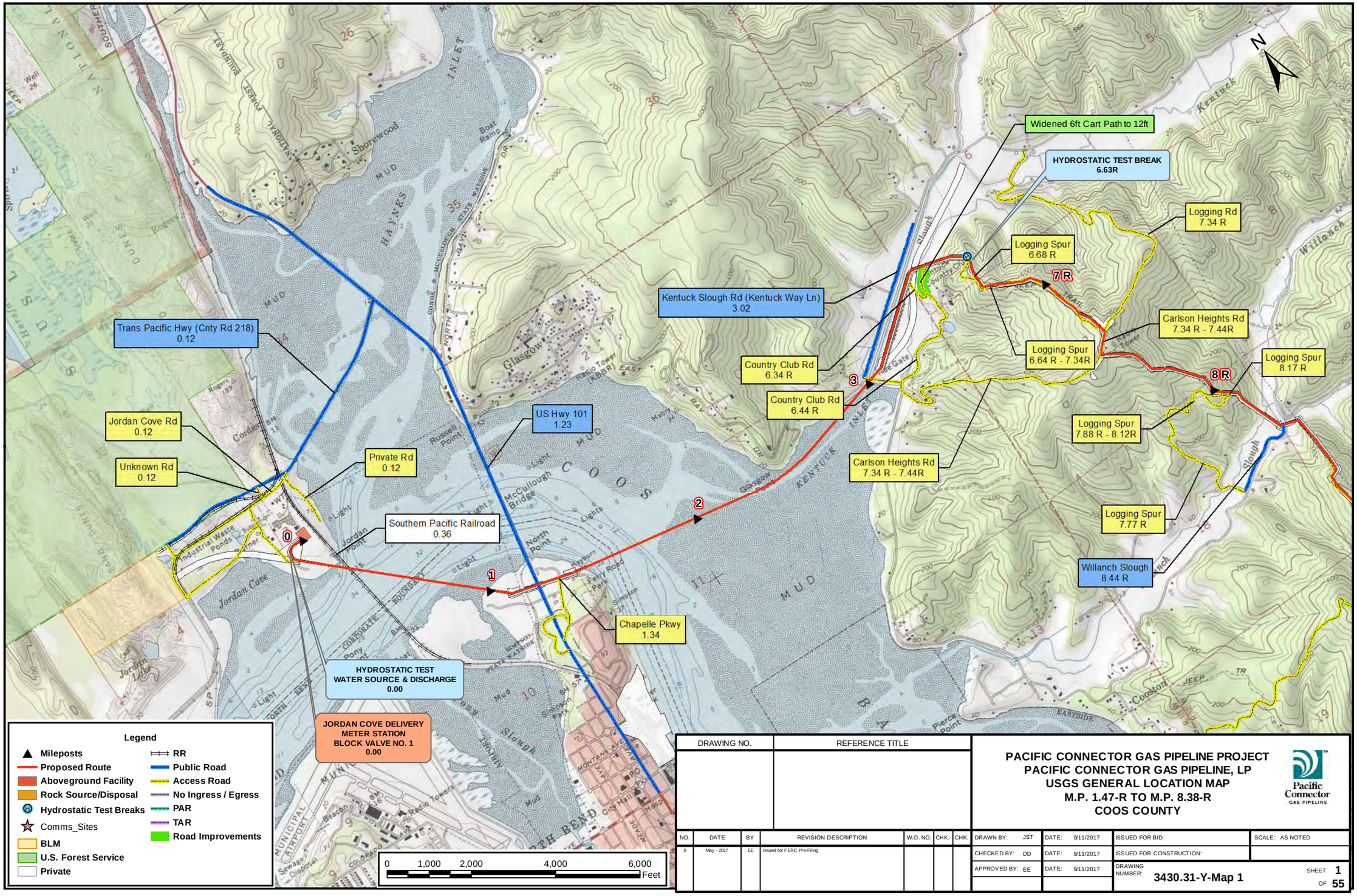
Adjacent Tax Lots
Trans Pacific Parkway and
US-101 Intersection Improvements

Jordan Cove LNG℠

10/5/2018

FIGURE NO. 1.2-10


N
Jordan Cove Meter Station at MP 0.00
Blue Ridge Comm Tower
Signal Tree Comm Tower
Sheep Hill MW
Starveout Creek Comm Tower
Harness Mtn. Comm Tower
Flounce Rock Comm Tower
Robinson Butte Comm Tower
Stukel Mtn. Comm Tower
Klamath Compressor Station,
Klamath-Eagle Meter Station and
Klamath-Beaver Meter Station at MP 228.81
MP 10
MP 25
MP 30
MP 35
MP 40
MP 45
MP 50
MP 55
MP 60
MP 65
MP 70
MP 80
MP 90
MP 95
MP 100
MP 105
MP 110
MP 115
MP 120
MP 125
MP 130
MP 135
MP 140
MP 145
MP 150
MP 155
MP 160
MP 165
MP 170
MP 175
MP 180
MP 185
MP 190
MP 195
MP 200
MP 205
MP 210
MP 215
MP 220
MP 225
Coos Bay
Roseburg North
Medford
Klamath Falls
Coos County
Douglas County
Lane County
Jackson County
Josephine County
Klamath County
Curry County
Del Norte County
Lake County
Pacific Ocean
Willamette National Forest
Umpqua National Forest
Rogue River National Forest
Siskiyou National Forest
Winema National Forest
Fremont National Forest
Modoc National Forest
Deschutes National Forest
Diamond Peak Wilderness
Boulder Creek Wilderness
Mount Thielsen Wilderness
Rogue-Umpqua Divide Wilderness
Crater Lake National Park
Sky Lakes Wilderness
Mountain Lakes Wilderness
Grassy Knob Wilderness
Wild Rogue Wilderness
Kalmiopsis Wilderness
Oregon Caves National Monument
Red Buttes Wilderness
Siskiyou Wilderness
Smith River National Recreation Area
Redwood National Park
10 5 0 10 Miles
Legend
Proposed PCGP Route
Milepost
Comm Sites
Forest Service
Bureau of Land Management
National Park Service
Stream
Canal
Dam
Municipality
County Boundary
State Line
Pacific Connector Gas Pipeline Project
Pacific Connector Gas Pipeline, LP
Figure 1.1-1
General Location



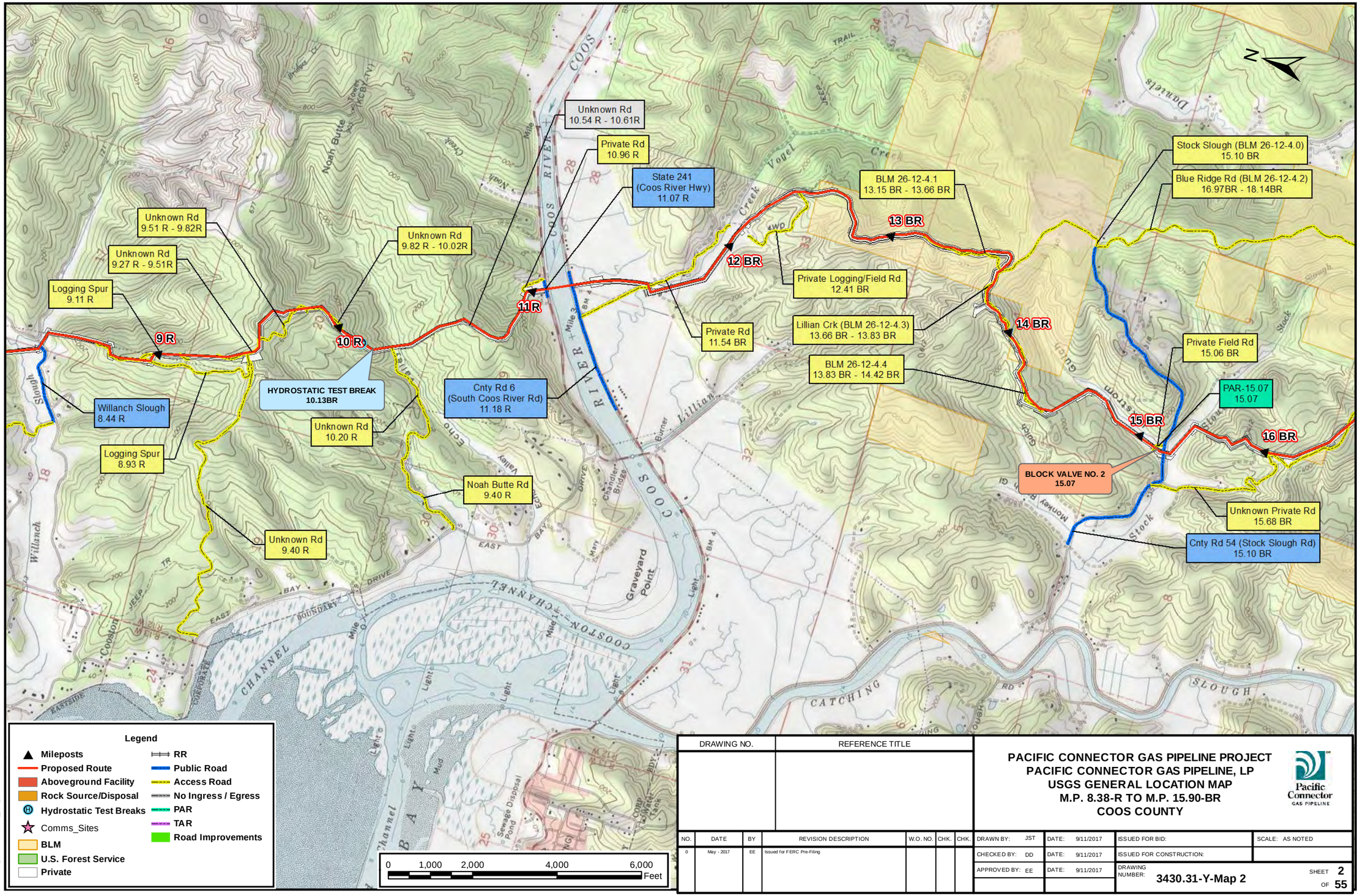
DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 1.47-R TO M.P. 8.38-R
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: JST	DATE: 9/11/2017	ISSUED FOR BID:	SCALE: AS NOTED	
CHECKED BY: DD	DATE: 9/11/2017	ISSUED FOR CONSTRUCTION:		
APPROVED BY: EE	DATE: 9/11/2017	DRAWING NUMBER: 3430.31-Y-Map 1	SHEET 1 OF 55	



DRAWING NO.	REFERENCE TITLE

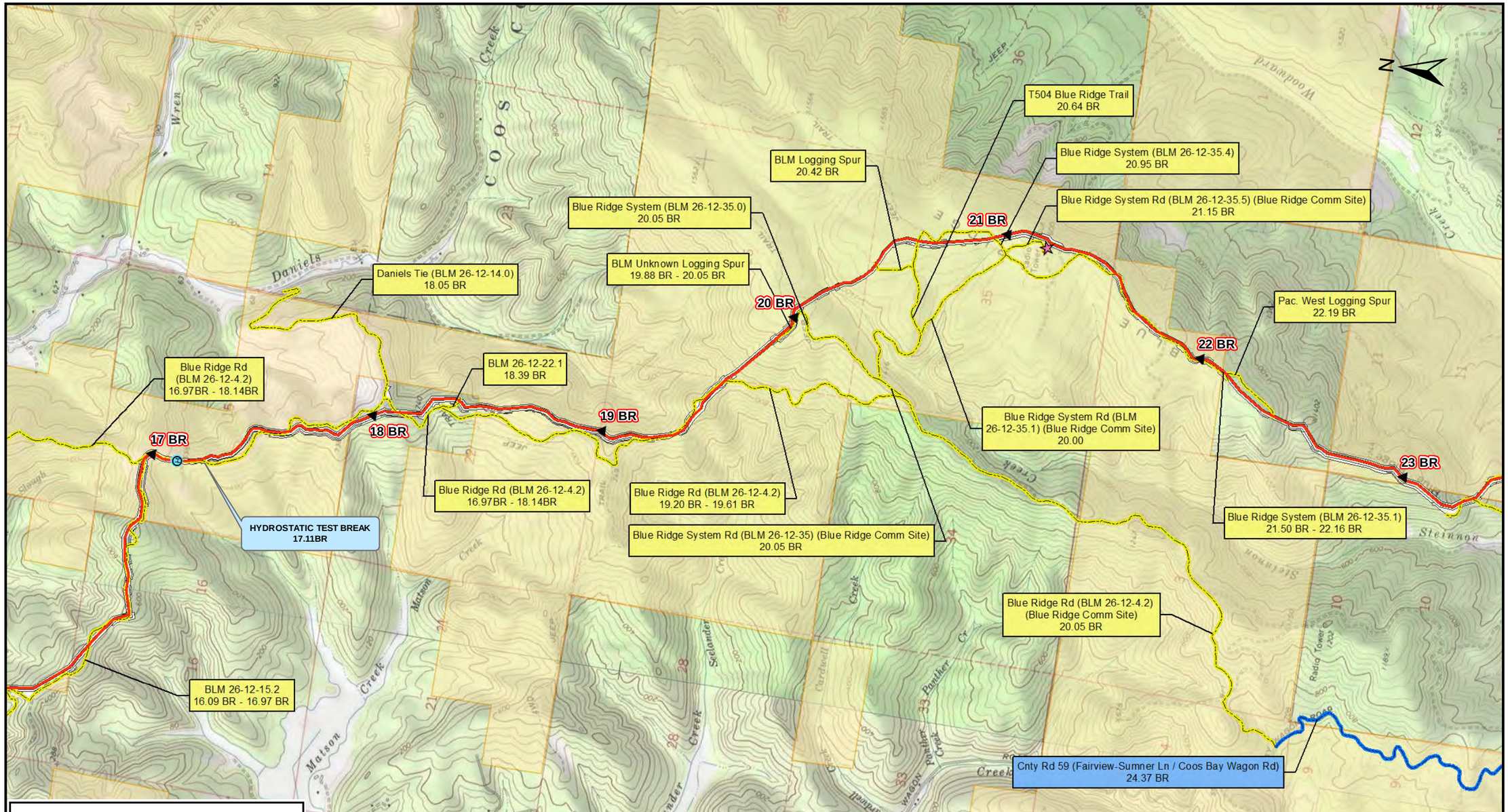
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 8.38-R TO M.P. 15.90-BR
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: JST	DATE: 9/11/2017	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: DD	DATE: 9/11/2017	ISSUED FOR CONSTRUCTION:	
APPROVED BY: EE	DATE: 9/11/2017	DRAWING NUMBER: 3430.31-Y-Map 2	SHEET 2 OF 55

Path: P:\PCGP_JCL\GIS\Arcfig\TMP_TMP_DOP.mxd



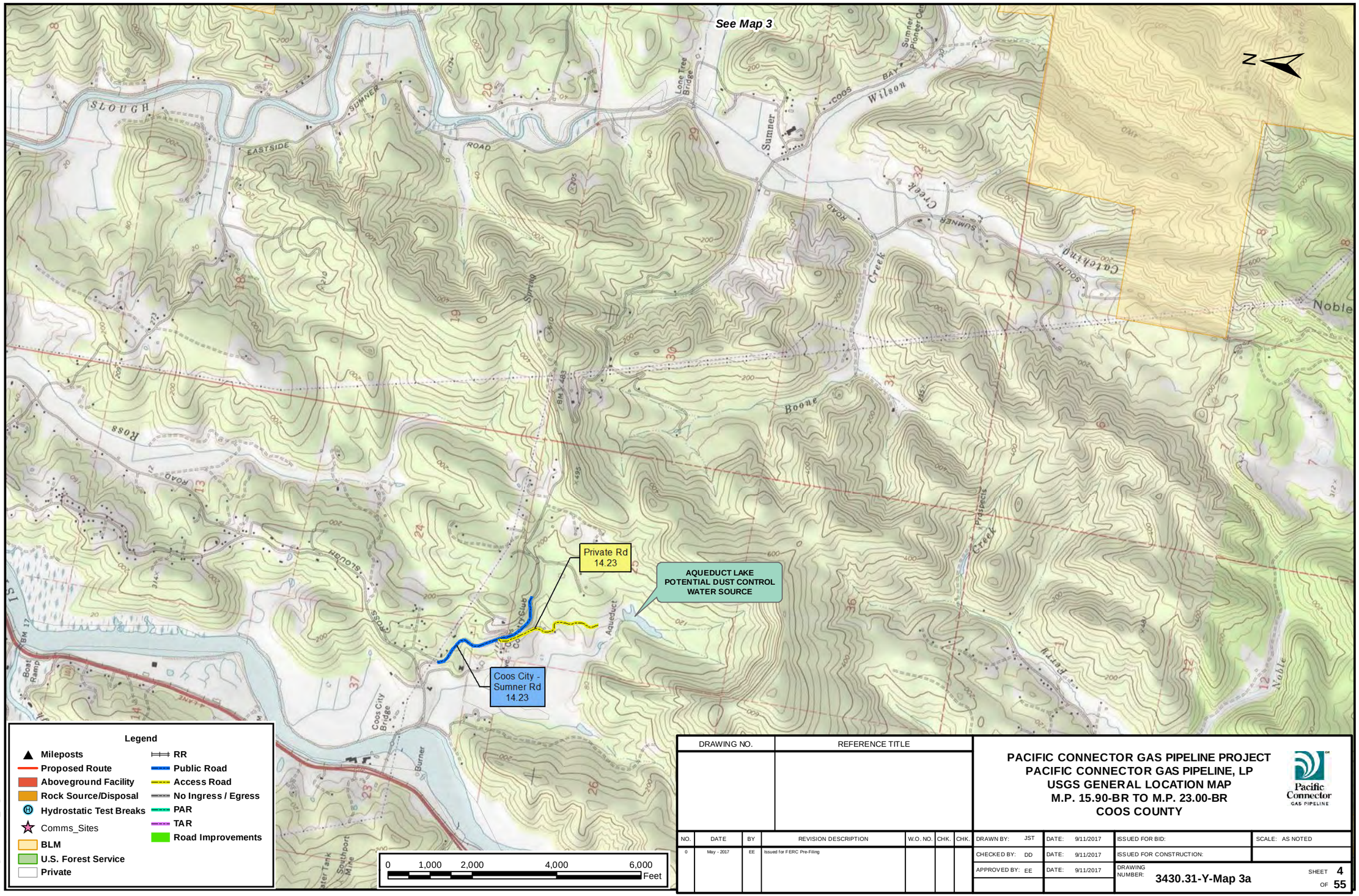
DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 15.90-BR TO M.P. 23.00-BR
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: JST	DATE: 9/11/2017	ISSUED FOR BID:	SCALE: AS NOTED		
CHECKED BY: DD	DATE: 9/11/2017	ISSUED FOR CONSTRUCTION:			
APPROVED BY: EE	DATE: 9/11/2017	DRAWING NUMBER: 3430.31-Y-Map 3	SHEET 3 OF 55		



DRAWING NO.	REFERENCE TITLE

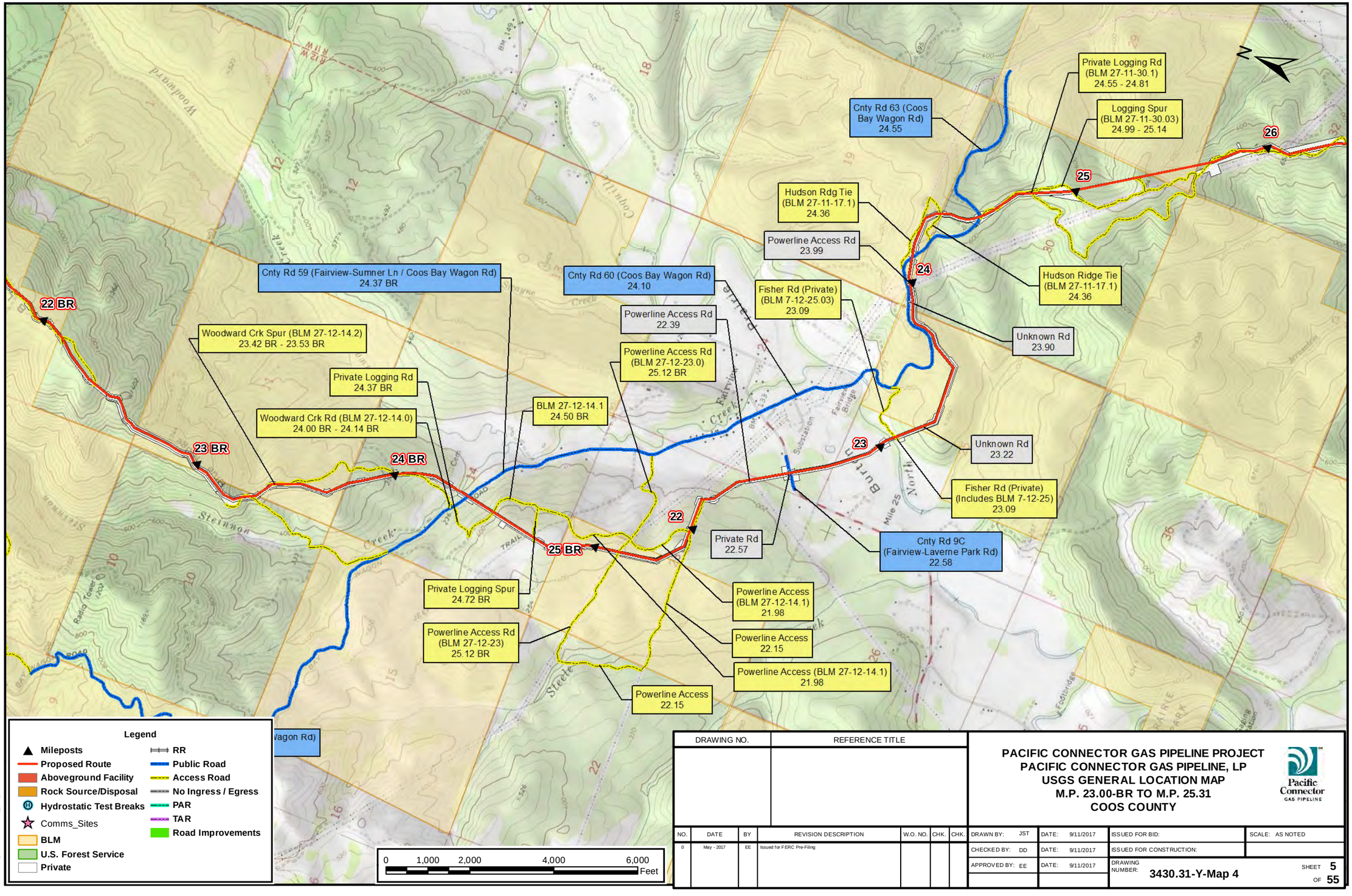
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 15.90-BR TO M.P. 23.00-BR
COOS COUNTY

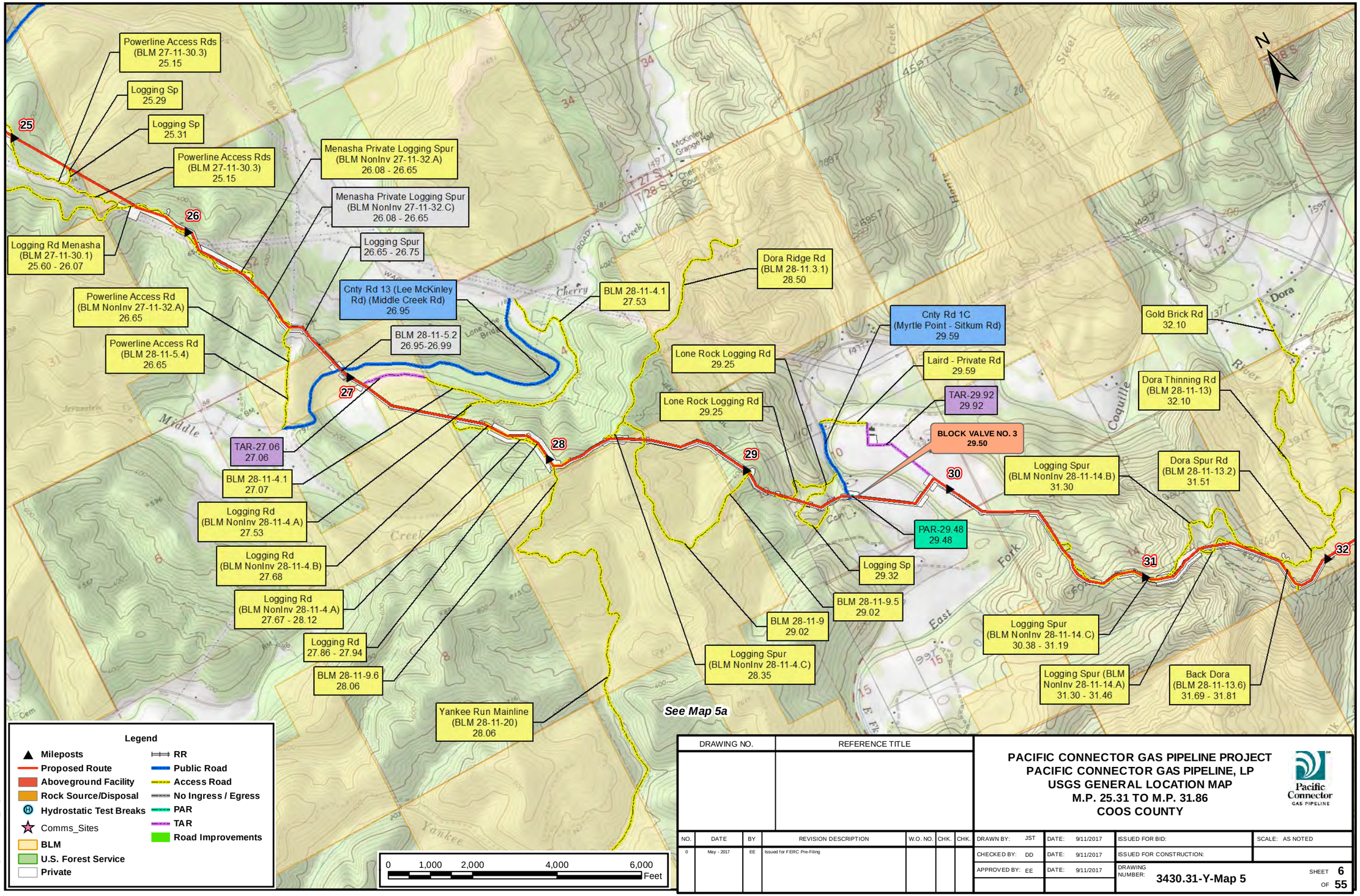
Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: JST	DATE: 9/11/2017	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: DD	DATE: 9/11/2017	ISSUED FOR CONSTRUCTION:	
APPROVED BY: EE	DATE: 9/11/2017	DRAWING NUMBER: 3430.31-Y-Map 3a	SHEET 4 OF 55

Path: P:\PCGP_JCLNG\ArcMap\TMPL_TMP_DDP.mxd


Private Logging Rd (BLM 27-11-30.1) 24.55 - 24.81
Logging Spur (BLM 27-11-30.03) 24.99 - 25.14
Cnty Rd 63 (Coos Bay Wagon Rd) 24.55
Hudson Rdg Tie (BLM 27-11-17.1) 24.36
Powerline Access Rd 23.99
Hudson Ridge Tie (BLM 27-11-17.1) 24.36
Cnty Rd 59 (Fairview-Sumner Ln / Coos Bay Wagon Rd) 24.37 BR
Cnty Rd 60 (Coos Bay Wagon Rd) 24.10
Fisher Rd (Private) (BLM 7-12-25.03) 23.09
Powerline Access Rd 22.39
Unknown Rd 23.90
Woodward Crk Spur (BLM 27-12-14.2) 23.42 BR - 23.53 BR
Powerline Access Rd (BLM 27-12-23.0) 25.12 BR
Private Logging Rd 24.37 BR
BLM 27-12-14.1 24.50 BR
Woodward Crk Rd (BLM 27-12-14.0) 24.00 BR - 24.14 BR
Unknown Rd 23.22
Fisher Rd (Private) (Includes BLM 7-12-25) 23.09
Private Rd 22.57
Cnty Rd 9C (Fairview-Laverne Park Rd) 22.58
Private Logging Spur 24.72 BR
Powerline Access (BLM 27-12-14.1) 21.98
Powerline Access Rd (BLM 27-12-23) 25.12 BR
Powerline Access 22.15
Powerline Access (BLM 27-12-14.1) 21.98
Powerline Access 22.15
22 BR
23 BR
24 BR
25 BR
22
23
24
25
26
Legend
Mileposts
Proposed Route
Aboveground Facility
Rock Source/Disposal
Hydrostatic Test Breaks
Comms_Sites
BLM
U.S. Forest Service
Private
RR
Public Road
Access Road
No Ingress / Egress
PAR
TAR
Road Improvements
0 1,000 2,000 4,000 6,000 Feet
DRAWING NO.
REFERENCE TITLE
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 23.00-BR TO M.P. 25.31
COOS COUNTY
Pacific Connector GAS PIPELINE
NO. DATE BY REVISION DESCRIPTION W.O. NO. CHK. CHK.
0 May - 2017 EE Issued for FERC Pre-Filing
DRAWN BY: JST DATE: 9/11/2017
CHECKED BY: DD DATE: 9/11/2017
APPROVED BY: EE DATE: 9/11/2017
ISSUED FOR BID:
ISSUED FOR CONSTRUCTION:
SCALE: AS NOTED
DRAWING NUMBER: 3430.31-Y-Map 4
SHEET 5 OF 55



DRAWING NO.	REFERENCE TITLE

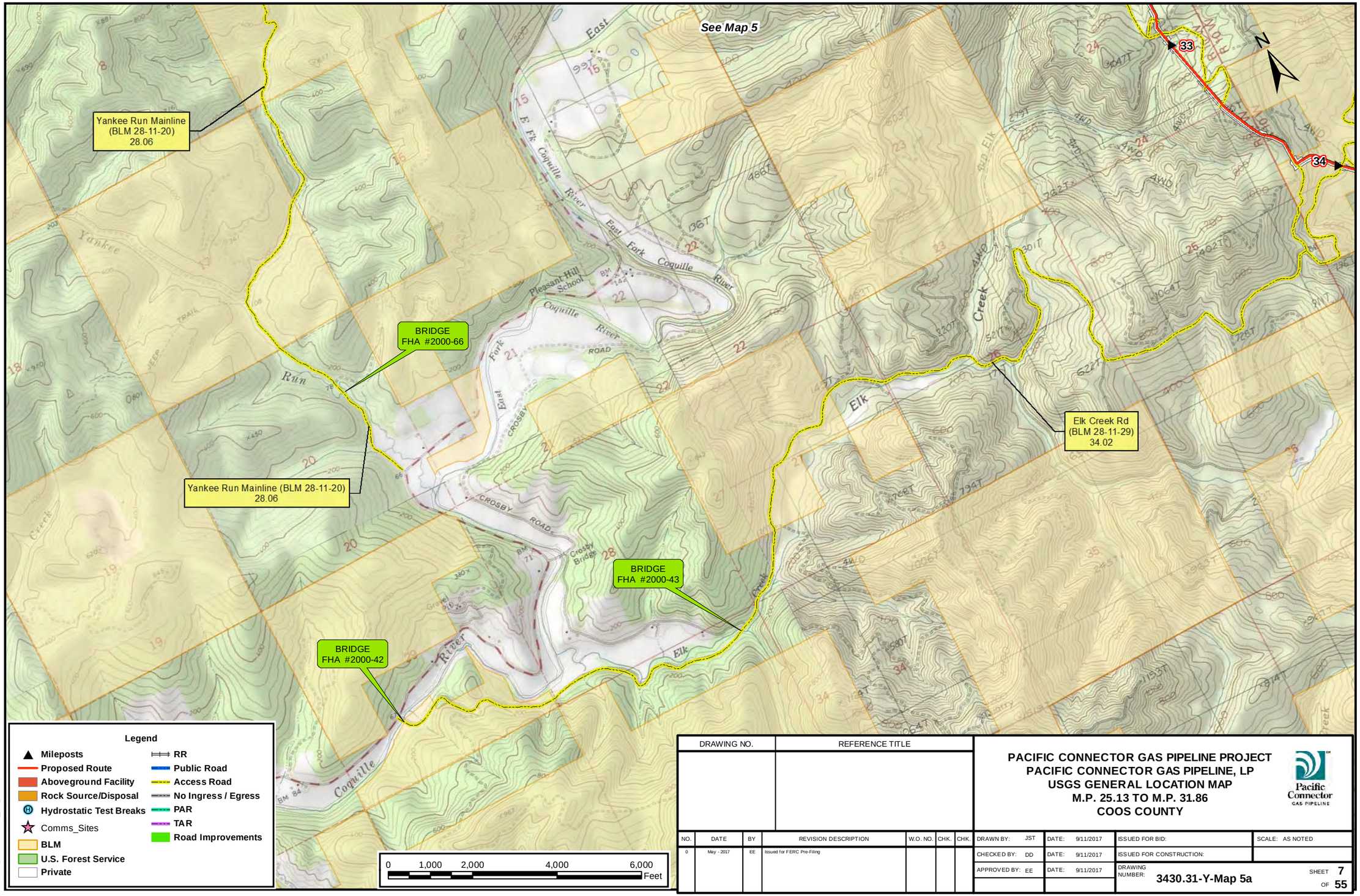
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 25.31 TO M.P. 31.86
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: JST	DATE: 9/11/2017	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: DD	DATE: 9/11/2017	ISSUED FOR CONSTRUCTION:	
APPROVED BY: EE	DATE: 9/11/2017	DRAWING NUMBER: 3430.31-Y-Map 5	SHEET 6 OF 55

Path: P:\PCGP_JCL\GIS\Arcgis\MPs_TMP_DOP.mxd



DRAWING NO.	REFERENCE TITLE

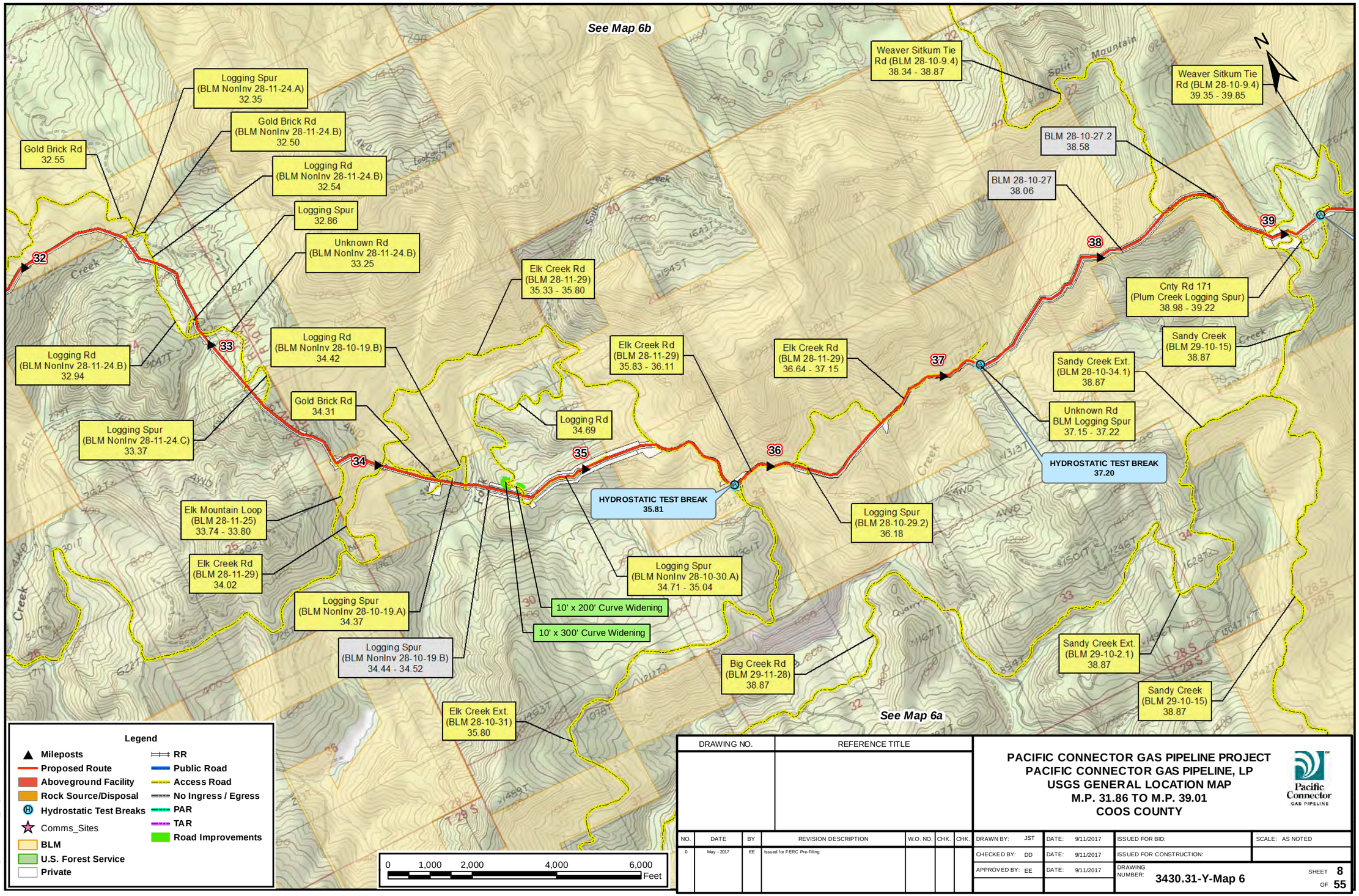
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 25.13 TO M.P. 31.86
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: JST	DATE: 9/11/2017	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: DD	DATE: 9/11/2017	ISSUED FOR CONSTRUCTION:	
APPROVED BY: EE	DATE: 9/11/2017	DRAWING NUMBER: 3430.31-Y-Map 5a	SHEET 7 OF 55

Path: P:\PCGP_JCLNG\ArcMap\TMP_TMP_DDP.mxd



DRAWING NO.	REFERENCE TITLE

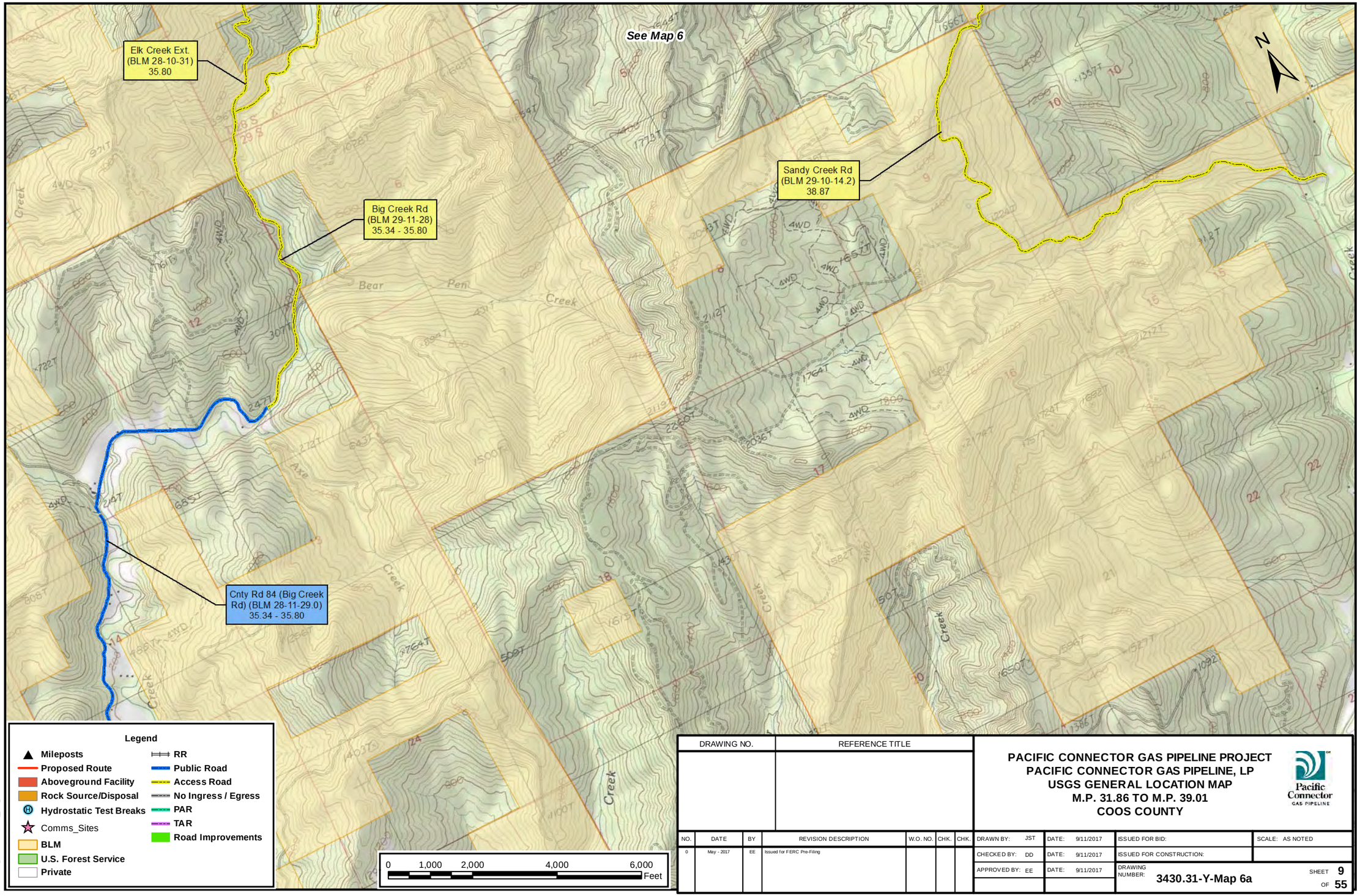
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 31.86 TO M.P. 39.01
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: JST	DATE: 9/11/2017	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: DD	DATE: 9/11/2017	ISSUED FOR CONSTRUCTION:	
APPROVED BY: EE	DATE: 9/11/2017	DRAWING NUMBER: 3430.31-Y-Map 6	SHEET 8 OF 55

Path: P:\PCGP_JCLNG\ArcMap\TMP_TMP_DDP.mxd



DRAWING NO.	REFERENCE TITLE

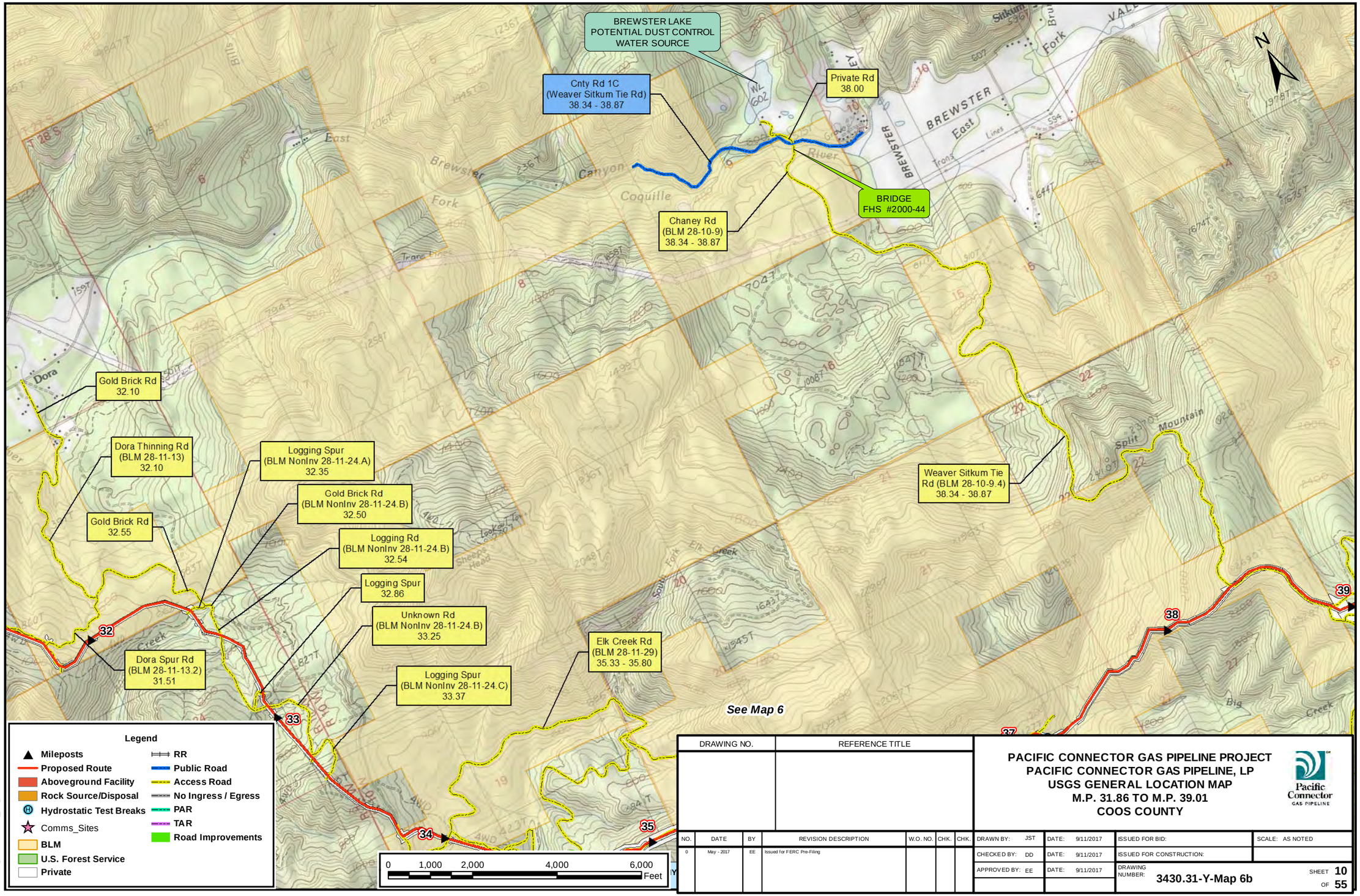
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 31.86 TO M.P. 39.01
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: JST	DATE: 9/11/2017	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: DD	DATE: 9/11/2017	ISSUED FOR CONSTRUCTION:	
APPROVED BY: EE	DATE: 9/11/2017	DRAWING NUMBER: 3430.31-Y-Map 6a	SHEET 9 OF 55

Path: P:\PCGP_JCL\NG\ArcMap\TMP_TMP_DDP.mxd



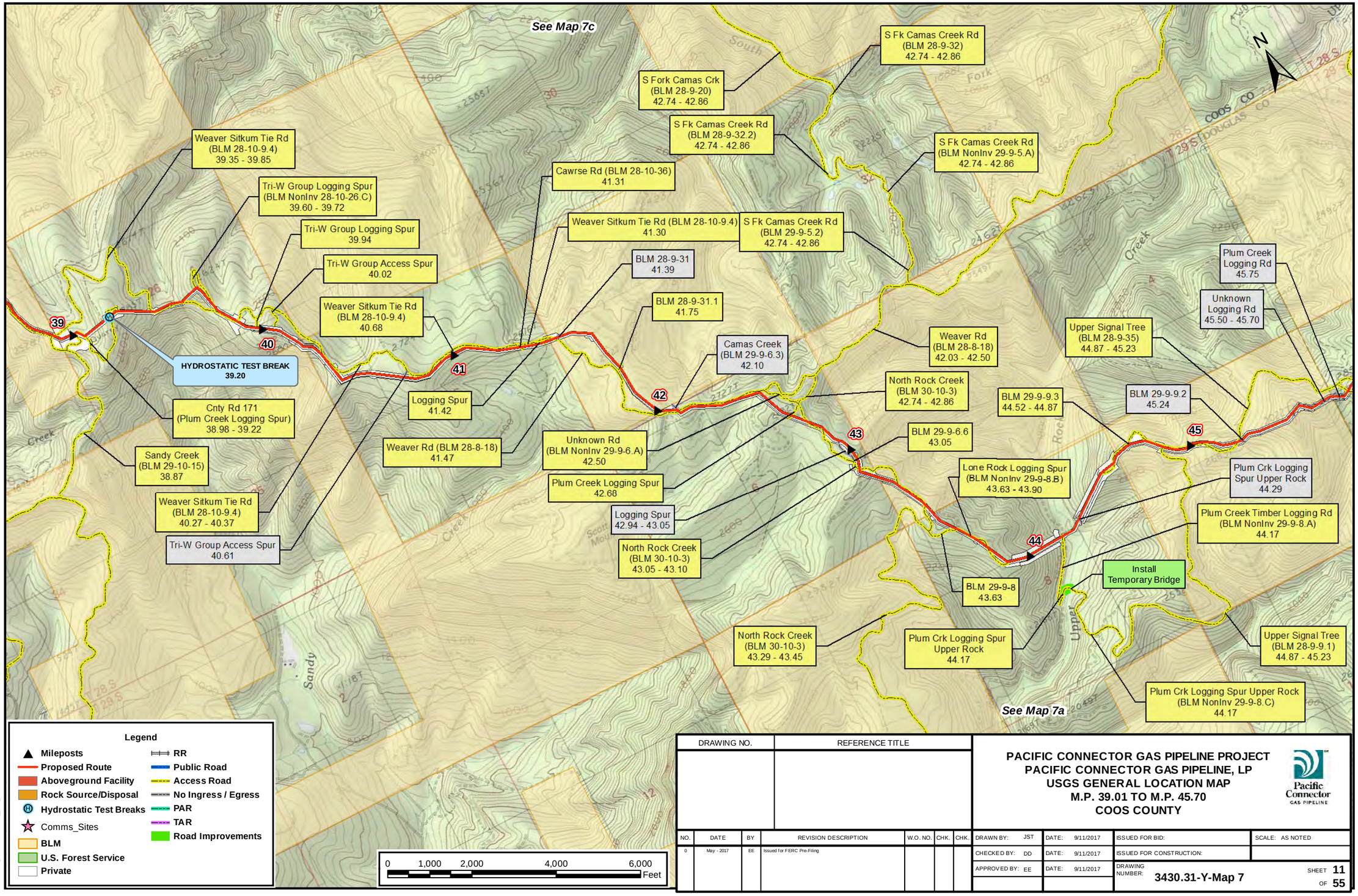
DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 31.86 TO M.P. 39.01
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: JST	DATE: 9/11/2017	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: DD	DATE: 9/11/2017	ISSUED FOR CONSTRUCTION:	
APPROVED BY: EE	DATE: 9/11/2017	DRAWING NUMBER: 3430.31-Y-Map 6b	SHEET 10 OF 55



DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 39.01 TO M.P. 45.70
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: JST	DATE: 9/11/2017	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: DD	DATE: 9/11/2017	ISSUED FOR CONSTRUCTION:	
APPROVED BY: EE	DATE: 9/11/2017	DRAWING NUMBER: 3430.31-Y-Map 7	SHEET 11 OF 55

Attachment 3:

NPDES Industrial Discharge Permit Modification Application Report

CONTENTS

FIGURES ..... **v**

TABLES ..... **v**

APPENDICES ..... **v**

ACRONYMS ..... **vii**

SUMMARY **1**

1. PROJECT DESCRIPTION **2**

1.1 Pre-Construction (ODEQ Jurisdiction) 2
1.2 Construction of the LNG terminal Facility 2
1.3 Post-Construction / Completed LNG Facility 2
1.3.1 Ingram Yard 2
1.3.2 Access and Utility Corridor 3
1.3.3 South Dunes 3
1.4 LNG Terminal Support Systems 4
1.4.1 Source Water 4
1.4.2 IWWP 4

2. WASTEWATER SOURCES RELATED TO LNG FACILITY **5**

2.1 Pre-Construction Period 5
2.2 Construction Period 5
2.2.1 Construction Worker Sanitary Facilities 5
2.2.2 Peat Removal and Deep Excavation Dewatering 6
2.2.3 Hydrostatic Test Water 6
2.2.4 Oily Water Separator 6
2.2.5 Construction Stormwater 7
2.3 Post-Construction/Completed LNG Terminal Facility 7
2.3.1 Gas Inlet and Conditioning Facility 8
2.3.2 Liquefaction and Marine facilities 8
2.3.3 Stormwater Systems 9
2.3.4 Sanitary 10

3. OUTFALL INVENTORY **11**

3.1 Currently Permitted Outfalls 11
3.2 Outfall Changes During and After Construction 11

4. EFFLUENT CHARACTERIZATION **13**

4.1 Sampling and Analysis 13
4.1.1 Raw Groundwater Sampling – September and November 2018 13
4.1.2 Potable Water Sampling – November 2018 13

4.1.3 Ambient Receiving Water Sampling – September 2018 and January 2019 14
4.2 Current Conditions 14
4.2.1 Historical IWWP Discharge Analytical Results 14
4.2.2 Historical Landfill Leachate Analytical Data 15
4.2.3 Raw Groundwater from Coos Bay-North Bend Water Board West Well Field 16
4.3 During Construction 16
4.4 After Construction 16
4.4.1 Facility Waste Streams 16
4.4.2 IWWP Discharge 17
4.4.3 Combined IWWP Discharge, Facility Wastewater and Raw Groundwater 17

5. RECEIVING ENVIRONMENT AND MIXING ZONE 18
5.1 Outfall Location and Description 18
5.2 Receiving Environment Characterization 18
5.3 Dilutions 18

6. EFFLUENT MONITORING 19
6.1 Proposed Monitoring Location 19
6.2 Recommended Monitoring Parameters 19

FIGURES

Figure 1 Topographic Map
Figure 2 Water/Wastewater Line Diagram – During Construction
Figure 3 Water/Wastewater Line Diagram – After Construction

TABLES

Table 1 Estimation of Facility Wastewater Quality
Table 2 Summary of Raw Groundwater Analytical Results
Table 3 Summary of CBNBWB Potable Water Analytical Results
Table 4 Summary of Ambient Ocean Samples Analytical Results
Table 5 IWWP DMR Data Summary, 2015 through 2017 (included in main body of report)
Table 6 Leachate Data Summary, 1999 through 2017 (included in main body of report)
Table 7 Summary of Historical Onsite Groundwater Analytical Results

APPENDICES

Appendix A Industrial Wastewater Pipeline, Water Pipelines relocation and Utility Tie-Ins, SHN Engineers

Appendix B Laboratory Analytical Reports – Raw Groundwater, September 2018
Appendix C Laboratory Analytical Reports – Raw Groundwater and CBNBWB Potable Water, November 2018
Appendix D Seasonality Assessment of Dunes Area Groundwater
Appendix E Laboratory Analytical Reports – Ambient Marine Water, September 2018
Appendix F Laboratory Analytical Reports – Ambient Marine Water, January 2098
Appendix G Summary of DMR Data, 2015 through 2017
Appendix H Summary of Leachate Analytical Results

ACRONYMS

AGRU	acid gas removal unit
ASB	aerated (formerly) stabilization basin
BOD_5	five-day biochemical oxygen demand
°C	degrees Celsius
CBNBWB	Coos Bay North Bend Water Board
/s	centimeters per second
DMR	Discharge monitoring report
EPA	U.S. Environmental Protection Agency
EDI	Electro de-ionization
FEED	front end engineering design
FERC	Federal Energy Regulatory Commission
ft	foot
gpd	gallons per day
	gallons per minute
HRSG	Heat Recovery Steam Generator
IWWP	industrial wastewater pipeline
JCEP	Jordan Cove Energy Project
L	Liter
LNG	liquefied natural gas
mg/L	milligrams per liter
mgd	million gallons per day
mtpa	million tonnes per annum
µg/L	microgram per liter
NPDES	National Pollutant Discharge Elimination System
ODEQ	Oregon Department of Environmental Quality
OWS	oily water separator
PCGP	Pacific Connector Gas Pipeline
ppth	parts per thousand
RFP	Roseburg Forest Products
RO	reverse osmosis
SORSC	Southwest Oregon Regional Safety Center
s.u.	standard units
TDS	total dissolved solids
TPP	Trans Pacific Parkway
TSS	total suspended solids
USGS	United States Geological Survey

SUMMARY

Jordan Cove Energy Project L.P. (JCEP) is submitting this Permit Modification Request to modify National Pollutant Discharge Elimination System (NPDES) Permit No. 101499. JCEP is currently authorized to discharge landfill leachate, residual papermill waste, miscellaneous wash water, deflation plane stormwater, deflation plane seepage, and seepage associated with the North and South Settling Ponds. Wastewater is currently discharged to the Pacific Ocean via the existing Industrial Wastewater Pipeline (IWWP). The current NPDES Permit expires June 30, 2020.

JCEP proposes to build a Liquefied Natural Gas (LNG) Terminal to be located on the bay side of the North Spit of Coos Bay in southwest Oregon (**Figure 1**). It would be designed to receive a maximum of 1,200,000 decatherms per day (dth/d) of natural gas and produce a maximum of 7.8 million tonnes per annum (mtpa) of LNG for export. Wastewater would continue to be discharged through the existing Outfall 001a. While Outfall 001a will remain unchanged, part of the IWWP between the proposed LNG Terminal and the outfall will be relocated with a new portion of the pipeline routed along the Trans Pacific Parkway (TPP).

As has been provided to the Oregon Department of Environmental Quality (ODEQ) in correspondence dated May 25, 2018 entitled "*Jordan Cove LNG Project NPDES Discharge Characterization Summary"* and subsequently discussed during teleconferences and meetings with ODEQ staff, JCEP requests that current Permit No. 101499 be modified to transfer the permit from Fort Chicago Holdings II U.S. LLC to JCEP, and to address a phased construction approach, i.e. the permit will include monitoring requirements for the three following project phases: current conditions, conditions during construction, and conditions post construction of the LNG facility.

This permit modification request contains a description of the project, sources of wastewater, preliminary wastewater treatment concepts, proposed monitoring location, and other relevant information as required on EPA application forms. The information provided in this document reflects the front end engineering design (FEED) plans.

1. PROJECT DESCRIPTION

1.1 PRE-CONSTRUCTION (ODEQ JURISDICTION)

Fort Chicago Holdings II U.S. LLC, the holder of the current NPDES Permit No. 101499, intends to close the ODEQ permitted industrial landfill prior to JCEP's construction of the LNG Terminal.

1.2 CONSTRUCTION OF THE LNG TERMINAL FACILITY

Activities occurring on site during construction consist of typical industrial construction components and are authorized under applicable regulatory requirements, such as a 1200-Z construction stormwater NPDES permit, which is being permitted separately.

As part of the LNG Terminal project construction, portions of the existing IWWP will be removed or abandoned and replaced with a new IWWP pipeline along a relocated route, as shown in **Appendix A**. A figure showing the location of the project is attached (**Figure 1**). The construction of the relocated portion of the IWWP will commence within the first 6 months of construction of the LNG Terminal.

The Access and Utility Corridor will be constructed between Ingram Yard and the South Dunes Site. The full length of the corridor will be used during construction for the movement of equipment and materials. The road will be used to haul materials excavated from the Ingram Yard to the South Dunes Site and the RFP property. Use of the corridor for mass earth moving will reduce impacts to the TPP and the existing RFP facility.

During construction, the South Dunes site will include temporary construction facilities, construction operations for the Pacific Connector Gas Pipeline (PCGP) metering station and a Workforce Housing Facility.

1.3 POST-CONSTRUCTION / COMPLETED LNG FACILITY

The proposed LNG Terminal will consist of two contiguous parcels (Ingram Yard and South Dunes) connected by an Access and Utility Corridor. Each of these components is briefly described below in Sections 1.2.1 through 1.2.3.

The LNG Terminal will receive natural gas from the pipeline through the metering station and feed gas line to Ingram Yard. A brief description of relevant facility components is presented below. Sources of wastewater associated with relevant components are described in **Section 2**.

1.3.1 INGRAM YARD

Ingram Yard is the portion of the LNG Terminal site that will house permanent LNG Terminal facilities including the Gas Inlet and Conditioning Facilities, LNG tanks and Liquefaction Facilities, and Marine Facilities (LNG loading, slip and access channel).

1.3.1.1 Gas Inlet Facilities and Gas Conditioning

Natural gas will enter the facility at the interface point at the LNG Terminal, immediately downstream of a metering skid located on the South Dunes. The metering facilities include the pipeline pig receiver, inlet filter/separator, and flow meter. The Gas Conditioning Train provides mercury and acid gas removal and dehydration. Downstream of the acid gas removal system, natural gas is subject to the dehydration system, where the water removal system will reduce water in the treated feed gas.

1.3.1.2 LNG Tanks and Liquefaction Facilities

The natural gas will be liquefied via a single mixed refrigerant circuit with a two-stage compressor and refrigerant exchanger. Components of the liquefaction facilities will include the following:

- Liquefaction trains;
- Heavy hydrocarbon removal units;
- Refrigeration units, including refrigerant makeup;
- Air cooled heat exchangers;
- Two full containment insulated LNG storage tanks, each with a working capacity of 160,000 cubic meters of LNG; and,
- In-tank LNG loading pumps to send LNG via the marine facilities to the LNG carriers.

1.3.1.3 Marine Facilities

Activities at the marine berth will primarily consist of LNG transfer from the LNG storage tanks to the LNG carriers. The Marine Facilities include a single-use marine slip, dedicated to supporting the LNG exports, Access Channel, LNG carrier berths, Emergency Lay Berth, Product Loading Berth, Material Offloading Facility and Tug Berth.

1.3.2 ACCESS AND UTILITY CORRIDOR

The Access and Utility Corridor will be constructed between Ingram Yard and the South Dunes site. The corridor will be approximately one (1) mile long. It will be located entirely on property owned by JCEP. The Access and Utility Corridor will encompass about 26 acres.

The primary purpose of the Access and Utility Corridor is to provide a conduit for the underground feed gas supply to the LNG Terminal and the required utility services running between the LNG Terminal and South Dunes. Utilities in the corridor will include underground power lines, fire water supply, communications lines, and metering skid control lines.

1.3.3 SOUTH DUNES

The South Dunes site will house temporary construction (laydown and Workforce Housing Facility) and permanent facilities, including the PCGP metering station, Helipad, and the Southwest Oregon Regional Safety Center (SORSC), which would provide emergency response services for the facility and the southern Oregon region.

1.4 LNG TERMINAL SUPPORT SYSTEMS

The LNG Terminal will include typical facility support systems such as fire suppression, stormwater and wastewater treatment, utility water, steam and vapor handling systems. Support systems producing wastewater relevant to the NPDES Permit are discussed in **Section 2** of this report.

1.4.1 SOURCE WATER

The proposed LNG Terminal facility will use a combination of potable and raw groundwater. Potable and raw groundwater will be supplied from the Coos Bay-North Bend Water Board (CBNBWB) via existing pipelines. The CBNBWB potable water system relies primarily on surface water from reservoirs that is treated in the CBNBWB drinking water treatment plant. Raw groundwater is supplied by existing CBNBWB well fields and is not treated.

Potable water will fulfill normal operational water needs at the LNG Terminal, including fire water makeup, utility water, and potable water. A portion of the utility water will be demineralized for use as makeup to the Steam System and the acid gas removal unit (AGRU). The demineralized water system will consist of a reverse osmosis (RO) unit and electro de-ionization (EDI) unit followed by a mixed bed polisher that is not regenerable. The RO Unit and EDI unit will both produce a reject stream as wastewater. The mixed bed polisher is not regenerated onsite but is swapped out at the end of its useful life.

Raw groundwater, supplied from the CBNBWB raw water pipeline, will be used for construction water, including LNG tank hydrotesting. Although the raw water pipeline will remain connected after construction, use of raw water is not anticipated for normal facility operations. However, raw water will be used to supplement discharge flow out the IWWP to maintain a minimum flow rate for operation of the wastewater diffuser.

1.4.2 IWWP

Wastewater will be discharged through the IWWP to the ocean outfall diffuser (discussed further in **Section 3.2**). The IWWP will be located as shown on the drawing prepared by SHN Consulting Engineers and Geologists (**Appendix A**).

2. WASTEWATER SOURCES RELATED TO LNG FACILITY

2.1 PRE-CONSTRUCTION PERIOD

During the pre-construction period, effluent characteristics will be the same as those currently permitted under the existing NPDES Permit No. 101499. As the operational and maintenance activities of the current infrastructure are covered under the existing NPDES permit, additional details are not presented in this document. Such activities may include removal of solids from the North and South Settling Ponds that has been a regular historic maintenance activity at the site.

Prior to construction of the LNG Terminal, Fort Chicago Holdings II U.S. LLC, the holder of the current NPDES Permit No. 101499, plans to close Cell 3 of the permitted landfill. Once Cell 3 is closed, effluent from the Cell 3 landfill will be eliminated and therefore will no longer be discharged to Outfall 001a via the IWWP. The Settling Ponds will continue to receive stormwater and remain in operation until the South Dunes site has been re-graded during the construction of the LNG Terminal facilities. Seepage from the Settling Ponds currently discharges via Outfall 003.

2.2 CONSTRUCTION PERIOD

Construction stormwater will be managed under a 1200-C NPDES General Permit for Stormwater Discharges from Construction Sites. Wastewater generated during construction will be managed under the modified NPDES permit.

A wastewater flow diagram for construction conditions is attached (**Figure 2**). During construction, wastewater streams discharged to the IWWP may include:

- Effluent from temporary sanitary treatment facilities;
- Water from construction dewatering;
- Hydrostatic test water;
- Effluent from the oily water separator (OWS);
- Contact stormwater not managed under the 1200-C permit; this is composed of stormwater that flows into and through the OWS and then the sump; and
- Wheel wash and equipment wash water (no detergent or solvents used) that discharges to the OWS and then the IWWP.

Seepage from the Settling Ponds, currently discharged via Outfall 003, will continue in the early phases of construction, overlapping for a short time with discharge of construction-related wastewaters until the ponds are filled during regrading of the South Dunes Site.

2.2.1 CONSTRUCTION WORKER SANITARY FACILITIES

Sanitary wastewater will be treated in two sanitary package plant wastewater treatment facilities. Wastewater will be generated by construction offices, construction workforce housing, and washcar facilities (portable worker sanitation/washing facilities).

During peak construction activity, approximately 2,000 workers will be employed at the site with an average of around 1,000 workers during non-peak construction periods. The temporary Workforce Housing Facility will be designed and installed to accommodate up to 700 workers on South Dunes.

An estimated 1,080,000 gallons of treated sanitary wastewater from these facilities are expected to be generated monthly (i.e., 36,000 gpd or an average of 25 gpm, likely to range from 0 to 150 gpm). Wastewater treatment solids will be appropriately disposed of at an offsite disposal facility. No wastewater will be disposed of onsite.

2.2.2 PEAT REMOVAL AND DEEP EXCAVATION DEWATERING

Dewatering will be conducted during peat removal and other deep excavations, if deemed necessary by peat investigation activities and through maturation of the construction execution plan. This water will consist of groundwater from construction dewatering well points. Water from construction dewatering will preferentially either be infiltrated on site or beneficially used for grading activities (e.g., used as needed for dust control) under the 1200-C NPDES General Permit for Stormwater Discharges from Construction Sites. However, JCEP requests that dewatering water be included in the wastewater discharge permit in the event infiltration systems cannot handle construction dewatering flows and discharge to the IWWP is necessary.

2.2.3 HYDROSTATIC TEST WATER

The LNG storage tanks and facility flowlines will be hydrostatically tested during the construction phase. Once tests are complete, the hydrostatic test water will be collected onsite in newly constructed infiltration swales or discharged to Outfall 001a. Current plans are for infiltration; however, JCEP requests that the permit cover discharges to Outfall 001a if infiltration systems cannot handle hydrostatic test water flows.

The water to be used for the LNG tank hydrostatic tests will be raw well water from the CBNBWB. Testing of each of the LNG storage tanks is anticipated to generate 30,000,000 gallons of hydrostatic test water. This water will be discharged over a period of time such that the discharge flow rate, estimated to be at a rate up to 3,000 gpm over a period of one month, is compatible with infiltration, or, if the water is discharged to Outfall 001a, compatible with the IWWP pipeline.

Pipelines within the LNG facility will also be hydrostatically tested; however, wastewater generation rates will be significantly lower than the LNG storage tank volumes and generated intermittently during construction. As with the tank hydrostatic tests, the primary means of discharge is planned to be infiltration; however, JCEP requests that the permit cover discharges to Outfall 001a if infiltration cannot be conducted.

2.2.4 OILY WATER SEPARATOR

The OWS will be installed early in the construction process to be used during construction, and it will remain as part of treatment operations of the LNG Terminal. It will be located next to the wastewater collection sump. The OWS will be used to treat contact stormwater potentially contaminated by oil and

oily wastewater, if any, that may be generated during construction operations. Oil and oily wastewater may come from automotive fluids, gas and diesel, oil and grease, transformer oil, and washdown water associated with trucks and vehicles, leaks and spills, equipment (pumps, etc.), transformers, diesel fueling, heavy equipment, oil or diesel storage, and equipment maintenance.

The OWS will be sized to handle water flows from the area draining to the OWS. The sizing is based on the highest design firefighting water flow (consisting of fire hose use plus fixed deluge flow) in the area the OWS serves. The OWS will include a series of baffles and plates to coalesce the oil which will then rise to the surface of the downstream collection chamber where oil will accumulate. An oil level sensor will alarm at high oil levels and provide direction to pump oil out of the OWS for appropriate disposal offsite. Solids will collect at the upstream end of the separator and will be removed through a manway for appropriate disposal offsite.

2.2.5 CONSTRUCTION STORMWATER

Construction stormwater will be managed under a 1200-C NPDES General Permit for Stormwater Discharges from Construction Sites. Water quality of construction stormwater will be managed under erosion and sediment control features developed per the 1200-C Permit and associated Erosion and Sediment Control Plan.

During earthwork, stormwater will infiltrate locally or into infiltration basin(s) with overflow to the local natural drainage areas. Infiltration basins will be installed early in the construction phases and before the completion of the LNG Terminal facility. After earthworks (and the drainage system is completed), the permanent system will be used.

It is anticipated that most construction stormwater will be managed through infiltration basin(s) excavated early in the construction process and permitted under the 1200-C NPDES General Permit; however, if construction stormwater becomes contaminated with oil-based products, it will either be segregated for off-site disposal, pumped to the OWS, or allowed to gravity drain to the OWS after which it will be discharged to the IWWP as wastewater.

2.3 POST-CONSTRUCTION/COMPLETED LNG TERMINAL FACILITY

Following construction, wastewater sources will be treated through the permanent facilities as illustrated in **Figure 3**. **Figure 3** also provides estimated average flows for wastewater streams for which preliminary design information is available. Flow rates estimated for each stream are considered on a continuous basis, although each effluent stream is an intermittent discharge, collecting in the Wastewater Sump (33,000 gallons working capacity) at an estimated average rate of approximately 147 gpm. The sump pumps will discharge to the IWWP at an approximate instantaneous flow rate of 2,140 gpm for an average of 15 minutes every 224 minutes (just under four hours), equivalent to approximately 212,000 gpd).

Raw well water may be added continuously to the IWWP downstream of the sump to maintain and supplement flow at a rate of 350 to 700 gpm (0.5 to 1.0 mgd).

2.3.1 GAS INLET AND CONDITIONING FACILITY

No process wastewater is anticipated to be discharged from the gas conditioning process.

2.3.2 LIQUEFACTION AND MARINE FACILITIES

The LNG Terminal facility and marine LNG loading area will include various drainage elements to manage segregated networks for contaminated and uncontaminated water from designated areas. Wastewater from the LNG facility and marine LNG loading area consists mainly of precipitation, protection of equipment with fire water, processing areas, storage areas, domestic areas, and utilities units. Accumulated wastewater from oil-filled equipment spill impounding basins, if any, will be pumped by submersible pumps to the OWS.

Based on the preliminary FEED, wastewater generated at the LNG liquefaction facilities consists of the following:

- Filter backwash: Prior to treatment via RO and EDI, raw water requires pre-treatment to filter out solids and remove compounds that can foul the RO membranes. The pre-treatment filters require routine backwashing. The estimated average flow rate for the intermittent discharge of pre-treatment filter backwash is 4 gpm (approximately 2,900 gallons per backwash, with two backwash cycles per day, i.e. 5,800 gpd).

- Demineralization System: The RO filters will use membrane technology to filter impurities from the source potable water. The EDI units further purify the water. Following pre-treatment in the filters, the RO system uses applied pressure to overcome osmotic pressure, causing the water molecules to move through the semi-permeable membrane, leaving particles and minerals such as calcium, chloride, sodium, and chlorine behind in a concentrated stream. The EDI also produces a concentrated wastewater stream which is to be recycled back to the RO. The concentrated streams are referred to as reject water, and the reject wastewater flows from the RO and EDI systems (when not recycled) will have an estimated average generation rate of 17 gpm (approximately 25,000 gpd).

  Antiscalant will likely be added to the feed of the RO system for scale prevention, and residual antiscalant will be present in the RO reject stream. Sodium bisulfate, acid, and/or caustic may be fed to the RO inlet for proper equipment operation. Intermittent cleaning chemicals for the RO membranes which allow for proper equipment operation may include sodium bisulfite, acid, and/or caustic. RO clean-in-place (CIP) operations will occur intermittently with wastewaters discharging to the wastewater collection sump. The frequency of membrane cleanings is dependent on the feed water quality and appropriate controls to limit scaling and/or fouling of the membranes.

- Condensate polishers: The condensate polishers are resin-based ion exchange systems that filter the condensate from the steam production cycle to maintain condensate purity. When the ion exchange capability of the condensate polisher is exhausted, the resin beds must be backwashed. Periodically, the polishers may become spent and will be disposed off-site.

- Condensate from turbine inlet air chiller: Condensate will be produced via cooling/dehumidification of ambient air through the Turbine Inlet Air Chilling packages during the warmer summer months. Each chiller package will produce a condensate stream averaging 8 gpm (40 gpm total for 5 trains, for a total of ~58,000 gpd). Because this stream contains only condensate, it is not anticipated to contain significant concentrations of constituents of concern.

- Heat Recovery Steam Generator (HRSG) Quenched Blowdown: The LNG Terminal will use steam as a heat transfer fluid for process heating. High pressure steam is provided by HRSGs which use waste heat from refrigerant compressor driver exhaust gases.

  Trisodium phosphate, caustic (sodium hydroxide), 19% Aqueous Ammonia and/or a proprietary chemical will likely be used for boiler feedwater treatment in the HRSG system. The slightly oxidizing environment creates a protective corrosion layer within the steam cycle which helps to maintain the lifespan and integrity of the equipment with less chemical cleaning. Corrosion inhibitors, typically based on amine chemistry, may also be used in the HRSG system. Some residual corrosion and scale inhibitors will likely be present in the HRSG blowdown stream.

  Quenched blowdown from the HRSG system will be generated intermittently at an anticipated flowrate of 51 gpm. Chiller condensate will combine with the quenched blowdown stream at an estimated rate of 40 gpm at the HRSG Blowdown Sump, yielding a combined intermittent flowrate of up to 91 gpm.

- Plant and equipment wash and flush water: Plant and equipment wash water will be directed through an OWS for treatment prior to discharge to the IWWP. Combustion turbine wash water may contain cleaning agents that cannot be processed by the OWS or discharged; therefore, effluent from turbine washing will be collected and appropriately disposed at an offsite disposal facility.

2.3.3 STORMWATER SYSTEMS

The LNG liquefaction facility and marine LNG loading area will include various drainage elements to manage segregated networks for contaminated and uncontaminated water from designated areas. Wastewater from the LNG facility and marine LNG loading area consists mainly of precipitation, protection of equipment with fire protection water, processing areas, storage areas, domestic areas, and utilities units. Water from oil-filled equipment in LNG spill impounding basins will be pumped by submersible pumps to the OWS.

Stormwater collected in areas that are potentially contaminated with oil or grease will be pumped or will flow to the OWS before being treated, collected in the wastewater collection sump and discharged to the IWWP. The OWS will be an intermittent discharge at an average flowrate of 30 gpm.

The discharge of non-contact stormwater to Coos Bay or the slip is not covered under the permit for which this application is being prepared.

2.3.4 SANITARY

Two separate sanitary treatment package plants; to service the South Dunes and Ingram Yard areas, will be installed to support activities during construction and post-construction periods. The manufacturer of sanitary wastewater treatment facilities has not been identified at this time. The packaged treatment systems will be designed and constructed to achieve typical sanitary wastewater effluent quality and the permitted effluent quality. Expected sanitary treatment effluent quality, based on the influent potable water chemistry and the expected efficiency of the sanitary treatment facilities, is summarized in the predicted effluent quality table presented in **Table 1**. Details for the information provided in **Table 1** are presented in later sections of this Report.

Treated liquid effluent from the Ingram Yard package plant will be directed to the wastewater sump and then discharged to the IWWP. The system serving Ingram Yard, to be located in the utility corridor near the operational buildings, is expected to average 4.5 to 5 gpm. Treated liquid effluent from the South Dunes package plant will discharge directly to the IWWP. Discharge from the South Dunes treatment system is expected to average 2 to 2.5 gpm. The anticipated average total flowrate of treated sanitary wastewater is 7 gpm.

Sanitary waste from the tug building will be routed to a lift station and discharged to the sanitary package plant supporting the Ingram Yard area.

Solids will be removed from the packaged treatment systems as deemed appropriate by a sanitary waste contractor and disposed offsite at an authorized disposal site through the sanitary waste contractor's permits.

Sanitary waste from the northwest guard house will be directed to a holding tank due to the low flow and elevation below the package plant. A sanitary waste contractor will remove the tank contents as needed (and indicated by level sensors and alarms, as appropriate), and disposal will occur at authorized disposal sites through the sanitary waste contractor's permits. No wastewater will be disposed of onsite.

3. OUTFALL INVENTORY

3.1 CURRENTLY PERMITTED OUTFALLS

The current NPDES Permit authorizes discharge of wastewaters via the following:

- Outfall 001a (marine outfall): landfill leachate, stormwater, residual paper mill waste, miscellaneous wash water
- Outfall 001b (same marine outfall as Outfall 001a): deflation plain stormwater
- Outfall 002: Aerated Stabilization Basin (ASB)/deflation plain seepage
- Outfall 003: North and South Settling Pond seepage

Currently, wastewaters are routed to the IWWP and discharged via Outfalls 001a and 001b to the Pacific Ocean. The Pacific Ocean discharge pipe includes a multiport diffuser located about 1,000 ft from shore. While there will be relocation of the IWWP around the LNG facility site, there are no current plans to modify the Pacific Ocean discharge pipe and diffuser.

The diffuser was designed to handle a discharge flow of 10 mgd. When in use for the mill, flow rates averaged 3 to 4 mgd. Current average flow is 0.31 mgd (215 gpm). As a result of the decreased flow volume, much of the diffuser has reportedly become buried. A dive inspection of the outfall was conducted in September 2018 and revealed 7 open ports, three on one arm and four on the other. The open ports are those closest to the junction of the two arms.

3.2 OUTFALL CHANGES DURING AND AFTER CONSTRUCTION

Outfall 001a: Prior to construction, Outfall 001a will continue to receive the discharges described in Section 3.1. Decommissioning and removal of landfill Cell 3 and the leachate collection system will be conducted under the current Landfill Operations Plan and Closure Plan prior to construction of the LNG Terminal. Prior to construction, discharge of landfill leachate or residual paper mill waste through Outfall 001a will cease. During construction, the outfall will continue to receive raw water and stormwater collection discharges from the settling ponds to keep the diffuser open until relocation of the IWWP.

Outfall 001b: Historically, there was a pipe through the berm connecting the deflation plain and the ASB however, the pipe connecting the deflation plain and the ASB was decommissioned via installation of a steel plate at the end of the pipe, sealing off the pipe; therefore, Outfall 001b is no longer necessary in the modified permit.

Outfall 002: After construction, stormwater will no longer be routed to the deflation plain. With the waste streams removed through pre-construction and construction activities, deflation plain and ASB seepage discharges to Outfall 002 will no longer occur; therefore, while Outfall 002 will exist pre-construction and for a time during construction, Outfall 002 will not be necessary after construction is complete.

Outfall 003: The North and South Settling Ponds will no longer exist after construction is complete; therefore, while Outfall 003 will continue to operate pre-construction, Outfall 003 will not be necessary after construction is complete.

In summary:

- Pre-Construction: Outfall 001a, Outfall 002, and Outfall 003 will be active;
- During Construction: Outfall 001a, Outfall 002 and Outfall 003 may be active during portions of this time period; and
- Post Construction: Only Outfall 001a will be active.

4. EFFLUENT CHARACTERIZATION

4.1 SAMPLING AND ANALYSIS

To characterize the quality of influent waters to the facility and the waters of the receiving environment, the following sampling events were completed:

- Raw groundwater sampling in September and November 2018
- Potable water sampling in November 2018
- Ambient receiving water sampling in September 2018 and January 2019

These sampling events are described below.

4.1.1 RAW GROUNDWATER SAMPLING – SEPTEMBER AND NOVEMBER 2018

Four samples of raw groundwater were collected on September 27 and 28, 2018 and were analyzed for inorganic parameters expected in groundwater. An additional four samples of raw groundwater were collected on November 11 and 12, 2018 and were analyzed for the same inorganics, plus the full suite of priority pollutants as listed on Table 2D-2 of EPA Form 2D.

Samples were collected from the water flowing from the well water pipeline, where it flows into the northwest corner of the ASB. Samples were collected and preserved in bottles provided by the analytical laboratory consistent with the laboratory analytical methods for each analyte. Bottles were placed in a cooler with ice/cold packs, shipped to the analytical laboratory under chain-of-custody protocol, and delivered to the laboratory within the method-specified time frames. Samples were analyzed by Neilson Research Corporation (Medford, OR) for the priority pollutants listed on Table 2D-2 of EPA Form 2D.

Results of the raw groundwater analyses are summarized in **Table 2** (included at the end of this report). Laboratory analytical reports are included in **Appendix B** (September 2018 sampling results) and **Appendix C** (November 2018 sampling results).

The raw groundwater samples collected in 2018 represent two months of the year, September and November. The 2018 data were evaluated together with data from the South Dunes wellfield collected over the period from 1958 through 1970 and reported by United States Geological Survey (USGS) (1973). Collectively, these data cover the months of April, June, July, August, September, October, and November. There were no seasonal trends clearly evident in the data. For the majority of the parameters, variability within a single month was on the same order as variability across all months. Details of the seasonality assessment are included in **Appendix D**.

4.1.2 POTABLE WATER SAMPLING – NOVEMBER 2018

Four samples of potable drinking water were collected from the facilities at a nearby campground on November 11 and 12, 2018. The campground is located on the North Spit and is tied into the same main

line that will service the Jordan Cove LNG facility. Water was run for several minutes prior to collecting samples to flush the local lines.

Samples were collected in bottles provided by the analytical laboratory, placed in a cooler with ice/cold packs, and shipped to the analytical laboratory under chain-of-custody protocol. Samples were analyzed by Neilson Research Corporation (Medford, OR) for the priority pollutants listed on Table 2D-2 of EPA Form 2D. Results of these analyses are summarized in **Table 3** (included at the end of this report). Laboratory analytical reports are included in **Appendix C**.

4.1.3 AMBIENT RECEIVING WATER SAMPLING – SEPTEMBER 2018 AND JANUARY 2019

Ambient samples were collected by SHN during the September 2018 outfall inspection. One surface and one mid-depth (approximately 25 ft below surface) were collected at location approximately 1,000 ft north and south of the outfall (four samples total). Results are included in **Table 4** (included at the end of this report). Laboratory analytical reports from SHN's sampling event are included in **Appendix E**.

A second sampling event was conducted in January 2019 to collect samples for analysis of dissolved metals. Marine samples were collected from two public docks in Charleston near the mouth of Coos Bay and at a depth of approximately 10 to 15 ft below the water surface. The samples were collected near the end of flood tide to capture marine water entering the Bay from the Pacific Ocean. Field measurements of salinity confirmed the samples were marine (salinity greater than 31 parts per thousand). Samples were collected and preserved in accordance with the applicable analytical methods and were delivered under chain of custody to Neilson Research Corporation in Medford, OR and Brooks Applied Labs in Bothell, WA. Results are included in **Table 4** (included at the end of this report). Laboratory analytical reports from the January 2019 sampling event are included in **Appendix F**.

4.2 CURRENT CONDITIONS

Under its current configuration, wastewater from the site is discharged to the IWWP under NPDES Permit number 101499. Active waste streams to the IWWP include:

- Leachate from landfill Cell 3;
- Raw untreated groundwater from the CBNBWB West Well Field; and
- Stormwater from the former Weyerhaeuser mill Site.

Summarized below are the available data for the IWWP discharge under the current permit. Because data is limited, characterization data are also presented for the landfill leachate and raw groundwater individually.

4.2.1 HISTORICAL IWWP DISCHARGE ANALYTICAL RESULTS

Effluent monitoring requirements for discharge to the IWWP under the current NPDES permit include once daily flow measurement and monthly sampling and analysis for 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS) and twice monthly sampling and analysis for pH. The sample location for pH is the discharge control gate of the ASB. The sample location for BOD_5 and TSS is the

building after the control gate housing the IWWP flow meter. Both sampling locations reflect the combined discharge including leachate, untreated well water, and stormwater.

Discharge Monitoring Report (DMR) data were reviewed for the period from 2015 through 2017 and are summarized below in **Table 5**, below. Details are included in **Appendix G**.

Table 5. IWWP DMR Data Summary, 2015 through 2017

Parameter	Quantity	Minimum	Median	Maximum
Daily Discharge (MGD)	1,093	0.01	0.31	2.73
Average Flow Rate (gpm)	NA	7	215	1,896
BOD_5 (mg/L)*	42	0.9	3.5	14
TSS (mg/L)	42	0.4	4.1	28
pH (s.u.)	70	6.4	8.3	10

*mg/L: milligrams per liter
s.u.: standard units

4.2.2 HISTORICAL LANDFILL LEACHATE ANALYTICAL DATA

Landfill leachate has been monitored and sampled biannually since 1999 under Solid Waste Permit number 1142. Samples are analyzed for iron, manganese, color, total dissolved solids (TDS), nitrate, pH, TSS, alkalinity, cyanide, and mercury. Results for the period of record (1999 through 2017) are summarized in **Table 6,** below, for parameters with marine water quality criteria. Details are included in **Appendix H**.

Landfill leachate makes up a small fraction of the total current IWWP discharge. Leachate flow rates range from 2 to 3 gpm during the summer (2,880 to 4,320 gpd) to 20 to 30 gpm during the winter (28,800 to 43,200 gpd). Average total discharge flow to the IWWP is 215 gpm.

Table 6. Leachate Data Summary, 1999 through 2017

Parameter	Ambient Criteria	Quantity	Minimum	Median	Maximum
Temperature (°C)	<0.3 increase	42	13.6	17.2	21.0
pH (field) (s.u.)	7.0 to 8.5	39	**5.9**	**6.6**	7.2
Dissolved Oxygen (mg/L)	No reduction	33	0.1	1.2	7.3
Ammonia (mg/L dissolved)	1.3 (ALc)[1]	47	**2.9**	**11**	**16**
Manganese (µg/L total)	100 (HH)	59	**912**	**1,840**	**7,360**
Arsenic (µg/L total)	36 (ALc)	59	1.5	12.5	**104**
Barium (mg/L total)	1.0 (HH)	49	0.22	0.38	**2.2**

[1]Ambient criteria for ammonia estimated using ODEQ's Saltwater Ammonia Calculator (2013) assuming a temperature of 11.7°C (50th percentile surface temperature recorded at data buoy CB-06 for 2015 through 2017), pH 8.1, and salinity of 32 ppth.
HH – denoted human health criterion.
ALc – denoted chronic marine aquatic life criterion.
Bold – denotes value not meeting ambient criterion.

4.2.3 RAW GROUNDWATER FROM COOS BAY-NORTH BEND WATER BOARD WEST WELL FIELD

Raw groundwater quality is discussed **in Section 4.1.1**, above.

4.3 DURING CONSTRUCTION

A wastewater flow diagram for construction conditions is attached (**Figure 2**). During construction, wastewater streams discharged to the IWWP may include:

- Effluent from temporary sanitary treatment facilities;
- Water from construction dewatering;
- Hydrostatic test water;
- Effluent from the OWS; and
- Contact stormwater not managed under the 1200-C permit

Effluent from temporary sanitary facilities is expected to have characteristics of the potable water from the CBNBWB (**Table 3**) plus treated sanitary wastewater components, as identified in the "Sanitary Effluent" column in **Table 1**.

Effluent from construction dewatering is expected to have characteristics of the raw groundwater from the CBNBWB West Well Field (**Table 2**) and groundwater samples collected from onsite monitoring wells (**summarized in Table 7**).

Effluent from hydrostatic test water will have characteristics of potable water from CBNBWB (**Table 3**) and raw groundwater from the CBNBWB West Well Field (**Table 2**).

Effluent from the OWS and stormwater are expected to have low concentrations of minerals. The OWS will remove oil and sediment.

4.4 AFTER CONSTRUCTION

Since the LNG facility has not yet been constructed, no actual effluent quality data is available for the proposed facility. Estimates are provided below for the individual facility waste streams and the end-of-pipe discharge which also includes raw groundwater.

4.4.1 FACILITY WASTE STREAMS

Aside from treated sanitary effluent from the South Dunes sanitary package plant, wastewater from the facility will accumulate in the sump. The estimated average flow rate is approximately 151 gpm. Discharges from the sump to the IWWP will occur for approximately 15 minutes every 219 minutes (just under four hours) at an approximate instantaneous rate of 2,140 gpm. Effluent quality for the individual waste streams going to the sump (filter backwash, RO reject, quenched blowdown, sanitary effluent, and effluent from the OWS) was estimated using preliminary design factors and analytical results for Coos Bay-North Bend potable water as follows:

- Preliminary design information was used to estimate the concentration factors applied to the source water concentrations for each individual waste stream. For example, inorganic constituents in the sanitary waste are assumed to be unchanged from that of the source water, whereas in the combined RO and EDI reject streams, they are concentrated by a factor of approximately 4.

- The concentration factors from preliminary design information were applied to the potable water analytical results from November 2018 to estimate concentrations for the individual waste streams. Average concentrations from the four samples were used to represent the average condition. Maximum concentrations were also estimated using the maximum value from the four drinking water samples.

4.4.2 IWWP DISCHARGE

As discussed in **Section 2.3**, there will be two operating conditions for discharge to the IWWP. The first condition will consist of discharge of facility wastewater, and the second condition will consist of raw groundwater for flow augmentation, to prevent siltation of the outfall ports.

Under the first condition, facility wastewater from the sump will be discharged to the IWWP for approximately 15 minutes every four hours, at a rate of 2,140 gpm. The sump water may be augmented with up to 700 gpm of raw water. Estimated discharge characteristics under this condition is discussed below.

For the second condition, effluent will consist entirely of raw groundwater (**Table 2**). This is the condition under which the outfall will operate for the majority of the time. Raw groundwater will discharge at flows up to 700 gpm, which is the current maximum volume of water available.

4.4.3 COMBINED IWWP DISCHARGE, FACILITY WASTEWATER AND RAW GROUNDWATER

For approximately 15 minutes every four hours, the wastewater collection sump will discharge wastewater to the IWWP at an instantaneous flow rate of approximately 2,140 gpm, with up to an additional 700 gpm of raw well water added to the IWWP after the sump. End-of-pipe effluent characteristics for the combined discharge were estimated using a flow-weighted average of the facility discharge and the raw groundwater. Results are included in **Table 1** and include average and maximum expected concentration estimates.

5. RECEIVING ENVIRONMENT AND MIXING ZONE

5.1 OUTFALL LOCATION AND DESCRIPTION

The outfall consists of a 30-inch diameter, concrete-coated, epoxy-lined steel pipeline that extends approximately 4,760 feet offshore into the Pacific Ocean. The approximate coordinates of the ocean outfall are:

- Latitude – 43° 25'46.71" North
- Longitude – 124°18'29.88" West

The outfall pipeline terminates in a Y-shaped diffuser. Diffuser arms are 20 inches in diameter, 252 feet long, and are separated by an angle of 150°. Each arm is equipped with sixteen 3-inch diameter ports on alternating sides of the diffuser.

The diffuser was designed to handle a discharge flow of 10 mgd. When in use for the Mill, flow rates averaged 3 to 4 mgd. Current average flow is 0.31 mgd (215 gpm). As an apparent result of the decreased flow volume, much of the diffuser is no longer functional. A dive inspection of the outfall was conducted in September 2018 and revealed 7 open ports, three on one arm and four on the other. The open ports are those closest to the junction of the two arms. A report describing the dive inspection in more detail will be submitted to ODEQ with a Mixing Zone Study.

5.2 RECEIVING ENVIRONMENT CHARACTERIZATION

A receiving environment characterization is being prepared for a Mixing Zone Study of the Jordan Cove discharge which will be submitted in 2019. A previous Mixing Zone Study conducted for the IWWP in 1993 described density stratification and current characteristics near the outfall. Density stratification is minimal, but, is greatest in the spring and summer due to upwelling of cold, high salinity deep ocean water. Measured current speeds in vicinity of the outfall were significant. The 10th 50th and 90th percentile speeds were 4.6, 14.9 and 32 cm/s, respectively, suggestive of a highly energetic system. Current directions are reported towards the south in the summer and fall and towards the north in the winter.

5.3 DILUTIONS

A mixing Zone Study is being prepared for the Jordan Cove discharge. Modeled dilutions will be presented as part of that Study.

6. EFFLUENT MONITORING

6.1 PROPOSED MONITORING LOCATION

JCEP proposes monitoring effluent at a point after facility waste streams and raw groundwater augmentation flow are combined.

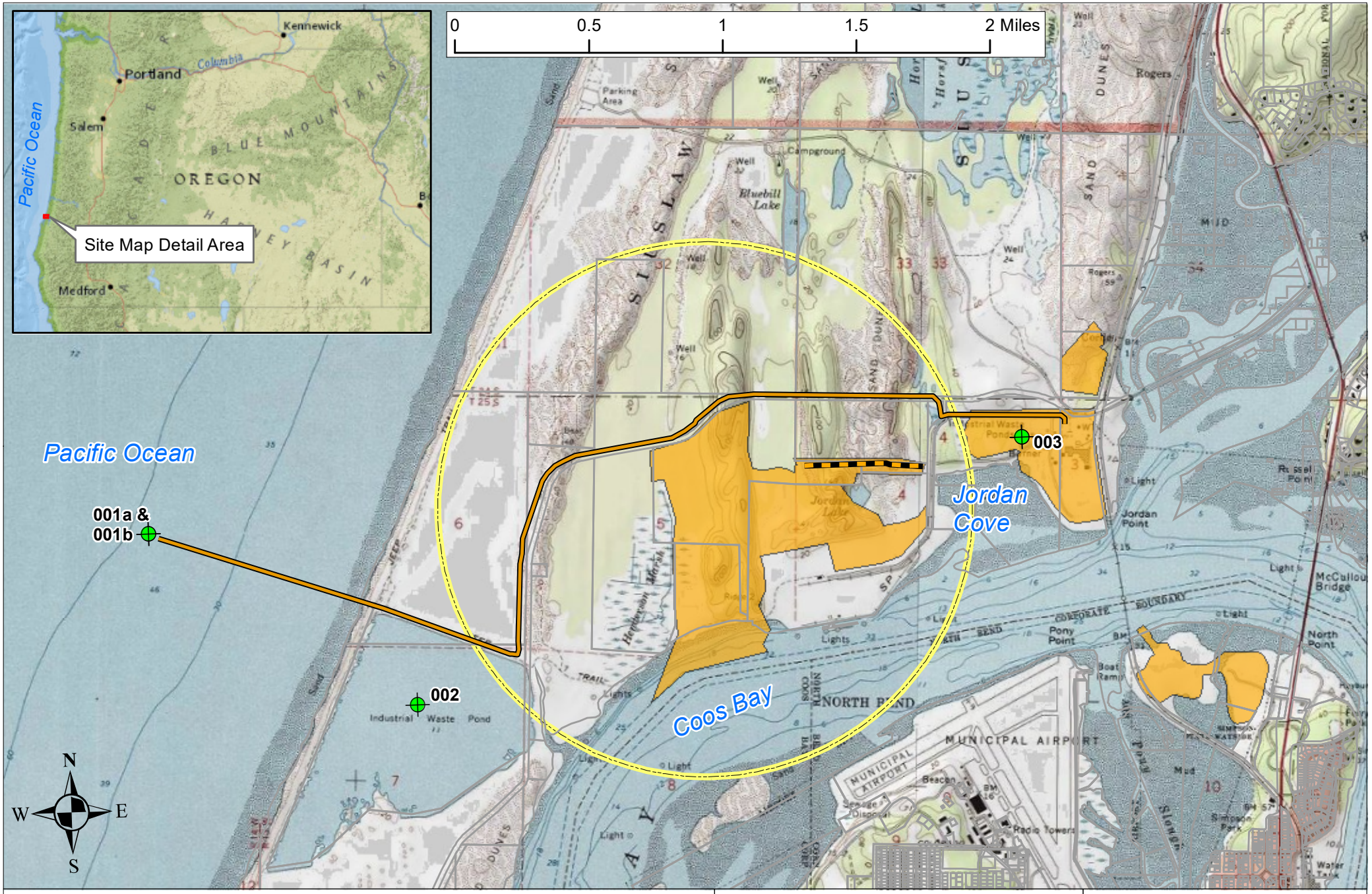
6.2 RECOMMENDED MONITORING PARAMETERS

The Mixing Zone Study will summarize predicted effluent dilutions at the mixing zone boundary, ambient concentrations in the ocean, and modeled concentrations at the mixing zone boundary. Based on review of parameters monitored at similar facilities and preliminary modeling results, JCEP proposes monitoring the effluent for the following parameters:

- Wastewater flow
- Flow augmentation groundwater
- pH
- BOD_5
- TSS
- Ammonia
- Fecal coliform
- E. Coli
- Enterococcus
- Residual chlorine
- Oil & grease
- Arsenic
- Copper

Figures

Figure 1	Topographic Map
Figure 2	Water/Wastewater Line Diagram – During Construction
Figure 3	Water/Wastewater Line Diagram – After Construction



Legend

- JCEP project area
- 1 mile radius from project center
- Coos County parcel lot lines
- access and utility corridor
- industrial wastewater pipeline
- NPDES outfall

Jordan Cove LNG SM

SLR

This drawing is for conceptual purposes only. Actual locations may vary and not all structures are shown.

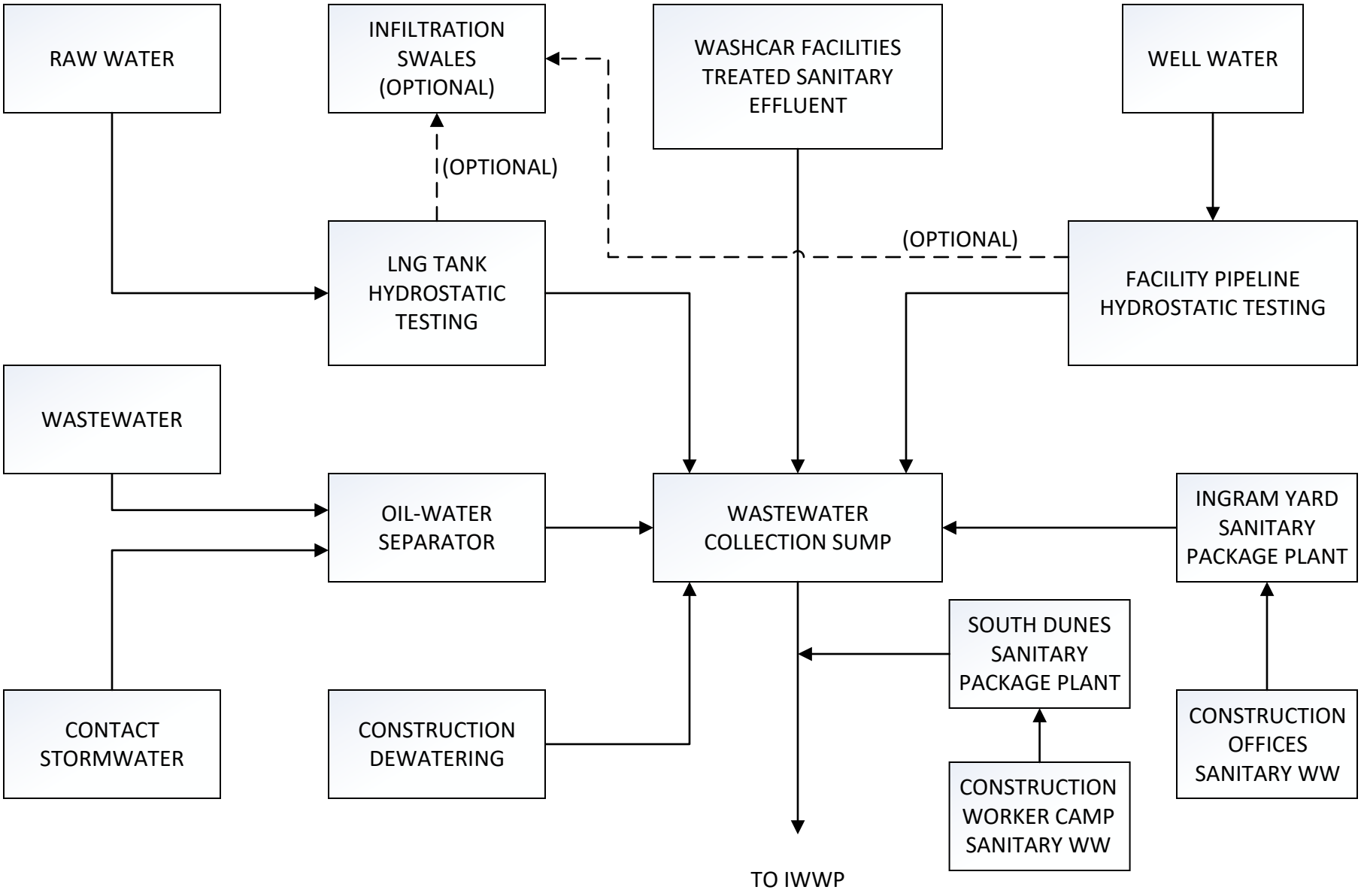
Scale: 1:30,000 @ 8.5x11
Project No.: 108.01593.00005

Drawing:

Figure 1
Jordan Cove Energy Project
NPDES Permit Application
Topographic Site Map

Date: January 2019

By: JG - SLR



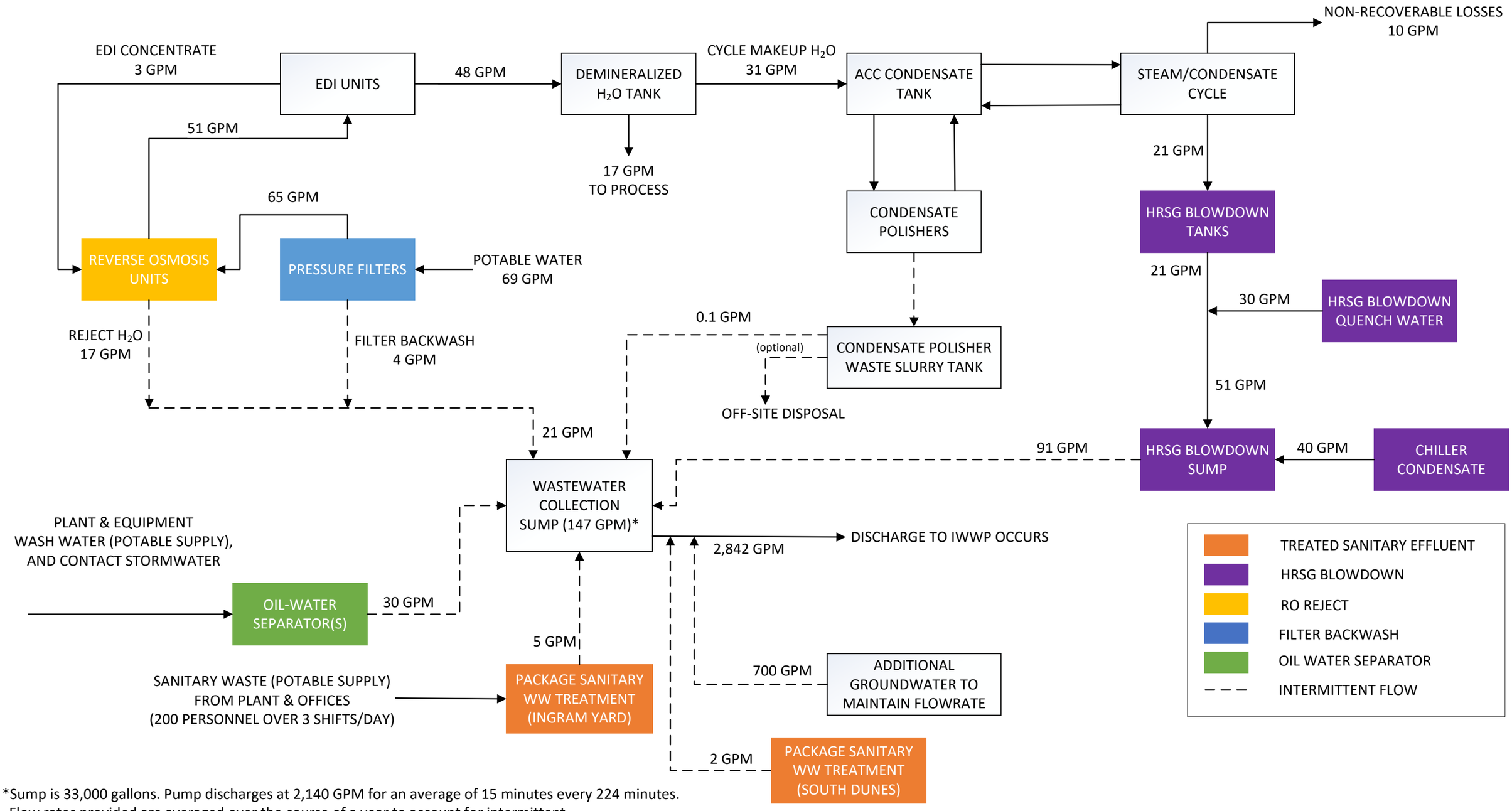
Prepared For: Jordan Cove Energy Project, L.P.

SLR

SLR INTERNATIONAL CORP.
PORTLAND, OR

01/11/2019

FIGURE 2
WATER/WASTEWATER LINE DIAGRAM DURING CONSTRUCTION
JORDAN COVE ENERGY PROJECT



*Sump is 33,000 gallons. Pump discharges at 2,140 GPM for an average of 15 minutes every 224 minutes. Flow rates provided are averaged over the course of a year to account for intermittent nature of discharges.

Prepared For: Jordan Cove Energy Project, L.P.	SLR INTERNATIONAL CORP. PORTLAND, OR	01/11/2019

FIGURE 3
WATER/WASTEWATER LINE DIAGRAM
AFTER CONSTRUCTION
JORDAN COVE ENERGY PROJECT

Tables

Table 1	Estimation of Facility Wastewater Quality
Table 2	Summary of Raw Groundwater Analytical Results
Table 3	Summary of CBNBWB Potable Water Analytical Results
Table 4	Summary of Ambient Ocean Samples Analytical Results
Table 5	IWWP DMR Data Summary, 2015 through 2017 (included in main body of report)
Table 6	Leachate Data Summary, 1999 through 2017 (included in main body of report)
Table 7	Summary of Historical Onsite Groundwater Analytical Results

Table 1

Estimation of Facility Wastewater Quality (before combining with untreated well flow-augment water)

Parameter[1]	Units	Coos Bay-North Bend Water Board Drinking Water[2]			Estimated Average Effluent Concentrations						Estimated Maximum Effluent Concentrations					
					Facility waste Streams					Average Facility WW[6]	Facility waste Streams					Maximum Facility WW[6]
		Average	Maximum	n	Filter Backwash[3]	RO Reject[4]	Quenched Blowdown[5]	Sanitary Effluent[3]	OWS Effluent[3]		Filter Backwash[3]	RO Reject[4]	Quenched Blowdown[5]	Sanitary Effluent[3]	OWS Effluent[3]	
Average WW Flow Rate (to Sump)		--	--	--	4	17	91	7	30	147	4	17	91	7	30	147
Average WW Flow Rate (to Sump)	GPM	--	--	--	0.006	0.024	0.131	0.010	0.043	0.21	0.006	0.024	0.131	0.010	0.043	0.21
pH	s.u.	7.13 to 7.30 (field)		2	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Alpha-BHC	ug/L	0.0037	0.0047	4	0.0037	0.0140	0.0022	0.0037	0.0037	0.0040	0.0047	0.0179	0.0028	0.0037	0.0037	0.0048
Aluminum, total	ug/L	25.675	33.9	4	25.7	97.6	15.1	25.7	25.7	27.8	33.9	128.8	19.9	33.9	33.9	36.7
Ammonia Nitrogen (as N)	mg/L	0.51	0.66	4	0.51	1.94	0.30	0.51	0.51	0.6	0.661	2.51	0.39	0.51	0.51	0.68
Arsenic, total	ug/L	0.313	0.350	4	0.31	1.19	0.18	0.31	0.31	0.34	0.35	1.33	0.21	0.31	0.31	0.37
Inorganic Arsenic, dissolved	ug/L	0.058	0.064	4	0.06	0.22	0.03	0.06	0.06	0.062	0.064	0.24	0.04	0.06	0.06	0.07
Inorganic Arsenic, total	ug/L	0.063	0.070	4	0.063	0.238	0.037	0.063	0.063	0.068	0.070	0.266	0.041	0.063	0.063	0.074
Barium, total	ug/L	12.23	12.60	4	12.2	46.5	7.2	12.2	12.2	13.2	12.6	47.9	7.4	12.2	12.2	13.5
Beryllium, total	ug/L	<0.1	<0.1	4	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1
Biochemical Oxygen Demand (BOD)	mg/L	<2	<2	4	3.9	0	0	20	6.7	2.4	3.9	0	0	20	6.7	2.4
Bromodichloromethane	ug/L	11.0	11.9	4	11.0	41.7	6.5	11.0	11.0	11.9	11.9	45.2	7.0	11.0	11.0	12.7
Cadmium, total	ug/L	<0.1	<0.1	4	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1
Cadmium, dissolved	ug/L	0.004	0.005	4	0.004	0.013	0.002	0.004	0.004	0.004	0.005	0.019	0.003	0.004	0.004	0.005
Chloroform	ug/L	15.05	16.1	4	15.1	57.2	8.9	15.1	15.1	16.3	16.1	61.2	9.5	15.1	15.1	17.2
Chromium, total	ug/L	<0.4	<0.4	4	<0.4	<1.5	<0.2	<0.4	<0.4	<0.4	<0.4	<1.5	<0.2	<0.4	<0.4	<0.4
Copper, total	ug/L	9.1	14.2	4	9.1	34.6	5.4	9.1	9.1	9.9	14.2	54.0	8.4	9.1	9.1	14.1
Copper, dissolved	ug/L	7.2	3.0	4	7.2	27.5	4.3	7.2	7.2	7.8	3.0	11.4	1.8	7.2	7.2	4.3
Cyanide, total	ug/L	2.83	3	4	2.825	10.7	1.7	2.8	2.8	3.1	3.0	11.4	1.8	2.8	2.8	3.2
Dibromochloromethane	ug/L	4.89	4.89	4	4.9	18.6	2.9	4.9	4.9	5.3	4.9	18.6	2.9	4.9	4.9	5.3
Enterococcus[7]	/100 mL	n.m.	n.m.	n.m.	0.0	0.0	0.0	<35	0.0	<2	0.0	0.0	0.0	<35	0.0	<2
Fecal coliform	/100 mL	n.m.	n.m.	n.m.	0	0	0	<14	0	<1	0	0	0	<14	0	<1
Fluoride	mg/L	0.56	0.70	4	0.56	2.13	0.33	0.56	0.56	0.61	0.70	2.64	0.41	0.56	0.56	0.72
Iron, total	mg/L	0.030	0.038	4	0.030	0.115	0.018	0.030	0.030	0.033	0.038	0.144	0.022	0.030	0.030	0.039
Lead, total	ug/L	0.312	0.456	4	0.312	1.187	0.184	0.312	0.312	0.338	0.456	1.733	0.268	0.312	0.312	0.457
Lead, dissolved	ug/L	0.187	0.24	4	0.19	0.71	0.11	0.19	0.19	0.20	0.24	0.90	0.14	0.19	0.19	0.24
Manganese, total	ug/L	3.29	3.89	4	3.29	12.50	1.94	3.29	3.29	3.56	3.89	14.78	2.29	3.29	3.29	4.06
Mercury, total	ug/L	<0.2	<0.2	4	<0.2	<0.8	<0.1	<0.2	<0.2	<0.2	<0.2	<0.8	<0.1	<0.2	<0.2	<0.2
Nickel, total	ug/L	0.2625	0.42	4	0.2625	1.00	0.15	0.26	0.26	0.28	0.42	1.60	0.25	0.26	0.26	0.42
Nickel, dissolved	ug/L	0.24	0.47	4	0.24	0.91	0.14	0.24	0.24	0.26	0.47	1.79	0.28	0.24	0.24	0.45
Nitrate-Nitrite (as N)	mg/L	0.06	0.07	4	0.06	0.22	0.03	0.06	0.06	0.06	0.07	0.26	0.04	0.06	0.06	0.07
Oil & Grease	mg/L	n.m.	n.m.	n.m.	0	0	0	0	5	1.0	0	0	0	0	5	1.0
Phosphorus (as P), total	ug/L	0.013	0.025	4	0.01325	0.050	0.008	0.013	0.013	0.014	0.025	0.095	0.015	0.013	0.013	0.024
Selenium, total	ug/L	<0.5	<0.5	4	<0.5	<1.9	<0.3	<0.5	<0.5	<0.5	<0.5	<1.9	<0.3	<0.5	<0.5	<0.5
Selenium, dissolved	ug/L	0.053	0.074	4	0.053	0.203	0.031	0.053	0.053	0.058	0.074	0.281	0.044	0.053	0.053	0.075

Table 1
Estimation of Facility Wastewater Quality (before combining with untreated well flow-augment water)

Parameter[1]	Units	Coos Bay-North Bend Water Board Drinking Water[2]			Estimated Average Effluent Concentrations						Estimated Maximum Effluent Concentrations					
					Facility waste Streams						Facility waste Streams					
		Average	Maximum	n	Filter Backwash[3]	RO Reject[4]	Quenched Blowdown[5]	Sanitary Effluent[3]	OWS Effluent[3]	Average Facility WW[6]	Filter Backwash[3]	RO Reject[4]	Quenched Blowdown[5]	Sanitary Effluent[3]	OWS Effluent[3]	Maximum Facility WW[6]
Silver, total	ug/L	0.004	0.005	4	0.004	0.015	0.002	0.004	0.004	0.004	0.005	0.019	0.003	0.004	0.004	0.005
Silver, dissolved	ug/L	0.003	0.0030	4	0.0026	0.0099	0.0015	0.0026	0.0026	0.0028	0.0030	0.0114	0.0018	0.0026	0.0026	0.0031
Sulfate (as SO4)	mg/L	2.40	2.42	4	2.40	9.10	1.41	2.40	2.40	2.59	2.42	9.20	1.42	2.40	2.40	2.61
Temperature (summer)	°C	n.m.	n.m.	n.m.	16	16	16	20	16	20	16	16	16	20	16	20
Temperature (winter)	°C	n.m.	n.m.	n.m.	8	8	8	10	8	8	8	8	8	10	8	8
Thallium, total	ug/L	0.027	0.100	4	0.027	0.104	0.016	0.027	0.027	0.029	0.100	0.380	0.059	0.027	0.027	0.090
Total Residual Chlorine (TRC)	ug/L	n.m.	n.m.	n.m.	3130	11894	1841	3130	3130	3388	3200	12160	1882	3200	3200	3464
Total Suspended Solids (TSS)	mg/L	<2	<2	4	7.8	0	0.3	30	10	3.9	7.8	0	0.3	30	10	3.9
Turbidity	NTU	0.16	0.20	4	0.16	0.61	0.09	0.16	0.16	0.17	0.20	0.76	0.12	0.16	0.16	0.21
Zinc, total	ug/L	6.1	17.4	4	6.1	23.1	3.6	6.1	6.1	6.6	17.4	66.1	10.2	6.1	6.1	16.0
Zinc, dissolved	ug/L	3.5	6.7	4	3.5	13.4	2.1	3.5	3.5	3.8	6.7	25.5	4.0	3.5	3.5	6.5

Notes:

Estimated average effluent concentrations were calculated using the avarage of the four CBNBWB samples collected in November 2018 to represent source water.

Estimated maximum effluent concentrations were calculated using the maximum of the four CBNBWB drinking water samples as the source water.

shaded	Denotes estimates from KBJ "Effluent Summary" document.
underlined	Denotes values for total residual chlorine reported by Coos Bay-North Bend Water Board (CBNBWB) in its 2017 Annual Report. Values were 3.13 mg/L average, and 3.20 mg/L maximum (3,130 ug/L and 3,200 ug/L, respectively).
blue	Denotes the estimated concentrations in the combined facility effluent from the listed waste streams.
n.m.	Denotes "not measured"
1	Only EPA Form 2D Table 2D-2 parameters with detections are shown. All other Form 2D-2 parameters were below detection limits. See analytical laboratory reports for details.
2	Summary data for Coos Bay-North Bend Water Board (CBNBWB) drinking water samples collected in November, 2018 at Boxcar Hill Campground located north of the the proposed facility and near point on main distribution line where JCEP would connect.
3	Except for where shaded, values shown for filter backwash, sanitary effluent, and OWS effluent were assumed equal to CBNBWB source water values. Shaded values are as provided by KBJ in their "Effluent Sumamry" document.
4	Except for where shaded, values shown for RO Reject were assumed equal to CBNBWB source water values multiplied by a RO concentration factor of 3.8, which corresponds to the RO concentration factor assumed by KBJ n their "Effluent Sumamry" document.
5	Except for where shaded, values shown for Quenched Blowdown were assumed equal to CBNBWB source water values divided by a factor of 1.7, which corresponds to conversion factor assumed by KBJ n their "Effluent Sumamry" document.
6	Values shown represent the flow-weighted average of the individual waste streams.

Table 2
Summary of Raw Groundwater Analytical Results

Sample ID	Sample collection date	Sample collection time	Total Alkalinity (as CaCO3)	Hardness (as CaCO3)	Ammonia Nitrogen (as N)	BOD5	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Turbidity	Dissolved Organic Carbon (DOC)	Total Phosphorus	Chloride	Fluoride	Nitrate nitrogen	Sulfate	Calcium	Magnesium	Iron	Potassium	Sodium
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Grab Sample 1	09/27/18	14:30	110	98.6	0.442	4.5 HT	160	20	134 HT	4.16 HT	--	18.3	0.095 J	0.01 HT	0.44 J	22.9	10	15.4	7.14	15
Grab Sample 2	09/27/18	19:20	110	99.1	0.487	2.75 HT	166	15.6	135 HT	4.07 HT	--	18.3	0.1 J	0.01 HT	0.45 J	23	10.1	15.6	7.14	15
Grab Sample 3	09/28/18	8:15	112	99.4	0.461	3.9 HT	139	15.6	140 HT	4.24 HT	--	18.3	0.095 J	0.01 HT	<0.5 J	23.1	10.1	16	7.19	15.1
Grab Sample 4	09/28/18	12:00	116	99.1	0.52	3.88 HT	158	10	143 HT	4.2 HT	--	18.3	0.093 J	0.01 HT	0.44 J	23	10.1	15.9	7.17	15
Well Water 1	11/11/18	17:45	120	97.4	0.36 J	3.14	180	11.7	145	4.07	0.175	18.2	0.079 J	<0.05	<0.01	22.6	9.94	15.5	7.52	14.8
Well Water 2	11/11/18	22:45	120	98.1	0.38 J	5.7	159	17.8	115	4.12	0.177	19	<0.2	<0.01	<0.5	22.8	10	13.8	7.64	14.9
Well Water 3	11/12/18	8:30	120	97.8	0.43 J	3.85	166	13.3	139	4.12	0.17	19.1	0.078 J	<0.01	<0.5	22.8	9.95	15.6	7.59	14.9
Well Water 4	11/12/18	12:30	120	96.2	0.39 J	5.04	175	20	126	4.59	0.174	19	0.08 J	<0.01	<0.5	22.3	9.83	15.3	7.35	14.6
minimum			110	96.2	0.36	2.75	139	10	115	4.07	0.17	18.2	0.078	0.01	0.006	22.3	9.83	13.8	7.14	14.6
median			118	98.35	0.436	3.89	163	15.6	137	4.14	0.175	18.3	0.094	0.01	0.475	22.85	10	15.55	7.27	14.95
average			116	98.21	0.434	4.10	163	15.5	135	4.196	0.174	18.56	0.103	0.011	0.417	22.81	10.00	15.39	7.34	14.91
maximum			120	99.4	0.52	5.7	180	20	145	4.59	0.177	19.1	0.2	0.012	0.5	23.1	10.1	16	7.64	15.1
n			8	8	8	8	8	8	8	8	4	8	8	7	8	8	8	8	8	8

The four samples collected on 11/11 and 11/12 were analyzed the full suite of EPA priority pollutnats. Results only shown for detected parameters.
Groundwater samples collected from where the groundwater is pumped into the southeast corner of the ASB.
Summary statistics calculated conservatively using the method reporting limit.
J - denotes that detected analyte below quantitation limits
HT - denotes that hold time for parameter exceeded
MI - denotes that matrix spike recovery out of limits due to matric interference.
HR- denotes sample received outside of method specified holding time
L- denotes that dissolved metals were not filtered within 15 minutes of collection per 40 CFR Part 136
bold - denotes value creater than criteria.

Table 2
Summary of Raw Groundwater Analytical Results

Sample ID	Sample collection date	Sample collection time	Aluminum	Arsenic (total)	Cadmium	Cadmium Dissolved	Chromium	Chromium, Trivalent (III)	Chromium, Trivalent III, Dissolved	Copper	Copper Dissolved	Cyanide	Lead	Lead Dissolved	Manganese	Nickel	Nickle Dissolved	Selenium	Selenium Dissolved
			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Grab Sample 1	09/27/18	14:30	--	24.7	--	--	--	--	--	0.19 J	--	--	0.032 J	--	123	--	--	--	--
Grab Sample 2	09/27/18	19:20	--	25.5	--	--	--	--	--	0.18 J	--	--	0.017 J	--	125	--	--	--	--
Grab Sample 3	09/28/18	8:15	--	26	--	--	--	--	--	0.2 J	--	--	0.024 J	--	126	--	--	--	--
Grab Sample 4	09/28/18	12:00	--	25.8	--	--	--	--	--	0.23 J	--	--	0.021 J	--	126	--	--	--	--
Well Water 1	11/11/18	17:45	7.5 J	24.2	<0.1 L,N,J	0.013 L,N,J	<0.4	<0.4	0.15 L,N,J	0.17 J	0.13 L,J	2.7 J	0.009 J	0.032 L,N,J	137	0.42 J	0.33 L,J	0.17 J	0.12 L,N,J
Well Water 2	11/11/18	22:45	9.8 J	21.8	<0.1 L,N,J	0.004 L,N,J	<0.4	<0.4	0.19 L,N,J	0.21 J	0.14 L,J	<3	<0.1	0.007 L,N,J	140	0.4 J	0.35 L,J	0.047 J	0.13 L,N,J
Well Water 3	11/12/18	8:30	8.2 J	24.9	<0.1 L,N,J	0.003 L,N,J	0.042 J	0.042 J	0.2 L,N,J	0.17 J	0.15 L,J	<3	<0.1	<0.1 L	141	0.41 J	0.34 L,J	<0.5	0.12 L,N,J
Well Water 4	11/12/18	12:30	7.3 J	24.8	<0.1 L,N,J	0.002 L,N,J	0.04 J	0.04 J	0.24 L,N,J	0.16 J	0.13 L,J	<3	<0.1	<0.1 L	140	0.41 J	0.23 L,J	<0.5	0.1 L,J
minimum			7.3	21.8	0.1	0.002	0.04	0.04	0.15	0.16	0.13	2.7	0.009	0.007	123	0.4	0.23	0.047	0.1
median			7.85	24.85	0.1	0.004	0.221	0.221	0.195	0.185	0.135	3	0.028	0.066	132	0.41	0.335	0.335	0.12
average			8.2	24.71	0.1	0.006	0.221	0.221	0.195	0.189	0.138	3	0.0504	0.06	132	0.41	0.313	0.304	0.118
maximum			9.8	26.0	0.1	0.013	0.400	0.400	0.24	0.23	0.15	3	0.1	0.10	141	0.42	0.350	0.500	0.130
n			4	8	4	4	4	4	4	8	4	4	8	4	8	4	4	4	4

The four samples collected on 11/11 and 11/12 were analyzed the full suite of EPA priority pollutnats. Results only shown for detected parameters.
Groundwater samples collected from where the groundwater is pumped into the southeast corner of the ASB.
Summary statistics calculated conservatively using the method reporting limit.
J - denotes that detected analyte below quantitation limits
HT - denotes that hold time for parameter exceeded
MI - denotes that matrix spike recovery out of limits due to matric interference.
HR- denotes sample received outside of method specified holding time
L- denotes that dissolved metals were not filtered within 15 minutes of collection per 40 CFR Part 136
bold - denotes value creater than criteria.

Table 2
Summary of Raw Groundwater Analytical Results

Sample ID	Sample collection date	Sample collection time	Silver	Silver Dissolved	Thallium	Zinc	Zinc Dissolved	Inorganic Arsenic (total)	Inorganic Arsenic (dissolved)	Barium	pH (field)
			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Grab Sample 1	09/27/18	14:30	--	--	--	2.5 J	--	--	--	--	
Grab Sample 2	09/27/18	19:20	--	--	--	1.1 J	--	--	--	--	
Grab Sample 3	09/28/18	8:15	--	--	--	1.2 J	--	--	--	--	
Grab Sample 4	09/28/18	12:00	--	--	--	1.4 J	--	--	--	--	
Well Water 1	11/11/18	17:45	0.01 J	0.005 L,J	0.058 J	<5	0.55 L,N,J	23.7	--	0.59 J	--
Well Water 2	11/11/18	22:45	<0.1	<0.1 L	0.014 J	0.76 J	0.79 L,N,J	23.4	--	0.27	--
Well Water 3	11/12/18	8:30	0.005 J	<0.1 L	0.009 J	<5	0.6 L,N,J	23.3	4.79 H	0.29 J	6.73
Well Water 4	11/12/18	12:30	<0.1	<0.1 L	<0.1	<5	0.79 L,N,J	23	--	0.29 J	6.82
minimum			0.005	0.005	0.009	0.76	0.55	23	4.79	0.27	6.73
median			0.055	0.1	0.036	1.95	0.695	23.35	4.79	0.29	6.775
average			0.054	0.076	0.045	2.75	0.683	23.35	4.79	0.36	6.775
maximum			0.100	0.100	0.100	5	0.79	23.7	4.79	0.59	6.82
n			4	4	4	8	4	4	1	4	2

The four samples collected on 11/11 and 11/12 were analyzed the full suite of EPA priority pollutnats. Results only shown for detected parameters.
Groundwater samples collected from where the groundwater is pumped into the southeast corner of the ASB.
Summary statistics calculated conservatively using the method reporting limit.
J - denotes that detected analyte below quantitation limits
HT - denotes that hold time for parameter exceeded
MI - denotes that matrix spike recovery out of limits due to matric interference.
HR- denotes sample received outside of method specified holding time
L- denotes that dissolved metals were not filtered within 15 minutes of collection per 40 CFR Part 136
bold - denotes value creater than criteria.

Table 3

Summary of CBNBWB Potable Water Analytical Results

Sample ID	Sample collection date	Sample collection time	Total Alkalinity (as CaCO3) mg/L	Hardness (as $CaCO_3$) mg/L	Ammonia Nitrogen (as N) mg/L	BOD5 mg/L	Chloride mg/L	Fluoride mg/L	Nitrate nitrogen mg/L	Sulfate mg/L	Iron mg/L	Potassium mg/L	Sodium mg/L	Arsenic (total) ug/L	Inorganic Arsenic (dissolved) ug/L	Copper (total) ug/L	Copper (dissolved) ug/L	Lead ug/L	Manganese ug/L
City Tap Water 1	11/11/18	18:15	20	21.4	0.66	<2	17.2	0.695	0.068	2.39	0.0378	0.88 J	9.38	0.29 J	0.054 H	14.2	14.1 L	0.456	2.91
City Tap Water 2	11/11/18	22:15	18	21.8	0.48	<2	17	0.693	0.0691	2.42	0.0364	0.89 J	9.59	0.31 J	0.054 H	8.81	8.80 L	0.141	2.84
City Tap Water 3	11/12/18	8:45	18	20.5	0.46 J	<2	16.7	<0.2	0.0511	2.36	0.0249	0.89 J	9.45	0.3 J	0.058 H	10.2	2.78 L	0.442	3.52
City Tap Water 4	11/12/18	10:30	18	20.5	0.44	<2	16.6	0.649	0.048 J	2.41	0.0219	0.84	9.26	0.35	0.064 H	3.21	3.23 L,N	0.21	3.89
minimum			18	20.5	0.44	2	16.6	0.2	0.048	2.36	0.0219	0.84	9.26	0.29	0.054	3.21	2.78	0.141	2.84
median			18	20.95	0.47	2	16.85	0.671	0.0596	2.4	0.0307	0.885	9.415	0.305	0.056	9.505	6.015	0.326	3.215
maximum			20	21.8	0.661	2	17.2	0.695	0.0691	2.42	0.0378	0.89	9.59	0.35	0.064	14.2	14.1	0.456	3.89
average			18.5	21.05	0.5103	<2	16.875	0.5593	0.0591	2.395	0.0303	0.875	9.42	0.3125	0.0575	9.105	7.2275	0.3123	3.29
n			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

Samples collected from faucet at Box Car Hill Campground.

J - denotes that detected analyte below quantitation limits

HT - denotes that hold time for parameter exceeded

MI - denotes that matrix spike recovery out of limits due to matric interference.

HR- denotes sample received outside of method specified holding time

All Table 2D-2 Section 3 organics below detection limits except as shown for chloroform, dibromochloromethane, and dichlorobromomethane, alpha-BHC, and bis(2-ethylhexyl)phthalate. See Analytical report for details.

Table 3
Summary of CBNBWB Potable Water Analytical Results

Sample ID	Sample collection date	Sample collection time	Zinc ug/L	Total Dissolved Solids (TDS) mg/L	Total Suspended Solids (TSS) mg/L	Turbidity NTU	Dissolved Organic Carbon (DOC) mg/L	Cadmium (total) ug/L	Cadmium (dissolved) ug/L	Chromium (total) ug/L	Chromium III (total) ug/L	Chromium III (dissolved) ug/L	Chromium VI (total) ug/L	Chromium VI (dissolved) ug/L	Mercury (total) ug/L	Nickel (total) ug/L	Selenium (total) ug/L	Silver (total) ug/L	Cyanide (total) ug/L
City Tap Water 1	11/11/18	18:15	17.4	52.5	<1	0.2	1.55	<0.1	0.005 .,N,	<0.4	<0.4	0.25 .,N,	0.022 HR	0.04 R,L	<0.2	0.42 J	<0.5	0.004 J	2.6 J
City Tap Water 2	11/11/18	22:15	2.9 J	71.2	<2	0.15	1.59	<0.1	0.004 .,N,	<0.4	<0.4	0.21 .,N,	0.019 HR,	0.028 R,L	<0.2	0.23 J	<0.5	0.004 J	<3
City Tap Water 3	11/12/18	8:45	3.2 J	53.8	<2	0.13	1.93	<0.1	0.003 .,N,	<0.4	<0.4	0.24	0.012 HR,	0.005 R,L	<0.2	0.24 J	<0.5	0.005 J	2.9 J
City Tap Water 4	11/12/18	10:30	0.86 J	56.2	<2	0.16	1.62	<0.1	0.002 .,N,	<0.4	<0.4	0.24	<0.02 HR	<0.02 HR,	<0.2	0.16 J	<0.5	0.003 J	2.8 J
minimum			0.86	52.5	1	0.13	1.55	0.1	0.002	0.4	0.4	0.21	0.012	0.005	0.2	0.16	0.5	0.003	2.6
median			3.05	55	2	0.155	1.605	0.1	0.0035	0.4	0.4	0.24	0.0195	0.024	0.2	0.235	0.5	0.004	2.85
maximum			17.4	71.2	2	0.2	1.93	0.1	0.005	0.4	0.4	0.25	0.022	0.04	0.2	0.42	0.5	0.005	3
average			6.09	58.425	1.75	0.16	1.6725	0.1	0.0035	0.4	0.4	0.235	0.0183	0.0233	0.2	0.2625	0.5	0.004	2.825
n			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

Samples collected from faucet at Box Car Hill Campground.
J - denotes that detected analyte below quantitation limits
HT - denotes that hold time for parameter exceeded
MI - denotes that matrix spike recovery out of limits due to matric interference.
HR- denotes sample received outside of method specified holding time
All Table 2D-2 Section 3 organics below detection limits except as shown for chloroform, dibromochloromethane, and dichlorobromomethane, alpha-BHC, and bis(2-ethylhexyl)phthalate. See Analytical report for details.

Table 3
Summary of CBNBWB Potable Water Analytical Results

Sample ID	Sample collection date	Sample collection time	Aluminim (total recoverable) ug/L	Alpha-BHC ug/L	Bromodichloromethane ug/L	Chloroform ug/L	Dibromochloromethane ug/L	Bis (2-ethylhexyl)phthalate ug/L	Total Phosphorus ug/L	Thallium ug/L	Berullium ug/L	Inorganic Arsenic (total) ug/L	Barium ug/L	pH (field) s.u.	Lead (dissolved) ug/L	Nickel (dissolved) ug/L	Selenium (dissolved) ug/L	Silver (dissolved) ug/L	Zinc (dissolved) ug/L
City Tap Water 1	11/11/18	18:15	26.8	0.0032	9.94	14.6	4.69	<1	0.007 J	0.004 J	<0.1	0.063	12.50	--	0.24 L	0.47 LNJ	0.07 LNJ	0.003 LJ	6.72 L
City Tap Water 2	11/11/18	22:15	23.9	0.0047	10.2	14.7	4.71	1	0.007 J	0.003 J	<0.1	0.070	12.60	--	0.14 L	0.21 LJ	<0.05 LJ	0.002 L	3.90 LNJ
City Tap Water 3	11/12/18	8:45	33.9	0.0034	11.9	14.8	5.22	<1	0.014 J	0.002 J	<0.1	0.060	12.10	6.52	0.14 L	0.14 LJ	<0.05 LJ	0.002 L	1.60 LJ
City Tap Water 4	11/12/18	10:30	18.1	0.0034	11.9	16.1	4.93	<1	<0.025	<0.1	<0.1	0.057	11.70	7.15	0.24 LN	0.14 LJ	<0.05 LJ	0.002 L	1.90 LNJ
minimum			18.1	0.0032	9.94	14.6	4.69	1	0.007	0.002	<0.1	0.057	11.70	6.52	0.14	0.14	<0.05	0.002	1.60
median			25.35	0.0034	11.05	14.75	4.82	1	0.0105	0.0035	<0.1	0.062	12.30	6.84	0.19	0.18	<0.05	0.002	2.90
maximum			33.9	0.0047	11.9	16.1	5.22	1	0.025	0.1	<0.1	0.070	12.60	7.15	0.24	0.47	0.07	0.003	6.72
average			25.675	0.0037	10.985	15.05	4.8875	1	0.0133	0.0273	<0.1	0.063	12.23	6.84	0.19	0.24	0.05	0.003	3.53
n			4	4	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4

Samples collected from faucet at Box Car Hill Campground.
J - denotes that detected analyte below quantitation limits
HT - denotes that hold time for parameter exceeded
MI - denotes that matrix spike recovery out of limits due to matric interference.
HR- denotes sample received outside of method specified holding time
All Table 2D-2 Section 3 organics below detection limits except as shown for chloroform, dibromochloromethane, and dichlorobromomethane, alpha-BHC, and bis(2-ethylhexyl)phthalate. See Analytical report for details.

Table 4
Summary of Ambient Ocean Samples Analytical Results

Sample ID	Sample collection date	Sample collection time	Total Alkalinity (as CaCO3)	Ammonia Nitrogen (as N)	BOD5	Chloride	Calcium (total)	Calcium (dissolved)	Dissolved Organic Carbon (DOC)	Fluoride	Nitrate nitrogen	Potassium (dissolved)	Sulfate	Sodium (total)	Soidum (dissolved)	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Turbidity	Aluminim (dissolved)
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	ug/L
South 1	09/30/18	9:44	130	0.14 J	<2.00 HT	17,700	441	--	--	1.7 ER,J	0.25	--	2,560	9,920	--	33,500	10.7	0.67 HT	--
South 2	09/30/18	9:48	130	0.38	2.85 HT	17,900	415	--	--	1.8 ER,J	0.10	--	2,580	9,290	--	32,200	16.0	0.65 HT	--
North 1	09/30/18	9:58	120	0.36	2.75 HT	18,200	373	--	--	1.8 ER,J	0.25	--	2,640	9,280	--	30,700	11.3	0.70 HT	--
North 2	09/30/18	10:02	135	0.24 J	2.95 HT	17,900	388 MI	--	--	2.0 ER,J	0.09	--	2,580	8,790 MI	--	34,000	16.0 MI	0.63 HT	--
Dock 1	01/03/19	8:55	--	--	--	--	--	310	0.38	--	--	299	--	--	8,600	--	12.0	0.61	21 J
Dock 2	01/03/19	9:25	--	--	--	--	--	327	0.44	--	--	314	--	--	8,920	--	15.2	0.53	<19 J
Dock 3	01/03/19	10:15	--	--	--	--	--	342	0.71	--	--	321	--	--	9,140	--	8.0	0.55	<13 U
Dock 4	01/03/19	10:45	--	--	--	--	--	324	0.77	--	--	316	--	--	8,970	--	7.1	0.62	<16 J
Summary Statistics	minimum		120	0.14	<2.00	17,700	373	310	0.38	1.7	0.09	299	2,560	8,790	8,600	30,700	7.1	0.53	<13
	median		130	0.30	2.80	17,900	402	326	0.58	1.8	0.18	315	2,580	9,285	8,945	32,850	11.7	0.63	17
	maximum		135	0.38	2.95	18,200	441	342	0.77	2.0	0.25	321	2,640	9,920	9,140	34,000	16.0	0.70	21
	90th %ile		134	0.37	2.92	18,110	433	338	0.75	1.9	0.25	320	2,622	9,731	9,089	33,850	16.0	0.68	20
	geomean		129	0.26	2.61	17,924	403	326	0.55	1.8	0.16	312	2,590	9,311	8,905	32,575	11.6	0.62	17
	n		4	4	4	4	4	4	4	4	4	4	4	4	4	4	8	8	4

September 2018 sampling conducted by by SHN Consultants during dive inspection of outfall. Samples were collected 1,000 ft north and 1,000 ft south of the outfall diffuser.
January 2019 sampling was conducted by SLR. Samples were collected from the public and marina docks in Charleston at high tide to capture marine water. Marine water was confirmed by field measurement of salinity (all > 30 ppth).
See laboratory nalytical reports for a description of qualifiers.

Table 4
Summary of Ambient Ocean Samples Analytical Results

Sample ID	Sample collection date	Sample collection time	Arsenic (total)	Arsenic (dissolved)	Inorganic Arsenic (dissolved)	Inorganic Arsenic, total	Barium total	Beryllium total	Beryllium (dissolved)	Cadmium (dissolved)	Chromium (total)	Chromium (dissolved)	Copper (total)	Copper (dissolved)	Iron (total)	Iron (dissolved)	Lead (total)	Lead (dissolved)	Magnesium (total)
			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	mg/L
South 1	09/30/18	9:44	57.9	--	--	--	--	--	--	--	--	--	3.0 ER,J	--	<0.1	--	0.30 ER,J	--	1320
South 2	09/30/18	9:48	54.1	--	--	--	--	--	--	--	--	--	7.8 ER,J	--	<0.1	--	0.45 ER,J	--	1330
North 1	09/30/18	9:58	72.0	--	--	--	--	--	--	--	--	--	10.0 ER,J	--	<0.1	--	2.00 ER,J	--	1210
North 2	09/30/18	10:02	57.6	--	--	--	--	--	--	--	--	--	2.7 ER,J	--	<0.1	--	0.30 ER,J	--	1240 MI
Dock 1	01/03/19	8:55	1.28	1.23	1.18	1.26 HT	6.53	<0.008 U	<0.006 U	0.021 J	0.631	0.179	6.26	1.59 J	--	36.5	--	<0.128 U	--
Dock 2	01/03/19	9:25	1.04	1.14	1.19	1.30 HT	6.39	<0.008 U	<0.006 U	0.021 J	0.432	0.229	<1.02 U	1.6 J	--	27.5	--	<0.128 U	--
Dock 3	01/03/19	10:15	1.16	1.11	1.27	1.46 HT	6.46	<0.008 U	<0.006 U	0.023 J	0.334	0.206	<1.02 U	2.34	--	13.2 J	--	<0.128 U	--
Dock 4	01/03/19	10:45	1.17	1.17	1.23	1.22 HT	6.66	<0.008 U	<0.006 U	0.022 J	0.345	0.171	3.41	1.26 J	--	18.1 J	--	<0.128 U	--
Summary Statistics	minimum		54.1	1.11	1.18	1.2	6.39	<0.008	<0.006	0.021	0.334	0.171	1.0	1.3	<0.1	13.2	0.30	<0.128	1210
	median		57.8	1.16	1.21	1	6.50	<0.008	<0.006	0.022	0.389	0.193	3.0	1.6	<0.1	18.1	0.38	<0.128	1280
	maximum		72.0	1.23	1.27	1.5	6.66	<0.008	<0.006	0.023	0.631	0.229	10.0	2.3	<0.1	36.5	2.00	<0.128	1330
	90th %ile		67.8	1.21	1.26	1.4	6.62	<0.008	<0.006	0.022	0.571	0.222	8.5	2.1	<0.1	33.8	1.54	<0.128	1327
	geomean		60.0	1.16	1.22	1.3	6.51	<0.008	<0.006	0.022	0.421	0.195	3.3	1.7	<0.1	22.1	0.53	<0.128	1274
	n		4	4	4	4	4	4	4	4	4	4	8	4	4	4	4	4	4

September 2018 sampling conducted by by SHN Consultants during dive inspection of outfall. Samples were collected 1,000 ft north and 1,000 ft south of the outfall diffuser.
January 2019 sampling was conducted by SLR. Samples were collected from the public and marina docks in Charleston at high tide to capture marine water. Marine water was confirmed by field measurement of salinity (all > 30 ppth).
See laboratory nalytical reports for a description of qualifiers.

Table 4
Summary of Ambient Ocean Samples Analytical Results

Sample ID	Sample collection date	Sample collection time	Magnesium (dissolved)	Manganese (total)	Manganese (dissolved)	Nickel (dissolved)	Potassium (total)	Selenium (dissolved)	Silver (dissolved)	Thallium (dissolved)	Thallium (total)	Zinc (total)	Zinc (dissolved)	alpha-BHC	Dibromochloromethane	Bromodichloromethane	Chloroform
			mg/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
South 1	09/30/18	9:44	--	<1.0 ER	--	--	510	--	--	--	--	<24 ER	--	--	--	--	--
South 2	09/30/18	9:48	--	<1.0 ER	--	--	524	--	--	--	--	<24 ER	--	--	--	--	--
North 1	09/30/18	9:58	--	<1.0 ER	--	--	462	--	--	--	--	<24 ER	--	--	--	--	--
North 2	09/30/18	10:02	--	<1.0 ER	--	--	476 MI	--	--	--	--	<24 ER	--	--	--	--	--
Dock 1	01/03/19	8:55	1040	--	1.39 J	0.442	--	<0.46 U	<0.18 U	0.012	0.013	--	<5.1 U	<0.003	<0.25	<0.28	<0.26
Dock 2	01/03/19	9:25	1080	--	1.30 J	0.381	--	<0.46 U	<0.18 U	0.012	0.014	--	<5.1 U	<0.003	<0.25	<0.28	<0.26
Dock 3	01/03/19	10:15	1100	--	1.13	0.403	--	<0.46 U	<0.18 U	0.012	0.012	--	<5.1 U	<0.003	<0.25	<0.28	<0.26
Dock 4	01/03/19	10:45	1070	--	1.17 J	0.381	--	<0.46 U	<0.18 U	0.011	0.013	--	<5.1 U	<0.003	<0.25	<0.28	<0.26
Summary Statistics	minimum		1040	<1.0	1.13	0.381	462	<0.46	<0.18	0.011	0.012	<24	<5.1	<0.003	<0.25	<0.28	<0.26
	median		1075	<1.0	1.24	0.392	493	<0.46	<0.18	0.012	0.013	<24	<5.1	<0.003	<0.25	<0.28	<0.26
	maximum		1100	<1.0	1.39	0.442	524	<0.46	<0.18	0.012	0.014	<24	<5.1	<0.003	<0.25	<0.28	<0.26
	90th %ile		1094	<1.0	1.36	0.43	520	<0.46	<0.18	0.012	0.014	<24	<5.1	<0.003	<0.25	<0.28	<0.26
	geomean		1072	<1.0	1	0	492	<0.46	<0.18	0.012	0.013	<24	<5.1	<0.003	<0.25	<0.28	<0.26
	n		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

September 2018 sampling conducted by by SHN Consultants during dive inspection of outfall. Samples were collected 1,000 ft north and 1,000 ft south of the outfall diffuser.
January 2019 sampling was conducted by SLR. Samples were collected from the public and marina docks in Charleston at high tide to capture marine water. Marine water was confirmed by field measurement of salinity (all > 30 ppth).
See laboratory nalytical reports for a description of qualifiers.

Table 7
Summary of Historical Onsite Groundwater Analytical Results

Well ID	Sample Date	Result Type	Temperature Field (°C)	pH Field (units)	pH Lab (units)	Specific Field (uS/cm)	Specific Lab (uS/cm)	Oxygen Field (mg/L)	TDS (mg/L)	TSS (mg/L)	Color (true) Total (units)	TOC (mg/L)	Alkalinity Total (mg/L as CaCO3)	Alkalinity Dissolved (mg/L as CaCO3)
Background (MW-17)	1/12/1999	Primary Set 1	8	3	---	95	---	0	---	---	210	---	---	---
	1/12/1999	Duplicate 1 Set 1	8	6	---	95	---	0	---	---	200	---	---	---
	2/1/1999	Primary Set 1	8	6	6	89	77	0	50	6	190	11	12	13
	4/19/1999	Primary Set 1	10	6	6	89	78	0	80	1	140	7	11	10
	5/11/1999	Primary Set 1	13	6	---	94	---	0	---	---	140	---	---	---
	9/7/1999	Primary Set 1	16	6	---	126	---	0	---	---	200	---	---	---
	1/25/2000	Primary Set 1	8	6	---	91	---	0	---	---	160	---	---	---
	2/14/2000	Primary Set 1	9	6	6	84	71	4	60	1	170	8	10	11
	2/14/2000	Duplicate 1 Set 1	9	6	6	84	71	4	58	1	169	---	10	---
	4/17/2000	Primary Set 1	12	6	6	84	74	0	30	1	170	9	12	---
	5/16/2000	Primary Set 1	13	6	---	97	---	0	---	---	180	---	---	---
	9/12/2000	Primary Set 1	16	6	---	120	---	0	---	---	220	---	---	---
	9/12/2000	Duplicate 1 Set 1	16	6	---	120	---	0	---	---	---	---	---	---
	9/25/2000	Primary Set 1	16	6	6	120	100	0	80	1	220	9	27	---
	2/6/2001	Primary Set 1	11	6	---	152	---	1	---	---	230	---	---	---
	2/12/2001	Primary Set 1	10	6	6	155	140	1	80	1	220	7	24	27
	4/30/2001	Primary Set 1	11	6	6	162	141	1	120	1	220	5	---	---
	6/19/2001	Primary Set 1	13	6	---	159	---	0	---	---	220	---	---	---
	9/25/2001	Primary Set 1	15	6	---	161	---	0	---	---	360	---	---	---
	10/2/2001	Primary Set 1	15	6	6	156	120	0	100	1	310	10	---	---
	2/26/2002	Primary Set 1	10	6	6	96	88	1	80	2	200	14	9	8
	9/9/2002	Primary Set 1	15	6	6	146	110	---	100	2	300	16	27	19
	9/9/2002	Duplicate 1 Set 1	15	6	---	146	---	---	---	---	---	---	---	---
	3/10/2003	Primary Set 1	9	5	6	76	63	0	50	1	220	15	8	10
	10/28/2003	Primary Set 1	15	6	6	170	120	---	110	2	400	15	44	42
	3/17/2004	Primary Set 1	11	6	6	69	59	---	50	2	180	17	9	9
	11/3/2004	Primary Set 1	15	6	6	461	110	---	80	2	240	15	27	25
	3/23/2005	Primary Set 1	10	6	6	101	86	0	120	2	300	21	22	21
	10/25/2005	Primary Set 1	14	---	6	---	100	0	110	2	370	18	37	37
	n		29	28	17	28	17	24	17	17	27	16	15	12
	min		8	3	6	69	59	0	30	1	140	5	8	8
	median		12	6	6	111	88	0	80	1	220	13	12	16
	max		16	6	6	461	141	4	120	6	400	21	44	42

Data Summarized from 2017 Annual Groundwater Monitoring Report (SHN Consulting Engineers, 2018).

Table 7
Summary of Historical Onsite Groundwater Analytical Results

Well ID	Sample Date	Result Type	Bicarbonate				Sulfate		Chloride		Nitrite (as N)		(NH3 as N)		Calcium	
			Total (mg/L as CaCO3)	Dissolved (mg/L as CaCO3)	Total (mg/L as CaCO3)	Dissolved (mg/L as CaCO3)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)
Background (MW-17)	1/12/1999	Primary Set 1	---	---	---	---	1	---	11	---	---	---	---	---	---	---
	1/12/1999	Duplicate 1 Set 1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2/1/1999	Primary Set 1	---	---	15	16	0	---	11	---	0.015	---	<0.05	---	---	3.9
	4/19/1999	Primary Set 1	---	---	13	12	0	---	13	---	0.015	---	<0.05	---	---	3.2
	5/11/1999	Primary Set 1	---	---	---	---	0	---	14	---	---	---	---	---	3	---
	9/7/1999	Primary Set 1	---	---	---	---	0	---	13	---	---	---	---	---	---	---
	1/25/2000	Primary Set 1	---	---	---	---	4	---	11	---	---	---	---	---	---	---
	2/14/2000	Primary Set 1	---	---	12	13	---	2	---	11	---	0.015	0.05	---	---	3.5
	2/14/2000	Duplicate 1 Set 1	---	---	---	13	---	---	---	---	---	0.015	0.05	---	---	---
	4/17/2000	Primary Set 1	---	---	15	---	---	0	---	11	---	0.015	---	0.07	3.6	3.3
	5/16/2000	Primary Set 1	---	---	---	---	0	---	10	---	---	---	---	---	---	---
	9/12/2000	Primary Set 1	---	---	---	---	0	---	12	---	---	---	---	---	---	---
	9/12/2000	Duplicate 1 Set 1	---	---	---	---	0	---	12	---	---	---	---	---	---	---
	9/25/2000	Primary Set 1	---	---	33	---	---	0	---	12	---	0.015	0.07	---	5.9	6.2
	2/6/2001	Primary Set 1	---	---	---	---	10	---	14	---	---	---	---	---	---	---
	2/12/2001	Primary Set 1	---	---	29	33	---	10	---	14	---	0.015	---	0.06	---	7.2
	4/30/2001	Primary Set 1	---	---	---	---	---	13	---	17	---	0.015	---	0.07	---	7.5
	6/19/2001	Primary Set 1	---	---	---	---	10	---	18	---	---	---	---	---	---	---
	9/25/2001	Primary Set 1	---	---	---	---	1	---	14	---	---	---	---	---	---	---
	10/2/2001	Primary Set 1	---	---	---	---	---	2	---	13	---	0.015	---	0.09	6.8	---
	2/26/2002	Primary Set 1	---	---	10	10	---	4	---	14	---	0.015	---	0.05	---	3.3
	9/9/2002	Primary Set 1	---	---	33	23	---	1	---	19	---	0.015	---	0.12	---	5.6
	9/9/2002	Duplicate 1 Set 1	---	---	---	---	---	---	---	19	---		---	0.13	---	---
	3/10/2003	Primary Set 1	---	---	10	12	---	0	---	9.4	---	0.015	---	<0.05	---	3.16
	10/28/2003	Primary Set 1	---	---	54	51	---	0	---	15	---	0.015	---	0.17	---	7.84
	3/17/2004	Primary Set 1	---	---	10	10	0	---	9	---	0.015	---	<0.05	---	---	2.7
	11/3/2004	Primary Set 1	---	---	33	30	5	---	13	---	0.015	---	0.11	---	---	5.5
	3/23/2005	Primary Set 1	22	21	26	25	---	0	---	10	---	0.015	---	0.08	---	4.5
	10/25/2005	Primary Set 1	37	37	45	45	---	0	---	13	---	0.015	---	0.13	---	5.5
	n		2	2	14	13	14	12	14	13	4	13	7	10	4	15
	min		22	21	10	10	0	0	9	9.4	0.0	0.0	0.1	0.1	3.0	2.7
	median		30	29	21	16	0	1	12	13.0	0.0	0.0	0.1	0.1	4.8	4.5
	max		37	37	54	51	10	13	18	19.0	0.0	0.0	0.1	0.2	6.8	7.8

Data Summarized from 2017 Annual Groundwater Monitoring Repor

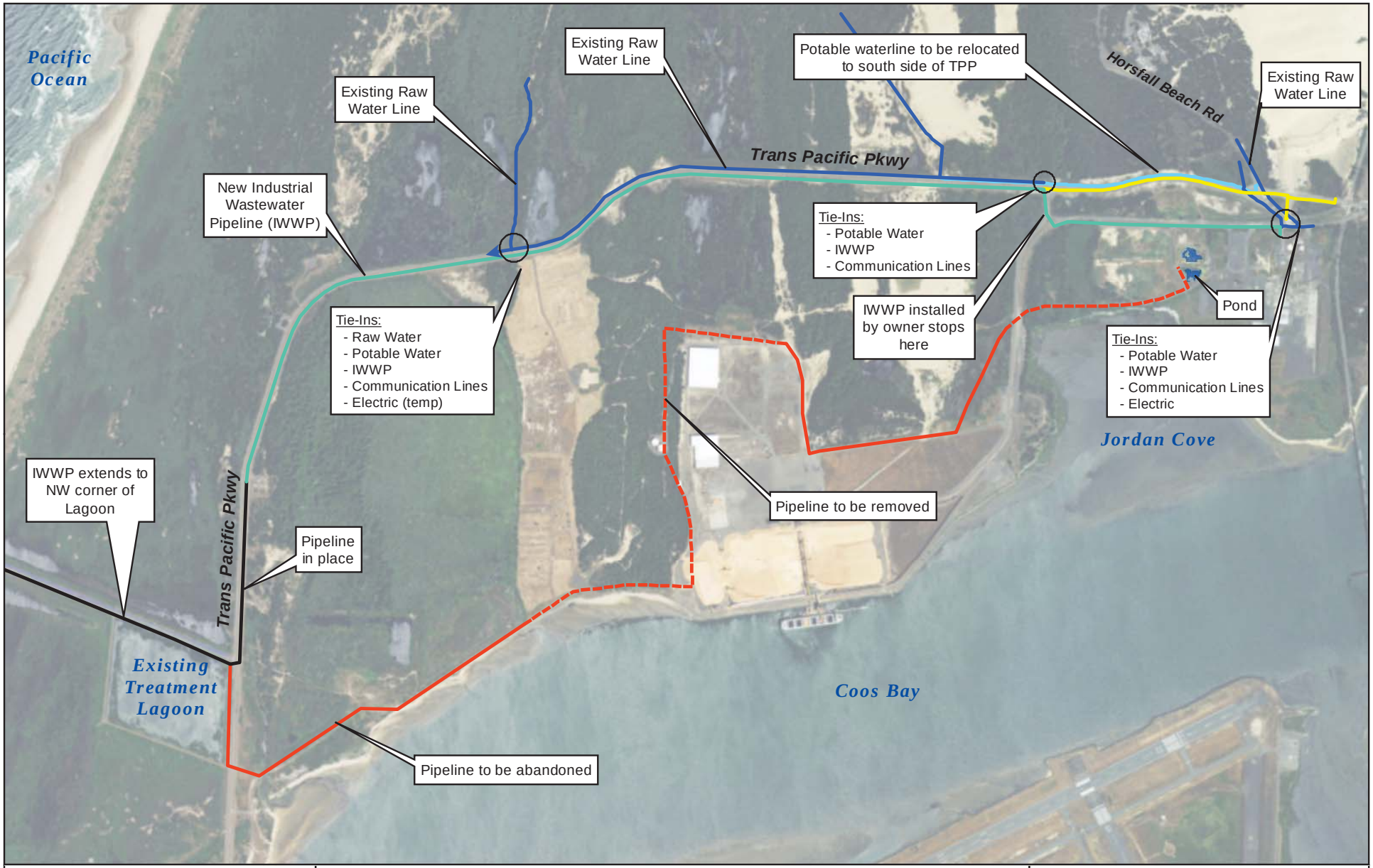
Table 7
Summary of Historical Onsite Groundwater Analytical Results

Well ID	Sample Date	Result Type	Magnesium Total (mg/L)	Magnesium Dissolved (mg/L)	Sodium Total (mg/L)	Sodium Dissolved (mg/L)	Potassium Total (mg/L)	Potassium Dissolved (mg/L)	Iron Total (mg/L)	Manganese Total (mg/L)	Arsenic Total (mg/L)	Barium Total (mg/L)	Chromium Total (mg/L)
Background (MW-17)	1/12/1999	Primary Set 1	---	---	7	---	---	---	7.79	0.144	0.012	---	0.005
	1/12/1999	Duplicate 1 Set 1	---	---	---	---	---	---	---	---	---	---	---
	2/1/1999	Primary Set 1	---	1.4	---	6.3	---	0.6	5.32	0.116	0.0015	0.005	0.005
	4/19/1999	Primary Set 1	---	1.2	---	7.6	---	1.4	4.58	0.096	0.008	0.01	0.005
	5/11/1999	Primary Set 1	1.2	---	6.7	---	---	---	5.28	0.108	0.011	---	0.005
	9/7/1999	Primary Set 1	---	---	7.7	---	---	---	6.78	0.164	0.014	---	0.005
	1/25/2000	Primary Set 1	---	---	6.3	---	---	---	6.25	0.138	0.01	---	0.005
	2/14/2000	Primary Set 1	---	1.4	---	6.3	---	1.5	5.85	0.127	0.007	0.005	0.005
	2/14/2000	Duplicate 1 Set 1	---	---	---	---	---	---	---	---	---	---	---
	4/17/2000	Primary Set 1	1.4	1.4	6.6	6.7	---	1.7	5.65	0.12	0.009	0.005	0.005
	5/16/2000	Primary Set 1	---	---	6.6	---	---	---	6.36	0.132	0.012	---	0.005
	9/12/2000	Primary Set 1	---	---	7.3	---	---	---	7.27	0.171	0.016	---	0.005
	9/12/2000	Duplicate 1 Set 1	---	---	---	---	---	---	---	---	---	---	---
	9/25/2000	Primary Set 1	2.6	2.9	7.5	7.4	2.3	2.2	7.39	0.174	0.008	0.0025	0.005
	2/6/2001	Primary Set 1	---	---	9.5	---	---	---	10.7	0.228	0.015	---	0.005
	2/12/2001	Primary Set 1	---	3.4	---	9.4	---	2.3	10.6	0.217	0.013	0.0025	0.005
	4/30/2001	Primary Set 1	---	3.3	---	9.2	---	2.2	10.4	0.222	0.007	0.0025	0.005
	6/19/2001	Primary Set 1	---	---	9.8	---	---	---	10.7	0.224	0.015	---	0.005
	9/25/2001	Primary Set 1	---	---	10	---	---	---	13.8	0.258	0.021	---	0.005
	10/2/2001	Primary Set 1	---	3	---	9.4	---	2.3	12.7	0.237	0.017	0.0025	0.005
	2/26/2002	Primary Set 1	---	1.5	---	8.2	---	1.6	5.47	0.102	0.01	0.0025	0.005
	9/9/2002	Primary Set 1	---	2.5	---	9.1	---	2.3	12.1	0.202	0.022	0.0025	0.005
	9/9/2002	Duplicate 1 Set 1	---	---	---	---	---	---	---	---	---	---	---
	3/10/2003	Primary Set 1	---	1.49	---	6.49	---	1.3	6.03	0.0958	0.012	0.0025	0.005
	10/28/2003	Primary Set 1	---	3.27	---	9.52	---	2.6	18.2	0.219	0.03	0.0025	0.005
	3/17/2004	Primary Set 1	---	1.3	---	5.3	---	2.5	3.26	0.067	0.007	0.0025	---
	11/3/2004	Primary Set 1	---	2.7	---	7.9	---	2.5	9.01	0.177	0.015	0.006	---
	3/23/2005	Primary Set 1	---	2.1	---	7.4	---	2.5	8.21	0.153	0.014	0.0025	---
	10/25/2005	Primary Set 1	---	2.5	---	8.6	---	2.5	13.2	0.158	0.024	0.0025	---
	n		3	16	11	16	1	16	25	25	25	16	21
	min		1.2	1.2	6.3	5.3	2.3	0.6	3.3	0.1	0.0	0.0	0.0
	median		1.4	2.3	7.3	7.8	2.3	2.3	7.4	0.2	0.0	0.0	0.0
	max		2.6	3.4	10.0	9.5	2.3	2.6	18.2	0.3	0.0	0.0	0.0

t (SHN Consulting Engineers, 2018).

Appendix A

Industrial Wastewater Pipeline, Water Pipelines relocation and Utility Tie-Ins, SHN Engineers



Jordan Cove Energy Project, L.P.

N

0 0.1 0.2 Miles

- New Industrial Wastewater Pipeline (IWWP)
- Relocated Potable Water Line
- Existing Raw Water Line
- Existing Potable Water Line
- Existing IWWP
- IWWP to be Removed
- IWWP to be Abandoned

Jordan Cove Energy Project

Figure 1.4-1

Industrial Wastewater Pipeline, Water Pipelines Relocation and Utility Tie-Ins

Appendix B

Laboratory Analytical Reports – Raw Groundwater, September 2018

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory

10/10/2018

Chris Brow
SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068

TEL: (503) 723-4423
FAX

RE: 108.01593.00005 Jordan Cove

Order No.: 1810068

Dear Chris Brow:

Neilson Research Corporation received 4 sample(s) on 10/2/2018 for the analyses presented in the following report.

The results relate only to the parameters tested or to the sample as received by the laboratory. This report shall not be reproduced except in full, without the written approval of Neilson Research Corporation. If you have any questions regarding these test results, please feel free to call.

Sincerely,
Neilson Research Corporation

Tamra Schmedemann

Tamra R. Schmedemann
Project Manager

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

CLIENT: SLR International Corporation
Project: 108.01593.00005 Jordan Cove
Lab Order: 1810068

Date: 10-Oct-18

CASE NARRATIVE

The analyses were performed according to the guidelines in the Neilson Research Corporation Quality Assurance Program. This report contains analytical results for the sample(s) as received by the laboratory.

Neilson Research Corporation certifies that this report is in compliance with the requirements of NELAP. No unusual difficulties were experienced during analysis of this batch except as noted below or qualified with data flags on the reports.

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-01A**
Collection Date: **9/27/2018 2:30:00 PM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	110		10.0	10	mg/L	1	A	10/4/2018
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.442		0.105	0.15	mg/L	1	A	10/4/2018
BOD, 5 DAY			**SM 5210 B**					Analyst: **EAT**
Biochemical Oxygen Demand	4.50	HT	2.00	2	mg/L	1	A	10/2/2018 3:11:
ANIONS			**EPA 300.0**					Analyst: **SCM**
Chloride	18.3		0.0742	1	mg/L	1	A	10/3/2018 3:34:
Fluoride	0.095	J	0.00767	0.2	mg/L	1	A	10/3/2018 3:34:
Nitrate Nitrogen	ND	HT	0.0109	0.2	mg/L	1	A	10/3/2018 3:34:
Sulfate	0.44	J	0.0623	0.5	mg/L	1	A	10/3/2018 3:34:
HARDNESS			**SM 2340B**					Analyst: **JWC**
Hardness, Total (As CaCO3)	98.6		0.0112	6.62	mg/L	1	A	10/4/2018
TRACE METALS			**EPA 200.7**					Analyst: **JWC**
Calcium	22.9		0.00310	1	mg/L	1	A	10/4/2018
Iron	15.4		0.00204	0.015	mg/L	1	A	10/4/2018
Magnesium	10.0		0.00126	1	mg/L	1	A	10/4/2018
Potassium	7.14		0.0169	1	mg/L	1	A	10/4/2018
Sodium	15.0		0.00803	1	mg/L	1	A	10/4/2018
TRACE METALS			**EPA 200.8**					Analyst: **BMG**
Arsenic	0.0247		0.00000825	0.0005	mg/L	1	A	10/3/2018
Copper	0.00019	J	0.0000251	0.0005	mg/L	1	A	10/3/2018
Lead	0.000032	J	0.00000508	0.0001	mg/L	1	A	10/3/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-01A**
Collection Date: **9/27/2018 2:30:00 PM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRACE METALS			**EPA 200.8**					Analyst: **BMG**
Manganese	0.123		0.0000195	0.002	mg/L	1	A	10/3/2018
Zinc	0.0025	J	0.000486	0.005	mg/L	1	A	10/3/2018
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	160		5.00	5	mg/L	1	A	10/3/2018
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	20.0		7.00	7	mg/L	1	A	10/4/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	134	HT	0.100	0.1	NTU	1		10/2/2018 5:15:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-01B**
Collection Date: **9/27/2018 2:30:00 PM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	4.16	HT	0.0490	0.1	mg/L	1	A	10/4/2018 1:08:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-02A**
Collection Date: **9/27/2018 7:20:00 PM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	110		10.0	10	mg/L	1	A	10/4/2018
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.487		0.105	0.15	mg/L	1	A	10/4/2018
BOD, 5 DAY			**SM 5210 B**					Analyst: **EAT**
Biochemical Oxygen Demand	2.75	HT	2.00	2	mg/L	1	A	10/2/2018 3:11:
ANIONS			**EPA 300.0**					Analyst: **SCM**
Chloride	18.3		0.0742	1	mg/L	1	A	10/3/2018 4:00:
Fluoride	0.10	J	0.00767	0.2	mg/L	1	A	10/3/2018 4:00:
Nitrate Nitrogen	ND	HT	0.0109	0.2	mg/L	1	A	10/3/2018 4:00:
Sulfate	0.45	J	0.0623	0.5	mg/L	1	A	10/3/2018 4:00:
HARDNESS			**SM 2340B**					Analyst: **JWC**
Hardness, Total (As CaCO3)	99.1		0.0112	6.62	mg/L	1	A	10/4/2018
TRACE METALS			**EPA 200.7**					Analyst: **JWC**
Calcium	23.0		0.00310	1	mg/L	1	A	10/4/2018
Iron	15.6		0.00204	0.015	mg/L	1	A	10/4/2018
Magnesium	10.1		0.00126	1	mg/L	1	A	10/4/2018
Potassium	7.14		0.0169	1	mg/L	1	A	10/4/2018
Sodium	15.0		0.00803	1	mg/L	1	A	10/4/2018
TRACE METALS			**EPA 200.8**					Analyst: **BMG**
Arsenic	0.0255		0.00000825	0.0005	mg/L	1	A	10/3/2018
Copper	0.00018	J	0.0000251	0.0005	mg/L	1	A	10/3/2018
Lead	0.000017	J	0.00000508	0.0001	mg/L	1	A	10/3/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-02A**
Collection Date: **9/27/2018 7:20:00 PM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRACE METALS			**EPA 200.8**					Analyst: **BMG**
Manganese	0.125		0.0000195	0.002	mg/L	1	A	10/3/2018
Zinc	0.0011	J	0.000486	0.005	mg/L	1	A	10/3/2018
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	166		5.00	5	mg/L	1	A	10/3/2018
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	15.6		4.00	4	mg/L	1	A	10/4/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	135	HT	0.100	0.1	NTU	1		10/2/2018 5:15:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-02B**
Collection Date: **9/27/2018 7:20:00 PM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	4.07	HT	0.0490	0.1	mg/L	1	A	10/4/2018 1:53:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-03A**
Collection Date: **9/28/2018 8:15:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	112		10.0	10	mg/L	1	A	10/4/2018
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.461		0.105	0.15	mg/L	1	A	10/4/2018
BOD, 5 DAY			**SM 5210 B**					Analyst: **EAT**
Biochemical Oxygen Demand	3.90	HT	2.00	2	mg/L	1	A	10/2/2018 3:11:
ANIONS			**EPA 300.0**					Analyst: **SCM**
Chloride	18.3		0.0742	1	mg/L	1	A	10/3/2018 4:27:
Fluoride	0.095	J	0.00767	0.2	mg/L	1	A	10/3/2018 4:27:
Nitrate Nitrogen	ND	HT	0.0109	0.2	mg/L	1	A	10/3/2018 4:27:
Sulfate	ND		0.0623	0.5	mg/L	1	A	10/3/2018 4:27:
HARDNESS			**SM 2340B**					Analyst: **JWC**
Hardness, Total (As CaCO3)	99.4		0.0112	6.62	mg/L	1	A	10/4/2018
TRACE METALS			**EPA 200.7**					Analyst: **JWC**
Calcium	23.1		0.00310	1	mg/L	1	A	10/4/2018
Iron	16.0		0.00204	0.015	mg/L	1	A	10/4/2018
Magnesium	10.1		0.00126	1	mg/L	1	A	10/4/2018
Potassium	7.19		0.0169	1	mg/L	1	A	10/4/2018
Sodium	15.1		0.00803	1	mg/L	1	A	10/4/2018
TRACE METALS			**EPA 200.8**					Analyst: **BMG**
Arsenic	0.0260		0.00000825	0.0005	mg/L	1	A	10/3/2018
Copper	0.00020	J	0.0000251	0.0005	mg/L	1	A	10/3/2018
Lead	0.000024	J	0.00000508	0.0001	mg/L	1	A	10/3/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-03A**
Collection Date: **9/28/2018 8:15:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRACE METALS			**EPA 200.8**					Analyst: **BMG**
Manganese	0.126		0.0000195	0.002	mg/L	1	A	10/3/2018
Zinc	0.0012	J	0.000486	0.005	mg/L	1	A	10/3/2018
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	139		5.00	5	mg/L	1	A	10/3/2018
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	15.6		4.00	4	mg/L	1	A	10/4/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	140	HT	0.100	0.1	NTU	1		10/2/2018 5:15:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-03B**
Collection Date: **9/28/2018 8:15:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	4.24	HT	0.0490	0.1	mg/L	1	A	10/4/2018 2:37:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-04A**
Collection Date: **9/28/2018 12:00:00 PM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	116		10.0	10	mg/L	1	A	10/4/2018
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.520		0.105	0.15	mg/L	1	A	10/4/2018
BOD, 5 DAY			**SM 5210 B**					Analyst: **EAT**
Biochemical Oxygen Demand	3.88	HT	2.00	2	mg/L	1	A	10/2/2018 3:11:
ANIONS			**EPA 300.0**					Analyst: **SCM**
Chloride	18.3		0.0742	1	mg/L	1	A	10/3/2018 4:54:
Fluoride	0.093	J	0.00767	0.2	mg/L	1	A	10/3/2018 4:54:
Nitrate Nitrogen	ND	HT	0.0109	0.2	mg/L	1	A	10/3/2018 4:54:
Sulfate	0.44	J	0.0623	0.5	mg/L	1	A	10/3/2018 4:54:
HARDNESS			**SM 2340B**					Analyst: **JWC**
Hardness, Total (As CaCO3)	99.1		0.0112	6.62	mg/L	1	A	10/4/2018
TRACE METALS			**EPA 200.7**					Analyst: **JWC**
Calcium	23.0		0.00310	1	mg/L	1	A	10/4/2018
Iron	15.9		0.00204	0.015	mg/L	1	A	10/4/2018
Magnesium	10.1		0.00126	1	mg/L	1	A	10/4/2018
Potassium	7.17		0.0169	1	mg/L	1	A	10/4/2018
Sodium	15.0		0.00803	1	mg/L	1	A	10/4/2018
TRACE METALS			**EPA 200.8**					Analyst: **BMG**
Arsenic	0.0258		0.00000825	0.0005	mg/L	1	A	10/3/2018
Copper	0.00023	J	0.0000251	0.0005	mg/L	1	A	10/3/2018
Lead	0.000021	J	0.00000508	0.0001	mg/L	1	A	10/3/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-04A**
Collection Date: **9/28/2018 12:00:00 PM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRACE METALS			**EPA 200.8**					Analyst: **BMG**
Manganese	0.126		0.0000195	0.002	mg/L	1	A	10/3/2018
Zinc	0.0014	J	0.000486	0.005	mg/L	1	A	10/3/2018
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	158		5.00	5	mg/L	1	A	10/3/2018
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	10.0		3.00	3	mg/L	1	A	10/4/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	143	HT	0.100	0.1	NTU	1		10/2/2018 5:15:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corporation
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Grab Sample 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1810068**
NRC Sample ID **1810068-04B**
Collection Date: **9/28/2018 12:00:00 PM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/10/2018 2:48:31 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	4.20	HT	0.0490	0.1	mg/L	1	A	10/4/2018 2:59:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

DATA FLAGS

B	Analyte detected in the associated method blank.
BA	BOD Alternative Calculation: The initial results performed by Standard Methods did not fall within parameters of the Standard Methods calculation. An alternate approved calculation was performed using the HACH method and the value reported is an estimated concentration.
C	Sample(s) does not meet NELAP/ORELAP sample acceptance criteria. See Case Narrative.
C1	Sample(s) does not meet NELAP/ORELAP sample acceptance criteria for temperature.
CF	Results confirmed by re-analysis.
CU	Cleanup performed as specified by method.
D1	The diesel elution pattern for the sample is not typical.
D2	The sample appears to be a heavier hydrocarbon range than diesel.
D3	The sample appears to be a lighter hydrocarbon range than diesel.
D4	Detected hydrocarbons do not have pattern and range consistent with typical petroleum products and may be due to biogenic interference.
D5	Detected hydrocarbons in the diesel range appear to be weathered diesel.
E	Estimated value.
ER	Elevated reporting limit due to matrix. Report limits (MDLs, MRLs & PQLs) are adjusted based on variations in sample preparation amounts, analytical dilutions, and percent solids, where applicable.
FC	Fecal Coliforms: Sample(s) received past 40 CFR Part 136 specified holding time. Results reported as estimated values.
G1	The gasoline elution pattern for the sample is not typical.
G2	The sample appears to be a heavier hydrocarbon range than gasoline.
G3	The sample appears to be a lighter hydrocarbon range than gasoline.
G4	Detected hydrocarbons in the gasoline range appear to be weathered gasoline.
HP	Sample re-analysis performed outside of method specified holding time.
HR	Sample received outside of method specified holding time.
HS	Sample analyzed for volatile organics contained headspace.
HT	At the client's request, the sample was analyzed outside of method specified holding time.
H	Analysis performed outside of method specified holding time.
J	Analyte detected below the Minimum Reporting Limit (MRL) and above the Method Detection Limit (MDL). The J flag result is an estimated value and the user should be aware that this data is of limited reliability.
L	Dissolved metals were not filtered within 15 minutes of collection per 40 CFR Part 136.
MI	Surrogate or Matrix Spike recovery is out of control limits due to matrix interference. Sample results may be biased.
N	See Case Narrative on page 2 of report.
Q	Closing continuing calibration verification (CCV) or laboratory control sample (LCS) exceeded high recovery limits, but associated samples are non-detect and the sample results are not affected. Data meets EPA/NELAP requirements.
R	Relative percent difference (RPD) is outside of the accepted recovery limits.
R1	Relative percent difference (RPD) is outside of the accepted recovery limits. However, analyses are not controlled on RPD values for sample concentrations that are less than the reporting limit.
R3	The relative percent difference (RPD) and/or percent recovery for the duplicate (DUP) or matrix spike (MS)/matrix spike duplicate (MSD) cannot be accurately calculated due to the concentration of analyte already present in the sample.
R4	Duplicate analysis failed due to result being at or near method reporting limit.
S	Surrogate and/or matrix spike recovery is outside of the accepted recovery limits. Sample results may be biased.
S1	Surrogate or matrix spike recovery is outside of control limits due to dilution necessary for analysis.
SC	Sub-contracted to another laboratory for analysis.
SP	Sample(s) were not collected per EPA Method 5035A protocols. The results are considered minimum values.
T	Toxicity Characteristic Leaching Procedure – Sample submitted contained < 0.5% solids. If the waste contains <0.5% dry solids, the liquid portion of the waste, after filtration, is defined as the TCLP extract.
#	Value exceeds regulatory level for TCLP contaminant.
X1	The motor oil elution pattern for the sample is not typical.
X2	The sample appears to be a heavier hydrocarbon range than motor oil.
X3	The sample appears to be a lighter hydrocarbon range than motor oil.
*	Value exceeds Maximum Contaminant Level or is outside the acceptable range.

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ALKALINITY_W

Sample ID **MB-R107063**	SampType: **MBLK**	TestCode: **ALKALINITY_**	Units: **mg/L**	Prep Date:	RunNo: **107063**
Client ID: **ZZZZZ**	Batch ID: **R107063**	TestNo: **SM 2320B**		Analysis Date: **10/4/2018**	SeqNo: **1630604**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	10.0									

Sample ID **LCS-R107063**	SampType: **LCS**	TestCode: **ALKALINITY_**	Units: **mg/L**	Prep Date:	RunNo: **107063**
Client ID: **ZZZZZ**	Batch ID: **R107063**	TestNo: **SM 2320B**		Analysis Date: **10/4/2018**	SeqNo: **1630605**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	44.00	10.0	50	0	88.0	80	120				

Sample ID **1809A06-01ADUP**	SampType: **DUP**	TestCode: **ALKALINITY_**	Units: **mg/L**	Prep Date:	RunNo: **107063**
Client ID: **ZZZZZ**	Batch ID: **R107063**	TestNo: **SM 2320B**		Analysis Date: **10/4/2018**	SeqNo: **1630607**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	35.00	10.0						35	0	10	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: AMMONIA_AUTO_W

Sample ID	**MB-42555**	SampType:	**MBLK**	TestCode:	**AMMONIA_A**	Units:	**mg/L**	Prep Date:	**10/3/2018**	RunNo:	**107073**
Client ID:	**ZZZZZ**	Batch ID:	**42555**	TestNo:	**EPA 350.1**		**(EPA 350.1)**	Analysis Date:	**10/4/2018**	SeqNo:	**1630769**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	ND	0.150									

Sample ID	**LCS-42555**	SampType:	**LCS**	TestCode:	**AMMONIA_A**	Units:	**mg/L**	Prep Date:	**10/3/2018**	RunNo:	**107073**
Client ID:	**ZZZZZ**	Batch ID:	**42555**	TestNo:	**EPA 350.1**		**(EPA 350.1)**	Analysis Date:	**10/4/2018**	SeqNo:	**1630768**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.595	0.150	1.645	0	97.0	90	110				

Sample ID	**1809B95-02AMS**	SampType:	**MS**	TestCode:	**AMMONIA_A**	Units:	**mg/L**	Prep Date:	**10/3/2018**	RunNo:	**107073**
Client ID:	**ZZZZZ**	Batch ID:	**42555**	TestNo:	**EPA 350.1**		**(EPA 350.1)**	Analysis Date:	**10/4/2018**	SeqNo:	**1630755**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.737	0.150	1.645	0.283	88.4	80	120				

Sample ID	**1809B95-02AMSD**	SampType:	**MSD**	TestCode:	**AMMONIA_A**	Units:	**mg/L**	Prep Date:	**10/3/2018**	RunNo:	**107073**
Client ID:	**ZZZZZ**	Batch ID:	**42555**	TestNo:	**EPA 350.1**		**(EPA 350.1)**	Analysis Date:	**10/4/2018**	SeqNo:	**1630756**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.702	0.150	1.645	0.283	86.3	80	120	1.737	2.04	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: BOD-5DAY

Sample ID **MB-42562**	SampType: **MBLK**	TestCode: **BOD-5DAY**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107128**
Client ID: **ZZZZZ**	Batch ID: **42562**	TestNo: **SM 5210 B**	**(SM 5210 B)**	Analysis Date: **10/2/2018**	SeqNo: **1631759**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	ND	2.00									

Sample ID **LCS-42562**	SampType: **LCS**	TestCode: **BOD-5DAY**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107128**
Client ID: **ZZZZZ**	Batch ID: **42562**	TestNo: **SM 5210 B**	**(SM 5210 B)**	Analysis Date: **10/2/2018**	SeqNo: **1631760**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	187.0	2.00	198	0	94.4	85	115				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: DOC_W

Sample ID **MBLK (DOC)**	SampType: **MBLK**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **107102**
Client ID: **ZZZZZ**	Batch ID: **R107102**	TestNo: **SM5310C**		Analysis Date: **10/4/2018**	SeqNo: **1631355**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	0.05730	0.100									J

Sample ID **LCS (DOC)**	SampType: **LCS**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **107102**
Client ID: **ZZZZZ**	Batch ID: **R107102**	TestNo: **SM5310C**		Analysis Date: **10/4/2018**	SeqNo: **1631354**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	0.9636	0.100	1	0.0573	90.6	85	115				

Sample ID **1810068-01BMS**	SampType: **MS**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **107102**
Client ID: **Grab Sample 1**	Batch ID: **R107102**	TestNo: **SM5310C**		Analysis Date: **10/4/2018**	SeqNo: **1631357**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	6.626	0.100	2.5	4.164	98.5	80	120				HT

Sample ID **1810068-02BDUP**	SampType: **DUP**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **107102**
Client ID: **Grab Sample 2**	Batch ID: **R107102**	TestNo: **SM5310C**		Analysis Date: **10/4/2018**	SeqNo: **1631359**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	4.115	0.100						4.07	1.10	25	HT

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA300_W

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107052**
Client ID: **ZZZZZ**	Batch ID: **R107052**	TestNo: **EPA 300.0**		Analysis Date: **10/2/2018**	SeqNo: **1630330**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	1.00									
Fluoride	ND	0.200									
Nitrate Nitrogen	ND	0.200									
Sulfate	ND	0.500									

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107052**
Client ID: **ZZZZZ**	Batch ID: **R107052**	TestNo: **EPA 300.0**		Analysis Date: **10/2/2018**	SeqNo: **1630329**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	5.753	1.00	6	0	95.9	90	110				
Fluoride	1.042	0.200	1	0	104	90	110				
Nitrate Nitrogen	1.004	0.200	1	0	100	90	110				
Sulfate	5.979	0.500	6	0	99.6	90	110				

Sample ID **1810073-02AMS**	SampType: **MS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107052**
Client ID: **ZZZZZ**	Batch ID: **R107052**	TestNo: **EPA 300.0**		Analysis Date: **10/5/2018**	SeqNo: **1632013**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	30160	2000	12000	17910	102	80	120				
Sulfate	14580	1000	12000	3182	95.0	80	120				

Sample ID **1810073-02AMS**	SampType: **MS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107052**
Client ID: **ZZZZZ**	Batch ID: **R107052**	TestNo: **EPA 300.0**		Analysis Date: **10/4/2018**	SeqNo: **1632548**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	10.79	2.00	10	1.81	89.8	80	120				
Nitrate Nitrogen	10.71	2.00	10	1.049	96.6	80	120				HT

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA300_W

Sample ID **1810073-02AMSD** SampType: **MSD** TestCode: **EPA300_W** Units: **mg/L** Prep Date: RunNo: **107052**
Client ID: **ZZZZZ** Batch ID: **R107052** TestNo: **EPA 300.0** Analysis Date: **10/5/2018** SeqNo: **1632014**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	30170	2000	12000	17910	102	80	120	30160	0.00717	15	
Sulfate	14580	1000	12000	3182	94.9	80	120	14580	0.0335	15	

Sample ID **1810073-02AMSD** SampType: **MSD** TestCode: **EPA300_W** Units: **mg/L** Prep Date: RunNo: **107052**
Client ID: **ZZZZZ** Batch ID: **R107052** TestNo: **EPA 300.0** Analysis Date: **10/4/2018** SeqNo: **1632549**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	10.66	2.00	10	1.81	88.5	80	120	10.79	1.25	15	
Nitrate Nitrogen	10.46	2.00	10	1.049	94.2	80	120	10.71	2.31	15	HT

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP-HARD_W

Sample ID **MB-42554**	SampType: **MBLK**	TestCode: **ICP-HARD_W**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107207**
Client ID: **ZZZZZ**	Batch ID: **42554**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **10/4/2018**	SeqNo: **1632902**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	ND	6.62									

Sample ID **LCS-42554**	SampType: **LCS**	TestCode: **ICP-HARD_W**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107207**
Client ID: **ZZZZZ**	Batch ID: **42554**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **10/4/2018**	SeqNo: **1632903**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	6.593	6.62	6.615	0	99.7	85	115				J

Sample ID **1810073-04AMS**	SampType: **MS**	TestCode: **ICP-HARD_W**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107207**
Client ID: **ZZZZZ**	Batch ID: **42554**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **10/4/2018**	SeqNo: **1632911**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	6630	331	138	6068	407	70	130				MI

Sample ID **1810073-04AMSD**	SampType: **MSD**	TestCode: **ICP-HARD_W**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107207**
Client ID: **ZZZZZ**	Batch ID: **42554**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **10/4/2018**	SeqNo: **1632912**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	6045	331	138	6068	-16.4	70	130	6630	9.23	20	MI

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_200.7_W

Sample ID **MB-42554** SampType: **MBLK** TestCode: **ICP_200.7_W** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107100**
Client ID: **ZZZZZ** Batch ID: **42554** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **10/4/2018** SeqNo: **1631302**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	ND	1.00									
Iron	ND	0.0150									
Magnesium	ND	1.00									
Potassium	ND	1.00									
Sodium	ND	1.00									

Sample ID **LCS-42554** SampType: **LCS** TestCode: **ICP_200.7_W** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107100**
Client ID: **ZZZZZ** Batch ID: **42554** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **10/4/2018** SeqNo: **1631303**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	0.9911	1.00	1	0	99.1	85	115				J
Iron	1.032	0.0150	1	0	103	85	115				
Magnesium	1.000	1.00	1	0	100	85	115				
Potassium	0.9502	1.00	1	0	95.0	85	115				J
Sodium	1.869	1.00	2	0	93.5	85	115				

Sample ID **1810073-04AMS** SampType: **MS** TestCode: **ICP_200.7_W** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107100**
Client ID: **ZZZZZ** Batch ID: **42554** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **10/4/2018** SeqNo: **1631314**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	436.2	50.0	21	387.5	232	70	130				S1
Iron	22.61	0.750	21	0	108	70	130				
Magnesium	1346	50.0	21	1238	510	70	130				S1
Potassium	540.5	50.0	21	476	307	70	130				S1
Sodium	10290	50.0	22	9550	3360	70	130				S1 E

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_200.7_W

Sample ID **1810073-04AMSD** SampType: **MSD** TestCode: **ICP_200.7_W** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107100**
Client ID: **ZZZZZ** Batch ID: **42554** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **10/4/2018** SeqNo: **1631315**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	398.2	50.0	21	387.5	51.0	70	130	436.2	9.11	20	S1
Iron	20.38	0.750	21	0	97.0	70	130	22.61	10.4	20	
Magnesium	1226	50.0	21	1238	-57.1	70	130	1346	9.25	20	S1
Potassium	486.2	50.0	21	476	48.6	70	130	540.5	10.6	20	S1
Sodium	9390	50.0	22	9550	-727	70	130	10290	9.15	20	S1 E

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_200.8_W

Sample ID **MB-42557** SampType: **MBLK** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107071**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/3/2018** SeqNo: **1630737**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.0001230	0.000500									J
Copper	ND	0.000500									
Lead	ND	0.000100									
Manganese	ND	0.00200									
Zinc	0.0009920	0.00500									J

Sample ID **LCS-42557** SampType: **LCS** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107071**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/3/2018** SeqNo: **1630738**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1056	0.000500	0.1	0.000123	105	85	115				
Copper	0.1082	0.000500	0.1	0	108	85	115				
Lead	0.1055	0.000100	0.1	0	106	85	115				
Manganese	0.1072	0.00200	0.1	0	107	85	115				
Zinc	0.1047	0.00500	0.1	0.000992	104	85	115				

Sample ID **1810099-01BMS** SampType: **MS** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107071**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/3/2018** SeqNo: **1630744**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1028	0.000500	0.1	0.000606	102	70	130				
Copper	0.2383	0.000500	0.1	0.1458	92.6	70	130				
Lead	0.1091	0.000100	0.1	0.00493	104	70	130				
Manganese	0.1079	0.00200	0.1	0.004701	103	70	130				

Sample ID **1810099-01BMS** SampType: **MS** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107107**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/4/2018** SeqNo: **1631476**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_200.8_W

Sample ID **1810099-01BMS**	SampType: **MS**	TestCode: **ICPMS_200.8**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107107**
Client ID: **ZZZZZ**	Batch ID: **42557**	TestNo: **EPA 200.8**	**(EPA 200.8)**	Analysis Date: **10/4/2018**	SeqNo: **1631476**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Zinc	13.61	0.100	0.1	13.6	12.2	70	130				MI

Sample ID **1810099-01BMSD**	SampType: **MSD**	TestCode: **ICPMS_200.8**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107071**
Client ID: **ZZZZZ**	Batch ID: **42557**	TestNo: **EPA 200.8**	**(EPA 200.8)**	Analysis Date: **10/3/2018**	SeqNo: **1630745**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1032	0.000500	0.1	0.000606	103	70	130	0.1028	0.393	20	
Copper	0.2397	0.000500	0.1	0.1458	93.9	70	130	0.2383	0.562	20	
Lead	0.1086	0.000100	0.1	0.00493	104	70	130	0.1091	0.498	20	
Manganese	0.1083	0.00200	0.1	0.004701	104	70	130	0.1079	0.329	20	

Sample ID **1810099-01BMSD**	SampType: **MSD**	TestCode: **ICPMS_200.8**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107107**
Client ID: **ZZZZZ**	Batch ID: **42557**	TestNo: **EPA 200.8**	**(EPA 200.8)**	Analysis Date: **10/4/2018**	SeqNo: **1631477**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Zinc	13.41	0.100	0.1	13.6	-185	70	130	13.61	1.46	20	MI

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: SOLIDS_TDS_W

Sample ID **MB-42565**	SampType: **MBLK**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107120**
Client ID: **ZZZZZ**	Batch ID: **42565**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **10/3/2018**	SeqNo: **1631695**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	5.00									

Sample ID **LCS-42565**	SampType: **LCS**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107120**
Client ID: **ZZZZZ**	Batch ID: **42565**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **10/3/2018**	SeqNo: **1631696**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	107.5	5.00	100	0	108	80	120				

Sample ID **1810068-04ADUP**	SampType: **DUP**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107120**
Client ID: **Grab Sample 4**	Batch ID: **42565**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **10/3/2018**	SeqNo: **1631701**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	157.5	5.00						157.5	0	5	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: SOLIDS_TSS_W

Sample ID **MB-42572** SampType: **MBLK** TestCode: **SOLIDS_TSS** Units: **mg/L** Prep Date: **10/4/2018** RunNo: **107101**
Client ID: **ZZZZZ** Batch ID: **42572** TestNo: **SM 2540D (Solids)** Analysis Date: **10/4/2018** SeqNo: **1631318**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	ND	1.00									

Sample ID **LCS-42572** SampType: **LCS** TestCode: **SOLIDS_TSS** Units: **mg/L** Prep Date: **10/4/2018** RunNo: **107101**
Client ID: **ZZZZZ** Batch ID: **42572** TestNo: **SM 2540D (Solids)** Analysis Date: **10/4/2018** SeqNo: **1631319**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	980.0	40.0	1000	0	98.0	80	120				

Sample ID **1810073-04ADUP** SampType: **DUP** TestCode: **SOLIDS_TSS** Units: **mg/L** Prep Date: **10/4/2018** RunNo: **107101**
Client ID: **ZZZZZ** Batch ID: **42572** TestNo: **SM 2540D (Solids)** Analysis Date: **10/4/2018** SeqNo: **1631331**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	8.670	3.00						16	59.4	5	MI

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corporation
Work Order: 1810068
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: TURBIDITY_W

Sample ID	**MB-R107024**	SampType:	**MBLK**	TestCode:	**TURBIDITY_**	Units:	**NTU**	Prep Date:		RunNo:	**107024**
Client ID:	**ZZZZZ**	Batch ID:	**R107024**	TestNo:	**SM 2130B**			Analysis Date:	**10/2/2018**	SeqNo:	**1629961**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	ND	0.100									

Sample ID	**LCS-R107024**	SampType:	**LCS**	TestCode:	**TURBIDITY_**	Units:	**NTU**	Prep Date:		RunNo:	**107024**
Client ID:	**ZZZZZ**	Batch ID:	**R107024**	TestNo:	**SM 2130B**			Analysis Date:	**10/2/2018**	SeqNo:	**1629962**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	2.170	0.100	2.31	0	93.9	90	110				

Sample ID	**1810068-01ADUP**	SampType:	**DUP**	TestCode:	**TURBIDITY_**	Units:	**NTU**	Prep Date:		RunNo:	**107024**
Client ID:	**Grab Sample 1**	Batch ID:	**R107024**	TestNo:	**SM 2130B**			Analysis Date:	**10/2/2018**	SeqNo:	**1629964**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	136.0	0.100						134	1.48	10	HT

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory
245 South Grape Street * Medford, OR 97501
(541) 770-5678 fax (541) 770-2901

Chain of Custody Record

This Chain of Custody is a LEGAL DOCUMENT and must be filled out accurately.

Page 1 of 1

RUSH

Section A
Required Client Information

Company: SLR International Corporation
Address: 1800 Blankenship Road, Suite 440
West Linn, OR 97068
Email: tweber@slr consulting.com, cbrov@slrconsulting.com
Phone: 503-723-4423 Fax:
Collected By (Print): Tyler Weber
Collected By (Sign): [signature]
Email Report X Yes ___ No Mail Report X Yes ___ No
Fax Report ___ Yes X No

Section B
Required Project Information

Project Name: Jordan Cove
Project Number: 108.01593.00005
Report To: Chris brow, cbrov@slrconsulting.com
Copy To: shammer@slrconsulting.com
tweber@slrconsulting.com

Section C
Invoice Information

Attention: Accounts Payable
Company Name: SLR International
Address: 22118 20th Ave, Suite 6202
Bothell, WA 98021
P.O.# 108.01593.00005
task 0504

Section D
Rush Status (Subject to Scheduling)

___ Standard 10-14 Days
___ 5 Business Days (50% surcharge)
___ 3 Business Days (75% surcharge)
___ 24 - 48 hours (100% surcharge)
X Other ASAP
Authorized ___ Yes ___ No

Section E
Sample Information

NRC Workorder # (Lab Use Only) 1810068

Sample ID	Comp/Grab	Matrix*	Date Collected	Time Collected	No. of Containers	BOD, TSS, TDS	DOC	Turbidity, Alk, Ammonia-N	Nitrate, Sulfate	Chloride, Sodium	Fluoride,	As, Ca, Cu, Fe, Pb, Mg, Mn, K, Zn	Hardness	Added 10/9/18 TD		Remarks/Field Data	NRC Sample # (Lab Use Only)
Grab Sample 1	Grab	W	9/27/18	1430	5	X	X	X	X	X	X	X	X				01A-B
Grab Sample 2	Grab	W	9/27/18	1920	5	X	X	X	X	X	X	X	X				02A-B
Grab Sample 3	Grab	W	9/28/18	815	5	X	X	X	X	X	X	X	X				03A-B
Grab Sample 4	Grab	W	9/28/18	1200	5	X	X	X	X	X	X	X	X				04A-B

*Matrix: DW - Drinking Water WW - Wastewater W - Water S - Soil/Solid SL - Sludge O - Oil WP - Wipe OT - Other

Section F
Relinquish/Receive

	Sign	Print	Date	Time
Relinquished By:	[signature]	Tyler Weber	10/1/2018	1200
Received By:				
Relinquished By:				
Received By:				
Relinquished By:				
Received By Laboratory:	[signature]	Jordan Merrill	10-2-18	1015

Section G
Lab Use Only

Temp: 2.9°C
4°C +/- 2°C: X Yes ___ No
Received on Ice: X Yes ___ No
Number of Bottles Received: 20
pH Checked:
COC Seals Intact: ___ Yes ___ No ___ NA
Field Blank Included: ___ Yes ___ No
Received Via ___ UPS X FedEX ___ Other ___ Hand
Payment: X Invoice ___ Cash ___ VISA, M/C ___ Check # _____ Amount _____

Appendix C

Laboratory Analytical Reports – Raw Groundwater and CBNBWB Potable Water, November 2018

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory

12/10/2018

Chris Brow
SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068

TEL: (503) 723-4423
FAX

RE: 108.01593.00005 Jordan Cove-AMENDED

Order No.: 1811421

Dear Chris Brow:

Neilson Research Corporation received 7 sample(s) on 11/13/2018 for the analyses presented in the following report.

The results relate only to the parameters tested or to the sample as received by the laboratory. This report shall not be reproduced except in full, without the written approval of Neilson Research Corporation. If you have any questions regarding these test results, please feel free to call.

Sincerely,
Neilson Research Corporation

Tamra Schmedemann

Tamra R. Schmedemann
Project Manager

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

CLIENT: SLR International Corp
Project: 108.01593.00005 Jordan Cove-AMENDED
Lab Order: 1811421

Date: 10-Dec-18

CASE NARRATIVE

The analyses were performed according to the guidelines in the Neilson Research Corporation Quality Assurance Program. This report contains analytical results for the sample(s) as received by the laboratory.

Neilson Research Corporation certifies that this report is in compliance with the requirements of NELAP. No unusual difficulties were experienced during analysis of this batch except as noted below or qualified with data flags on the reports.

Analytical Comments for EPA 200.8 Dissolved Metals, SAMPLE 1811421-01 through 1811421-06: Some of the dissolved metals are greater than the total metals due to the low levels present in the sample. Most of the dissolved and total metals are "J" flagged. The "J" flag is an estimated value that shows the analyte is present but the result is not accurate.

Added Calcium and Magnesium per client request on 12/10/18. TK/NRC

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01A**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	120		50.0	50	mg/L	5	A	11/19/2018
ANIONS			**EPA 300.0**					Analyst: **EAT**
Chloride	18.2		0.148	2	mg/L	2	A	11/14/2018 10:3
Fluoride	0.079	J	0.00767	0.2	mg/L	1	A	11/14/2018 12:1
Sulfate	ND		0.0623	0.5	mg/L	1	A	11/14/2018 12:1
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	180		5.00	5	mg/L	1	A	11/15/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	145		0.100	0.1	NTU	1	A	11/13/2018 5:2(

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01B**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
BOD, 5 DAY			**SM 5210 B**					Analyst: **MJN**
Biochemical Oxygen Demand	3.14		2.00	2	mg/L	1	A	11/13/2018 5:12
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	11.7		7.00	7	mg/L	1	A	11/15/2016

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01C**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.36	J	0.105	0.5	mg/L	1	A	11/21/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrogen, Nitrate-Nitrite	ND		0.0118	0.05	mg/L	1	A	11/19/2018
TOTAL PHOSPHORUS AS P			**SM 4500-P E**					Analyst: **EAT**
Phosphorus, Total (As P)	0.175		0.00600	0.025	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01D**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
CYANIDE, TOTAL			**EPA 335.4**					Analyst: **SJK**
Cyanide	2.7	J	2.28	3	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01E**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	4.07		0.0490	0.2	mg/L	1	A	11/17/2018 7:27

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01F**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
4,4´-DDD	ND		0.00307	0.01	µg/L	1	A	11/21/2018
4,4´-DDE	ND		0.00361	0.01	µg/L	1	A	11/21/2018
4,4´-DDT	ND		0.00365	0.01	µg/L	1	A	11/21/2018
Aldrin	ND		0.00377	0.01	µg/L	1	A	11/21/2018
alpha-BHC	ND		0.00301	0.01	µg/L	1	A	11/21/2018
Aroclor 1016	ND		0.0147	0.25	µg/L	1	A	11/21/2018
Aroclor 1221	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1232	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1242	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1248	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1254	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1260	ND		0.0219	0.25	µg/L	1	A	11/21/2018
beta-BHC	ND		0.00314	0.01	µg/L	1	A	11/21/2018
Chlordane	ND		0.0190	0.1	µg/L	1	A	11/21/2018
delta-BHC	ND		0.00297	0.01	µg/L	1	A	11/21/2018
Dieldrin	ND		0.00309	0.01	µg/L	1	A	11/21/2018
Endosulfan I	ND		0.00320	0.01	µg/L	1	A	11/21/2018
Endosulfan II	ND		0.00365	0.01	µg/L	1	A	11/21/2018
Endosulfan sulfate	ND		0.00367	0.01	µg/L	1	A	11/21/2018
Endrin	ND		0.00346	0.01	µg/L	1	A	11/21/2018
Endrin aldehyde	ND		0.00382	0.01	µg/L	1	A	11/21/2018
Endrin ketone	ND		0.00304	0.02	µg/L	1	A	11/21/2018
gamma-BHC (Lindane)	ND		0.00316	0.01	µg/L	1	A	11/21/2018
Heptachlor	ND		0.00357	0.01	µg/L	1	A	11/21/2018
Heptachlor epoxide	ND		0.00334	0.01	µg/L	1	A	11/21/2018
Methoxychlor	ND		0.00428	0.01	µg/L	1	A	11/21/2018
Toxaphene	ND		0.0680	0.5	µg/L	1	A	11/21/2018
Total Polychlorinated Biphenyls	ND		0.0147	0.25	µg/L	1	A	11/21/2018
Surr: Decachlorobiphenyl	80.9		0.0775	0	%REC	1		11/21/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01G**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
1,2,4,5-Tetrachlorobenzene	ND		0.0593	1	µg/L	1	A	12/5/2018
1,2,4-Trichlorobenzene	ND		0.242	1	µg/L	1	A	12/5/2018
1,2-Diphenylhydrazine as Azobenzene	ND		0.216	2	µg/L	1		12/5/2018
2,4,5-Trichlorophenol	ND		0.0877	1	µg/L	1	A	12/5/2018
2,4,6-Trichlorophenol	ND		0.259	1	µg/L	1	A	12/5/2018
2,4-Dichlorophenol	ND		0.206	1	µg/L	1	A	12/5/2018
2,4-Dimethylphenol	ND		0.169	2	µg/L	1	A	12/5/2018
2,4-Dinitrophenol	ND		1.28	5	µg/L	1	A	12/5/2018
2,4-Dinitrotoluene	ND		0.398	1	µg/L	1	A	12/5/2018
2,6-Dinitrotoluene	ND		0.201	1	µg/L	1	A	12/5/2018
2-Chloronaphthalene	ND		0.213	1	µg/L	1	A	12/5/2018
2-Chlorophenol	ND		0.0664	1	µg/L	1	A	12/5/2018
2-Methylphenol (Cresol)	ND		0.0513	1	µg/L	1	A	12/5/2018
2-Nitrophenol	ND		0.0799	2	µg/L	1	A	12/5/2018
3+4-Methylphenol (m,p Cresol)	ND		0.0349	1	µg/L	1	A	12/5/2018
3,3´-Dichlorobenzidine	ND		1.02	1	µg/L	1	A	12/5/2018
4,6-Dinitro-2-methylphenol	ND		0.337	2	µg/L	1	A	12/5/2018
4-Bromophenyl phenyl ether	ND		0.240	1	µg/L	1	A	12/5/2018
4-Chloro-3-methylphenol	ND		0.222	1	µg/L	1	A	12/5/2018
4-Chlorophenyl phenyl ether	ND		0.205	1	µg/L	1	A	12/5/2018
4-Nitrophenol	ND		0.458	5	µg/L	1	A	12/5/2018
Acenaphthene	ND		0.230	1	µg/L	1	A	12/5/2018
Acenaphthylene	ND		0.232	1	µg/L	1	A	12/5/2018
Anthracene	ND		0.250	1	µg/L	1	A	12/5/2018
Benzidine	ND		1.90	10	µg/L	1	A	12/5/2018
Benzo(a)anthracene	ND		0.239	0.5	µg/L	1	A	12/5/2018
Benzo(a)pyrene	ND		0.0494	0.5	µg/L	1	A	12/5/2018
Benzo(b)fluoranthene	ND		0.223	0.5	µg/L	1	A	12/5/2018
Benzo(g,h,i)perylene	ND		0.350	1	µg/L	1	A	12/5/2018
Benzo(k)fluoranthene	ND		0.313	0.5	µg/L	1	A	12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01G**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Bis(2-chloroethoxy)methane	ND		0.273	2	µg/L	1	A	12/5/2018
Bis(2-chloroethyl)ether	ND		0.200	1	µg/L	1	A	12/5/2018
Bis(2-chloroisopropyl)ether	ND		0.227	2	µg/L	1	A	12/5/2018
Bis(2-ethylhexyl)phthalate	ND		0.430	1	µg/L	1	A	12/5/2018
Butyl benzyl phthalate	ND		0.330	1	µg/L	1	A	12/5/2018
Chrysene	ND		0.244	0.5	µg/L	1	A	12/5/2018
Di-n-butyl phthalate	ND		0.533	1	µg/L	1	A	12/5/2018
Di-n-octyl phthalate	ND		0.258	1	µg/L	1	A	12/5/2018
Dibenz(a,h)anthracene	ND		0.343	0.5	µg/L	1	A	12/5/2018
Diethyl phthalate	ND		0.228	1	µg/L	1	A	12/5/2018
Dimethyl phthalate	ND		0.231	1	µg/L	1	A	12/5/2018
Fluoranthene	ND		0.277	2	µg/L	1	A	12/5/2018
Fluorene	ND		0.204	1	µg/L	1	A	12/5/2018
Hexachlorobenzene	ND		0.338	1	µg/L	1	A	12/5/2018
Hexachlorobutadiene	ND		0.207	2	µg/L	1	A	12/5/2018
Hexachlorocyclopentadiene	ND		0.222	2	µg/L	1	A	12/5/2018
Hexachloroethane	ND		0.234	1	µg/L	1	A	12/5/2018
Indeno(1,2,3-cd)pyrene	ND		0.293	0.5	µg/L	1	A	12/5/2018
Isophorone	ND		0.249	1	µg/L	1	A	12/5/2018
N-Nitrosodi-n-propylamine	ND		0.237	2	µg/L	1	A	12/5/2018
N-Nitrosodimethylamine	ND		0.0168	1	µg/L	1	A	12/5/2018
N-Nitrosodiphenylamine	ND		0.239	1	µg/L	1	A	12/5/2018
Naphthalene	ND		0.209	1	µg/L	1	A	12/5/2018
Nitrobenzene	ND		0.238	1	µg/L	1	A	12/5/2018
Pentachlorobenzene	ND		0.0526	1	µg/L	1	A	12/5/2018
Pentachlorophenol	ND		0.390	1	µg/L	1	A	12/5/2018
Phenanthrene	ND		0.222	1	µg/L	1	A	12/5/2018
Phenol	ND		0.0237	1	µg/L	1	A	12/5/2018
Pyrene	ND		0.264	1	µg/L	1	A	12/5/2018
Surr: 2,4,6-Tribromophenol	73.5		0	0	%REC	1		12/5/2018
Surr: 2-Fluorobiphenyl	57.8		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01G**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Surr: 2-Fluorophenol	30.8		0	0	%REC	1		12/5/2018
Surr: 4-Terphenyl-d14	80.4		0	0	%REC	1		12/5/2018
Surr: Nitrobenzene-d5	64.4		0	0	%REC	1		12/5/2018
Surr: Phenol-d6	20.9		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01H**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Acrolein	ND	Q	0.489	5	µg/L	1	A	11/13/2018
Acrylonitrile	ND		0.687	5	µg/L	1	A	11/13/2018
Benzene	ND		0.264	0.5	µg/L	1	A	11/13/2018
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	11/13/2018
Bromomethane	ND		0.191	0.5	µg/L	1	A	11/13/2018
Bromoform	ND		0.274	0.5	µg/L	1	A	11/13/2018
1,2-Dichlorobenzene	ND		0.312	0.5	µg/L	1	A	11/13/2018
1,3-Dichlorobenzene	ND		0.307	0.5	µg/L	1	A	11/13/2018
1,4-Dichlorobenzene	ND		0.306	0.5	µg/L	1	A	11/13/2018
Chlorobenzene	ND		0.330	0.5	µg/L	1	A	11/13/2018
Carbon tetrachloride	ND		0.261	0.5	µg/L	1	A	11/13/2018
Chloroethane	ND		0.305	0.5	µg/L	1	A	11/13/2018
Chloromethane	ND		0.340	0.5	µg/L	1	A	11/13/2018
2-Chloroethyl vinyl ether	ND		0.610	5	µg/L	1	A	11/13/2018
Chloroform	ND		0.259	0.5	µg/L	1	A	11/13/2018
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	11/13/2018
Dichlorodifluoromethane	ND	Q	0.171	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,2-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethene	ND		0.160	0.5	µg/L	1	A	11/13/2018
1,2-Dichloropropane	ND		0.288	0.5	µg/L	1	A	11/13/2018
trans-1,2-Dichloroethylene	ND		0.257	0.5	µg/L	1	A	11/13/2018
cis-1,3-Dichloropropene	ND		0.224	0.5	µg/L	1	A	11/13/2018
trans-1,3-Dichloropropene	ND		0.296	0.5	µg/L	1	A	11/13/2018
Ethylbenzene	ND		0.282	0.5	µg/L	1	A	11/13/2018
Methylene chloride	ND		0.206	0.5	µg/L	1	A	11/13/2018
1,1,2,2-Tetrachloroethane	ND		0.382	0.5	µg/L	1	A	11/13/2018
Tetrachloroethene	ND		0.275	0.5	µg/L	1	A	11/13/2018
Toluene	ND		0.295	0.5	µg/L	1	A	11/13/2018
1,2,4-Trichlorobenzene	ND		0.320	0.5	µg/L	1	A	11/13/2018
1,1,1-Trichloroethane	ND		0.107	0.5	µg/L	1	A	11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01H**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
1,1,2-Trichloroethane	ND		0.315	0.5	µg/L	1	A	11/13/2018
Trichloroethene	ND		0.256	0.5	µg/L	1	A	11/13/2018
Trichlorofluoromethane	ND		0.105	0.5	µg/L	1	A	11/13/2018
Vinyl chloride	ND		0.154	0.5	µg/L	1	A	11/13/2018
Xylenes, Total	ND		0.148	1.5	µg/L	1	A	11/13/2018
Surr: Dibromofluoromethane	96.9		0	0	%REC	1		11/13/2018
Surr: Toluene-d8	97.7		0	0	%REC	1		11/13/2018
Surr: 4-Bromofluorobenzene	102		0	0	%REC	1		11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01I**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Dissolved Chromium, Trivalent (III)	0.15	L NJ	0.0357	0.4	µg/L	1		11/21/2018
DISSOLVED HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Dissolved Chromium, Hexavalent	ND	HR L	0.00330	0.02	µg/L	1	A	11/15/2018
HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Chromium, Hexavalent	ND	HR	0.00830	0.02	µg/L	1	A	11/15/2018
DISSOLVED TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Cadmium	0.013	L NJ	0.00168	0.1	µg/L	1	A	11/19/2018
Copper	0.13	L J	0.0251	0.5	µg/L	1	A	11/19/2018
Lead	0.032	L NJ	0.00508	0.1	µg/L	1	A	11/19/2018
Nickel	0.33	L J	0.0161	0.5	µg/L	1	A	11/19/2018
Selenium	0.12	L NJ	0.0466	0.5	µg/L	1	A	11/19/2018
Silver	0.0050	L J	0.00247	0.1	µg/L	1	A	11/19/2018
Zinc	0.55	L NJ	0.486	5	µg/L	1	A	11/19/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-01J**
Collection Date: **11/11/2018 5:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Chromium, Trivalent (III)	ND		0.0357	0.4	µg/L	1		11/21/2018
TRACE METALS			**EPA 245.1**					Analyst: **JWC**
Mercury	ND		0.0227	0.2	µg/L	1	A	11/26/2018
HARDNESS			**SM 2340B**					Analyst: **KHG**
Hardness, Total (As CaCO3)	97400		11.2	6620	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.7**					Analyst: **KHG**
Aluminum	7.5	J	1.12	10	µg/L	1	A	11/15/2018
Calcium	22600		3.10	1000	µg/L	1	A	11/15/2018
Iron	15500		2.04	15	µg/L	1	A	11/15/2018
Magnesium	9940		1.26	1000	µg/L	1	A	11/15/2018
Potassium	7520		16.9	1000	µg/L	1	A	11/19/2018
Sodium	14800		8.03	1000	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	24.2		0.00825	0.5	µg/L	1	A	11/16/2018
Beryllium	ND		0.0905	0.1	µg/L	1	A	11/16/2018
Cadmium	ND		0.00168	0.1	µg/L	1	A	11/16/2018
Chromium	ND		0.0289	0.4	µg/L	1	A	11/16/2018
Copper	0.17	J	0.0251	0.5	µg/L	1	A	11/16/2018
Lead	0.0090	J	0.00508	0.1	µg/L	1	A	11/16/2018
Manganese	137		0.0195	2	µg/L	1	A	11/16/2018
Nickel	0.42	J	0.0161	0.5	µg/L	1	A	11/16/2018
Selenium	ND		0.0466	0.5	µg/L	1	A	11/16/2018
Silver	0.010	J	0.00247	0.1	µg/L	1	A	11/16/2018
Thallium	0.058	J	0.00153	0.1	µg/L	1	A	11/16/2018
Zinc	ND		0.486	5	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02A**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	120		50.0	50	mg/L	5	A	11/19/2018
ANIONS			**EPA 300.0**					Analyst: **EAT**
Chloride	19.0		0.0742	1	mg/L	1	A	11/14/2018 1:32
Fluoride	ND		0.00767	0.2	mg/L	1	A	11/14/2018 1:32
Sulfate	ND		0.0623	0.5	mg/L	1	A	11/14/2018 1:32
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	159		5.00	5	mg/L	1	A	11/15/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	115		0.100	0.1	NTU	1	A	11/13/2018 6:30

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02B**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
BOD, 5 DAY			**SM 5210 B**					Analyst: **MJN**
Biochemical Oxygen Demand	5.70		2.00	2	mg/L	1	A	11/13/2018 5:12
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	17.8	MI	4.00	4	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02C**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.38	J	0.105	0.5	mg/L	1	A	11/21/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrogen, Nitrate-Nitrite	ND		0.0118	0.05	mg/L	1	A	11/19/2018
TOTAL PHOSPHORUS AS P			**SM 4500-P E**					Analyst: **EAT**
Phosphorus, Total (As P)	0.177		0.00600	0.025	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02D**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
CYANIDE, TOTAL			**EPA 335.4**					Analyst: **SJK**
Cyanide	ND		2.28	3	µg/L	1	A	11/26/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02E**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	4.12		0.0490	0.2	mg/L	1	A	11/17/2018 7:5(

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02F**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
4,4´-DDD	ND		0.00307	0.01	µg/L	1	A	11/21/2018
4,4´-DDE	ND		0.00361	0.01	µg/L	1	A	11/21/2018
4,4´-DDT	ND		0.00365	0.01	µg/L	1	A	11/21/2018
Aldrin	ND		0.00377	0.01	µg/L	1	A	11/21/2018
alpha-BHC	ND		0.00301	0.01	µg/L	1	A	11/21/2018
Aroclor 1016	ND		0.0147	0.25	µg/L	1	A	11/21/2018
Aroclor 1221	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1232	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1242	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1248	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1254	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1260	ND		0.0219	0.25	µg/L	1	A	11/21/2018
beta-BHC	ND		0.00314	0.01	µg/L	1	A	11/21/2018
Chlordane	ND		0.0190	0.1	µg/L	1	A	11/21/2018
delta-BHC	ND		0.00297	0.01	µg/L	1	A	11/21/2018
Dieldrin	ND		0.00309	0.01	µg/L	1	A	11/21/2018
Endosulfan I	ND		0.00320	0.01	µg/L	1	A	11/21/2018
Endosulfan II	ND		0.00365	0.01	µg/L	1	A	11/21/2018
Endosulfan sulfate	ND		0.00367	0.01	µg/L	1	A	11/21/2018
Endrin	ND		0.00346	0.01	µg/L	1	A	11/21/2018
Endrin aldehyde	ND		0.00382	0.01	µg/L	1	A	11/21/2018
Endrin ketone	ND		0.00304	0.02	µg/L	1	A	11/21/2018
gamma-BHC (Lindane)	ND		0.00316	0.01	µg/L	1	A	11/21/2018
Heptachlor	ND		0.00357	0.01	µg/L	1	A	11/21/2018
Heptachlor epoxide	ND		0.00334	0.01	µg/L	1	A	11/21/2018
Methoxychlor	ND		0.00428	0.01	µg/L	1	A	11/21/2018
Toxaphene	ND		0.0680	0.5	µg/L	1	A	11/21/2018
Total Polychlorinated Biphenyls	ND		0.0147	0.25	µg/L	1	A	11/21/2018
Surr: Decachlorobiphenyl	84.3		0.0775	0	%REC	1		11/21/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02G**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
1,2,4,5-Tetrachlorobenzene	ND		0.0593	1	µg/L	1	A	12/5/2018
1,2,4-Trichlorobenzene	ND		0.242	1	µg/L	1	A	12/5/2018
1,2-Diphenylhydrazine as Azobenzene	ND		0.216	2	µg/L	1		12/5/2018
2,4,5-Trichlorophenol	ND		0.0877	1	µg/L	1	A	12/5/2018
2,4,6-Trichlorophenol	ND		0.259	1	µg/L	1	A	12/5/2018
2,4-Dichlorophenol	ND		0.206	1	µg/L	1	A	12/5/2018
2,4-Dimethylphenol	ND		0.169	2	µg/L	1	A	12/5/2018
2,4-Dinitrophenol	ND		1.28	5	µg/L	1	A	12/5/2018
2,4-Dinitrotoluene	ND		0.398	1	µg/L	1	A	12/5/2018
2,6-Dinitrotoluene	ND		0.201	1	µg/L	1	A	12/5/2018
2-Chloronaphthalene	ND		0.213	1	µg/L	1	A	12/5/2018
2-Chlorophenol	ND		0.0664	1	µg/L	1	A	12/5/2018
2-Methylphenol (Cresol)	ND		0.0513	1	µg/L	1	A	12/5/2018
2-Nitrophenol	ND		0.0799	2	µg/L	1	A	12/5/2018
3+4-Methylphenol (m,p Cresol)	ND		0.0349	1	µg/L	1	A	12/5/2018
3,3´-Dichlorobenzidine	ND		1.02	1	µg/L	1	A	12/5/2018
4,6-Dinitro-2-methylphenol	ND		0.337	2	µg/L	1	A	12/5/2018
4-Bromophenyl phenyl ether	ND		0.240	1	µg/L	1	A	12/5/2018
4-Chloro-3-methylphenol	ND		0.222	1	µg/L	1	A	12/5/2018
4-Chlorophenyl phenyl ether	ND		0.205	1	µg/L	1	A	12/5/2018
4-Nitrophenol	ND		0.458	5	µg/L	1	A	12/5/2018
Acenaphthene	ND		0.230	1	µg/L	1	A	12/5/2018
Acenaphthylene	ND		0.232	1	µg/L	1	A	12/5/2018
Anthracene	ND		0.250	1	µg/L	1	A	12/5/2018
Benzidine	ND		1.90	10	µg/L	1	A	12/5/2018
Benzo(a)anthracene	ND		0.239	0.5	µg/L	1	A	12/5/2018
Benzo(a)pyrene	ND		0.0494	0.5	µg/L	1	A	12/5/2018
Benzo(b)fluoranthene	ND		0.223	0.5	µg/L	1	A	12/5/2018
Benzo(g,h,i)perylene	ND		0.350	1	µg/L	1	A	12/5/2018
Benzo(k)fluoranthene	ND		0.313	0.5	µg/L	1	A	12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02G**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Bis(2-chloroethoxy)methane	ND		0.273	2	µg/L	1	A	12/5/2018
Bis(2-chloroethyl)ether	ND		0.200	1	µg/L	1	A	12/5/2018
Bis(2-chloroisopropyl)ether	ND		0.227	2	µg/L	1	A	12/5/2018
Bis(2-ethylhexyl)phthalate	ND		0.430	1	µg/L	1	A	12/5/2018
Butyl benzyl phthalate	ND		0.330	1	µg/L	1	A	12/5/2018
Chrysene	ND		0.244	0.5	µg/L	1	A	12/5/2018
Di-n-butyl phthalate	ND		0.533	1	µg/L	1	A	12/5/2018
Di-n-octyl phthalate	ND		0.258	1	µg/L	1	A	12/5/2018
Dibenz(a,h)anthracene	ND		0.343	0.5	µg/L	1	A	12/5/2018
Diethyl phthalate	ND		0.228	1	µg/L	1	A	12/5/2018
Dimethyl phthalate	ND		0.231	1	µg/L	1	A	12/5/2018
Fluoranthene	ND		0.277	2	µg/L	1	A	12/5/2018
Fluorene	ND		0.204	1	µg/L	1	A	12/5/2018
Hexachlorobenzene	ND		0.338	1	µg/L	1	A	12/5/2018
Hexachlorobutadiene	ND		0.207	2	µg/L	1	A	12/5/2018
Hexachlorocyclopentadiene	ND		0.222	2	µg/L	1	A	12/5/2018
Hexachloroethane	ND		0.234	1	µg/L	1	A	12/5/2018
Indeno(1,2,3-cd)pyrene	ND		0.293	0.5	µg/L	1	A	12/5/2018
Isophorone	ND		0.249	1	µg/L	1	A	12/5/2018
N-Nitrosodi-n-propylamine	ND		0.237	2	µg/L	1	A	12/5/2018
N-Nitrosodimethylamine	ND		0.0168	1	µg/L	1	A	12/5/2018
N-Nitrosodiphenylamine	ND		0.239	1	µg/L	1	A	12/5/2018
Naphthalene	ND		0.209	1	µg/L	1	A	12/5/2018
Nitrobenzene	ND		0.238	1	µg/L	1	A	12/5/2018
Pentachlorobenzene	ND		0.0526	1	µg/L	1	A	12/5/2018
Pentachlorophenol	ND		0.390	1	µg/L	1	A	12/5/2018
Phenanthrene	ND		0.222	1	µg/L	1	A	12/5/2018
Phenol	ND		0.0237	1	µg/L	1	A	12/5/2018
Pyrene	ND		0.264	1	µg/L	1	A	12/5/2018
Surr: 2,4,6-Tribromophenol	70.5		0	0	%REC	1		12/5/2018
Surr: 2-Fluorobiphenyl	53.7		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02G**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Surr: 2-Fluorophenol	30.4		0	0	%REC	1		12/5/2018
Surr: 4-Terphenyl-d14	75.6		0	0	%REC	1		12/5/2018
Surr: Nitrobenzene-d5	61.0		0	0	%REC	1		12/5/2018
Surr: Phenol-d6	19.5		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02H**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Acrolein	ND	Q	0.489	5	µg/L	1	A	11/13/2018
Acrylonitrile	ND		0.687	5	µg/L	1	A	11/13/2018
Benzene	ND		0.264	0.5	µg/L	1	A	11/13/2018
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	11/13/2018
Bromomethane	ND		0.191	0.5	µg/L	1	A	11/13/2018
Bromoform	ND		0.274	0.5	µg/L	1	A	11/13/2018
1,2-Dichlorobenzene	ND		0.312	0.5	µg/L	1	A	11/13/2018
1,3-Dichlorobenzene	ND		0.307	0.5	µg/L	1	A	11/13/2018
1,4-Dichlorobenzene	ND		0.306	0.5	µg/L	1	A	11/13/2018
Chlorobenzene	ND		0.330	0.5	µg/L	1	A	11/13/2018
Carbon tetrachloride	ND		0.261	0.5	µg/L	1	A	11/13/2018
Chloroethane	ND		0.305	0.5	µg/L	1	A	11/13/2018
Chloromethane	ND		0.340	0.5	µg/L	1	A	11/13/2018
2-Chloroethyl vinyl ether	ND		0.610	5	µg/L	1	A	11/13/2018
Chloroform	ND		0.259	0.5	µg/L	1	A	11/13/2018
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	11/13/2018
Dichlorodifluoromethane	ND	Q	0.171	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,2-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethene	ND		0.160	0.5	µg/L	1	A	11/13/2018
1,2-Dichloropropane	ND		0.288	0.5	µg/L	1	A	11/13/2018
trans-1,2-Dichloroethylene	ND		0.257	0.5	µg/L	1	A	11/13/2018
cis-1,3-Dichloropropene	ND		0.224	0.5	µg/L	1	A	11/13/2018
trans-1,3-Dichloropropene	ND		0.296	0.5	µg/L	1	A	11/13/2018
Ethylbenzene	ND		0.282	0.5	µg/L	1	A	11/13/2018
Methylene chloride	ND		0.206	0.5	µg/L	1	A	11/13/2018
1,1,2,2-Tetrachloroethane	ND		0.382	0.5	µg/L	1	A	11/13/2018
Tetrachloroethene	ND		0.275	0.5	µg/L	1	A	11/13/2018
Toluene	ND		0.295	0.5	µg/L	1	A	11/13/2018
1,2,4-Trichlorobenzene	ND		0.320	0.5	µg/L	1	A	11/13/2018
1,1,1-Trichloroethane	ND		0.107	0.5	µg/L	1	A	11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02H**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
1,1,2-Trichloroethane	ND		0.315	0.5	µg/L	1	A	11/13/2018
Trichloroethene	ND		0.256	0.5	µg/L	1	A	11/13/2018
Trichlorofluoromethane	ND		0.105	0.5	µg/L	1	A	11/13/2018
Vinyl chloride	ND		0.154	0.5	µg/L	1	A	11/13/2018
Xylenes, Total	ND		0.148	1.5	µg/L	1	A	11/13/2018
Surr: Dibromofluoromethane	97.1		0	0	%REC	1		11/13/2018
Surr: Toluene-d8	97.5		0	0	%REC	1		11/13/2018
Surr: 4-Bromofluorobenzene	103		0	0	%REC	1		11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02I**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:04 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Chromium, Trivalent (III)	ND		0.0357	0.4	µg/L	1		11/21/2018
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Dissolved Chromium, Trivalent (III)	0.19	L NJ	0.0357	0.4	µg/L	1		11/21/2018
DISSOLVED HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Dissolved Chromium, Hexavalent	ND	HR L	0.00330	0.02	µg/L	1	A	11/15/2018
HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Chromium, Hexavalent	ND	HR	0.00830	0.02	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 245.1**					Analyst: **JWC**
Mercury	ND		0.0227	0.2	µg/L	1	A	11/30/2018
HARDNESS			**SM 2340B**					Analyst: **KHG**
Hardness, Total (As CaCO3)	98100		11.2	6620	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.7**					Analyst: **KHG**
Aluminum	9.8	J	1.12	10	µg/L	1	A	11/15/2018
Calcium	22800		3.10	1000	µg/L	1	A	11/15/2018
Iron	13800		2.04	15	µg/L	1	A	11/15/2018
Magnesium	10000		1.26	1000	µg/L	1	A	11/15/2018
Potassium	7640		16.9	1000	µg/L	1	A	11/19/2018
Sodium	14900		8.03	1000	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	21.8		0.00825	0.5	µg/L	1	A	11/16/2018
Beryllium	ND		0.0905	0.1	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-02I**
Collection Date: **11/11/2018 10:45:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Cadmium	ND		0.00168	0.1	µg/L	1	A	11/16/2018
Chromium	ND		0.0289	0.4	µg/L	1	A	11/16/2018
Copper	0.21	J	0.0251	0.5	µg/L	1	A	11/16/2018
Lead	ND		0.00508	0.1	µg/L	1	A	11/16/2018
Manganese	140		0.0195	2	µg/L	1	A	11/16/2018
Nickel	0.40	J	0.0161	0.5	µg/L	1	A	11/16/2018
Selenium	0.047	J	0.0466	0.5	µg/L	1	A	11/16/2018
Silver	ND		0.00247	0.1	µg/L	1	A	11/16/2018
Thallium	0.014	J	0.00153	0.1	µg/L	1	A	11/16/2018
Zinc	0.76	J	0.486	5	µg/L	1	A	11/16/2018
DISSOLVED TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Cadmium	0.0040	L NJ	0.00168	0.1	µg/L	1	A	11/19/2018
Copper	0.14	L J	0.0251	0.5	µg/L	1	A	11/19/2018
Lead	0.0070	L N J	0.00508	0.1	µg/L	1	A	11/19/2018
Nickel	0.35	L J	0.0161	0.5	µg/L	1	A	11/19/2018
Selenium	0.13	L NJ	0.0466	0.5	µg/L	1	A	11/19/2018
Silver	ND	L	0.00247	0.1	µg/L	1	A	11/19/2018
Zinc	0.79	L NJ	0.486	5	µg/L	1	A	11/19/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03A**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	120		50.0	50	mg/L	5	A	11/19/2018
ANIONS			**EPA 300.0**					Analyst: **EAT**
Chloride	19.1		0.0742	1	mg/L	1	A	11/14/2018 1:5
Fluoride	0.078	J	0.00767	0.2	mg/L	1	A	11/14/2018 1:5
Sulfate	ND		0.0623	0.5	mg/L	1	A	11/14/2018 1:5
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	166		5.00	5	mg/L	1	A	11/15/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	139		0.100	0.1	NTU	1	A	11/13/2018 6:3

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03B**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
BOD, 5 DAY			**SM 5210 B**					Analyst: **MJN**
Biochemical Oxygen Demand	3.85		2.00	2	mg/L	1	A	11/13/2018 5:12
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	13.3		4.00	4	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03C**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.43	J	0.105	0.5	mg/L	1	A	11/21/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrogen, Nitrate-Nitrite	ND		0.0118	0.05	mg/L	1	A	11/19/2018
TOTAL PHOSPHORUS AS P			**SM 4500-P E**					Analyst: **EAT**
Phosphorus, Total (As P)	0.170		0.00600	0.025	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03D**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
CYANIDE, TOTAL			**EPA 335.4**					Analyst: **SJK**
Cyanide	ND		2.28	3	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03E**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	4.12		0.0490	0.2	mg/L	1	A	11/17/2018 8:12

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report ORELAP 100016 EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03F**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
4,4´-DDD	ND		0.00307	0.01	µg/L	1	A	11/21/2018
4,4´-DDE	ND		0.00361	0.01	µg/L	1	A	11/21/2018
4,4´-DDT	ND		0.00365	0.01	µg/L	1	A	11/21/2018
Aldrin	ND		0.00377	0.01	µg/L	1	A	11/21/2018
alpha-BHC	ND		0.00301	0.01	µg/L	1	A	11/21/2018
Aroclor 1016	ND		0.0147	0.25	µg/L	1	A	11/21/2018
Aroclor 1221	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1232	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1242	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1248	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1254	ND		0.250	0.25	µg/L	1	A	11/21/2018
Aroclor 1260	ND		0.0219	0.25	µg/L	1	A	11/21/2018
beta-BHC	ND		0.00314	0.01	µg/L	1	A	11/21/2018
Chlordane	ND		0.0190	0.1	µg/L	1	A	11/21/2018
delta-BHC	ND		0.00297	0.01	µg/L	1	A	11/21/2018
Dieldrin	ND		0.00309	0.01	µg/L	1	A	11/21/2018
Endosulfan I	ND		0.00320	0.01	µg/L	1	A	11/21/2018
Endosulfan II	ND		0.00365	0.01	µg/L	1	A	11/21/2018
Endosulfan sulfate	ND		0.00367	0.01	µg/L	1	A	11/21/2018
Endrin	ND		0.00346	0.01	µg/L	1	A	11/21/2018
Endrin aldehyde	ND		0.00382	0.01	µg/L	1	A	11/21/2018
Endrin ketone	ND		0.00304	0.02	µg/L	1	A	11/21/2018
gamma-BHC (Lindane)	ND		0.00316	0.01	µg/L	1	A	11/21/2018
Heptachlor	ND		0.00357	0.01	µg/L	1	A	11/21/2018
Heptachlor epoxide	ND		0.00334	0.01	µg/L	1	A	11/21/2018
Methoxychlor	ND		0.00428	0.01	µg/L	1	A	11/21/2018
Toxaphene	ND		0.0680	0.5	µg/L	1	A	11/21/2018
Total Polychlorinated Biphenyls	ND		0.0147	0.25	µg/L	1	A	11/21/2018
Surr: Decachlorobiphenyl	86.3		0.0775	0	%REC	1		11/21/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03G**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
1,2,4,5-Tetrachlorobenzene	ND		0.0593	1	µg/L	1	A	12/5/2018
1,2,4-Trichlorobenzene	ND		0.242	1	µg/L	1	A	12/5/2018
1,2-Diphenylhydrazine as Azobenzene	ND		0.216	2	µg/L	1		12/5/2018
2,4,5-Trichlorophenol	ND		0.0877	1	µg/L	1	A	12/5/2018
2,4,6-Trichlorophenol	ND		0.259	1	µg/L	1	A	12/5/2018
2,4-Dichlorophenol	ND		0.206	1	µg/L	1	A	12/5/2018
2,4-Dimethylphenol	ND		0.169	2	µg/L	1	A	12/5/2018
2,4-Dinitrophenol	ND		1.28	5	µg/L	1	A	12/5/2018
2,4-Dinitrotoluene	ND		0.398	1	µg/L	1	A	12/5/2018
2,6-Dinitrotoluene	ND		0.201	1	µg/L	1	A	12/5/2018
2-Chloronaphthalene	ND		0.213	1	µg/L	1	A	12/5/2018
2-Chlorophenol	ND		0.0664	1	µg/L	1	A	12/5/2018
2-Methylphenol (Cresol)	ND		0.0513	1	µg/L	1	A	12/5/2018
2-Nitrophenol	ND		0.0799	2	µg/L	1	A	12/5/2018
3+4-Methylphenol (m,p Cresol)	ND		0.0349	1	µg/L	1	A	12/5/2018
3,3´-Dichlorobenzidine	ND		1.02	1	µg/L	1	A	12/5/2018
4,6-Dinitro-2-methylphenol	ND		0.337	2	µg/L	1	A	12/5/2018
4-Bromophenyl phenyl ether	ND		0.240	1	µg/L	1	A	12/5/2018
4-Chloro-3-methylphenol	ND		0.222	1	µg/L	1	A	12/5/2018
4-Chlorophenyl phenyl ether	ND		0.205	1	µg/L	1	A	12/5/2018
4-Nitrophenol	ND		0.458	5	µg/L	1	A	12/5/2018
Acenaphthene	ND		0.230	1	µg/L	1	A	12/5/2018
Acenaphthylene	ND		0.232	1	µg/L	1	A	12/5/2018
Anthracene	ND		0.250	1	µg/L	1	A	12/5/2018
Benzidine	ND		1.90	10	µg/L	1	A	12/5/2018
Benzo(a)anthracene	ND		0.239	0.5	µg/L	1	A	12/5/2018
Benzo(a)pyrene	ND		0.0494	0.5	µg/L	1	A	12/5/2018
Benzo(b)fluoranthene	ND		0.223	0.5	µg/L	1	A	12/5/2018
Benzo(g,h,i)perylene	ND		0.350	1	µg/L	1	A	12/5/2018
Benzo(k)fluoranthene	ND		0.313	0.5	µg/L	1	A	12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report ORELAP 100016 EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03G**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Bis(2-chloroethoxy)methane	ND		0.273	2	µg/L	1	A	12/5/2018
Bis(2-chloroethyl)ether	ND		0.200	1	µg/L	1	A	12/5/2018
Bis(2-chloroisopropyl)ether	ND		0.227	2	µg/L	1	A	12/5/2018
Bis(2-ethylhexyl)phthalate	ND		0.430	1	µg/L	1	A	12/5/2018
Butyl benzyl phthalate	ND		0.330	1	µg/L	1	A	12/5/2018
Chrysene	ND		0.244	0.5	µg/L	1	A	12/5/2018
Di-n-butyl phthalate	ND		0.533	1	µg/L	1	A	12/5/2018
Di-n-octyl phthalate	ND		0.258	1	µg/L	1	A	12/5/2018
Dibenz(a,h)anthracene	ND		0.343	0.5	µg/L	1	A	12/5/2018
Diethyl phthalate	ND		0.228	1	µg/L	1	A	12/5/2018
Dimethyl phthalate	ND		0.231	1	µg/L	1	A	12/5/2018
Fluoranthene	ND		0.277	2	µg/L	1	A	12/5/2018
Fluorene	ND		0.204	1	µg/L	1	A	12/5/2018
Hexachlorobenzene	ND		0.338	1	µg/L	1	A	12/5/2018
Hexachlorobutadiene	ND		0.207	2	µg/L	1	A	12/5/2018
Hexachlorocyclopentadiene	ND		0.222	2	µg/L	1	A	12/5/2018
Hexachloroethane	ND		0.234	1	µg/L	1	A	12/5/2018
Indeno(1,2,3-cd)pyrene	ND		0.293	0.5	µg/L	1	A	12/5/2018
Isophorone	ND		0.249	1	µg/L	1	A	12/5/2018
N-Nitrosodi-n-propylamine	ND		0.237	2	µg/L	1	A	12/5/2018
N-Nitrosodimethylamine	ND		0.0168	1	µg/L	1	A	12/5/2018
N-Nitrosodiphenylamine	ND		0.239	1	µg/L	1	A	12/5/2018
Naphthalene	ND		0.209	1	µg/L	1	A	12/5/2018
Nitrobenzene	ND		0.238	1	µg/L	1	A	12/5/2018
Pentachlorobenzene	ND		0.0526	1	µg/L	1	A	12/5/2018
Pentachlorophenol	ND		0.390	1	µg/L	1	A	12/5/2018
Phenanthrene	ND		0.222	1	µg/L	1	A	12/5/2018
Phenol	ND		0.0237	1	µg/L	1	A	12/5/2018
Pyrene	ND		0.264	1	µg/L	1	A	12/5/2018
Surr: 2,4,6-Tribromophenol	72.8		0	0	%REC	1		12/5/2018
Surr: 2-Fluorobiphenyl	53.6		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03G**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Surr: 2-Fluorophenol	32.1		0	0	%REC	1		12/5/2018
Surr: 4-Terphenyl-d14	82.4		0	0	%REC	1		12/5/2018
Surr: Nitrobenzene-d5	61.1		0	0	%REC	1		12/5/2018
Surr: Phenol-d6	20.8		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03H**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Acrolein	ND	Q	0.489	5	µg/L	1	A	11/13/2018
Acrylonitrile	ND		0.687	5	µg/L	1	A	11/13/2018
Benzene	ND		0.264	0.5	µg/L	1	A	11/13/2018
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	11/13/2018
Bromomethane	ND		0.191	0.5	µg/L	1	A	11/13/2018
Bromoform	ND		0.274	0.5	µg/L	1	A	11/13/2018
1,2-Dichlorobenzene	ND		0.312	0.5	µg/L	1	A	11/13/2018
1,3-Dichlorobenzene	ND		0.307	0.5	µg/L	1	A	11/13/2018
1,4-Dichlorobenzene	ND		0.306	0.5	µg/L	1	A	11/13/2018
Chlorobenzene	ND		0.330	0.5	µg/L	1	A	11/13/2018
Carbon tetrachloride	ND		0.261	0.5	µg/L	1	A	11/13/2018
Chloroethane	ND		0.305	0.5	µg/L	1	A	11/13/2018
Chloromethane	ND		0.340	0.5	µg/L	1	A	11/13/2018
2-Chloroethyl vinyl ether	ND		0.610	5	µg/L	1	A	11/13/2018
Chloroform	ND		0.259	0.5	µg/L	1	A	11/13/2018
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	11/13/2018
Dichlorodifluoromethane	ND	Q	0.171	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,2-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethene	ND		0.160	0.5	µg/L	1	A	11/13/2018
1,2-Dichloropropane	ND		0.288	0.5	µg/L	1	A	11/13/2018
trans-1,2-Dichloroethylene	ND		0.257	0.5	µg/L	1	A	11/13/2018
cis-1,3-Dichloropropene	ND		0.224	0.5	µg/L	1	A	11/13/2018
trans-1,3-Dichloropropene	ND		0.296	0.5	µg/L	1	A	11/13/2018
Ethylbenzene	ND		0.282	0.5	µg/L	1	A	11/13/2018
Methylene chloride	ND		0.206	0.5	µg/L	1	A	11/13/2018
1,1,2,2-Tetrachloroethane	ND		0.382	0.5	µg/L	1	A	11/13/2018
Tetrachloroethene	ND		0.275	0.5	µg/L	1	A	11/13/2018
Toluene	ND		0.295	0.5	µg/L	1	A	11/13/2018
1,2,4-Trichlorobenzene	ND		0.320	0.5	µg/L	1	A	11/13/2018
1,1,1-Trichloroethane	ND		0.107	0.5	µg/L	1	A	11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03H**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
1,1,2-Trichloroethane	ND		0.315	0.5	µg/L	1	A	11/13/2018
Trichloroethene	ND		0.256	0.5	µg/L	1	A	11/13/2018
Trichlorofluoromethane	ND		0.105	0.5	µg/L	1	A	11/13/2018
Vinyl chloride	ND		0.154	0.5	µg/L	1	A	11/13/2018
Xylenes, Total	ND		0.148	1.5	µg/L	1	A	11/13/2018
Surr: Dibromofluoromethane	92.5		0	0	%REC	1		11/13/2018
Surr: Toluene-d8	96.7		0	0	%REC	1		11/13/2018
Surr: 4-Bromofluorobenzene	99.6		0	0	%REC	1		11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03I**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Dissolved Chromium, Trivalent (III)	0.20	L NJ	0.0357	0.4	µg/L	1		11/21/2018
DISSOLVED HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Dissolved Chromium, Hexavalent	ND	HR L	0.00330	0.02	µg/L	1	A	11/15/2018
HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Chromium, Hexavalent	ND	HR	0.00830	0.02	µg/L	1	A	11/15/2018
DISSOLVED TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Cadmium	0.0030	L NJ	0.00168	0.1	µg/L	1	A	11/19/2018
Copper	0.15	L J	0.0251	0.5	µg/L	1	A	11/19/2018
Lead	ND	L	0.00508	0.1	µg/L	1	A	11/19/2018
Nickel	0.34	L J	0.0161	0.5	µg/L	1	A	11/19/2018
Selenium	0.12	L NJ	0.0466	0.5	µg/L	1	A	11/19/2018
Silver	ND	L	0.00247	0.1	µg/L	1	A	11/19/2018
Zinc	0.60	L NJ	0.486	5	µg/L	1	A	11/19/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report ORELAP 100016 EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-03J**
Collection Date: **11/12/2018 8:30:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Chromium, Trivalent (III)	0.042	J	0.0357	0.4	µg/L	1		11/21/2018
TRACE METALS			**EPA 245.1**					Analyst: **JWC**
Mercury	ND		0.0227	0.2	µg/L	1	A	11/26/2018
HARDNESS			**SM 2340B**					Analyst: **KHG**
Hardness, Total (As CaCO3)	97800		11.2	6620	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.7**					Analyst: **KHG**
Aluminum	8.2	J	1.12	10	µg/L	1	A	11/15/2018
Calcium	22800		3.10	1000	µg/L	1	A	11/15/2018
Iron	15600		2.04	15	µg/L	1	A	11/15/2018
Magnesium	9950		1.26	1000	µg/L	1	A	11/15/2018
Potassium	7590		16.9	1000	µg/L	1	A	11/19/2018
Sodium	14900		8.03	1000	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	24.9		0.00825	0.5	µg/L	1	A	11/16/2018
Beryllium	ND		0.0905	0.1	µg/L	1	A	11/16/2018
Cadmium	ND		0.00168	0.1	µg/L	1	A	11/16/2018
Chromium	0.042	J	0.0289	0.4	µg/L	1	A	11/16/2018
Copper	0.17	J	0.0251	0.5	µg/L	1	A	11/16/2018
Lead	ND		0.00508	0.1	µg/L	1	A	11/16/2018
Manganese	141		0.0195	2	µg/L	1	A	11/16/2018
Nickel	0.41	J	0.0161	0.5	µg/L	1	A	11/16/2018
Selenium	ND		0.0466	0.5	µg/L	1	A	11/16/2018
Silver	0.0050	J	0.00247	0.1	µg/L	1	A	11/16/2018
Thallium	0.0090	J	0.00153	0.1	µg/L	1	A	11/16/2018
Zinc	ND		0.486	5	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04A**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	20.0		10.0	10	mg/L	1	A	11/19/2018
ANIONS			**EPA 300.0**					Analyst: **EAT**
Chloride	17.2		0.0742	1	mg/L	1	A	11/14/2018 2:25
Fluoride	0.695		0.00767	0.2	mg/L	1	A	11/14/2018 2:25
Sulfate	2.39		0.0623	0.5	mg/L	1	A	11/14/2018 2:25
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	52.5		5.00	5	mg/L	1	A	11/15/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	0.200		0.100	0.1	NTU	1	A	11/13/2018 5:20

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04B**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
BOD, 5 DAY			**SM 5210 B**					Analyst: **MJN**
Biochemical Oxygen Demand	ND		2.00	2	mg/L	1	A	11/13/2018 5:3(
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	ND		1.00	1	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04C**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.661		0.105	0.5	mg/L	1	A	11/21/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrogen, Nitrate-Nitrite	0.0680		0.0118	0.05	mg/L	1	A	11/19/2018
TOTAL PHOSPHORUS AS P			**SM 4500-P E**					Analyst: **EAT**
Phosphorus, Total (As P)	0.0070	J	0.00600	0.025	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04D**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
CYANIDE, TOTAL			**EPA 335.4**					Analyst: **SJK**
Cyanide	2.6	J	2.28	3	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04E**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	1.55		0.0490	0.2	mg/L	1	A	11/17/2018 8:34

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04F**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
4,4´-DDD	ND		0.00307	0.01	µg/L	1	A	11/22/2018
4,4´-DDE	ND		0.00361	0.01	µg/L	1	A	11/22/2018
4,4´-DDT	ND		0.00365	0.01	µg/L	1	A	11/22/2018
Aldrin	ND		0.00377	0.01	µg/L	1	A	11/22/2018
alpha-BHC	0.0032	J	0.00301	0.01	µg/L	1	A	11/22/2018
Aroclor 1016	ND		0.0147	0.25	µg/L	1	A	11/22/2018
Aroclor 1221	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1232	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1242	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1248	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1254	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1260	ND		0.0219	0.25	µg/L	1	A	11/22/2018
beta-BHC	ND		0.00314	0.01	µg/L	1	A	11/22/2018
Chlordane	ND		0.0190	0.1	µg/L	1	A	11/22/2018
delta-BHC	ND		0.00297	0.01	µg/L	1	A	11/22/2018
Dieldrin	ND		0.00309	0.01	µg/L	1	A	11/22/2018
Endosulfan I	ND		0.00320	0.01	µg/L	1	A	11/22/2018
Endosulfan II	ND		0.00365	0.01	µg/L	1	A	11/22/2018
Endosulfan sulfate	ND		0.00367	0.01	µg/L	1	A	11/22/2018
Endrin	ND		0.00346	0.01	µg/L	1	A	11/22/2018
Endrin aldehyde	ND		0.00382	0.01	µg/L	1	A	11/22/2018
Endrin ketone	ND		0.00304	0.02	µg/L	1	A	11/22/2018
gamma-BHC (Lindane)	ND		0.00316	0.01	µg/L	1	A	11/22/2018
Heptachlor	ND		0.00357	0.01	µg/L	1	A	11/22/2018
Heptachlor epoxide	ND		0.00334	0.01	µg/L	1	A	11/22/2018
Methoxychlor	ND		0.00428	0.01	µg/L	1	A	11/22/2018
Toxaphene	ND		0.0680	0.5	µg/L	1	A	11/22/2018
Total Polychlorinated Biphenyls	ND		0.0147	0.25	µg/L	1	A	11/22/2018
Surr: Decachlorobiphenyl	80.0		0.0775	0	%REC	1		11/22/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report ORELAP 100016 EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04G**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
1,2,4,5-Tetrachlorobenzene	ND		0.0593	1	µg/L	1	A	12/5/2018
1,2,4-Trichlorobenzene	ND		0.242	1	µg/L	1	A	12/5/2018
1,2-Diphenylhydrazine as Azobenzene	ND		0.216	2	µg/L	1		12/5/2018
2,4,5-Trichlorophenol	ND		0.0877	1	µg/L	1	A	12/5/2018
2,4,6-Trichlorophenol	ND		0.259	1	µg/L	1	A	12/5/2018
2,4-Dichlorophenol	ND		0.206	1	µg/L	1	A	12/5/2018
2,4-Dimethylphenol	ND		0.169	2	µg/L	1	A	12/5/2018
2,4-Dinitrophenol	ND		1.28	5	µg/L	1	A	12/5/2018
2,4-Dinitrotoluene	ND		0.398	1	µg/L	1	A	12/5/2018
2,6-Dinitrotoluene	ND		0.201	1	µg/L	1	A	12/5/2018
2-Chloronaphthalene	ND		0.213	1	µg/L	1	A	12/5/2018
2-Chlorophenol	ND		0.0664	1	µg/L	1	A	12/5/2018
2-Methylphenol (Cresol)	ND		0.0513	1	µg/L	1	A	12/5/2018
2-Nitrophenol	ND		0.0799	2	µg/L	1	A	12/5/2018
3+4-Methylphenol (m,p Cresol)	ND		0.0349	1	µg/L	1	A	12/5/2018
3,3´-Dichlorobenzidine	ND		1.02	1	µg/L	1	A	12/5/2018
4,6-Dinitro-2-methylphenol	ND		0.337	2	µg/L	1	A	12/5/2018
4-Bromophenyl phenyl ether	ND		0.240	1	µg/L	1	A	12/5/2018
4-Chloro-3-methylphenol	ND		0.222	1	µg/L	1	A	12/5/2018
4-Chlorophenyl phenyl ether	ND		0.205	1	µg/L	1	A	12/5/2018
4-Nitrophenol	ND	MI	0.458	5	µg/L	1	A	12/5/2018
Acenaphthene	ND		0.230	1	µg/L	1	A	12/5/2018
Acenaphthylene	ND		0.232	1	µg/L	1	A	12/5/2018
Anthracene	ND		0.250	1	µg/L	1	A	12/5/2018
Benzidine	ND		1.90	10	µg/L	1	A	12/5/2018
Benzo(a)anthracene	ND		0.239	0.5	µg/L	1	A	12/5/2018
Benzo(a)pyrene	ND		0.0494	0.5	µg/L	1	A	12/5/2018
Benzo(b)fluoranthene	ND		0.223	0.5	µg/L	1	A	12/5/2018
Benzo(g,h,i)perylene	ND		0.350	1	µg/L	1	A	12/5/2018
Benzo(k)fluoranthene	ND		0.313	0.5	µg/L	1	A	12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04G**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Bis(2-chloroethoxy)methane	ND		0.273	2	µg/L	1	A	12/5/2018
Bis(2-chloroethyl)ether	ND		0.200	1	µg/L	1	A	12/5/2018
Bis(2-chloroisopropyl)ether	ND		0.227	2	µg/L	1	A	12/5/2018
Bis(2-ethylhexyl)phthalate	ND		0.430	1	µg/L	1	A	12/5/2018
Butyl benzyl phthalate	ND		0.330	1	µg/L	1	A	12/5/2018
Chrysene	ND		0.244	0.5	µg/L	1	A	12/5/2018
Di-n-butyl phthalate	ND		0.533	1	µg/L	1	A	12/5/2018
Di-n-octyl phthalate	ND		0.258	1	µg/L	1	A	12/5/2018
Dibenz(a,h)anthracene	ND		0.343	0.5	µg/L	1	A	12/5/2018
Diethyl phthalate	ND		0.228	1	µg/L	1	A	12/5/2018
Dimethyl phthalate	ND		0.231	1	µg/L	1	A	12/5/2018
Fluoranthene	ND		0.277	2	µg/L	1	A	12/5/2018
Fluorene	ND		0.204	1	µg/L	1	A	12/5/2018
Hexachlorobenzene	ND		0.338	1	µg/L	1	A	12/5/2018
Hexachlorobutadiene	ND		0.207	2	µg/L	1	A	12/5/2018
Hexachlorocyclopentadiene	ND		0.222	2	µg/L	1	A	12/5/2018
Hexachloroethane	ND		0.234	1	µg/L	1	A	12/5/2018
Indeno(1,2,3-cd)pyrene	ND		0.293	0.5	µg/L	1	A	12/5/2018
Isophorone	ND		0.249	1	µg/L	1	A	12/5/2018
N-Nitrosodi-n-propylamine	ND		0.237	2	µg/L	1	A	12/5/2018
N-Nitrosodimethylamine	ND		0.0168	1	µg/L	1	A	12/5/2018
N-Nitrosodiphenylamine	ND		0.239	1	µg/L	1	A	12/5/2018
Naphthalene	ND		0.209	1	µg/L	1	A	12/5/2018
Nitrobenzene	ND		0.238	1	µg/L	1	A	12/5/2018
Pentachlorobenzene	ND		0.0526	1	µg/L	1	A	12/5/2018
Pentachlorophenol	ND		0.390	1	µg/L	1	A	12/5/2018
Phenanthrene	ND		0.222	1	µg/L	1	A	12/5/2018
Phenol	ND		0.0237	1	µg/L	1	A	12/5/2018
Pyrene	ND		0.264	1	µg/L	1	A	12/5/2018
Surr: 2,4,6-Tribromophenol	69.8		0	0	%REC	1		12/5/2018
Surr: 2-Fluorobiphenyl	70.6		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04G**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Surr: 2-Fluorophenol	26.1		0	0	%REC	1		12/5/2018
Surr: 4-Terphenyl-d14	87.1		0	0	%REC	1		12/5/2018
Surr: Nitrobenzene-d5	69.1		0	0	%REC	1		12/5/2018
Surr: Phenol-d6	4.10	MI	0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04H**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Acrolein	ND	Q	0.489	5	µg/L	1	A	11/13/2018
Acrylonitrile	ND		0.687	5	µg/L	1	A	11/13/2018
Benzene	ND		0.264	0.5	µg/L	1	A	11/13/2018
Bromodichloromethane	9.94		0.278	0.5	µg/L	1	A	11/13/2018
Bromomethane	ND		0.191	0.5	µg/L	1	A	11/13/2018
Bromoform	ND		0.274	0.5	µg/L	1	A	11/13/2018
1,2-Dichlorobenzene	ND		0.312	0.5	µg/L	1	A	11/13/2018
1,3-Dichlorobenzene	ND		0.307	0.5	µg/L	1	A	11/13/2018
1,4-Dichlorobenzene	ND		0.306	0.5	µg/L	1	A	11/13/2018
Chlorobenzene	ND		0.330	0.5	µg/L	1	A	11/13/2018
Carbon tetrachloride	ND		0.261	0.5	µg/L	1	A	11/13/2018
Chloroethane	ND		0.305	0.5	µg/L	1	A	11/13/2018
Chloromethane	ND		0.340	0.5	µg/L	1	A	11/13/2018
2-Chloroethyl vinyl ether	ND		0.610	5	µg/L	1	A	11/13/2018
Chloroform	14.6		0.259	0.5	µg/L	1	A	11/13/2018
Dibromochloromethane	4.69		0.245	0.5	µg/L	1	A	11/13/2018
Dichlorodifluoromethane	ND	Q	0.171	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,2-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethene	ND		0.160	0.5	µg/L	1	A	11/13/2018
1,2-Dichloropropane	ND		0.288	0.5	µg/L	1	A	11/13/2018
trans-1,2-Dichloroethylene	ND		0.257	0.5	µg/L	1	A	11/13/2018
cis-1,3-Dichloropropene	ND		0.224	0.5	µg/L	1	A	11/13/2018
trans-1,3-Dichloropropene	ND		0.296	0.5	µg/L	1	A	11/13/2018
Ethylbenzene	ND		0.282	0.5	µg/L	1	A	11/13/2018
Methylene chloride	ND		0.206	0.5	µg/L	1	A	11/13/2018
1,1,2,2-Tetrachloroethane	ND		0.382	0.5	µg/L	1	A	11/13/2018
Tetrachloroethene	ND		0.275	0.5	µg/L	1	A	11/13/2018
Toluene	ND		0.295	0.5	µg/L	1	A	11/13/2018
1,2,4-Trichlorobenzene	ND		0.320	0.5	µg/L	1	A	11/13/2018
1,1,1-Trichloroethane	ND		0.107	0.5	µg/L	1	A	11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04H**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
1,1,2-Trichloroethane	ND		0.315	0.5	µg/L	1	A	11/13/2018
Trichloroethene	ND		0.256	0.5	µg/L	1	A	11/13/2018
Trichlorofluoromethane	ND		0.105	0.5	µg/L	1	A	11/13/2018
Vinyl chloride	ND		0.154	0.5	µg/L	1	A	11/13/2018
Xylenes, Total	ND		0.148	1.5	µg/L	1	A	11/13/2018
Surr: Dibromofluoromethane	93.8		0	0	%REC	1		11/13/2018
Surr: Toluene-d8	96.3		0	0	%REC	1		11/13/2018
Surr: 4-Bromofluorobenzene	99.0		0	0	%REC	1		11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04I**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Dissolved Chromium, Trivalent (III)	0.25	L NJ	0.0357	0.4	µg/L	1		11/21/2018
DISSOLVED HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Dissolved Chromium, Hexavalent	0.0400	HR L N	0.00330	0.02	µg/L	1	A	11/15/2018
HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Chromium, Hexavalent	0.0220	HR	0.00830	0.02	µg/L	1	A	11/15/2018
DISSOLVED TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Cadmium	0.0050	L NJ	0.00168	0.1	µg/L	1	A	11/19/2018
Copper	14.1	L	0.0251	0.5	µg/L	1	A	11/19/2018
Lead	0.237	L	0.00508	0.1	µg/L	1	A	11/19/2018
Nickel	0.47	L NJ	0.0161	0.5	µg/L	1	A	11/19/2018
Selenium	0.074	L NJ	0.0466	0.5	µg/L	1	A	11/19/2018
Silver	0.0030	L J	0.00247	0.1	µg/L	1	A	11/19/2018
Zinc	6.72	L	0.486	5	µg/L	1	A	11/19/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report ORELAP 100016 EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 1**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-04J**
Collection Date: **11/11/2018 6:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Chromium, Trivalent (III)	ND		0.0357	0.4	µg/L	1		11/21/2018
TRACE METALS			**EPA 245.1**					Analyst: **JWC**
Mercury	ND		0.0227	0.2	µg/L	1	A	11/26/2018
HARDNESS			**SM 2340B**					Analyst: **KHG**
Hardness, Total (As CaCO3)	21400		11.2	6620	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.7**					Analyst: **KHG**
Aluminum	26.8		1.12	10	µg/L	1	A	11/15/2018
Calcium	5470		3.10	1000	µg/L	1	A	11/15/2018
Iron	37.8		2.04	15	µg/L	1	A	11/15/2018
Magnesium	1880		1.26	1000	µg/L	1	A	11/15/2018
Potassium	880	J	16.9	1000	µg/L	1	A	11/19/2018
Sodium	9380		8.03	1000	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	0.29	J	0.00825	0.5	µg/L	1	A	11/16/2018
Beryllium	ND		0.0905	0.1	µg/L	1	A	11/16/2018
Cadmium	ND		0.00168	0.1	µg/L	1	A	11/16/2018
Chromium	ND		0.0289	0.4	µg/L	1	A	11/16/2018
Copper	14.2		0.0251	0.5	µg/L	1	A	11/16/2018
Lead	0.456		0.00508	0.1	µg/L	1	A	11/16/2018
Manganese	2.91		0.0195	2	µg/L	1	A	11/16/2018
Nickel	0.42	J	0.0161	0.5	µg/L	1	A	11/16/2018
Selenium	ND		0.0466	0.5	µg/L	1	A	11/16/2018
Silver	0.0040	J	0.00247	0.1	µg/L	1	A	11/16/2018
Thallium	0.0040	J	0.00153	0.1	µg/L	1	A	11/16/2018
Zinc	17.4		0.486	5	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05A**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	18.0		10.0	10	mg/L	1	A	11/19/2018
ANIONS			**EPA 300.0**					Analyst: **EAT**
Chloride	17.0		0.0742	1	mg/L	1	A	11/14/2018 2:52
Fluoride	0.693		0.00767	0.2	mg/L	1	A	11/14/2018 2:52
Sulfate	2.42		0.0623	0.5	mg/L	1	A	11/14/2018 2:52
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	71.2		5.00	5	mg/L	1	A	11/15/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	0.150		0.100	0.1	NTU	1	A	11/13/2018 6:30

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05B**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
BOD, 5 DAY			**SM 5210 B**					Analyst: **MJN**
Biochemical Oxygen Demand	ND		2.00	2	mg/L	1	A	11/13/2018 5:3(
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	ND		2.00	2	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05C**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.48	J	0.105	0.5	mg/L	1	A	11/21/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrogen, Nitrate-Nitrite	0.0691		0.0118	0.05	mg/L	1	A	11/19/2018
TOTAL PHOSPHORUS AS P			**SM 4500-P E**					Analyst: **EAT**
Phosphorus, Total (As P)	0.0070	J	0.00600	0.025	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05D**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
CYANIDE, TOTAL			**EPA 335.4**					Analyst: **SJK**
Cyanide	ND		2.28	3	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05E**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	1.59		0.0490	0.2	mg/L	1	A	11/17/2018 8:5

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05F**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
4,4´-DDD	ND		0.00307	0.01	µg/L	1	A	11/22/2018
4,4´-DDE	ND		0.00361	0.01	µg/L	1	A	11/22/2018
4,4´-DDT	ND		0.00365	0.01	µg/L	1	A	11/22/2018
Aldrin	ND		0.00377	0.01	µg/L	1	A	11/22/2018
alpha-BHC	0.0047	J	0.00301	0.01	µg/L	1	A	11/22/2018
Aroclor 1016	ND		0.0147	0.25	µg/L	1	A	11/22/2018
Aroclor 1221	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1232	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1242	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1248	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1254	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1260	ND		0.0219	0.25	µg/L	1	A	11/22/2018
beta-BHC	ND		0.00314	0.01	µg/L	1	A	11/22/2018
Chlordane	ND		0.0190	0.1	µg/L	1	A	11/22/2018
delta-BHC	ND		0.00297	0.01	µg/L	1	A	11/22/2018
Dieldrin	ND		0.00309	0.01	µg/L	1	A	11/22/2018
Endosulfan I	ND		0.00320	0.01	µg/L	1	A	11/22/2018
Endosulfan II	ND		0.00365	0.01	µg/L	1	A	11/22/2018
Endosulfan sulfate	ND		0.00367	0.01	µg/L	1	A	11/22/2018
Endrin	ND		0.00346	0.01	µg/L	1	A	11/22/2018
Endrin aldehyde	ND		0.00382	0.01	µg/L	1	A	11/22/2018
Endrin ketone	ND		0.00304	0.02	µg/L	1	A	11/22/2018
gamma-BHC (Lindane)	ND		0.00316	0.01	µg/L	1	A	11/22/2018
Heptachlor	ND		0.00357	0.01	µg/L	1	A	11/22/2018
Heptachlor epoxide	ND		0.00334	0.01	µg/L	1	A	11/22/2018
Methoxychlor	ND		0.00428	0.01	µg/L	1	A	11/22/2018
Toxaphene	ND		0.0680	0.5	µg/L	1	A	11/22/2018
Total Polychlorinated Biphenyls	ND		0.0147	0.25	µg/L	1	A	11/22/2018
Surr: Decachlorobiphenyl	87.3		0.0775	0	%REC	1		11/22/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05G**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
1,2,4,5-Tetrachlorobenzene	ND		0.0593	1	µg/L	1	A	12/5/2018
1,2,4-Trichlorobenzene	ND		0.242	1	µg/L	1	A	12/5/2018
1,2-Diphenylhydrazine as Azobenzene	ND		0.216	2	µg/L	1		12/5/2018
2,4,5-Trichlorophenol	ND		0.0877	1	µg/L	1	A	12/5/2018
2,4,6-Trichlorophenol	ND		0.259	1	µg/L	1	A	12/5/2018
2,4-Dichlorophenol	ND		0.206	1	µg/L	1	A	12/5/2018
2,4-Dimethylphenol	ND		0.169	2	µg/L	1	A	12/5/2018
2,4-Dinitrophenol	ND		1.28	5	µg/L	1	A	12/5/2018
2,4-Dinitrotoluene	ND		0.398	1	µg/L	1	A	12/5/2018
2,6-Dinitrotoluene	ND		0.201	1	µg/L	1	A	12/5/2018
2-Chloronaphthalene	ND		0.213	1	µg/L	1	A	12/5/2018
2-Chlorophenol	ND		0.0664	1	µg/L	1	A	12/5/2018
2-Methylphenol (Cresol)	ND		0.0513	1	µg/L	1	A	12/5/2018
2-Nitrophenol	ND		0.0799	2	µg/L	1	A	12/5/2018
3+4-Methylphenol (m,p Cresol)	ND		0.0349	1	µg/L	1	A	12/5/2018
3,3´-Dichlorobenzidine	ND		1.02	1	µg/L	1	A	12/5/2018
4,6-Dinitro-2-methylphenol	ND		0.337	2	µg/L	1	A	12/5/2018
4-Bromophenyl phenyl ether	ND		0.240	1	µg/L	1	A	12/5/2018
4-Chloro-3-methylphenol	ND		0.222	1	µg/L	1	A	12/5/2018
4-Chlorophenyl phenyl ether	ND		0.205	1	µg/L	1	A	12/5/2018
4-Nitrophenol	ND		0.458	5	µg/L	1	A	12/5/2018
Acenaphthene	ND		0.230	1	µg/L	1	A	12/5/2018
Acenaphthylene	ND		0.232	1	µg/L	1	A	12/5/2018
Anthracene	ND		0.250	1	µg/L	1	A	12/5/2018
Benzidine	ND		1.90	10	µg/L	1	A	12/5/2018
Benzo(a)anthracene	ND		0.239	0.5	µg/L	1	A	12/5/2018
Benzo(a)pyrene	ND		0.0494	0.5	µg/L	1	A	12/5/2018
Benzo(b)fluoranthene	ND		0.223	0.5	µg/L	1	A	12/5/2018
Benzo(g,h,i)perylene	ND		0.350	1	µg/L	1	A	12/5/2018
Benzo(k)fluoranthene	ND		0.313	0.5	µg/L	1	A	12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05G**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Bis(2-chloroethoxy)methane	ND		0.273	2	µg/L	1	A	12/5/2018
Bis(2-chloroethyl)ether	ND		0.200	1	µg/L	1	A	12/5/2018
Bis(2-chloroisopropyl)ether	ND		0.227	2	µg/L	1	A	12/5/2018
Bis(2-ethylhexyl)phthalate	1.00		0.430	1	µg/L	1	A	12/5/2018
Butyl benzyl phthalate	ND		0.330	1	µg/L	1	A	12/5/2018
Chrysene	ND		0.244	0.5	µg/L	1	A	12/5/2018
Di-n-butyl phthalate	ND		0.533	1	µg/L	1	A	12/5/2018
Di-n-octyl phthalate	ND		0.258	1	µg/L	1	A	12/5/2018
Dibenz(a,h)anthracene	ND		0.343	0.5	µg/L	1	A	12/5/2018
Diethyl phthalate	ND		0.228	1	µg/L	1	A	12/5/2018
Dimethyl phthalate	ND		0.231	1	µg/L	1	A	12/5/2018
Fluoranthene	ND		0.277	2	µg/L	1	A	12/5/2018
Fluorene	ND		0.204	1	µg/L	1	A	12/5/2018
Hexachlorobenzene	ND		0.338	1	µg/L	1	A	12/5/2018
Hexachlorobutadiene	ND		0.207	2	µg/L	1	A	12/5/2018
Hexachlorocyclopentadiene	ND		0.222	2	µg/L	1	A	12/5/2018
Hexachloroethane	ND		0.234	1	µg/L	1	A	12/5/2018
Indeno(1,2,3-cd)pyrene	ND		0.293	0.5	µg/L	1	A	12/5/2018
Isophorone	ND		0.249	1	µg/L	1	A	12/5/2018
N-Nitrosodi-n-propylamine	ND		0.237	2	µg/L	1	A	12/5/2018
N-Nitrosodimethylamine	ND		0.0168	1	µg/L	1	A	12/5/2018
N-Nitrosodiphenylamine	ND		0.239	1	µg/L	1	A	12/5/2018
Naphthalene	ND		0.209	1	µg/L	1	A	12/5/2018
Nitrobenzene	ND		0.238	1	µg/L	1	A	12/5/2018
Pentachlorobenzene	ND		0.0526	1	µg/L	1	A	12/5/2018
Pentachlorophenol	ND		0.390	1	µg/L	1	A	12/5/2018
Phenanthrene	ND		0.222	1	µg/L	1	A	12/5/2018
Phenol	ND		0.0237	1	µg/L	1	A	12/5/2018
Pyrene	ND		0.264	1	µg/L	1	A	12/5/2018
Surr: 2,4,6-Tribromophenol	71.2		0	0	%REC	1		12/5/2018
Surr: 2-Fluorobiphenyl	69.8		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05G**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Surr: 2-Fluorophenol	29.7		0	0	%REC	1		12/5/2018
Surr: 4-Terphenyl-d14	80.3		0	0	%REC	1		12/5/2018
Surr: Nitrobenzene-d5	70.6		0	0	%REC	1		12/5/2018
Surr: Phenol-d6	18.4		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05H**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Acrolein	ND	Q	0.489	5	µg/L	1	A	11/13/2018
Acrylonitrile	ND		0.687	5	µg/L	1	A	11/13/2018
Benzene	ND		0.264	0.5	µg/L	1	A	11/13/2018
Bromodichloromethane	10.2		0.278	0.5	µg/L	1	A	11/13/2018
Bromomethane	ND		0.191	0.5	µg/L	1	A	11/13/2018
Bromoform	ND		0.274	0.5	µg/L	1	A	11/13/2018
1,2-Dichlorobenzene	ND		0.312	0.5	µg/L	1	A	11/13/2018
1,3-Dichlorobenzene	ND		0.307	0.5	µg/L	1	A	11/13/2018
1,4-Dichlorobenzene	ND		0.306	0.5	µg/L	1	A	11/13/2018
Chlorobenzene	ND		0.330	0.5	µg/L	1	A	11/13/2018
Carbon tetrachloride	ND		0.261	0.5	µg/L	1	A	11/13/2018
Chloroethane	ND		0.305	0.5	µg/L	1	A	11/13/2018
Chloromethane	ND		0.340	0.5	µg/L	1	A	11/13/2018
2-Chloroethyl vinyl ether	ND		0.610	5	µg/L	1	A	11/13/2018
Chloroform	14.7		0.259	0.5	µg/L	1	A	11/13/2018
Dibromochloromethane	4.71		0.245	0.5	µg/L	1	A	11/13/2018
Dichlorodifluoromethane	ND	Q	0.171	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,2-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethene	ND		0.160	0.5	µg/L	1	A	11/13/2018
1,2-Dichloropropane	ND		0.288	0.5	µg/L	1	A	11/13/2018
trans-1,2-Dichloroethylene	ND		0.257	0.5	µg/L	1	A	11/13/2018
cis-1,3-Dichloropropene	ND		0.224	0.5	µg/L	1	A	11/13/2018
trans-1,3-Dichloropropene	ND		0.296	0.5	µg/L	1	A	11/13/2018
Ethylbenzene	ND		0.282	0.5	µg/L	1	A	11/13/2018
Methylene chloride	ND		0.206	0.5	µg/L	1	A	11/13/2018
1,1,2,2-Tetrachloroethane	ND		0.382	0.5	µg/L	1	A	11/13/2018
Tetrachloroethene	ND		0.275	0.5	µg/L	1	A	11/13/2018
Toluene	ND		0.295	0.5	µg/L	1	A	11/13/2018
1,2,4-Trichlorobenzene	ND		0.320	0.5	µg/L	1	A	11/13/2018
1,1,1-Trichloroethane	ND		0.107	0.5	µg/L	1	A	11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05H**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
1,1,2-Trichloroethane	ND		0.315	0.5	µg/L	1	A	11/13/2018
Trichloroethene	ND		0.256	0.5	µg/L	1	A	11/13/2018
Trichlorofluoromethane	ND		0.105	0.5	µg/L	1	A	11/13/2018
Vinyl chloride	ND		0.154	0.5	µg/L	1	A	11/13/2018
Xylenes, Total	ND		0.148	1.5	µg/L	1	A	11/13/2018
Surr: Dibromofluoromethane	95.4		0	0	%REC	1		11/13/2018
Surr: Toluene-d8	98.1		0	0	%REC	1		11/13/2018
Surr: 4-Bromofluorobenzene	104		0	0	%REC	1		11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05I**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Dissolved Chromium, Trivalent (III)	0.21	L NJ	0.0357	0.4	µg/L	1		11/21/2018
DISSOLVED HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Dissolved Chromium, Hexavalent	0.0280	HR L N	0.00330	0.02	µg/L	1	A	11/15/2018
HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Chromium, Hexavalent	0.019	HR J	0.00830	0.02	µg/L	1	A	11/15/2018
DISSOLVED TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Cadmium	0.0040	L NJ	0.00168	0.1	µg/L	1	A	11/19/2018
Copper	8.80	L	0.0251	0.5	µg/L	1	A	11/19/2018
Lead	0.138	L	0.00508	0.1	µg/L	1	A	11/19/2018
Nickel	0.21	LJ	0.0161	0.5	µg/L	1	A	11/19/2018
Selenium	ND	L	0.0466	0.5	µg/L	1	A	11/19/2018
Silver	ND	L	0.00247	0.1	µg/L	1	A	11/19/2018
Zinc	3.9	L NJ	0.486	5	µg/L	1	A	11/19/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report ORELAP 100016 EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 2**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-05J**
Collection Date: **11/11/2018 10:15:00 PM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Chromium, Trivalent (III)	ND		0.0357	0.4	µg/L	1		11/21/2018
TRACE METALS			**EPA 245.1**					Analyst: **JWC**
Mercury	ND		0.0227	0.2	µg/L	1	A	11/26/2018
HARDNESS			**SM 2340B**					Analyst: **KHG**
Hardness, Total (As CaCO3)	21800		11.2	6620	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.7**					Analyst: **KHG**
Aluminum	23.9		1.12	10	µg/L	1	A	11/15/2018
Calcium	5660		3.10	1000	µg/L	1	A	11/15/2018
Iron	36.4		2.04	15	µg/L	1	A	11/15/2018
Magnesium	1850		1.26	1000	µg/L	1	A	11/15/2018
Potassium	890	J	16.9	1000	µg/L	1	A	11/19/2018
Sodium	9590		8.03	1000	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	0.31	J	0.00825	0.5	µg/L	1	A	11/16/2018
Beryllium	ND		0.0905	0.1	µg/L	1	A	11/16/2018
Cadmium	ND		0.00168	0.1	µg/L	1	A	11/16/2018
Chromium	ND		0.0289	0.4	µg/L	1	A	11/16/2018
Copper	8.81		0.0251	0.5	µg/L	1	A	11/16/2018
Lead	0.141		0.00508	0.1	µg/L	1	A	11/16/2018
Manganese	2.84		0.0195	2	µg/L	1	A	11/16/2018
Nickel	0.23	J	0.0161	0.5	µg/L	1	A	11/16/2018
Selenium	ND		0.0466	0.5	µg/L	1	A	11/16/2018
Silver	0.0040	J	0.00247	0.1	µg/L	1	A	11/16/2018
Thallium	0.0030	J	0.00153	0.1	µg/L	1	A	11/16/2018
Zinc	2.9	J	0.486	5	µg/L	1	A	11/16/2018

Qualifiers:
- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Minimum Reporting Limit
- S Spike Recovery outside accepted recovery limits

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06A**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	18.0		10.0	10	mg/L	1	A	11/19/2018
ANIONS			**EPA 300.0**					Analyst: **EAT**
Chloride	16.7		0.0742	1	mg/L	1	A	11/14/2018 3:19
Fluoride	ND		0.00767	0.2	mg/L	1	A	11/14/2018 3:19
Sulfate	2.36		0.0623	0.5	mg/L	1	A	11/14/2018 3:19
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	53.8		5.00	5	mg/L	1	A	11/15/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	0.130		0.100	0.1	NTU	1	A	11/13/2018 6:30

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06B**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
BOD, 5 DAY			**SM 5210 B**					Analyst: **MJN**
Biochemical Oxygen Demand	ND		2.00	2	mg/L	1	A	11/13/2018 5:3(
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	ND		2.00	2	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06C**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.46	J	0.105	0.5	mg/L	1	A	11/21/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrogen, Nitrate-Nitrite	0.0511		0.0118	0.05	mg/L	1	A	11/19/2018
TOTAL PHOSPHORUS AS P			**SM 4500-P E**					Analyst: **EAT**
Phosphorus, Total (As P)	0.014	J	0.00600	0.025	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06D**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
CYANIDE, TOTAL			**EPA 335.4**					Analyst: **SJK**
Cyanide	2.9	J	2.28	3	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06E**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	1.93		0.0490	0.2	mg/L	1	A	11/17/2018 9:18

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06F**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
4,4´-DDD	ND		0.00307	0.01	µg/L	1	A	11/22/2018
4,4´-DDE	ND		0.00361	0.01	µg/L	1	A	11/22/2018
4,4´-DDT	ND		0.00365	0.01	µg/L	1	A	11/22/2018
Aldrin	ND		0.00377	0.01	µg/L	1	A	11/22/2018
alpha-BHC	0.0034	J	0.00301	0.01	µg/L	1	A	11/22/2018
Aroclor 1016	ND		0.0147	0.25	µg/L	1	A	11/22/2018
Aroclor 1221	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1232	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1242	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1248	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1254	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1260	ND		0.0219	0.25	µg/L	1	A	11/22/2018
beta-BHC	ND		0.00314	0.01	µg/L	1	A	11/22/2018
Chlordane	ND		0.0190	0.1	µg/L	1	A	11/22/2018
delta-BHC	ND		0.00297	0.01	µg/L	1	A	11/22/2018
Dieldrin	ND		0.00309	0.01	µg/L	1	A	11/22/2018
Endosulfan I	ND		0.00320	0.01	µg/L	1	A	11/22/2018
Endosulfan II	ND		0.00365	0.01	µg/L	1	A	11/22/2018
Endosulfan sulfate	ND		0.00367	0.01	µg/L	1	A	11/22/2018
Endrin	ND		0.00346	0.01	µg/L	1	A	11/22/2018
Endrin aldehyde	ND		0.00382	0.01	µg/L	1	A	11/22/2018
Endrin ketone	ND		0.00304	0.02	µg/L	1	A	11/22/2018
gamma-BHC (Lindane)	ND		0.00316	0.01	µg/L	1	A	11/22/2018
Heptachlor	ND		0.00357	0.01	µg/L	1	A	11/22/2018
Heptachlor epoxide	ND		0.00334	0.01	µg/L	1	A	11/22/2018
Methoxychlor	ND		0.00428	0.01	µg/L	1	A	11/22/2018
Toxaphene	ND		0.0680	0.5	µg/L	1	A	11/22/2018
Total Polychlorinated Biphenyls	ND		0.0147	0.25	µg/L	1	A	11/22/2018
Surr: Decachlorobiphenyl	91.5		0.0775	0	%REC	1		11/22/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06G**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
1,2,4,5-Tetrachlorobenzene	ND		0.0593	1	µg/L	1	A	12/5/2018
1,2,4-Trichlorobenzene	ND		0.242	1	µg/L	1	A	12/5/2018
1,2-Diphenylhydrazine as Azobenzene	ND		0.216	2	µg/L	1		12/5/2018
2,4,5-Trichlorophenol	ND		0.0877	1	µg/L	1	A	12/5/2018
2,4,6-Trichlorophenol	ND		0.259	1	µg/L	1	A	12/5/2018
2,4-Dichlorophenol	ND		0.206	1	µg/L	1	A	12/5/2018
2,4-Dimethylphenol	ND		0.169	2	µg/L	1	A	12/5/2018
2,4-Dinitrophenol	ND		1.28	5	µg/L	1	A	12/5/2018
2,4-Dinitrotoluene	ND		0.398	1	µg/L	1	A	12/5/2018
2,6-Dinitrotoluene	ND		0.201	1	µg/L	1	A	12/5/2018
2-Chloronaphthalene	ND		0.213	1	µg/L	1	A	12/5/2018
2-Chlorophenol	ND		0.0664	1	µg/L	1	A	12/5/2018
2-Methylphenol (Cresol)	ND		0.0513	1	µg/L	1	A	12/5/2018
2-Nitrophenol	ND		0.0799	2	µg/L	1	A	12/5/2018
3+4-Methylphenol (m,p Cresol)	ND		0.0349	1	µg/L	1	A	12/5/2018
3,3´-Dichlorobenzidine	ND		1.02	1	µg/L	1	A	12/5/2018
4,6-Dinitro-2-methylphenol	ND		0.337	2	µg/L	1	A	12/5/2018
4-Bromophenyl phenyl ether	ND		0.240	1	µg/L	1	A	12/5/2018
4-Chloro-3-methylphenol	ND		0.222	1	µg/L	1	A	12/5/2018
4-Chlorophenyl phenyl ether	ND		0.205	1	µg/L	1	A	12/5/2018
4-Nitrophenol	ND		0.458	5	µg/L	1	A	12/5/2018
Acenaphthene	ND		0.230	1	µg/L	1	A	12/5/2018
Acenaphthylene	ND		0.232	1	µg/L	1	A	12/5/2018
Anthracene	ND		0.250	1	µg/L	1	A	12/5/2018
Benzidine	ND		1.90	10	µg/L	1	A	12/5/2018
Benzo(a)anthracene	ND		0.239	0.5	µg/L	1	A	12/5/2018
Benzo(a)pyrene	ND		0.0494	0.5	µg/L	1	A	12/5/2018
Benzo(b)fluoranthene	ND		0.223	0.5	µg/L	1	A	12/5/2018
Benzo(g,h,i)perylene	ND		0.350	1	µg/L	1	A	12/5/2018
Benzo(k)fluoranthene	ND		0.313	0.5	µg/L	1	A	12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06G**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Bis(2-chloroethoxy)methane	ND		0.273	2	µg/L	1	A	12/5/2018
Bis(2-chloroethyl)ether	ND		0.200	1	µg/L	1	A	12/5/2018
Bis(2-chloroisopropyl)ether	ND		0.227	2	µg/L	1	A	12/5/2018
Bis(2-ethylhexyl)phthalate	ND		0.430	1	µg/L	1	A	12/5/2018
Butyl benzyl phthalate	ND		0.330	1	µg/L	1	A	12/5/2018
Chrysene	ND		0.244	0.5	µg/L	1	A	12/5/2018
Di-n-butyl phthalate	ND		0.533	1	µg/L	1	A	12/5/2018
Di-n-octyl phthalate	ND		0.258	1	µg/L	1	A	12/5/2018
Dibenz(a,h)anthracene	ND		0.343	0.5	µg/L	1	A	12/5/2018
Diethyl phthalate	ND		0.228	1	µg/L	1	A	12/5/2018
Dimethyl phthalate	ND		0.231	1	µg/L	1	A	12/5/2018
Fluoranthene	ND		0.277	2	µg/L	1	A	12/5/2018
Fluorene	ND		0.204	1	µg/L	1	A	12/5/2018
Hexachlorobenzene	ND		0.338	1	µg/L	1	A	12/5/2018
Hexachlorobutadiene	ND		0.207	2	µg/L	1	A	12/5/2018
Hexachlorocyclopentadiene	ND		0.222	2	µg/L	1	A	12/5/2018
Hexachloroethane	ND		0.234	1	µg/L	1	A	12/5/2018
Indeno(1,2,3-cd)pyrene	ND		0.293	0.5	µg/L	1	A	12/5/2018
Isophorone	ND		0.249	1	µg/L	1	A	12/5/2018
N-Nitrosodi-n-propylamine	ND		0.237	2	µg/L	1	A	12/5/2018
N-Nitrosodimethylamine	ND		0.0168	1	µg/L	1	A	12/5/2018
N-Nitrosodiphenylamine	ND		0.239	1	µg/L	1	A	12/5/2018
Naphthalene	ND		0.209	1	µg/L	1	A	12/5/2018
Nitrobenzene	ND		0.238	1	µg/L	1	A	12/5/2018
Pentachlorobenzene	ND		0.0526	1	µg/L	1	A	12/5/2018
Pentachlorophenol	ND		0.390	1	µg/L	1	A	12/5/2018
Phenanthrene	ND		0.222	1	µg/L	1	A	12/5/2018
Phenol	ND		0.0237	1	µg/L	1	A	12/5/2018
Pyrene	ND		0.264	1	µg/L	1	A	12/5/2018
Surr: 2,4,6-Tribromophenol	73.1		0	0	%REC	1		12/5/2018
Surr: 2-Fluorobiphenyl	68.0		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06G**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Surr: 2-Fluorophenol	32.9		0	0	%REC	1		12/5/2018
Surr: 4-Terphenyl-d14	80.2		0	0	%REC	1		12/5/2018
Surr: Nitrobenzene-d5	69.6		0	0	%REC	1		12/5/2018
Surr: Phenol-d6	19.6		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06H**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Acrolein	ND	Q MI	0.489	5	µg/L	1	A	11/13/2018
Acrylonitrile	ND		0.687	5	µg/L	1	A	11/13/2018
Benzene	ND		0.264	0.5	µg/L	1	A	11/13/2018
Bromodichloromethane	11.9		0.278	0.5	µg/L	1	A	11/13/2018
Bromomethane	ND		0.191	0.5	µg/L	1	A	11/13/2018
Bromoform	ND		0.274	0.5	µg/L	1	A	11/13/2018
1,2-Dichlorobenzene	ND		0.312	0.5	µg/L	1	A	11/13/2018
1,3-Dichlorobenzene	ND		0.307	0.5	µg/L	1	A	11/13/2018
1,4-Dichlorobenzene	ND		0.306	0.5	µg/L	1	A	11/13/2018
Chlorobenzene	ND		0.330	0.5	µg/L	1	A	11/13/2018
Carbon tetrachloride	ND		0.261	0.5	µg/L	1	A	11/13/2018
Chloroethane	ND		0.305	0.5	µg/L	1	A	11/13/2018
Chloromethane	ND		0.340	0.5	µg/L	1	A	11/13/2018
2-Chloroethyl vinyl ether	ND		0.610	5	µg/L	1	A	11/13/2018
Chloroform	14.8		0.259	0.5	µg/L	1	A	11/13/2018
Dibromochloromethane	5.22		0.245	0.5	µg/L	1	A	11/13/2018
Dichlorodifluoromethane	ND	Q	0.171	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,2-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethene	ND		0.160	0.5	µg/L	1	A	11/13/2018
1,2-Dichloropropane	ND		0.288	0.5	µg/L	1	A	11/13/2018
trans-1,2-Dichloroethylene	ND		0.257	0.5	µg/L	1	A	11/13/2018
cis-1,3-Dichloropropene	ND		0.224	0.5	µg/L	1	A	11/13/2018
trans-1,3-Dichloropropene	ND		0.296	0.5	µg/L	1	A	11/13/2018
Ethylbenzene	ND		0.282	0.5	µg/L	1	A	11/13/2018
Methylene chloride	ND		0.206	0.5	µg/L	1	A	11/13/2018
1,1,2,2-Tetrachloroethane	ND		0.382	0.5	µg/L	1	A	11/13/2018
Tetrachloroethene	ND	MI	0.275	0.5	µg/L	1	A	11/13/2018
Toluene	ND		0.295	0.5	µg/L	1	A	11/13/2018
1,2,4-Trichlorobenzene	ND	MI	0.320	0.5	µg/L	1	A	11/13/2018
1,1,1-Trichloroethane	ND		0.107	0.5	µg/L	1	A	11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06H**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
1,1,2-Trichloroethane	ND		0.315	0.5	µg/L	1	A	11/13/2018
Trichloroethene	ND		0.256	0.5	µg/L	1	A	11/13/2018
Trichlorofluoromethane	ND		0.105	0.5	µg/L	1	A	11/13/2018
Vinyl chloride	ND		0.154	0.5	µg/L	1	A	11/13/2018
Xylenes, Total	ND		0.148	1.5	µg/L	1	A	11/13/2018
Surr: Dibromofluoromethane	94.7		0	0	%REC	1		11/13/2018
Surr: Toluene-d8	95.8		0	0	%REC	1		11/13/2018
Surr: 4-Bromofluorobenzene	101		0	0	%REC	1		11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06I**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Dissolved Chromium, Trivalent (III)	0.24	L NJ	0.0357	0.4	µg/L	1		11/21/2018
DISSOLVED HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Dissolved Chromium, Hexavalent	0.0050	HR L J	0.00330	0.02	µg/L	1	A	11/15/2018
HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Chromium, Hexavalent	0.012	HR J	0.00830	0.02	µg/L	1	A	11/15/2018
DISSOLVED TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Cadmium	0.0030	L NJ	0.00168	0.1	µg/L	1	A	11/19/2018
Copper	2.78	L	0.0251	0.5	µg/L	1	A	11/19/2018
Lead	0.137	L	0.00508	0.1	µg/L	1	A	11/19/2018
Nickel	0.14	L J	0.0161	0.5	µg/L	1	A	11/19/2018
Selenium	ND	L	0.0466	0.5	µg/L	1	A	11/19/2018
Silver	ND	L	0.00247	0.1	µg/L	1	A	11/19/2018
Zinc	1.6	LJ	0.486	5	µg/L	1	A	11/19/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report ORELAP 100016 EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 3**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-06J**
Collection Date: **11/12/2018 8:45:00 AM**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Chromium, Trivalent (III)	ND		0.0357	0.4	µg/L	1		11/21/2018
TRACE METALS			**EPA 245.1**					Analyst: **JWC**
Mercury	ND		0.0227	0.2	µg/L	1	A	11/26/2018
HARDNESS			**SM 2340B**					Analyst: **KHG**
Hardness, Total (As CaCO3)	20500		11.2	6620	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.7**					Analyst: **KHG**
Aluminum	33.9		1.12	10	µg/L	1	A	11/15/2018
Calcium	5680		3.10	1000	µg/L	1	A	11/15/2018
Iron	24.9		2.04	15	µg/L	1	A	11/15/2018
Magnesium	1540		1.26	1000	µg/L	1	A	11/15/2018
Potassium	890	J	16.9	1000	µg/L	1	A	11/19/2018
Sodium	9450		8.03	1000	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	0.30	J	0.00825	0.5	µg/L	1	A	11/16/2018
Beryllium	ND		0.0905	0.1	µg/L	1	A	11/16/2018
Cadmium	ND		0.00168	0.1	µg/L	1	A	11/16/2018
Chromium	ND		0.0289	0.4	µg/L	1	A	11/16/2018
Copper	10.2		0.0251	0.5	µg/L	1	A	11/16/2018
Lead	0.442		0.00508	0.1	µg/L	1	A	11/16/2018
Manganese	3.52		0.0195	2	µg/L	1	A	11/16/2018
Nickel	0.24	J	0.0161	0.5	µg/L	1	A	11/16/2018
Selenium	ND		0.0466	0.5	µg/L	1	A	11/16/2018
Silver	0.0050	J	0.00247	0.1	µg/L	1	A	11/16/2018
Thallium	0.0020	J	0.00153	0.1	µg/L	1	A	11/16/2018
Zinc	3.2	J	0.486	5	µg/L	1	A	11/16/2018

Qualifiers:
- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Minimum Reporting Limit
- S Spike Recovery outside accepted recovery limits

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report ORELAP 100016 EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Trip Blank #19097**
Sample Location:
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-07A**
Collection Date: **11/12/2018**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Water**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Acrolein	ND	Q	0.489	5	µg/L	1	A	11/13/2018
Acrylonitrile	ND		0.687	5	µg/L	1	A	11/13/2018
Benzene	ND		0.264	0.5	µg/L	1	A	11/13/2018
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	11/13/2018
Bromomethane	ND		0.191	0.5	µg/L	1	A	11/13/2018
Bromoform	ND		0.274	0.5	µg/L	1	A	11/13/2018
1,2-Dichlorobenzene	ND		0.312	0.5	µg/L	1	A	11/13/2018
1,3-Dichlorobenzene	ND		0.307	0.5	µg/L	1	A	11/13/2018
1,4-Dichlorobenzene	ND		0.306	0.5	µg/L	1	A	11/13/2018
Chlorobenzene	ND		0.330	0.5	µg/L	1	A	11/13/2018
Carbon tetrachloride	ND		0.261	0.5	µg/L	1	A	11/13/2018
Chloroethane	ND		0.305	0.5	µg/L	1	A	11/13/2018
Chloromethane	ND		0.340	0.5	µg/L	1	A	11/13/2018
2-Chloroethyl vinyl ether	ND		0.610	5	µg/L	1	A	11/13/2018
Chloroform	ND		0.259	0.5	µg/L	1	A	11/13/2018
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	11/13/2018
Dichlorodifluoromethane	ND	Q	0.171	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,2-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/13/2018
1,1-Dichloroethene	ND		0.160	0.5	µg/L	1	A	11/13/2018
1,2-Dichloropropane	ND		0.288	0.5	µg/L	1	A	11/13/2018
trans-1,2-Dichloroethylene	ND		0.257	0.5	µg/L	1	A	11/13/2018
cis-1,3-Dichloropropene	ND		0.224	0.5	µg/L	1	A	11/13/2018
trans-1,3-Dichloropropene	ND		0.296	0.5	µg/L	1	A	11/13/2018
Ethylbenzene	ND		0.282	0.5	µg/L	1	A	11/13/2018
Methylene chloride	ND		0.206	0.5	µg/L	1	A	11/13/2018
1,1,2,2-Tetrachloroethane	ND		0.382	0.5	µg/L	1	A	11/13/2018
Tetrachloroethene	ND		0.275	0.5	µg/L	1	A	11/13/2018
Toluene	ND		0.295	0.5	µg/L	1	A	11/13/2018
1,2,4-Trichlorobenzene	ND		0.320	0.5	µg/L	1	A	11/13/2018
1,1,1-Trichloroethane	ND		0.107	0.5	µg/L	1	A	11/13/2018

Qualifiers:
- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Minimum Reporting Limit
- S Spike Recovery outside accepted recovery limits

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Trip Blank #19097**
Sample Location:
Project: **108.01593.00005 Jordan Cove-AMENDED**

Lab Order: **1811421**
NRC Sample ID **1811421-07A**
Collection Date: **11/12/2018**
Received Date: **11/13/2018 10:30:00 AM**
Reported Date: **12/10/2018 11:14:05 AM**
Matrix: **Water**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
1,1,2-Trichloroethane	ND		0.315	0.5	µg/L	1	A	11/13/2018
Trichloroethene	ND		0.256	0.5	µg/L	1	A	11/13/2018
Trichlorofluoromethane	ND		0.105	0.5	µg/L	1	A	11/13/2018
Vinyl chloride	ND		0.154	0.5	µg/L	1	A	11/13/2018
Xylenes, Total	ND		0.148	1.5	µg/L	1	A	11/13/2018
Surr: Dibromofluoromethane	94.9		0	0	%REC	1		11/13/2018
Surr: Toluene-d8	95.9		0	0	%REC	1		11/13/2018
Surr: 4-Bromofluorobenzene	99.9		0	0	%REC	1		11/13/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

DATA FLAGS

B	Analyte detected in the associated method blank.
BA	BOD Alternative Calculation: The initial results performed by Standard Methods did not fall within parameters of the Standard Methods calculation. An alternate approved calculation was performed using the HACH method and the value reported is an estimated concentration.
C	Sample(s) does not meet NELAP/ORELAP sample acceptance criteria. See Case Narrative.
C1	Sample(s) does not meet NELAP/ORELAP sample acceptance criteria for temperature.
CF	Results confirmed by re-analysis.
CU	Cleanup performed as specified by method.
D1	The diesel elution pattern for the sample is not typical.
D2	The sample appears to be a heavier hydrocarbon range than diesel.
D3	The sample appears to be a lighter hydrocarbon range than diesel.
D4	Detected hydrocarbons do not have pattern and range consistent with typical petroleum products and may be due to biogenic interference.
D5	Detected hydrocarbons in the diesel range appear to be weathered diesel.
E	Estimated value.
ER	Elevated reporting limit due to matrix. Report limits (MDLs, MRLs & PQLs) are adjusted based on variations in sample preparation amounts, analytical dilutions, and percent solids, where applicable.
FC	Fecal Coliforms: Sample(s) received past 40 CFR Part 136 specified holding time. Results reported as estimated values.
G1	The gasoline elution pattern for the sample is not typical.
G2	The sample appears to be a heavier hydrocarbon range than gasoline.
G3	The sample appears to be a lighter hydrocarbon range than gasoline.
G4	Detected hydrocarbons in the gasoline range appear to be weathered gasoline.
HP	Sample re-analysis performed outside of method specified holding time.
HR	Sample received outside of method specified holding time.
HS	Sample analyzed for volatile organics contained headspace.
HT	At the client's request, the sample was analyzed outside of method specified holding time.
H	Analysis performed outside of method specified holding time.
J	Analyte detected below the Minimum Reporting Limit (MRL) and above the Method Detection Limit (MDL). The J flag result is an estimated value and the user should be aware that this data is of limited reliability.
L	Dissolved metals were not filtered within 15 minutes of collection per 40 CFR Part 136.
MI	Surrogate or Matrix Spike recovery is out of control limits due to matrix interference. Sample results may be biased.
N	See Case Narrative on page 2 of report.
Q	Closing continuing calibration verification (CCV) or laboratory control sample (LCS) exceeded high recovery limits, but associated samples are non-detect and the sample results are not affected. Data meets EPA/NELAP requirements.
R	Relative percent difference (RPD) is outside of the accepted recovery limits.
R1	Relative percent difference (RPD) is outside of the accepted recovery limits. However, analyses are not controlled on RPD values for sample concentrations that are less than the reporting limit.
R3	The relative percent difference (RPD) and/or percent recovery for the duplicate (DUP) or matrix spike (MS)/matrix spike duplicate (MSD) cannot be accurately calculated due to the concentration of analyte already present in the sample.
R4	Duplicate analysis failed due to result being at or near method reporting limit.
S	Surrogate and/or matrix spike recovery is outside of the accepted recovery limits. Sample results may be biased.
S1	Surrogate or matrix spike recovery is outside of control limits due to dilution necessary for analysis.
SC	Sub-contracted to another laboratory for analysis.
SP	Sample(s) were not collected per EPA Method 5035A protocols. The results are considered minimum values.
T	Toxicity Characteristic Leaching Procedure – Sample submitted contained < 0.5% solids. If the waste contains <0.5% dry solids, the liquid portion of the waste, after filtration, is defined as the TCLP extract.
#	Value exceeds regulatory level for TCLP contaminant.
X1	The motor oil elution pattern for the sample is not typical.
X2	The sample appears to be a heavier hydrocarbon range than motor oil.
X3	The sample appears to be a lighter hydrocarbon range than motor oil.
*	Value exceeds Maximum Contaminant Level or is outside the acceptable range.

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ALKALINITY_W

Sample ID **MB-R108163** SampType: **MBLK** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649544**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	10.0									

Sample ID **MB-R108163** SampType: **MBLK** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649570**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	10.0									

Sample ID **LCS-R108163** SampType: **LCS** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649545**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	48.00	10.0	50	0	96.0	80	120				

Sample ID **LCS-R108163** SampType: **LCS** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649571**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	50.00	10.0	50	0	100	80	120				

Sample ID **1811223-01BDUP** SampType: **DUP** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649547**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	48.00	10.0						50	4.08	10	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ALKALINITY_W

Sample ID **1811421-06ADUP** SampType: **DUP** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **City Tap Water 3** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649573**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	18.00	10.0						18	0	10	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: AMMONIA_AUTO_W

Sample ID	**MB-43005**	SampType: **MBLK**	TestCode: **AMMONIA_A**	Units: **mg/L**	Prep Date: **11/20/2018**	RunNo: **108242**
Client ID:	**ZZZZZ**	Batch ID: **43005**	TestNo: **EPA 350.1**	**(EPA 350.1)**	Analysis Date: **11/21/2018**	SeqNo: **1650995**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	ND	0.500									

Sample ID	**LCS-43005**	SampType: **LCS**	TestCode: **AMMONIA_A**	Units: **mg/L**	Prep Date: **11/20/2018**	RunNo: **108242**
Client ID:	**ZZZZZ**	Batch ID: **43005**	TestNo: **EPA 350.1**	**(EPA 350.1)**	Analysis Date: **11/21/2018**	SeqNo: **1650994**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.488	0.500	1.645	0	90.5	90	110				

Sample ID	**1811421-06CMS**	SampType: **MS**	TestCode: **AMMONIA_A**	Units: **mg/L**	Prep Date: **11/20/2018**	RunNo: **108242**
Client ID:	**City Tap Water 3**	Batch ID: **43005**	TestNo: **EPA 350.1**	**(EPA 350.1)**	Analysis Date: **11/21/2018**	SeqNo: **1650982**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.884	0.500	1.645	0.465	86.3	80	120				

Sample ID	**1811421-06CMSD**	SampType: **MSD**	TestCode: **AMMONIA_A**	Units: **mg/L**	Prep Date: **11/20/2018**	RunNo: **108242**
Client ID:	**City Tap Water 3**	Batch ID: **43005**	TestNo: **EPA 350.1**	**(EPA 350.1)**	Analysis Date: **11/21/2018**	SeqNo: **1650983**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.985	0.500	1.645	0.465	92.4	80	120	1.884	5.22	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: BOD-5DAY

Sample ID **MB-42948**	SampType: **MBLK**	TestCode: **BOD-5DAY**	Units: **mg/L**	Prep Date: **11/13/2018**	RunNo: **108151**
Client ID: **ZZZZZ**	Batch ID: **42948**	TestNo: **SM 5210 B**	**(SM 5210 B)**	Analysis Date: **11/13/2018**	SeqNo: **1649438**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	ND	2.00									

Sample ID **LCS-42948**	SampType: **LCS**	TestCode: **BOD-5DAY**	Units: **mg/L**	Prep Date: **11/13/2018**	RunNo: **108151**
Client ID: **ZZZZZ**	Batch ID: **42948**	TestNo: **SM 5210 B**	**(SM 5210 B)**	Analysis Date: **11/13/2018**	SeqNo: **1649439**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	219.0	2.00	198	0	111	85	115				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: CYANIDE_WW_AUTO

Sample ID	MB-42962	SampType:	MBLK	TestCode:	CYANIDE_W	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108114
Client ID:	ZZZZZ	Batch ID:	42962	TestNo:	EPA 335.4	(EPA 335.3)		Analysis Date:	11/16/2018	SeqNo:	1649041

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	3.00									

Sample ID	LCS-42962	SampType:	LCS	TestCode:	CYANIDE_W	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108114
Client ID:	ZZZZZ	Batch ID:	42962	TestNo:	EPA 335.4	(EPA 335.3)		Analysis Date:	11/16/2018	SeqNo:	1649039

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	42.90	3.00	40	0	107	90	110				

Sample ID	1811421-01DMS	SampType:	MS	TestCode:	CYANIDE_W	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108114
Client ID:	Well Water 1	Batch ID:	42962	TestNo:	EPA 335.4	(EPA 335.3)		Analysis Date:	11/16/2018	SeqNo:	1649021

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	37.90	3.00	40	2.7	88.0	80	120				

Sample ID	1811421-01DMSD	SampType:	MSD	TestCode:	CYANIDE_W	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108114
Client ID:	Well Water 1	Batch ID:	42962	TestNo:	EPA 335.4	(EPA 335.3)		Analysis Date:	11/16/2018	SeqNo:	1649022

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	36.70	3.00	40	2.7	85.0	80	120	37.9	3.22	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: DOC_W

Sample ID **MBLK (DOC)** SampType: **MBLK** TestCode: **DOC_W** Units: **mg/L** Prep Date: RunNo: **108154**
Client ID: **ZZZZZ** Batch ID: **R108154** TestNo: **SM5310C** Analysis Date: **11/16/2018** SeqNo: **1649452**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	0.1416	0.200									J

Sample ID **LCS (DOC)** SampType: **LCS** TestCode: **DOC_W** Units: **mg/L** Prep Date: RunNo: **108154**
Client ID: **ZZZZZ** Batch ID: **R108154** TestNo: **SM5310C** Analysis Date: **11/16/2018** SeqNo: **1649450**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	0.9859	0.200	1	0	98.6	85	115				

Sample ID **LCSD (DOC)** SampType: **LCSD** TestCode: **DOC_W** Units: **mg/L** Prep Date: RunNo: **108154**
Client ID: **ZZZZZ** Batch ID: **R108154** TestNo: **SM5310C** Analysis Date: **11/16/2018** SeqNo: **1649451**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	0.9985	0.200	1	0	99.8	85	115	0.9859	1.27	25	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA218.7_DISS

Sample ID	MB-R108229	SampType:	MBLK	TestCode:	EPA218.7_DI	Units:	µg/L	Prep Date:		RunNo:	108229		
Client ID:	ZZZZZ	Batch ID:	R108229	TestNo:	EPA 218.7			Analysis Date:	11/15/2018	SeqNo:	1650739		
Analyte		Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Dissolved Chromium, Hexavalent		ND	0.0200										

Sample ID	LCS-R108229	SampType:	LCS	TestCode:	EPA218.7_DI	Units:	µg/L	Prep Date:		RunNo:	108229		
Client ID:	ZZZZZ	Batch ID:	R108229	TestNo:	EPA 218.7			Analysis Date:	11/15/2018	SeqNo:	1650740		
Analyte		Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Dissolved Chromium, Hexavalent		3.229	0.0200	3.62	0	89.2	85	115					

Sample ID	1811421-05IMS	SampType:	MS	TestCode:	EPA218.7_DI	Units:	µg/L	Prep Date:		RunNo:	108229		
Client ID:	City Tap Water 2	Batch ID:	R108229	TestNo:	EPA 218.7			Analysis Date:	11/15/2018	SeqNo:	1650749		
Analyte		Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Dissolved Chromium, Hexavalent		2.031	0.0200	2	0.028	100	85	115				HR	

Sample ID	1811421-05IMSD	SampType:	MSD	TestCode:	EPA218.7_DI	Units:	µg/L	Prep Date:		RunNo:	108229		
Client ID:	City Tap Water 2	Batch ID:	R108229	TestNo:	EPA 218.7			Analysis Date:	11/15/2018	SeqNo:	1650750		
Analyte		Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Dissolved Chromium, Hexavalent		1.883	0.0200	2	0.028	92.8	85	115	2.031	7.56	15	HR	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA218.7_WW

Sample ID	**MB-R108230**	SampType:	**MBLK**	TestCode:	**EPA218.7_W**	Units:	**µg/L**	Prep Date:		RunNo:	**108230**		
Client ID:	**ZZZZZ**	Batch ID:	**R108230**	TestNo:	**EPA 218.7**			Analysis Date:	**11/15/2018**	SeqNo:	**1650752**		
Analyte		Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Chromium, Hexavalent		ND	0.0200										

Sample ID	**LCS-R108230**	SampType:	**LCS**	TestCode:	**EPA218.7_W**	Units:	**µg/L**	Prep Date:		RunNo:	**108230**		
Client ID:	**ZZZZZ**	Batch ID:	**R108230**	TestNo:	**EPA 218.7**			Analysis Date:	**11/15/2018**	SeqNo:	**1650753**		
Analyte		Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Chromium, Hexavalent		3.229	0.0200	3.62	0	89.2	85	115					

Sample ID	**1811421-05IMS**	SampType:	**MS**	TestCode:	**EPA218.7_W**	Units:	**µg/L**	Prep Date:		RunNo:	**108230**		
Client ID:	**City Tap Water 2**	Batch ID:	**R108230**	TestNo:	**EPA 218.7**			Analysis Date:	**11/15/2018**	SeqNo:	**1650762**		
Analyte		Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Chromium, Hexavalent		1.917	0.0200	2	0.019	94.9	85	115					HR

Sample ID	**1811421-05IMSD**	SampType:	**MSD**	TestCode:	**EPA218.7_W**	Units:	**µg/L**	Prep Date:		RunNo:	**108230**		
Client ID:	**City Tap Water 2**	Batch ID:	**R108230**	TestNo:	**EPA 218.7**			Analysis Date:	**11/15/2018**	SeqNo:	**1650763**		
Analyte		Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Chromium, Hexavalent		2.226	0.0200	2	0.019	110	85	115	1.917	14.9	20	HR	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA300_W

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **108040**
Client ID: **ZZZZZ**	Batch ID: **R108040**	TestNo: **EPA 300.0**		Analysis Date: **11/13/2018**	SeqNo: **1647483**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	1.00									
Fluoride	ND	0.200									
Sulfate	ND	0.500									

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **108040**
Client ID: **ZZZZZ**	Batch ID: **R108040**	TestNo: **EPA 300.0**		Analysis Date: **11/14/2018**	SeqNo: **1648212**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	1.00									
Fluoride	ND	0.200									
Sulfate	ND	0.500									

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **108040**
Client ID: **ZZZZZ**	Batch ID: **R108040**	TestNo: **EPA 300.0**		Analysis Date: **11/13/2018**	SeqNo: **1647482**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	5.828	1.00	6	0	97.1	90	110				
Fluoride	1.079	0.200	1	0	108	90	110				
Sulfate	6.172	0.500	6	0	103	90	110				

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **108040**
Client ID: **ZZZZZ**	Batch ID: **R108040**	TestNo: **EPA 300.0**		Analysis Date: **11/14/2018**	SeqNo: **1648211**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	5.872	1.00	6	0	97.9	90	110				
Fluoride	1.040	0.200	1	0	104	90	110				
Sulfate	6.141	0.500	6	0	102	90	110				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA300_W

Sample ID **1811421-01AMS** SampType: **MS** TestCode: **EPA300_W** Units: **mg/L** Prep Date: RunNo: **108040**
Client ID: **Well Water 1** Batch ID: **R108040** TestNo: **EPA 300.0** Analysis Date: **11/14/2018** SeqNo: **1647489**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	1.033	0.200	1	0.07915	95.4	80	120				
Sulfate	6.239	0.500	6	0	104	80	120				

Sample ID **1811421-01AMS** SampType: **MS** TestCode: **EPA300_W** Units: **mg/L** Prep Date: RunNo: **108040**
Client ID: **Well Water 1** Batch ID: **R108040** TestNo: **EPA 300.0** Analysis Date: **11/14/2018** SeqNo: **1648214**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	30.80	2.00	12	18.19	105	80	120				

Sample ID **1811421-01AMSD** SampType: **MSD** TestCode: **EPA300_W** Units: **mg/L** Prep Date: RunNo: **108040**
Client ID: **Well Water 1** Batch ID: **R108040** TestNo: **EPA 300.0** Analysis Date: **11/14/2018** SeqNo: **1647490**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	1.022	0.200	1	0.07915	94.2	80	120	1.033	1.12	15	
Sulfate	6.164	0.500	6	0	103	80	120	6.239	1.21	15	

Sample ID **1811421-01AMSD** SampType: **MSD** TestCode: **EPA300_W** Units: **mg/L** Prep Date: RunNo: **108040**
Client ID: **Well Water 1** Batch ID: **R108040** TestNo: **EPA 300.0** Analysis Date: **11/14/2018** SeqNo: **1648215**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	30.85	2.00	12	18.19	106	80	120	30.8	0.163	15	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID **MB-42959** SampType: **MBLK** TestCode: **EPA608** Units: **µg/L** Prep Date: **11/14/2018** RunNo: **108306**
Client ID: **ZZZZZ** Batch ID: **42959** TestNo: **EPA 608** **(EPA 3510C)** Analysis Date: **11/21/2018** SeqNo: **1651814**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	0.0100									
4,4´-DDE	ND	0.0100									
4,4´-DDT	ND	0.0100									
Aldrin	ND	0.0100									
Aroclor 1016	ND	0.250									
Aroclor 1221	ND	0.250									
Aroclor 1232	ND	0.250									
Aroclor 1242	ND	0.250									
Aroclor 1248	ND	0.250									
Aroclor 1254	ND	0.250									
Aroclor 1260	ND	0.250									
beta-BHC	ND	0.0100									
Chlordane	ND	0.100									
delta-BHC	ND	0.0100									
Dieldrin	ND	0.0100									
Endosulfan I	ND	0.0100									
Endosulfan II	ND	0.0100									
Endosulfan sulfate	ND	0.0100									
Endrin	ND	0.0100									
Endrin aldehyde	ND	0.0100									
Endrin ketone	ND	0.0200									
gamma-BHC (Lindane)	ND	0.0100									
Heptachlor	ND	0.0100									
Heptachlor epoxide	ND	0.0100									
Methoxychlor	ND	0.0100									
Toxaphene	ND	0.500									
Total Polychlorinated Biphenyls	ND	0.250									
Surr: Decachlorobiphenyl	0.2279	0	0.25	0	91.2	60	140				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID **MB-42959**	SampType: **MBLK**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **ZZZZZ**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/21/2018**	SeqNo: **1652207**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	ND	0.0100									

Sample ID **LCS-42959**	SampType: **LCS**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **ZZZZZ**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/21/2018**	SeqNo: **1651813**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	0.2038	0.0100	0.2	0	102	60	140				
4,4´-DDE	0.1906	0.0100	0.2	0	95.3	60	140				
4,4´-DDT	0.2008	0.0100	0.2	0	100	60	140				
Aldrin	0.1891	0.0100	0.2	0	94.5	60	122				
beta-BHC	0.2040	0.0100	0.2	0	102	60	140				
delta-BHC	0.2040	0.0100	0.2	0	102	60	140				
Dieldrin	0.2006	0.0100	0.2	0	100	60	140				
Endosulfan I	0.1969	0.0100	0.2	0	98.4	60	140				
Endosulfan II	0.1997	0.0100	0.2	0	99.9	60	140				
Endosulfan sulfate	0.2051	0.0100	0.2	0	103	60	140				
Endrin	0.2094	0.0100	0.2	0	105	60	140				
Endrin aldehyde	0.1963	0.0100	0.2	0	98.2	60	140				
Endrin ketone	0.2077	0.0200	0.2	0	104	60	140				
gamma-BHC (Lindane)	0.2001	0.0100	0.2	0	100	60	127				
Heptachlor	0.2033	0.0100	0.2	0	102	60	111				
Heptachlor epoxide	0.1988	0.0100	0.2	0	99.4	60	140				
Methoxychlor	0.2090	0.0100	0.2	0	105	60	140				
Surr: Decachlorobiphenyl	0.2362	0	0.25	0	94.5	60	140				

Sample ID **LCS-42959**	SampType: **LCS**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **ZZZZZ**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/21/2018**	SeqNo: **1652206**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID	LCS-42959	SampType:	LCS	TestCode:	EPA608	Units:	µg/L	Prep Date:	11/14/2018	RunNo:	108306
Client ID:	ZZZZZ	Batch ID:	42959	TestNo:	EPA 608	(EPA 3510C)		Analysis Date:	11/21/2018	SeqNo:	1652206

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	0.1912	0.0100	0.2	0	95.6	60	134				

Sample ID	1811421-04FMS	SampType:	MS	TestCode:	EPA608	Units:	µg/L	Prep Date:	11/14/2018	RunNo:	108306
Client ID:	City Tap Water 1	Batch ID:	42959	TestNo:	EPA 608	(EPA 3510C)		Analysis Date:	11/22/2018	SeqNo:	1651820

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	0.2166	0.0100	0.2	0	108	40	160				
4,4´-DDE	0.1963	0.0100	0.2	0	98.1	40	160				
4,4´-DDT	0.2131	0.0100	0.2	0	107	40	160				
Aldrin	0.1936	0.0100	0.2	0	96.8	40	160				
beta-BHC	0.2057	0.0100	0.2	0	103	40	160				
delta-BHC	0.2078	0.0100	0.2	0	104	40	160				
Dieldrin	0.2064	0.0100	0.2	0	103	40	160				
Endosulfan I	0.2009	0.0100	0.2	0	100	40	160				
Endosulfan II	0.2008	0.0100	0.2	0	100	40	160				
Endosulfan sulfate	0.2112	0.0100	0.2	0	106	40	160				
Endrin	0.2220	0.0100	0.2	0	111	40	160				
Endrin aldehyde	0.1941	0.0100	0.2	0	97.0	40	160				
Endrin ketone	0.2123	0.0200	0.2	0	106	40	160				
gamma-BHC (Lindane)	0.2065	0.0100	0.2	0	103	40	160				
Heptachlor	0.2196	0.0100	0.2	0	110	40	160				
Heptachlor epoxide	0.2027	0.0100	0.2	0	101	40	160				
Methoxychlor	0.2222	0.0100	0.2	0	111	40	160				
Surr: Decachlorobiphenyl	0.2345	0	0.25	0	93.8	60	140				

Sample ID	1811421-04FMS	SampType:	MS	TestCode:	EPA608	Units:	µg/L	Prep Date:	11/14/2018	RunNo:	108306
Client ID:	City Tap Water 1	Batch ID:	42959	TestNo:	EPA 608	(EPA 3510C)		Analysis Date:	11/22/2018	SeqNo:	1652213

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID **1811421-04FMS**	SampType: **MS**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **City Tap Water 1**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/22/2018**	SeqNo: **1652213**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	0.1843	0.0100	0.2	0.00322	90.6	40	160				

Sample ID **1811421-04FMSD**	SampType: **MSD**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **City Tap Water 1**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/22/2018**	SeqNo: **1651821**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	0.2085	0.0100	0.2	0	104	40	160	0.2166	3.80	20	
4,4´-DDE	0.1900	0.0100	0.2	0	95.0	40	160	0.1963	3.23	20	
4,4´-DDT	0.2074	0.0100	0.2	0	104	40	160	0.2131	2.71	20	
Aldrin	0.1865	0.0100	0.2	0	93.2	40	160	0.1936	3.77	20	
beta-BHC	0.1952	0.0100	0.2	0	97.6	40	160	0.2057	5.21	20	
delta-BHC	0.1999	0.0100	0.2	0	99.9	40	160	0.2078	3.89	20	
Dieldrin	0.2012	0.0100	0.2	0	101	40	160	0.2064	2.56	20	
Endosulfan I	0.1921	0.0100	0.2	0	96.0	40	160	0.2009	4.47	20	
Endosulfan II	0.1949	0.0100	0.2	0	97.4	40	160	0.2008	2.98	20	
Endosulfan sulfate	0.2036	0.0100	0.2	0	102	40	160	0.2112	3.64	20	
Endrin	0.2136	0.0100	0.2	0	107	40	160	0.222	3.85	20	
Endrin aldehyde	0.1880	0.0100	0.2	0	94.0	40	160	0.1941	3.18	20	
Endrin ketone	0.2074	0.0200	0.2	0	104	40	160	0.2123	2.34	20	
gamma-BHC (Lindane)	0.1981	0.0100	0.2	0	99.1	40	160	0.2065	4.12	20	
Heptachlor	0.2102	0.0100	0.2	0	105	40	160	0.2196	4.37	20	
Heptachlor epoxide	0.1957	0.0100	0.2	0	97.8	40	160	0.2027	3.53	20	
Methoxychlor	0.2144	0.0100	0.2	0	107	40	160	0.2222	3.54	20	
Surr: Decachlorobiphenyl	0.2301	0	0.25	0	92.1	60	140	0	0	0	

Sample ID **1811421-04FMSD**	SampType: **MSD**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **City Tap Water 1**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/22/2018**	SeqNo: **1652214**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID **1811421-04FMSD** SampType: **MSD** TestCode: **EPA608** Units: **µg/L** Prep Date: **11/14/2018** RunNo: **108306**
Client ID: **City Tap Water 1** Batch ID: **42959** TestNo: **EPA 608** **(EPA 3510C)** Analysis Date: **11/22/2018** SeqNo: **1652214**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	0.1713	0.0100	0.2	0.00322	84.0	40	160	0.1843	7.33	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **MBLK** SampType: **MBLK** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108031**
Client ID: **ZZZZZ** Batch ID: **R108031** TestNo: **EPA 624** Analysis Date: **11/13/2018** SeqNo: **1647675**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acrolein	ND	5.00									
Acrylonitrile	ND	5.00									
Benzene	ND	0.500									
Bromodichloromethane	ND	0.500									
Bromomethane	ND	0.500									
Bromoform	ND	0.500									
1,2-Dichlorobenzene	ND	0.500									
1,3-Dichlorobenzene	ND	0.500									
1,4-Dichlorobenzene	ND	0.500									
Chlorobenzene	ND	0.500									
Carbon tetrachloride	ND	0.500									
Chloroethane	ND	0.500									
Chloromethane	ND	0.500									
2-Chloroethyl vinyl ether	ND	5.00									
Chloroform	ND	0.500									
Dibromochloromethane	ND	0.500									
Dichlorodifluoromethane	ND	0.500									
1,1-Dichloroethane	ND	0.500									
1,2-Dichloroethane	ND	0.500									
1,1-Dichloroethene	ND	0.500									
1,2-Dichloropropane	ND	0.500									
trans-1,2-Dichloroethylene	ND	0.500									
cis-1,3-Dichloropropene	ND	0.500									
trans-1,3-Dichloropropene	ND	0.500									
Ethylbenzene	ND	0.500									
Methylene chloride	ND	0.500									
1,1,2,2-Tetrachloroethane	ND	0.500									
Tetrachloroethene	ND	0.500									
Toluene	ND	0.500									

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **MBLK** SampType: **MBLK** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108031**
Client ID: **ZZZZZ** Batch ID: **R108031** TestNo: **EPA 624** Analysis Date: **11/13/2018** SeqNo: **1647675**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	0.500									
1,1,1-Trichloroethane	ND	0.500									
1,1,2-Trichloroethane	ND	0.500									
Trichloroethene	ND	0.500									
Trichlorofluoromethane	ND	0.500									
Vinyl chloride	ND	0.500									
o-Xylene	ND	0.500									
m,p-Xylene	ND	1.00									
Xylenes, Total	ND	1.50									
Surr: Dibromofluoromethane	40.61	0	40	0	102	80	120				
Surr: Toluene-d8	39.67	0	40	0	99.2	80	120				
Surr: 4-Bromofluorobenzene	41.09	0	40	0	103	80	120				

Sample ID **LCS** SampType: **LCS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108031**
Client ID: **ZZZZZ** Batch ID: **R108031** TestNo: **EPA 624** Analysis Date: **11/13/2018** SeqNo: **1647687**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acrolein	20.77	5.00	20	0	104	50	150				
Acrylonitrile	42.08	5.00	40	0	105	50	150				
Benzene	20.82	0.500	20	0	104	37	151				
Bromodichloromethane	21.62	0.500	20	0	108	35	155				
Bromomethane	19.88	0.500	20	0	99.4	0	242				
Bromoform	19.67	0.500	20	0	98.4	45	169				
1,2-Dichlorobenzene	20.72	0.500	20	0	104	18	190				
1,3-Dichlorobenzene	21.21	0.500	20	0	106	59	156				
1,4-Dichlorobenzene	21.04	0.500	20	0	105	18	190				
Chlorobenzene	21.39	0.500	20	0	107	37	160				
Carbon tetrachloride	21.51	0.500	20	0	108	70	140				
Chloroethane	21.06	0.500	20	0	105	14	230				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **LCS** SampType: **LCS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108031**
Client ID: **ZZZZZ** Batch ID: **R108031** TestNo: **EPA 624** Analysis Date: **11/13/2018** SeqNo: **1647687**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	20.46	0.500	20	0	102	0	273				
2-Chloroethyl vinyl ether	20.65	5.00	20	0	103	0	305				
Chloroform	20.65	0.500	20	0	103	51	138				
Dibromochloromethane	19.77	0.500	20	0	98.8	53	149				
Dichlorodifluoromethane	20.89	0.500	20	0	104	50	150				
1,1-Dichloroethane	21.41	0.500	20	0	107	59	150				
1,2-Dichloroethane	20.87	0.500	20	0	104	49	155				
1,1-Dichloroethene	21.81	0.500	20	0	109	0	234				
1,2-Dichloropropane	21.49	0.500	20	0	107	0	210				
trans-1,2-Dichloroethylene	21.64	0.500	20	0	108	54	156				
cis-1,3-Dichloropropene	21.96	0.500	20	0	110	0	227				
trans-1,3-Dichloropropene	21.47	0.500	20	0	107	17	183				
Ethylbenzene	21.87	0.500	20	0	109	37	162				
Methylene chloride	20.93	0.500	20	0	105	0	221				
1,1,2,2-Tetrachloroethane	21.23	0.500	20	0	106	46	157				
Tetrachloroethene	21.84	0.500	20	0	109	64	148				
Toluene	21.34	0.500	20	0	107	47	150				
1,2,4-Trichlorobenzene	19.78	0.500	20	0	98.9	70	130				
1,1,1-Trichloroethane	21.27	0.500	20	0	106	52	162				
1,1,2-Trichloroethane	21.36	0.500	20	0	107	52	150				
Trichloroethene	21.38	0.500	20	0	107	71	157				
Trichlorofluoromethane	21.17	0.500	20	0	106	17	181				
Vinyl chloride	21.30	0.500	20	0	106	0	251				
o-Xylene	22.43	0.500	20	0	112	70	130				
m,p-Xylene	44.36	1.00	40	0	111	70	130				
Xylenes, Total	66.79	1.50	60	0	111	70	130				
Surr: Dibromofluoromethane	39.38	0	40	0	98.4	80	120				
Surr: Toluene-d8	40.22	0	40	0	101	80	120				
Surr: 4-Bromofluorobenzene	40.65	0	40	0	102	80	120				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **1811421-06HMS** SampType: **MS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108031**
Client ID: **City Tap Water 3** Batch ID: **R108031** TestNo: **EPA 624** Analysis Date: **11/13/2018** SeqNo: **1647686**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acrolein	ND	5.00	20	0	0	50	150				MI
Acrylonitrile	32.56	5.00	40	0	81.4	50	150				
Benzene	18.71	0.500	20	0	93.6	37	151				
Bromodichloromethane	33.46	0.500	20	11.87	108	35	155				
Bromomethane	14.16	0.500	20	0	70.8	0	242				
Bromoform	16.02	0.500	20	0	80.1	45	169				
1,2-Dichlorobenzene	17.42	0.500	20	0	87.1	18	190				
1,3-Dichlorobenzene	17.76	0.500	20	0	88.8	59	156				
1,4-Dichlorobenzene	18.03	0.500	20	0	90.2	18	190				
Chlorobenzene	18.50	0.500	20	0	92.5	37	160				
Carbon tetrachloride	22.34	0.500	20	0	112	70	140				
Chloroethane	17.88	0.500	20	0	89.4	14	230				
Chloromethane	16.26	0.500	20	0	81.3	0	273				
2-Chloroethyl vinyl ether	16.09	5.00	20	0	80.4	0	305				
Chloroform	33.21	0.500	20	14.83	91.9	51	138				
Dibromochloromethane	22.87	0.500	20	5.22	88.2	53	149				
Dichlorodifluoromethane	17.97	0.500	20	0	89.8	50	150				
1,1-Dichloroethane	18.88	0.500	20	0	94.4	59	150				
1,2-Dichloroethane	19.83	0.500	20	0	99.2	49	155				
1,1-Dichloroethene	19.62	0.500	20	0	98.1	0	234				
1,2-Dichloropropane	18.84	0.500	20	0	94.2	0	210				
trans-1,2-Dichloroethylene	17.89	0.500	20	0	89.4	54	156				
cis-1,3-Dichloropropene	16.68	0.500	20	0	83.4	0	227				
trans-1,3-Dichloropropene	17.74	0.500	20	0	88.7	17	183				
Ethylbenzene	20.33	0.500	20	0	102	37	162				
Methylene chloride	16.63	0.500	20	0	83.2	0	221				
1,1,2,2-Tetrachloroethane	14.17	0.500	20	0	70.8	46	157				
Tetrachloroethene	35.92	0.500	20	0	180	64	148				MI
Toluene	18.95	0.500	20	0	94.8	47	150				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **1811421-06HMS** SampType: **MS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108031**
Client ID: **City Tap Water 3** Batch ID: **R108031** TestNo: **EPA 624** Analysis Date: **11/13/2018** SeqNo: **1647686**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	13.75	0.500	20	0	68.8	70	130				MI
1,1,1-Trichloroethane	20.27	0.500	20	0	101	52	162				
1,1,2-Trichloroethane	18.42	0.500	20	0	92.1	52	150				
Trichloroethene	21.76	0.500	20	0	109	71	157				
Trichlorofluoromethane	20.77	0.500	20	0	104	17	181				
Vinyl chloride	18.19	0.500	20	0	91.0	0	251				
Xylenes, Total	58.75	1.50	60	0	97.9	70	130				
Surr: Dibromofluoromethane	37.91	0	40	0	94.8	80	120				
Surr: Toluene-d8	40.06	0	40	0	100	80	120				
Surr: 4-Bromofluorobenzene	40.97	0	40	0	102	80	120				

Sample ID **1811421-05HDUP** SampType: **DUP** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108031**
Client ID: **City Tap Water 2** Batch ID: **R108031** TestNo: **EPA 624** Analysis Date: **11/13/2018** SeqNo: **1647684**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acrolein	ND	5.00						0	0	25	Q
Acrylonitrile	ND	5.00						0	0	25	
Benzene	ND	0.500						0	0	25	
Bromodichloromethane	10.23	0.500						10.24	0.0977	25	
Bromomethane	ND	0.500						0	0	25	
Bromoform	ND	0.500						0	0	25	
1,2-Dichlorobenzene	ND	0.500						0	0	25	
1,3-Dichlorobenzene	ND	0.500						0	0	25	
1,4-Dichlorobenzene	ND	0.500						0	0	25	
Chlorobenzene	ND	0.500						0	0	25	
Carbon tetrachloride	ND	0.500						0	0	25	
Chloroethane	ND	0.500						0	0	25	
Chloromethane	ND	0.500						0	0	25	
2-Chloroethyl vinyl ether	ND	5.00						0	0	25	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **1811421-05HDUP** SampType: **DUP** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108031**
Client ID: **City Tap Water 2** Batch ID: **R108031** TestNo: **EPA 624** Analysis Date: **11/13/2018** SeqNo: **1647684**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	15.40	0.500						14.74	4.38	25	
Dibromochloromethane	4.680	0.500						4.71	0.639	25	
Dichlorodifluoromethane	ND	0.500						0	0	25	Q
1,1-Dichloroethane	ND	0.500						0	0	25	
1,2-Dichloroethane	ND	0.500						0	0	25	
1,1-Dichloroethene	ND	0.500						0	0	25	
1,2-Dichloropropane	ND	0.500						0	0	25	
trans-1,2-Dichloroethylene	ND	0.500						0	0	25	
cis-1,3-Dichloropropene	ND	0.500						0	0	25	
trans-1,3-Dichloropropene	ND	0.500						0	0	25	
Ethylbenzene	ND	0.500						0	0	25	
Methylene chloride	ND	0.500						0	0	25	
1,1,2,2-Tetrachloroethane	ND	0.500						0	0	25	
Tetrachloroethene	ND	0.500						0	0	25	
Toluene	ND	0.500						0	0	25	
1,2,4-Trichlorobenzene	ND	0.500						0	0	25	
1,1,1-Trichloroethane	ND	0.500						0	0	25	
1,1,2-Trichloroethane	ND	0.500						0	0	25	
Trichloroethene	ND	0.500						0	0	25	
Trichlorofluoromethane	ND	0.500						0	0	25	
Vinyl chloride	ND	0.500						0	0	25	
o-Xylene	ND	0.500						0	0	25	
m,p-Xylene	ND	1.00						0	0	25	
Xylenes, Total	ND	1.50						0	0	0	
Surr: Dibromofluoromethane	38.41	0	40	0	96.0	80	120	0	0	25	
Surr: Toluene-d8	38.62	0	40	0	96.6	80	120	0	0	25	
Surr: 4-Bromofluorobenzene	40.24	0	40	0	101	80	120	0	0	25	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **MB-42978** SampType: **MBLK** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657008**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4,5-Tetrachlorobenzene	ND	1.00									
1,2,4-Trichlorobenzene	ND	1.00									
1,2-Diphenylhydrazine as Azobenzene	ND	2.00									
2,4,5-Trichlorophenol	ND	1.00									
2,4,6-Trichlorophenol	ND	1.00									
2,4-Dichlorophenol	ND	1.00									
2,4-Dimethylphenol	ND	2.00									
2,4-Dinitrophenol	ND	5.00									
2,4-Dinitrotoluene	ND	1.00									
2,6-Dinitrotoluene	ND	1.00									
2-Chloronaphthalene	ND	1.00									
2-Chlorophenol	ND	1.00									
2-Methylphenol (Cresol)	ND	1.00									
2-Nitrophenol	ND	2.00									
3+4-Methylphenol (m,p Cresol)	ND	1.00									
3,3´-Dichlorobenzidine	ND	1.00									
4,6-Dinitro-2-methylphenol	ND	2.00									
4-Bromophenyl phenyl ether	ND	1.00									
4-Chloro-3-methylphenol	ND	1.00									
4-Chlorophenyl phenyl ether	ND	1.00									
4-Nitrophenol	ND	5.00									
Acenaphthene	ND	1.00									
Acenaphthylene	ND	1.00									
Anthracene	ND	1.00									
Benzidine	ND	10.0									
Benzo(a)anthracene	ND	0.500									
Benzo(a)pyrene	ND	0.500									
Benzo(b)fluoranthene	ND	0.500									
Benzo(g,h,i)perylene	ND	1.00									

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **MB-42978** SampType: **MBLK** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657008**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(k)fluoranthene	ND	0.500									
Bis(2-chloroethoxy)methane	ND	2.00									
Bis(2-chloroethyl)ether	ND	1.00									
Bis(2-chloroisopropyl)ether	ND	2.00									
Bis(2-ethylhexyl)phthalate	ND	1.00									
Butyl benzyl phthalate	ND	1.00									
Chrysene	ND	0.500									
Di-n-butyl phthalate	ND	1.00									
Di-n-octyl phthalate	ND	1.00									
Dibenz(a,h)anthracene	ND	0.500									
Diethyl phthalate	ND	1.00									
Dimethyl phthalate	ND	1.00									
Fluoranthene	ND	2.00									
Fluorene	ND	1.00									
Hexachlorobenzene	ND	1.00									
Hexachlorobutadiene	ND	2.00									
Hexachlorocyclopentadiene	ND	2.00									
Hexachloroethane	ND	1.00									
Indeno(1,2,3-cd)pyrene	ND	0.500									
Isophorone	ND	1.00									
N-Nitrosodi-n-propylamine	ND	2.00									
N-Nitrosodimethylamine	ND	1.00									
N-Nitrosodiphenylamine	ND	1.00									
Naphthalene	ND	1.00									
Nitrobenzene	ND	1.00									
Pentachlorobenzene	ND	1.00									
Pentachlorophenol	ND	1.00									
Phenanthrene	ND	1.00									
Phenol	ND	1.00									

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **MB-42978** SampType: **MBLK** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657008**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pyrene	ND	1.00									
Surr: 2,4,6-Tribromophenol	35.89	0	50	0	71.8	20	140				
Surr: 2-Fluorobiphenyl	17.57	0	25	0	70.3	40	140				
Surr: 2-Fluorophenol	14.10	0	50	0	28.2	10	120				
Surr: 4-Terphenyl-d14	20.52	0	25	0	82.1	50	140				
Surr: Nitrobenzene-d5	16.91	0	25	0	67.6	40	140				
Surr: Phenol-d6	9.320	0	50	0	18.6	10	110				

Sample ID **LCS-42978** SampType: **LCS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657007**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4,5-Tetrachlorobenzene	15.11	1.00	20	0	75.6	40	140				
1,2,4-Trichlorobenzene	29.39	1.00	40	0	73.5	44	142				
1,2-Diphenylhydrazine as Azobenzene	35.16	2.00	40	0	87.9	50	150				
2,4,5-Trichlorophenol	36.76	1.00	40	0	91.9	40	140				
2,4,6-Trichlorophenol	36.70	1.00	40	0	91.8	37	144				
2,4-Dichlorophenol	32.35	1.00	40	0	80.9	39	135				
2,4-Dimethylphenol	25.21	2.00	40	0	63.0	32	119				
2,4-Dinitrophenol	32.74	5.00	40	0	81.8	0	191				
2,4-Dinitrotoluene	33.35	1.00	40	0	83.4	39	139				
2,6-Dinitrotoluene	35.46	1.00	40	0	88.6	50	158				
2-Chloronaphthalene	32.27	1.00	40	0	80.7	60	118				
2-Chlorophenol	25.25	1.00	40	0	63.1	23	134				
2-Methylphenol (Cresol)	21.81	1.00	40	0	54.5	40	140				
2-Nitrophenol	32.81	2.00	40	0	82.0	29	182				
3+4-Methylphenol (m,p Cresol)	20.08	1.00	40	0	50.2	40	140				
3,3´-Dichlorobenzidine	71.66	1.00	80	0	89.6	0	262				
4,6-Dinitro-2-methylphenol	36.34	2.00	40	0	90.8	0	181				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **LCS-42978** SampType: **LCS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657007**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Bromophenyl phenyl ether	36.33	1.00	40	0	90.8	53	127				
4-Chloro-3-methylphenol	32.19	1.00	40	0	80.5	22	147				
4-Chlorophenyl phenyl ether	33.99	1.00	40	0	85.0	25	158				
4-Nitrophenol	13.20	5.00	40	0	33.0	0	132				
Acenaphthene	33.08	1.00	40	0	82.7	47	145				
Acenaphthylene	34.17	1.00	40	0	85.4	33	145				
Anthracene	35.69	1.00	40	0	89.2	27	133				
Benzidine	18.93	10.0	80	0	23.7	10	132				
Benzo(a)anthracene	35.46	0.500	40	0	88.6	33	143				
Benzo(a)pyrene	38.64	0.500	40	0	96.6	17	163				
Benzo(b)fluoranthene	37.91	0.500	40	0	94.8	24	159				
Benzo(g,h,i)perylene	36.83	1.00	40	0	92.1	0	219				
Benzo(k)fluoranthene	36.83	0.500	40	0	92.1	11	162				
Bis(2-chloroethoxy)methane	32.46	2.00	40	0	81.2	33	184				
Bis(2-chloroethyl)ether	29.58	1.00	40	0	74.0	12	158				
Bis(2-chloroisopropyl)ether	29.95	2.00	40	0	74.9	36	166				
Bis(2-ethylhexyl)phthalate	37.13	1.00	40	0	92.8	8	158				
Butyl benzyl phthalate	37.27	1.00	40	0	93.2	0	152				
Chrysene	35.25	0.500	40	0	88.1	17	168				
Di-n-butyl phthalate	37.06	1.00	40	0	92.6	1	118				
Di-n-octyl phthalate	36.76	1.00	40	0	91.9	4	146				
Dibenz(a,h)anthracene	37.56	0.500	40	0	93.9	0	227				
Diethyl phthalate	34.46	1.00	40	0	86.2	0	114				
Dimethyl phthalate	33.25	1.00	40	0	83.1	0	112				
Fluoranthene	37.35	2.00	40	0	93.4	26	137				
Fluorene	33.17	1.00	40	0	82.9	59	121				
Hexachlorobenzene	37.02	1.00	40	0	92.6	0	152				
Hexachlorobutadiene	30.10	2.00	40	0	75.2	24	116				
Hexachlorocyclopentadiene	31.55	2.00	40	0	78.9	25	150				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **LCS-42978** SampType: **LCS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657007**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachloroethane	28.48	1.00	40	0	71.2	40	113				
Indeno(1,2,3-cd)pyrene	37.16	0.500	40	0	92.9	0	171				
Isophorone	35.12	1.00	40	0	87.8	21	196				
N-Nitrosodi-n-propylamine	34.21	2.00	40	0	85.5	0	230				
N-Nitrosodimethylamine	14.61	1.00	40	0	36.5	10	129				
N-Nitrosodiphenylamine	36.22	1.00	40	0	90.6	50	150				
Naphthalene	29.94	1.00	40	0	74.8	21	131				
Nitrobenzene	30.21	1.00	40	0	75.5	35	180				
Pentachlorobenzene	16.02	1.00	20	0	80.1	40	140				
Pentachlorophenol	36.29	1.00	40	0	90.7	14	176				
Phenanthrene	34.50	1.00	40	0	86.2	54	120				
Phenol	9.090	1.00	40	0	22.7	5	112				
Pyrene	36.62	1.00	40	0	91.6	52	115				
Surr: 2,4,6-Tribromophenol	39.76	0	50	0	79.5	20	140				
Surr: 2-Fluorobiphenyl	17.32	0	25	0	69.3	40	140				
Surr: 2-Fluorophenol	14.17	0	50	0	28.3	10	120				
Surr: 4-Terphenyl-d14	18.13	0	25	0	72.5	50	140				
Surr: Nitrobenzene-d5	16.47	0	25	0	65.9	40	140				
Surr: Phenol-d6	9.500	0	50	0	19.0	10	110				

Sample ID **1811421-04GMS** SampType: **MS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **City Tap Water 1** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657017**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4,5-Tetrachlorobenzene	14.81	1.00	20	0	74.0	40	140				
1,2,4-Trichlorobenzene	28.36	1.00	40	0	70.9	44	142				
1,2-Diphenylhydrazine as Azobenzene	31.99	2.00	40	0	80.0	50	150				
2,4,5-Trichlorophenol	34.21	1.00	40	0	85.5	40	140				
2,4,6-Trichlorophenol	33.99	1.00	40	0	85.0	37	144				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **1811421-04GMS** SampType: **MS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **City Tap Water 1** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657017**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,4-Dichlorophenol	29.79	1.00	40	0	74.5	39	135				
2,4-Dimethylphenol	21.21	2.00	40	0	53.0	32	119				
2,4-Dinitrophenol	12.78	5.00	40	0	32.0	0	191				
2,4-Dinitrotoluene	28.66	1.00	40	0	71.6	39	139				
2,6-Dinitrotoluene	32.18	1.00	40	0	80.4	50	158				
2-Chloronaphthalene	33.30	1.00	40	0	83.3	60	118				
2-Chlorophenol	23.79	1.00	40	0	59.5	23	134				
2-Methylphenol (Cresol)	20.34	1.00	40	0	50.9	40	140				
2-Nitrophenol	30.78	2.00	40	0	77.0	29	182				
3+4-Methylphenol (m,p Cresol)	17.74	1.00	40	0	44.4	40	140				
3,3´-Dichlorobenzidine	71.50	1.00	80	0	89.4	0	262				
4,6-Dinitro-2-methylphenol	27.17	2.00	40	0	67.9	0	181				
4-Bromophenyl phenyl ether	38.63	1.00	40	0	96.6	53	127				
4-Chloro-3-methylphenol	28.92	1.00	40	0	72.3	22	147				
4-Chlorophenyl phenyl ether	31.97	1.00	40	0	79.9	25	158				
4-Nitrophenol	6.630	5.00	40	0	16.6	0	132				
Acenaphthene	33.03	1.00	40	0	82.6	47	145				
Acenaphthylene	33.23	1.00	40	0	83.1	33	145				
Anthracene	36.48	1.00	40	0	91.2	27	133				
Benzidine	18.95	10.0	80	0	23.7	10	132				
Benzo(a)anthracene	36.20	0.500	40	0	90.5	33	143				
Benzo(a)pyrene	38.42	0.500	40	0	96.0	17	163				
Benzo(b)fluoranthene	38.03	0.500	40	0	95.1	24	159				
Benzo(g,h,i)perylene	39.45	1.00	40	0	98.6	0	219				
Benzo(k)fluoranthene	37.40	0.500	40	0	93.5	11	162				
Bis(2-chloroethoxy)methane	31.78	2.00	40	0	79.4	33	184				
Bis(2-chloroethyl)ether	29.37	1.00	40	0	73.4	12	158				
Bis(2-chloroisopropyl)ether	29.61	2.00	40	0	74.0	36	166				
Bis(2-ethylhexyl)phthalate	38.07	1.00	40	0	95.2	8	158				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **1811421-04GMS** SampType: **MS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **City Tap Water 1** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657017**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Butyl benzyl phthalate	37.74	1.00	40	0	94.4	0	152				
Chrysene	36.28	0.500	40	0	90.7	17	168				
Di-n-butyl phthalate	37.44	1.00	40	0	93.6	1	118				
Di-n-octyl phthalate	39.05	1.00	40	0	97.6	4	146				
Dibenz(a,h)anthracene	40.15	0.500	40	0	100	0	227				
Diethyl phthalate	29.79	1.00	40	0	74.5	0	114				
Dimethyl phthalate	31.10	1.00	40	0	77.8	0	112				
Fluoranthene	38.32	2.00	40	0	95.8	26	137				
Fluorene	30.93	1.00	40	0	77.3	59	121				
Hexachlorobenzene	39.17	1.00	40	0	97.9	0	152				
Hexachlorobutadiene	29.02	2.00	40	0	72.6	24	116				
Hexachlorocyclopentadiene	32.70	2.00	40	0	81.8	25	150				
Hexachloroethane	27.95	1.00	40	0	69.9	40	113				
Indeno(1,2,3-cd)pyrene	39.49	0.500	40	0	98.7	0	171				
Isophorone	34.75	1.00	40	0	86.9	21	196				
N-Nitrosodi-n-propylamine	33.84	2.00	40	0	84.6	0	230				
N-Nitrosodimethylamine	14.14	1.00	40	0	35.4	10	129				
N-Nitrosodiphenylamine	33.60	1.00	40	0	84.0	50	150				
Naphthalene	29.06	1.00	40	0	72.6	21	131				
Nitrobenzene	29.45	1.00	40	0	73.6	35	180				
Pentachlorobenzene	15.99	1.00	20	0	80.0	40	140				
Pentachlorophenol	18.85	1.00	40	0	47.1	14	176				
Phenanthrene	35.65	1.00	40	0	89.1	54	120				
Phenol	8.380	1.00	40	0	21.0	5	112				
Pyrene	37.96	1.00	40	0	94.9	52	115				
Surr: 2,4,6-Tribromophenol	38.74	0	50	0	77.5	20	140				
Surr: 2-Fluorobiphenyl	18.59	0	25	0	74.4	40	140				
Surr: 2-Fluorophenol	13.53	0	50	0	27.1	10	120				
Surr: 4-Terphenyl-d14	18.11	0	25	0	72.4	50	140				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **1811421-04GMS**	SampType: **MS**	TestCode: **EPA625**	Units: **µg/L**	Prep Date: **11/16/2018**	RunNo: **108590**
Client ID: **City Tap Water 1**	Batch ID: **42978**	TestNo: **EPA 625**	**(EPA 3510C)**	Analysis Date: **12/5/2018**	SeqNo: **1657017**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	16.10	0	25	0	64.4	40	140				
Surr: Phenol-d6	8.990	0	50	0	18.0	10	110				

Sample ID **1811421-04GMSD**	SampType: **MSD**	TestCode: **EPA625**	Units: **µg/L**	Prep Date: **11/16/2018**	RunNo: **108590**
Client ID: **City Tap Water 1**	Batch ID: **42978**	TestNo: **EPA 625**	**(EPA 3510C)**	Analysis Date: **12/5/2018**	SeqNo: **1657018**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4,5-Tetrachlorobenzene	15.14	1.00	20	0	75.7	40	140	14.81	2.20	25	
1,2,4-Trichlorobenzene	28.38	1.00	40	0	71.0	44	142	28.36	0.0705	25	
1,2-Diphenylhydrazine as Azobenzene	36.21	2.00	40	0	90.5	50	150	31.99	12.4	25	
2,4,5-Trichlorophenol	33.39	1.00	40	0	83.5	40	140	34.21	2.43	25	
2,4,6-Trichlorophenol	31.81	1.00	40	0	79.5	37	144	33.99	6.63	25	
2,4-Dichlorophenol	29.12	1.00	40	0	72.8	39	135	29.79	2.27	25	
2,4-Dimethylphenol	19.61	2.00	40	0	49.0	32	119	21.21	7.84	25	
2,4-Dinitrophenol	14.63	5.00	40	0	36.6	0	191	12.78	13.5	25	
2,4-Dinitrotoluene	36.03	1.00	40	0	90.1	39	139	28.66	22.8	25	
2,6-Dinitrotoluene	36.87	1.00	40	0	92.2	50	158	32.18	13.6	25	
2-Chloronaphthalene	31.68	1.00	40	0	79.2	60	118	33.3	4.99	25	
2-Chlorophenol	22.50	1.00	40	0	56.2	23	134	23.79	5.57	25	
2-Methylphenol (Cresol)	18.76	1.00	40	0	46.9	40	140	20.34	8.08	25	
2-Nitrophenol	30.41	2.00	40	0	76.0	29	182	30.78	1.21	25	
3+4-Methylphenol (m,p Cresol)	16.22	1.00	40	0	40.6	40	140	17.74	8.95	25	
3,3´-Dichlorobenzidine	72.82	1.00	80	0	91.0	0	262	71.5	1.83	25	
4,6-Dinitro-2-methylphenol	27.52	2.00	40	0	68.8	0	181	27.17	1.28	25	
4-Bromophenyl phenyl ether	35.58	1.00	40	0	89.0	53	127	38.63	8.22	25	
4-Chloro-3-methylphenol	28.88	1.00	40	0	72.2	22	147	28.92	0.138	25	
4-Chlorophenyl phenyl ether	34.15	1.00	40	0	85.4	25	158	31.97	6.59	25	
4-Nitrophenol	9.160	5.00	40	0	22.9	0	132	6.63	32.0	25	MI
Acenaphthene	32.86	1.00	40	0	82.2	47	145	33.03	0.516	25	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **1811421-04GMSD** SampType: **MSD** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **City Tap Water 1** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657018**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthylene	33.16	1.00	40	0	82.9	33	145	33.23	0.211	25	
Anthracene	36.25	1.00	40	0	90.6	27	133	36.48	0.632	25	
Benzidine	16.25	10.0	80	0	20.3	10	132	18.95	15.3	60	
Benzo(a)anthracene	36.99	0.500	40	0	92.5	33	143	36.2	2.16	25	
Benzo(a)pyrene	38.49	0.500	40	0	96.2	17	163	38.42	0.182	25	
Benzo(b)fluoranthene	38.40	0.500	40	0	96.0	24	159	38.03	0.968	25	
Benzo(g,h,i)perylene	40.29	1.00	40	0	101	0	219	39.45	2.11	25	
Benzo(k)fluoranthene	37.12	0.500	40	0	92.8	11	162	37.4	0.751	25	
Bis(2-chloroethoxy)methane	31.81	2.00	40	0	79.5	33	184	31.78	0.0944	25	
Bis(2-chloroethyl)ether	28.92	1.00	40	0	72.3	12	158	29.37	1.54	25	
Bis(2-chloroisopropyl)ether	29.13	2.00	40	0	72.8	36	166	29.61	1.63	25	
Bis(2-ethylhexyl)phthalate	38.91	1.00	40	0	97.3	8	158	38.07	2.18	25	
Butyl benzyl phthalate	38.95	1.00	40	0	97.4	0	152	37.74	3.16	25	
Chrysene	36.49	0.500	40	0	91.2	17	168	36.28	0.577	25	
Di-n-butyl phthalate	39.60	1.00	40	0	99.0	1	118	37.44	5.61	25	
Di-n-octyl phthalate	38.60	1.00	40	0	96.5	4	146	39.05	1.16	25	
Dibenz(a,h)anthracene	41.08	0.500	40	0	103	0	227	40.15	2.29	25	
Diethyl phthalate	36.21	1.00	40	0	90.5	0	114	29.79	19.5	25	
Dimethyl phthalate	34.48	1.00	40	0	86.2	0	112	31.1	10.3	25	
Fluoranthene	39.76	2.00	40	0	99.4	26	137	38.32	3.69	25	
Fluorene	33.81	1.00	40	0	84.5	59	121	30.93	8.90	25	
Hexachlorobenzene	36.97	1.00	40	0	92.4	0	152	39.17	5.78	25	
Hexachlorobutadiene	28.72	2.00	40	0	71.8	24	116	29.02	1.04	25	
Hexachlorocyclopentadiene	30.67	2.00	40	0	76.7	25	150	32.7	6.41	25	
Hexachloroethane	27.17	1.00	40	0	67.9	40	113	27.95	2.83	25	
Indeno(1,2,3-cd)pyrene	40.57	0.500	40	0	101	0	171	39.49	2.70	25	
Isophorone	34.84	1.00	40	0	87.1	21	196	34.75	0.259	25	
N-Nitrosodi-n-propylamine	33.59	2.00	40	0	84.0	0	230	33.84	0.742	25	
N-Nitrosodimethylamine	14.27	1.00	40	0	35.7	10	129	14.14	0.915	25	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **1811421-04GMSD** SampType: **MSD** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **City Tap Water 1** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657018**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
N-Nitrosodiphenylamine	29.57	1.00	40	0	73.9	50	150	33.6	12.8	25	
Naphthalene	28.88	1.00	40	0	72.2	21	131	29.06	0.621	25	
Nitrobenzene	29.47	1.00	40	0	73.7	35	180	29.45	0.0679	25	
Pentachlorobenzene	16.69	1.00	20	0	83.4	40	140	15.99	4.28	25	
Pentachlorophenol	17.20	1.00	40	0	43.0	14	176	18.85	9.15	25	
Phenanthrene	35.31	1.00	40	0	88.3	54	120	35.65	0.958	25	
Phenol	8.290	1.00	40	0	20.7	5	112	8.38	1.08	25	
Pyrene	39.28	1.00	40	0	98.2	52	115	37.96	3.42	25	
Surr: 2,4,6-Tribromophenol	36.00	0	50	0	72.0	20	140	0	0	25	
Surr: 2-Fluorobiphenyl	17.70	0	25	0	70.8	40	140	0	0	25	
Surr: 2-Fluorophenol	13.09	0	50	0	26.2	10	120	0	0	25	
Surr: 4-Terphenyl-d14	19.46	0	25	0	77.8	50	140	0	0	25	
Surr: Nitrobenzene-d5	16.43	0	25	0	65.7	40	140	0	0	25	
Surr: Phenol-d6	9.010	0	50	0	18.0	10	110	0	0	25	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: HG_WW

Sample ID	MB-43021	SampType:	MBLK	TestCode:	HG_WW	Units:	µg/L	Prep Date:	11/21/2018	RunNo:	108356
Client ID:	ZZZZZ	Batch ID:	43021	TestNo:	EPA 245.1		(EPA 245.1/7	Analysis Date:	11/26/2018	SeqNo:	1652481

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.02800	0.200									J

Sample ID	LCS-43021	SampType:	LCS	TestCode:	HG_WW	Units:	µg/L	Prep Date:	11/21/2018	RunNo:	108356
Client ID:	ZZZZZ	Batch ID:	43021	TestNo:	EPA 245.1		(EPA 245.1/7	Analysis Date:	11/26/2018	SeqNo:	1652482

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.516	0.200	5	0.028	110	80	120				

Sample ID	1811421-06JMS	SampType:	MS	TestCode:	HG_WW	Units:	µg/L	Prep Date:	11/21/2018	RunNo:	108356
Client ID:	City Tap Water 3	Batch ID:	43021	TestNo:	EPA 245.1		(EPA 245.1/7	Analysis Date:	11/26/2018	SeqNo:	1652484

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.596	0.200	5	0	112	75	125				

Sample ID	1811471-02JMS	SampType:	MS	TestCode:	HG_WW	Units:	µg/L	Prep Date:	11/21/2018	RunNo:	108356
Client ID:	ZZZZZ	Batch ID:	43021	TestNo:	EPA 245.1		(EPA 245.1/7	Analysis Date:	11/26/2018	SeqNo:	1652486

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.556	0.200	5	0	111	75	125				

Sample ID	1811421-06JMSD	SampType:	MSD	TestCode:	HG_WW	Units:	µg/L	Prep Date:	11/21/2018	RunNo:	108356
Client ID:	City Tap Water 3	Batch ID:	43021	TestNo:	EPA 245.1		(EPA 245.1/7	Analysis Date:	11/26/2018	SeqNo:	1652485

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.774	0.200	5	0	115	75	125	5.596	3.13	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: HG_WW

Sample ID **1811471-02JMSD** SampType: **MSD** TestCode: **HG_WW** Units: **µg/L** Prep Date: **11/21/2018** RunNo: **108356**
Client ID: **ZZZZZ** Batch ID: **43021** TestNo: **EPA 245.1** **(EPA 245.1/7** Analysis Date: **11/26/2018** SeqNo: **1652487**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.570	0.200	5	0	111	75	125	5.556	0.252	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP-HARD_WW

Sample ID **MB-42970** SampType: **MBLK** TestCode: **ICP-HARD_W** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108139**
Client ID: **ZZZZZ** Batch ID: **42970** TestNo: **SM 2340B (EPA 200.7)** Analysis Date: **11/15/2018** SeqNo: **1649241**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	ND	6620									

Sample ID **MB-42970** SampType: **MBLK** TestCode: **ICP-HARD_W** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108532**
Client ID: **ZZZZZ** Batch ID: **42970** TestNo: **SM 2340B (EPA 200.7)** Analysis Date: **11/15/2018** SeqNo: **1655824**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	ND	6620									

Sample ID **LCS-42970** SampType: **LCS** TestCode: **ICP-HARD_W** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108139**
Client ID: **ZZZZZ** Batch ID: **42970** TestNo: **SM 2340B (EPA 200.7)** Analysis Date: **11/15/2018** SeqNo: **1649242**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	6683	6620	6615	0	101	85	115				

Sample ID **LCS-42970** SampType: **LCS** TestCode: **ICP-HARD_W** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108532**
Client ID: **ZZZZZ** Batch ID: **42970** TestNo: **SM 2340B (EPA 200.7)** Analysis Date: **11/15/2018** SeqNo: **1655825**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	6683	6620	6615	0	101	85	115				

Sample ID **1811490-01AMS** SampType: **MS** TestCode: **ICP-HARD_W** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108139**
Client ID: **ZZZZZ** Batch ID: **42970** TestNo: **SM 2340B (EPA 200.7)** Analysis Date: **11/15/2018** SeqNo: **1649254**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	141800	6620	138800	2046	101	70	130				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP-HARD_WW

Sample ID **1811490-01AMS**	SampType: **MS**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108532**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1655830**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	141800	6620	138800	2046	101	70	130				

Sample ID **1811490-01AMSD**	SampType: **MSD**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108139**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1649255**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	141700	6620	138800	2046	101	70	130	141800	0.0176	20	

Sample ID **1811490-01AMSD**	SampType: **MSD**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108532**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1655831**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	141700	6620	138800	2046	101	70	130	141800	0.0176	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_200.7_WW

Sample ID **MB-42970**	SampType: **MBLK**	TestCode: **ICP_200.7_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108136**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **EPA 200.7**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1649194**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									
Calcium	ND	1000									
Iron	ND	15.0									
Magnesium	ND	1000									
Potassium	ND	1000									
Sodium	128.1	1000									J

Sample ID **LCS-42970**	SampType: **LCS**	TestCode: **ICP_200.7_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108136**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **EPA 200.7**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1649195**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	980.5	10.0	1000	0	98.0	85	115				
Calcium	1014	1000	1000	0	101	85	115				
Iron	1007	15.0	1000	0	101	85	115				
Magnesium	1008	1000	1000	0	101	85	115				
Potassium	878.4	1000	1000	0	87.8	85	115				J
Sodium	2073	1000	2000	128.1	97.2	85	115				

Sample ID **1811490-01AMS**	SampType: **MS**	TestCode: **ICP_200.7_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108136**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **EPA 200.7**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1649207**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	20880	10.0	21000	13	99.4	70	130				
Calcium	21430	1000	21000	767.1	98.4	70	130				
Iron	21160	15.0	21000	7.5	101	70	130				
Magnesium	21430	1000	21000	31.7	102	70	130				
Potassium	23710	1000	21000	200.9	112	70	130				
Sodium	120800	1000	21000	96470	116	70	130				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_200.7_WW

Sample ID **1811490-01AMSD** SampType: **MSD** TestCode: **ICP_200.7_W** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108136**
Client ID: **ZZZZZ** Batch ID: **42970** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **11/15/2018** SeqNo: **1649208**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	20850	10.0	21000	13	99.2	70	130	20880	0.144	20	
Calcium	21420	1000	21000	767.1	98.3	70	130	21430	0.0467	20	
Iron	21140	15.0	21000	7.5	101	70	130	21160	0.0946	20	
Magnesium	21430	1000	21000	31.7	102	70	130	21430	0	20	
Potassium	23870	1000	21000	200.9	113	70	130	23710	0.673	20	
Sodium	121400	1000	21000	96470	119	70	130	120800	0.495	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_WW

Sample ID **MB-42974** SampType: **MBLK** TestCode: **ICPMS_WW** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108149**
Client ID: **ZZZZZ** Batch ID: **42974** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **11/16/2018** SeqNo: **1653305**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.07600	0.500									J

Sample ID **MB-42974** SampType: **MBLK** TestCode: **ICPMS_WW** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108149**
Client ID: **ZZZZZ** Batch ID: **42974** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **11/21/2018** SeqNo: **1653323**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Beryllium	ND	0.100									
Cadmium	0.003000	0.100									J
Chromium	0.05600	0.400									J
Copper	0.03900	0.500									J
Lead	ND	0.100									
Manganese	0.04800	2.00									J
Nickel	ND	0.500									
Selenium	ND	0.500									
Silver	ND	0.100									
Thallium	0.008000	0.100									J
Zinc	ND	5.00									

Sample ID **LCS-42974** SampType: **LCS** TestCode: **ICPMS_WW** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108149**
Client ID: **ZZZZZ** Batch ID: **42974** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **11/16/2018** SeqNo: **1653306**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	99.52	0.500	100	0.3	99.2	85	115				
Beryllium	98.07	0.100	100	0	98.1	85	115				
Cadmium	96.45	0.100	100	0.003	96.4	85	115				
Chromium	96.24	0.400	100	0.056	96.2	85	115				
Copper	97.02	0.500	100	0.039	97.0	85	115				
Lead	95.12	0.100	100	0	95.1	85	115				
Manganese	97.08	2.00	100	0.048	97.0	85	115				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_WW

Sample ID **LCS-42974** SampType: **LCS** TestCode: **ICPMS_WW** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108149**
Client ID: **ZZZZZ** Batch ID: **42974** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **11/16/2018** SeqNo: **1653306**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nickel	95.60	0.500	100	0	95.6	85	115				
Selenium	95.69	0.500	100	0	95.7	85	115				
Silver	94.77	0.100	100	0	94.8	85	115				
Thallium	95.77	0.100	100	0.008	95.8	85	115				
Zinc	98.64	5.00	100	0	98.6	85	115				

Sample ID **1811471-02JMS** SampType: **MS** TestCode: **ICPMS_WW** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108149**
Client ID: **ZZZZZ** Batch ID: **42974** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **11/16/2018** SeqNo: **1653317**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	100.6	0.500	100	0.35	100	70	130				
Beryllium	92.40	0.100	100	0	92.4	70	130				
Cadmium	95.95	0.100	100	0	96.0	70	130				
Chromium	95.92	0.400	100	0	95.9	70	130				
Copper	96.36	0.500	100	3.21	93.1	70	130				
Lead	94.10	0.100	100	0.21	93.9	70	130				
Manganese	98.86	2.00	100	3.886	95.0	70	130				
Nickel	93.54	0.500	100	0.155	93.4	70	130				
Selenium	91.96	0.500	100	0	92.0	70	130				
Silver	92.74	0.100	100	0.003	92.7	70	130				
Thallium	94.47	0.100	100	0	94.5	70	130				
Zinc	96.70	5.00	100	0.862	95.8	70	130				

Sample ID **1811471-02JMSD** SampType: **MSD** TestCode: **ICPMS_WW** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108149**
Client ID: **ZZZZZ** Batch ID: **42974** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **11/16/2018** SeqNo: **1653318**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	95.25	0.500	100	0.35	94.9	70	130	100.6	5.43	20	
Beryllium	87.17	0.100	100	0	87.2	70	130	92.4	5.82	20	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_WW

Sample ID **1811471-02JMSD** SampType: **MSD** TestCode: **ICPMS_WW** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108149**
Client ID: **ZZZZZ** Batch ID: **42974** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **11/16/2018** SeqNo: **1653318**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	89.35	0.100	100	0	89.4	70	130	95.95	7.12	20	
Chromium	89.55	0.400	100	0	89.5	70	130	95.92	6.87	20	
Copper	91.70	0.500	100	3.21	88.5	70	130	96.36	4.95	20	
Lead	88.71	0.100	100	0.21	88.5	70	130	94.1	5.89	20	
Manganese	92.54	2.00	100	3.886	88.6	70	130	98.86	6.61	20	
Nickel	88.28	0.500	100	0.155	88.1	70	130	93.54	5.79	20	
Selenium	86.64	0.500	100	0	86.6	70	130	91.96	5.95	20	
Silver	86.56	0.100	100	0.003	86.6	70	130	92.74	6.90	20	
Thallium	88.83	0.100	100	0	88.8	70	130	94.47	6.15	20	
Zinc	91.96	5.00	100	0.862	91.1	70	130	96.7	5.02	20	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_WWDISS

Sample ID	MB-42985	SampType:	MBLK	TestCode:	ICPMS_WWD	Units:	µg/L	Prep Date:	11/16/2018	RunNo:	108179
Client ID:	ZZZZZ	Batch ID:	42985	TestNo:	EPA 200.8	(EPA 3005A)		Analysis Date:	11/19/2018	SeqNo:	1649837

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	0.002000	0.100									J
Copper	ND	0.500									
Lead	ND	0.100									
Nickel	ND	0.500									
Selenium	ND	0.500									
Silver	ND	0.100									
Zinc	0.4880	5.00									J

Sample ID	LCS-42985	SampType:	LCS	TestCode:	ICPMS_WWD	Units:	µg/L	Prep Date:	11/16/2018	RunNo:	108179
Client ID:	ZZZZZ	Batch ID:	42985	TestNo:	EPA 200.8	(EPA 3005A)		Analysis Date:	11/19/2018	SeqNo:	1649838

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	102.5	0.100	100	0.002	102	85	115				
Copper	104.9	0.500	100	0	105	85	115				
Lead	100.5	0.100	100	0	100	85	115				
Nickel	101.0	0.500	100	0	101	85	115				
Selenium	102.4	0.500	100	0	102	85	115				
Silver	101.3	0.100	100	0	101	85	115				
Zinc	105.5	5.00	100	0.488	105	85	115				

Sample ID	1811421-05IMS	SampType:	MS	TestCode:	ICPMS_WWD	Units:	µg/L	Prep Date:	11/16/2018	RunNo:	108179
Client ID:	City Tap Water 2	Batch ID:	42985	TestNo:	EPA 200.8	(EPA 3005A)		Analysis Date:	11/19/2018	SeqNo:	1649847

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	104.1	0.100	100	0.004	104	70	130				
Copper	116.2	0.500	100	8.796	107	70	130				
Lead	102.1	0.100	100	0.138	102	70	130				
Nickel	102.7	0.500	100	0.209	103	70	130				
Selenium	99.99	0.500	100	0	100	70	130				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_WWDISS

Sample ID **1811421-05IMS** SampType: **MS** TestCode: **ICPMS_WWD** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108179**
Client ID: **City Tap Water 2** Batch ID: **42985** TestNo: **EPA 200.8** **(EPA 3005A)** Analysis Date: **11/19/2018** SeqNo: **1649847**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Silver	100.6	0.100	100	0	101	70	130				
Zinc	115.0	5.00	100	3.931	111	70	130				

Sample ID **1811421-05IMSD** SampType: **MSD** TestCode: **ICPMS_WWD** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108179**
Client ID: **City Tap Water 2** Batch ID: **42985** TestNo: **EPA 200.8** **(EPA 3005A)** Analysis Date: **11/19/2018** SeqNo: **1649848**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	103.3	0.100	100	0.004	103	70	130	104.1	0.749	20	
Copper	114.3	0.500	100	8.796	106	70	130	116.2	1.64	20	
Lead	102.2	0.100	100	0.138	102	70	130	102.1	0.0842	20	
Nickel	100.1	0.500	100	0.209	99.9	70	130	102.7	2.61	20	
Selenium	98.51	0.500	100	0	98.5	70	130	99.99	1.49	20	
Silver	100.1	0.100	100	0	100	70	130	100.6	0.570	20	
Zinc	113.0	5.00	100	3.931	109	70	130	115	1.76	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: NO2NO3_AUTO_W

Sample ID **MBLK** SampType: **MBLK** TestCode: **NO2NO3_AU** Units: **mg/L** Prep Date: RunNo: **108183**
Client ID: **ZZZZZ** Batch ID: **R108183** TestNo: **EPA 353.2** Analysis Date: **11/19/2018** SeqNo: **1649915**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate-Nitrite	ND	0.0500									

Sample ID **LCS** SampType: **LCS** TestCode: **NO2NO3_AU** Units: **mg/L** Prep Date: RunNo: **108183**
Client ID: **ZZZZZ** Batch ID: **R108183** TestNo: **EPA 353.2** Analysis Date: **11/19/2018** SeqNo: **1649914**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate-Nitrite	30.54	1.00	30	0	102	90	110				

Sample ID **1811427-01AMS** SampType: **MS** TestCode: **NO2NO3_AU** Units: **mg/L** Prep Date: RunNo: **108183**
Client ID: **ZZZZZ** Batch ID: **R108183** TestNo: **EPA 353.2** Analysis Date: **11/19/2018** SeqNo: **1649902**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate-Nitrite	1.273	0.100	1	0.0994	117	80	120				

Sample ID **1811427-01AMSD** SampType: **MSD** TestCode: **NO2NO3_AU** Units: **mg/L** Prep Date: RunNo: **108183**
Client ID: **ZZZZZ** Batch ID: **R108183** TestNo: **EPA 353.2** Analysis Date: **11/19/2018** SeqNo: **1649903**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate-Nitrite	1.254	0.100	1	0.0994	115	80	120	1.273	1.55	20	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: PHOS-T_W

Sample ID	**MB-42967**	SampType:	**MBLK**	TestCode:	**PHOS-T_W**	Units:	**mg/L**	Prep Date:	**11/15/2018**	RunNo:	**108091**
Client ID:	**ZZZZZ**	Batch ID:	**42967**	TestNo:	**SM 4500-P E**	**(SM 4500 P-E**		Analysis Date:	**11/15/2018**	SeqNo:	**1648528**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	ND	0.0250									

Sample ID	**LCS-42967**	SampType:	**LCS**	TestCode:	**PHOS-T_W**	Units:	**mg/L**	Prep Date:	**11/15/2018**	RunNo:	**108091**
Client ID:	**ZZZZZ**	Batch ID:	**42967**	TestNo:	**SM 4500-P E**	**(SM 4500 P-E**		Analysis Date:	**11/15/2018**	SeqNo:	**1648529**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.5150	0.0250	0.5	0	103	85	115				

Sample ID	**1811306-02BMS**	SampType:	**MS**	TestCode:	**PHOS-T_W**	Units:	**mg/L**	Prep Date:	**11/16/2018**	RunNo:	**108091**
Client ID:	**ZZZZZ**	Batch ID:	**42967**	TestNo:	**SM 4500-P E**	**(SM 4500 P-E**		Analysis Date:	**11/15/2018**	SeqNo:	**1648535**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	22.20	1.25	10	12.39	98.1	80	120				

Sample ID	**1811306-02BMSD**	SampType:	**MSD**	TestCode:	**PHOS-T_W**	Units:	**mg/L**	Prep Date:	**11/16/2018**	RunNo:	**108091**
Client ID:	**ZZZZZ**	Batch ID:	**42967**	TestNo:	**SM 4500-P E**	**(SM 4500 P-E**		Analysis Date:	**11/15/2018**	SeqNo:	**1648536**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	22.12	1.25	10	12.39	97.3	80	120	22.2	0.372	15	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: SOLIDS_TDS_W

Sample ID **MB-42977**	SampType: **MBLK**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **11/15/2018**	RunNo: **108336**
Client ID: **ZZZZZ**	Batch ID: **42977**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **11/15/2018**	SeqNo: **1652098**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	5.00									

Sample ID **LCS-42977**	SampType: **LCS**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **11/15/2018**	RunNo: **108336**
Client ID: **ZZZZZ**	Batch ID: **42977**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **11/15/2018**	SeqNo: **1652099**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	95.00	5.00	100	0	95.0	80	120				

Sample ID **1811471-02ADUP**	SampType: **DUP**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **11/15/2018**	RunNo: **108336**
Client ID: **ZZZZZ**	Batch ID: **42977**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **11/15/2018**	SeqNo: **1652109**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	57.50	5.00						56.25	2.20	5	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: SOLIDS_TSS_W

Sample ID	MB-42966	SampType:	MBLK	TestCode:	SOLIDS_TSS	Units:	mg/L	Prep Date:	11/15/2018	RunNo:	108134
Client ID:	ZZZZZ	Batch ID:	42966	TestNo:	SM 2540D	(Solids)		Analysis Date:	11/15/2016	SeqNo:	1649128

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	ND	1.00									

Sample ID	LCS-42966	SampType:	LCS	TestCode:	SOLIDS_TSS	Units:	mg/L	Prep Date:	11/15/2018	RunNo:	108134
Client ID:	ZZZZZ	Batch ID:	42966	TestNo:	SM 2540D	(Solids)		Analysis Date:	11/15/2016	SeqNo:	1649129

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	900.0	40.0	1000	0	90.0	80	120				

Sample ID	1811421-02BDUP	SampType:	DUP	TestCode:	SOLIDS_TSS	Units:	mg/L	Prep Date:	11/15/2018	RunNo:	108134
Client ID:	Well Water 2	Batch ID:	42966	TestNo:	SM 2540D	(Solids)		Analysis Date:	11/15/2018	SeqNo:	1649133

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	21.11	4.00						17.78	17.1	5	MI

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811421
Project: 108.01593.00005 Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: TURBIDITY_W

Sample ID	MB-R108053	SampType:	MBLK	TestCode:	TURBIDITY_	Units:	NTU	Prep Date:		RunNo:	108053
Client ID:	ZZZZZ	Batch ID:	R108053	TestNo:	SM 2130B			Analysis Date:	11/13/2018	SeqNo:	1647600

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	ND	0.100									

Sample ID	LCS-R108053	SampType:	LCS	TestCode:	TURBIDITY_	Units:	NTU	Prep Date:		RunNo:	108053
Client ID:	ZZZZZ	Batch ID:	R108053	TestNo:	SM 2130B			Analysis Date:	11/13/2018	SeqNo:	1647601

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	2.310	0.100	2.31	0	100	90	110				

Sample ID	1811421-01ADUP	SampType:	DUP	TestCode:	TURBIDITY_	Units:	NTU	Prep Date:		RunNo:	108053
Client ID:	Well Water 1	Batch ID:	R108053	TestNo:	SM 2130B			Analysis Date:	11/13/2018	SeqNo:	1647603

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	145.0	0.100						145	0	10	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory
245 South Grape Street * Medford, OR 97501
(541) 770-5678 fax (541) 770-2901

Chain of Custody Record

This Chain of Custody is a LEGAL DOCUMENT and must be filled out accurately.

Section A — Required Client Information

Company:	SLR Consulting
Address:	1800 Blankenship Road, Ste 440
	West Linn, OR 97068
Email:	cbrow@slrconsulting.com
Phone:	503-905-3729 Fax:
Collected By (Print):	Tyler Weber
Collected By (Sign):	[signature]
Email Report	X Yes ___ No
Mail Report	___ Yes ___ No
Fax Report	___ Yes ___ No

Section B — Required Project Information

Project Name:	Jordan Cove
Project Number:	108.01593.00005
Report To:	Chris Brow
Copy To:	Steve Hammer
	Tyler Weber

Section C — Invoice Information

Attention:	Accounts Payable
Company Name:	SLR International
Address:	22118 20th Ave, Suite
	Bothell, WA 98021 G202
P.O. #	108.01593.00005, T0004

Section D — Rush Status (Subject to Scheduling)

- X Standard 10-14 Days
- ___ 5 Business Days (50% surcharge)
- ___ 3 Business Days (75% surcharge)
- ___ 24 - 48 hours (100% surcharge)
- ___ Other _____

Authorized ___ Yes ___ No

Total Metals= Fe,K,Na,Al,As,Cu,Pb,Mn,Zn,Be Cd,Ni,Se,Ag,Tl,Hg,Hardness, Ca, Mg added

Diss Metals=Cd,Cu,Pb,Ni,Se,Ag,Zn

NRC Workorder # (Lab Use Only) 1811421

Section E — Sample Information

Sample ID	Comp/Grab	Matrix*	Date Collected	Time Collected	No. of Containers	Alk, Turb, TDS, Cl, F, SO42	BOD, TSS	NH3, NO3-NO2, Tphos	Cyanide*	DOC	608, 624, 625	Cr Spec/Diss Cr Spec	Total Metals	Diss Metals	Lab Filter	Remarks/Field Data	NRC Sample # (Lab Use Only)
Well water 1	G	W	11/11/18	17:45	20	X	X	X	X	X	X	X	X	X	X	* Free Cyanide if over QL	01
Well water 2	G	W	11/11/18	22:45	~~20~~ 19	X	X	X	X	X	X	X	X	X	X		02
Well water 3	G	W	11/12/18	08:30	20	X	X	X	X	X	X	X	X	X	X		03
~~Well water 4~~	~~G~~	~~W~~				~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
City Tap Water 1	G	W	11/11/18	18:15	~~20~~ 19 20	X	X	X	X	X	X	X	X	X	X		04
City Tap Water 2	G	W	11/11/18	22:15	20	X	X	X	X	X	X	X	X	X	X		05
City Tap Water 3	G	W	11/12/18	08:45	20	X	X	X	X	X	X	X	X	X	X		06
~~City Tap Water 4~~	~~G~~	~~W~~				~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		

Errors 11/13/18

*Matrix: DW - Drinking Water WW - Wastewater W - Water S - Soil/Solid SL - Sludge O - Oil WP - Wipe OT - Other

Section F — Relinquish/Receive

	Sign	Print	Date	Time
Relinquished By:	[signature]	Tyler Weber	11/12/18	1100
Received By:				
Relinquished By:				
Received By:				
Relinquished By:				
Received By Laboratory:	Tamra Schmidemeier	Tamra Schmidemeier	11/13/18	10:30

Section G — Lab Use Only

Temp:	-6°C not frozen
4°C +/- 2°C:	___ Yes X No
Received on Ice:	X Yes ___ No
Number of Bottles Received:	~~120~~ 119
pH Checked:	N/A
COC Seals Intact:	X Yes ___ No ___ NA
Field Blank Included:	___ Yes X No

Received Via X UPS ___ FedEX ___ Other ___ Hand

Payment X Invoice ___ Cash ___ VISA, M/C ___ Check # _____ Amount _____

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory

12/12/2018

Chris Brow
SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068

TEL: (503) 723-4423
FAX

RE: 108.01593.00005 Jordan Cove

Order No.: 1811471

Dear Chris Brow:

Neilson Research Corporation received 3 sample(s) on 11/14/2018 for the analyses presented in the following report.

The results relate only to the parameters tested or to the sample as received by the laboratory. This report shall not be reproduced except in full, without the written approval of Neilson Research Corporation. If you have any questions regarding these test results, please feel free to call.

Sincerely,
Neilson Research Corporation

Tamra Schmedemann

Tamra R. Schmedemann
Project Manager

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

CLIENT: SLR International Corp
Project: 108.01593.00005 Jordan Cove
Lab Order: 1811471

Date: 12-Dec-18

CASE NARRATIVE

The analyses were performed according to the guidelines in the Neilson Research Corporation Quality Assurance Program. This report contains analytical results for the sample(s) as received by the laboratory.

Neilson Research Corporation certifies that this report is in compliance with the requirements of NELAP. No unusual difficulties were experienced during analysis of this batch except as noted below or qualified with data flags on the reports.

Analytical Comments for EPA 200.8, SAMPLE 1811471-01-1811471-02: Some of the dissolved metals are greater than the total metals due to the low levels present in the sample. Most of the dissolved and total metals are "J" flagged. The "J" flag is an estimated value that shows the analyte is present but the result is not accurate.

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01A**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	120		50.0	50	mg/L	5	A	11/19/2018
ANIONS			**EPA 300.0**					Analyst: **SCM**
Chloride	19.0		0.0742	1	mg/L	1	A	11/15/2018 3:25
Fluoride	0.080	J	0.00767	0.2	mg/L	1	A	11/15/2018 3:25
Sulfate	ND		0.0623	0.5	mg/L	1	A	11/15/2018 3:25
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	175		5.00	5	mg/L	1	A	11/15/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	126		0.100	0.1	NTU	1	A	11/14/2018 11:3

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01B**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
BOD, 5 DAY			**SM 5210 B**					Analyst: **EAT**
Biochemical Oxygen Demand	5.04		2.00	2	mg/L	1	A	11/14/2018 12:2
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	20.0		4.00	4	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01C**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.39	J	0.105	0.5	mg/L	1	A	11/21/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrogen, Nitrate-Nitrite	ND		0.0118	0.05	mg/L	1	A	11/19/2018
TOTAL PHOSPHORUS AS P			**SM 4500-P E**					Analyst: **EAT**
Phosphorus, Total (As P)	0.174		0.00600	0.025	mg/L	1	A	11/19/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01D**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
CYANIDE, TOTAL			**EPA 335.4**					Analyst: **SJK**
Cyanide	ND		2.28	3	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01E**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	4.59		0.0490	0.2	mg/L	1	A	11/17/2018 9:4(

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01F**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
4,4´-DDD	ND		0.00307	0.01	µg/L	1	A	11/22/2018
4,4´-DDE	ND		0.00361	0.01	µg/L	1	A	11/22/2018
4,4´-DDT	ND		0.00365	0.01	µg/L	1	A	11/22/2018
Aldrin	ND		0.00377	0.01	µg/L	1	A	11/22/2018
alpha-BHC	ND		0.00301	0.01	µg/L	1	A	11/22/2018
Aroclor 1016	ND		0.0147	0.25	µg/L	1	A	11/22/2018
Aroclor 1221	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1232	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1242	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1248	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1254	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1260	ND		0.0219	0.25	µg/L	1	A	11/22/2018
beta-BHC	ND		0.00314	0.01	µg/L	1	A	11/22/2018
Chlordane	ND		0.0190	0.1	µg/L	1	A	11/22/2018
delta-BHC	ND		0.00297	0.01	µg/L	1	A	11/22/2018
Dieldrin	ND		0.00309	0.01	µg/L	1	A	11/22/2018
Endosulfan I	ND		0.00320	0.01	µg/L	1	A	11/22/2018
Endosulfan II	ND		0.00365	0.01	µg/L	1	A	11/22/2018
Endosulfan sulfate	ND		0.00367	0.01	µg/L	1	A	11/22/2018
Endrin	ND		0.00346	0.01	µg/L	1	A	11/22/2018
Endrin aldehyde	ND		0.00382	0.01	µg/L	1	A	11/22/2018
Endrin ketone	ND		0.00304	0.02	µg/L	1	A	11/22/2018
gamma-BHC (Lindane)	ND		0.00316	0.01	µg/L	1	A	11/22/2018
Heptachlor	ND		0.00357	0.01	µg/L	1	A	11/22/2018
Heptachlor epoxide	ND		0.00334	0.01	µg/L	1	A	11/22/2018
Methoxychlor	ND		0.00428	0.01	µg/L	1	A	11/22/2018
Toxaphene	ND		0.0680	0.5	µg/L	1	A	11/22/2018
Total Polychlorinated Biphenyls	ND		0.0147	0.25	µg/L	1	A	11/22/2018
Surr: Decachlorobiphenyl	95.9		0.0775	0	%REC	1		11/22/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01G**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
1,2,4,5-Tetrachlorobenzene	ND		0.0593	1	µg/L	1	A	12/5/2018
1,2,4-Trichlorobenzene	ND		0.242	1	µg/L	1	A	12/5/2018
1,2-Diphenylhydrazine as Azobenzene	ND		0.216	2	µg/L	1		12/5/2018
2,4,5-Trichlorophenol	ND		0.0877	1	µg/L	1	A	12/5/2018
2,4,6-Trichlorophenol	ND		0.259	1	µg/L	1	A	12/5/2018
2,4-Dichlorophenol	ND		0.206	1	µg/L	1	A	12/5/2018
2,4-Dimethylphenol	ND		0.169	2	µg/L	1	A	12/5/2018
2,4-Dinitrophenol	ND		1.28	5	µg/L	1	A	12/5/2018
2,4-Dinitrotoluene	ND		0.398	1	µg/L	1	A	12/5/2018
2,6-Dinitrotoluene	ND		0.201	1	µg/L	1	A	12/5/2018
2-Chloronaphthalene	ND		0.213	1	µg/L	1	A	12/5/2018
2-Chlorophenol	ND		0.0664	1	µg/L	1	A	12/5/2018
2-Methylphenol (Cresol)	ND		0.0513	1	µg/L	1	A	12/5/2018
2-Nitrophenol	ND		0.0799	2	µg/L	1	A	12/5/2018
3+4-Methylphenol (m,p Cresol)	ND		0.0349	1	µg/L	1	A	12/5/2018
3,3´-Dichlorobenzidine	ND		1.02	1	µg/L	1	A	12/5/2018
4,6-Dinitro-2-methylphenol	ND		0.337	2	µg/L	1	A	12/5/2018
4-Bromophenyl phenyl ether	ND		0.240	1	µg/L	1	A	12/5/2018
4-Chloro-3-methylphenol	ND		0.222	1	µg/L	1	A	12/5/2018
4-Chlorophenyl phenyl ether	ND		0.205	1	µg/L	1	A	12/5/2018
4-Nitrophenol	ND		0.458	5	µg/L	1	A	12/5/2018
Acenaphthene	ND		0.230	1	µg/L	1	A	12/5/2018
Acenaphthylene	ND		0.232	1	µg/L	1	A	12/5/2018
Anthracene	ND		0.250	1	µg/L	1	A	12/5/2018
Benzidine	ND		1.90	10	µg/L	1	A	12/5/2018
Benzo(a)anthracene	ND		0.239	0.5	µg/L	1	A	12/5/2018
Benzo(a)pyrene	ND		0.0494	0.5	µg/L	1	A	12/5/2018
Benzo(b)fluoranthene	ND		0.223	0.5	µg/L	1	A	12/5/2018
Benzo(g,h,i)perylene	ND		0.350	1	µg/L	1	A	12/5/2018
Benzo(k)fluoranthene	ND		0.313	0.5	µg/L	1	A	12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01G**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Bis(2-chloroethoxy)methane	ND		0.273	2	µg/L	1	A	12/5/2018
Bis(2-chloroethyl)ether	ND		0.200	1	µg/L	1	A	12/5/2018
Bis(2-chloroisopropyl)ether	ND		0.227	2	µg/L	1	A	12/5/2018
Bis(2-ethylhexyl)phthalate	ND		0.430	1	µg/L	1	A	12/5/2018
Butyl benzyl phthalate	ND		0.330	1	µg/L	1	A	12/5/2018
Chrysene	ND		0.244	0.5	µg/L	1	A	12/5/2018
Di-n-butyl phthalate	ND		0.533	1	µg/L	1	A	12/5/2018
Di-n-octyl phthalate	ND		0.258	1	µg/L	1	A	12/5/2018
Dibenz(a,h)anthracene	ND		0.343	0.5	µg/L	1	A	12/5/2018
Diethyl phthalate	ND		0.228	1	µg/L	1	A	12/5/2018
Dimethyl phthalate	ND		0.231	1	µg/L	1	A	12/5/2018
Fluoranthene	ND		0.277	2	µg/L	1	A	12/5/2018
Fluorene	ND		0.204	1	µg/L	1	A	12/5/2018
Hexachlorobenzene	ND		0.338	1	µg/L	1	A	12/5/2018
Hexachlorobutadiene	ND		0.207	2	µg/L	1	A	12/5/2018
Hexachlorocyclopentadiene	ND		0.222	2	µg/L	1	A	12/5/2018
Hexachloroethane	ND		0.234	1	µg/L	1	A	12/5/2018
Indeno(1,2,3-cd)pyrene	ND		0.293	0.5	µg/L	1	A	12/5/2018
Isophorone	ND		0.249	1	µg/L	1	A	12/5/2018
N-Nitrosodi-n-propylamine	ND		0.237	2	µg/L	1	A	12/5/2018
N-Nitrosodimethylamine	ND		0.0168	1	µg/L	1	A	12/5/2018
N-Nitrosodiphenylamine	ND		0.239	1	µg/L	1	A	12/5/2018
Naphthalene	ND		0.209	1	µg/L	1	A	12/5/2018
Nitrobenzene	ND		0.238	1	µg/L	1	A	12/5/2018
Pentachlorobenzene	ND		0.0526	1	µg/L	1	A	12/5/2018
Pentachlorophenol	ND		0.390	1	µg/L	1	A	12/5/2018
Phenanthrene	ND		0.222	1	µg/L	1	A	12/5/2018
Phenol	ND		0.0237	1	µg/L	1	A	12/5/2018
Pyrene	ND		0.264	1	µg/L	1	A	12/5/2018
Surr: 2,4,6-Tribromophenol	68.7		0	0	%REC	1		12/5/2018
Surr: 2-Fluorobiphenyl	45.4		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01G**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Surr: 2-Fluorophenol	30.4		0	0	%REC	1		12/5/2018
Surr: 4-Terphenyl-d14	60.0		0	0	%REC	1		12/5/2018
Surr: Nitrobenzene-d5	50.1		0	0	%REC	1		12/5/2018
Surr: Phenol-d6	18.9		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01H**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Acrolein	ND		0.489	5	µg/L	1	A	11/14/2018
Acrylonitrile	ND		0.687	5	µg/L	1	A	11/14/2018
Benzene	ND		0.264	0.5	µg/L	1	A	11/14/2018
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	11/14/2018
Bromomethane	ND		0.191	0.5	µg/L	1	A	11/14/2018
Bromoform	ND		0.274	0.5	µg/L	1	A	11/14/2018
1,2-Dichlorobenzene	ND		0.312	0.5	µg/L	1	A	11/14/2018
1,3-Dichlorobenzene	ND		0.307	0.5	µg/L	1	A	11/14/2018
1,4-Dichlorobenzene	ND		0.306	0.5	µg/L	1	A	11/14/2018
Chlorobenzene	ND		0.330	0.5	µg/L	1	A	11/14/2018
Carbon tetrachloride	ND		0.261	0.5	µg/L	1	A	11/14/2018
Chloroethane	ND		0.305	0.5	µg/L	1	A	11/14/2018
Chloromethane	ND		0.340	0.5	µg/L	1	A	11/14/2018
2-Chloroethyl vinyl ether	ND		0.610	5	µg/L	1	A	11/14/2018
Chloroform	ND		0.259	0.5	µg/L	1	A	11/14/2018
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	11/14/2018
Dichlorodifluoromethane	ND	Q	0.171	0.5	µg/L	1	A	11/14/2018
1,1-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/14/2018
1,2-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/14/2018
1,1-Dichloroethene	ND		0.160	0.5	µg/L	1	A	11/14/2018
1,2-Dichloropropane	ND		0.288	0.5	µg/L	1	A	11/14/2018
trans-1,2-Dichloroethylene	ND		0.257	0.5	µg/L	1	A	11/14/2018
cis-1,3-Dichloropropene	ND		0.224	0.5	µg/L	1	A	11/14/2018
trans-1,3-Dichloropropene	ND		0.296	0.5	µg/L	1	A	11/14/2018
Ethylbenzene	ND		0.282	0.5	µg/L	1	A	11/14/2018
Methylene chloride	ND	Q	0.206	0.5	µg/L	1	A	11/14/2018
1,1,2,2-Tetrachloroethane	ND		0.382	0.5	µg/L	1	A	11/14/2018
Tetrachloroethene	ND		0.275	0.5	µg/L	1	A	11/14/2018
Toluene	ND		0.295	0.5	µg/L	1	A	11/14/2018
1,2,4-Trichlorobenzene	ND		0.320	0.5	µg/L	1	A	11/14/2018
1,1,1-Trichloroethane	ND		0.107	0.5	µg/L	1	A	11/14/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01H**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
1,1,2-Trichloroethane	ND		0.315	0.5	µg/L	1	A	11/14/2018
Trichloroethene	ND		0.256	0.5	µg/L	1	A	11/14/2018
Trichlorofluoromethane	ND		0.105	0.5	µg/L	1	A	11/14/2018
Vinyl chloride	ND		0.154	0.5	µg/L	1	A	11/14/2018
Xylenes, Total	ND		0.148	1.5	µg/L	1	A	11/14/2018
Surr: Dibromofluoromethane	97.0		0	0	%REC	1		11/14/2018
Surr: Toluene-d8	98.6		0	0	%REC	1		11/14/2018
Surr: 4-Bromofluorobenzene	101		0	0	%REC	1		11/14/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report ORELAP 100016 EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01I**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Dissolved Chromium, Trivalent (III)	0.24	L NJ	0.0357	0.4	µg/L	1		11/21/2018
DISSOLVED HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Dissolved Chromium, Hexavalent	ND	HR L	0.00330	0.02	µg/L	1	A	11/15/2018
HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Chromium, Hexavalent	ND	HR	0.00830	0.02	µg/L	1	A	11/15/2018
DISSOLVED TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Cadmium	0.0020	L NJ	0.00168	0.1	µg/L	1	A	11/19/2018
Copper	0.13	LJ	0.0251	0.5	µg/L	1	A	11/19/2018
Lead	ND	L	0.00508	0.1	µg/L	1	A	11/19/2018
Nickel	0.23	LJ	0.0161	0.5	µg/L	1	A	11/19/2018
Selenium	0.10	LJ	0.0466	0.5	µg/L	1	A	11/19/2018
Silver	ND	L	0.00247	0.1	µg/L	1	A	11/19/2018
Zinc	0.79	L NJ	0.486	5	µg/L	1	A	11/19/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Well Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-01J**
Collection Date: **11/12/2018 12:30:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Chromium, Trivalent (III)	0.040	J	0.0357	0.4	µg/L	1		11/21/2018
TRACE METALS			**EPA 245.1**					Analyst: **JWC**
Mercury	ND		0.0227	0.2	µg/L	1	A	11/26/2018
HARDNESS			**SM 2340B**					Analyst: **KHG**
Hardness, Total (As CaCO3)	96200		11.2	6620	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.7**					Analyst: **KHG**
Aluminum	7.3	J	1.12	10	µg/L	1	A	11/15/2018
Calcium	22300		3.10	1000	µg/L	1	A	11/15/2018
Iron	15300		2.04	15	µg/L	1	A	11/15/2018
Magnesium	9830		1.26	1000	µg/L	1	A	11/15/2018
Potassium	7350		16.9	1000	µg/L	1	A	11/19/2018
Sodium	14600		8.03	1000	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	24.8		0.00825	0.5	µg/L	1	A	11/16/2018
Beryllium	ND		0.0905	0.1	µg/L	1	A	11/16/2018
Cadmium	ND		0.00168	0.1	µg/L	1	A	11/16/2018
Chromium	0.040	J	0.0289	0.4	µg/L	1	A	11/16/2018
Copper	0.16	J	0.0251	0.5	µg/L	1	A	11/16/2018
Lead	ND		0.00508	0.1	µg/L	1	A	11/16/2018
Manganese	140		0.0195	2	µg/L	1	A	11/16/2018
Nickel	0.41	J	0.0161	0.5	µg/L	1	A	11/16/2018
Selenium	ND		0.0466	0.5	µg/L	1	A	11/16/2018
Silver	ND		0.00247	0.1	µg/L	1	A	11/16/2018
Thallium	ND		0.00153	0.1	µg/L	1	A	11/16/2018
Zinc	ND		0.486	5	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02A**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	18.0		10.0	10	mg/L	1	A	11/19/2018
ANIONS			**EPA 300.0**					Analyst: **SCM**
Chloride	16.6		0.0742	1	mg/L	1	A	11/15/2018 3:52
Fluoride	0.649		0.00767	0.2	mg/L	1	A	11/15/2018 3:52
Sulfate	2.41		0.0623	0.5	mg/L	1	A	11/15/2018 3:52
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	56.2		5.00	5	mg/L	1	A	11/15/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	0.160		0.100	0.1	NTU	1	A	11/14/2018 11:3

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02B**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
BOD, 5 DAY			**SM 5210 B**					Analyst: **EAT**
Biochemical Oxygen Demand	ND		2.00	2	mg/L	1	A	11/14/2018 12:2
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	ND		2.00	2	mg/L	1	A	11/15/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02C**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.44	J	0.105	0.5	mg/L	1	A	11/21/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrogen, Nitrate-Nitrite	0.048	J	0.0118	0.05	mg/L	1	A	11/19/2018
TOTAL PHOSPHORUS AS P			**SM 4500-P E**					Analyst: **EAT**
Phosphorus, Total (As P)	ND		0.00600	0.025	mg/L	1	A	11/19/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02D**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
CYANIDE, TOTAL			**EPA 335.4**					Analyst: **SJK**
Cyanide	2.8	J	2.28	3	µg/L	1	A	11/26/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02E**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	1.62		0.0490	0.2	mg/L	1	A	11/17/2018 10:4

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02F**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
4,4´-DDD	ND		0.00307	0.01	µg/L	1	A	11/22/2018
4,4´-DDE	ND		0.00361	0.01	µg/L	1	A	11/22/2018
4,4´-DDT	ND		0.00365	0.01	µg/L	1	A	11/22/2018
Aldrin	ND		0.00377	0.01	µg/L	1	A	11/22/2018
alpha-BHC	0.0034	J	0.00301	0.01	µg/L	1	A	11/22/2018
Aroclor 1016	ND		0.0147	0.25	µg/L	1	A	11/22/2018
Aroclor 1221	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1232	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1242	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1248	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1254	ND		0.250	0.25	µg/L	1	A	11/22/2018
Aroclor 1260	ND		0.0219	0.25	µg/L	1	A	11/22/2018
beta-BHC	ND		0.00314	0.01	µg/L	1	A	11/22/2018
Chlordane	ND		0.0190	0.1	µg/L	1	A	11/22/2018
delta-BHC	ND		0.00297	0.01	µg/L	1	A	11/22/2018
Dieldrin	ND		0.00309	0.01	µg/L	1	A	11/22/2018
Endosulfan I	ND		0.00320	0.01	µg/L	1	A	11/22/2018
Endosulfan II	ND		0.00365	0.01	µg/L	1	A	11/22/2018
Endosulfan sulfate	ND		0.00367	0.01	µg/L	1	A	11/22/2018
Endrin	ND		0.00346	0.01	µg/L	1	A	11/22/2018
Endrin aldehyde	ND		0.00382	0.01	µg/L	1	A	11/22/2018
Endrin ketone	ND		0.00304	0.02	µg/L	1	A	11/22/2018
gamma-BHC (Lindane)	ND		0.00316	0.01	µg/L	1	A	11/22/2018
Heptachlor	ND		0.00357	0.01	µg/L	1	A	11/22/2018
Heptachlor epoxide	ND		0.00334	0.01	µg/L	1	A	11/22/2018
Methoxychlor	ND		0.00428	0.01	µg/L	1	A	11/22/2018
Toxaphene	ND		0.0680	0.5	µg/L	1	A	11/22/2018
Total Polychlorinated Biphenyls	ND		0.0147	0.25	µg/L	1	A	11/22/2018
Surr: Decachlorobiphenyl	87.6		0.0775	0	%REC	1		11/22/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02G**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
1,2,4,5-Tetrachlorobenzene	ND		0.0593	1	µg/L	1	A	12/5/2018
1,2,4-Trichlorobenzene	ND		0.242	1	µg/L	1	A	12/5/2018
1,2-Diphenylhydrazine as Azobenzene	ND		0.216	2	µg/L	1		12/5/2018
2,4,5-Trichlorophenol	ND		0.0877	1	µg/L	1	A	12/5/2018
2,4,6-Trichlorophenol	ND		0.259	1	µg/L	1	A	12/5/2018
2,4-Dichlorophenol	ND		0.206	1	µg/L	1	A	12/5/2018
2,4-Dimethylphenol	ND		0.169	2	µg/L	1	A	12/5/2018
2,4-Dinitrophenol	ND		1.28	5	µg/L	1	A	12/5/2018
2,4-Dinitrotoluene	ND		0.398	1	µg/L	1	A	12/5/2018
2,6-Dinitrotoluene	ND		0.201	1	µg/L	1	A	12/5/2018
2-Chloronaphthalene	ND		0.213	1	µg/L	1	A	12/5/2018
2-Chlorophenol	ND		0.0664	1	µg/L	1	A	12/5/2018
2-Methylphenol (Cresol)	ND		0.0513	1	µg/L	1	A	12/5/2018
2-Nitrophenol	ND		0.0799	2	µg/L	1	A	12/5/2018
3+4-Methylphenol (m,p Cresol)	ND		0.0349	1	µg/L	1	A	12/5/2018
3,3´-Dichlorobenzidine	ND		1.02	1	µg/L	1	A	12/5/2018
4,6-Dinitro-2-methylphenol	ND		0.337	2	µg/L	1	A	12/5/2018
4-Bromophenyl phenyl ether	ND		0.240	1	µg/L	1	A	12/5/2018
4-Chloro-3-methylphenol	ND		0.222	1	µg/L	1	A	12/5/2018
4-Chlorophenyl phenyl ether	ND		0.205	1	µg/L	1	A	12/5/2018
4-Nitrophenol	ND		0.458	5	µg/L	1	A	12/5/2018
Acenaphthene	ND		0.230	1	µg/L	1	A	12/5/2018
Acenaphthylene	ND		0.232	1	µg/L	1	A	12/5/2018
Anthracene	ND		0.250	1	µg/L	1	A	12/5/2018
Benzidine	ND		1.90	10	µg/L	1	A	12/5/2018
Benzo(a)anthracene	ND		0.239	0.5	µg/L	1	A	12/5/2018
Benzo(a)pyrene	ND		0.0494	0.5	µg/L	1	A	12/5/2018
Benzo(b)fluoranthene	ND		0.223	0.5	µg/L	1	A	12/5/2018
Benzo(g,h,i)perylene	ND		0.350	1	µg/L	1	A	12/5/2018
Benzo(k)fluoranthene	ND		0.313	0.5	µg/L	1	A	12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02G**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Bis(2-chloroethoxy)methane	ND		0.273	2	µg/L	1	A	12/5/2018
Bis(2-chloroethyl)ether	ND		0.200	1	µg/L	1	A	12/5/2018
Bis(2-chloroisopropyl)ether	ND		0.227	2	µg/L	1	A	12/5/2018
Bis(2-ethylhexyl)phthalate	ND		0.430	1	µg/L	1	A	12/5/2018
Butyl benzyl phthalate	ND		0.330	1	µg/L	1	A	12/5/2018
Chrysene	ND		0.244	0.5	µg/L	1	A	12/5/2018
Di-n-butyl phthalate	ND		0.533	1	µg/L	1	A	12/5/2018
Di-n-octyl phthalate	ND		0.258	1	µg/L	1	A	12/5/2018
Dibenz(a,h)anthracene	ND		0.343	0.5	µg/L	1	A	12/5/2018
Diethyl phthalate	ND		0.228	1	µg/L	1	A	12/5/2018
Dimethyl phthalate	ND		0.231	1	µg/L	1	A	12/5/2018
Fluoranthene	ND		0.277	2	µg/L	1	A	12/5/2018
Fluorene	ND		0.204	1	µg/L	1	A	12/5/2018
Hexachlorobenzene	ND		0.338	1	µg/L	1	A	12/5/2018
Hexachlorobutadiene	ND		0.207	2	µg/L	1	A	12/5/2018
Hexachlorocyclopentadiene	ND		0.222	2	µg/L	1	A	12/5/2018
Hexachloroethane	ND		0.234	1	µg/L	1	A	12/5/2018
Indeno(1,2,3-cd)pyrene	ND		0.293	0.5	µg/L	1	A	12/5/2018
Isophorone	ND		0.249	1	µg/L	1	A	12/5/2018
N-Nitrosodi-n-propylamine	ND		0.237	2	µg/L	1	A	12/5/2018
N-Nitrosodimethylamine	ND		0.0168	1	µg/L	1	A	12/5/2018
N-Nitrosodiphenylamine	ND		0.239	1	µg/L	1	A	12/5/2018
Naphthalene	ND		0.209	1	µg/L	1	A	12/5/2018
Nitrobenzene	ND		0.238	1	µg/L	1	A	12/5/2018
Pentachlorobenzene	ND		0.0526	1	µg/L	1	A	12/5/2018
Pentachlorophenol	ND		0.390	1	µg/L	1	A	12/5/2018
Phenanthrene	ND		0.222	1	µg/L	1	A	12/5/2018
Phenol	ND		0.0237	1	µg/L	1	A	12/5/2018
Pyrene	ND		0.264	1	µg/L	1	A	12/5/2018
Surr: 2,4,6-Tribromophenol	73.8		0	0	%REC	1		12/5/2018
Surr: 2-Fluorobiphenyl	70.3		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02G**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
SEMIVOLATILE ORGANICS			**EPA 625**					Analyst: **JEL**
Surr: 2-Fluorophenol	30.6		0	0	%REC	1		12/5/2018
Surr: 4-Terphenyl-d14	81.5		0	0	%REC	1		12/5/2018
Surr: Nitrobenzene-d5	72.5		0	0	%REC	1		12/5/2018
Surr: Phenol-d6	18.3		0	0	%REC	1		12/5/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02H**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Acrolein	ND	MI	0.489	5	µg/L	1	A	11/14/2018
Acrylonitrile	ND		0.687	5	µg/L	1	A	11/14/2018
Benzene	ND		0.264	0.5	µg/L	1	A	11/14/2018
Bromodichloromethane	11.9		0.278	0.5	µg/L	1	A	11/14/2018
Bromomethane	ND		0.191	0.5	µg/L	1	A	11/14/2018
Bromoform	ND		0.274	0.5	µg/L	1	A	11/14/2018
1,2-Dichlorobenzene	ND		0.312	0.5	µg/L	1	A	11/14/2018
1,3-Dichlorobenzene	ND		0.307	0.5	µg/L	1	A	11/14/2018
1,4-Dichlorobenzene	ND		0.306	0.5	µg/L	1	A	11/14/2018
Chlorobenzene	ND		0.330	0.5	µg/L	1	A	11/14/2018
Carbon tetrachloride	ND		0.261	0.5	µg/L	1	A	11/14/2018
Chloroethane	ND		0.305	0.5	µg/L	1	A	11/14/2018
Chloromethane	ND		0.340	0.5	µg/L	1	A	11/14/2018
2-Chloroethyl vinyl ether	ND		0.610	5	µg/L	1	A	11/14/2018
Chloroform	16.1		0.259	0.5	µg/L	1	A	11/14/2018
Dibromochloromethane	4.93		0.245	0.5	µg/L	1	A	11/14/2018
Dichlorodifluoromethane	ND	Q	0.171	0.5	µg/L	1	A	11/14/2018
1,1-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/14/2018
1,2-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/14/2018
1,1-Dichloroethene	ND		0.160	0.5	µg/L	1	A	11/14/2018
1,2-Dichloropropane	ND		0.288	0.5	µg/L	1	A	11/14/2018
trans-1,2-Dichloroethylene	ND		0.257	0.5	µg/L	1	A	11/14/2018
cis-1,3-Dichloropropene	ND		0.224	0.5	µg/L	1	A	11/14/2018
trans-1,3-Dichloropropene	ND		0.296	0.5	µg/L	1	A	11/14/2018
Ethylbenzene	ND		0.282	0.5	µg/L	1	A	11/14/2018
Methylene chloride	ND	Q	0.206	0.5	µg/L	1	A	11/14/2018
1,1,2,2-Tetrachloroethane	ND		0.382	0.5	µg/L	1	A	11/14/2018
Tetrachloroethene	ND	MI	0.275	0.5	µg/L	1	A	11/14/2018
Toluene	ND		0.295	0.5	µg/L	1	A	11/14/2018
1,2,4-Trichlorobenzene	ND		0.320	0.5	µg/L	1	A	11/14/2018
1,1,1-Trichloroethane	ND		0.107	0.5	µg/L	1	A	11/14/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02H**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
1,1,2-Trichloroethane	ND		0.315	0.5	µg/L	1	A	11/14/2018
Trichloroethene	ND		0.256	0.5	µg/L	1	A	11/14/2018
Trichlorofluoromethane	ND		0.105	0.5	µg/L	1	A	11/14/2018
Vinyl chloride	ND		0.154	0.5	µg/L	1	A	11/14/2018
Xylenes, Total	ND		0.148	1.5	µg/L	1	A	11/14/2018
Surr: Dibromofluoromethane	99.4		0	0	%REC	1		11/14/2018
Surr: Toluene-d8	98.8		0	0	%REC	1		11/14/2018
Surr: 4-Bromofluorobenzene	102		0	0	%REC	1		11/14/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02I**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Dissolved Chromium, Trivalent (III)	0.24	L NJ	0.0357	0.4	µg/L	1		11/21/2018
DISSOLVED HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Dissolved Chromium, Hexavalent	ND	HR L	0.00330	0.02	µg/L	1	A	11/15/2018
HEXAVALENT CHROMIUM			**EPA 218.7**					Analyst: **CSB**
Chromium, Hexavalent	ND	HR	0.00830	0.02	µg/L	1	A	11/15/2018
DISSOLVED TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Cadmium	0.0020	L NJ	0.00168	0.1	µg/L	1	A	11/19/2018
Copper	3.23	L N	0.0251	0.5	µg/L	1	A	11/19/2018
Lead	0.237	L N	0.00508	0.1	µg/L	1	A	11/19/2018
Nickel	0.14	LJ	0.0161	0.5	µg/L	1	A	11/19/2018
Selenium	ND	L	0.0466	0.5	µg/L	1	A	11/19/2018
Silver	ND	L	0.00247	0.1	µg/L	1	A	11/19/2018
Zinc	1.9	L NJ	0.486	5	µg/L	1	A	11/19/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report ORELAP 100016 EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **City Tap Water 4**
Sample Location: **Grab**
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-02J**
Collection Date: **11/12/2018 1:00:00 PM**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TRIVALENT CHROMIUM CALCULATION			**EPA 218.7/EPA 200.8**					Analyst: **JWC**
Chromium, Trivalent (III)	ND		0.0357	0.4	µg/L	1		11/21/2018
TRACE METALS			**EPA 245.1**					Analyst: **JWC**
Mercury	ND		0.0227	0.2	µg/L	1	A	11/26/2018
HARDNESS			**SM 2340B**					Analyst: **KHG**
Hardness, Total (As CaCO3)	20500		11.2	6620	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.7**					Analyst: **KHG**
Aluminum	18.1		1.12	10	µg/L	1	A	11/15/2018
Calcium	5640		3.10	1000	µg/L	1	A	11/15/2018
Iron	21.9		2.04	15	µg/L	1	A	11/15/2018
Magnesium	1540		1.26	1000	µg/L	1	A	11/15/2018
Potassium	840	J	16.9	1000	µg/L	1	A	11/19/2018
Sodium	9260		8.03	1000	µg/L	1	A	11/15/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	0.35	J	0.00825	0.5	µg/L	1	A	11/16/2018
Beryllium	ND		0.0905	0.1	µg/L	1	A	11/16/2018
Cadmium	ND		0.00168	0.1	µg/L	1	A	11/16/2018
Chromium	ND		0.0289	0.4	µg/L	1	A	11/16/2018
Copper	3.21		0.0251	0.5	µg/L	1	A	11/16/2018
Lead	0.210		0.00508	0.1	µg/L	1	A	11/16/2018
Manganese	3.89		0.0195	2	µg/L	1	A	11/16/2018
Nickel	0.16	J	0.0161	0.5	µg/L	1	A	11/16/2018
Selenium	ND		0.0466	0.5	µg/L	1	A	11/16/2018
Silver	0.0030	J	0.00247	0.1	µg/L	1	A	11/16/2018
Thallium	ND		0.00153	0.1	µg/L	1	A	11/16/2018
Zinc	0.86	J	0.486	5	µg/L	1	A	11/16/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Trip Blank #19096**
Sample Location:
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-03A**
Collection Date: **11/12/2018**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Water**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Acrolein	ND		0.489	5	µg/L	1	A	11/14/2018
Acrylonitrile	ND		0.687	5	µg/L	1	A	11/14/2018
Benzene	ND		0.264	0.5	µg/L	1	A	11/14/2018
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	11/14/2018
Bromomethane	ND		0.191	0.5	µg/L	1	A	11/14/2018
Bromoform	ND		0.274	0.5	µg/L	1	A	11/14/2018
1,2-Dichlorobenzene	ND		0.312	0.5	µg/L	1	A	11/14/2018
1,3-Dichlorobenzene	ND		0.307	0.5	µg/L	1	A	11/14/2018
1,4-Dichlorobenzene	ND		0.306	0.5	µg/L	1	A	11/14/2018
Chlorobenzene	ND		0.330	0.5	µg/L	1	A	11/14/2018
Carbon tetrachloride	ND		0.261	0.5	µg/L	1	A	11/14/2018
Chloroethane	ND		0.305	0.5	µg/L	1	A	11/14/2018
Chloromethane	ND		0.340	0.5	µg/L	1	A	11/14/2018
2-Chloroethyl vinyl ether	ND		0.610	5	µg/L	1	A	11/14/2018
Chloroform	ND		0.259	0.5	µg/L	1	A	11/14/2018
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	11/14/2018
Dichlorodifluoromethane	ND	Q	0.171	0.5	µg/L	1	A	11/14/2018
1,1-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/14/2018
1,2-Dichloroethane	ND		0.174	0.5	µg/L	1	A	11/14/2018
1,1-Dichloroethene	ND		0.160	0.5	µg/L	1	A	11/14/2018
1,2-Dichloropropane	ND		0.288	0.5	µg/L	1	A	11/14/2018
trans-1,2-Dichloroethylene	ND		0.257	0.5	µg/L	1	A	11/14/2018
cis-1,3-Dichloropropene	ND		0.224	0.5	µg/L	1	A	11/14/2018
trans-1,3-Dichloropropene	ND		0.296	0.5	µg/L	1	A	11/14/2018
Ethylbenzene	ND		0.282	0.5	µg/L	1	A	11/14/2018
Methylene chloride	ND	Q	0.206	0.5	µg/L	1	A	11/14/2018
1,1,2,2-Tetrachloroethane	ND		0.382	0.5	µg/L	1	A	11/14/2018
Tetrachloroethene	ND		0.275	0.5	µg/L	1	A	11/14/2018
Toluene	ND		0.295	0.5	µg/L	1	A	11/14/2018
1,2,4-Trichlorobenzene	ND		0.320	0.5	µg/L	1	A	11/14/2018
1,1,1-Trichloroethane	ND		0.107	0.5	µg/L	1	A	11/14/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Trip Blank #19096**
Sample Location:
Project: **108.01593.00005 Jordan Cove**

Lab Order: **1811471**
NRC Sample ID **1811471-03A**
Collection Date: **11/12/2018**
Received Date: **11/14/2018 10:30:00 AM**
Reported Date: **12/12/2018 3:02:20 PM**
Matrix: **Water**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
1,1,2-Trichloroethane	ND		0.315	0.5	µg/L	1	A	11/14/2018
Trichloroethene	ND		0.256	0.5	µg/L	1	A	11/14/2018
Trichlorofluoromethane	ND		0.105	0.5	µg/L	1	A	11/14/2018
Vinyl chloride	ND		0.154	0.5	µg/L	1	A	11/14/2018
Xylenes, Total	ND		0.148	1.5	µg/L	1	A	11/14/2018
Surr: Dibromofluoromethane	97.3		0	0	%REC	1		11/14/2018
Surr: Toluene-d8	99.0		0	0	%REC	1		11/14/2018
Surr: 4-Bromofluorobenzene	104		0	0	%REC	1		11/14/2018

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

DATA FLAGS

B	Analyte detected in the associated method blank.
BA	BOD Alternative Calculation: The initial results performed by Standard Methods did not fall within parameters of the Standard Methods calculation. An alternate approved calculation was performed using the HACH method and the value reported is an estimated concentration.
C	Sample(s) does not meet NELAP/ORELAP sample acceptance criteria. See Case Narrative.
C1	Sample(s) does not meet NELAP/ORELAP sample acceptance criteria for temperature.
CF	Results confirmed by re-analysis.
CU	Cleanup performed as specified by method.
D1	The diesel elution pattern for the sample is not typical.
D2	The sample appears to be a heavier hydrocarbon range than diesel.
D3	The sample appears to be a lighter hydrocarbon range than diesel.
D4	Detected hydrocarbons do not have pattern and range consistent with typical petroleum products and may be due to biogenic interference.
D5	Detected hydrocarbons in the diesel range appear to be weathered diesel.
E	Estimated value.
ER	Elevated reporting limit due to matrix. Report limits (MDLs, MRLs & PQLs) are adjusted based on variations in sample preparation amounts, analytical dilutions, and percent solids, where applicable.
FC	Fecal Coliforms: Sample(s) received past 40 CFR Part 136 specified holding time. Results reported as estimated values.
G1	The gasoline elution pattern for the sample is not typical.
G2	The sample appears to be a heavier hydrocarbon range than gasoline.
G3	The sample appears to be a lighter hydrocarbon range than gasoline.
G4	Detected hydrocarbons in the gasoline range appear to be weathered gasoline.
HP	Sample re-analysis performed outside of method specified holding time.
HR	Sample received outside of method specified holding time.
HS	Sample analyzed for volatile organics contained headspace.
HT	At the client's request, the sample was analyzed outside of method specified holding time.
H	Analysis performed outside of method specified holding time.
J	Analyte detected below the Minimum Reporting Limit (MRL) and above the Method Detection Limit (MDL). The J flag result is an estimated value and the user should be aware that this data is of limited reliability.
L	Dissolved metals were not filtered within 15 minutes of collection per 40 CFR Part 136.
MI	Surrogate or Matrix Spike recovery is out of control limits due to matrix interference. Sample results may be biased.
N	See Case Narrative on page 2 of report.
Q	Closing continuing calibration verification (CCV) or laboratory control sample (LCS) exceeded high recovery limits, but associated samples are non-detect and the sample results are not affected. Data meets EPA/NELAP requirements.
R	Relative percent difference (RPD) is outside of the accepted recovery limits.
R1	Relative percent difference (RPD) is outside of the accepted recovery limits. However, analyses are not controlled on RPD values for sample concentrations that are less than the reporting limit.
R3	The relative percent difference (RPD) and/or percent recovery for the duplicate (DUP) or matrix spike (MS)/matrix spike duplicate (MSD) cannot be accurately calculated due to the concentration of analyte already present in the sample.
R4	Duplicate analysis failed due to result being at or near method reporting limit.
S	Surrogate and/or matrix spike recovery is outside of the accepted recovery limits. Sample results may be biased.
S1	Surrogate or matrix spike recovery is outside of control limits due to dilution necessary for analysis.
SC	Sub-contracted to another laboratory for analysis.
SP	Sample(s) were not collected per EPA Method 5035A protocols. The results are considered minimum values.
T	Toxicity Characteristic Leaching Procedure – Sample submitted contained < 0.5% solids. If the waste contains <0.5% dry solids, the liquid portion of the waste, after filtration, is defined as the TCLP extract.
#	Value exceeds regulatory level for TCLP contaminant.
X1	The motor oil elution pattern for the sample is not typical.
X2	The sample appears to be a heavier hydrocarbon range than motor oil.
X3	The sample appears to be a lighter hydrocarbon range than motor oil.
*	Value exceeds Maximum Contaminant Level or is outside the acceptable range.

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ALKALINITY_W

Sample ID **MB-R108163** SampType: **MBLK** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649544**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	10.0									

Sample ID **MB-R108163** SampType: **MBLK** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649570**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	10.0									

Sample ID **LCS-R108163** SampType: **LCS** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649545**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	48.00	10.0	50	0	96.0	80	120				

Sample ID **LCS-R108163** SampType: **LCS** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649571**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	50.00	10.0	50	0	100	80	120				

Sample ID **1811223-01BDUP** SampType: **DUP** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649547**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	48.00	10.0						50	4.08	10	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ALKALINITY_W

Sample ID **1811421-06ADUP** SampType: **DUP** TestCode: **ALKALINITY_** Units: **mg/L** Prep Date: RunNo: **108163**
Client ID: **ZZZZZ** Batch ID: **R108163** TestNo: **SM 2320B** Analysis Date: **11/19/2018** SeqNo: **1649573**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	18.00	10.0						18	0	10	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: AMMONIA_AUTO_W

Sample ID	MB-43005	SampType:	MBLK	TestCode:	AMMONIA_A	Units:	mg/L	Prep Date:	11/20/2018	RunNo:	108242
Client ID:	ZZZZZ	Batch ID:	43005	TestNo:	EPA 350.1	(EPA 350.1)		Analysis Date:	11/21/2018	SeqNo:	1650995

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	ND	0.500									

Sample ID	LCS-43005	SampType:	LCS	TestCode:	AMMONIA_A	Units:	mg/L	Prep Date:	11/20/2018	RunNo:	108242
Client ID:	ZZZZZ	Batch ID:	43005	TestNo:	EPA 350.1	(EPA 350.1)		Analysis Date:	11/21/2018	SeqNo:	1650994

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.488	0.500	1.645	0	90.5	90	110				

Sample ID	1811421-06CMS	SampType:	MS	TestCode:	AMMONIA_A	Units:	mg/L	Prep Date:	11/20/2018	RunNo:	108242
Client ID:	ZZZZZ	Batch ID:	43005	TestNo:	EPA 350.1	(EPA 350.1)		Analysis Date:	11/21/2018	SeqNo:	1650982

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.884	0.500	1.645	0.465	86.3	80	120				

Sample ID	1811421-06CMSD	SampType:	MSD	TestCode:	AMMONIA_A	Units:	mg/L	Prep Date:	11/20/2018	RunNo:	108242
Client ID:	ZZZZZ	Batch ID:	43005	TestNo:	EPA 350.1	(EPA 350.1)		Analysis Date:	11/21/2018	SeqNo:	1650983

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.985	0.500	1.645	0.465	92.4	80	120	1.884	5.22	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: BOD-5DAY

Sample ID **MB-42957**	SampType: **MBLK**	TestCode: **BOD-5DAY**	Units: **mg/L**	Prep Date: **11/14/2018**	RunNo: **108167**
Client ID: **ZZZZZ**	Batch ID: **42957**	TestNo: **SM 5210 B**	**(SM 5210 B)**	Analysis Date: **11/14/2018**	SeqNo: **1649609**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	ND	2.00									

Sample ID **LCS-42957**	SampType: **LCS**	TestCode: **BOD-5DAY**	Units: **mg/L**	Prep Date: **11/14/2018**	RunNo: **108167**
Client ID: **ZZZZZ**	Batch ID: **42957**	TestNo: **SM 5210 B**	**(SM 5210 B)**	Analysis Date: **11/14/2018**	SeqNo: **1649610**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	208.0	2.00	198	0	105	85	115				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: CYANIDE_WW_AUTO

Sample ID	MB-42962	SampType:	MBLK	TestCode:	CYANIDE_W	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108114
Client ID:	ZZZZZ	Batch ID:	42962	TestNo:	EPA 335.4	(EPA 335.3)		Analysis Date:	11/16/2018	SeqNo:	1649041

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	3.00									

Sample ID	LCS-42962	SampType:	LCS	TestCode:	CYANIDE_W	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108114
Client ID:	ZZZZZ	Batch ID:	42962	TestNo:	EPA 335.4	(EPA 335.3)		Analysis Date:	11/16/2018	SeqNo:	1649039

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	42.90	3.00	40	0	107	90	110				

Sample ID	1811421-01DMS	SampType:	MS	TestCode:	CYANIDE_W	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108114
Client ID:	ZZZZZ	Batch ID:	42962	TestNo:	EPA 335.4	(EPA 335.3)		Analysis Date:	11/16/2018	SeqNo:	1649021

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	37.90	3.00	40	2.7	88.0	80	120				

Sample ID	1811421-01DMSD	SampType:	MSD	TestCode:	CYANIDE_W	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108114
Client ID:	ZZZZZ	Batch ID:	42962	TestNo:	EPA 335.4	(EPA 335.3)		Analysis Date:	11/16/2018	SeqNo:	1649022

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	36.70	3.00	40	2.7	85.0	80	120	37.9	3.22	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: DOC_W

Sample ID **MBLK (DOC)**	SampType: **MBLK**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **108154**
Client ID: **ZZZZZ**	Batch ID: **R108154**	TestNo: **SM5310C**		Analysis Date: **11/16/2018**	SeqNo: **1649452**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	0.1416	0.200									J

Sample ID **LCS (DOC)**	SampType: **LCS**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **108154**
Client ID: **ZZZZZ**	Batch ID: **R108154**	TestNo: **SM5310C**		Analysis Date: **11/16/2018**	SeqNo: **1649450**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	0.9859	0.200	1	0	98.6	85	115				

Sample ID **LCSD (DOC)**	SampType: **LCSD**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **108154**
Client ID: **ZZZZZ**	Batch ID: **R108154**	TestNo: **SM5310C**		Analysis Date: **11/16/2018**	SeqNo: **1649451**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	0.9985	0.200	1	0	99.8	85	115	0.9859	1.27	25	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA218.7_DISS

Sample ID **MB-R108229**	SampType: **MBLK**	TestCode: **EPA218.7_DI**	Units: **µg/L**	Prep Date:	RunNo: **108229**
Client ID: **ZZZZZ**	Batch ID: **R108229**	TestNo: **EPA 218.7**		Analysis Date: **11/15/2018**	SeqNo: **1650739**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dissolved Chromium, Hexavalent	ND	0.0200									

Sample ID **LCS-R108229**	SampType: **LCS**	TestCode: **EPA218.7_DI**	Units: **µg/L**	Prep Date:	RunNo: **108229**
Client ID: **ZZZZZ**	Batch ID: **R108229**	TestNo: **EPA 218.7**		Analysis Date: **11/15/2018**	SeqNo: **1650740**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dissolved Chromium, Hexavalent	3.229	0.0200	3.62	0	89.2	85	115				

Sample ID **1811421-05IMS**	SampType: **MS**	TestCode: **EPA218.7_DI**	Units: **µg/L**	Prep Date:	RunNo: **108229**
Client ID: **ZZZZZ**	Batch ID: **R108229**	TestNo: **EPA 218.7**		Analysis Date: **11/15/2018**	SeqNo: **1650749**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dissolved Chromium, Hexavalent	2.031	0.0200	2	0.028	100	85	115				HR

Sample ID **1811421-05IMSD**	SampType: **MSD**	TestCode: **EPA218.7_DI**	Units: **µg/L**	Prep Date:	RunNo: **108229**
Client ID: **ZZZZZ**	Batch ID: **R108229**	TestNo: **EPA 218.7**		Analysis Date: **11/15/2018**	SeqNo: **1650750**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dissolved Chromium, Hexavalent	1.883	0.0200	2	0.028	92.8	85	115	2.031	7.56	15	HR

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA218.7_WW

Sample ID **MB-R108230**	SampType: **MBLK**	TestCode: **EPA218.7_W**	Units: **µg/L**	Prep Date:	RunNo: **108230**
Client ID: **ZZZZZ**	Batch ID: **R108230**	TestNo: **EPA 218.7**		Analysis Date: **11/15/2018**	SeqNo: **1650752**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	0.0200									

Sample ID **LCS-R108230**	SampType: **LCS**	TestCode: **EPA218.7_W**	Units: **µg/L**	Prep Date:	RunNo: **108230**
Client ID: **ZZZZZ**	Batch ID: **R108230**	TestNo: **EPA 218.7**		Analysis Date: **11/15/2018**	SeqNo: **1650753**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	3.229	0.0200	3.62	0	89.2	85	115				

Sample ID **1811421-05IMS**	SampType: **MS**	TestCode: **EPA218.7_W**	Units: **µg/L**	Prep Date:	RunNo: **108230**
Client ID: **ZZZZZ**	Batch ID: **R108230**	TestNo: **EPA 218.7**		Analysis Date: **11/15/2018**	SeqNo: **1650762**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	1.917	0.0200	2	0.019	94.9	85	115				HR

Sample ID **1811421-05IMSD**	SampType: **MSD**	TestCode: **EPA218.7_W**	Units: **µg/L**	Prep Date:	RunNo: **108230**
Client ID: **ZZZZZ**	Batch ID: **R108230**	TestNo: **EPA 218.7**		Analysis Date: **11/15/2018**	SeqNo: **1650763**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	2.226	0.0200	2	0.019	110	85	115	1.917	14.9	20	HR

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA300_W

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **108074**
Client ID: **ZZZZZ**	Batch ID: **R108074**	TestNo: **EPA 300.0**		Analysis Date: **11/14/2018**	SeqNo: **1647960**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	1.00									
Fluoride	ND	0.200									
Sulfate	ND	0.500									

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **108074**
Client ID: **ZZZZZ**	Batch ID: **R108074**	TestNo: **EPA 300.0**		Analysis Date: **11/14/2018**	SeqNo: **1647959**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	5.872	1.00	6	0	97.9	90	110				
Fluoride	1.040	0.200	1	0	104	90	110				
Sulfate	6.141	0.500	6	0	102	90	110				

Sample ID **1811471-02AMS**	SampType: **MS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **108074**
Client ID: **City Tap Water 4**	Batch ID: **R108074**	TestNo: **EPA 300.0**		Analysis Date: **11/15/2018**	SeqNo: **1647968**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	23.09	1.00	6	16.58	109	80	120				
Fluoride	1.551	0.200	1	0.6494	90.1	80	120				
Sulfate	8.188	0.500	6	2.41	96.3	80	120				

Sample ID **1811471-02AMSD**	SampType: **MSD**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **108074**
Client ID: **City Tap Water 4**	Batch ID: **R108074**	TestNo: **EPA 300.0**		Analysis Date: **11/15/2018**	SeqNo: **1647969**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	23.10	1.00	6	16.58	109	80	120	23.09	0.0435	15	
Fluoride	1.557	0.200	1	0.6494	90.7	80	120	1.551	0.388	15	
Sulfate	8.226	0.500	6	2.41	96.9	80	120	8.188	0.459	15	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID **MB-42959** SampType: **MBLK** TestCode: **EPA608** Units: **µg/L** Prep Date: **11/14/2018** RunNo: **108306**
Client ID: **ZZZZZ** Batch ID: **42959** TestNo: **EPA 608** **(EPA 3510C)** Analysis Date: **11/21/2018** SeqNo: **1651814**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	0.0100									
4,4´-DDE	ND	0.0100									
4,4´-DDT	ND	0.0100									
Aldrin	ND	0.0100									
Aroclor 1016	ND	0.250									
Aroclor 1221	ND	0.250									
Aroclor 1232	ND	0.250									
Aroclor 1242	ND	0.250									
Aroclor 1248	ND	0.250									
Aroclor 1254	ND	0.250									
Aroclor 1260	ND	0.250									
beta-BHC	ND	0.0100									
Chlordane	ND	0.100									
delta-BHC	ND	0.0100									
Dieldrin	ND	0.0100									
Endosulfan I	ND	0.0100									
Endosulfan II	ND	0.0100									
Endosulfan sulfate	ND	0.0100									
Endrin	ND	0.0100									
Endrin aldehyde	ND	0.0100									
Endrin ketone	ND	0.0200									
gamma-BHC (Lindane)	ND	0.0100									
Heptachlor	ND	0.0100									
Heptachlor epoxide	ND	0.0100									
Methoxychlor	ND	0.0100									
Toxaphene	ND	0.500									
Total Polychlorinated Biphenyls	ND	0.250									
Surr: Decachlorobiphenyl	0.2279	0	0.25	0	91.2	60	140				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID **MB-42959**	SampType: **MBLK**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **ZZZZZ**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/21/2018**	SeqNo: **1652207**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	ND	0.0100									

Sample ID **LCS-42959**	SampType: **LCS**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **ZZZZZ**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/21/2018**	SeqNo: **1651813**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	0.2038	0.0100	0.2	0	102	60	140				
4,4´-DDE	0.1906	0.0100	0.2	0	95.3	60	140				
4,4´-DDT	0.2008	0.0100	0.2	0	100	60	140				
Aldrin	0.1891	0.0100	0.2	0	94.5	60	122				
beta-BHC	0.2040	0.0100	0.2	0	102	60	140				
delta-BHC	0.2040	0.0100	0.2	0	102	60	140				
Dieldrin	0.2006	0.0100	0.2	0	100	60	140				
Endosulfan I	0.1969	0.0100	0.2	0	98.4	60	140				
Endosulfan II	0.1997	0.0100	0.2	0	99.9	60	140				
Endosulfan sulfate	0.2051	0.0100	0.2	0	103	60	140				
Endrin	0.2094	0.0100	0.2	0	105	60	140				
Endrin aldehyde	0.1963	0.0100	0.2	0	98.2	60	140				
Endrin ketone	0.2077	0.0200	0.2	0	104	60	140				
gamma-BHC (Lindane)	0.2001	0.0100	0.2	0	100	60	127				
Heptachlor	0.2033	0.0100	0.2	0	102	60	111				
Heptachlor epoxide	0.1988	0.0100	0.2	0	99.4	60	140				
Methoxychlor	0.2090	0.0100	0.2	0	105	60	140				
Surr: Decachlorobiphenyl	0.2362	0	0.25	0	94.5	60	140				

Sample ID **LCS-42959**	SampType: **LCS**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **ZZZZZ**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/21/2018**	SeqNo: **1652206**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID	LCS-42959	SampType:	LCS	TestCode:	EPA608	Units:	µg/L	Prep Date:	11/14/2018	RunNo:	108306
Client ID:	ZZZZZ	Batch ID:	42959	TestNo:	EPA 608	(EPA 3510C)		Analysis Date:	11/21/2018	SeqNo:	1652206

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	0.1912	0.0100	0.2	0	95.6	60	134				

Sample ID	1811421-04FMS	SampType:	MS	TestCode:	EPA608	Units:	µg/L	Prep Date:	11/14/2018	RunNo:	108306
Client ID:	ZZZZZ	Batch ID:	42959	TestNo:	EPA 608	(EPA 3510C)		Analysis Date:	11/22/2018	SeqNo:	1651820

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	0.2166	0.0100	0.2	0	108	40	160				
4,4´-DDE	0.1963	0.0100	0.2	0	98.1	40	160				
4,4´-DDT	0.2131	0.0100	0.2	0	107	40	160				
Aldrin	0.1936	0.0100	0.2	0	96.8	40	160				
beta-BHC	0.2057	0.0100	0.2	0	103	40	160				
delta-BHC	0.2078	0.0100	0.2	0	104	40	160				
Dieldrin	0.2064	0.0100	0.2	0	103	40	160				
Endosulfan I	0.2009	0.0100	0.2	0	100	40	160				
Endosulfan II	0.2008	0.0100	0.2	0	100	40	160				
Endosulfan sulfate	0.2112	0.0100	0.2	0	106	40	160				
Endrin	0.2220	0.0100	0.2	0	111	40	160				
Endrin aldehyde	0.1941	0.0100	0.2	0	97.0	40	160				
Endrin ketone	0.2123	0.0200	0.2	0	106	40	160				
gamma-BHC (Lindane)	0.2065	0.0100	0.2	0	103	40	160				
Heptachlor	0.2196	0.0100	0.2	0	110	40	160				
Heptachlor epoxide	0.2027	0.0100	0.2	0	101	40	160				
Methoxychlor	0.2222	0.0100	0.2	0	111	40	160				
Surr: Decachlorobiphenyl	0.2345	0	0.25	0	93.8	60	140				

Sample ID	1811421-04FMS	SampType:	MS	TestCode:	EPA608	Units:	µg/L	Prep Date:	11/14/2018	RunNo:	108306
Client ID:	ZZZZZ	Batch ID:	42959	TestNo:	EPA 608	(EPA 3510C)		Analysis Date:	11/22/2018	SeqNo:	1652213

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID **1811421-04FMS**	SampType: **MS**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **ZZZZZ**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/22/2018**	SeqNo: **1652213**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	0.1843	0.0100	0.2	0.00322	90.6	40	160				

Sample ID **1811421-04FMSD**	SampType: **MSD**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **ZZZZZ**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/22/2018**	SeqNo: **1651821**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	0.2085	0.0100	0.2	0	104	40	160	0.2166	3.80	20	
4,4´-DDE	0.1900	0.0100	0.2	0	95.0	40	160	0.1963	3.23	20	
4,4´-DDT	0.2074	0.0100	0.2	0	104	40	160	0.2131	2.71	20	
Aldrin	0.1865	0.0100	0.2	0	93.2	40	160	0.1936	3.77	20	
beta-BHC	0.1952	0.0100	0.2	0	97.6	40	160	0.2057	5.21	20	
delta-BHC	0.1999	0.0100	0.2	0	99.9	40	160	0.2078	3.89	20	
Dieldrin	0.2012	0.0100	0.2	0	101	40	160	0.2064	2.56	20	
Endosulfan I	0.1921	0.0100	0.2	0	96.0	40	160	0.2009	4.47	20	
Endosulfan II	0.1949	0.0100	0.2	0	97.4	40	160	0.2008	2.98	20	
Endosulfan sulfate	0.2036	0.0100	0.2	0	102	40	160	0.2112	3.64	20	
Endrin	0.2136	0.0100	0.2	0	107	40	160	0.222	3.85	20	
Endrin aldehyde	0.1880	0.0100	0.2	0	94.0	40	160	0.1941	3.18	20	
Endrin ketone	0.2074	0.0200	0.2	0	104	40	160	0.2123	2.34	20	
gamma-BHC (Lindane)	0.1981	0.0100	0.2	0	99.1	40	160	0.2065	4.12	20	
Heptachlor	0.2102	0.0100	0.2	0	105	40	160	0.2196	4.37	20	
Heptachlor epoxide	0.1957	0.0100	0.2	0	97.8	40	160	0.2027	3.53	20	
Methoxychlor	0.2144	0.0100	0.2	0	107	40	160	0.2222	3.54	20	
Surr: Decachlorobiphenyl	0.2301	0	0.25	0	92.1	60	140	0	0	0	

Sample ID **1811421-04FMSD**	SampType: **MSD**	TestCode: **EPA608**	Units: **µg/L**	Prep Date: **11/14/2018**	RunNo: **108306**
Client ID: **ZZZZZ**	Batch ID: **42959**	TestNo: **EPA 608**	**(EPA 3510C)**	Analysis Date: **11/22/2018**	SeqNo: **1652214**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID **1811421-04FMSD** SampType: **MSD** TestCode: **EPA608** Units: **µg/L** Prep Date: **11/14/2018** RunNo: **108306**
Client ID: **ZZZZZ** Batch ID: **42959** TestNo: **EPA 608** **(EPA 3510C)** Analysis Date: **11/22/2018** SeqNo: **1652214**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	0.1713	0.0100	0.2	0.00322	84.0	40	160	0.1843	7.33	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **MBLK** SampType: **MBLK** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108062**
Client ID: **ZZZZZ** Batch ID: **R108062** TestNo: **EPA 624** Analysis Date: **11/14/2018** SeqNo: **1649585**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acrolein	ND	5.00									
Acrylonitrile	ND	5.00									
Benzene	ND	0.500									
Bromodichloromethane	ND	0.500									
Bromomethane	ND	0.500									
Bromoform	ND	0.500									
1,2-Dichlorobenzene	ND	0.500									
1,3-Dichlorobenzene	ND	0.500									
1,4-Dichlorobenzene	ND	0.500									
Chlorobenzene	ND	0.500									
Carbon tetrachloride	ND	0.500									
Chloroethane	ND	0.500									
Chloromethane	ND	0.500									
2-Chloroethyl vinyl ether	ND	5.00									
Chloroform	ND	0.500									
Dibromochloromethane	ND	0.500									
Dichlorodifluoromethane	ND	0.500									
1,1-Dichloroethane	ND	0.500									
1,2-Dichloroethane	ND	0.500									
1,1-Dichloroethene	ND	0.500									
1,2-Dichloropropane	ND	0.500									
trans-1,2-Dichloroethylene	ND	0.500									
cis-1,3-Dichloropropene	ND	0.500									
trans-1,3-Dichloropropene	ND	0.500									
Ethylbenzene	ND	0.500									
Methylene chloride	ND	0.500									
1,1,2,2-Tetrachloroethane	ND	0.500									
Tetrachloroethene	ND	0.500									
Toluene	ND	0.500									

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **MBLK** SampType: **MBLK** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108062**
Client ID: **ZZZZZ** Batch ID: **R108062** TestNo: **EPA 624** Analysis Date: **11/14/2018** SeqNo: **1649585**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	0.500									
1,1,1-Trichloroethane	ND	0.500									
1,1,2-Trichloroethane	ND	0.500									
Trichloroethene	ND	0.500									
Trichlorofluoromethane	ND	0.500									
Vinyl chloride	ND	0.500									
o-Xylene	ND	0.500									
m,p-Xylene	ND	1.00									
Xylenes, Total	ND	1.50									
Surr: Dibromofluoromethane	39.27	0	40	0	98.2	80	120				
Surr: Toluene-d8	39.36	0	40	0	98.4	80	120				
Surr: 4-Bromofluorobenzene	41.02	0	40	0	103	80	120				

Sample ID **LCS** SampType: **LCS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108062**
Client ID: **ZZZZZ** Batch ID: **R108062** TestNo: **EPA 624** Analysis Date: **11/14/2018** SeqNo: **1649594**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acrolein	22.27	5.00	20	0	111	50	150				
Acrylonitrile	45.35	5.00	40	0	113	50	150				
Benzene	21.06	0.500	20	0	105	37	151				
Bromodichloromethane	23.12	0.500	20	0	116	35	155				
Bromomethane	20.48	0.500	20	0	102	0	242				
Bromoform	20.45	0.500	20	0	102	45	169				
1,2-Dichlorobenzene	21.96	0.500	20	0	110	18	190				
1,3-Dichlorobenzene	22.16	0.500	20	0	111	59	156				
1,4-Dichlorobenzene	21.93	0.500	20	0	110	18	190				
Chlorobenzene	21.76	0.500	20	0	109	37	160				
Carbon tetrachloride	22.67	0.500	20	0	113	70	140				
Chloroethane	21.64	0.500	20	0	108	14	230				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **LCS** SampType: **LCS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108062**
Client ID: **ZZZZZ** Batch ID: **R108062** TestNo: **EPA 624** Analysis Date: **11/14/2018** SeqNo: **1649594**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	22.22	0.500	20	0	111	0	273				
2-Chloroethyl vinyl ether	21.61	5.00	20	0	108	0	305				
Chloroform	21.88	0.500	20	0	109	51	138				
Dibromochloromethane	20.63	0.500	20	0	103	53	149				
Dichlorodifluoromethane	22.40	0.500	20	0	112	50	150				
1,1-Dichloroethane	22.40	0.500	20	0	112	59	150				
1,2-Dichloroethane	21.82	0.500	20	0	109	49	155				
1,1-Dichloroethene	22.52	0.500	20	0	113	0	234				
1,2-Dichloropropane	22.12	0.500	20	0	111	0	210				
trans-1,2-Dichloroethylene	22.32	0.500	20	0	112	54	156				
cis-1,3-Dichloropropene	23.57	0.500	20	0	118	0	227				
trans-1,3-Dichloropropene	23.39	0.500	20	0	117	17	183				
Ethylbenzene	22.75	0.500	20	0	114	37	162				
Methylene chloride	22.12	0.500	20	0	111	0	221				
1,1,2,2-Tetrachloroethane	23.31	0.500	20	0	117	46	157				
Tetrachloroethene	22.01	0.500	20	0	110	64	148				
Toluene	21.94	0.500	20	0	110	47	150				
1,2,4-Trichlorobenzene	21.87	0.500	20	0	109	70	130				
1,1,1-Trichloroethane	22.58	0.500	20	0	113	52	162				
1,1,2-Trichloroethane	22.66	0.500	20	0	113	52	150				
Trichloroethene	22.10	0.500	20	0	110	71	157				
Trichlorofluoromethane	22.22	0.500	20	0	111	17	181				
Vinyl chloride	21.35	0.500	20	0	107	0	251				
o-Xylene	23.08	0.500	20	0	115	70	130				
m,p-Xylene	45.71	1.00	40	0	114	70	130				
Xylenes, Total	68.79	1.50	60	0	115	70	130				
Surr: Dibromofluoromethane	40.76	0	40	0	102	80	120				
Surr: Toluene-d8	40.24	0	40	0	101	80	120				
Surr: 4-Bromofluorobenzene	40.25	0	40	0	101	80	120				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **1811471-02HMS** SampType: **MS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108062**
Client ID: **City Tap Water 4** Batch ID: **R108062** TestNo: **EPA 624** Analysis Date: **11/15/2018** SeqNo: **1649592**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acrolein	ND	5.00	20	0	0	50	150				MI
Acrylonitrile	40.30	5.00	40	0	101	50	150				
Benzene	20.34	0.500	20	0	102	37	151				
Bromodichloromethane	36.17	0.500	20	11.94	121	35	155				
Bromomethane	12.92	0.500	20	0	64.6	0	242				
Bromoform	17.89	0.500	20	0	89.4	45	169				
1,2-Dichlorobenzene	18.73	0.500	20	0	93.6	18	190				
1,3-Dichlorobenzene	18.09	0.500	20	0	90.4	59	156				
1,4-Dichlorobenzene	18.03	0.500	20	0	90.2	18	190				
Chlorobenzene	19.95	0.500	20	0	99.8	37	160				
Carbon tetrachloride	22.09	0.500	20	0	110	70	140				
Chloroethane	20.00	0.500	20	0	100	14	230				
Chloromethane	19.14	0.500	20	0	95.7	0	273				
2-Chloroethyl vinyl ether	19.20	5.00	20	0	96.0	0	305				
Chloroform	37.81	0.500	20	16.08	109	51	138				
Dibromochloromethane	25.18	0.500	20	4.93	101	53	149				
Dichlorodifluoromethane	17.65	0.500	20	0	88.2	50	150				
1,1-Dichloroethane	21.71	0.500	20	0	109	59	150				
1,2-Dichloroethane	20.72	0.500	20	0	104	49	155				
1,1-Dichloroethene	21.84	0.500	20	0	109	0	234				
1,2-Dichloropropane	21.41	0.500	20	0	107	0	210				
trans-1,2-Dichloroethylene	20.90	0.500	20	0	104	54	156				
cis-1,3-Dichloropropene	16.04	0.500	20	0	80.2	0	227				
trans-1,3-Dichloropropene	18.99	0.500	20	0	95.0	17	183				
Ethylbenzene	20.57	0.500	20	0	103	37	162				
Methylene chloride	20.18	0.500	20	0	101	0	221				
1,1,2,2-Tetrachloroethane	16.03	0.500	20	0	80.2	46	157				
Tetrachloroethene	33.38	0.500	20	0	167	64	148				MI
Toluene	20.51	0.500	20	0	103	47	150				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **1811471-02HMS** SampType: **MS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108062**
Client ID: **City Tap Water 4** Batch ID: **R108062** TestNo: **EPA 624** Analysis Date: **11/15/2018** SeqNo: **1649592**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	14.03	0.500	20	0	70.2	70	130				
1,1,1-Trichloroethane	22.24	0.500	20	0	111	52	162				
1,1,2-Trichloroethane	21.03	0.500	20	0	105	52	150				
Trichloroethene	23.37	0.500	20	0	117	71	157				
Trichlorofluoromethane	19.68	0.500	20	0	98.4	17	181				
Vinyl chloride	19.37	0.500	20	0	96.8	0	251				
Xylenes, Total	61.82	1.50	60	0	103	70	130				
Surr: Dibromofluoromethane	40.37	0	40	0	101	80	120				
Surr: Toluene-d8	40.20	0	40	0	100	80	120				
Surr: 4-Bromofluorobenzene	40.32	0	40	0	101	80	120				

Sample ID **1811471-02HMSD** SampType: **MSD** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108062**
Client ID: **City Tap Water 4** Batch ID: **R108062** TestNo: **EPA 624** Analysis Date: **11/15/2018** SeqNo: **1649593**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acrolein	ND	5.00	20	0	0	50	150	0	0	25	MI
Acrylonitrile	41.31	5.00	40	0	103	50	150	40.3	2.48	25	
Benzene	20.49	0.500	20	0	102	37	151	20.34	0.735	25	
Bromodichloromethane	36.57	0.500	20	11.94	123	35	155	36.17	1.10	25	
Bromomethane	14.69	0.500	20	0	73.5	0	242	12.92	12.8	25	
Bromoform	18.11	0.500	20	0	90.6	45	169	17.89	1.22	25	
1,2-Dichlorobenzene	18.56	0.500	20	0	92.8	18	190	18.73	0.912	25	
1,3-Dichlorobenzene	18.08	0.500	20	0	90.4	59	156	18.09	0.0553	25	
1,4-Dichlorobenzene	17.95	0.500	20	0	89.8	18	190	18.03	0.445	25	
Chlorobenzene	19.77	0.500	20	0	98.8	37	160	19.95	0.906	25	
Carbon tetrachloride	22.39	0.500	20	0	112	70	140	22.09	1.35	25	
Chloroethane	18.12	0.500	20	0	90.6	14	230	20	9.86	25	
Chloromethane	18.34	0.500	20	0	91.7	0	273	19.14	4.27	25	
2-Chloroethyl vinyl ether	18.97	5.00	20	0	94.8	0	305	19.2	1.21	25	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **1811471-02HMSD** SampType: **MSD** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **108062**
Client ID: **City Tap Water 4** Batch ID: **R108062** TestNo: **EPA 624** Analysis Date: **11/15/2018** SeqNo: **1649593**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	37.75	0.500	20	16.08	108	51	138	37.81	0.159	25	
Dibromochloromethane	24.94	0.500	20	4.93	100	53	149	25.18	0.958	25	
Dichlorodifluoromethane	16.64	0.500	20	0	83.2	50	150	17.65	5.89	25	
1,1-Dichloroethane	21.55	0.500	20	0	108	59	150	21.71	0.740	25	
1,2-Dichloroethane	20.98	0.500	20	0	105	49	155	20.72	1.25	25	
1,1-Dichloroethene	21.54	0.500	20	0	108	0	234	21.84	1.38	25	
1,2-Dichloropropane	21.33	0.500	20	0	107	0	210	21.41	0.374	25	
trans-1,2-Dichloroethylene	19.97	0.500	20	0	99.8	54	156	20.9	4.55	25	
cis-1,3-Dichloropropene	18.41	0.500	20	0	92.0	0	227	16.04	13.8	25	
trans-1,3-Dichloropropene	19.83	0.500	20	0	99.2	17	183	18.99	4.33	25	
Ethylbenzene	20.44	0.500	20	0	102	37	162	20.57	0.634	25	
Methylene chloride	19.87	0.500	20	0	99.4	0	221	20.18	1.55	25	
1,1,2,2-Tetrachloroethane	15.98	0.500	20	0	79.9	46	157	16.03	0.312	25	
Tetrachloroethene	32.94	0.500	20	0	165	64	148	33.38	1.33	25	MI
Toluene	20.41	0.500	20	0	102	47	150	20.51	0.489	25	
1,2,4-Trichlorobenzene	14.50	0.500	20	0	72.5	70	130	14.03	3.29	25	
1,1,1-Trichloroethane	22.25	0.500	20	0	111	52	162	22.24	0.0450	25	
1,1,2-Trichloroethane	21.04	0.500	20	0	105	52	150	21.03	0.0475	25	
Trichloroethene	23.72	0.500	20	0	119	71	157	23.37	1.49	25	
Trichlorofluoromethane	18.02	0.500	20	0	90.1	17	181	19.68	8.81	25	
Vinyl chloride	18.23	0.500	20	0	91.2	0	251	19.37	6.06	25	
Xylenes, Total	60.92	1.50	60	0	102	70	130	0	0	0	
Surr: Dibromofluoromethane	40.07	0	40	0	100	80	120	0	0	25	
Surr: Toluene-d8	40.17	0	40	0	100	80	120	0	0	25	
Surr: 4-Bromofluorobenzene	40.47	0	40	0	101	80	120	0	0	25	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **MB-42978** SampType: **MBLK** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657008**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4,5-Tetrachlorobenzene	ND	1.00									
1,2,4-Trichlorobenzene	ND	1.00									
1,2-Diphenylhydrazine as Azobenzene	ND	2.00									
2,4,5-Trichlorophenol	ND	1.00									
2,4,6-Trichlorophenol	ND	1.00									
2,4-Dichlorophenol	ND	1.00									
2,4-Dimethylphenol	ND	2.00									
2,4-Dinitrophenol	ND	5.00									
2,4-Dinitrotoluene	ND	1.00									
2,6-Dinitrotoluene	ND	1.00									
2-Chloronaphthalene	ND	1.00									
2-Chlorophenol	ND	1.00									
2-Methylphenol (Cresol)	ND	1.00									
2-Nitrophenol	ND	2.00									
3+4-Methylphenol (m,p Cresol)	ND	1.00									
3,3´-Dichlorobenzidine	ND	1.00									
4,6-Dinitro-2-methylphenol	ND	2.00									
4-Bromophenyl phenyl ether	ND	1.00									
4-Chloro-3-methylphenol	ND	1.00									
4-Chlorophenyl phenyl ether	ND	1.00									
4-Nitrophenol	ND	5.00									
Acenaphthene	ND	1.00									
Acenaphthylene	ND	1.00									
Anthracene	ND	1.00									
Benzidine	ND	10.0									
Benzo(a)anthracene	ND	0.500									
Benzo(a)pyrene	ND	0.500									
Benzo(b)fluoranthene	ND	0.500									
Benzo(g,h,i)perylene	ND	1.00									

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **MB-42978** SampType: **MBLK** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657008**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(k)fluoranthene	ND	0.500									
Bis(2-chloroethoxy)methane	ND	2.00									
Bis(2-chloroethyl)ether	ND	1.00									
Bis(2-chloroisopropyl)ether	ND	2.00									
Bis(2-ethylhexyl)phthalate	ND	1.00									
Butyl benzyl phthalate	ND	1.00									
Chrysene	ND	0.500									
Di-n-butyl phthalate	ND	1.00									
Di-n-octyl phthalate	ND	1.00									
Dibenz(a,h)anthracene	ND	0.500									
Diethyl phthalate	ND	1.00									
Dimethyl phthalate	ND	1.00									
Fluoranthene	ND	2.00									
Fluorene	ND	1.00									
Hexachlorobenzene	ND	1.00									
Hexachlorobutadiene	ND	2.00									
Hexachlorocyclopentadiene	ND	2.00									
Hexachloroethane	ND	1.00									
Indeno(1,2,3-cd)pyrene	ND	0.500									
Isophorone	ND	1.00									
N-Nitrosodi-n-propylamine	ND	2.00									
N-Nitrosodimethylamine	ND	1.00									
N-Nitrosodiphenylamine	ND	1.00									
Naphthalene	ND	1.00									
Nitrobenzene	ND	1.00									
Pentachlorobenzene	ND	1.00									
Pentachlorophenol	ND	1.00									
Phenanthrene	ND	1.00									
Phenol	ND	1.00									

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **MB-42978** SampType: **MBLK** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657008**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pyrene	ND	1.00									
Surr: 2,4,6-Tribromophenol	35.89	0	50	0	71.8	20	140				
Surr: 2-Fluorobiphenyl	17.57	0	25	0	70.3	40	140				
Surr: 2-Fluorophenol	14.10	0	50	0	28.2	10	120				
Surr: 4-Terphenyl-d14	20.52	0	25	0	82.1	50	140				
Surr: Nitrobenzene-d5	16.91	0	25	0	67.6	40	140				
Surr: Phenol-d6	9.320	0	50	0	18.6	10	110				

Sample ID **LCS-42978** SampType: **LCS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657007**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4,5-Tetrachlorobenzene	15.11	1.00	20	0	75.6	40	140				
1,2,4-Trichlorobenzene	29.39	1.00	40	0	73.5	44	142				
1,2-Diphenylhydrazine as Azobenzene	35.16	2.00	40	0	87.9	50	150				
2,4,5-Trichlorophenol	36.76	1.00	40	0	91.9	40	140				
2,4,6-Trichlorophenol	36.70	1.00	40	0	91.8	37	144				
2,4-Dichlorophenol	32.35	1.00	40	0	80.9	39	135				
2,4-Dimethylphenol	25.21	2.00	40	0	63.0	32	119				
2,4-Dinitrophenol	32.74	5.00	40	0	81.8	0	191				
2,4-Dinitrotoluene	33.35	1.00	40	0	83.4	39	139				
2,6-Dinitrotoluene	35.46	1.00	40	0	88.6	50	158				
2-Chloronaphthalene	32.27	1.00	40	0	80.7	60	118				
2-Chlorophenol	25.25	1.00	40	0	63.1	23	134				
2-Methylphenol (Cresol)	21.81	1.00	40	0	54.5	40	140				
2-Nitrophenol	32.81	2.00	40	0	82.0	29	182				
3+4-Methylphenol (m,p Cresol)	20.08	1.00	40	0	50.2	40	140				
3,3´-Dichlorobenzidine	71.66	1.00	80	0	89.6	0	262				
4,6-Dinitro-2-methylphenol	36.34	2.00	40	0	90.8	0	181				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **LCS-42978** SampType: **LCS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657007**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Bromophenyl phenyl ether	36.33	1.00	40	0	90.8	53	127				
4-Chloro-3-methylphenol	32.19	1.00	40	0	80.5	22	147				
4-Chlorophenyl phenyl ether	33.99	1.00	40	0	85.0	25	158				
4-Nitrophenol	13.20	5.00	40	0	33.0	0	132				
Acenaphthene	33.08	1.00	40	0	82.7	47	145				
Acenaphthylene	34.17	1.00	40	0	85.4	33	145				
Anthracene	35.69	1.00	40	0	89.2	27	133				
Benzidine	18.93	10.0	80	0	23.7	10	132				
Benzo(a)anthracene	35.46	0.500	40	0	88.6	33	143				
Benzo(a)pyrene	38.64	0.500	40	0	96.6	17	163				
Benzo(b)fluoranthene	37.91	0.500	40	0	94.8	24	159				
Benzo(g,h,i)perylene	36.83	1.00	40	0	92.1	0	219				
Benzo(k)fluoranthene	36.83	0.500	40	0	92.1	11	162				
Bis(2-chloroethoxy)methane	32.46	2.00	40	0	81.2	33	184				
Bis(2-chloroethyl)ether	29.58	1.00	40	0	74.0	12	158				
Bis(2-chloroisopropyl)ether	29.95	2.00	40	0	74.9	36	166				
Bis(2-ethylhexyl)phthalate	37.13	1.00	40	0	92.8	8	158				
Butyl benzyl phthalate	37.27	1.00	40	0	93.2	0	152				
Chrysene	35.25	0.500	40	0	88.1	17	168				
Di-n-butyl phthalate	37.06	1.00	40	0	92.6	1	118				
Di-n-octyl phthalate	36.76	1.00	40	0	91.9	4	146				
Dibenz(a,h)anthracene	37.56	0.500	40	0	93.9	0	227				
Diethyl phthalate	34.46	1.00	40	0	86.2	0	114				
Dimethyl phthalate	33.25	1.00	40	0	83.1	0	112				
Fluoranthene	37.35	2.00	40	0	93.4	26	137				
Fluorene	33.17	1.00	40	0	82.9	59	121				
Hexachlorobenzene	37.02	1.00	40	0	92.6	0	152				
Hexachlorobutadiene	30.10	2.00	40	0	75.2	24	116				
Hexachlorocyclopentadiene	31.55	2.00	40	0	78.9	25	150				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **LCS-42978** SampType: **LCS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657007**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachloroethane	28.48	1.00	40	0	71.2	40	113				
Indeno(1,2,3-cd)pyrene	37.16	0.500	40	0	92.9	0	171				
Isophorone	35.12	1.00	40	0	87.8	21	196				
N-Nitrosodi-n-propylamine	34.21	2.00	40	0	85.5	0	230				
N-Nitrosodimethylamine	14.61	1.00	40	0	36.5	10	129				
N-Nitrosodiphenylamine	36.22	1.00	40	0	90.6	50	150				
Naphthalene	29.94	1.00	40	0	74.8	21	131				
Nitrobenzene	30.21	1.00	40	0	75.5	35	180				
Pentachlorobenzene	16.02	1.00	20	0	80.1	40	140				
Pentachlorophenol	36.29	1.00	40	0	90.7	14	176				
Phenanthrene	34.50	1.00	40	0	86.2	54	120				
Phenol	9.090	1.00	40	0	22.7	5	112				
Pyrene	36.62	1.00	40	0	91.6	52	115				
Surr: 2,4,6-Tribromophenol	39.76	0	50	0	79.5	20	140				
Surr: 2-Fluorobiphenyl	17.32	0	25	0	69.3	40	140				
Surr: 2-Fluorophenol	14.17	0	50	0	28.3	10	120				
Surr: 4-Terphenyl-d14	18.13	0	25	0	72.5	50	140				
Surr: Nitrobenzene-d5	16.47	0	25	0	65.9	40	140				
Surr: Phenol-d6	9.500	0	50	0	19.0	10	110				

Sample ID **1811421-04GMS** SampType: **MS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657017**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4,5-Tetrachlorobenzene	14.81	1.00	20	0	74.0	40	140				
1,2,4-Trichlorobenzene	28.36	1.00	40	0	70.9	44	142				
1,2-Diphenylhydrazine as Azobenzene	31.99	2.00	40	0	80.0	50	150				
2,4,5-Trichlorophenol	34.21	1.00	40	0	85.5	40	140				
2,4,6-Trichlorophenol	33.99	1.00	40	0	85.0	37	144				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **1811421-04GMS** SampType: **MS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657017**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,4-Dichlorophenol	29.79	1.00	40	0	74.5	39	135				
2,4-Dimethylphenol	21.21	2.00	40	0	53.0	32	119				
2,4-Dinitrophenol	12.78	5.00	40	0	32.0	0	191				
2,4-Dinitrotoluene	28.66	1.00	40	0	71.6	39	139				
2,6-Dinitrotoluene	32.18	1.00	40	0	80.4	50	158				
2-Chloronaphthalene	33.30	1.00	40	0	83.3	60	118				
2-Chlorophenol	23.79	1.00	40	0	59.5	23	134				
2-Methylphenol (Cresol)	20.34	1.00	40	0	50.9	40	140				
2-Nitrophenol	30.78	2.00	40	0	77.0	29	182				
3+4-Methylphenol (m,p Cresol)	17.74	1.00	40	0	44.4	40	140				
3,3´-Dichlorobenzidine	71.50	1.00	80	0	89.4	0	262				
4,6-Dinitro-2-methylphenol	27.17	2.00	40	0	67.9	0	181				
4-Bromophenyl phenyl ether	38.63	1.00	40	0	96.6	53	127				
4-Chloro-3-methylphenol	28.92	1.00	40	0	72.3	22	147				
4-Chlorophenyl phenyl ether	31.97	1.00	40	0	79.9	25	158				
4-Nitrophenol	6.630	5.00	40	0	16.6	0	132				
Acenaphthene	33.03	1.00	40	0	82.6	47	145				
Acenaphthylene	33.23	1.00	40	0	83.1	33	145				
Anthracene	36.48	1.00	40	0	91.2	27	133				
Benzidine	18.95	10.0	80	0	23.7	10	132				
Benzo(a)anthracene	36.20	0.500	40	0	90.5	33	143				
Benzo(a)pyrene	38.42	0.500	40	0	96.0	17	163				
Benzo(b)fluoranthene	38.03	0.500	40	0	95.1	24	159				
Benzo(g,h,i)perylene	39.45	1.00	40	0	98.6	0	219				
Benzo(k)fluoranthene	37.40	0.500	40	0	93.5	11	162				
Bis(2-chloroethoxy)methane	31.78	2.00	40	0	79.4	33	184				
Bis(2-chloroethyl)ether	29.37	1.00	40	0	73.4	12	158				
Bis(2-chloroisopropyl)ether	29.61	2.00	40	0	74.0	36	166				
Bis(2-ethylhexyl)phthalate	38.07	1.00	40	0	95.2	8	158				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **1811421-04GMS** SampType: **MS** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657017**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Butyl benzyl phthalate	37.74	1.00	40	0	94.4	0	152				
Chrysene	36.28	0.500	40	0	90.7	17	168				
Di-n-butyl phthalate	37.44	1.00	40	0	93.6	1	118				
Di-n-octyl phthalate	39.05	1.00	40	0	97.6	4	146				
Dibenz(a,h)anthracene	40.15	0.500	40	0	100	0	227				
Diethyl phthalate	29.79	1.00	40	0	74.5	0	114				
Dimethyl phthalate	31.10	1.00	40	0	77.8	0	112				
Fluoranthene	38.32	2.00	40	0	95.8	26	137				
Fluorene	30.93	1.00	40	0	77.3	59	121				
Hexachlorobenzene	39.17	1.00	40	0	97.9	0	152				
Hexachlorobutadiene	29.02	2.00	40	0	72.6	24	116				
Hexachlorocyclopentadiene	32.70	2.00	40	0	81.8	25	150				
Hexachloroethane	27.95	1.00	40	0	69.9	40	113				
Indeno(1,2,3-cd)pyrene	39.49	0.500	40	0	98.7	0	171				
Isophorone	34.75	1.00	40	0	86.9	21	196				
N-Nitrosodi-n-propylamine	33.84	2.00	40	0	84.6	0	230				
N-Nitrosodimethylamine	14.14	1.00	40	0	35.4	10	129				
N-Nitrosodiphenylamine	33.60	1.00	40	0	84.0	50	150				
Naphthalene	29.06	1.00	40	0	72.6	21	131				
Nitrobenzene	29.45	1.00	40	0	73.6	35	180				
Pentachlorobenzene	15.99	1.00	20	0	80.0	40	140				
Pentachlorophenol	18.85	1.00	40	0	47.1	14	176				
Phenanthrene	35.65	1.00	40	0	89.1	54	120				
Phenol	8.380	1.00	40	0	21.0	5	112				
Pyrene	37.96	1.00	40	0	94.9	52	115				
Surr: 2,4,6-Tribromophenol	38.74	0	50	0	77.5	20	140				
Surr: 2-Fluorobiphenyl	18.59	0	25	0	74.4	40	140				
Surr: 2-Fluorophenol	13.53	0	50	0	27.1	10	120				
Surr: 4-Terphenyl-d14	18.11	0	25	0	72.4	50	140				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **1811421-04GMS**	SampType: **MS**	TestCode: **EPA625**	Units: **µg/L**	Prep Date: **11/16/2018**	RunNo: **108590**
Client ID: **ZZZZZ**	Batch ID: **42978**	TestNo: **EPA 625**	**(EPA 3510C)**	Analysis Date: **12/5/2018**	SeqNo: **1657017**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	16.10	0	25	0	64.4	40	140				
Surr: Phenol-d6	8.990	0	50	0	18.0	10	110				

Sample ID **1811421-04GMSD**	SampType: **MSD**	TestCode: **EPA625**	Units: **µg/L**	Prep Date: **11/16/2018**	RunNo: **108590**
Client ID: **ZZZZZ**	Batch ID: **42978**	TestNo: **EPA 625**	**(EPA 3510C)**	Analysis Date: **12/5/2018**	SeqNo: **1657018**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4,5-Tetrachlorobenzene	15.14	1.00	20	0	75.7	40	140	14.81	2.20	25	
1,2,4-Trichlorobenzene	28.38	1.00	40	0	71.0	44	142	28.36	0.0705	25	
1,2-Diphenylhydrazine as Azobenzene	36.21	2.00	40	0	90.5	50	150	31.99	12.4	25	
2,4,5-Trichlorophenol	33.39	1.00	40	0	83.5	40	140	34.21	2.43	25	
2,4,6-Trichlorophenol	31.81	1.00	40	0	79.5	37	144	33.99	6.63	25	
2,4-Dichlorophenol	29.12	1.00	40	0	72.8	39	135	29.79	2.27	25	
2,4-Dimethylphenol	19.61	2.00	40	0	49.0	32	119	21.21	7.84	25	
2,4-Dinitrophenol	14.63	5.00	40	0	36.6	0	191	12.78	13.5	25	
2,4-Dinitrotoluene	36.03	1.00	40	0	90.1	39	139	28.66	22.8	25	
2,6-Dinitrotoluene	36.87	1.00	40	0	92.2	50	158	32.18	13.6	25	
2-Chloronaphthalene	31.68	1.00	40	0	79.2	60	118	33.3	4.99	25	
2-Chlorophenol	22.50	1.00	40	0	56.2	23	134	23.79	5.57	25	
2-Methylphenol (Cresol)	18.76	1.00	40	0	46.9	40	140	20.34	8.08	25	
2-Nitrophenol	30.41	2.00	40	0	76.0	29	182	30.78	1.21	25	
3+4-Methylphenol (m,p Cresol)	16.22	1.00	40	0	40.6	40	140	17.74	8.95	25	
3,3´-Dichlorobenzidine	72.82	1.00	80	0	91.0	0	262	71.5	1.83	25	
4,6-Dinitro-2-methylphenol	27.52	2.00	40	0	68.8	0	181	27.17	1.28	25	
4-Bromophenyl phenyl ether	35.58	1.00	40	0	89.0	53	127	38.63	8.22	25	
4-Chloro-3-methylphenol	28.88	1.00	40	0	72.2	22	147	28.92	0.138	25	
4-Chlorophenyl phenyl ether	34.15	1.00	40	0	85.4	25	158	31.97	6.59	25	
4-Nitrophenol	9.160	5.00	40	0	22.9	0	132	6.63	32.0	25	MI
Acenaphthene	32.86	1.00	40	0	82.2	47	145	33.03	0.516	25	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **1811421-04GMSD** SampType: **MSD** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657018**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthylene	33.16	1.00	40	0	82.9	33	145	33.23	0.211	25	
Anthracene	36.25	1.00	40	0	90.6	27	133	36.48	0.632	25	
Benzidine	16.25	10.0	80	0	20.3	10	132	18.95	15.3	60	
Benzo(a)anthracene	36.99	0.500	40	0	92.5	33	143	36.2	2.16	25	
Benzo(a)pyrene	38.49	0.500	40	0	96.2	17	163	38.42	0.182	25	
Benzo(b)fluoranthene	38.40	0.500	40	0	96.0	24	159	38.03	0.968	25	
Benzo(g,h,i)perylene	40.29	1.00	40	0	101	0	219	39.45	2.11	25	
Benzo(k)fluoranthene	37.12	0.500	40	0	92.8	11	162	37.4	0.751	25	
Bis(2-chloroethoxy)methane	31.81	2.00	40	0	79.5	33	184	31.78	0.0944	25	
Bis(2-chloroethyl)ether	28.92	1.00	40	0	72.3	12	158	29.37	1.54	25	
Bis(2-chloroisopropyl)ether	29.13	2.00	40	0	72.8	36	166	29.61	1.63	25	
Bis(2-ethylhexyl)phthalate	38.91	1.00	40	0	97.3	8	158	38.07	2.18	25	
Butyl benzyl phthalate	38.95	1.00	40	0	97.4	0	152	37.74	3.16	25	
Chrysene	36.49	0.500	40	0	91.2	17	168	36.28	0.577	25	
Di-n-butyl phthalate	39.60	1.00	40	0	99.0	1	118	37.44	5.61	25	
Di-n-octyl phthalate	38.60	1.00	40	0	96.5	4	146	39.05	1.16	25	
Dibenz(a,h)anthracene	41.08	0.500	40	0	103	0	227	40.15	2.29	25	
Diethyl phthalate	36.21	1.00	40	0	90.5	0	114	29.79	19.5	25	
Dimethyl phthalate	34.48	1.00	40	0	86.2	0	112	31.1	10.3	25	
Fluoranthene	39.76	2.00	40	0	99.4	26	137	38.32	3.69	25	
Fluorene	33.81	1.00	40	0	84.5	59	121	30.93	8.90	25	
Hexachlorobenzene	36.97	1.00	40	0	92.4	0	152	39.17	5.78	25	
Hexachlorobutadiene	28.72	2.00	40	0	71.8	24	116	29.02	1.04	25	
Hexachlorocyclopentadiene	30.67	2.00	40	0	76.7	25	150	32.7	6.41	25	
Hexachloroethane	27.17	1.00	40	0	67.9	40	113	27.95	2.83	25	
Indeno(1,2,3-cd)pyrene	40.57	0.500	40	0	101	0	171	39.49	2.70	25	
Isophorone	34.84	1.00	40	0	87.1	21	196	34.75	0.259	25	
N-Nitrosodi-n-propylamine	33.59	2.00	40	0	84.0	0	230	33.84	0.742	25	
N-Nitrosodimethylamine	14.27	1.00	40	0	35.7	10	129	14.14	0.915	25	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA625

Sample ID **1811421-04GMSD** SampType: **MSD** TestCode: **EPA625** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108590**
Client ID: **ZZZZZ** Batch ID: **42978** TestNo: **EPA 625** **(EPA 3510C)** Analysis Date: **12/5/2018** SeqNo: **1657018**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
N-Nitrosodiphenylamine	29.57	1.00	40	0	73.9	50	150	33.6	12.8	25	
Naphthalene	28.88	1.00	40	0	72.2	21	131	29.06	0.621	25	
Nitrobenzene	29.47	1.00	40	0	73.7	35	180	29.45	0.0679	25	
Pentachlorobenzene	16.69	1.00	20	0	83.4	40	140	15.99	4.28	25	
Pentachlorophenol	17.20	1.00	40	0	43.0	14	176	18.85	9.15	25	
Phenanthrene	35.31	1.00	40	0	88.3	54	120	35.65	0.958	25	
Phenol	8.290	1.00	40	0	20.7	5	112	8.38	1.08	25	
Pyrene	39.28	1.00	40	0	98.2	52	115	37.96	3.42	25	
Surr: 2,4,6-Tribromophenol	36.00	0	50	0	72.0	20	140	0	0	25	
Surr: 2-Fluorobiphenyl	17.70	0	25	0	70.8	40	140	0	0	25	
Surr: 2-Fluorophenol	13.09	0	50	0	26.2	10	120	0	0	25	
Surr: 4-Terphenyl-d14	19.46	0	25	0	77.8	50	140	0	0	25	
Surr: Nitrobenzene-d5	16.43	0	25	0	65.7	40	140	0	0	25	
Surr: Phenol-d6	9.010	0	50	0	18.0	10	110	0	0	25	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: HG_WW

Sample ID	MB-43021	SampType:	MBLK	TestCode:	HG_WW	Units:	µg/L	Prep Date:	11/21/2018	RunNo:	108356
Client ID:	ZZZZZ	Batch ID:	43021	TestNo:	EPA 245.1	(EPA 245.1/7		Analysis Date:	11/26/2018	SeqNo:	1652481

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.02800	0.200									J

Sample ID	LCS-43021	SampType:	LCS	TestCode:	HG_WW	Units:	µg/L	Prep Date:	11/21/2018	RunNo:	108356
Client ID:	ZZZZZ	Batch ID:	43021	TestNo:	EPA 245.1	(EPA 245.1/7		Analysis Date:	11/26/2018	SeqNo:	1652482

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.516	0.200	5	0.028	110	80	120				

Sample ID	1811421-06JMS	SampType:	MS	TestCode:	HG_WW	Units:	µg/L	Prep Date:	11/21/2018	RunNo:	108356
Client ID:	ZZZZZ	Batch ID:	43021	TestNo:	EPA 245.1	(EPA 245.1/7		Analysis Date:	11/26/2018	SeqNo:	1652484

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.596	0.200	5	0	112	75	125				

Sample ID	1811471-02JMS	SampType:	MS	TestCode:	HG_WW	Units:	µg/L	Prep Date:	11/21/2018	RunNo:	108356
Client ID:	City Tap Water 4	Batch ID:	43021	TestNo:	EPA 245.1	(EPA 245.1/7		Analysis Date:	11/26/2018	SeqNo:	1652486

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.556	0.200	5	0	111	75	125				

Sample ID	1811421-06JMSD	SampType:	MSD	TestCode:	HG_WW	Units:	µg/L	Prep Date:	11/21/2018	RunNo:	108356
Client ID:	ZZZZZ	Batch ID:	43021	TestNo:	EPA 245.1	(EPA 245.1/7		Analysis Date:	11/26/2018	SeqNo:	1652485

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.774	0.200	5	0	115	75	125	5.596	3.13	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: HG_WW

Sample ID **1811471-02JMSD** SampType: **MSD** TestCode: **HG_WW** Units: **µg/L** Prep Date: **11/21/2018** RunNo: **108356**
Client ID: **City Tap Water 4** Batch ID: **43021** TestNo: **EPA 245.1** **(EPA 245.1/7** Analysis Date: **11/26/2018** SeqNo: **1652487**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.570	0.200	5	0	111	75	125	5.556	0.252	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP-HARD_WW

Sample ID **MB-42970**	SampType: **MBLK**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108139**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1649241**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	ND	6620									

Sample ID **MB-42970**	SampType: **MBLK**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108532**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1655824**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	ND	6620									

Sample ID **LCS-42970**	SampType: **LCS**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108139**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1649242**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	6683	6620	6615	0	101	85	115				

Sample ID **LCS-42970**	SampType: **LCS**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108532**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1655825**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	6683	6620	6615	0	101	85	115				

Sample ID **1811490-01AMS**	SampType: **MS**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108139**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1649254**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	141800	6620	138800	2046	101	70	130				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP-HARD_WW

Sample ID **1811490-01AMS**	SampType: **MS**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108532**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1655830**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	141800	6620	138800	2046	101	70	130				

Sample ID **1811490-01AMSD**	SampType: **MSD**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108139**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1649255**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	141700	6620	138800	2046	101	70	130	141800	0.0176	20	

Sample ID **1811490-01AMSD**	SampType: **MSD**	TestCode: **ICP-HARD_W**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108532**
Client ID: **ZZZZZ**	Batch ID: **42970**	TestNo: **SM 2340B**	**(EPA 200.7)**	Analysis Date: **11/15/2018**	SeqNo: **1655831**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness, Total (As CaCO3)	141700	6620	138800	2046	101	70	130	141800	0.0176	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_200.7_WW

Sample ID **MB-42970** SampType: **MBLK** TestCode: **ICP_200.7_W** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108136**
Client ID: **ZZZZZ** Batch ID: **42970** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **11/15/2018** SeqNo: **1649194**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									
Calcium	ND	1000									
Iron	ND	15.0									
Magnesium	ND	1000									
Potassium	ND	1000									
Sodium	128.1	1000									J

Sample ID **LCS-42970** SampType: **LCS** TestCode: **ICP_200.7_W** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108136**
Client ID: **ZZZZZ** Batch ID: **42970** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **11/15/2018** SeqNo: **1649195**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	980.5	10.0	1000	0	98.0	85	115				
Calcium	1014	1000	1000	0	101	85	115				
Iron	1007	15.0	1000	0	101	85	115				
Magnesium	1008	1000	1000	0	101	85	115				
Potassium	878.4	1000	1000	0	87.8	85	115				J
Sodium	2073	1000	2000	128.1	97.2	85	115				

Sample ID **1811490-01AMS** SampType: **MS** TestCode: **ICP_200.7_W** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108136**
Client ID: **ZZZZZ** Batch ID: **42970** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **11/15/2018** SeqNo: **1649207**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	20880	10.0	21000	13	99.4	70	130				
Calcium	21430	1000	21000	767.1	98.4	70	130				
Iron	21160	15.0	21000	7.5	101	70	130				
Magnesium	21430	1000	21000	31.7	102	70	130				
Potassium	23710	1000	21000	200.9	112	70	130				
Sodium	120800	1000	21000	96470	116	70	130				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_200.7_WW

Sample ID **1811490-01AMSD** SampType: **MSD** TestCode: **ICP_200.7_W** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108136**
Client ID: **ZZZZZ** Batch ID: **42970** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **11/15/2018** SeqNo: **1649208**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	20850	10.0	21000	13	99.2	70	130	20880	0.144	20	
Calcium	21420	1000	21000	767.1	98.3	70	130	21430	0.0467	20	
Iron	21140	15.0	21000	7.5	101	70	130	21160	0.0946	20	
Magnesium	21430	1000	21000	31.7	102	70	130	21430	0	20	
Potassium	23870	1000	21000	200.9	113	70	130	23710	0.673	20	
Sodium	121400	1000	21000	96470	119	70	130	120800	0.495	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_WW

Sample ID **MB-42974**	SampType: **MBLK**	TestCode: **ICPMS_WW**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108149**
Client ID: **ZZZZZ**	Batch ID: **42974**	TestNo: **EPA 200.8**	**(EPA 200.8)**	Analysis Date: **11/16/2018**	SeqNo: **1653305**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.07600	0.500									J

Sample ID **MB-42974**	SampType: **MBLK**	TestCode: **ICPMS_WW**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108149**
Client ID: **ZZZZZ**	Batch ID: **42974**	TestNo: **EPA 200.8**	**(EPA 200.8)**	Analysis Date: **11/21/2018**	SeqNo: **1653323**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Beryllium	ND	0.100									
Cadmium	0.003000	0.100									J
Chromium	0.05600	0.400									J
Copper	0.03900	0.500									J
Lead	ND	0.100									
Manganese	0.04800	2.00									J
Nickel	ND	0.500									
Selenium	ND	0.500									
Silver	ND	0.100									
Thallium	0.008000	0.100									J
Zinc	ND	5.00									

Sample ID **LCS-42974**	SampType: **LCS**	TestCode: **ICPMS_WW**	Units: **µg/L**	Prep Date: **11/15/2018**	RunNo: **108149**
Client ID: **ZZZZZ**	Batch ID: **42974**	TestNo: **EPA 200.8**	**(EPA 200.8)**	Analysis Date: **11/16/2018**	SeqNo: **1653306**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	99.52	0.500	100	0.3	99.2	85	115				
Beryllium	98.07	0.100	100	0	98.1	85	115				
Cadmium	96.45	0.100	100	0.003	96.4	85	115				
Chromium	96.24	0.400	100	0.056	96.2	85	115				
Copper	97.02	0.500	100	0.039	97.0	85	115				
Lead	95.12	0.100	100	0	95.1	85	115				
Manganese	97.08	2.00	100	0.048	97.0	85	115				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_WW

Sample ID	LCS-42974	SampType:	LCS	TestCode:	ICPMS_WW	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108149
Client ID:	ZZZZZ	Batch ID:	42974	TestNo:	EPA 200.8	(EPA 200.8)		Analysis Date:	11/16/2018	SeqNo:	1653306

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nickel	95.60	0.500	100	0	95.6	85	115				
Selenium	95.69	0.500	100	0	95.7	85	115				
Silver	94.77	0.100	100	0	94.8	85	115				
Thallium	95.77	0.100	100	0.008	95.8	85	115				
Zinc	98.64	5.00	100	0	98.6	85	115				

Sample ID	1811471-02JMS	SampType:	MS	TestCode:	ICPMS_WW	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108149
Client ID:	City Tap Water 4	Batch ID:	42974	TestNo:	EPA 200.8	(EPA 200.8)		Analysis Date:	11/16/2018	SeqNo:	1653317

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	100.6	0.500	100	0.35	100	70	130				
Beryllium	92.40	0.100	100	0	92.4	70	130				
Cadmium	95.95	0.100	100	0	96.0	70	130				
Chromium	95.92	0.400	100	0	95.9	70	130				
Copper	96.36	0.500	100	3.21	93.1	70	130				
Lead	94.10	0.100	100	0.21	93.9	70	130				
Manganese	98.86	2.00	100	3.886	95.0	70	130				
Nickel	93.54	0.500	100	0.155	93.4	70	130				
Selenium	91.96	0.500	100	0	92.0	70	130				
Silver	92.74	0.100	100	0.003	92.7	70	130				
Thallium	94.47	0.100	100	0	94.5	70	130				
Zinc	96.70	5.00	100	0.862	95.8	70	130				

Sample ID	1811471-02JMSD	SampType:	MSD	TestCode:	ICPMS_WW	Units:	µg/L	Prep Date:	11/15/2018	RunNo:	108149
Client ID:	City Tap Water 4	Batch ID:	42974	TestNo:	EPA 200.8	(EPA 200.8)		Analysis Date:	11/16/2018	SeqNo:	1653318

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	95.25	0.500	100	0.35	94.9	70	130	100.6	5.43	20	
Beryllium	87.17	0.100	100	0	87.2	70	130	92.4	5.82	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_WW

Sample ID **1811471-02JMSD** SampType: **MSD** TestCode: **ICPMS_WW** Units: **µg/L** Prep Date: **11/15/2018** RunNo: **108149**
Client ID: **City Tap Water 4** Batch ID: **42974** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **11/16/2018** SeqNo: **1653318**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	89.35	0.100	100	0	89.4	70	130	95.95	7.12	20	
Chromium	89.55	0.400	100	0	89.5	70	130	95.92	6.87	20	
Copper	91.70	0.500	100	3.21	88.5	70	130	96.36	4.95	20	
Lead	88.71	0.100	100	0.21	88.5	70	130	94.1	5.89	20	
Manganese	92.54	2.00	100	3.886	88.6	70	130	98.86	6.61	20	
Nickel	88.28	0.500	100	0.155	88.1	70	130	93.54	5.79	20	
Selenium	86.64	0.500	100	0	86.6	70	130	91.96	5.95	20	
Silver	86.56	0.100	100	0.003	86.6	70	130	92.74	6.90	20	
Thallium	88.83	0.100	100	0	88.8	70	130	94.47	6.15	20	
Zinc	91.96	5.00	100	0.862	91.1	70	130	96.7	5.02	20	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_WWDISS

Sample ID **MB-42985**	SampType: **MBLK**	TestCode: **ICPMS_WWD**	Units: **µg/L**	Prep Date: **11/16/2018**	RunNo: **108179**
Client ID: **ZZZZZ**	Batch ID: **42985**	TestNo: **EPA 200.8**	**(EPA 3005A)**	Analysis Date: **11/19/2018**	SeqNo: **1649837**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	0.002000	0.100									J
Copper	ND	0.500									
Lead	ND	0.100									
Nickel	ND	0.500									
Selenium	ND	0.500									
Silver	ND	0.100									
Zinc	0.4880	5.00									J

Sample ID **LCS-42985**	SampType: **LCS**	TestCode: **ICPMS_WWD**	Units: **µg/L**	Prep Date: **11/16/2018**	RunNo: **108179**
Client ID: **ZZZZZ**	Batch ID: **42985**	TestNo: **EPA 200.8**	**(EPA 3005A)**	Analysis Date: **11/19/2018**	SeqNo: **1649838**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	102.5	0.100	100	0.002	102	85	115				
Copper	104.9	0.500	100	0	105	85	115				
Lead	100.5	0.100	100	0	100	85	115				
Nickel	101.0	0.500	100	0	101	85	115				
Selenium	102.4	0.500	100	0	102	85	115				
Silver	101.3	0.100	100	0	101	85	115				
Zinc	105.5	5.00	100	0.488	105	85	115				

Sample ID **1811421-05IMS**	SampType: **MS**	TestCode: **ICPMS_WWD**	Units: **µg/L**	Prep Date: **11/16/2018**	RunNo: **108179**
Client ID: **ZZZZZ**	Batch ID: **42985**	TestNo: **EPA 200.8**	**(EPA 3005A)**	Analysis Date: **11/19/2018**	SeqNo: **1649847**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	104.1	0.100	100	0.004	104	70	130				
Copper	116.2	0.500	100	8.796	107	70	130				
Lead	102.1	0.100	100	0.138	102	70	130				
Nickel	102.7	0.500	100	0.209	103	70	130				
Selenium	99.99	0.500	100	0	100	70	130				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_WWDISS

Sample ID **1811421-05IMS** SampType: **MS** TestCode: **ICPMS_WWD** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108179**
Client ID: **ZZZZZ** Batch ID: **42985** TestNo: **EPA 200.8** **(EPA 3005A)** Analysis Date: **11/19/2018** SeqNo: **1649847**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Silver	100.6	0.100	100	0	101	70	130				
Zinc	115.0	5.00	100	3.931	111	70	130				

Sample ID **1811421-05IMSD** SampType: **MSD** TestCode: **ICPMS_WWD** Units: **µg/L** Prep Date: **11/16/2018** RunNo: **108179**
Client ID: **ZZZZZ** Batch ID: **42985** TestNo: **EPA 200.8** **(EPA 3005A)** Analysis Date: **11/19/2018** SeqNo: **1649848**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	103.3	0.100	100	0.004	103	70	130	104.1	0.749	20	
Copper	114.3	0.500	100	8.796	106	70	130	116.2	1.64	20	
Lead	102.2	0.100	100	0.138	102	70	130	102.1	0.0842	20	
Nickel	100.1	0.500	100	0.209	99.9	70	130	102.7	2.61	20	
Selenium	98.51	0.500	100	0	98.5	70	130	99.99	1.49	20	
Silver	100.1	0.100	100	0	100	70	130	100.6	0.570	20	
Zinc	113.0	5.00	100	3.931	109	70	130	115	1.76	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: NO2NO3_AUTO_W

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **NO2NO3_AU**	Units: **mg/L**	Prep Date:	RunNo: **108183**
Client ID: **ZZZZZ**	Batch ID: **R108183**	TestNo: **EPA 353.2**		Analysis Date: **11/19/2018**	SeqNo: **1649915**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate-Nitrite	ND	0.0500									

Sample ID **LCS**	SampType: **LCS**	TestCode: **NO2NO3_AU**	Units: **mg/L**	Prep Date:	RunNo: **108183**
Client ID: **ZZZZZ**	Batch ID: **R108183**	TestNo: **EPA 353.2**		Analysis Date: **11/19/2018**	SeqNo: **1649914**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate-Nitrite	30.54	1.00	30	0	102	90	110				

Sample ID **1811427-01AMS**	SampType: **MS**	TestCode: **NO2NO3_AU**	Units: **mg/L**	Prep Date:	RunNo: **108183**
Client ID: **ZZZZZ**	Batch ID: **R108183**	TestNo: **EPA 353.2**		Analysis Date: **11/19/2018**	SeqNo: **1649902**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate-Nitrite	1.273	0.100	1	0.0994	117	80	120				

Sample ID **1811427-01AMSD**	SampType: **MSD**	TestCode: **NO2NO3_AU**	Units: **mg/L**	Prep Date:	RunNo: **108183**
Client ID: **ZZZZZ**	Batch ID: **R108183**	TestNo: **EPA 353.2**		Analysis Date: **11/19/2018**	SeqNo: **1649903**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate-Nitrite	1.254	0.100	1	0.0994	115	80	120	1.273	1.55	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: PHOS-T_W

Sample ID **MB-42991**	SampType: **MBLK**	TestCode: **PHOS-T_W**	Units: **mg/L**	Prep Date: **11/19/2018**	RunNo: **108184**
Client ID: **ZZZZZ**	Batch ID: **42991**	TestNo: **SM 4500-P E**	**(SM 4500 P-E**	Analysis Date: **11/19/2018**	SeqNo: **1649916**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	ND	0.0250									

Sample ID **LCS-42991**	SampType: **LCS**	TestCode: **PHOS-T_W**	Units: **mg/L**	Prep Date: **11/19/2018**	RunNo: **108184**
Client ID: **ZZZZZ**	Batch ID: **42991**	TestNo: **SM 4500-P E**	**(SM 4500 P-E**	Analysis Date: **11/19/2018**	SeqNo: **1649917**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.5035	0.0250	0.5	0	101	85	115				

Sample ID **1811473-05AMS**	SampType: **MS**	TestCode: **PHOS-T_W**	Units: **mg/L**	Prep Date: **11/19/2018**	RunNo: **108184**
Client ID: **ZZZZZ**	Batch ID: **42991**	TestNo: **SM 4500-P E**	**(SM 4500 P-E**	Analysis Date: **11/19/2018**	SeqNo: **1649925**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.2824	0.0250	0.2	0.06969	106	80	120				

Sample ID **1811473-05AMSD**	SampType: **MSD**	TestCode: **PHOS-T_W**	Units: **mg/L**	Prep Date: **11/19/2018**	RunNo: **108184**
Client ID: **ZZZZZ**	Batch ID: **42991**	TestNo: **SM 4500-P E**	**(SM 4500 P-E**	Analysis Date: **11/19/2018**	SeqNo: **1649926**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.2808	0.0250	0.2	0.06969	106	80	120	0.2824	0.586	15	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: SOLIDS_TDS_W

Sample ID **MB-42977**	SampType: **MBLK**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **11/15/2018**	RunNo: **108336**
Client ID: **ZZZZZ**	Batch ID: **42977**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **11/15/2018**	SeqNo: **1652098**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	5.00									

Sample ID **LCS-42977**	SampType: **LCS**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **11/15/2018**	RunNo: **108336**
Client ID: **ZZZZZ**	Batch ID: **42977**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **11/15/2018**	SeqNo: **1652099**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	95.00	5.00	100	0	95.0	80	120				

Sample ID **1811471-02ADUP**	SampType: **DUP**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **11/15/2018**	RunNo: **108336**
Client ID: **City Tap Water 4**	Batch ID: **42977**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **11/15/2018**	SeqNo: **1652109**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	57.50	5.00						56.25	2.20	5	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: SOLIDS_TSS_W

Sample ID **MB-42966**	SampType: **MBLK**	TestCode: **SOLIDS_TSS**	Units: **mg/L**	Prep Date: **11/15/2018**	RunNo: **108134**
Client ID: **ZZZZZ**	Batch ID: **42966**	TestNo: **SM 2540D**	**(Solids)**	Analysis Date: **11/15/2016**	SeqNo: **1649128**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	ND	1.00									

Sample ID **LCS-42966**	SampType: **LCS**	TestCode: **SOLIDS_TSS**	Units: **mg/L**	Prep Date: **11/15/2018**	RunNo: **108134**
Client ID: **ZZZZZ**	Batch ID: **42966**	TestNo: **SM 2540D**	**(Solids)**	Analysis Date: **11/15/2016**	SeqNo: **1649129**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	900.0	40.0	1000	0	90.0	80	120				

Sample ID **1811421-02BDUP**	SampType: **DUP**	TestCode: **SOLIDS_TSS**	Units: **mg/L**	Prep Date: **11/15/2018**	RunNo: **108134**
Client ID: **ZZZZZ**	Batch ID: **42966**	TestNo: **SM 2540D**	**(Solids)**	Analysis Date: **11/15/2018**	SeqNo: **1649133**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	21.11	4.00						17.78	17.1	5	MI

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1811471
Project: 108.01593.00005 Jordan Cove

ANALYTICAL QC SUMMARY REPORT

TestCode: TURBIDITY_W

Sample ID	MB-R108053	SampType:	MBLK	TestCode:	TURBIDITY_	Units:	NTU	Prep Date:		RunNo:	108053
Client ID:	ZZZZZ	Batch ID:	R108053	TestNo:	SM 2130B			Analysis Date:	11/13/2018	SeqNo:	1647600

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	ND	0.100									

Sample ID	LCS-R108053	SampType:	LCS	TestCode:	TURBIDITY_	Units:	NTU	Prep Date:		RunNo:	108053
Client ID:	ZZZZZ	Batch ID:	R108053	TestNo:	SM 2130B			Analysis Date:	11/13/2018	SeqNo:	1647601

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	2.310	0.100	2.31	0	100	90	110				

Sample ID	1811421-01ADUP	SampType:	DUP	TestCode:	TURBIDITY_	Units:	NTU	Prep Date:		RunNo:	108053
Client ID:	ZZZZZ	Batch ID:	R108053	TestNo:	SM 2130B			Analysis Date:	11/13/2018	SeqNo:	1647603

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	145.0	0.100						145	0	10	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory
245 South Grape Street * Medford, OR 97501
(541) 770-5678 fax (541) 770-2901

Chain of Custody Record

This Chain of Custody is a LEGAL DOCUMENT and must be filled out accurately.

Section A
Required Client Information

Company:	SLR Consulting
Address:	1800 Blankenship Road, Ste 440
West Linn, OR 97068	
Email:	cbrow@slrconsulting.com
Phone:	503-905-3729 Fax:
Collected By (Print):	Tyler Weber
Collected By (Sign):	
Email Report	X Yes ___ No Mail Report ___ Yes ___ No
Fax Report	___ Yes ___ No

Section B
Required Project Information

Project Name:	Jordan Cove
Project Number:	108.01593.00005
Report To:	Chris Brow
Copy To:	Steve Hammer

Section C
Invoice Information

Attention:	Accounts Payable
Company Name:	SLR International
Address:	2118 20th Ave, Suite 6202
	Bothell, WA 98021
P.O. #	108.01593.00005, task 0004

Section D
Rush Status (Subject to Scheduling)

- X Standard 10-14 Days
- ___ 5 Business Days (50% surcharge)
- ___ 3 Business Days (75% surcharge)
- ___ 24 - 48 hours (100% surcharge)
- ___ Other ___

Authorized ___ Yes ___ No

Section E
Sample Information

Sample ID	Comp/Grab	Matrix*	Date Collected	Time Collected	No. of Containers	Alk, Turb, TDS, Cl, F, SO42	BOD, TSS	NH3, NO3-NO2, Tphos	Cyanide*	DOC	608, 624, 625	Cr Spec/Diss Cr Spec	Total Metals	Diss Metals	Lab Filter
Well Water 4	Grab	W	11/12/18	1230	20	X	X	X	X	X	X	X	X	X	X
City Tap Water 4	Grab	W	11/12/18	1300	20	X	X	X	X	X	X	X	X	X	X

Analysis Requested

Total Metals= Fe,K,Na,Al,As,Cu,Pb,Mn,Zn,Be Cd,Ni,Se,Ag,Tl,Hg,Hardness (Ca, Mg added per CL)

Diss Metals=Cd,Cu,Pb,Ni,Se,Ag,Zn

NRC Workorder # (Lab Use Only) 181471 12/10

Remarks/Field Data	NRC Sample # (Lab Use Only)
* Free Cyanide if over QL	01A-R
	02A-J

*Matrix: **DW** - Drinking Water **WW** - Wastewater **W** - Water **S** - Soil/Solid **SL** - Sludge **O** - Oil **WP** - Wipe **OT** - Other

Section F
Relinquish/Receive

	Sign	Print	Date (3)	Time
Relinquished By:	Tyler Weber	Tyler Weber	11/13/18	1300
Received By:				
Relinquished By:				
Received By:				
Relinquished By:				
Received By Laboratory:	JMerrill	Jordan Merrill	11-14-18	1030

Section G
Lab Use Only

Temp:	1.0°C
4°C +/- 2°C:	___ Yes ___ No
Received on Ice:	✓ Yes ___ No
Number of Bottles Received:	40
pH Checked:	
COC Seals Intact:	___ Yes ___ No ___ NA
Field Blank Included:	___ Yes ___ No

Received Via ___ UPS ✓ FedEX ___ Other ___ Hand

Payment: ✓ Invoice ___ Cash ___ VISA, M/C ___ Check # ___ Amount ___

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

December 12, 2018

Neilson Research Corporation
ATTN: Tamra Schmedemann
245 South Grape Street
Medford, OR 97501
tschmedemann@nrclabs.com

RE: Project NRC-MF1802 Client Project: 108.01593.00005, 0004

Dear Tamra Schmedemann,

On November 14, 2018, Brooks Applied Labs (BAL) received seven (7) water samples. The samples were logged-in for the analyses of total and dissolved inorganic arsenic (InorgAs) according to the chain-of-custody (COC) forms. All samples were received and stored according to BAL SOPs and EPA methodology.

Samples for dissolved analyses were filtered upon receipt by BAL. This meant that the dissolved fractions were not able to be pre-preserved with hydrochloric acid (HCl) as is required by EPA Method 1632. All dissolved fractions were qualified **H** for preservation holding times not being met.

The COC for the samples received on November 14 included the sample *Well Water 4*, which was not received in the shipment. It was determined that this sample was the same as the sample received on November 16. This sample was reported in 1846036B report.

Samples *Well Water 1* and *Well Water 2* had two containers that were both pre-preserved with HCl. A dissolved fraction was not able to be filtered for these three samples.

Water samples were preserved with hydrochloric acid and were analyzed via EPA Method 1632.

The results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

The dissolved InorgAs result for sample *City Tap Water* (1846036-12) was slightly greater than the associated total value (1846036-11). The total and dissolved result met duplicate precision criteria (relative percent difference less than 20%). All InorgAs should be considered to be in the dissolved form for this sample.

All data was reported without qualification and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report. Please feel free to contact us if you have any questions regarding this report.

Sincerely,



Lydia Greaves
Client Services Manager
Brooks Applied Labs
lydia@brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Report Information

Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	standard reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

(Effective 9/23/09)

E An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H Holding time and/or preservation requirements not met. Please see narrative for explanation.
J Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1 Estimated value. A full explanation is presented in the narrative.
M Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R Rejected, unusable value. A full explanation is presented in the narrative.
U Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
Well Water 1	1846036-01	Water	Sample	11/11/2018	11/14/2018
Well Water 2	1846036-02	Water	Sample	11/11/2018	11/14/2018
Well Water 3	1846036-03	Water	Sample	11/12/2018	11/14/2018
Well Water 3	1846036-04	Water	Sample	11/12/2018	11/14/2018
City Tap Water 1	1846036-05	Water	Sample	11/11/2018	11/14/2018
City Tap Water 1	1846036-06	Water	Sample	11/11/2018	11/14/2018
City Tap Water 2	1846036-07	Water	Sample	11/11/2018	11/14/2018
City Tap Water 2	1846036-08	Water	Sample	11/11/2018	11/14/2018
City Tap Water 3	1846036-09	Water	Sample	11/12/2018	11/14/2018
City Tap Water 3	1846036-10	Water	Sample	11/12/2018	11/14/2018
City Tap Water 4	1846036-11	Water	Sample	11/12/2018	11/14/2018
City Tap Water 4	1846036-12	Water	Sample	11/12/2018	11/14/2018

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
InorgAs	Water	EPA 1632	12/05/2018	12/05/2018	B183174	1801649

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
Well Water 1										
1846036-01	InorgAs	Water	TR	23.7		0.160	0.500	µg/L	B183174	1801649
Well Water 2										
1846036-02	InorgAs	Water	TR	23.4		0.320	1.00	µg/L	B183174	1801649
Well Water 3										
1846036-03	InorgAs	Water	TR	23.3		0.320	1.00	µg/L	B183174	1801649
Well Water 3										
1846036-04	InorgAs	Water	D	4.79	H	0.320	1.00	µg/L	B183174	1801649
City Tap Water 1										
1846036-05	InorgAs	Water	TR	0.063		0.008	0.025	µg/L	B183174	1801649
City Tap Water 1										
1846036-06	InorgAs	Water	D	0.054	H	0.008	0.025	µg/L	B183174	1801649
City Tap Water 2										
1846036-07	InorgAs	Water	TR	0.070		0.008	0.025	µg/L	B183174	1801649
City Tap Water 2										
1846036-08	InorgAs	Water	D	0.054	H	0.008	0.025	µg/L	B183174	1801649
City Tap Water 3										
1846036-09	InorgAs	Water	TR	0.060		0.008	0.025	µg/L	B183174	1801649
City Tap Water 3										
1846036-10	InorgAs	Water	D	0.058	H	0.008	0.025	µg/L	B183174	1801649
City Tap Water 4										
1846036-11	InorgAs	Water	TR	0.057		0.008	0.025	µg/L	B183174	1801649
City Tap Water 4										
1846036-12	InorgAs	Water	D	0.064	H	0.008	0.025	µg/L	B183174	1801649

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Accuracy & Precision Summary

Batch: B183174
Lab Matrix: Water
Method: EPA 1632

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B183174-BS1	**Blank Spike, (1846009)**						
	InorgAs		0.5000	0.491	µg/L	98% 65-135	
B183174-SRM1	**Standard Reference Material (1803063, TMDA 70.2 Reference Standard - Bottle6)**						
	InorgAs		42.30	39.77	µg/L	94% 75-125	
B183174-MS1	**Matrix Spike (1846036-05)**						
	InorgAs	0.063	0.2500	0.316	µg/L	101% 65-135	
B183174-MSD1	**Matrix Spike Duplicate (1846036-05)**						
	InorgAs	0.063	0.2500	0.297	µg/L	94% 65-135	6% 35
B183174-MS2	**Matrix Spike (1846036-07)**						
	InorgAs	0.070	0.2500	0.295	µg/L	90% 65-135	
B183174-MSD2	**Matrix Spike Duplicate (1846036-07)**						
	InorgAs	0.070	0.2500	0.312	µg/L	97% 65-135	6% 35

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Method Blanks & Reporting Limits

Batch: B183174
Matrix: Water
Method: EPA 1632
Analyte: InorgAs

Sample	Result	Units
B183174-BLK1	0.00	µg/L
B183174-BLK2	0.00	µg/L
B183174-BLK3	0.00	µg/L

Average: 0.000 **Standard Deviation:** 0.000 **MDL:** 0.008
Limit: 0.016 **Limit:** 0.005 **MRL:** 0.025

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Sample Containers

Lab ID: 1846036-01 **Report Matrix:** Water **Collected:** 11/11/2018
Sample: Well Water 1 **Sample Type:** Sample **Received:** 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (PP)	1842048	<2	Cooler - 1846036
B	EXTRA_VOL	250mL	17-0170	1.0mL 6N HCl (PP)	1842048	<2	Cooler - 1846036

Lab ID: 1846036-02 **Report Matrix:** Water **Collected:** 11/11/2018
Sample: Well Water 2 **Sample Type:** Sample **Received:** 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (PP)	1842048	<2	Cooler - 1846036
B	EXTRA_VOL	250mL	17-0170	1.0mL 6N HCl (PP)	1842048	<2	Cooler - 1846036

Lab ID: 1846036-03 **Report Matrix:** Water **Collected:** 11/12/2018
Sample: Well Water 3 **Sample Type:** Sample **Received:** 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (PP)	1842048	<2	Cooler - 1846036

Lab ID: 1846036-04 **Report Matrix:** Water **Collected:** 11/12/2018
Sample: Well Water 3 **Sample Type:** Sample **Received:** 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (BAL)	1842048	<2	Cooler - 1846036

Lab ID: 1846036-05 **Report Matrix:** Water **Collected:** 11/11/2018
Sample: City Tap Water 1 **Sample Type:** Sample **Received:** 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (BAL)	1842048	<2	Cooler - 1846036

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Sample Containers

Lab ID: 1846036-06
Sample: City Tap Water 1
Report Matrix: Water
Sample Type: Sample
Collected: 11/11/2018
Received: 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (BAL)	1842048	<2	Cooler - 1846036

Lab ID: 1846036-07
Sample: City Tap Water 2
Report Matrix: Water
Sample Type: Sample
Collected: 11/11/2018
Received: 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (BAL)	1842048	<2	Cooler - 1846036

Lab ID: 1846036-08
Sample: City Tap Water 2
Report Matrix: Water
Sample Type: Sample
Collected: 11/11/2018
Received: 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (BAL)	1842048	<2	Cooler - 1846036

Lab ID: 1846036-09
Sample: City Tap Water 3
Report Matrix: Water
Sample Type: Sample
Collected: 11/12/2018
Received: 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (BAL)	1842048	<2	Cooler - 1846036

Lab ID: 1846036-10
Sample: City Tap Water 3
Report Matrix: Water
Sample Type: Sample
Collected: 11/12/2018
Received: 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (BAL)	1842048	<2	Cooler - 1846036

Lab ID: 1846036-11
Sample: City Tap Water 4
Report Matrix: Water
Sample Type: Sample
Collected: 11/12/2018
Received: 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (PP)	1842048	<2	Cooler - 1846036

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Sample Containers

Lab ID: 1846036-12
Sample: City Tap Water 4

Report Matrix: Water
Sample Type: Sample

Collected: 11/12/2018
Received: 11/14/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (BAL)	1842048	<2	Cooler - 1846036

Shipping Containers

Cooler - 1846036

Received: November 14, 2018 10:00
Tracking No: 783758071150 via FedEx
Coolant Type: Ice
Temperature: 3.0 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR#18

Custody seals present? Yes
Custody seals intact? Yes
COC present? Yes

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

BAL Report 1846036A

Chain-of-Custody Form

BROOKS APPLIED LABS

Ship samples to:
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

For BAL use only
Received by: [signature] Date: 11/14/18
Work Order ID: _____ Time: 1000
Project ID: _____

Client: SLR International
Contact: Chris Brow
Client Project ID: 108.01593.00005, 0004
Samples Collected By: Tyler Webs

PO Number: 108.01593.00005, 4
Phone: 503-723-4423
Email: cbrow@slrconsulting.com

Mailing Address: 1800 Blankenship Road, Suite 440
West Linn, OR 97068
Email Receipt Confirmation? (Yes/No)
BAL PM: _____

Requested TAT (business days)
- [X] 20 (standard)
- [ ] 15*
- [ ] 10*
- [ ] 5*
- [ ] Other ____

*Surcharges may apply to expedited TATs

	Sample ID	Collection: Date	Collection: Time	Client Sample Info: Matrix Type	Number of Containers	Field Filtered? (Yes/No)	Preservation Type HCl /HNO_3/Other	BAL Analyses Required: Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify)	As Species (specify) InOrg, III, V, MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Ukmown	Filtration	Other (specify)	Other (specify)	Comments: Specify Here
1	Well water 1	11/11/18	1745	W	2	No	HCl				X					
2	Well water 2	11/11/18	2245	W	2	No					X					
3	Well Water 3	11/12/18	0830	W	2	No					X					
4	Well Water 4	11/12/18	1230	W	2	No					X					
5	City tap water 1	11/11/18	1815	W	2	No					X					
6	City tap water 2	11/11/18	2215	W	2	No					X					
7	City tap water 3	11/12/18	0845	W	2	No					X					
8	City tap Water 4	11/12/18	1300	W	2	No	↓				X					
9																
10																
	Trip Blank															

Relinquished By: [signature]	Date: 11/13/18	Time: 1366	Relinquished By:	Date:	Time:
Received By:	Date:	Time:	Total Number of Packages:		

Page 1 of 1

List Hazardous Contaminants: None Expected

samples@brooksapplied.com | brooksapplied.com

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

December 12, 2018

Neilson Research Corporation
ATTN: Tamra Schmedemann
245 South Grape Street
Medford, OR 97501
tschmedemann@nrclabs.com

RE: Project NRC-MF1802 Client Project: 1811471

Dear Tamra Schmedemann,

On November 16, 2018, Brooks Applied Labs (BAL) received one (1) water sample. The sample was logged-in for the analyses of total and dissolved inorganic arsenic (InorgAs) according to the chain-of-custody (COC) forms. All samples were received and stored according to BAL SOPs and EPA methodology.

Sample had two containers that were both pre-preserved with HCl. A dissolved fraction was not able to be filtered for this sample. Only the total fraction was reported.

Water samples were preserved with hydrochloric acid and were analyzed via EPA Method 1632.

The results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

All data was reported without qualification and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report. Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Lydia Greaves

Lydia Greaves
Client Services Manager
Brooks Applied Labs
lydia@brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Report Information

Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	standard reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

(Effective 9/23/09)

E An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H Holding time and/or preservation requirements not met. Please see narrative for explanation.
J Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1 Estimated value. A full explanation is presented in the narrative.
M Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R Rejected, unusable value. A full explanation is presented in the narrative.
U Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
1811471-01K	1846036-01	Water	Sample	11/11/2018	11/16/2018

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
InorgAs	Water	EPA 1632	12/05/2018	12/05/2018	B183174	1801649

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
1811471-01K										
1846036-13	InorgAs	Water	TR	23.0		0.160	0.500	µg/L	B183174	1801649

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Accuracy & Precision Summary

Batch: B183174
Lab Matrix: Water
Method: EPA 1632

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B183174-BS1	**Blank Spike, (1846009)**						
	InorgAs		0.5000	0.491	µg/L	98% 65-135	
B183174-SRM1	**Standard Reference Material (1803063, TMDA 70.2 Reference Standard - Bottle6)**						
	InorgAs		42.30	39.77	µg/L	94% 75-125	
B183174-MS1	**Matrix Spike (1846036-05)**						
	InorgAs	0.063	0.2500	0.316	µg/L	101% 65-135	
B183174-MSD1	**Matrix Spike Duplicate (1846036-05)**						
	InorgAs	0.063	0.2500	0.297	µg/L	94% 65-135	6% 35
B183174-MS2	**Matrix Spike (1846036-07)**						
	InorgAs	0.070	0.2500	0.295	µg/L	90% 65-135	
B183174-MSD2	**Matrix Spike Duplicate (1846036-07)**						
	InorgAs	0.070	0.2500	0.312	µg/L	97% 65-135	6% 35

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Method Blanks & Reporting Limits

Batch: B183174
Matrix: Water
Method: EPA 1632
Analyte: InorgAs

Sample	Result	Units
B183174-BLK1	0.00	µg/L
B183174-BLK2	0.00	µg/L
B183174-BLK3	0.00	µg/L

Average: 0.000 **Standard Deviation:** 0.000 **MDL:** 0.008
Limit: 0.016 **Limit:** 0.005 **MRL:** 0.025

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1802
PM: Lydia Greaves

Client PM: Tamra Schmedemann
Client Project: SLR International

Sample Containers

Lab ID: 1846036-13
Sample: 1811471-01K

Report Matrix: Water
Sample Type: Sample

Collected: 11/11/2018
Received: 11/16/2018

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250mL	17-0170	1.0mL 6N HCl (PP)	1842048	<2	Cooler#2 - 1846036
B	EXTRA_VOL	250mL	17-0170	1.0mL 6N HCl (PP)	1842048	<2	Cooler#2 - 1846036

Shipping Containers

Cooler#2 - 1846036

Received: November 16, 2018 10:30
Tracking No: 773736448309 via FedEx
Coolant Type: Ice
Temperature: 0.9 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR#15

Custody seals present? No
Custody seals intact? No
COC present? Yes

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory
245 South Grape Street * Medford, OR 97501
(541) 770-5678 fax (541) 770-2901

Chain of Custody Record

This Chain of Custody is a LEGAL DOCUMENT and must be filled out accurately.

Section A
Required Client Information

Company:	Neilson Research Corporation
Address:	245 South Grape Street
Medford, Or 97501	
Email:	tkreutzer@nrclabs.com
Phone:	541-770-5678 Fax:
Collected By (Print):	
Collected By (Sign):	
Email Report ___ Yes ___ No	Mail Report ___ Yes ___ No
Fax Report ___ Yes ___No	

Section B
Required Project Information

Project Name:	1811471
Project Number:	
Report To:	
Copy To:	

Section C
Invoice Information

Attention:	
Company Name:	
Address:	
P.O. #	61051

Section D
Rush Status (Subject to Scheduling)

- ____ Standard 10-14 Days
- ____ 5 Business Days (50% surcharge)
- ____ 3 Business Days (75% surcharge)
- ____ 24 - 48 hours (100% surcharge)
- ____ Other _____

Authorized ____ Yes ____ No

Section E
Sample Information

Sample ID	Comp/Grab	Matrix*	Date Collected	Time Collected	No. of Containers	1632-Inorganic As	1632-Diss Inorganic As	Analysis Requested								NRC Workorder # (Lab Use Only) Remarks/Field Data	NRC Sample # (Lab Use Only)
1811471-01K	Grab	W	11/12/2018	12:30pm	X	X	X										

*Matrix: **DW** - Drinking Water **WW** - Wastewater **W** - Water **S** - Soil/Solid **SL** - Sludge **O** - Oil **WP** - Wipe **OT** - Other

Section F
Relinquish/Receive

	Sign	Print	Date	Time
Relinquished By:	Tamra Schmedeman	Tamra Schmedeman	11/15/18	10:43
Received By:	Lydia Greaves	Lydia Greaves	11/16/18	10:30
Relinquished By:				
Received By:				
Relinquished By:				
Received By Laboratory:				

Section G
Lab Use Only

Temp:
4°C +/- 2°C: ____ Yes ____ No
Received on Ice: ____ Yes ____ No
Number of Bottles Received:
pH Checked:
COC Seals Intact: ___ Yes ___ No ___ NA
Field Blank Included: ___ Yes ___ No

Received Via ___ UPS ___ FedEX ___ Other ___ Hand

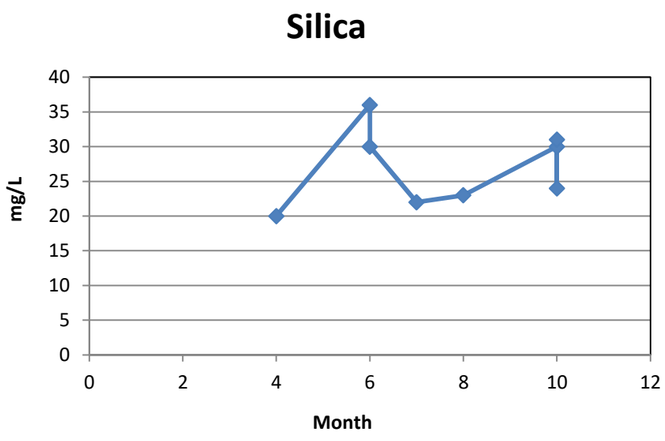
Payment: ___ Invoice ___ Cash ___VISA, M/C ___ Check # _____ Amount _____

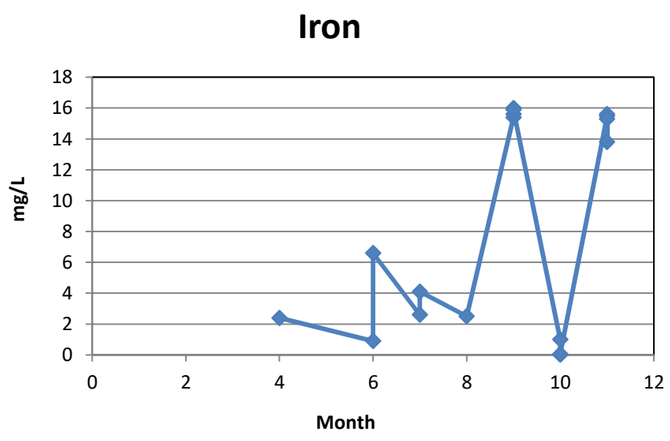
Appendix D

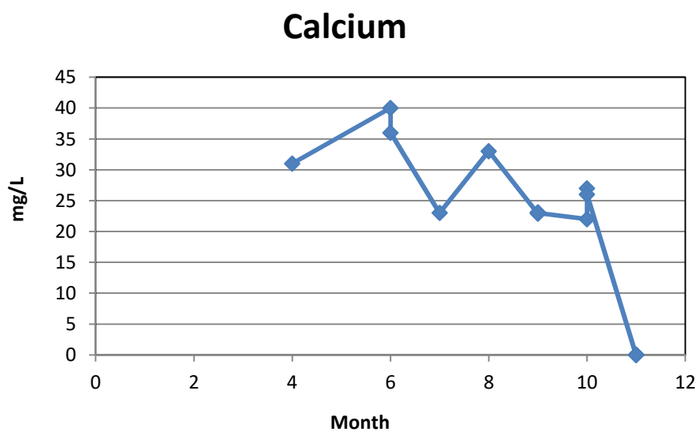
Seasonality Assessment of Dunes Area Groundwater

Appendix I
Seasonality Assessment of Dunes Area Groundwater

Source	ID	Date	Month	Silica mg/L	Iron mg/L	Calcium mg/L	Magnesium mg/L	Sodium mg/L	Potassium mg/L	Bicarbonate mg/L	Carbonate mg/L	Sulfate mg/L	Chloride mg/L	Fluoride mg/L	Nitrate mg/L	Dissolved Solids mg/L	Hardness mg/L	pH s.u.	Temperature C
USGS, 1973	48	4/7/59	4	20	2.4	31	4.9	12	6	120	0	3	18	0	0	160	97	7.8	--
USGS, 1973	57	6/18/70	6	36	0.9	40	7.7	21	5.7	164	0	0	34	0.1	3	230	130	7.9	14
USGS, 1973	58	6/18/70	6	30	6.6	36	5	22	4.3	142	0	0	33	0.1	2.9	210	110	7.7	13
USGS, 1973	49	7/17/70	7	22	2.6	23	3.4	9.6	3.5	90	0	4.2	14	0.1	0.8	130	72	7.7	13
USGS, 1973	56	7/16/70	7	--	4.1	--	--	--	--	--	--	--	27	--	--	--	--	--	--
USGS, 1973	47,48,49	8/8/58	8	23	2.5	33	3.4	9.7	4.9	110	0	2.9	16	0	0.1	150	95	7.6	--
SLR	1	9/27/18	9	--	15.4	22.9	10	15	7.14	110	--	0.44	18.3	0.1	--	160	98.6	--	--
SLR	2	9/27/18	9	--	15.6	23	10.1	15	7.14	110	--	0.45	18.3	0.1	--	166	99.1	--	--
SLR	3	9/28/18	9	--	16	23.1	10.1	15.1	7.19	112	--	<0.06	18.3	0.1	--	139	99.4	--	--
SLR	4	9/28/18	9	--	15.9	23	10.1	15	7.17	116	--	0.44	18.3	0.09	--	158	99.1	--	--
USGS, 1973	44	10/28/70	10	30	1	22	11	17	8.7	143	0	2.8	23	0.1	0.1	190	100	7.6	13
USGS, 1973	46	10/31/70	10	24	0.02	27	20	18	--	189	0	7.5	28	0.1	0.3	220	150	7.9	12
USGS, 1973	55	10/4/70	10	31	0.05	26	6.8	19	--	124	0	1	27		0.3	170	93	7.8	14
SLR	1	11/12/18	11	--	15.5	--	--	14.8	7.52	120	0	0.006	18.2	0.079	0.36	180	97.4	--	--
SLR	2	11/12/18	11	--	13.8	--	--	14.9	7.64	120	0	0.5	19	0.2	0.38	159	98.1	--	--
SLR	3	11/13/18	11	--	15.6	--	--	14.9	7.59	120	0	0.5	19.1	0.078	0.43	166	97.8	6.73	12.1
SLR	4	11/13/18	11	--	15.3	--	--	14.6	7.35	120	0	0.5	19	0.08	0.39	175	96.2	6.82	14.1

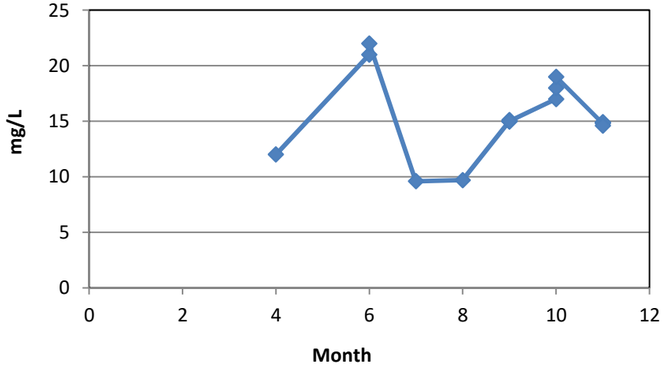




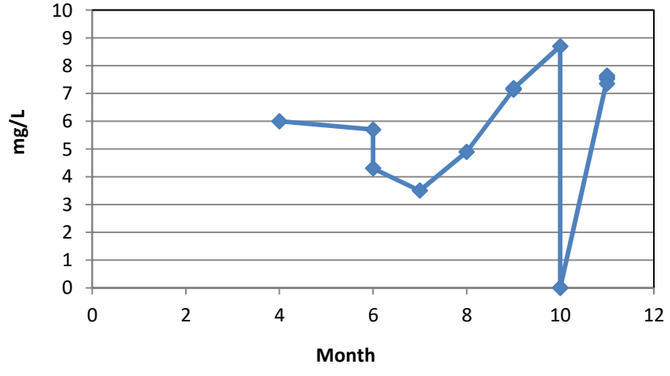


Appendix I
Seasonality Assessment of Dunes Area Groundwater

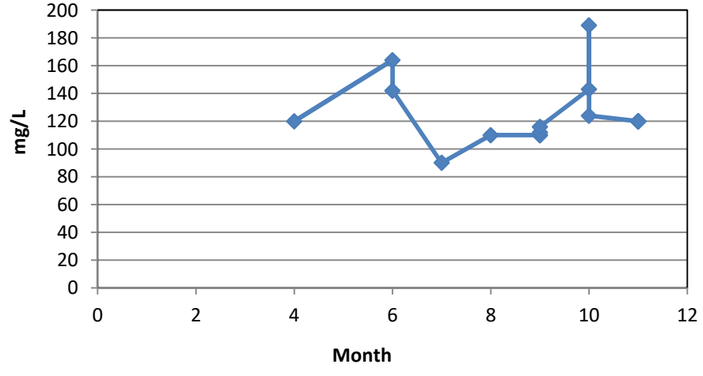
Sodium



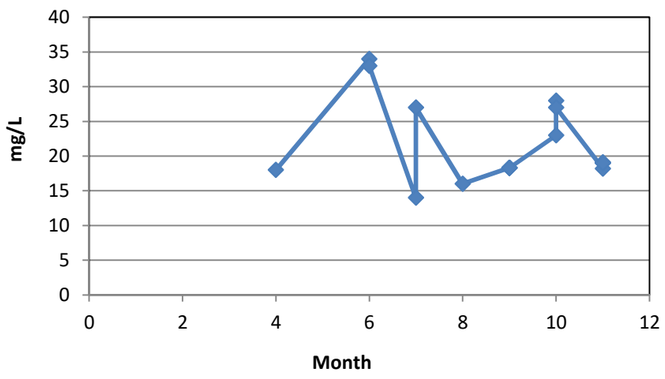
Potassium



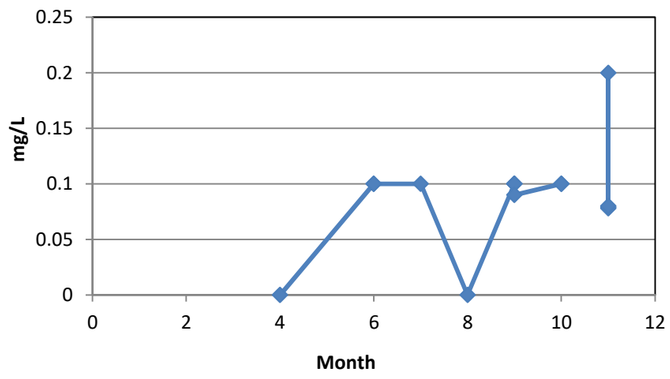
Bicarbonate



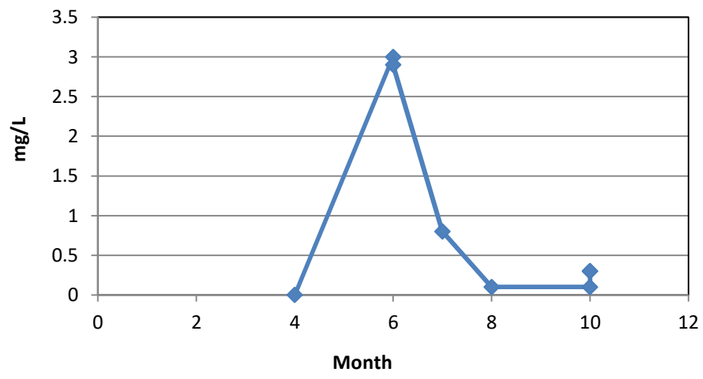
Chloride



Fluoride

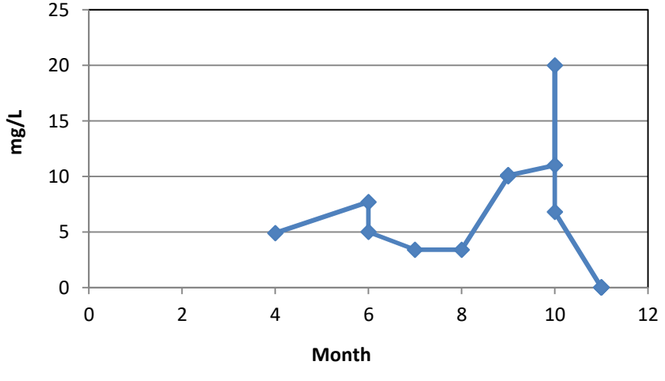


Nitrate

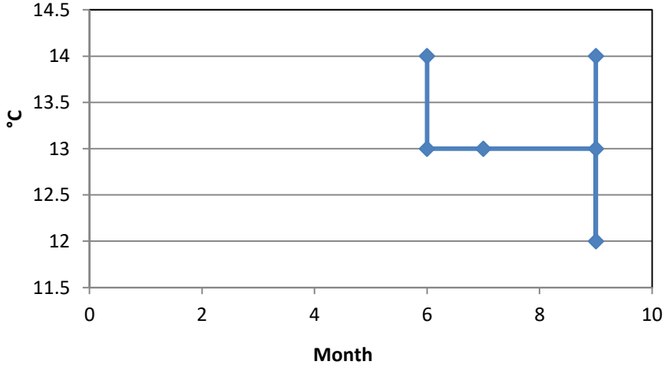


Appendix I
Seasonality Assessment of Dunes Area Groundwater

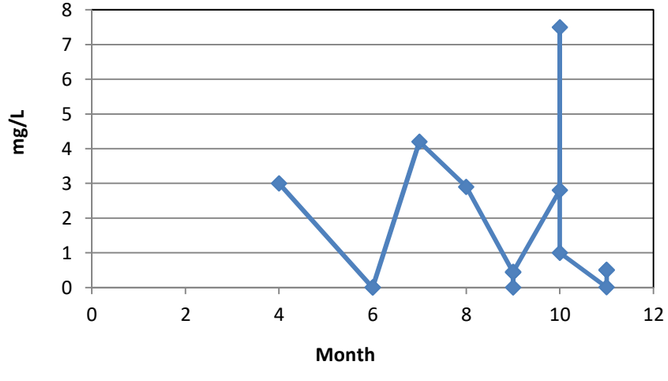
Magnesium



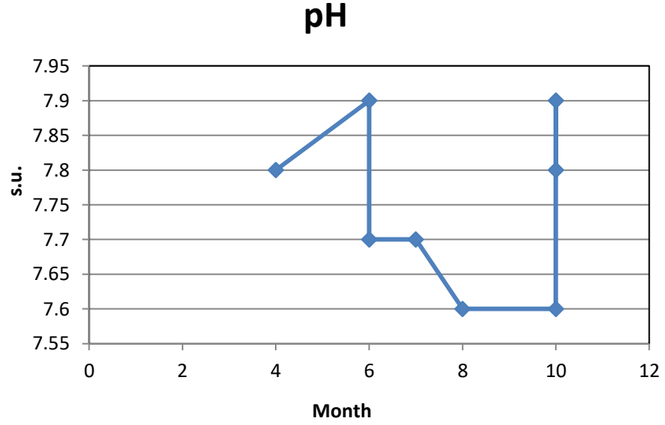
Temperature



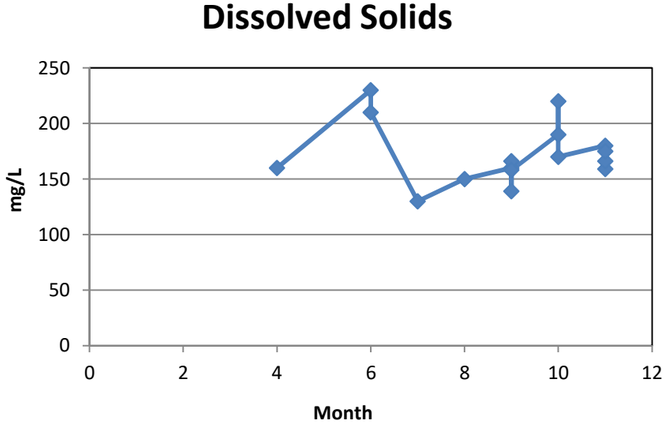
Sulfate



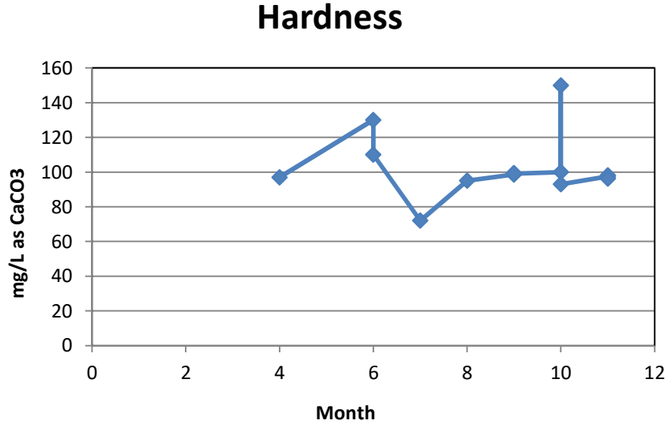
pH



Dissolved Solids



Hardness



Historical data Sourced From USGS (1973) "Hydrology of the Dunes Area North of Coos Bay, Oregon."
SLR samples collected from pipe discharging into the ASB.

Appendix E

Laboratory Analytical Reports – Ambient Marine Water, September 2018

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory

10/15/2018

Steve Donovan
SHN Consulting Engineers & Geologist, LLC
275 Market Ave
Coos Bay, OR 97420

TEL: (541) 266-9890
FAX (541) 266-9496

RE: 618045 North Spit Outfall

Order No.: 1810073

Dear Steve Donovan:

Neilson Research Corporation received 4 sample(s) on 10/2/2018 for the analyses presented in the following report.

The results relate only to the parameters tested or to the sample as received by the laboratory. This report shall not be reproduced except in full, without the written approval of Neilson Research Corporation. If you have any questions regarding these test results, please feel free to call.

Sincerely,
Neilson Research Corporation

Tamra Schmedemann

Tamra R. Schmedemann
Project Manager

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

CLIENT: SHN Consulting Engineers & Geologist, LL
Project: 618045 North Spit Outfall
Lab Order: 1810073

Date: 15-Oct-18

CASE NARRATIVE

The analyses were performed according to the guidelines in the Neilson Research Corporation Quality Assurance Program. This report contains analytical results for the sample(s) as received by the laboratory.

Neilson Research Corporation certifies that this report is in compliance with the requirements of NELAP. No unusual difficulties were experienced during analysis of this batch except as noted below or qualified with data flags on the reports.

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 South 1**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-01A**
Collection Date: **9/30/2018 9:44:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:09 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	130		50.0	50	mg/L	5	A	10/9/2018
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.14	J	0.105	0.15	mg/L	1	A	10/9/2018
BOD, 5 DAY			**SM 5210 B**					Analyst: **EAT**
Biochemical Oxygen Demand	ND	HT	2.00	2	mg/L	1	A	10/2/2018 4:20:
ANIONS			**EPA 300.0**					Analyst: **SCM**
Chloride	17700		148	2000	mg/L	2000	A	10/5/2018 1:06:
Fluoride	1.7	ERJ	0.0767	2	mg/L	10	A	10/4/2018 1:10:
Sulfate	2560		12.5	100	mg/L	200	A	10/5/2018 1:33:
TRACE METALS			**EPA 200.7**					Analyst: **JWC**
Calcium	411		0.155	50	mg/L	50	A	10/4/2018
Iron	ND		0.102	0.75	mg/L	50	A	10/4/2018
Magnesium	1320		0.0629	50	mg/L	50	A	10/4/2018
Potassium	510		0.847	50	mg/L	50	A	10/4/2018
Sodium	9920		1.61	200	mg/L	200	A	10/9/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	0.0579		0.000413	0.025	mg/L	50	A	10/4/2018
Copper	0.0030	ERJ	0.00126	0.025	mg/L	50	A	10/4/2018
Lead	0.00030	ERJ	0.000254	0.005	mg/L	50	A	10/4/2018
Manganese	ND	ER	0.000976	0.1	mg/L	50	A	10/4/2018
Zinc	ND	ER	0.0243	0.25	mg/L	50	A	10/4/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 South 1**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-01A**
Collection Date: **9/30/2018 9:44:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrate Nitrogen	0.254		0.0118	0.05	mg/L	1	A	10/8/2018
PH IN WATER			**SM 4500 H-B**					Analyst: **CSB**
pH	7.79	HR	0.1	0.1	pH Units	1	A	10/2/2018 5:30:
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	33500		400	400	mg/L	1	A	10/3/2018
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	10.7		3.00	3	mg/L	1	A	10/4/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	0.670	HT	0.100	0.1	NTU	1		10/2/2018 5:15:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 South 1**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-01B**
Collection Date: **9/30/2018 9:44:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	0.381		0.0490	0.1	mg/L	1	A	10/4/2018 3:29:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 South 2**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-02A**
Collection Date: **9/30/2018 9:48:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	130		50.0	50	mg/L	5	A	10/9/2018
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.376		0.210	0.3	mg/L	1	A	10/9/2018
BOD, 5 DAY			**SM 5210 B**					Analyst: **EAT**
Biochemical Oxygen Demand	2.85	HT	2.00	2	mg/L	1	A	10/2/2018 4:20:
ANIONS			**EPA 300.0**					Analyst: **SCM**
Chloride	17900		148	2000	mg/L	2000	A	10/5/2018 2:00:
Fluoride	1.8	ERJ	0.0767	2	mg/L	10	A	10/4/2018 2:03:
Sulfate	2580		12.5	100	mg/L	200	A	10/5/2018 3:20:
TRACE METALS			**EPA 200.7**					Analyst: **JWC**
Calcium	415		0.155	50	mg/L	50	A	10/4/2018
Iron	ND		0.102	0.75	mg/L	50	A	10/4/2018
Magnesium	1330		0.0629	50	mg/L	50	A	10/4/2018
Potassium	524		0.847	50	mg/L	50	A	10/4/2018
Sodium	9290		1.61	200	mg/L	200	A	10/9/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	0.0541		0.000413	0.025	mg/L	50	A	10/4/2018
Copper	0.0078	ERJ	0.00126	0.025	mg/L	50	A	10/4/2018
Lead	0.00045	ERJ	0.000254	0.005	mg/L	50	A	10/4/2018
Manganese	ND	ER	0.000976	0.1	mg/L	50	A	10/4/2018
Zinc	ND	ER	0.0243	0.25	mg/L	50	A	10/4/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 South 2**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-02A**
Collection Date: **9/30/2018 9:48:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrate Nitrogen	0.103		0.0118	0.05	mg/L	1	A	10/8/2018
PH IN WATER			**SM 4500 H-B**					Analyst: **CSB**
pH	7.96	HR	0.1	0.1	pH Units	1	A	10/2/2018 5:30:
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	32200		400	400	mg/L	1	A	10/3/2018
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	16.0		3.00	3	mg/L	1	A	10/4/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	0.650	HT	0.100	0.1	NTU	1		10/2/2018 5:15:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 South 2**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-02B**
Collection Date: **9/30/2018 9:48:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	0.441		0.0490	0.1	mg/L	1	A	10/4/2018 3:58:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 North 1**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-03A**
Collection Date: **9/30/2018 9:58:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	120		50.0	50	mg/L	5	A	10/9/2018
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.364		0.210	0.3	mg/L	1	A	10/9/2018
BOD, 5 DAY			**SM 5210 B**					Analyst: **EAT**
Biochemical Oxygen Demand	2.75	HT	2.00	2	mg/L	1	A	10/2/2018 4:20:
ANIONS			**EPA 300.0**					Analyst: **SCM**
Chloride	18200		148	2000	mg/L	2000	A	10/5/2018 4:40:
Fluoride	1.8	ERJ	0.0767	2	mg/L	10	A	10/4/2018 4:44:
Sulfate	2640		12.5	100	mg/L	200	A	10/5/2018 5:07:
TRACE METALS			**EPA 200.7**					Analyst: **JWC**
Calcium	373		0.155	50	mg/L	50	A	10/4/2018
Iron	ND		0.102	0.75	mg/L	50	A	10/4/2018
Magnesium	1210		0.0629	50	mg/L	50	A	10/4/2018
Potassium	462		0.847	50	mg/L	50	A	10/4/2018
Sodium	9280		1.61	200	mg/L	200	A	10/9/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	0.0720		0.000413	0.025	mg/L	50	A	10/4/2018
Copper	0.010	ERJ	0.00126	0.025	mg/L	50	A	10/4/2018
Lead	0.0020	ERJ	0.000254	0.005	mg/L	50	A	10/4/2018
Manganese	ND	ER	0.000976	0.1	mg/L	50	A	10/4/2018
Zinc	ND	ER	0.0243	0.25	mg/L	50	A	10/4/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 North 1**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-03A**
Collection Date: **9/30/2018 9:58:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrate Nitrogen	0.250		0.0118	0.05	mg/L	1	A	10/8/2018
PH IN WATER			**SM 4500 H-B**					Analyst: **CSB**
pH	7.86	HR	0.1	0.1	pH Units	1	A	10/2/2018 5:30:
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	30700		400	400	mg/L	1	A	10/3/2018
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	11.3		3.00	3	mg/L	1	A	10/4/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	0.700	HT	0.100	0.1	NTU	1		10/2/2018 5:15:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 North 1**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-03B**
Collection Date: **9/30/2018 9:58:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	0.706		0.0490	0.1	mg/L	1	A	10/4/2018 4:27:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 North 2**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-04A**
Collection Date: **9/30/2018 10:02:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL ALKALINITY			**SM 2320B**					Analyst: **SCM**
Alkalinity, Total (As CaCO3)	135		50.0	50	mg/L	5	A	10/9/2018
AMMONIA NITROGEN AS N			**EPA 350.1**					Analyst: **SJK**
Nitrogen, Ammonia (As N)	0.24	J	0.210	0.3	mg/L	1	A	10/9/2018
BOD, 5 DAY			**SM 5210 B**					Analyst: **EAT**
Biochemical Oxygen Demand	2.95	HT	2.00	2	mg/L	1	A	10/2/2018 4:20:
ANIONS			**EPA 300.0**					Analyst: **SCM**
Chloride	17900		148	2000	mg/L	2000	A	10/5/2018 5:34:
Fluoride	2.0	ERJ	0.0767	2	mg/L	10	A	10/4/2018 5:37:
Sulfate	2580		12.5	100	mg/L	200	A	10/5/2018 6:01:
TRACE METALS			**EPA 200.7**					Analyst: **JWC**
Calcium	388	MI	0.155	50	mg/L	50	A	10/4/2018
Iron	ND		0.102	0.75	mg/L	50	A	10/4/2018
Magnesium	1240	MI	0.0629	50	mg/L	50	A	10/4/2018
Potassium	476	MI	0.847	50	mg/L	50	A	10/4/2018
Sodium	8790	MI	1.61	200	mg/L	200	A	10/9/2018
TRACE METALS			**EPA 200.8**					Analyst: **JWC**
Arsenic	0.0576		0.000413	0.025	mg/L	50	A	10/4/2018
Copper	0.0027	ERJ	0.00126	0.025	mg/L	50	A	10/4/2018
Lead	0.00030	ERJ	0.000254	0.005	mg/L	50	A	10/4/2018
Manganese	ND	ER	0.000976	0.1	mg/L	50	A	10/4/2018
Zinc	ND	ER	0.0243	0.25	mg/L	50	A	10/4/2018
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 North 2**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-04A**
Collection Date: **9/30/2018 10:02:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
NITRATE NITROGEN AS N			**EPA 353.2**					Analyst: **SJK**
Nitrate Nitrogen	0.0939		0.0118	0.05	mg/L	1	A	10/8/2018
PH IN WATER			**SM 4500 H-B**					Analyst: **CSB**
pH	7.93	HR	0.1	0.1	pH Units	1	A	10/2/2018 5:30:
TOTAL DISSOLVED SOLIDS			**SM 2540-C**					Analyst: **SCM**
Total Dissolved Solids (Residue, Filterable)	34000		400	400	mg/L	1	A	10/3/2018
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	16.0	MI	3.00	3	mg/L	1	A	10/4/2018
TURBIDITY			**SM 2130B**					Analyst: **MJN**
Turbidity	0.630	HT	0.100	0.1	NTU	1		10/2/2018 5:15:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SHN Consulting Engineers & Geologist,
275 Market Ave
Coos Bay, OR 97420
Client Sample ID: **618045 North 2**
Sample Location: **Comp**
Project: **618045 North Spit Outfall**

Lab Order: **1810073**
NRC Sample ID **1810073-04B**
Collection Date: **9/30/2018 10:02:00 AM**
Received Date: **10/2/2018 10:15:00 AM**
Reported Date: **10/15/2018 1:08:10 PM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANIC CARBON, DISSOLVED			**SM5310C**					Analyst: **JEL**
Organic Carbon, Dissolved	0.772		0.0490	0.1	mg/L	1	A	10/4/2018 4:55:

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

DATA FLAGS

B	Analyte detected in the associated method blank.
BA	BOD Alternative Calculation: The initial results performed by Standard Methods did not fall within parameters of the Standard Methods calculation. An alternate approved calculation was performed using the HACH method and the value reported is an estimated concentration.
C	Sample(s) does not meet NELAP/ORELAP sample acceptance criteria. See Case Narrative.
C1	Sample(s) does not meet NELAP/ORELAP sample acceptance criteria for temperature.
CF	Results confirmed by re-analysis.
CU	Cleanup performed as specified by method.
D1	The diesel elution pattern for the sample is not typical.
D2	The sample appears to be a heavier hydrocarbon range than diesel.
D3	The sample appears to be a lighter hydrocarbon range than diesel.
D4	Detected hydrocarbons do not have pattern and range consistent with typical petroleum products and may be due to biogenic interference.
D5	Detected hydrocarbons in the diesel range appear to be weathered diesel.
E	Estimated value.
ER	Elevated reporting limit due to matrix. Report limits (MDLs, MRLs & PQLs) are adjusted based on variations in sample preparation amounts, analytical dilutions, and percent solids, where applicable.
FC	Fecal Coliforms: Sample(s) received past 40 CFR Part 136 specified holding time. Results reported as estimated values.
G1	The gasoline elution pattern for the sample is not typical.
G2	The sample appears to be a heavier hydrocarbon range than gasoline.
G3	The sample appears to be a lighter hydrocarbon range than gasoline.
G4	Detected hydrocarbons in the gasoline range appear to be weathered gasoline.
HP	Sample re-analysis performed outside of method specified holding time.
HR	Sample received outside of method specified holding time.
HS	Sample analyzed for volatile organics contained headspace.
HT	At the client's request, the sample was analyzed outside of method specified holding time.
H	Analysis performed outside of method specified holding time.
J	Analyte detected below the Minimum Reporting Limit (MRL) and above the Method Detection Limit (MDL). The J flag result is an estimated value and the user should be aware that this data is of limited reliability.
L	Dissolved metals were not filtered within 15 minutes of collection per 40 CFR Part 136.
MI	Surrogate or Matrix Spike recovery is out of control limits due to matrix interference. Sample results may be biased.
N	See Case Narrative on page 2 of report.
Q	Closing continuing calibration verification (CCV) or laboratory control sample (LCS) exceeded high recovery limits, but associated samples are non-detect and the sample results are not affected. Data meets EPA/NELAP requirements.
R	Relative percent difference (RPD) is outside of the accepted recovery limits.
R1	Relative percent difference (RPD) is outside of the accepted recovery limits. However, analyses are not controlled on RPD values for sample concentrations that are less than the reporting limit.
R3	The relative percent difference (RPD) and/or percent recovery for the duplicate (DUP) or matrix spike (MS)/matrix spike duplicate (MSD) cannot be accurately calculated due to the concentration of analyte already present in the sample.
R4	Duplicate analysis failed due to result being at or near method reporting limit.
S	Surrogate and/or matrix spike recovery is outside of the accepted recovery limits. Sample results may be biased.
S1	Surrogate or matrix spike recovery is outside of control limits due to dilution necessary for analysis.
SC	Sub-contracted to another laboratory for analysis.
SP	Sample(s) were not collected per EPA Method 5035A protocols. The results are considered minimum values.
T	Toxicity Characteristic Leaching Procedure – Sample submitted contained < 0.5% solids. If the waste contains <0.5% dry solids, the liquid portion of the waste, after filtration, is defined as the TCLP extract.
#	Value exceeds regulatory level for TCLP contaminant.
X1	The motor oil elution pattern for the sample is not typical.
X2	The sample appears to be a heavier hydrocarbon range than motor oil.
X3	The sample appears to be a lighter hydrocarbon range than motor oil.
*	Value exceeds Maximum Contaminant Level or is outside the acceptable range.

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: ALKALINITY_W

Sample ID	MB-R107178	SampType:	MBLK	TestCode:	ALKALINITY_	Units:	mg/L	Prep Date:		RunNo:	107178		
Client ID:	ZZZZZ	Batch ID:	R107178	TestNo:	SM 2320B			Analysis Date:	10/9/2018	SeqNo:	1632470		
Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Alkalinity, Total (As CaCO3)	ND	10.0											

Sample ID	LCS-R107178	SampType:	LCS	TestCode:	ALKALINITY_	Units:	mg/L	Prep Date:		RunNo:	107178		
Client ID:	ZZZZZ	Batch ID:	R107178	TestNo:	SM 2320B			Analysis Date:	10/9/2018	SeqNo:	1632471		
Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Alkalinity, Total (As CaCO3)	46.00	10.0	50	0	92.0	80	120						

Sample ID	1810103-02ADUP	SampType:	DUP	TestCode:	ALKALINITY_	Units:	mg/L	Prep Date:		RunNo:	107178		
Client ID:	ZZZZZ	Batch ID:	R107178	TestNo:	SM 2320B			Analysis Date:	10/9/2018	SeqNo:	1632477		
Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Alkalinity, Total (As CaCO3)	57.00	10.0						60	5.13	10			

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: AMMONIA_AUTO_W

Sample ID	**MB-42601**	SampType:	**MBLK**	TestCode:	**AMMONIA_A**	Units:	**mg/L**	Prep Date:	**10/8/2018**	RunNo:	**107186**
Client ID:	**ZZZZZ**	Batch ID:	**42601**	TestNo:	**EPA 350.1**		**(EPA 350.1)**	Analysis Date:	**10/9/2018**	SeqNo:	**1632644**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	ND	0.150									

Sample ID	**LCS-42601**	SampType:	**LCS**	TestCode:	**AMMONIA_A**	Units:	**mg/L**	Prep Date:	**10/8/2018**	RunNo:	**107186**
Client ID:	**ZZZZZ**	Batch ID:	**42601**	TestNo:	**EPA 350.1**		**(EPA 350.1)**	Analysis Date:	**10/9/2018**	SeqNo:	**1632643**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.660	0.150	1.645	0	101	90	110				

Sample ID	**1810168-01AMS**	SampType:	**MS**	TestCode:	**AMMONIA_A**	Units:	**mg/L**	Prep Date:	**10/8/2018**	RunNo:	**107186**
Client ID:	**ZZZZZ**	Batch ID:	**42601**	TestNo:	**EPA 350.1**		**(EPA 350.1)**	Analysis Date:	**10/9/2018**	SeqNo:	**1632640**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	4.828	0.600	1.645	2.842	121	80	120				S1

Sample ID	**1810168-01AMSD**	SampType:	**MSD**	TestCode:	**AMMONIA_A**	Units:	**mg/L**	Prep Date:	**10/8/2018**	RunNo:	**107186**
Client ID:	**ZZZZZ**	Batch ID:	**42601**	TestNo:	**EPA 350.1**		**(EPA 350.1)**	Analysis Date:	**10/9/2018**	SeqNo:	**1632641**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	4.236	0.600	1.645	2.842	84.8	80	120	4.828	13.1	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: BOD-5DAY

Sample ID **MB-42562**	SampType: **MBLK**	TestCode: **BOD-5DAY**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107128**
Client ID: **ZZZZZ**	Batch ID: **42562**	TestNo: **SM 5210 B**	**(SM 5210 B)**	Analysis Date: **10/2/2018**	SeqNo: **1631759**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	ND	2.00									

Sample ID **LCS-42562**	SampType: **LCS**	TestCode: **BOD-5DAY**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107128**
Client ID: **ZZZZZ**	Batch ID: **42562**	TestNo: **SM 5210 B**	**(SM 5210 B)**	Analysis Date: **10/2/2018**	SeqNo: **1631760**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Biochemical Oxygen Demand	187.0	2.00	198	0	94.4	85	115				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: DOC_W

Sample ID **MBLK (DOC)**	SampType: **MBLK**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **107102**
Client ID: **ZZZZZ**	Batch ID: **R107102**	TestNo: **SM5310C**		Analysis Date: **10/4/2018**	SeqNo: **1631355**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	0.05730	0.100									J

Sample ID **LCS (DOC)**	SampType: **LCS**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **107102**
Client ID: **ZZZZZ**	Batch ID: **R107102**	TestNo: **SM5310C**		Analysis Date: **10/4/2018**	SeqNo: **1631354**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	0.9636	0.100	1	0.0573	90.6	85	115				

Sample ID **1810068-01BMS**	SampType: **MS**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **107102**
Client ID: **ZZZZZ**	Batch ID: **R107102**	TestNo: **SM5310C**		Analysis Date: **10/4/2018**	SeqNo: **1631357**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	6.626	0.100	2.5	4.164	98.5	80	120				HT

Sample ID **1810068-02BDUP**	SampType: **DUP**	TestCode: **DOC_W**	Units: **mg/L**	Prep Date:	RunNo: **107102**
Client ID: **ZZZZZ**	Batch ID: **R107102**	TestNo: **SM5310C**		Analysis Date: **10/4/2018**	SeqNo: **1631359**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	4.115	0.100						4.07	1.10	25	HT

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA300_W

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107052**
Client ID: **ZZZZZ**	Batch ID: **R107052**	TestNo: **EPA 300.0**		Analysis Date: **10/2/2018**	SeqNo: **1630330**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	1.00									
Fluoride	ND	0.200									
Sulfate	ND	0.500									

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107083**
Client ID: **ZZZZZ**	Batch ID: **R107083**	TestNo: **EPA 300.0**		Analysis Date: **10/3/2018**	SeqNo: **1630978**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	1.00									
Fluoride	ND	0.200									
Sulfate	ND	0.500									

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107110**
Client ID: **ZZZZZ**	Batch ID: **R107110**	TestNo: **EPA 300.0**		Analysis Date: **10/4/2018**	SeqNo: **1631555**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	1.00									
Fluoride	ND	0.200									
Sulfate	ND	0.500									

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107052**
Client ID: **ZZZZZ**	Batch ID: **R107052**	TestNo: **EPA 300.0**		Analysis Date: **10/2/2018**	SeqNo: **1630329**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	5.753	1.00	6	0	95.9	90	110				
Fluoride	1.042	0.200	1	0	104	90	110				
Sulfate	5.979	0.500	6	0	99.6	90	110				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA300_W

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107083**
Client ID: **ZZZZZ**	Batch ID: **R107083**	TestNo: **EPA 300.0**		Analysis Date: **10/3/2018**	SeqNo: **1630977**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	5.877	1.00	6	0	97.9	90	110				
Fluoride	0.9983	0.200	1	0	99.8	90	110				
Sulfate	6.200	0.500	6	0	103	90	110				

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107110**
Client ID: **ZZZZZ**	Batch ID: **R107110**	TestNo: **EPA 300.0**		Analysis Date: **10/4/2018**	SeqNo: **1631554**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	5.803	1.00	6	0	96.7	90	110				
Fluoride	1.030	0.200	1	0	103	90	110				
Sulfate	6.039	0.500	6	0	101	90	110				

Sample ID **1810073-02AMS**	SampType: **MS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107083**
Client ID: **618045 South 2**	Batch ID: **R107083**	TestNo: **EPA 300.0**		Analysis Date: **10/4/2018**	SeqNo: **1630985**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	10.79	2.00	10	1.81	89.8	80	120				

Sample ID **1810073-02AMS**	SampType: **MS**	TestCode: **EPA300_W**	Units: **mg/L**	Prep Date:	RunNo: **107110**
Client ID: **618045 South 2**	Batch ID: **R107110**	TestNo: **EPA 300.0**		Analysis Date: **10/5/2018**	SeqNo: **1631561**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	30160	2000	12000	17910	102	80	120				
Sulfate	14580	1000	12000	3182	95.0	80	120				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA300_W

Sample ID	1810073-02AMS	SampType:	MS	TestCode:	EPA300_W	Units:	mg/L	Prep Date:		RunNo:	107110
Client ID:	618045 South 2	Batch ID:	R107110	TestNo:	EPA 300.0			Analysis Date:	10/5/2018	SeqNo:	1631564

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	3809	100	1200	2576	103	80	120				

Sample ID	1810073-02AMS	SampType:	MS	TestCode:	EPA300_W	Units:	mg/L	Prep Date:		RunNo:	107052
Client ID:	618045 South 2	Batch ID:	R107052	TestNo:	EPA 300.0			Analysis Date:	10/5/2018	SeqNo:	1632013

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	30160	2000	12000	17910	102	80	120				
Sulfate	14580	1000	12000	3182	95.0	80	120				

Sample ID	1810073-02AMS	SampType:	MS	TestCode:	EPA300_W	Units:	mg/L	Prep Date:		RunNo:	107052
Client ID:	618045 South 2	Batch ID:	R107052	TestNo:	EPA 300.0			Analysis Date:	10/4/2018	SeqNo:	1632548

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	10.79	2.00	10	1.81	89.8	80	120				

Sample ID	1810073-02AMSD	SampType:	MSD	TestCode:	EPA300_W	Units:	mg/L	Prep Date:		RunNo:	107083
Client ID:	618045 South 2	Batch ID:	R107083	TestNo:	EPA 300.0			Analysis Date:	10/4/2018	SeqNo:	1630986

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	10.66	2.00	10	1.81	88.5	80	120	10.79	1.25	15	

Sample ID	1810073-02AMSD	SampType:	MSD	TestCode:	EPA300_W	Units:	mg/L	Prep Date:		RunNo:	107110
Client ID:	618045 South 2	Batch ID:	R107110	TestNo:	EPA 300.0			Analysis Date:	10/5/2018	SeqNo:	1631562

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	30170	2000	12000	17910	102	80	120	30160	0.00717	15	
Sulfate	14580	1000	12000	3182	94.9	80	120	14580	0.0335	15	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA300_W

Sample ID	1810073-02AMSD	SampType:	MSD	TestCode:	EPA300_W	Units:	mg/L	Prep Date:		RunNo:	107110
Client ID:	618045 South 2	Batch ID:	R107110	TestNo:	EPA 300.0			Analysis Date:	10/5/2018	SeqNo:	1631565

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	3822	100	1200	2576	104	80	120	3809	0.349	15	

Sample ID	1810073-02AMSD	SampType:	MSD	TestCode:	EPA300_W	Units:	mg/L	Prep Date:		RunNo:	107052
Client ID:	618045 South 2	Batch ID:	R107052	TestNo:	EPA 300.0			Analysis Date:	10/5/2018	SeqNo:	1632014

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	30170	2000	12000	17910	102	80	120	30160	0.00717	15	
Sulfate	14580	1000	12000	3182	94.9	80	120	14580	0.0335	15	

Sample ID	1810073-02AMSD	SampType:	MSD	TestCode:	EPA300_W	Units:	mg/L	Prep Date:		RunNo:	107052
Client ID:	618045 South 2	Batch ID:	R107052	TestNo:	EPA 300.0			Analysis Date:	10/4/2018	SeqNo:	1632549

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	10.66	2.00	10	1.81	88.5	80	120	10.79	1.25	15	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_200.7_W

Sample ID **MB-42554** SampType: **MBLK** TestCode: **ICP_200.7_W** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107100**
Client ID: **ZZZZZ** Batch ID: **42554** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **10/4/2018** SeqNo: **1631302**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	ND	1.00									
Iron	ND	0.0150									
Magnesium	ND	1.00									
Potassium	ND	1.00									
Sodium	ND	1.00									

Sample ID **LCS-42554** SampType: **LCS** TestCode: **ICP_200.7_W** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107100**
Client ID: **ZZZZZ** Batch ID: **42554** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **10/4/2018** SeqNo: **1631303**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	0.9911	1.00	1	0	99.1	85	115				J
Iron	1.032	0.0150	1	0	103	85	115				
Magnesium	1.000	1.00	1	0	100	85	115				
Potassium	0.9502	1.00	1	0	95.0	85	115				J
Sodium	1.869	1.00	2	0	93.5	85	115				

Sample ID **1810073-04AMS** SampType: **MS** TestCode: **ICP_200.7_W** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107100**
Client ID: **618045 North 2** Batch ID: **42554** TestNo: **EPA 200.7** **(EPA 200.7)** Analysis Date: **10/4/2018** SeqNo: **1631314**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	436.2	50.0	21	387.5	232	70	130				S1
Iron	22.61	0.750	21	0	108	70	130				
Magnesium	1346	50.0	21	1238	510	70	130				S1
Potassium	540.5	50.0	21	476	307	70	130				S1
Sodium	10290	50.0	22	9550	3360	70	130				S1 E

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_200.7_W

Sample ID **1810073-04AMS** SampType: **MS** TestCode: **ICP_200.7_W** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107238**
Client ID: **618045 North 2** Batch ID: **42554** TestNo: **EPA 200.7 (EPA 200.7)** Analysis Date: **10/9/2018** SeqNo: **1633302**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium	9460	200	22	8788	3050	70	130				MI

Sample ID **1810073-04AMSD** SampType: **MSD** TestCode: **ICP_200.7_W** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107100**
Client ID: **618045 North 2** Batch ID: **42554** TestNo: **EPA 200.7 (EPA 200.7)** Analysis Date: **10/4/2018** SeqNo: **1631315**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	398.2	50.0	21	387.5	51.0	70	130	436.2	9.11	20	S1
Iron	20.38	0.750	21	0	97.0	70	130	22.61	10.4	20	
Magnesium	1226	50.0	21	1238	-57.1	70	130	1346	9.25	20	S1
Potassium	486.2	50.0	21	476	48.6	70	130	540.5	10.6	20	S1
Sodium	9390	50.0	22	9550	-727	70	130	10290	9.15	20	S1 E

Sample ID **1810073-04AMSD** SampType: **MSD** TestCode: **ICP_200.7_W** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107238**
Client ID: **618045 North 2** Batch ID: **42554** TestNo: **EPA 200.7 (EPA 200.7)** Analysis Date: **10/9/2018** SeqNo: **1633303**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium	9132	200	22	8788	1560	70	130	9460	3.53	20	MI

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_200.8_W

Sample ID **MB-42557** SampType: **MBLK** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107071**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/3/2018** SeqNo: **1630737**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.0001230	0.000500									J
Copper	ND	0.000500									
Lead	ND	0.000100									
Manganese	ND	0.00200									
Zinc	0.0009920	0.00500									J

Sample ID **LCS-42557** SampType: **LCS** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107071**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/3/2018** SeqNo: **1630738**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1056	0.000500	0.1	0.000123	105	85	115				
Copper	0.1082	0.000500	0.1	0	108	85	115				
Lead	0.1055	0.000100	0.1	0	106	85	115				
Manganese	0.1072	0.00200	0.1	0	107	85	115				
Zinc	0.1047	0.00500	0.1	0.000992	104	85	115				

Sample ID **1810099-01BMS** SampType: **MS** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107071**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/3/2018** SeqNo: **1630744**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1028	0.000500	0.1	0.000606	102	70	130				
Copper	0.2383	0.000500	0.1	0.1458	92.6	70	130				
Lead	0.1091	0.000100	0.1	0.00493	104	70	130				
Manganese	0.1079	0.00200	0.1	0.004701	103	70	130				

Sample ID **1810099-01BMS** SampType: **MS** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107107**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/4/2018** SeqNo: **1631476**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: ICPMS_200.8_W

Sample ID **1810099-01BMS** SampType: **MS** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107107**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/4/2018** SeqNo: **1631476**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Zinc	13.61	0.100	0.1	13.6	12.2	70	130				MI

Sample ID **1810099-01BMSD** SampType: **MSD** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107071**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/3/2018** SeqNo: **1630745**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1032	0.000500	0.1	0.000606	103	70	130	0.1028	0.393	20	
Copper	0.2397	0.000500	0.1	0.1458	93.9	70	130	0.2383	0.562	20	
Lead	0.1086	0.000100	0.1	0.00493	104	70	130	0.1091	0.498	20	
Manganese	0.1083	0.00200	0.1	0.004701	104	70	130	0.1079	0.329	20	

Sample ID **1810099-01BMSD** SampType: **MSD** TestCode: **ICPMS_200.8** Units: **mg/L** Prep Date: **10/3/2018** RunNo: **107107**
Client ID: **ZZZZZ** Batch ID: **42557** TestNo: **EPA 200.8** **(EPA 200.8)** Analysis Date: **10/4/2018** SeqNo: **1631477**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Zinc	13.41	0.100	0.1	13.6	-185	70	130	13.61	1.46	20	MI

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: NO2NO3_AUTO_W

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **NO2NO3_AU**	Units: **mg/L**	Prep Date:	RunNo: **107167**
Client ID: **ZZZZZ**	Batch ID: **R107167**	TestNo: **EPA 353.2**		Analysis Date: **10/8/2018**	SeqNo: **1632239**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate Nitrogen	ND	0.0500									

Sample ID **LCS**	SampType: **LCS**	TestCode: **NO2NO3_AU**	Units: **mg/L**	Prep Date:	RunNo: **107167**
Client ID: **ZZZZZ**	Batch ID: **R107167**	TestNo: **EPA 353.2**		Analysis Date: **10/8/2018**	SeqNo: **1632238**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate Nitrogen	29.67	1.00	30	0	98.9	90	110				

Sample ID **1810217-01AMS**	SampType: **MS**	TestCode: **NO2NO3_AU**	Units: **mg/L**	Prep Date:	RunNo: **107167**
Client ID: **ZZZZZ**	Batch ID: **R107167**	TestNo: **EPA 353.2**		Analysis Date: **10/8/2018**	SeqNo: **1632234**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate Nitrogen	1.221	0.100	1	0.1606	106	80	120				

Sample ID **1810217-01AMSD**	SampType: **MSD**	TestCode: **NO2NO3_AU**	Units: **mg/L**	Prep Date:	RunNo: **107167**
Client ID: **ZZZZZ**	Batch ID: **R107167**	TestNo: **EPA 353.2**		Analysis Date: **10/8/2018**	SeqNo: **1632235**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate Nitrogen	1.164	0.100	1	0.1606	100	80	120	1.221	4.76	20	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: PH_W

Sample ID	**LCS-R107040**	SampType: **LCS**	TestCode: **PH_W**	Units: **pH Units**	Prep Date:	RunNo: **107040**
Client ID:	**ZZZZZ**	Batch ID: **R107040**	TestNo: **SM 4500 H-B**		Analysis Date: **10/2/2018**	SeqNo: **1630143**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	6.840	0.10	6.86	0	99.7	97.1	102.9				

Sample ID	**1810073-01ADUP**	SampType: **DUP**	TestCode: **PH_W**	Units: **pH Units**	Prep Date:	RunNo: **107040**
Client ID:	**618045 South 1**	Batch ID: **R107040**	TestNo: **SM 4500 H-B**		Analysis Date: **10/2/2018**	SeqNo: **1630145**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	7.800	0.10						7.79	0.128	10	HR

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: SOLIDS_TDS_W

Sample ID **MB-42565**	SampType: **MBLK**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107120**
Client ID: **ZZZZZ**	Batch ID: **42565**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **10/3/2018**	SeqNo: **1631695**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	5.00									

Sample ID **LCS-42565**	SampType: **LCS**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107120**
Client ID: **ZZZZZ**	Batch ID: **42565**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **10/3/2018**	SeqNo: **1631696**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	107.5	5.00	100	0	108	80	120				

Sample ID **1810068-04ADUP**	SampType: **DUP**	TestCode: **SOLIDS_TDS**	Units: **mg/L**	Prep Date: **10/3/2018**	RunNo: **107120**
Client ID: **ZZZZZ**	Batch ID: **42565**	TestNo: **SM 2540-C**	**(Solids)**	Analysis Date: **10/3/2018**	SeqNo: **1631701**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	157.5	5.00						157.5	0	5	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: SOLIDS_TSS_W

Sample ID	**MB-42572**	SampType:	**MBLK**	TestCode:	**SOLIDS_TSS**	Units:	**mg/L**	Prep Date:	**10/4/2018**	RunNo:	**107101**
Client ID:	**ZZZZZ**	Batch ID:	**42572**	TestNo:	**SM 2540D**		**(Solids)**	Analysis Date:	**10/4/2018**	SeqNo:	**1631318**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	ND	1.00									

Sample ID	**LCS-42572**	SampType:	**LCS**	TestCode:	**SOLIDS_TSS**	Units:	**mg/L**	Prep Date:	**10/4/2018**	RunNo:	**107101**
Client ID:	**ZZZZZ**	Batch ID:	**42572**	TestNo:	**SM 2540D**		**(Solids)**	Analysis Date:	**10/4/2018**	SeqNo:	**1631319**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	980.0	40.0	1000	0	98.0	80	120				

Sample ID	**1810073-04ADUP**	SampType:	**DUP**	TestCode:	**SOLIDS_TSS**	Units:	**mg/L**	Prep Date:	**10/4/2018**	RunNo:	**107101**
Client ID:	**618045 North 2**	Batch ID:	**42572**	TestNo:	**SM 2540D**		**(Solids)**	Analysis Date:	**10/4/2018**	SeqNo:	**1631331**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	8.670	3.00						16	59.4	5	MI

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SHN Consulting Engineers & Geologist, LL
Work Order: 1810073
Project: 618045 North Spit Outfall

ANALYTICAL QC SUMMARY REPORT

TestCode: TURBIDITY_W

Sample ID	**MB-R107024**	SampType:	**MBLK**	TestCode:	**TURBIDITY_**	Units:	**NTU**	Prep Date:		RunNo:	**107024**
Client ID:	**ZZZZZ**	Batch ID:	**R107024**	TestNo:	**SM 2130B**			Analysis Date:	**10/2/2018**	SeqNo:	**1629961**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	ND	0.100									

Sample ID	**LCS-R107024**	SampType:	**LCS**	TestCode:	**TURBIDITY_**	Units:	**NTU**	Prep Date:		RunNo:	**107024**
Client ID:	**ZZZZZ**	Batch ID:	**R107024**	TestNo:	**SM 2130B**			Analysis Date:	**10/2/2018**	SeqNo:	**1629962**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	2.170	0.100	2.31	0	93.9	90	110				

Sample ID	**1810068-01ADUP**	SampType:	**DUP**	TestCode:	**TURBIDITY_**	Units:	**NTU**	Prep Date:		RunNo:	**107024**
Client ID:	**ZZZZZ**	Batch ID:	**R107024**	TestNo:	**SM 2130B**			Analysis Date:	**10/2/2018**	SeqNo:	**1629964**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	136.0	0.100						134	1.48	10	HT

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory
245 South Grape Street * Medford, OR 97501
(541) 770-5678 fax (541) 770-2901

Chain of Custody Record

This Chain of Custody is a LEGAL DOCUMENT and must be filled out accurately.

Section A
Required Client Information

Company:	SHN Consulting Engineers
Address:	275 Market Avenue
	Coos Bay, Oregon 97420
Email:	sdonovan@shn-engr.com
Phone:	541-266-9890 Fax: 541-266-9496
Collected By (Print):	
Collected By (Sign):	
Email Report _x__ Yes ___ No	Mail Report __x_ Yes ___ No
Fax Report ___ Yes ___No	

Section B
Required Project Information

Project Name:	North Spit Outfall
Project Number:	618045
Report To:	sdonovan@shn-engr.com
Copy To:	dgraber@shn-engr.com

Section C
Invoice Information

Attention:	Steve Donovan
Company Name:	SHN Consulting Engineers
Address:	275 Market Ave
	Coos Bay, OR 97420
P.O. #	

Section D
Rush Status (Subject to Scheduling)

__x__ Standard 10-14 Days
___ 5 Business Days (50% surcharge)
___ 3 Business Days (75% surcharge)
___ 24 - 48 hours (100% surcharge)
___ Other _____

Authorized ____ Yes ____ No

Section E
Sample Information

Sample ID	Comp/Grab	Matrix*	Date Collected	Time Collected	No. of Containers	Analysis Requested	Remarks/Field Data	NRC Sample # (Lab Use Only)
618045 SOUTH 1	COMP		9/30/2018	9:44	5	SEE ATTACHED		01A-B
618045 SOUTH 2	COMP		9/30/2018	9:48	5			02A-B
618045 NORTH 1	COMP		9/30/2018	9:58	5			03A-B
618045 NORTH 2	COMP		9/30/2018	10:02	5			04A-B

NRC Workorder # (Lab Use Only) 1810073

*Matrix: **DW** - Drinking Water **WW** - Wastewater **W** - Water **S** - Soil/Solid **SL** - Sludge **O** - Oil **WP** - Wipe **OT** - Other

Section F
Relinquish/Receive

	Sign	Print	Date	Time
Relinquished By:		Chase Cribbs	10-1-18	9:23
Received By:				
Relinquished By:				
Received By:				
Relinquished By:				
Received By Laboratory:		Jordan Merrill	10-2-18	1015

Section G
Lab Use Only

Temp:	3.3°C
4°C +/- 2°C:	X Yes ___ No
Received on Ice:	X Yes ___ No
Number of Bottles Received:	20
pH Checked:	
COC Seals Intact:	___ Yes ___ No ___ NA
Field Blank Included:	___ Yes ___ No

Received Via ___ UPS ___ FedEX ___ Other ___ Hand

Payment: X Invoice ___ Cash ___ VISA, M/C ___ Check # _____ Amount _____

Appendix F

Laboratory Analytical Reports – Ambient Marine Water, January 2019

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory

1/29/2019

Chris Brow
SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068

TEL: (503) 723-4423
FAX

RE: Coos Bay/Jordan Cove-AMENDED

Order No.: 1901117

Dear Chris Brow:

Neilson Research Corporation received 5 sample(s) on 1/4/2019 for the analyses presented in the following report.

The results relate only to the parameters tested or to the sample as received by the laboratory. This report shall not be reproduced except in full, without the written approval of Neilson Research Corporation. If you have any questions regarding these test results, please feel free to call.

Sincerely,
Neilson Research Corporation

Tamra Schmedemann

Tamra R. Schmedemann
Project Manager

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

CLIENT: SLR International Corp
Project: Coos Bay/Jordan Cove-AMENDED
Lab Order: 1901117

Date: 29-Jan-19

CASE NARRATIVE

The analyses were performed according to the guidelines in the Neilson Research Corporation Quality Assurance Program. This report contains analytical results for the sample(s) as received by the laboratory.

Neilson Research Corporation certifies that this report is in compliance with the requirements of NELAP. No unusual difficulties were experienced during analysis of this batch except as noted below or qualified with data flags on the reports.

EPA 1638, EPA 1640 and EPA 1632 metals testing subcontracted to Brookes Applied Labs, Bothell, Washington. A copy of the report is enclosed.

The report is amended adding total Cu and total As to all four samples per client request 1/24/19. TRS

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #1**
Sample Location: **Dock #1**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-01A**
Collection Date: **1/3/2019 8:55:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
alpha-BHC	ND		0.00301	0.01	µg/L	1	A	1/8/2019
Surr: Decachlorobiphenyl	121		0.0775	0	%REC	1		1/8/2019

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #1**
Sample Location: **Dock #1**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-01B**
Collection Date: **1/3/2019 8:55:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	12.0		2.00	2	mg/L	1	A	1/4/2019
MISC. SUBCONTRACTED ANALYSIS			**SUB**					Analyst: **SUB**
Misc Subcontracted Analysis	See Attached	SC	0	0		1		1/24/2019
TURBIDITY			**SM 2130B**					Analyst: **CSB**
Turbidity	0.610		0.100	0.1	NTU	1	A	1/4/2018 5:05:0

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #1**
Sample Location: **Dock #1**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-01C**
Collection Date: **1/3/2019 8:55:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	1/4/2019
Chloroform	ND		0.259	0.5	µg/L	1	A	1/8/2019
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	1/4/2019
Surr: Dibromofluoromethane	106		0	0	%REC	1		1/4/2019
Surr: Toluene-d8	94.6		0	0	%REC	1		1/4/2019
Surr: 4-Bromofluorobenzene	95.5		0	0	%REC	1		1/4/2019

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #2**
Sample Location: **Dock #2**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-02A**
Collection Date: **1/3/2019 9:25:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
alpha-BHC	ND		0.00301	0.01	µg/L	1	A	1/8/2019
Surr: Decachlorobiphenyl	125		0.0775	0	%REC	1		1/8/2019

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #2**
Sample Location: **Dock #2**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-02B**
Collection Date: **1/3/2019 9:25:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	15.2		2.00	2	mg/L	1	A	1/4/2019
MISC. SUBCONTRACTED ANALYSIS			**SUB**					Analyst: **SUB**
Misc Subcontracted Analysis	See Attached	SC	0	0		1		1/24/2019
TURBIDITY			**SM 2130B**					Analyst: **CSB**
Turbidity	0.530		0.100	0.1	NTU	1	A	1/4/2018 5:05:0

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #2**
Sample Location: **Dock #2**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-02C**
Collection Date: **1/3/2019 9:25:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	1/4/2019
Chloroform	ND		0.259	0.5	µg/L	1	A	1/8/2019
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	1/4/2019
Surr: Dibromofluoromethane	109		0	0	%REC	1		1/4/2019
Surr: Toluene-d8	96.8		0	0	%REC	1		1/4/2019
Surr: 4-Bromofluorobenzene	98.7		0	0	%REC	1		1/4/2019

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #3**
Sample Location: **Dock #3**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-03A**
Collection Date: **1/3/2019 10:15:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
alpha-BHC	ND		0.00301	0.01	µg/L	1	A	1/8/2019
Surr: Decachlorobiphenyl	116		0.0775	0	%REC	1		1/8/2019

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #3**
Sample Location: **Dock #3**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-03B**
Collection Date: **1/3/2019 10:15:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	8.00		1.00	1	mg/L	1	A	1/4/2019
MISC. SUBCONTRACTED ANALYSIS			**SUB**					Analyst: **SUB**
Misc Subcontracted Analysis	See Attached	SC	0	0		1		1/24/2019
TURBIDITY			**SM 2130B**					Analyst: **CSB**
Turbidity	0.550		0.100	0.1	NTU	1	A	1/4/2018 5:05:0

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #3**
Sample Location: **Dock #3**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-03C**
Collection Date: **1/3/2019 10:15:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	1/4/2019
Chloroform	ND		0.259	0.5	µg/L	1	A	1/8/2019
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	1/4/2019
Surr: Dibromofluoromethane	106		0	0	%REC	1		1/4/2019
Surr: Toluene-d8	93.6		0	0	%REC	1		1/4/2019
Surr: 4-Bromofluorobenzene	95.7		0	0	%REC	1		1/4/2019

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #4**
Sample Location: **Dock #4**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-04A**
Collection Date: **1/3/2019 10:45:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
ORGANOCHLORINE PESTICIDES/PCBS			**EPA 608**					Analyst: **JEL**
alpha-BHC	ND		0.00301	0.01	µg/L	1	A	1/8/2019
Surr: Decachlorobiphenyl	94.2		0.0775	0	%REC	1		1/8/2019

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #4**
Sample Location: **Dock #4**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-04B**
Collection Date: **1/3/2019 10:45:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
TOTAL SUSPENDED SOLIDS			**SM 2540D**					Analyst: **EAT**
Suspended Solids (Residue, Non-Filterable)	7.11		1.00	1	mg/L	1	A	1/4/2019
MISC. SUBCONTRACTED ANALYSIS			**SUB**					Analyst: **SUB**
Misc Subcontracted Analysis	See Attached	SC	0	0		1		1/24/2019
TURBIDITY			**SM 2130B**					Analyst: **CSB**
Turbidity	0.620		0.100	0.1	NTU	1	A	1/4/2018 5:05:0

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Dock #4**
Sample Location: **Dock #4**
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-04C**
Collection Date: **1/3/2019 10:45:00 AM**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Aqueous**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	1/4/2019
Chloroform	ND		0.259	0.5	µg/L	1	A	1/8/2019
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	1/4/2019
Surr: Dibromofluoromethane	108		0	0	%REC	1		1/4/2019
Surr: Toluene-d8	97.1		0	0	%REC	1		1/4/2019
Surr: 4-Bromofluorobenzene	91.9		0	0	%REC	1		1/4/2019

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Neilson Research Corporation

245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA OR00028

SLR International Corp
1800 Blankenship Road Suite 440
West Linn, OR 97068
Client Sample ID: **Trip Blank #19553**
Sample Location:
Project: **Coos Bay/Jordan Cove-AMENDED**

Lab Order: **1901117**
NRC Sample ID **1901117-05A**
Collection Date: **1/3/2019**
Received Date: **1/4/2019 9:30:00 AM**
Reported Date: **1/29/2019 11:18:45 AM**
Matrix: **Water**

ANALYTICAL RESULTS

Analyses	Result	Qual	MDL	MRL	Units	DF	NELAP	Date Analyzed
VOLATILE ORGANICS			**EPA 624**					Analyst: **CSB**
Bromodichloromethane	ND		0.278	0.5	µg/L	1	A	1/4/2019
Chloroform	ND		0.259	0.5	µg/L	1	A	1/7/2019
Dibromochloromethane	ND		0.245	0.5	µg/L	1	A	1/4/2019
Surr: Dibromofluoromethane	105		0	0	%REC	1		1/4/2019
Surr: Toluene-d8	94.3		0	0	%REC	1		1/4/2019
Surr: 4-Bromofluorobenzene	93.1		0	0	%REC	1		1/4/2019

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Minimum Reporting Limit
S	Spike Recovery outside accepted recovery limits		

DATA FLAGS

B	Analyte detected in the associated method blank.
BA	BOD Alternative Calculation: The initial results performed by Standard Methods did not fall within parameters of the Standard Methods calculation. An alternate approved calculation was performed using the HACH method and the value reported is an estimated concentration.
C	Sample(s) does not meet NELAP/ORELAP sample acceptance criteria. See Case Narrative.
C1	Sample(s) does not meet NELAP/ORELAP sample acceptance criteria for temperature.
CF	Results confirmed by re-analysis.
CU	Cleanup performed as specified by method.
D1	The diesel elution pattern for the sample is not typical.
D2	The sample appears to be a heavier hydrocarbon range than diesel.
D3	The sample appears to be a lighter hydrocarbon range than diesel.
D4	Detected hydrocarbons do not have pattern and range consistent with typical petroleum products and may be due to biogenic interference.
D5	Detected hydrocarbons in the diesel range appear to be weathered diesel.
E	Estimated value.
ER	Elevated reporting limit due to matrix. Report limits (MDLs, MRLs & PQLs) are adjusted based on variations in sample preparation amounts, analytical dilutions, and percent solids, where applicable.
FC	Fecal Coliforms: Sample(s) received past 40 CFR Part 136 specified holding time. Results reported as estimated values.
G1	The gasoline elution pattern for the sample is not typical.
G2	The sample appears to be a heavier hydrocarbon range than gasoline.
G3	The sample appears to be a lighter hydrocarbon range than gasoline.
G4	Detected hydrocarbons in the gasoline range appear to be weathered gasoline.
HP	Sample re-analysis performed outside of method specified holding time.
HR	Sample received outside of method specified holding time.
HS	Sample analyzed for volatile organics contained headspace.
HT	At the client's request, the sample was analyzed outside of method specified holding time.
H	Analysis performed outside of method specified holding time.
J	Analyte detected below the Minimum Reporting Limit (MRL) and above the Method Detection Limit (MDL). The J flag result is an estimated value and the user should be aware that this data is of limited reliability.
L	Dissolved metals were not filtered within 15 minutes of collection per 40 CFR Part 136.
MI	Surrogate, Duplicate Sample (DUP) or Matrix Spikes recoveries are out of control limits due to matrix interference. Sample results may be biased.
N	See Case Narrative on page 2 of report.
NLR	No Legionella Recovered.
PLR	Presence of Legionella Recovered.
Q	Initial calibration verification (ICV), continuing calibration verification (CCV) or laboratory control sample (LCS) exceeded high recovery limits, but associated samples are non-detect and the sample results are not affected. Data meets EPA/NELAP requirements.
R	Relative percent difference (RPD) is outside of the accepted recovery limits.
R1	Relative percent difference (RPD) is outside of the accepted recovery limits. However, analyses are not controlled on RPD values for sample concentrations that are less than the reporting limit.
R2	The relative percent difference (RPD) for solids is out of control limits due to the results being less than 10 times the reporting limit.
R3	The relative percent difference (RPD) and/or percent recovery for the duplicate (DUP) or matrix spike (MS)/matrix spike duplicate (MSD) cannot be accurately calculated due to the concentration of analyte already present in the sample.
R4	Duplicate analysis failed due to result being at or near the method reporting limit.
S	Surrogate and/or matrix spike recovery is outside of the accepted recovery limits. Sample results may be biased.
S1	Surrogate or matrix spike recovery is outside of control limits due to dilution necessary for analysis.
SC	Sub-contracted to another laboratory for analysis.
SP	Sample(s) were not collected per EPA Method 5035A protocols. The results are considered minimum values.
#	Value exceeds regulatory level for TCLP contaminant.
X1	The motor oil elution pattern for the sample is not typical.
X2	The sample appears to be a heavier hydrocarbon range than motor oil.
X3	The sample appears to be a lighter hydrocarbon range than motor oil.
*	Value exceeds Maximum Contaminant Level or is outside the acceptable range.

CLIENT: SLR International Corp
Work Order: 1901117
Project: Coos Bay/Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA608

Sample ID **MB-43398** SampType: **MBLK** TestCode: **EPA608** Units: **µg/L** Prep Date: **1/4/2019** RunNo: **109270**
Client ID: **ZZZZZ** Batch ID: **43398** TestNo: **EPA 608** **(EPA 3510C)** Analysis Date: **1/8/2019** SeqNo: **1670063**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	ND	0.0100									
Surr: Decachlorobiphenyl	0.2861	0	0.25	0	114	60	140				

Sample ID **LCS-43398** SampType: **LCS** TestCode: **EPA608** Units: **µg/L** Prep Date: **1/4/2019** RunNo: **109270**
Client ID: **ZZZZZ** Batch ID: **43398** TestNo: **EPA 608** **(EPA 3510C)** Analysis Date: **1/8/2019** SeqNo: **1670062**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	0.1961	0.0100	0.2	0	98.0	60	134				
Surr: Decachlorobiphenyl	0.2581	0	0.25	0	103	60	140				

Sample ID **1901060-01AMS** SampType: **MS** TestCode: **EPA608** Units: **µg/L** Prep Date: **1/4/2019** RunNo: **109270**
Client ID: **ZZZZZ** Batch ID: **43398** TestNo: **EPA 608** **(EPA 3510C)** Analysis Date: **1/8/2019** SeqNo: **1670066**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	0.1898	0.0100	0.2	0	94.9	40	160				
Surr: Decachlorobiphenyl	0.2830	0	0.25	0	113	60	140				

Sample ID **1901060-01AMSD** SampType: **MSD** TestCode: **EPA608** Units: **µg/L** Prep Date: **1/4/2019** RunNo: **109270**
Client ID: **ZZZZZ** Batch ID: **43398** TestNo: **EPA 608** **(EPA 3510C)** Analysis Date: **1/8/2019** SeqNo: **1670067**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	0.1889	0.0100	0.2	0	94.5	40	160	0.1898	0.441	20	
Surr: Decachlorobiphenyl	0.2882	0	0.25	0	115	60	140	0	0	0	

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1901117
Project: Coos Bay/Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **MBLK** SampType: **MBLK** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109251**
Client ID: **ZZZZZ** Batch ID: **R109251** TestNo: **EPA 624** Analysis Date: **1/4/2019** SeqNo: **1669871**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bromodichloromethane	ND	0.500									
Dibromochloromethane	ND	0.500									
Surr: Dibromofluoromethane	42.50	0	40	0	106	80	120				
Surr: Toluene-d8	38.33	0	40	0	95.8	80	120				
Surr: 4-Bromofluorobenzene	39.95	0	40	0	99.9	80	120				

Sample ID **MBLK** SampType: **MBLK** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109254**
Client ID: **ZZZZZ** Batch ID: **R109254** TestNo: **EPA 624** Analysis Date: **1/7/2019** SeqNo: **1669902**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	ND	0.500									

Sample ID **MBLK** SampType: **MBLK** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109265**
Client ID: **ZZZZZ** Batch ID: **R109265** TestNo: **EPA 624** Analysis Date: **1/8/2019** SeqNo: **1670036**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	ND	0.500									

Sample ID **LCS** SampType: **LCS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109251**
Client ID: **ZZZZZ** Batch ID: **R109251** TestNo: **EPA 624** Analysis Date: **1/4/2019** SeqNo: **1669872**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bromodichloromethane	22.73	0.500	20	0	114	35	155				
Dibromochloromethane	20.24	0.500	20	0	101	53	149				
Surr: Dibromofluoromethane	41.45	0	40	0	104	80	120				
Surr: Toluene-d8	39.09	0	40	0	97.7	80	120				
Surr: 4-Bromofluorobenzene	38.88	0	40	0	97.2	80	120				

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1901117
Project: Coos Bay/Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **LCS** SampType: **LCS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109254**
Client ID: **ZZZZZ** Batch ID: **R109254** TestNo: **EPA 624** Analysis Date: **1/7/2019** SeqNo: **1669905**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	19.60	0.500	20	0	98.0	51	138				

Sample ID **LCS** SampType: **LCS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109265**
Client ID: **ZZZZZ** Batch ID: **R109265** TestNo: **EPA 624** Analysis Date: **1/8/2019** SeqNo: **1670033**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	19.50	0.500	20	0	97.5	51	138				

Sample ID **1901117-04CMS** SampType: **MS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109251**
Client ID: **Dock #4** Batch ID: **R109251** TestNo: **EPA 624** Analysis Date: **1/4/2019** SeqNo: **1669862**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bromodichloromethane	21.61	0.500	20	0	108	35	155				
Dibromochloromethane	18.98	0.500	20	0	94.9	53	149				
Surr: Dibromofluoromethane	41.71	0	40	0	104	80	120				
Surr: Toluene-d8	39.62	0	40	0	99.0	80	120				
Surr: 4-Bromofluorobenzene	37.58	0	40	0	94.0	80	120				

Sample ID **1901117-03CMS** SampType: **MS** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109265**
Client ID: **Dock #3** Batch ID: **R109265** TestNo: **EPA 624** Analysis Date: **1/8/2019** SeqNo: **1670032**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	17.68	0.500	20	0	88.4	51	138				

Sample ID **1901117-01CDUP** SampType: **DUP** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109251**
Client ID: **Dock #1** Batch ID: **R109251** TestNo: **EPA 624** Analysis Date: **1/4/2019** SeqNo: **1669858**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Minimum Reporting Limit
R RPD outside accepted recovery limits
S Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1901117
Project: Coos Bay/Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: EPA624_PLUS

Sample ID **1901117-01CDUP** SampType: **DUP** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109251**
Client ID: **Dock #1** Batch ID: **R109251** TestNo: **EPA 624** Analysis Date: **1/4/2019** SeqNo: **1669858**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bromodichloromethane	ND	0.500						0	0	25	
Dibromochloromethane	ND	0.500						0	0	25	
Surr: Dibromofluoromethane	42.21	0	40	0	106	80	120	0	0	25	
Surr: Toluene-d8	37.80	0	40	0	94.5	80	120	0	0	25	
Surr: 4-Bromofluorobenzene	38.42	0	40	0	96.0	80	120	0	0	25	

Sample ID **1901117-02CDUP** SampType: **DUP** TestCode: **EPA624_PLU** Units: **µg/L** Prep Date: RunNo: **109265**
Client ID: **Dock #2** Batch ID: **R109265** TestNo: **EPA 624** Analysis Date: **1/8/2019** SeqNo: **1670030**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	ND	0.500						0	0	25	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1901117
Project: Coos Bay/Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: SOLIDS_TSS_W

Sample ID **MB-43395**	SampType: **MBLK**	TestCode: **SOLIDS_TSS**	Units: **mg/L**	Prep Date: **1/4/2019**	RunNo: **109240**
Client ID: **ZZZZZ**	Batch ID: **43395**	TestNo: **SM 2540D**	**(Solids)**	Analysis Date: **1/4/2019**	SeqNo: **1669742**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	ND	1.00									

Sample ID **LCS-43395**	SampType: **LCS**	TestCode: **SOLIDS_TSS**	Units: **mg/L**	Prep Date: **1/4/2019**	RunNo: **109240**
Client ID: **ZZZZZ**	Batch ID: **43395**	TestNo: **SM 2540D**	**(Solids)**	Analysis Date: **1/4/2019**	SeqNo: **1669743**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	820.0	40.0	1000	0	82.0	80	120				

Sample ID **1901033-02BDUP**	SampType: **DUP**	TestCode: **SOLIDS_TSS**	Units: **mg/L**	Prep Date: **1/4/2019**	RunNo: **109240**
Client ID: **ZZZZZ**	Batch ID: **43395**	TestNo: **SM 2540D**	**(Solids)**	Analysis Date: **1/4/2019**	SeqNo: **1669748**

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Suspended Solids (Residue, Non-Filter	176.7	13.0						180	1.87	5	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

CLIENT: SLR International Corp
Work Order: 1901117
Project: Coos Bay/Jordan Cove-AMENDED

ANALYTICAL QC SUMMARY REPORT

TestCode: TURBIDITY_W

Sample ID	MB-R109244	SampType:	MBLK	TestCode:	TURBIDITY_	Units:	NTU	Prep Date:		RunNo:	109244
Client ID:	ZZZZZ	Batch ID:	R109244	TestNo:	SM 2130B			Analysis Date:	1/4/2018	SeqNo:	1669789

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	ND	0.100									

Sample ID	LCS-R109244	SampType:	LCS	TestCode:	TURBIDITY_	Units:	NTU	Prep Date:		RunNo:	109244
Client ID:	ZZZZZ	Batch ID:	R109244	TestNo:	SM 2130B			Analysis Date:	1/4/2018	SeqNo:	1669790

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	2.280	0.100	2.31	0	98.7	90	110				

Sample ID	1901117-03BDUP	SampType:	DUP	TestCode:	TURBIDITY_	Units:	NTU	Prep Date:		RunNo:	109244
Client ID:	Dock #3	Batch ID:	R109244	TestNo:	SM 2130B			Analysis Date:	1/4/2018	SeqNo:	1669794

Analyte	Result	MRL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Turbidity	0.5800	0.100						0.55	5.31	10	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Minimum Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

January 29, 2019

Neilson Research Corporation
ATTN: Tamra Schmedemann
245 South Grape Street
Medford, OR 97501
tschmedemann@nrclabs.com

Revision 1: This revision includes total As and Cu results at the request of the client. No other changes to the data were made.

RE: Project NRC-MF1803 Client Project: 1812942

Dear Tamra Schmedemann,

On January 5, 2019, Brooks Applied Labs (BAL) received four (4) seawater samples. All of the samples were filtered upon receipt. Additional total containers were received on January 9, 2019. The samples were logged-in for the analyses of total and/or dissolved silver (Ag), aluminum (Al), arsenic (As), inorganic arsenic (InorgAs), barium (Ba), beryllium (Be), calcium (Ca), cadmium (Cd), copper (Cu), chromium (Cr), iron (Fe), potassium (K), magnesium (Mg), manganese (Mn), sodium (Na), nickel (Ni), lead (Pb), selenium (Se), thallium (Tl), and zinc (Zn) according to the chain-of-custody forms. All samples were received and stored according to BAL SOPs and EPA methodology.

All samples were digested with an in-bottle oven digestion via modified EPA Method 1638 with nitric and hydrochloric acids for Ag, Al, As, Ba, Ca, Cu, Fe, K, Mg, Mn, Na, Pb, Se, and Zn.

All seawater samples were digested via EPA Method 1640 with reductive precipitation for Be, Cr, and Tl.

All seawater samples were digested with an in-bottle oven digestion via EPA Method 1640 with column chelation for Cd and Ni.

Trace metals were analyzed using inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, brooksapplied.com.

All samples for InorgAs were analyzed via EPA Method 1632.

The results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

The dissolved Cu results for *Dock #2* (1902001-02) and *Dock #3* (1902001-03) were slightly greater than the associated total Cu results of *1901117-02B* (1902001-06) and *1901117-03B* (1902001-07), respectively. These results met the secondary duplicate precision criteria of the results being within 5x

the MRL and within the MRL of each other. All Cu for these samples should be considered in the dissolved form.

The freshwater blank spike for Be (B183524-BS1) had a low recovery. The seawater blank spike (B183524-MS2) recovered within acceptance criteria. Since all samples were labeled as seawaters, no qualifications were necessary.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were ≤ 25% of the native sample concentrations, the recoveries were not reported (**NR**). No sample results were qualified on the basis of the MS or MSD recoveries.

Not all SRMs provided certified or information values for all elements; therefore, not all elements were reported.

Aside from concentration qualifiers, all data was reported without qualification and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report. Please feel free to contact us if you have any questions regarding this report.

Sincerely,



Lydia Greaves
Client Services Manager
Brooks Applied Labs
lydia@brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Report Information

Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	standard reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

(Effective 9/23/09)

E	An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H	Holding time and/or preservation requirements not met. Please see narrative for explanation.
J	Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1	Estimated value. A full explanation is presented in the narrative.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R	Rejected, unusable value. A full explanation is presented in the narrative.
U	Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X	Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
Dock #1	1902001-01	Water	Sample	01/03/2019	01/05/2019
Dock #2	1902001-02	Water	Sample	01/03/2019	01/05/2019
Dock #3	1902001-03	Water	Sample	01/03/2019	01/05/2019
Dock #4	1902001-04	Water	Sample	01/03/2019	01/05/2019
1901117-01B	1902001-05	Water	Sample	01/03/2019	01/09/2019
1901117-02B	1902001-06	Water	Sample	01/03/2019	01/09/2019
1901117-03B	1902001-07	Water	Sample	01/03/2019	01/09/2019
1901117-04B	1902001-08	Water	Sample	01/03/2019	01/09/2019

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
Ag	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Al	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
As	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Ba	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Be	Water	EPA 1640 RP	01/09/2019	01/17/2019	B183524	1900067
Ca	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Cd	Water	EPA 1640 Column	01/14/2019	01/21/2019	B190068	1900091
Cr	Water	EPA 1640 RP	01/09/2019	01/17/2019	B183524	1900067
Cu	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Fe	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
InorgAs	Water	EPA 1632	01/10/2019	01/10/2019	B190080	1900041
InorgAs	Water	EPA 1632	01/17/2019	01/17/2019	B190146	1900075
K	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Mg	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Mn	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Na	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Ni	Water	EPA 1640 Column	01/14/2019	01/21/2019	B190068	1900091
Pb	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Se	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067
Tl	Water	EPA 1640 RP	01/09/2019	01/17/2019	B183524	1900067
Zn	Water	EPA 1638 Mod	01/14/2019	01/17/2019	B190067	1900067

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
Dock #1										
1902001-01	Ag	Water	D	≤ 0.179	U	0.179	0.536	µg/L	B190067	1900067
1902001-01	Al	Water	D	20.7	J	12.8	51.0	µg/L	B190067	1900067
1902001-01	As	Water	D	1.23		0.306	1.02	µg/L	B190067	1900067
1902001-01	Be	Water	D	≤ 0.006	U	0.006	0.018	µg/L	B183524	1900067
1902001-01	Ca	Water	D	310000		23500	70400	µg/L	B190067	1900067
1902001-01	Cd	Water	D	0.0211	J	0.0202	0.0505	µg/L	B190068	1900091
1902001-01	Cr	Water	D	0.179		0.040	0.100	µg/L	B183524	1900067
1902001-01	Cu	Water	D	1.59	J	1.02	2.04	µg/L	B190067	1900067
1902001-01	Fe	Water	D	36.5		10.2	21.7	µg/L	B190067	1900067
1902001-01	InorgAs	Water	D	1.18		0.008	0.025	µg/L	B190080	1900041
1902001-01	K	Water	D	299000		12200	51000	µg/L	B190067	1900067
1902001-01	Mg	Water	D	1040000		2760	8670	µg/L	B190067	1900067
1902001-01	Mn	Water	D	1.39	J	0.536	1.61	µg/L	B190067	1900067
1902001-01	Na	Water	D	8600000		3670	7650	µg/L	B190067	1900067
1902001-01	Ni	Water	D	0.442		0.0354	0.152	µg/L	B190068	1900091
1902001-01	Pb	Water	D	≤ 0.128	U	0.128	0.383	µg/L	B190067	1900067
1902001-01	Se	Water	D	≤ 0.459	U	0.459	1.43	µg/L	B190067	1900067
1902001-01	Tl	Water	D	0.012		0.004	0.010	µg/L	B183524	1900067
1902001-01	Zn	Water	D	≤ 5.10	U	5.10	10.2	µg/L	B190067	1900067
Dock #2										
1902001-02	Ag	Water	D	≤ 0.179	U	0.179	0.536	µg/L	B190067	1900067
1902001-02	Al	Water	D	18.8	J	12.8	51.0	µg/L	B190067	1900067
1902001-02	As	Water	D	1.14		0.306	1.02	µg/L	B190067	1900067
1902001-02	Be	Water	D	≤ 0.006	U	0.006	0.018	µg/L	B183524	1900067
1902001-02	Ca	Water	D	327000		23500	70400	µg/L	B190067	1900067
1902001-02	Cd	Water	D	0.0210	J	0.0202	0.0505	µg/L	B190068	1900091
1902001-02	Cr	Water	D	0.229		0.040	0.100	µg/L	B183524	1900067
1902001-02	Cu	Water	D	1.60	J	1.02	2.04	µg/L	B190067	1900067
1902001-02	Fe	Water	D	27.5		10.2	21.7	µg/L	B190067	1900067
1902001-02	InorgAs	Water	D	1.19		0.032	0.100	µg/L	B190080	1900041
1902001-02	K	Water	D	314000		12200	51000	µg/L	B190067	1900067
1902001-02	Mg	Water	D	1080000		2760	8670	µg/L	B190067	1900067
1902001-02	Mn	Water	D	1.30	J	0.536	1.61	µg/L	B190067	1900067
1902001-02	Na	Water	D	8920000		3670	7650	µg/L	B190067	1900067
1902001-02	Ni	Water	D	0.381		0.0354	0.152	µg/L	B190068	1900091
1902001-02	Pb	Water	D	≤ 0.128	U	0.128	0.383	µg/L	B190067	1900067
1902001-02	Se	Water	D	≤ 0.459	U	0.459	1.43	µg/L	B190067	1900067
1902001-02	Tl	Water	D	0.012		0.004	0.010	µg/L	B183524	1900067
1902001-02	Zn	Water	D	≤ 5.10	U	5.10	10.2	µg/L	B190067	1900067

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
Dock #3										
1902001-03	Ag	Water	D	≤ 0.179	U	0.179	0.536	µg/L	B190067	1900067
1902001-03	Al	Water	D	≤ 12.8	U	12.8	51.0	µg/L	B190067	1900067
1902001-03	As	Water	D	1.11		0.306	1.02	µg/L	B190067	1900067
1902001-03	Be	Water	D	≤ 0.006	U	0.006	0.018	µg/L	B183524	1900067
1902001-03	Ca	Water	D	342000		23500	70400	µg/L	B190067	1900067
1902001-03	Cd	Water	D	0.0226	J	0.0202	0.0505	µg/L	B190068	1900091
1902001-03	Cr	Water	D	0.206		0.040	0.100	µg/L	B183524	1900067
1902001-03	Cu	Water	D	2.34		1.02	2.04	µg/L	B190067	1900067
1902001-03	Fe	Water	D	13.2	J	10.2	21.7	µg/L	B190067	1900067
1902001-03	InorgAs	Water	D	1.27		0.032	0.100	µg/L	B190080	1900041
1902001-03	K	Water	D	321000		12200	51000	µg/L	B190067	1900067
1902001-03	Mg	Water	D	1100000		2760	8670	µg/L	B190067	1900067
1902001-03	Mn	Water	D	1.13	J	0.536	1.61	µg/L	B190067	1900067
1902001-03	Na	Water	D	9140000		3670	7650	µg/L	B190067	1900067
1902001-03	Ni	Water	D	0.403		0.0354	0.152	µg/L	B190068	1900091
1902001-03	Pb	Water	D	≤ 0.128	U	0.128	0.383	µg/L	B190067	1900067
1902001-03	Se	Water	D	≤ 0.459	U	0.459	1.43	µg/L	B190067	1900067
1902001-03	Tl	Water	D	0.012		0.004	0.010	µg/L	B183524	1900067
1902001-03	Zn	Water	D	≤ 5.10	U	5.10	10.2	µg/L	B190067	1900067
Dock #4										
1902001-04	Ag	Water	D	≤ 0.179	U	0.179	0.536	µg/L	B190067	1900067
1902001-04	Al	Water	D	15.7	J	12.8	51.0	µg/L	B190067	1900067
1902001-04	As	Water	D	1.17		0.306	1.02	µg/L	B190067	1900067
1902001-04	Be	Water	D	≤ 0.006	U	0.006	0.018	µg/L	B183524	1900067
1902001-04	Ca	Water	D	324000		23500	70400	µg/L	B190067	1900067
1902001-04	Cd	Water	D	0.0222	J	0.0202	0.0505	µg/L	B190068	1900091
1902001-04	Cr	Water	D	0.171		0.040	0.100	µg/L	B183524	1900067
1902001-04	Cu	Water	D	1.26	J	1.02	2.04	µg/L	B190067	1900067
1902001-04	Fe	Water	D	18.1	J	10.2	21.7	µg/L	B190067	1900067
1902001-04	InorgAs	Water	D	1.23		0.032	0.100	µg/L	B190080	1900041
1902001-04	K	Water	D	316000		12200	51000	µg/L	B190067	1900067
1902001-04	Mg	Water	D	1070000		2760	8670	µg/L	B190067	1900067
1902001-04	Mn	Water	D	1.17	J	0.536	1.61	µg/L	B190067	1900067
1902001-04	Na	Water	D	8970000		3670	7650	µg/L	B190067	1900067
1902001-04	Ni	Water	D	0.381		0.0354	0.152	µg/L	B190068	1900091
1902001-04	Pb	Water	D	≤ 0.128	U	0.128	0.383	µg/L	B190067	1900067
1902001-04	Se	Water	D	≤ 0.459	U	0.459	1.43	µg/L	B190067	1900067
1902001-04	Tl	Water	D	0.011		0.004	0.010	µg/L	B183524	1900067
1902001-04	Zn	Water	D	≤ 5.10	U	5.10	10.2	µg/L	B190067	1900067

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
1901117-01B										
1902001-05	As	Water	TR	1.28		0.306	1.02	µg/L	B190067	1900067
1902001-05	Ba	Water	TR	6.53		0.510	1.53	µg/L	B190067	1900067
1902001-05	Be	Water	TR	≤ 0.008	U	0.008	0.023	µg/L	B183524	1900067
1902001-05	Cr	Water	TR	0.631		0.052	0.129	µg/L	B183524	1900067
1902001-05	Cu	Water	TR	6.26		1.02	2.04	µg/L	B190067	1900067
1902001-05	InorgAs	Water	TR	1.26		0.160	0.500	µg/L	B190146	1900075
1902001-05	Tl	Water	TR	0.013	J	0.005	0.013	µg/L	B183524	1900067
1901117-02B										
1902001-06	As	Water	TR	1.04		0.306	1.02	µg/L	B190067	1900067
1902001-06	Ba	Water	TR	6.39		0.510	1.53	µg/L	B190067	1900067
1902001-06	Be	Water	TR	≤ 0.008	U	0.008	0.023	µg/L	B183524	1900067
1902001-06	Cr	Water	TR	0.432		0.052	0.129	µg/L	B183524	1900067
1902001-06	Cu	Water	TR	≤ 1.02	U	1.02	2.04	µg/L	B190067	1900067
1902001-06	InorgAs	Water	TR	1.30		0.160	0.500	µg/L	B190146	1900075
1902001-06	Tl	Water	TR	0.014		0.005	0.013	µg/L	B183524	1900067
1901117-03B										
1902001-07	As	Water	TR	1.16		0.306	1.02	µg/L	B190067	1900067
1902001-07	Ba	Water	TR	6.46		0.510	1.53	µg/L	B190067	1900067
1902001-07	Be	Water	TR	≤ 0.008	U	0.008	0.025	µg/L	B183524	1900067
1902001-07	Cr	Water	TR	0.334		0.055	0.138	µg/L	B183524	1900067
1902001-07	Cu	Water	TR	≤ 1.02	U	1.02	2.04	µg/L	B190067	1900067
1902001-07	InorgAs	Water	TR	1.46		0.160	0.500	µg/L	B190146	1900075
1902001-07	Tl	Water	TR	0.012	J	0.006	0.014	µg/L	B183524	1900067
1901117-04B										
1902001-08	As	Water	TR	1.17		0.306	1.02	µg/L	B190067	1900067
1902001-08	Ba	Water	TR	6.66		0.510	1.53	µg/L	B190067	1900067
1902001-08	Be	Water	TR	≤ 0.008	U	0.008	0.024	µg/L	B183524	1900067
1902001-08	Cr	Water	TR	0.345		0.053	0.133	µg/L	B183524	1900067
1902001-08	Cu	Water	TR	3.41		1.02	2.04	µg/L	B190067	1900067
1902001-08	InorgAs	Water	TR	1.22		0.160	0.500	µg/L	B190146	1900075
1902001-08	Tl	Water	TR	0.013	J	0.005	0.013	µg/L	B183524	1900067

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Accuracy & Precision Summary

Batch: B183524
Lab Matrix: Water
Method: EPA 1640 RP

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B183524-BS1	**Blank Spike, (1902028)**						
	Be		0.1300	0.084	µg/L	*64%* 70-130	
	Cr		1.000	1.024	µg/L	102% 70-130	
	Tl		0.1000	0.108	µg/L	108% 70-130	
B183524-SRM1	**Standard Reference Material (1852001, SLEW-3)**						
	Cr		0.1830	0.207	µg/L	113% 70-130	
B183524-MS2	**Matrix Spike, (1832001-03)**						
	Be	ND	0.1300	0.110	µg/L	85% 70-130	
	Cr	0.139	1.000	1.166	µg/L	103% 70-130	
	Tl	0.011	0.1000	0.110	µg/L	99% 70-130	
B183524-DUP1	**Duplicate, (1902001-04)**						
	Be	ND		ND	µg/L		N/C 30
	Cr	0.171		0.143	µg/L		18% 30
	Tl	0.011		0.012	µg/L		2% 30
B183524-MS1	**Matrix Spike, (1902001-04)**						
	Be	ND	0.1300	0.112	µg/L	86% 70-130	
	Cr	0.171	1.000	1.224	µg/L	105% 70-130	
	Tl	0.011	0.1000	0.119	µg/L	107% 70-130	
B183524-MSD1	**Matrix Spike Duplicate, (1902001-04)**						
	Be	ND	0.1300	0.110	µg/L	84% 70-130	2% 30
	Cr	0.171	1.000	1.190	µg/L	102% 70-130	3% 30
	Tl	0.011	0.1000	0.112	µg/L	101% 70-130	6% 30

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Accuracy & Precision Summary

Batch: B190067
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B190067-BS1	**Blank Spike, (1903015)**						
	Ag		20.00	20.26	µg/L	101% 75-125	
	Al		4000	3929	µg/L	98% 75-125	
	As		200.0	198.9	µg/L	99% 75-125	
	Ba		200.0	206.2	µg/L	103% 75-125	
	Ca		4000	3529	µg/L	88% 75-125	
	Cu		200.0	200.6	µg/L	100% 75-125	
	Fe		4000	3950	µg/L	99% 75-125	
	K		4000	3617	µg/L	90% 75-125	
	Mg		4000	3809	µg/L	95% 75-125	
	Mn		200.0	199.1	µg/L	100% 75-125	
	Na		4000	3738	µg/L	93% 75-125	
	Pb		20.00	19.70	µg/L	99% 75-125	
	Se		200.0	203.6	µg/L	102% 75-125	
	Zn		200.0	198.5	µg/L	99% 75-125	
B190067-SRM1	**Standard Reference Material (1841074, T221 as SRM)**						
	Ag		14.00	14.80	µg/L	106% 75-125	
	Al		374.0	379.7	µg/L	102% 75-125	
	As		17.70	17.98	µg/L	102% 75-125	
	Ba		29.00	29.82	µg/L	103% 75-125	
	Ca		16700	15100	µg/L	90% 75-125	
	Cu		3.780	3.876	µg/L	103% 75-125	
	Fe		328.0	324.5	µg/L	99% 75-125	
	K		1900	1723	µg/L	91% 75-125	
	Mg		3770	3720	µg/L	99% 75-125	
	Mn		33.60	33.42	µg/L	99% 75-125	
	Na		17400	16210	µg/L	93% 75-125	
	Pb		0.4900	0.472	µg/L	96% 75-125	
	Se		3.800	3.787	µg/L	100% 75-125	

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Accuracy & Precision Summary

Batch: B190067
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B190067-SRM2	**Standard Reference Material (1836081, NIST 1643f (Batch SRM))**						
	Ag		0.9703	0.966	µg/L	100% 75-125	
	Al		133.8	136.6	µg/L	102% 75-125	
	As		57.42	57.09	µg/L	99% 75-125	
	Ba		518.2	526.0	µg/L	102% 75-125	
	Ca		29430	25540	µg/L	87% 75-125	
	Cu		21.66	21.90	µg/L	101% 75-125	
	Fe		93.44	92.77	µg/L	99% 75-125	
	K		1933	1725	µg/L	89% 75-125	
	Mg		7454	7311	µg/L	98% 75-125	
	Mn		37.14	36.08	µg/L	97% 75-125	
	Na		18830	17260	µg/L	92% 75-125	
	Pb		18.49	18.89	µg/L	102% 75-125	
	Se		11.70	11.82	µg/L	101% 75-125	
B190067-DUP1	**Duplicate, (1902001-05)**						
	Ca	330300		320700	µg/L		3% 20
	K	316400		316800	µg/L		0.1% 20
	Mg	1073000		1094000	µg/L		2% 20
	Na	8942000		9020000	µg/L		0.9% 20
B190067-DUP2	**Duplicate, (1902001-05)**						
	Ag	ND		ND	µg/L		N/C 20
	Al	44.56		46.55	µg/L		4% 20
	As	1.280		1.163	µg/L		10% 20
	Ba	6.534		6.536	µg/L		0.03% 20
	Cu	6.263		6.503	µg/L		4% 20
	Fe	79.83		78.68	µg/L		1% 20
	Mn	2.040		2.109	µg/L		3% 20
	Pb	ND		ND	µg/L		N/C 20
	Se	ND		ND	µg/L		N/C 20
	Zn	ND		ND	µg/L		N/C 20
B190067-MS1	**Matrix Spike, (1902001-05)**						
	Ca	330300	510200	777800	µg/L	88% 75-125	
	K	316400	510200	785200	µg/L	92% 75-125	
	Mg	1073000	510200	1603000	µg/L	104% 75-125	
	Na	8942000	510200	9867000	µg/L	NR 75-125	

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6216 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Accuracy & Precision Summary

Batch: B190067
Lab Matrix: Water
Method: EPA 1638 Mod

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B190067-MS2	**Matrix Spike, (1902001-05)**						
	Ag	ND	25.51	21.57	µg/L	85% 75-125	
	Al	44.56	2551	2980	µg/L	115% 75-125	
	As	1.280	255.1	303.1	µg/L	118% 75-125	
	Ba	6.534	255.1	272.9	µg/L	104% 75-125	
	Cu	6.263	255.1	266.4	µg/L	102% 75-125	
	Fe	79.83	2551	2802	µg/L	107% 75-125	
	Mn	2.040	255.1	280.2	µg/L	109% 75-125	
	Pb	ND	25.51	21.02	µg/L	82% 75-125	
	Se	ND	255.1	286.2	µg/L	112% 75-125	
	Zn	ND	255.1	235.9	µg/L	92% 75-125	
B190067-MSD1	**Matrix Spike Duplicate, (1902001-05)**						
	Ca	330300	510200	723500	µg/L	77% 75-125	7% 20
	K	316400	510200	719000	µg/L	79% 75-125	9% 20
	Mg	1073000	510200	1582000	µg/L	100% 75-125	1% 20
	Na	8942000	510200	9511000	µg/L	NR 75-125	N/C 20
B190067-MSD2	**Matrix Spike Duplicate, (1902001-05)**						
	Ag	ND	25.51	21.60	µg/L	85% 75-125	0.2% 20
	Al	44.56	2551	2960	µg/L	114% 75-125	0.7% 20
	As	1.280	255.1	303.6	µg/L	118% 75-125	0.2% 20
	Ba	6.534	255.1	271.3	µg/L	104% 75-125	0.6% 20
	Cu	6.263	255.1	267.8	µg/L	103% 75-125	0.5% 20
	Fe	79.83	2551	2825	µg/L	108% 75-125	0.8% 20
	Mn	2.040	255.1	282.5	µg/L	110% 75-125	0.8% 20
	Pb	ND	25.51	20.55	µg/L	81% 75-125	2% 20
	Se	ND	255.1	286.5	µg/L	112% 75-125	0.1% 20
	Zn	ND	255.1	238.0	µg/L	93% 75-125	0.9% 20

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6216 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Accuracy & Precision Summary

Batch: B190068
Lab Matrix: Water
Method: EPA 1640 Column

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B190068-BS1	**Blank Spike, (1853006)**						
	Cd		0.5000	0.5429	µg/L	109% 75-125	
	Ni		0.5000	0.5253	µg/L	105% 75-125	
B190068-SRM1	**Standard Reference Material (1741024, NASS-7)**						
	Cd		0.01610	0.0155	µg/L	96% 75-125	
	Ni		0.2480	0.2446	µg/L	99% 75-125	
B190068-SRM2	**Standard Reference Material (1808030, SLEW-3)**						
	Cd		0.04800	0.0520	µg/L	108% 70-130	
	Ni		1.230	1.333	µg/L	108% 70-130	
B190068-DUP1	**Duplicate, (1902001-04)**						
	Cd	0.0222		0.0207	µg/L		7% 20
	Ni	0.3805		0.3750	µg/L		1% 20
B190068-MS1	**Matrix Spike, (1902001-04)**						
	Cd	0.0222	2.525	2.722	µg/L	107% 75-125	
	Ni	0.3805	2.525	2.909	µg/L	100% 75-125	
B190068-MSD1	**Matrix Spike Duplicate, (1902001-04)**						
	Cd	0.0222	2.525	2.765	µg/L	109% 75-125	2% 20
	Ni	0.3805	2.525	2.946	µg/L	102% 75-125	1% 20

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6216 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Accuracy & Precision Summary

Batch: B190080
Lab Matrix: Water
Method: EPA 1632

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B190080-BS1	**Blank Spike, (1851003)**						
	InorgAs		0.5000	0.489	µg/L	98% 65-135	
B190080-SRM1	**Standard Reference Material (1829074, TMDA 70.2 Reference Standard - Bottle1)**						
	InorgAs		42.30	38.02	µg/L	90% 75-125	
B190080-MS1	**Matrix Spike (1902001-02)**						
	InorgAs	1.195	3.000	4.053	µg/L	95% 65-135	
B190080-MSD1	**Matrix Spike Duplicate (1902001-02)**						
	InorgAs	1.195	3.000	4.045	µg/L	95% 65-135	0.2% 35

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6216 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Accuracy & Precision Summary

Batch: B190146
Lab Matrix: Water
Method: EPA 1632

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B190146-BS1	**Blank Spike, (1851003)**						
	InorgAs		0.5000	0.495	µg/L	99% 65-135	
B190146-SRM1	**Standard Reference Material (1829074, TMDA 70.2 Reference Standard - Bottle1)**						
	InorgAs		42.30	38.96	µg/L	92% 75-125	
B190146-MS1	**Matrix Spike (1902001-05)**						
	InorgAs	1.255	5.000	6.239	µg/L	100% 65-135	
B190146-MSD1	**Matrix Spike Duplicate (1902001-05)**						
	InorgAs	1.255	5.000	6.276	µg/L	100% 65-135	0.6% 35

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Method Blanks & Reporting Limits

Batch: B183524
Matrix: Water
Method: EPA 1640 RP
Analyte: Be

Sample	Result	Units
B183524-BLK1	-0.00005	µg/L
B183524-BLK2	-0.0002	µg/L
B183524-BLK3	-0.00009	µg/L
B183524-BLK4	-0.0002	µg/L

Average: 0.000 **Standard Deviation:** 0.000 **MDL:** 0.006
Limit: 0.018 **Limit:** 0.006 **MRL:** 0.018

Analyte: Cr

Sample	Result	Units
B183524-BLK1	0.022	µg/L
B183524-BLK2	0.024	µg/L
B183524-BLK3	0.026	µg/L
B183524-BLK4	0.025	µg/L

Average: 0.024 **Standard Deviation:** 0.002 **MDL:** 0.040
Limit: 0.100 **Limit:** 0.040 **MRL:** 0.100

Analyte: Tl

Sample	Result	Units
B183524-BLK1	0.001	µg/L
B183524-BLK2	0.001	µg/L
B183524-BLK3	0.001	µg/L
B183524-BLK4	0.0009	µg/L

Average: 0.001 **Standard Deviation:** 0.000 **MDL:** 0.004
Limit: 0.010 **Limit:** 0.004 **MRL:** 0.010

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6216 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Method Blanks & Reporting Limits

Batch: B190067
Matrix: Water
Method: EPA 1638 Mod
Analyte: Ag

Sample	Result	Units
B190067-BLK1	0.00005	µg/L
B190067-BLK2	-0.0001	µg/L
B190067-BLK3	-0.00001	µg/L
B190067-BLK4	-0.00007	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.007
MRL: 0.021

Analyte: Al

Sample	Result	Units
B190067-BLK1	0.139	µg/L
B190067-BLK2	0.019	µg/L
B190067-BLK3	0.039	µg/L
B190067-BLK4	0.070	µg/L

Average: 0.067
Limit: 2.000

MDL: 0.500
MRL: 2.00

Analyte: As

Sample	Result	Units
B190067-BLK1	-0.022	µg/L
B190067-BLK2	-0.022	µg/L
B190067-BLK3	-0.022	µg/L
B190067-BLK4	-0.023	µg/L

Average: -0.022
Limit: 0.040

MDL: 0.012
MRL: 0.040

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6216 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Method Blanks & Reporting Limits

Analyte: Ba

Sample	Result	Units
B190067-BLK1	0.002	µg/L
B190067-BLK2	0.0007	µg/L
B190067-BLK3	0.0008	µg/L
B190067-BLK4	0.0006	µg/L

Average: 0.001
Limit: 0.060

MDL: 0.020
MRL: 0.060

Analyte: Ca

Sample	Result	Units
B190067-BLK1	0.387	µg/L
B190067-BLK2	0.172	µg/L
B190067-BLK3	0.193	µg/L
B190067-BLK4	0.256	µg/L

Average: 0.252
Limit: 13.800

MDL: 4.60
MRL: 13.8

Analyte: Cu

Sample	Result	Units
B190067-BLK1	0.007	µg/L
B190067-BLK2	0.007	µg/L
B190067-BLK3	0.006	µg/L
B190067-BLK4	0.014	µg/L

Average: 0.009
Limit: 0.080

MDL: 0.040
MRL: 0.080

Analyte: Fe

Sample	Result	Units
B190067-BLK1	0.45	µg/L
B190067-BLK2	0.37	µg/L
B190067-BLK3	0.31	µg/L
B190067-BLK4	0.34	µg/L

Average: 0.37
Limit: 0.85

MDL: 0.40
MRL: 0.85

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6216 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Method Blanks & Reporting Limits

Analyte: K

Sample	Result	Units
B190067-BLK1	-0.04	µg/L
B190067-BLK2	-0.1	µg/L
B190067-BLK3	-0.09	µg/L
B190067-BLK4	-0.08	µg/L

Average: -0.1
Limit: 10.0

MDL: 2.4
MRL: 10.0

Analyte: Mg

Sample	Result	Units
B190067-BLK1	0.14	µg/L
B190067-BLK2	0.10	µg/L
B190067-BLK3	0.08	µg/L
B190067-BLK4	0.09	µg/L

Average: 0.10
Limit: 1.70

MDL: 0.54
MRL: 1.70

Analyte: Mn

Sample	Result	Units
B190067-BLK1	0.003	µg/L
B190067-BLK2	0.0004	µg/L
B190067-BLK3	0.002	µg/L
B190067-BLK4	0.0004	µg/L

Average: 0.001
Limit: 0.063

MDL: 0.021
MRL: 0.063

Analyte: Na

Sample	Result	Units
B190067-BLK1	0.392	µg/L
B190067-BLK2	0.307	µg/L
B190067-BLK3	0.104	µg/L
B190067-BLK4	0.306	µg/L

Average: 0.277
Limit: 1.500

MDL: 0.720
MRL: 1.50

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6216 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Method Blanks & Reporting Limits

Analyte: Pb

Sample	Result	Units
B190067-BLK1	0.0009	µg/L
B190067-BLK2	0.0004	µg/L
B190067-BLK3	0.0002	µg/L
B190067-BLK4	0.0003	µg/L

Average: 0.000
Limit: 0.015

MDL: 0.005
MRL: 0.015

Analyte: Se

Sample	Result	Units
B190067-BLK1	-0.020	µg/L
B190067-BLK2	-0.022	µg/L
B190067-BLK3	-0.020	µg/L
B190067-BLK4	-0.021	µg/L

Average: -0.021
Limit: 0.056

MDL: 0.018
MRL: 0.056

Analyte: Zn

Sample	Result	Units
B190067-BLK1	0.03	µg/L
B190067-BLK2	-0.006	µg/L
B190067-BLK3	-0.008	µg/L
B190067-BLK4	0.001	µg/L

Average: 0.00
Limit: 0.40

MDL: 0.20
MRL: 0.40

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Method Blanks & Reporting Limits

Batch: B190068
Matrix: Water
Method: EPA 1640 Column
Analyte: Cd

Sample	Result	Units
B190068-BLK1	-0.000002	µg/L
B190068-BLK2	-0.000009	µg/L
B190068-BLK3	0.000006	µg/L
B190068-BLK4	-0.000003	µg/L

Average: 0.0000
Limit: 0.0100

MDL: 0.0040
MRL: 0.0100

Analyte: Ni

Sample	Result	Units
B190068-BLK1	0.0086	µg/L
B190068-BLK2	0.0083	µg/L
B190068-BLK3	0.0016	µg/L
B190068-BLK4	0.0064	µg/L

Average: 0.0062
Limit: 0.0300

MDL: 0.0070
MRL: 0.0300

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Method Blanks & Reporting Limits

Batch: B190080
Matrix: Water
Method: EPA 1632
Analyte: InorgAs

Sample	Result	Units
B190080-BLK1	0.00	µg/L
B190080-BLK2	0.00	µg/L
B190080-BLK3	0.00	µg/L

Average: 0.000 **Standard Deviation:** 0.000 **MDL:** 0.008
Limit: 0.016 **Limit:** 0.008 **MRL:** 0.025

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Method Blanks & Reporting Limits

Batch: B190146
Matrix: Water
Method: EPA 1632
Analyte: InorgAs

Sample	Result	Units
B190146-BLK1	0.00	µg/L
B190146-BLK2	0.00	µg/L
B190146-BLK3	0.00	µg/L

Average: 0.000 **Standard Deviation:** 0.000 **MDL:** 0.008
Limit: 0.016 **Limit:** 0.008 **MRL:** 0.025

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6216 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Sample Containers

Lab ID: 1902001-01
Sample: Dock #1
Report Matrix: Water
Sample Type: Sample
Collected: 01/03/2019
Received: 01/05/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250 mL	17-0170	1 mL 6N HCl (BAL)	1842048	<2	Cooler - 1902001
B	Bottle HDPE ICP-W	125 mL	18-0070	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
C	Bottle HDPE ICP-ChelCol	60 mL	18-0109	0.2% HNO3 (BAL)	1849088	<2	Cooler - 1902001
D	Bottle HDPE ICP-RP	1L	18-0212	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
E	EXTRA_VOL	125 mL	18-0070	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
F	EXTRA_VOL	60 mL	18-0109	0.2% HNO3 (BAL)	1849088	<2	Cooler - 1902001

Lab ID: 1902001-02
Sample: Dock #2
Report Matrix: Water
Sample Type: Sample
Collected: 01/03/2019
Received: 01/05/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250 mL	17-0170	1 mL 6N HCl (BAL)	1842048	<2	Cooler - 1902001
B	Bottle HDPE ICP-W	125 mL	18-0070	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
C	Bottle HDPE ICP-ChelCol	60 mL	18-0109	0.2% HNO3 (BAL)	1849088	<2	Cooler - 1902001
D	Bottle HDPE ICP-RP	1L	18-0212	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
E	EXTRA_VOL	125 mL	18-0070	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
F	EXTRA_VOL	60 mL	18-0109	0.2% HNO3 (BAL)	1849088	<2	Cooler - 1902001

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Sample Containers

Lab ID: 1902001-03
Sample: Dock #3
Report Matrix: Water
Sample Type: Sample
Collected: 01/03/2019
Received: 01/05/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250 mL	17-0170	1 mL 6N HCl (BAL)	1842048	<2	Cooler - 1902001
B	Bottle HDPE ICP-W	125 mL	18-0070	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
C	Bottle HDPE ICP-ChelCol	60 mL	18-0109	0.2% HNO3 (BAL)	1849088	<2	Cooler - 1902001
D	Bottle HDPE ICP-RP	1L	18-0212	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
E	EXTRA_VOL	125 mL	18-0070	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
F	EXTRA_VOL	60 mL	18-0109	0.2% HNO3 (BAL)	1849088	<2	Cooler - 1902001

Lab ID: 1902001-04
Sample: Dock #4
Report Matrix: Water
Sample Type: Sample
Collected: 01/03/2019
Received: 01/05/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	250 mL	17-0170	1 mL 6N HCl (BAL)	1842048	<2	Cooler - 1902001
B	Bottle HDPE ICP-W	125 mL	18-0070	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
C	Bottle HDPE ICP-ChelCol	60 mL	18-0109	0.2% HNO3 (BAL)	1849088	<2	Cooler - 1902001
D	Bottle HDPE ICP-RP	1L	18-0212	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
E	EXTRA_VOL	125 mL	18-0070	1% HNO3 (BAL)	1849088	<2	Cooler - 1902001
F	EXTRA_VOL	60 mL	18-0109	0.2% HNO3 (BAL)	1849088	<2	Cooler - 1902001

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Sample Containers

Lab ID: 1902001-05
Sample: 1901117-01B
Report Matrix: Water
Sample Type: Sample
Collected: 01/03/2019
Received: 01/09/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Client-Provided	125mL	na	0.6% HNO3(Client)	na	1	StyroCooler - 1902001
B	Bottle HDPE ICP-W	60mL	18-0109	0.6% HNO3(Client)	na	1	StyroCooler - 1902001
C	Cent Tube 15mL As-Sp	15mL		1% HNO3(BAL+Client), 1%HCl(BAL)			StyroCooler - 1902001

Comments: Split from 1901117-01B 1/15/19

Lab ID: 1902001-06
Sample: 1901117-02B
Report Matrix: Water
Sample Type: Sample
Collected: 01/03/2019
Received: 01/09/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Client-Provided	125mL	na	0.6% HNO3(Client)	na	1	StyroCooler - 1902001
B	Bottle HDPE ICP-W	60mL	18-0109	0.6% HNO3(Client)	na	1	StyroCooler - 1902001
C	Cent Tube 15mL As-Sp	15mL		1%HNO3(Client+BAL),1%HCl(BAL)			StyroCooler - 1902001

Comments: Split from 1901117-02B 1/15/19

Lab ID: 1902001-07
Sample: 1901117-03B
Report Matrix: Water
Sample Type: Sample
Collected: 01/03/2019
Received: 01/09/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Client-Provided	125mL	na	0.6% HNO3(Client)	na	1	StyroCooler - 1902001
B	Bottle HDPE ICP-W	60mL	18-0109	0.6% HNO3(Client)	na	1	StyroCooler - 1902001
C	Cent Tube 15mL As-Sp	15mL		1% HNO3(Client+BAL), 1%HCl(BAL)			StyroCooler - 1902001

Comments: Split from 1901117-03B 1/15/19

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: NRC-MF1803
PM: Lydia Greaves

Client PM: Tamra Schmedemann

Sample Containers

Lab ID: 1902001-08
Sample: 1901117-04B
Report Matrix: Water
Sample Type: Sample
Collected: 01/03/2019
Received: 01/09/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Client-Provided	125mL	na	0.6% HNO3(Client)	na	1	StyroCooler - 1902001
B	Bottle HDPE ICP-W	60mL	18-0109	0.6% HNO3(Client)	na	1	StyroCooler - 1902001
C	Cent Tube 15mL As-Sp	15mL		1%HNO3(BAL+Client),1%HCl(BAL)			StyroCooler - 1902001

Comments: Split from 1901117-04B 1/15/19

Shipping Containers

Cooler - 1902001

Received: January 5, 2019 8:00
Tracking No: 1ZA5505A015426 via UPS
Coolant Type: Ice
Temperature: 2.4 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR#18

Custody seals present? Yes
Custody seals intact? Yes
COC present? Yes

StyroCooler - 1902001

Received: January 9, 2019 12:20
Tracking No: 1Z 849 138 03 9796 8408 via UPS
Coolant Type: None
Temperature: 11.0 °C

Description: StyroCooler
Damaged in transit? No
Returned to client? No
Comments: IR#18

Custody seals present? No
Custody seals intact? No
COC present? Yes

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6216 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Chain-of-Custody Form

BROOKS APPLIED LABS

Ship samples to:
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

For BAL use only
Received by: [signature] Date: 1/5/19
Work Order ID: _____ Time: 0830
Project ID: _____

Client: SLR PO Number: — Mailing Address: 1800 Blankenship Rd, Suite 940
Contact: Chris Brow Phone: 503-723-4423
Client Project ID: ~~Jordan~~ Jordan Cove Email: Cbrow@slrconsulting.com Email Receipt Confirmation? (Yes/No)
Samples Collected By: Tyler Weber BAL PM: _____

Requested TAT (business days)
- [ ] 20 (standard)
- [ ] 15*
- [ ] 10*
- [ ] 5*
- [x] Other ASAP

*Surcharges may apply to expedited TATs

	Sample ID	Collection: Date	Collection: Time	Client Sample Info: Matrix Type	Number of Containers	Field Filtered? (Yes/No)	Preservation Type HCl/HNO3/Other	BAL Analyses Required: Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify) 1640	As Species (specify) inOrg, III, V, MMA, DMA 1632	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify)	Other (specify)	Comments: Specify Here
1	Dock #1	Jan 3rd, 2019	855	water	7	No	-			X	X			X		
2	Dock #2	Jan 3rd, 2019	925	water	7	No	-			X	X			X		
3	Dock #3	Jan 3rd, 2019	1015	water	7	NO	-			X	X			X		
4	Dock #4	Jan 3rd, 2019	1045	water	7	NO	-			X	X			X		
5	~~Dock #5~~	Jan 3rd, 2019		water	5	NO	-			X	X			X		
6																
7																
8																
9																
10																
	Trip Blank															

Relinquished By: [signature]	Date: 1/3/19	Time: 1230	Relinquished By:	Date:	Time:
Received By:	Date:	Time:	Total Number of Packages:		

Page 1 of 1 List Hazardous Contaminants: None Expected

samples@brooksapplied.com | brooksapplied.com

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory
245 South Grape Street * Medford, OR 97501
(541) 770-5678 fax (541) 770-2901

Chain of Custody Record

This Chain of Custody is a LEGAL DOCUMENT and must be filled out accurately.

Section A Required Client Information		Section B Required Project Information		Section C Invoice Information		Section D Rush Status (Subject to Scheduling)
Company:	Neilson Research Corporation	Project Name:	1812942	Attention:		___ Standard 10-14 Days
Address:	245 South Grape Street	Project Number:		Company Name:		___ 5 Business Days (50% surcharge)
Medford, Or 97501		Report To:		Address:		___ 3 Business Days (75% surcharge)
Email:	tkreutzer@nrclabs.com	Copy To:				___ 24 - 48 hours (100% surcharge)
Phone:	541-770-5678 Fax:			P.O. #	61131	___ Other _____
Collected By (Print):						Authorized Yes ___ No
Collected By (Sign):						
Email Report ___ Yes ___ No	Mail Report ___ Yes ___ No					
Fax Report ___ Yes ___ No						

Section E
Sample Information

Sample ID	Comp/Grab	Matrix*	Date Collected	Time Collected	No. of Containers	Analysis Requested: EPA 1640 Total Ba & Tl									NRC Workorder # (Lab Use Only) Remarks/Field Data	NRC Sample # (Lab Use Only)
1901117-01B	Grab	W	1/3/2019	8:55am	1	X										
1901117-02B	Grab	W	1/3/2019	9:25am	1	X										
1901117-03B	Grab	W	1/3/2019	10:15am	1	X										
1901117-04B	Grab	W	1/3/2019	10:45am	1	X										

*Matrix: DW - Drinking Water WW - Wastewater W - Water S - Soil/Solid SL - Sludge O - Oil WP - Wipe OT - Other

Section F
Relinquish/Receive

	Sign	Print	Date	Time
Relinquished By:	Tamra Schmidemann	Tamra Schmidemann	1/7/19	12:55
Received By:			1/9/19	12:20
Relinquished By:				
Received By:				
Relinquished By:				
Received By Laboratory:				

Section G
Lab Use Only

Temp:
4°C +/- 2°C: ___ Yes ___ No
Received on Ice: ___ Yes ___ No
Number of Bottles Received:
pH Checked:
COC Seals Intact: ___ Yes ___ No ___ NA
Field Blank Included: ___ Yes ___ No

Received Via ___ UPS ___ FedEX ___ Other ___ Hand

Payment: ___ Invoice ___ Cash ___ VISA, M/C ___ Check # _____ Amount _____

NEILSON RESEARCH CORPORATION
Environmental Testing Laboratory
245 South Grape Street * Medford, OR 97501
(541) 770-5678 fax (541) 770-2901

Chain of Custody Record

This Chain of Custody is a LEGAL DOCUMENT and must be filled out accurately.

RUSH

Section A
Required Client Information

Company:	SLR
Address:	1800 Blankenship Rd
Email:	cbrow@slrconsulting.com
Phone:	503-723-4423 Fax:
Collected By (Print):	Tyler Weber
Collected By (Sign):	
Email Report X Yes ___ No	Mail Report ___ Yes ___ No
Fax Report ___ Yes ___ No	

Section B
Required Project Information

Project Name:	Coos Bay Background
Project Number:	Jordan Cove
Report To:	Chris Brow
Copy To:	Steve Hammer

Section C
Invoice Information

Attention:	Accounts Payable
Company Name:	SLR consulting
Address:	22118 20th Ave SE
	Suite 6202, Bothell, WA 98021
P.O. #	

Section D
Rush Status (Subject to Scheduling)

___ Standard 10-14 Days
___ 5 Business Days (50% surcharge)
___ 3 Business Days (75% surcharge)
X 24 - 48 hours (100% surcharge) 2 Day
X Other ASAP

Authorized ___ Yes ___ No

Section E
Sample Information

Sample ID	Comp/Grab	Matrix*	Date Collected	Time Collected	No. of Containers	Analysis Requested	NRC Workorder # (Lab Use Only) 1910117 Remarks/Field Data	NRC Sample # (Lab Use Only)
Dock #1	Grab	Water	Jan 3rd 2019	855	8	608-624 See Quote to Chris Brow with TSS Fwd CWI 503-723-4423 questions		01A-C
Dock #2	Grab	water	Jan 3rd 2019	925	8			02
Dock #3	Grab	water	Jan 3rd 2019	1015	8			03
Dock #4	Grab	water	Jan 3rd 2019	1045	8		One empty amb liter was sent with bottles NB	04

*Matrix: DW - Drinking Water WW - Wastewater W - Water S - Soil/Solid SL - Sludge O - Oil WP - Wipe OT - Other

Section F
Relinquish/Receive

	Sign	Print	Date	Time
Relinquished By:		Tyler Weber	1/3/19	1230
Received By:				
Relinquished By:				
Received By:				
Relinquished By:				
Received By Laboratory:		Nicole Orr	1-4-19	9:30

Section G
Lab Use Only

Temp:	3.6°C
4°C +/- 2°C:	X Yes ___ No
Received on Ice:	X Yes ___ No
Number of Bottles Received:	31
pH Checked:	
COC Seals Intact:	___ Yes ___ No ___ NA
Field Blank Included:	___ Yes ___ No

Received Via X UPS ___ FedEX ___ Other ___ Hand

Payment: X Invoice ___ Cash ___ VISA, M/C ___ Check # ___ Amount ___

Appendix G

Summary of DMR Data, 2015 through 2017

Appendix G

DMR Summary for IWWP 2015 through 2017

Date	BOD (mg/L)	BOD (lb/day)	TSS (mg/L)	TSS (lb/day)	pH
1/2/2015	3.5	4.4	16.8	21	6.8
1/16/2015	5.8	8.2	23.6	33.5	6.4
2/6/2015	7.3	30.5	17.2	71.8	6.9
2/20/2015	3.5	16.4	18.2	85.1	7
3/6/2015	2.1	3	0.4	0.6	7
3/20/2015	2.7	50.2	8.8	163.8	7.4
4/3/2015	0.9	5	1.4	7.7	7.8
4/17/2015	4.9	18.8	2.6	10	8.6
5/1/2015	3.7	5.6	2.6	3.9	9.3
5/15/2015	3.6	4.2	5.2	6.1	6.8
6/19/2015	5	6.7	5	6.7	10
6/26/2015	5	4.6	3	2.8	8.3
7/10/2015	4	12.4	2	6.2	8.3
7/17/2015	2	5.5	2	5.5	7.7
8/7/2015	2	3.5	1.8	3.2	9.8
8/21/2015	--	--	--	--	9.5
9/18/2015	2	3	3	4.5	8.9
9/23/2015	--	--	--	--	9.1
10/2/2015	1	1.2	0.9	1.1	8.9
10/16/2015	--	--	--	--	8.6
11/13/2015	2	6.8	4.6	15.7	7
11/20/2015	--	--	--	--	7
1/8/2016	7	21.6	28	86.5	7.1
1/20/2016	--	--	--	--	7.1
2/5/2016	4	12.7	5.8	18.4	7.4
2/21/2016	--	--	--	--	8.5
3/11/2016	--	--	--	--	7.5
3/18/2016	4	52.4	6.8	89.1	8.1
4/8/2016	2	6	2.9	8.7	7.5
4/14/2016	--	--	--	--	7.3
5/6/2016	2	2	1.3	7.3	9.3
5/20/2016	--	--	--	--	9.7
6/3/2016	3	4	1.2	1.4	9.5
6/17/2016	--	--	--	--	8.3
7/1/2016	2	2.3	1.4	1.6	10.3
7/15/2016	--	--	--	--	9.25
8/5/2016	2	3.2	0.7	1.1	7.4
8/19/2016	--	--	--	--	7.4
9/2/2016	2	6.5	2.2	7.2	9.6
9/19/2016	--	--	--	--	9.1
10/7/2016	2	10.7	0.5	2.7	8.7

Appendix G

DMR Summary for IWWP 2015 through 2017

Date	BOD (mg/L)	BOD (lb/day)	TSS (mg/L)	TSS (lb/day)	pH
10/21/2016	--	--	--	--	7.8
11/4/2016	2	6.3	3.4	10.8	7.6
11/17/2016	--	--	--	--	7.3
12/2/2016	3	15	7.5	37.6	7.8
12/16/2016	--	--	--	--	6.8
1/6/2017	3	8.8	7.8	22.8	8
1/20/2017	--	--	--	--	7.9
2/3/2017	4	18	10.2	46	7.9
2/17/2017	--	--	--	--	8.1
3/3/2017	4	20	6	30	8.1
3/17/2017	--	--	--	--	9
4/7/2017	4	11	27	74.4	8.1
4/21/2017	--	--	--	--	8.2
5/5/2017	3	5.3	2	3.5	8.4
5/19/2017	--	--	--	--	9.2
6/2/2017	2	4	3	6	9.6
6/16/2017	--	--	--	--	9.2
7/7/2017	4	11.7	3.5	10.2	9.8
7/21/2017	--	--	--	--	8.3
8/4/2017	6	11.5	8.5	16.3	9.7
8/18/2017	--	--	--	--	9.7
9/1/2017	4	3.7	7	6.4	9.4
9/15/2017	--	--	--	--	9.5
10/6/2017	14	52.6	12	45.1	9.7
10/11/2017	--	--	--	--	9.4
11/3/2017	14	60.8	11	47.7	8.4
11/17/2017	--	--	--	--	8.2
12/1/2017	9	1.3	17	2.4	7.8
12/11/2017	--	--	--	--	7.7
Minimum	0.9	1.2	0.4	0.6	6.4
Median	3.5	6.6	4.05	8.2	8.25
Maximim	14	60.8	28	163.8	10.3
n	42	42	42	42	70

Summarized from DMRs 2015 through 2017.

Appendix H

Summary of Leachate Analytical Results

Appendix H
Summary of Leachate Analytical Results

Sample Date	Result Type	Temperatu Field (°C)	pH Field (units)	pH Lab (units)	Specific Conductance Field (uS/cm)	Specific Conductance Lab (uS/cm)	Dissolved Field (mg/L)	TDS (mg/L)	TSS (mg/L)	Color (true)[1] (units)
9/13/1999	Primary	---	---	---	---	---	---	2,600	52	---
9/13/1999	Duplicate 1	---	---	---	---	---	---	2,600	50	---
1/19/2000	Primary	---	---	---	---	---	---	1,500	80	---
1/19/2000	Duplicate 1	---	---	---	---	---	---	1,462	88	---
4/10/2000	Primary	---	---	---	---	---	---	2,860	40	---
4/10/2000	Duplicate 1	---	---	---	---	---	---	2,860	36	---
9/18/2000	Primary	---	---	---	---	---	---	2,530	90	---
9/18/2000	Duplicate 1	---	---	---	---	---	---	2,538	91	---
2/20/2001	Primary	---	---	---	---	---	---	1,500	50	---
5/7/2001	Primary	---	---	---	---	---	---	2,060	40	---
10/1/2001	Primary	21	6.7	---	1,598	---	0.8	2,160	90	---
2/20/2002	Primary	17.4	6.29	---	1,049	---	0.6	1,600	60	---
5/21/2002	Primary	18	6.6	---	1,656	---	0.5	2,070	81	---
5/21/2002	Duplicate 1	18		---	1,656	---	0.5	2,064	83.5	---
9/11/2002	Primary	20	6.6	---	1,303	---	---	2,280	83	---
9/11/2002	Duplicate 1	20	6.8	---	1,303	---	---	2,290	82	---
3/12/2003	Primary	19.5	6.8	---	1,248	---	---	1,600	50	---
5/20/2003	Primary	---	6.5	---	---	---	---	1,900	80	---
10/30/2003	Primary	---	---	---	---	---	---	2,220	90	83
3/17/2004	Primary	17.2	---	---	647	---	---	1,340	80	42
3/17/2004	Duplicate 1	17.2	6.61	---	647	---	---	1,320	74	43.1
5/18/2004	Primary	---	6.61	---	---	---	---	1,660	100	---
5/18/2004	Duplicate 1	---	---	---	---	---	---	1,670	100	---
11/3/2004	Primary	20	---	---	650	---	---	1,300	70	---
11/3/2004	Duplicate 1	20	6.7	---	650	---	---	1,350	69	---
3/23/2005	Primary	15.4	6.7	---	1,396	---	2.4	1,300	80	---
3/23/2005	Duplicate 1	15.4	6.74	---	1,396	---	2.4	1,300	75	---
6/15/2005	Primary	13.6	6.74	---	996	---	---	1,500	76	47
6/15/2005	Duplicate 1	13.6	6.01	---	996	---	---	1,508	80	58
10/25/2005	Primary	17.2	6.01	---	---	---	0.9	2,000	130	61
10/25/2005	Duplicate 1	17.2	---	---	---	---	0.9	1,975	129	60.7
3/20/2006	Primary	15.2	---	---	1,592	---	0.6	890	60	---
3/20/2006	Duplicate 1	15.2	5.93	---	1,592	---	0.6	908	59	---
10/24/2006	Primary	18.7	5.93	---	300	---	2.3	1,880	270	---
10/24/2006	Duplicate 1	18.7	6.59	---	300	---	2.3	1,841	281	---
3/20/2007	Primary	15.9	6.59	---	1,950	---	3	1,300	50	---
3/20/2007	Duplicate 1	15.9	6.75	---	1,950	---	3	1,200	50	---
10/9/2007	Primary	17.2	6.75	6.6	2,480	2500	1.2	1,700	120	44
10/9/2007	Duplicate 1	17.2	6.36	6.7	2,480	---	1.2	1,700	130	39
3/27/2008	Primary Set 1	15.1	6.36	6.4	1,840	1800	1.5	1,100	60	25
10/13/2008	Primary Set 1	18.1	6.45	6.7	2,760	2800	1.1	1,800	140	41
3/25/2009	Primary	14.44	7.24	6.5	1,716	1700	1.74	1,080	60	27
10/15/2009	Primary	17.88	6.54	6.7	2,728	2700	0.08	1,800	120	41
3/24/2010	Primary	17.8	6.5	6.6	1,774	1800	0.7	1,120	50	25
10/25/2010	Primary	16.8	6.42	6.8	2,116	2500	0.9	1,600	67	34
3/23/2011	Primary	14.7	6.66	6.5	1,280	1400	0.4	860	40	18
10/26/2011	Primary	18.5	6.25	6.6	1,455	2400	0.9	1,530	100	33
3/6/2012	Primary	15.47	6.73	6.5	1,560	1600	3.02	980	40	20
10/30/2012	Primary	16.01	6.53	6.3	1,290	1290	0.55	780	40	---
6/20/2013	Primary	---	6.14	---	---	---	---	1,100	---	*400*
10/31/2013	Primary	---	---	---	---	---	---	1,230	---	*6000*
3/11/2014	Primary	---	---	---	---	---	---	826	---	*400*
3/11/2014	Duplicate	---	---	---	---	---	---	856	---	*400*
9/22/2014	Primary	16	---	---	2,448	---	7.31	1,460	---	*800*
3/18/2015	Primary	15.89	6.40	---	1,000	---	2.75	748	---	*300*
9/10/2015	Primary	16.73	6.27	---	2,181	---	2.94	1,410	---	*1000*
3/8/2016	Primary	15.04	6.71	---	1,214	---	2.28	710	---	20
9/6/2016	Primary	17	6.27	---	1,944	---	1.84	1,330	---	30
3/22/2017	Primary	14.2	6.81	---	1,126	---	4.86	651	---	10
9/14/2017	Primary	17.1	6.40	6.50	2,061	1,850	2.49	1,200	106	*200*
minimum		13.6	5.93	6.3	300	1290	0.08	651	36	10
median		17.15	6.59	6.6	1507.5	1825	1.2	1500	80	43.1
maximum		21	7.24	6.8	2760	2800	7.31	2860	281	6000

Data reproduced from SHN Engineers "2017 Annual Groundwater Monitoring Report."

1 - Italics - denotes analytical results for color, as opposed to true color.

Appendix H
Summary of Leachate Analytical Results

Sample Date	Result Type	TOC	Alkalinity		Bicarbonate			Sulfate	
			Total	Dissolved	Total	Total	Dissolved	Total	Dissolved
		(mg/L)	(mg/L $CaCO_3$)	(mg/L $CaCO_3$)	(mg/L $CaCO_3$)	(mg/L HCO_3)	(mg/L HCO_3)	(mg/L)	(mg/L)
9/13/1999	Primary	96	---	2,200	---	---	2,680	---	2.3
9/13/1999	Duplicate 1	97	---	2,200	---	---	---	---	2.2
1/19/2000	Primary	340	970	---	---	1,180	---	11	---
1/19/2000	Duplicate 1	341	969	---	---	1,181	---	10.6	---
4/10/2000	Primary	680	---	---	---	---	---	---	1.3
4/10/2000	Duplicate 1	732	---	---	---	---	---	---	1.27
9/18/2000	Primary	200	2,100	---	---	2,560	---	---	0.34
9/18/2000	Duplicate 1	193	2,120	---	---	2,585	---	---	0.33
2/20/2001	Primary	110	1,100	---	---	1,340	---	---	420
5/7/2001	Primary	73	1,840	---	---	2,240	---	---	4.2
10/1/2001	Primary	94	2,090	---	---	2,560	---	---	1.4
2/20/2002	Primary	140	---	1,400	---	---	1,700	---	2
5/21/2002	Primary	81	---	1,810	---	---	2,210	---	0.56
5/21/2002	Duplicate 1	80	---	1,830	---	---	2,230	---	0.55
9/11/2002	Primary	100	---	2,000	---	---	2,440	---	0.68
9/11/2002	Duplicate 1	103	---	1,980	---	---	2,410	---	0.675
3/12/2003	Primary	93	1,400	---	---	1,700	---	---	1.4
5/20/2003	Primary	82	1,700	---	---	2,070	---	---	0.76
10/30/2003	Primary	100	1,990	---	---	2,430	---	---	0.83
3/17/2004	Primary	53	1,190	---	---	1,450	---	---	10
3/17/2004	Duplicate 1	56	1,170	---	---	1,430	---	---	10
5/18/2004	Primary	59	1,500	---	---	1,800	---	1.2	---
5/18/2004	Duplicate 1	61	1,500	---	---	1,800	---	1.1	---
11/3/2004	Primary	54	---	1,200	---	---	1,460	---	72
11/3/2004	Duplicate 1	54	---	---	---	---	---	---	71
3/23/2005	Primary	48	1,200	---	1,200	1,460	---	---	12
3/23/2005	Duplicate 1	48.4	1,210	---	1,210	1,480	---	---	12
6/15/2005	Primary	60	1,300	---	1,300	1,580	---	---	3.7
6/15/2005	Duplicate 1	56.1	1,310	---	1,310	1,600	---	---	3.59
10/25/2005	Primary	84	1,800	---	1,800	2,190	---	---	4.1
10/25/2005	Duplicate 1	86.2	1,800	---	1,800	2,190	---	---	3.94
3/20/2006	Primary	27	810	---	---	990	---	---	45
3/20/2006	Duplicate 1	27	810	---	---	990	---	---	45.2
10/24/2006	Primary	73	1,700	---	---	2,100	---	---	7.8
10/24/2006	Duplicate 1	74.2	1,654	---	---	2,000	---	---	7.84
3/20/2007	Primary	38	1,100	---	1,100	1,300	---	---	73
3/20/2007	Duplicate 1	39	1,100	---	1,100	1,300	---	---	74
10/9/2007	Primary	62	1,500	---	1,500	1,800	---	---	23
10/9/2007	Duplicate 1	62	1,500	---	1,500	1,800	---	---	22
3/27/2008	Primary Set 1	31	910	---	---	1,110	---	---	67
10/13/2008	Primary Set 1	64	1,600	---	---	1,950	---	---	14
3/25/2009	Primary	34	1,870	---	---	2,280	---	---	46
10/15/2009	Primary	62	---	---	1,570	1,915	---	---	16
3/24/2010	Primary	31	---	---	960	---	---	---	39
10/25/2010	Primary	53	---	---	1,400	---	---	---	7.6
3/23/2011	Primary	21	---	---	720	---	---	---	28
10/26/2011	Primary	48	---	---	1,290	---	---	---	11
3/6/2012	Primary	22	---	---	720	---	---	---	67
10/30/2012	Primary	21	---	---	630	---	---	---	41
6/20/2013	Primary	---	---	---	---	---	---	---	---
10/31/2013	Primary	---	---	---	---	---	---	---	---
3/11/2014	Primary	---	---	---	---	---	---	---	---
3/11/2014	Duplicate	---	---	---	---	---	---	---	---
9/22/2014	Primary	---	---	---	---	---	---	---	---
3/18/2015	Primary	---	---	---	---	---	---	---	---
9/10/2015	Primary	---	---	---	---	---	---	---	---
3/8/2016	Primary	---	---	---	---	---	---	---	---
9/6/2016	Primary	---	---	---	---	---	---	---	---
3/22/2017	Primary	---	---	---	---	---	---	---	---
9/14/2017	Primary	33.2	---	<60.0	---	---	1,420	---	0.29
minimum		21	810	1200	630	990	1420	1.1	0.29
median		62	1500	1905	1290	1800	2220	5.9	7.82
maximum		732	2120	2200	1800	2585	2680	11	420

Data reproduced from SHN Engineers "2017 Annual Groun

1 - Italics - denotes analytical results for color, as opposed t

Appendix H
Summary of Leachate Analytical Results

Sample Date	Result Type	Chloride		Ammonia		Calcium		Magnesium	
		Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
		(mg/L)	(mg/L)	(mg/L NH_3	(mg/L NH_3	(mg/L)	(mg/L)	(mg/L)	(mg/L)
9/13/1999	Primary	---	59	---	2.9	285	---	91.1	---
9/13/1999	Duplicate 1	---	59	---	3.2	---	---	---	---
1/19/2000	Primary	27	---	2.9	---	225	---	49.4	---
1/19/2000	Duplicate 1	26	---	0.387	---	227	---	49.7	---
4/10/2000	Primary	---	34	---	3.7	393	---	81.1	---
4/10/2000	Duplicate 1	---	34.7	---	3.78	397	---	81.7	---
9/18/2000	Primary	---	52	---	5.8	382	---	101	---
9/18/2000	Duplicate 1	---	53.4	---	5.5	378	---	100	---
2/20/2001	Primary	---	30	---	5.1	209	---	64.4	---
5/7/2001	Primary	---	49	---	7.7	278	---	87.6	---
10/1/2001	Primary	---	60	---	11.4	298	---	96.1	---
2/20/2002	Primary	---	33	---	5.3	257	---	80.2	---
5/21/2002	Primary	---	50	---	9.6	320	---	104	---
5/21/2002	Duplicate 1	---	49.8	---	9.42	318	---	104	---
9/11/2002	Primary	---	62	---	15	315	---	110	---
9/11/2002	Duplicate 1	---	60.7	---	14.7	310	---	108	---
3/12/2003	Primary	---	31	---	11	241	---	80.4	---
5/20/2003	Primary	---	44	---	13	292	---	100.2	---
10/30/2003	Primary	---	60	---	16	300	---	110	---
3/17/2004	Primary	---	26	---	11	203	---	68.7	---
3/17/2004	Duplicate 1	---	26.7	---	11	204	---	69.3	---
5/18/2004	Primary	---	36	---	13	236	---	80.1	---
5/18/2004	Duplicate 1	---	35	---	13	236	---	80.9	---
11/3/2004	Primary	---	30	---	11	226	---	66.6	---
11/3/2004	Duplicate 1	---	28	---	11	228	---	67.3	---
3/23/2005	Primary	---	24	---	11	216	---	68	---
3/23/2005	Duplicate 1	---	23.6	---	---	213	---	67.3	---
6/15/2005	Primary	---	34	---	11	220	---	72.7	---
6/15/2005	Duplicate 1	---	32.7	---	11.3	222	---	74.2	---
10/25/2005	Primary	---	52	---	14	275	---	108	---
10/25/2005	Duplicate 1	---	54.38	---	14.1	273	---	108	---
3/20/2006	Primary	---	14	---	6.8	158	---	43	---
3/20/2006	Duplicate 1	---	13.8	---	6.84	158	---	43.2	---
10/24/2006	Primary	---	44	---	12	294	---	98.8	---
10/24/2006	Duplicate 1	---	44.3	---	11.8	302	---	102	---
3/20/2007	Primary	---	22	---	9.8	---	176	---	50.1
3/20/2007	Duplicate 1	---	23	---	9.7	---	---	---	---
10/9/2007	Primary	---	40	---	12	---	218	---	73.6
10/9/2007	Duplicate 1	---	40	---	12	---	---	---	---
3/27/2008	Primary Set 1	---	17	---	9.6	---	173	---	47.6
10/13/2008	Primary Set 1	---	41	---	6.5	---	242	---	85
3/25/2009	Primary	---	16	---	9.9	---	177	---	46.7
10/15/2009	Primary	---	37	---	12	---	232	---	82.7
3/24/2010	Primary	---	16	---	11	---	186	---	49.2
10/25/2010	Primary	---	31	---	11	---	216	---	74.7
3/23/2011	Primary	---	12	---	6.7	---	158	---	37
10/26/2011	Primary	---	31	---	10	---	214	---	70.6
3/6/2012	Primary	---	14	---	8.2	---	183	---	44
10/30/2012	Primary	---	21	---	5.6	---	135	---	33.1
6/20/2013	Primary	---	---	---	---	---	---	---	---
10/31/2013	Primary	---	---	---	---	---	---	---	---
3/11/2014	Primary	---	---	---	---	---	---	---	---
3/11/2014	Duplicate	---	---	---	---	---	---	---	---
9/22/2014	Primary	---	---	---	---	---	---	---	---
3/18/2015	Primary	---	---	---	---	---	---	---	---
9/10/2015	Primary	---	---	---	---	---	---	---	---
3/8/2016	Primary	---	---	---	---	---	---	---	---
9/6/2016	Primary	---	---	---	---	---	---	---	---
3/22/2017	Primary	---	---	---	---	---	---	---	---
9/14/2017	Primary	---	22.0	---	8.74	---	228	---	60.5
minimum		26	12	0.387	2.9	158	135	43	33.1
median		26.5	34	1.6435	11	265	186	81	50.1
maximum		27	62	2.9	16	397	242	110	85

dwater Monitoring Report."

o true color.

Data reproduced from SHN E

1 - Italics - denotes analytical

Appendix H
Summary of Leachate Analytical Results

Sample Date	Result Type	Sodium		Potassium		Iron		Manganese		Arsenic
		Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
9/13/1999	Primary	456	---	103	---	26.7	---	2.2	---	0.014
9/13/1999	Duplicate 1	---	---	---	---	---	---	---	---	---
1/19/2000	Primary	168	---	42.7	---	30.3	---	3.69	---	0.01
1/19/2000	Duplicate 1	170	---	44.9	---	30.4	---	3.71	---	0.01
4/10/2000	Primary	254	---	58.2	---	66.3	---	7.3	---	0.0015
4/10/2000	Duplicate 1	255	---	59.2	---	66.9	---	7.36	---	0.0015
9/18/2000	Primary	386	---	92.3	---	40.3	---	4.34	---	0.012
9/18/2000	Duplicate 1	383	---	91.1	---	39.9	---	4.29	---	0.011
2/20/2001	Primary	195	---	57.3	---	29.8	---	2.28	---	0.009
5/7/2001	Primary	319	---	87.4	---	15.2	---	2.73	---	0.01
10/1/2001	Primary	358	---	106	---	38	---	2.66	---	0.018
2/20/2002	Primary	199	---	65.3	---	42.3	---	2.9	---	0.009
5/21/2002	Primary	292	---	83.6	---	43.9	---	2.96	---	0.019
5/21/2002	Duplicate 1	291	---	84.2	---	43.7	---	2.95	---	0.018
9/11/2002	Primary	339	---	102	---	34.7	---	2.54	---	0.019
9/11/2002	Duplicate 1	336	---	101	---	34.1	---	2.51	---	0.019
3/12/2003	Primary	200	---	79.7	---	25.2	---	1.99	---	0.01
5/20/2003	Primary	286	---	96.7	---	34.1	---	2.36	---	0.014
10/30/2003	Primary	337	---	131	---	35.8	---	2.22	---	0.018
3/17/2004	Primary	154	---	76	---	34.9	---	1.74	---	0.012
3/17/2004	Duplicate 1	156	---	77	---	35.1	---	1.75	---	0.011
5/18/2004	Primary	192	---	89	---	38.7	---	1.99	---	0.014
5/18/2004	Duplicate 1	195	---	90	---	38.8	---	2	---	0.014
11/3/2004	Primary	142	---	76	---	31.4	---	1.89	---	0.012
11/3/2004	Duplicate 1	143	---	77	---	31.6	---	1.91	---	0.013
3/23/2005	Primary	141	---	78	---	31.8	---	1.86	---	0.016
3/23/2005	Duplicate 1	140	---	77	---	31.5	---	1.84	---	0.016
6/15/2005	Primary	156	---	81	---	48.4	---	1.84	---	0.018
6/15/2005	Duplicate 1	160	---	83	---	49.2	---	1.86	---	0.018
10/25/2005	Primary	298	---	128	---	58.4	---	2.11	---	0.021
10/25/2005	Duplicate 1	297	---	127	---	58	---	2.1	---	0.02
3/20/2006	Primary	85.4	---	51	---	25.1	---	1.23	---	0.0107
3/20/2006	Duplicate 1	86.1	---	52	---	25.2	---	1.23	---	0.0107
10/24/2006	Primary	277	---	117	---	224	---	2.16	---	0.101
10/24/2006	Duplicate 1	287	---	121	---	229	---	2.23	---	0.104
3/20/2007	Primary	---	134	---	66	22.4	---	1.45	---	0.0104
3/20/2007	Duplicate 1	---	---	---	---	23.1	---	1.48	---	0.0105
10/9/2007	Primary	---	206	---	94	56.3	---	1.64	---	0.035
10/9/2007	Duplicate 1	---	---	---	---	55.6	---	1.61	---	0.032
3/27/2008	Primary Set 1	---	119	---	62	27.1	---	1.25	---	0.0125
10/13/2008	Primary Set 1	---	250	---	117	54.1	---	1.66	---	0.0287
3/25/2009	Primary	---	103	---	64	27.5	---	1.28	---	0.0107
10/15/2009	Primary	---	234	---	110	46.1	46.6	1.61	1.64	0.0236
3/24/2010	Primary	---	104	---	66	27.5	26.7	1.32	1.33	0.0106
10/25/2010	Primary	---	197	---	101	26.4	23.6	1.41	1.4	0.0124
3/23/2011	Primary	---	65.7	---	48	20.1	20	1.1	1.1	0.0072
10/26/2011	Primary	---	185	---	93	40.4	39.3	1.5	1.47	0.0173
3/6/2012	Primary	---	78	---	57	15.8	13.3	1.24	1.25	0.0072
10/30/2012	Primary	---	72.4	---	48	19.2	15	0.912	0.89	0.0081
6/20/2013	Primary	---	---	---	---	37.7	---	1.600	---	0.0128
10/31/2013	Primary	---	---	---	---	255	---	1.82	---	0.0981
3/11/2014	Primary	---	---	---	---	21.1	---	1.33	---	0.00817
3/11/2014	Duplicate	---	---	---	---	21.4	---	1.30	---	0.00769
9/22/2014	Primary	---	---	---	---	56.2	---	1.54	---	0.0162
3/18/2015	Primary	---	---	---	---	17.3	---	1.14	---	0.00777
9/10/2015	Primary	---	---	---	---	56.3	---	1.56	---	0.0172
3/8/2016	Primary	---	---	---	---	19.2	---	1.05	---	0.00651
9/6/2016	Primary	---	---	---	---	56.4	---	1.72	---	0.01830
3/22/2017	Primary	---	---	---	---	49.5	---	0.992	---	0.01010
9/14/2017	Primary	---	136	---	76.2	60.9	---	1.53	1.51	0.01210
minimum		85.4	65.7	42.7	48	15.2	13.3	0.912	0.89	0.0015
median		227	134	83.3	66	35.1	23.6	1.84	1.365	0.0125
maximum		456	250	131	117	255	46.6	7.36	1.64	0.104

ngineers "2017 Annual Groundwater Monitoring Report."
results for color, as opposed to true color.

Appendix H
Summary of Leachate Analytical Results

Sample Date	Result Type	Barium Total (mg/L)
9/13/1999	Primary	0.48
9/13/1999	Duplicate 1	---
1/19/2000	Primary	0.33
1/19/2000	Duplicate 1	0.33
4/10/2000	Primary	0.49
4/10/2000	Duplicate 1	0.5
9/18/2000	Primary	0.513
9/18/2000	Duplicate 1	0.509
2/20/2001	Primary	0.318
5/7/2001	Primary	0.357
10/1/2001	Primary	0.507
2/20/2002	Primary	0.398
5/21/2002	Primary	0.487
5/21/2002	Duplicate 1	0.486
9/11/2002	Primary	0.536
9/11/2002	Duplicate 1	0.528
3/12/2003	Primary	0.384
5/20/2003	Primary	0.473
10/30/2003	Primary	0.533
3/17/2004	Primary	0.333
3/17/2004	Duplicate 1	0.337
5/18/2004	Primary	0.363
5/18/2004	Duplicate 1	0.369
11/3/2004	Primary	0.325
11/3/2004	Duplicate 1	0.329
3/23/2005	Primary	0.303
3/23/2005	Duplicate 1	0.3
6/15/2005	Primary	0.377
6/15/2005	Duplicate 1	0.386
10/25/2005	Primary	0.574
10/25/2005	Duplicate 1	0.571
3/20/2006	Primary	0.22
3/20/2006	Duplicate 1	0.222
10/24/2006	Primary	2.15
10/24/2006	Duplicate 1	2.23
3/20/2007	Primary	0.269
3/20/2007	Duplicate 1	0.264
10/9/2007	Primary	0.799
10/9/2007	Duplicate 1	0.809
3/27/2008	Primary Set 1	0.279
10/13/2008	Primary Set 1	0.602
3/25/2009	Primary	0.227
10/15/2009	Primary	0.505
3/24/2010	Primary	0.295
10/25/2010	Primary	0.364
3/23/2011	Primary	0.216
10/26/2011	Primary	0.456
3/6/2012	Primary	0.228
10/30/2012	Primary	0.252
6/20/2013	Primary	---
10/31/2013	Primary	---
3/11/2014	Primary	---
3/11/2014	Duplicate	---
9/22/2014	Primary	---
3/18/2015	Primary	---
9/10/2015	Primary	---
3/8/2016	Primary	---
9/6/2016	Primary	---
3/22/2017	Primary	---
9/14/2017	Primary	0.493
minimum		0.216
median		0.384
maximum		2.23

Oregon
Kate Brown, Governor

Department of Environmental Quality
Western Region Eugene Office
165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838
FAX (541) 686-7551
TTY 711

May 6, 2019

VIA EMAIL, CERTIFIED MAIL, AND U.S. FIRST CLASS MAIL

Derik Vowels
Jordan Cove LNG, LLC
Pacific Connector Gas Pipeline, LP
111 SW 5th Ave., Suite1100
Portland, OR 97204

and

Jordan Cove LNG, LLC
Pacific Connector Gas Pipeline, LP
5615 Kirby, Suite 500
Houston, TX 77005

Tyler Krug, Regulatory Project Manager
North Bend Field Office, Portland District
United States Army Corps of Engineers
2201 N. Broadway Suite C
North Bend, Oregon 97459

Ms. Kimberly D. Bose,
Secretary
Federal Energy Regulatory Commission
888 First St., N.E., Room 1A
Washington, D.C. 20426
FERC Dockets No. CP17-494, CP17-495

Dear Mr.Vowels, Mr. Krug and Ms. Bose:

On October 24, 2017, the U.S. Army Corps of Engineers (Corps) notified the Oregon Department of Environmental Quality (DEQ) that it had received an application from Jordan Cove LNG LLC and Pacific Connector Gas Pipeline LP, (herein collectively referred to as "Jordan Cove" or the "Applicant") for Section 404 (Clean Water Act, or CWA) and Section 10 and 14 (Rivers and Harbors Act) permits related to construction and operation of LNG facilities and an associated pipeline (collectively, the "Project"). Consistent with its regulations, the Corps

determined that the initial application of October 24, 2017 was incomplete on November 3, 2017. Consistent with Corps regulations, the Corps requested additional information from November 2017 through May 2018 before the Corps determined it had received a complete application and issued a public notice on May 22, 2018, which commenced DEQ's water quality certification (401 WQC) review pursuant to CWA Section 401.

The proposed Project consists of two interconnected parts. The 200-acre Jordan Cove LNG Export Terminal would be located in Coos County, Oregon on the North Spit of Coos Bay. The facility would include a slip and access channel, modifications to the federal navigational channel, a marine terminal, a natural gas conditioning and liquefaction facility, temporary workforce housing, security and safety buildings, and wetland mitigation sites. The Pacific Connector gas pipeline is the second part of the Project, consisting of a 229-mile 36-inch diameter pipeline and associated roadways and work areas, extending from the terminal to interconnections with existing pipelines near Malin, Oregon. The Jordan Cove terminal would receive up to 1.2 billion cubic feet per day of natural gas from the Pacific Connector gas pipeline.

DEQ has evaluated the Project application pursuant to Section 401 of the Clean Water Act, 33 USC §1341, ORS 468B.035 through 468B.047, and DEQ's certification rules found in Oregon Administrative Rules 340, Division 048. To certify the Project, DEQ must have reasonable assurance that the proposed activities will be conducted in a manner that will not violate the applicable provisions of Sections 301, 302, 303, 306, and 307 of the Clean Water Act, and Oregon water quality standards in Oregon Administrative Rules 340, Division 041, adopted to implement these sections.

Following a preliminary review of the Project, DEQ filed a request for additional information with Jordan Cove on September 7, 2018. Jordan Cove filed responses on October 8, 2018. However, because many of the responses were incomplete or inadequate, the Department filed a supplemental information request with Jordan Cove on December 20, 2018. That request included examples of the information sought. Jordan Cove responded, in part, on January 22, February 20, and April 16, 2019, and committed to filing complete responses by the end of April 2019. DEQ filed additional requests for project information on September 25, 2018, and March 11 and 13, 2019. Jordan Cove filed a response to these requests on April 30, 2019; however, the late date of Jordan Cove's filing prevented any significant review of the material for this decision. OAR 340-048-0020(3).

On March 29, 2019, DEQ reviewed the FAST-41 Coordinated Project Plan for the Project. DEQ notes that the Corps has indicated that JCEP is considering pipeline route changes, and that the Corps intends to issue a revised public notice once it receives sufficient information regarding the changes. DEQ has not yet received information from Jordan Cove regarding these changes to the proposed Project.

DEQ denies Jordan Cove's request for 401 WQC for the Project. DEQ does not have a reasonable assurance that the construction and operation of the Project will comply with applicable Oregon water quality standards, as described in the attached Evaluation and Findings Report, which is incorporated in its entirety by this reference. DEQ's decision, however, is made without prejudice. Jordan Cove may reapply for 401 WQC for the Project, and DEQ will consider additional information that is responsive to the bases for denial in this decision.

In accordance with the Oregon Administrative Procedures Act (Oregon Revised Statute, chapter 183) and OAR 340-048-0045(2), Jordan Cove may request a contested case hearing if dissatisfied with the certification decision. Your request for a hearing must be made in writing to and received by the Department of Environmental Quality within 20 days of the date of mailing of this certification decision, and such request must comply with OAR 340-011-0530(2) and OAR 340-048-0045(2).

A request for a hearing must be mailed to:

Oregon Department of Environmental Quality
Attn: Chris Stine
165 East Seventh Avenue, Suite 100
Eugene, Oregon 97401

If a request for hearing is not received within this 20-day period, your right to a hearing will be considered waived. If you request a hearing, you will be notified of the time and place of the hearing and provided information on the procedures by which contested cases are heard, your rights, the import and effect of such a hearing, and your rights and remedies.

Contested cases are governed by the rules of the Office of Administrative Hearings, specifically OAR 137-003-0501 through -0700. As a corporation, you must be represented by legal counsel at this hearing, if any.

In accordance with OAR 340-048-0045(3), this certification decision is effective upon issuance of this decision, notwithstanding a request for a contested case or other judicial review, if any.

As noted above, this decision is being made without prejudice. Jordan Cove may resubmit an application for 401 WQC with DEQ. If Jordan Cove does so, DEQ strongly recommends that Jordan Cove, the Corps and DEQ hold a pre-application conference to ensure a shared understanding of the information and actions required to complete a subsequent review of an application in a timely manner that would avoid delays in consideration of the application by DEQ, and that is coordinated with both the Corps and the FAST-41 Project Plan being managed by the Federal Energy Regulatory Commission. DEQ also requests that if it does resubmit an application, Jordan Cove clearly indicate in such a submittal whether the applicant is seeking certification for purposes of the permits and licenses for the Project pending before both FERC and the Corps.

If you have any questions, please contact Chris Stine at stine.chris@deq.state,or.us or at (541) 686-7810 or at the address on this letterhead.

Sincerely,

Richard Whitman
Director
Oregon Department of Environmental Quality

Attachment: Evaluation and Findings Report

cc: Ms. Natalie Eades, Jordan Cove LNG
Mr. Mike Koski, Jordan Cove LNG,
Ms. Rose Haddon, Jordan Cove LNG
Mr. Bill Abadie, US Army Corp of Engineers
Mr. Sean Mole, Oregon Department of Energy
Mr. Jim Rue, Oregon Department of Land Conservation and Development
Mr. Keith Andersen, DEQ
Mr. David Belyea, DEQ
Mr. Chris Stine, DEQ
FERC Dockets No. CP17-494, CP17-495
DEQ (file)

NOTICE TO ACTIVE DUTY SERVICEMEMBERS

Active duty Service members have a right to stay these proceedings under the federal Servicemembers Civil Relief Act. For more information contact the Oregon State Bar at 800-452-8260, the Oregon Military Department at 503-584-3571 or the nearest United States Armed Forces Legal Assistance Office through http://legalassistance.law.af.mil. The Oregon Military Department does not have a toll free telephone number.

APPENDIX 6.E.

Evaluation and Findings Report

Section 401 Water Quality Certification for the Jordan Cove Energy Project

May 2019

Water Quality Division
165 E. 7th Ave., Suite 700
Eugene, OR 97401
Phone: 503-229-5696
800-452-4011
Fax: 541-686-7551
Contact: Christopher Stine

www.oregon.gov/DEQ

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

State of Oregon
Department of
Environmental
Quality

This report prepared by:

Oregon Department of Environmental Quality
165 E. 7th Ave. Suite 100
Eugene, OR 97401
1-800-452-4011
www.oregon.gov/deq

Contact:
Christopher Stine
541-686-7810

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 800-452-4011, ext. 5696; or email deqinfo@deq.state.or.us.

Table of Contents

1.0 Introduction 1
1.1 Background 1
1.2 Additional Information Requests 1
1.3 Public Comment Period 2
1.4 WQC Decision 3
2.0 Summary of Application 3
2.1 Legal Name of Applicant 4
2.2 Description of Project Location 4
2.2.1 Jordan Cove LNG Export Terminal 4
2.2.2 Pacific Connector Gas Pipeline 4
2.3 Adjacent Landowners 4
2.4 Description of Activity 4
2.5 Waters of the State Affected by the Project 7
2.5.1 Water Resources Affected by the Jordan Cove LNG Facility 7
2.5.2 Water Resources Affected by the Pacific Connector Gas Pipeline 7
2.6 Documents Filed in Support of the JCEP Application 7
2.7 Public Notice(s) Issued by the Federal Licensing Authority 8
2.8 Land Use Determination by Local Planning Jurisdiction 8
2.9 Consistency with Other Requirements of State Law 8
3.0 Project Description 9
3.1 Jordan Cove LNG Export Terminal 9
3.2 Pacific Connector Natural Gas Pipeline 10
3.2.1 Pacific Connector Natural Gas Pipeline 11
3.2.2 Aboveground Facilities 11
3.2.3 Land Requirements 12
3.3 Port of Coos Bay Proposed Channel Deeping Project 12
4.0 Water Quality Standards 13
4.1 Beneficial Uses 14
4.2 Numeric and Narrative Criteria 14
4.3 Antidegradation Policy 14
5.0 Proposed Actions Included in this 401 Analysis 15
5.1 Pipeline Construction 15
5.2 Waterbody Crossings 16

5.3 Construction and Maintenance of Roads 17
5.4 Permanent Pipeline Right-of-Way 17
5.5 Terminal and Off-Site Project Area Stormwater 17
5.6 Jordan Cove LNG Terminal Dredging 18
6.0 Water Quality Compliance Evaluation 18
6.1 Statewide Narrative Criteria 18
6.1.1 Applicable Standard 18
6.1.2 DEQ Evaluation 18
6.1.3 DEQ Findings 44
6.2 Biocriteria 45
6.2.1 Applicable Standard 45
6.2.2 Evaluation of Biocriteria 46
6.2.3 DEQ Findings 53
6.3 Dissolved Oxygen 53
6.3.1 Applicable Standard 53
6.3.2 DEQ Evaluation: Dissolved Oxygen 54
6.3.3 DEQ Findings: Dissolved Oxygen 55
6.4 Nuisance Phytoplankton Growth 56
6.4.1 Applicable Standard 56
6.4.2 DEQ Evaluation: Nuisance Phytoplankton Growth 56
6.4.3 DEQ Findings 56
6.5 Hydrogen Ion Concentration (pH) 56
6.5.1 Applicable Standard 56
6.5.2 DEQ Evaluation: pH 56
6.5.3 DEQ Findings 57
6.6 Temperature 57
6.6.1 Applicable Standard 58
6.6.2 DEQ Evaluation 62
6.6.3 DEQ Findings 68
6.7 Total Dissolved Gas 68
6.7.1 Applicable Standard 68
6.7.2 DEQ Evaluation: Total Dissolved Gas 69
6.7.3 DEQ Findings 69
6.8 Toxic Substances 69
6.8.1 Applicable Standard 69

6.8.1 DEQ Evaluation: Toxic Substances 69
6.8.2 DEQ Findings 71
6.9 Turbidity 72
6.9.1 Applicable Standard 72
6.9.2 DEQ Evaluation: Turbidity 72
6.9.3 DEQ Findings: Turbidity 76
6.10 Antidegradation 76
6.10.1 Applicable Standard 77
6.10.2 DEQ Evaluation 78
6.10.3 DEQ Findings 78
7 Evaluation of Compliance with Sections 301, 302, 303, 306 and 307 of the Federal Clean Water Act 79
8.0 Evaluation Of Other Appropriate Requirements Of State Law 79
9.0 Public Comment 84
10.0 Conclusion 84

List of Tables

Table 1: Subbasins and Watersheds Crossed by the Proposed Gas Pipeline 7
Table 2: Total Pipeline Land Requirements for Construction and Operation 12
Table 3: Designated Beneficial Uses 14
Table 4: Basin-Specific Criteria: pH 56

List of Figures

Figure 1: Jordan Cove LNG Export Facility 5
Figure 2: Pacific Connector Pipeline Alignment 6
Figure 3: Schematic of Ridgetop Right-of-Way 19
Figure 4: Examples of Convergent Headwalls 22
Figure 5: Spoil Placement on Headwalls for Construction ROW and TEWA 8.72-W between MP 8.56 – 8.75 24
Figure 6: Fill Placement on Headwalls for Construction Right-of-Way and TEWA 10.71-W MP 10.78 – 10.87 26
Figure 7: Fill Placement on Headwalls for Construction Right-of-Way and TEWA 31.06-W MP 31.07 – 31.28. 27
Figure 8: Map of Hudson Creek-North Fork Coquille Subwatershed 35
Figure 9: Construction Right-of-Way Above Headwall 37
Figure 10: Pipeline Parallel to and Crossing Spencer Creek and crossing Clover Creek, near Milepost 177 39
Figure 11: Potential Dredge Disposal Areas Relative to LNG Terminal and Adjacent Wetlands 42
Figure 12: Proposed Finish Grade of Dredge Soil Locations 43
Figure 13: Lick Creek and Little Butte Creek Vicinity 47
Figure 14: Wetland Areas Adjacent to LNG Terminal and Dredge Spoil Placement 52
Figure 15: Pipeline Crossing at Wetland S1-04 (Willanch Slough) showing no “neckdown” of the ROW 64
Figure 16: Pipeline Crossing at Tributary to Cooston Channel showing no “neckdown” of ROW 64
Figure 17: Modeled Turbidity from Capital and Maintenance Dredging at NRI-3 75

Attachments

Attachment A: DEQ Additional Information Requests

1.0 Introduction

1.1 Background

On October 24, 2017, the U.S. Army Corps of Engineers (Corps) notified the Oregon Department of Environmental Quality (DEQ) that it had received an application from Jordan Cove LNG LLC and Pacific Connector Gas Pipeline LP, (herein referred to collectively as "JCEP" "Applicant" or "Jordan Cove")JCEP for Section 404 (Clean Water Act, or CWA) and Section 10 and 14 (Rivers and Harbors Act) permits related to construction and operation of LNG facilities and an associated pipeline (collectively, the "Project"). Consistent with its regulations, the Corps determined that the initial application of October 24, 2017, was incomplete on November 3, 2017. 33 CFRR 325.1. The Corps requested additional information from JCEP on November 2017 through May 2018.

JCEP submitted additional information to the Corps on May 8, 2018. Within 15 days of receiving such information from JCEP, the Corps determined it had received a complete application, and issued a public notice on May 22, 2018 (hereinafter referred to as "the Public Notice"). Per DEQ's usual procedure regarding Corps' permit applications, DEQ treated receipt of the Public Notice as receipt of a request for water quality certification under CWA Section 401 ("WQC") for the project pursuant to OAR 340-048-0032. The Public Notice included DEQ's notice of an application for WQC, and commenced the public comment period for the Corps' section 404/10-14 permits application and DEQ's WQC. Thus, DEQ's 401 WQC review process began on May 22, 2018. The Public Notice did not specify the applicable time period for DEQ's certification review; therefore, on June 22, 2018, DEQ sent a request to the Corps for additional time to complete its water quality certification review based upon the specific factual circumstances. 33 CFR 325.2(b)(1)(ii). The Corps responded to DEQ on July 3, 2018, and consistent with its regulations, indicated that DEQ had until May 7, 2019, to act on JCEP's certification request.[1]

1.2 Additional Information Requests

Pursuant to OAR 340-048-0032(2), DEQ made a number of formal additional information requests ("AIRs") to JCEP, see Attachment A. A brief chronology of DEQ requests and JCEP responses is described below, including the supplemental response to the 9/7/18 request that identifies where JCEP's responses were deemed insufficient.

AIR-1: September 7, 2018
Subject: Minimum 401 application and decision requirements per OAR 340-048-0020 & OAR 340-048-0042.

October 8, 2018: Jordan Cove files response.

December 20, 2018: DEQ files supplemental information request providing examples of deficiencies in October 8, 2018 response.

January 22, 2019: Jordan Cove asserted that DEQ's requests were overbroad and onerous, and requested meeting with senior management and legal representatives. During this meeting, DEQ explained that the

[1] Letter from Colonel Aaron Dorf, Corps, to Richard Whitman, DEQ (July 3, 2018). DEQ notes that it also communicated to JCEP its intent to deny water quality certification prior to October 22, 2018, due to the lack of reasonable assurance of the Project's compliance with water quality standards, noting deficiencies in the application and outstanding additional information requests. At that time, JCEP indicated that such responses were forthcoming and, of its own volition, withdrew its then pending request for 401 certification with DEQ on September 25, 2018, and resubmitted a new 401 certification request for the Corps permits that same day. See Letter from Tony Diocee, JCEP to Mary Camarata et. al, DEQ, at 1 (Sept. 25, 2018).

requested information is directly related to specific provisions of the agency's rules for water quality certifications, and that the requested information is consistent with information provided by other large pipeline developers including, most recently, the Ruby pipeline. OAR 340-048-0032, -0020. In many cases, the requested information is necessary for DEQ to determine whether proposed construction methods represent the highest and best practicable treatment and/or control of wastes, activities, and flows – a central narrative water quality criterion. In other cases, particularly where the affected waterbody is water quality limited, any new discharge may be allowed only if the proponent demonstrates that the discharge would not adversely affect the water quality impairment or is allowed under a TMDL implementation plan. This requires some level of site-specific evaluation corresponding to the specific activity proposed and the condition of the waterbody. The JCEP has continued to rely on standard FERC prescriptions and suggest that DEQ use its authority to condition a certification. The problem with this approach is that it presumes that conditions would always succeed in meeting standards. DEQ requires enough information to make an informed judgement before taking such a course JCEP.

February 20, 2019: Jordan Cove files partial response to September 7, 2018 request. Commits to filing remaining material within two months.

April 16, 2019: Jordan Cove files partial response to the December 20, 2018 request.

AIR-2: September 25, 2018
Subject: Post-construction stormwater plan for Jordan Cove Terminal.

October 25, 2018: Jordan Cove files partial response.

April 1, 2019: Jordan Cove files revised stormwater plan in response to September 25, 2018 information request.

AIR-3: March 11, 2019
Subject: Requests information on selection of particular waterbody crossing methods for particular crossings, and for baseline environmental conditions for site-specific stream restoration plans. The JCEP was not able to compile and submit the information requested in time for DEQ to evaluate it before making a 401 WQC decision.

AIR-4: **March 13, 2019**
Subject: Land Use Compatibility.

April 30, 2019: Jordan Cove files a response to prior DEQ requests for information. The JCEP did not submit the information requested with adequate time for DEQ to evaluate it before making a 401 WQC decision.

On March 29, 2019, DEQ reviewed the FAST-41 Coordinated Project Plan for the Project and notes that the Corps has indicated that JCEP has changed the project scope and that the Corps intends to revise the public notice once it receives information in sufficient detail. DEQ notes that if JCEP resubmits an application to DEQ for WQC, and the project scope has changed to include the Blue Ridge Variation,[2] it would need to provide the same information to DEQ for its review.

1.3 Public Comment Period

The Corps' and DEQ's public comment period for the Project were originally set to close on July 21, 2018. The agencies extended the public comment period with a new comment close date of August 20, 2018. DEQ

[2] The Blue Ridge Variation would increase the number of perennial waterbodies crossed by the pipeline by 27. FERC DEIS at 3-20.

received about 42,000 public comments electronically and by mail.

This Evaluation and Findings Report does not include responses to these public comments because DEQ is denying certification JCEP. Therefore, a response to public comments has not been prepared.

1.4 WQC Decision

DEQ has prepared this Evaluation and Findings Report supporting the attached 401 Water Quality Certification decision (the DEQ WQC Decision) for the Corps' issuance of CWA Section 404 and RHA Section 10 permits pursuant to Section 401 of the Clean Water Act (33 U.S.C. Section 1431), Oregon Revised Statutes (ORS) chapter 468B) and OAR 340 Division 48, other water quality related requirements of state law, and in consideration of all public comments received relevant to water quality and beneficial use concerns. As described in the DEQ WQC Decision, DEQ denies the requested certification because it does not have a reasonable assurance that the construction and operation of the Project would comply with applicable state water quality standards. DEQ's decision, however, is made without prejudice. Jordan Cove may reapply for 401 WQC for the Project, and DEQ would consider additional information that is responsive to the bases for denial in this decision.

DEQ notes that it has not received an application for WQC for issuance of a FERC permit or license associated with the Project. DEQ did receive information relevant to JCEP's applications to the Corps for Section 404/10 permits on February 6, 2018; May 21, 2018; November 21, 2018; March 19, 2019 and April 30, 2019. However, to the extent there was any ambiguity as to the nature of the materials received by DEQ on February 6, 2018 (specifically, whether that submittal constituted a separate request to DEQ for WQC for any FERC authorization or was a supplement to materials for the Corps' review) JCEP confirmed in correspondence on December 7, 2018, that the February 6, 2018 materials were supplements to its application to the Corps for Section 404 and Section 10 permits. Additionally, contrary to JCEP's assertion in its December 7, 2018, letter to DEQ that JCEP had submitted to DEQ a 401 WQC application on October 22, 2017, no record supports this assertion. The only materials DEQ received regarding the Project in October of 2017 were emailed notices from the Corps on October 23, 2017 and October 24, 2017 of the Corps' receipt of Section 404/10 permit application materials from JCEP. As described above, the Corps deemed that application incomplete (33 CFR 325.2(a)). As a result, in accordance with DEQ's rule (OAR 340-048-0032(1)) DEQ did not receive a 401 WQC application from JCEP for the Corps' permits until the Corps determined JCEP's application constituted a valid request for certification and issued the Public Notice on May 22, 2018, pursuant to Corps regulations. See 33 CFR 325.2(b)(1)(ii). In the event that JCEP resubmits an application to DEQ for certification, DEQ requests that JCEP expressly state whether the application is for certification for pending FERC authorizations under the Natural Gas Act as well as the pending Corps Section 404/10 permits.[3]

2.0 Summary of Application

Section 401(a) of the Clean Water Act, 33 U.S.C. § 1341(a), requires an applicant for "a Federal license or permit to conduct any activity which may result in a discharge into the navigable waters" to provide the federal licensing or permitting agency a certification from the relevant state that the discharge would comply with applicable provisions of sections 1311, 1312, 1313, 1316, and 1317 of the Clean Water Act.

[3] At this time, DEQ is not aware of any reason why review of a new certification request would require additional time as a result of including both the Corps permits and the proposed FERC authorizations.

2.1 Legal Name of Applicant

Jordan Cove LNG, LLC
Pacific Connector Gas Pipeline, LP
5615 Kirby, Suite 500
Houston, TX 77005

2.2 Description of Project Location

2.2.1 Jordan Cove LNG Export Terminal

The Jordan Cove LNG Export Terminal and associated facilities are proposed be located primarily on the bay side of the North Spit of Coos Bay in southwest Oregon in Section 5 of Township 25 South, Range 13 West at Latitude/Longitude: 43.432238°, -124.267136°. The primary site for the LNG Terminal is about 7.5 miles up the existing Coos Bay Federal Navigation Channel, approximately 1,000 feet north of the city limit of North Bend, in Coos County, Oregon, and more than one mile away from the nearest residence. Figure 1 presents a site plan of the proposed LNG Export Terminal.

2.2.2 Pacific Connector Gas Pipeline

The Pacific Connector gas pipeline would extend for about 229 miles across Klamath, Jackson, Douglas, and Coos Counties, Oregon and terminate at the proposed Jordan Cove LNG Export Terminal in Coos County. Figure 2illustrates the proposed alignment of the Pacific Connector gas pipeline. The pipeline would occupy 4,947.7 acres of land during construction and 1,398.57 acres of land as part of a permanent easement.

2.3 Adjacent Landowners

A list of landowners adjacent to the Jordan Cove LNG Export Facility is provided in Attachment K to the Section 404/10 application to the Corps and is incorporated here by reference.

Jordan Cove seeks to negotiate agreements with private, non-federal landowners to occupy lands necessary for temporary and permanent pipeline easements. Jordan Cove would also apply for Right-of-Way Grants with Federal land agencies to construct and operate the pipeline on federally owned lands.

2.4 Description of Activity

Jordan Cove Energy Project, LP is seeking to site, construct, and operate a natural gas liquefaction and liquefied natural gas export facility to be located on the bay side of the North Spit of Coos Bay, Oregon. To supply the LNG Terminal with natural gas, Pacific Connector Gas Pipeline, LP is proposing to construct and operate a new, approximately 229-mile-long natural gas transmission pipeline and compressor station from interconnections with the existing Ruby Pipeline LLC and Gas Transmission Northwest LLC (“GTN”) systems to the LNG Terminal.

The Project is described more fully in section three of this report, and in the Section 404/10 Application to the Army Corps of Engineers (NWP-2017-041), which is incorporated into this section by reference.

Figure 1: Jordan Cove LNG Export Facility

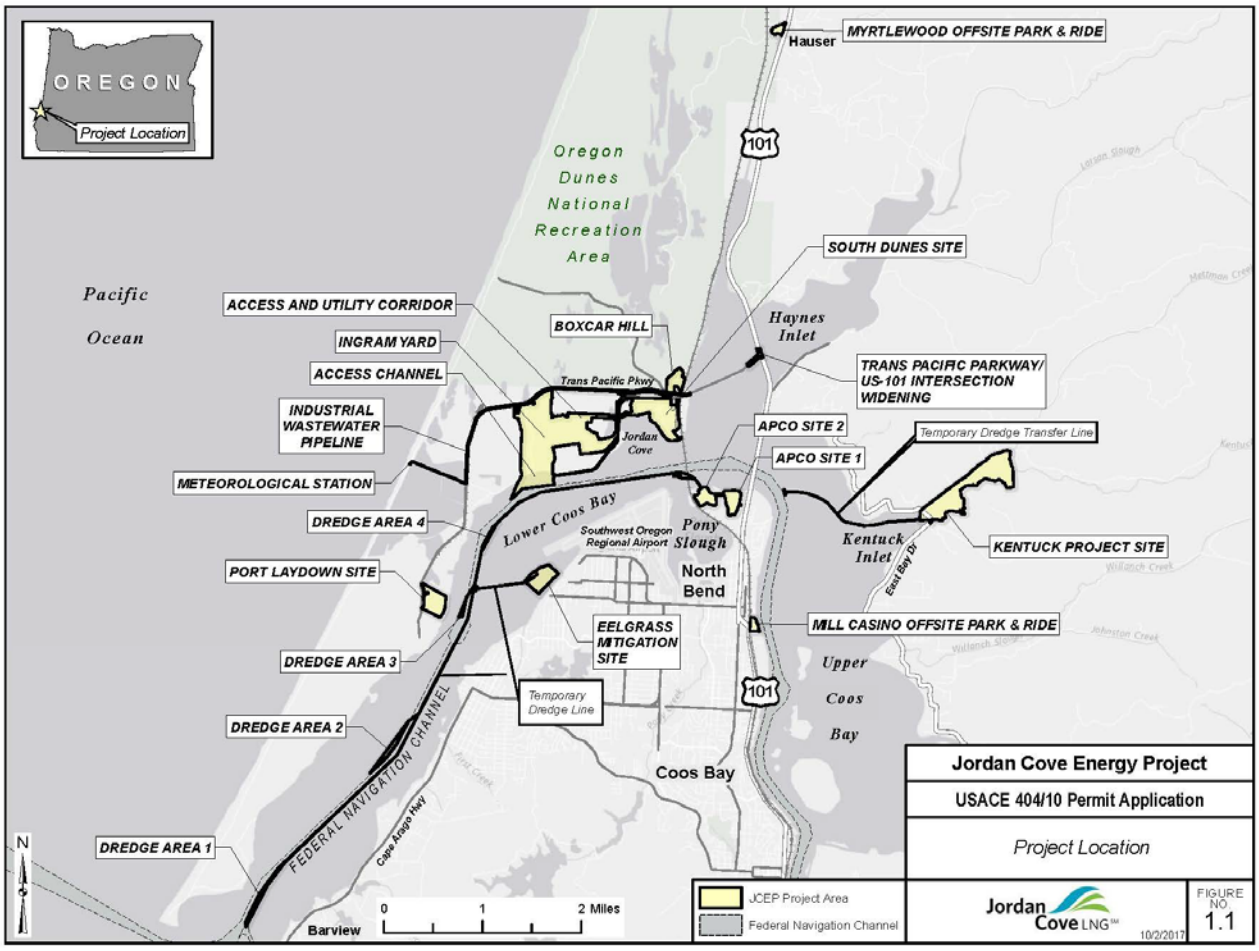
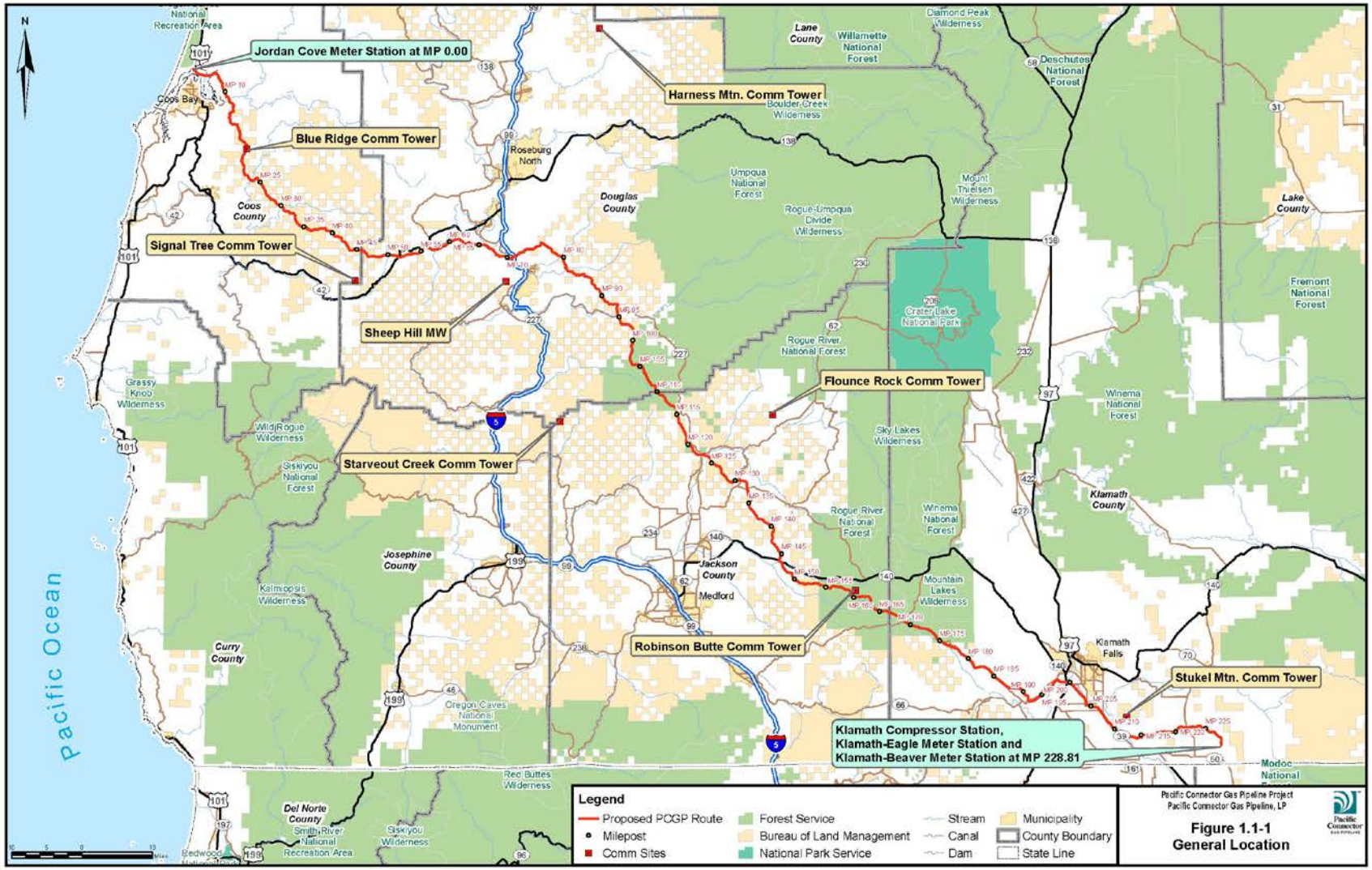


Figure 2: Pacific Connector Pipeline Alignment



2.5 Waters of the State Affected by the Project

2.5.1 Water Resources Affected by the Jordan Cove LNG Facility

Construction and operation of the Jordan Cove LNG Export Terminal would result in the temporary and permanent loss of estuarine and freshwater wetlands as well as alterations to those wetlands. In addition, the construction and operation of the Export Terminal would affect the Coos Bay estuary. A comprehensive accounting of wetland and water resources affected by the proposed action is presented in Section 6 of the Section 404/10 application to the US Army Corps of Engineers (NWP-2017-041).

2.5.2 Water Resources Affected by the Pacific Connector Gas Pipeline

Basins and watersheds affected by the proposed Pacific Connector gas pipeline are summarized in Table 1, below. The proposed pipeline would cross approximately 352 waterbodies (not including wetlands).

Table 1: Subbasins and Watersheds Crossed by the Proposed Gas Pipeline

Subbasins and Watersheds Crossed by Proposed Pacific Connector Pipeline

	Level 5 Watershed		
Subbasin	**Watershed Name**	**HUC a/**	**Miles Crossed b/**
Coos	Coos Bay- Frontal Pacific Ocean	1710030403	15.4
	South Fork Coos River c/	1710030401	2.0
Coquille	North Fork Coquille River	1710030504	11.5
	East Fork Coquille River	1710030503	9.7
	Middle Fork Coquille River	1710030501	15.8
South Umpqua	Olalla Creek-Lookingglass Creek	1710030212	8.8
	Clark Branch - South Umpqua River	1710030211	12.8
	Myrtle Creek	1710030210	8.9
	Days Creek - South Umpqua River	1710030205	19.2
	Elk Creek c/	1710030204	3.3
	Upper Cow Creek	1710030206	5.3
Upper Rogue	Trail Creek	1710030706	10.7
	Shady Cove - Rogue River	1710030707	8.1
	Big Butte Creek	1710030704	5.1
	Little Butte Creek	1710030708	32.9
Upper Klamath	Spencer Creek	1801020601	15.1
	John C. Boyle Reservoir - Klamath River-	1801020602	5.4
Lost River	Lake Ewauna-Upper Klamath River	1801020412	16.3
	Mills Creek - Lost River	1801020409	23.0
		Total	**229.1**

a/ Hydrologic Unit Code (USGS 1987).
b/ Total miles of watershed area crossed by the pipeline in each HUC, rounded to nearest tenth of a mile.
c/ There are no waterbodies crossed in these watersheds.

2.6 Documents Filed in Support of the JCEP Application

Jordan Cove submitted the following documents in support of their request for water quality certification:

May 22, 2018 – U.S. Army Corp Engineers Section 404/10 permit application (NWP-2017-014)

- US Army Corp Engineers Section 404/10 permit application materials (Oct. 23, 2017)
  - Additional Application Information to NWP-2017-041 (November 21, 2018)

- Section 401 Water Quality Package (February 6, 2018)
  Part 1: Jordan Cove Energy Project 401 Package
  Part 2: Pacific Connector Gas Pipeline 401 Package

- Additional Application Information to NWP-2017-041 (March 19, 2019).
- Responses to requests for additional information filed by DEQ on September 7, December 20, 2018, March 11 and March 13, 2019.

2.7 Public Notice(s) Issued by the Federal Licensing Authority

On May 22, 2018, the US Army Corps of Engineers publically noticed the receipt of a Section 404/10 application by the Jordan Cove LNG, LLC.[4] Corps' public notice also included a public notice of receipt of an application to DEQ for section 401 water quality certification pursuant to OAR 340-048-0032(1). The issuance date and public comment period for the applications were as follows:

Issue Date: May 22, 2018
Expiration Date: July 21, 2018
US Army Corps of Engineers No: NWP-2017-41

Following requests from the public, the Corps and DEQ extended the public comment period to August 20, 2019.

2.8 Land Use Determination by Local Planning Jurisdiction

An application for a 401 water quality certification is required to include land use compatibility findings for the activity prepared by the local planning jurisdiction (OAR 340-048-0020 (2)(i)(A)). The Project is located in the land use planning jurisdictions of Klamath County, Jackson County, Douglas County - noncoastal and coastal - sections, Coos County, City of Coos Bay, and the City of North Bend.

The JCEP supplied land use compatibility statements from Klamath County, Jackson County, Douglas County - coastal and non-coastal sections, Coos County, City of Coos Bay, and City of North Bend for the associated Pacific Connector pipeline and Jordan Cove Liquid Natural Gas Projects on January 28, 2019. DEQ found that the land use compatibility statements to be insufficient for various reasons (i.e., no determination of compatibility was made by the jurisdiction; land use approval had expired; and, in another case, an appeal was pending).

DEQ received additional information related to land use on April 30, 2019. This submission did not provide time for DEQ to evaluate it before making its 401 water quality certification decision.

Land use compatibility is addressed in more detail in Section 8 of this report.

2.9 Consistency with Other Requirements of State Law

Please refer to section 8 of this Evaluation and Findings Report.

[4] https://www.nwp.usace.army.mil/Missions/Regulatory/Notices/Article/1529167/nwp-2017-41/

3.0 Project Description

The Project consists of two distinct but interconnected parts: the Jordan Cove LNG Export Terminal, and the Pacific Connector Natural Gas Pipeline. Jordan Cove developed the Section 404/10 permit application in two sections to present each principle project component: Part 1 presents the Jordan Cove LNG Export Terminal; Part 2 presents the Pacific Connector Gas Pipeline. The following sections present descriptions of the proposed activities.

3.1 Jordan Cove LNG Export Terminal

The proposed Jordan Cove LNG export terminal would be located on the bay side of the North Spit of Coos Bay, Oregon. The export terminal and associated facilities (collectively, the "LNG Export Facilities") include the following components:

- LNG Export Terminal
- Slip and Access Channel
- Materials Offloading Facility
- Navigation Reliability Improvements
- Meteorological Station
- Industrial Wastewater Pipeline
- Trans Pacific Parkway / US 101 Widening
- APCO Sites 1 and 2
- Kentuck Site
- Eelgrass Mitigation Site
- Temporary Construction Areas

A complete description of the proposed action is presented in Section 6 of Part 1 of the Section 404/10 Permit Application filed by Jordan Cove with the Corps, and further described in Resource Report RR1 ("General Project Description") dated September 2017[5]. This report incorporates by reference the entirety of the proposed project as described in these documents and as summarized below:

LNG Terminal

The LNG Terminal includes all building infrastructure, machinery, utilities, and other project components associated with the receipt, liquefaction, storage, and loading of LNG onto ocean-going LNG carriers for export. The principle areas include the following:

- Ingram Yard – Includes LNG storage, loading, and export facilities.
- South Dunes Site – Includes temporary and permanent facilities including a Workforce Housing Facility, metering station, administrative building, and the Southwest Oregon Regional Safety Center.
- Access and Utility Corridor – A narrow corridor connects Ingram Yard with the Dunes site, which would provide temporary construction and permanent access roads and facilities, and would include the Fire Department Facility, underground utilities, and gas feed to the LNG Terminal.

Slip and Access Channel

Jordan Cove proposes a 38-acre marine slip for vessel loading. Jordan Cove proposes to excavate the marine slip from land that is currently upland area in the North Spit. To connect the Slip with the existing Coos Bay Federal Navigation Channel, Jordan Cove proposes to dredge about 22 acres of open water area. The Access Channel would be excavated to a depth of 45.21-feet MLLW with a 2-foot overdredge allowance and a 1.7-foot advance maintenance allowance (total depth of 48.91 feet MLLW, or 11.91-feet deeper than the authorized Federal

[5] Resource Report No. 1 General Project Description, Jordan Cove Energy Project September 2017. https://www.jordancovelng.com/pdf/FERC-Filing-Public-Only/JCEP/Volume-II-Public/RR1/2.1.1-JCEP-RR1.pdf

Navigational Channel depth at Channel Mile 7.3 near the proposed Project.[6]

Materials Off-Loading Facility
This area includes a permanent marine offloading facility for initial delivery of construction equipment, site construction, and future delivery of construction equipment related to facility maintenance.

Navigation Reliability Improvements
JCEP plans to excavate four submerged areas lying adjacent to the FNC to improve navigation efficiency and reliability for under broader weather conditions. The four NRI locations would require dredging approximately 700,000 cubic yards of sediment and the creation of disposal areas in the Coos Bay area.

Meteorological Station
Jordan Cove proposes to construct a new, permanent meteorological facility located on the west side of the lagoon on the North Spit. The facility would measure wind speed, direction, and other data to provide weather information to the LNG Terminal facility to support ship navigation.

Industrial Wastewater Pipeline
Relocation of an existing industrial wastewater discharge line near the Trans Pacific Parkway.

Trans Pacific Parkway and U.S. Highway 101Intersection Widening
Jordan Cove proposes to widen the intersection of the Trans Pacific Parkway and US-101 to provide safe ingress/egress during construction. The proposed widening would create a left-turn lane from Trans Pacific Parkway onto northbound US-101, and a right-turn lane from US-101 onto Trans Pacific Parkway.

APCO Sites 1 and 2
Jordan Cove proposes to utilize two land parcels on North Point, separated by a mudflat, for permanent placement of dredge material and temporary laydown of construction material.

Kentuck Project Mitigation Site
Jordan Cove proposes to mitigate for impacts to wetlands by restoring hydrologic and habitat function at the approximately 100-acre former golf course located adjacent to Kentuck Slough.

Eelgrass Mitigation Site
To mitigate for the permanent loss of eelgrass habitat due to dredging the Access Channel, Jordan Cove proposes to create a 9.3-acre eelgrass mitigation site near the offshore end of the North Bend Municipal Airport runway.

Temporary Construction Sites
Jordan Cove proposes to use additional sites outside of the immediate project construction footprint to provide space for construction staging, temporary equipment laydown, and employee park & rides. These areas include the Port Laydown site, Roseburg, Boxcar Hill, Myrtlewood and Ride and Mill Casino Park and Rides and APCO Site.

3.2 Pacific Connector Natural Gas Pipeline

Pacific Connector proposes to site, construct, and operate a 229-mile 36-inch diameter natural gas pipeline from interconnections with two existing interstate natural gas pipelines, the Ruby Pipeline and Gas Transmission Northwest LLC's GTN Pipeline, near Malin, Oregon, to the proposed Jordan Cove LNG Export Terminal near Coos Bay, Oregon. Part 2 of the Section 404/10 application filed with the Corps describes the proposed pipeline. The proposed action is further described in Resource Report RR1 ("General Project Description") provided as

[6] This depth would be consistent with the depth of the FNC that is proposed under the Port of Coos Bay Channel Modification, which is currently under consideration by the Corps. See, https://www.nwp.usace.army.mil/coast/coos-bay/channel-modification/ (last visited 5/3/2019).

Attachment A to the Corps' application. This report fully incorporates by reference the description of the proposed pipeline and associated facilities (collectively, the Applicant) presented in these two Corps' documents, which are briefly summarized below:

3.2.1 Pacific Connector Natural Gas Pipeline

Applicant is seeking to construct and operate a new 229-mile 36-inch diameter gas pipeline. The proposed pipeline would receive natural gas from interconnections near Malin, Oregon and deliver the gas to the Jordan Cove LNG Export Terminal near Coos Bay, Oregon. There, the natural gas would be liquefied, stored, and load onto vessels for transit to Pacific markets. The pipeline is expected to transport up to 1,200,000 decatherms per day (Dth/d) at 1600 psig and produce up to 7.8 million metric tons per annum (mtpa) LNG for export.

Over most of the alignment, the pipeline would occupy a 95-foot temporary easement during construction and a 50-foot permanent easement during operation. Applicant proposed exceptions to the width of both the operational and permanent easement to reduce impacts to areas such as wetlands and stream crossings. Applicant describes the proposed alignment of the Applicant gas pipeline in the Environmental Alignment Sheets, Appendix H.1 of Resource Report 1, which is incorporated herein by this reference.

3.2.2 Aboveground Facilities

Applicant proposes permanent infrastructure installations to support operation of the gas pipeline. Aboveground facilities proposed by Applicant are described in Section 1.1.2.3 of Resource Report 1, General Project Description, and summarized below.

Klamath Compressor Station

Applicant would locate the Klamath Compressor Station at MP 228.81 near the interconnection with the existing Ruby and Gas Transmission Northwest (GTN) pipelines. The compressor station includes two turbine-driven centrifugal compressor units providing 62,200 ISO[7] horsepower of compression and one similar 31,300 ISO horsepower compressor unit for backup compression operation.

Jordan Cove Meter Station

The Jordan Cove Meter Station would be located at the pipeline terminus on 1.72 acres of the Jordan Cove site adjacent to the LNG export terminal. A pig launcher/receiver and mainline block valve would be located within the meter station facility.

Launchers and Receivers

Pigging is the practice of using devices ("pigs") to conduct routing maintenance and inspection of pipeline interiors. Applicant would insert pigs at launching stations and transport these under pressure to a receiving station. Applicant proposes pig launching and receiving stations at each end of the pipeline. Applicant also proposes intermediate stations collocated with Block Valve Assemblies #6, #11 and #14 at MPs 71.51, 132.46 and 187.43.

Mainline Block-Valve Assemblies

Applicant proposes seven mainline block valves to isolate sections of the pipeline consistent with US Department of Transportation requirements and applicable guidance or rules by the Pipeline and Hazardous Materials Safety Administration. Applicant would automate five block-valves at intermediate locations along the alignment.

Communications Sites

Communications between the Klamath Compressor Station and the Jordan Cove Meter Station would require communication sites distributed along the pipeline alignment. Applicant expects fifteen communications locations are required including those located at the Klamath Compressor Station and the Jordan Cove Meter Station. Applicant is investigating leasing capacity from existing communications sites and building new facilities, as needed. Where feasible, new installations would be collocated with proposed aboveground facilities.

[7] International Organization for Standardization.

3.2.3 Land Requirements

Applicant describes the land required to construct and operate the proposed gas pipeline in Section 1.2 of Resource Report 1, General Project Description. DEQ incorporates this description by reference in this report. A summary of temporary and permanent land required for the project is presented in Table 2, below.

Table 2: Total Pipeline Land Requirements for Construction and Operation

Pipeline Component	Length (miles) or Number of Sites	Land Affected During Construction (acres)	Land Affected During Operation (acres)
Pipeline Facilities	229.09*	2,582.04	1,373.66[1] / 820.60
Temporary Extra Work Areas[2]	1,603	922.64	(44.80)[7]
Uncleared Storage Areas	320	676.44	0.00
Quarries & Disposal Sites	20	41.18	(41.18) [7]
Contractor and Pipe Storage Yards	36	674.17	0.00
Existing Roads Needing Improvements in Limited Locations [3]	32 Improvements (27 Roads)	22.52	(22.70)[9]
Temporary Access Roads	10	3.80	0.00
Permanent Access Roads	15	2.16[4]	2.16[4]
Aboveground Facilities	17	22.75[5]	22.75[6]
Total		**4,947.70**	**1,398.57[7, 8]**

* Because of changes in the centerline and associated MP equations, the ending MP no longer represents the actual centerline length.

[1] New permanent easement is 50-feet on private and federal lands.

[2] TEWAs are shown on the Environmental Alignment Sheets provided in Appendix H.1.

[3] Includes those existing roads requiring widening in specific locations; does not include limbing/brush clearing or blading/grading for potholes.

[4] Portions of the PARs are within the construction right-of-way and permanent easement.

[5] Construction impacts associated with the aboveground facilities are included in the construction impacts for the Pipeline facilities except the 8 potential communication tower sites and the Klamath Compressor Station, which are included here (1.61 acres and 17.14 acres, respectively).

[6] Portions of the operational impacts of the aboveground facilities are included within the permanent easement acreage.

[7] Represents TEWAs, existing quarries, and rock source and disposal sites provided in Table A.8-4 that may be used as permanent storage areas. The acreages are not included in the overall operational total because the storage areas will not be used during operation of the Pipeline.

[8] Although the improvements will not be reclaimed, these road improvements are not needed for operations, and the acres are not included in the total operational acreage.

Source: Pacific Connector Gas Pipeline Project, Resource Report 1

3.3 Port of Coos Bay Proposed Channel Deeping Project

The Oregon International Port of Coos Bay is proposing modifications to the lower Coos Bay Federal Navigation Channel to deepen, widen and lengthen the channel (the "Port Channel Deepening Project").[8] The Port Channel Deepening Project would expand the existing channel from -37' depth and 300' width to -45' depth and 450' width from the channel entrance to river mile 8.2, just beyond the Jordan Cove LNG Export Terminal. The Port Channel Deepening Project is not included in the activity under consideration for this 401 WQC sought by Jordan Cove. Jordan Cove did not request that DEQ consider the effects of the proposed deepening of the Federal Navigation Channel in the section 401 evaluation for the JCEP. According to Jordan Cove and the U.S. Coast Guard, the JCEP could function without the Port Channel Deepening Project, although the timing and (potentially) the overall volume of vessel traffic would likely be different.

[8] https://www.portofcoosbay.com/channel-deepening

Jordan Cove requires a depth of -45 feet to accommodate the expected class of LNG carriers with a minimum 10-percent under-keel clearance while ships are in dock. Because the draft of these vessels exceeds the present depth of the Federal Navigation Channel, these vessels cannot fully utilize the channel on all tides. Further, the Port Channel Deepening Project is largely dependent on JCEP as a source of financing for the proposed work. The Federal Energy Regulatory Commission is considering the cumulative effects of the Channel Deepening Project together with the effects of the proposed LNG Export Facilities.[9] In the event that Jordan Cove resubmits an application for certification, DEQ requests that the analysis being performed for FERC (or the Corps, or other similar information) be included in the submittal to DEQ given the likelihood that if the JCEP becomes operational, the Channel Deepening Project is also likely to occur. Information that DEQ currently holds shows that there could be cumulative effects on salinity and dissolved oxygen. The significance of these effects has not been fully analyzed at this time.

4.0 Water Quality Standards

Water quality standards are comprised of three elements. These include the beneficial uses that must be protected, the water quality criteria intended to protect those uses, and an antidegradation policy that is designed to prevent worsening existing water quality. To support all beneficial uses, DEQ applies numeric and narrative criteria to specific waterbodies and reaches within those waterbodies. OAR 340, Division 41 contains Oregon's water quality standards including beneficial uses, policies, and criteria. This section of the Evaluation and Findings Report identifies the beneficial uses designated within the area of the proposed Project and the narrative and numeric criteria established to protect those uses.

[9] FERC DEIS, at 4-793.

4.1 Beneficial Uses

Table 3 identifies designated beneficial uses within the area of the proposed Project.

Table 3: Designated Beneficial Uses

	South Coast		Umpqua		Rogue			Klamath	
Beneficial Use	**Estuaries and Adjacent Marine Waters**	**All Streams and Tributaries Thereto**	**South Umpqua River Main Stem**	**All Other Tributaries to Umpqua, North and South Umpqua Rivers**	**Rogue River Main Stem From Estuary to Lost Creek Dam**	**Rogue River Main Stem above Lost Dam and Tributaries**	**All Other Tributaries to Rogue River and Bear Creek**	**Klamath River from Klamath Lake to Keno Dam**	**Lost River and Lost River Diversion Channel**
Public Domestic Water Supply		X	X	X	X	X	X	X	X
Private Domestic Water Supply		X	X	X	X	X	X	X	X
Industrial Water Supply	X	X	X	X	X	X	X	X	X
Irrigation		X	X	X	X	X	X	X	X
Livestock Watering		X	X	X	X	X	X	X	X
Wildlife and Hunting	X	X	X	X	X	X	X	X	X
Fishing	X	X	X	X	X	X	X	X	X
Boating	X	X	X	X	X	X	X	X	X
Water Contact Recreation	X	X	X	X	X	X	X	X	X
Aesthetic Quality	X	X	X	X	X	X	X	X	X
Hydro Power		X	X	X		X	X	X	
Commercial Navigation and Transportation	X				X			X	
Fish and Aquatic Life	X	X	X	X	X	X	X	X	X

4.2 Numeric and Narrative Criteria

Oregon has adopted numeric and narrative criteria to support designated beneficial uses. DEQ's biologically based numeric criteria identify minimum conditions necessary to support life-stage histories of sensitive aquatic receptors such as salmonids. DEQ further implement numeric criteria through basin-specific rules that reflect regional water quality requirements. DEQ uses Oregon's narrative criteria to identify goals, practices and objectives to prevent degradation of water quality characteristics necessary to support all beneficial uses.

Section 305(b) of the Clean Water Act requires that states bi-annually assess the status of water quality. Water bodies that do not provide full support for designated beneficial uses are included on a list of impaired water bodies as required by Section 303(d) of the Clean Water Act. Impaired water bodies cannot assimilate additional pollution. DEQ is required to develop Total Maximum Daily Loads for impaired segments of water bodies to reduce pollution loading with the objective of attaining compliance with numeric and narrative criteria. In water bodies that are on the 303(d) list, where no TMDL has yet been adopted, new discharges may be allowed only if it is demonstrated that they would not increase the applicable pollutant load or that any such increase is mitigated.

4.3 Antidegradation Policy

Oregon's antidegradation policy (OAR 340-041-0004) applies to all surface waters. Oregon's antidegradation policy complements the use of water quality criteria. While numeric criteria provide the minimum conditions

needed to protect designated uses, antidegradation extends protection to waters whose characteristics meet or exceed minimum criteria. The policy prohibits degradation of water quality in some circumstances and provides for exceptions in others; however, the policy allows the lowering of water quality only after a systematic decision-making process considering many factors. These factors include the waterbody classification, consideration of alternative treatments, and a comparison of economic and social benefits with environmental costs. In addition, the antidegradation policy requires the involvement of the public through direct notice and through coordination with other government agencies. In this way, DEQ makes decisions to maintain or to change current water quality only after a deliberate and inclusive process. The goal of the antidegradation policy is to prevent unnecessary further degradation of water quality and to protect, maintain, and enhance the quality of existing surfaces waters to ensure the full protection of all existing beneficial uses

5.0 Proposed Actions Included in this 401 Analysis

Sections 3.1 and 3.2 of this Evaluations and Findings Report summarize the activities that are considered in this 401 WQC. These sections describe, in more detail, the methods and activities proposed by Jordan Cove and Pacific Connector to construct and operate the Jordan Cove Energy Project.

5.1 Pipeline Construction

Pipeline construction procedures are described in Section 1.3 of Pacific Connector's Resource Report 1 and are summarized below.

The 229-mile proposed pipeline alignment extends from the Jordan Cove LNG Export Terminal in Coos Bay to interconnections with existing pipelines near Malin, Oregon. Typical construction steps include surveying and staking the alignment, clearing and grading, trenching for pipe installation, pipe assembly, pipe placement and backfilling, hydrostatic testing, and site restoration. Because of the geographic scope of the project, Applicant anticipates performing pipeline construction in at least five construction spreads.

Applicant proposes to construct the pipeline generally within a 95-foot wide temporary construction right-of-way. To reduce impacts to water bodies or other sensitive areas the construction corridor, Applicant proposes to reduce the construction right-of-way width to 75 feet when it is sited through wetlands and waterbodies. Applicant anticipates pipeline construction would require an additional 922 acres of temporary extra work areas adjacent to the construction right-of-way to accommodate temporary storage of timber, slash, soil, rock, material and other construction-related equipment.

Applicant expects to exceed the minimum pipeline burial depths required by US Department of Transportation in 49 CFR 192.327. Where possible, JCEP would install the pipeline up to 36-inches deep in Class 1 areas with normal soils and 24-inches deep in Class 1 areas with consolidated rock. Applicant may consider deeper burial depths at stream crossings based on site conditions and concerns about erosion or scour potential.

Applicant proposes a significant portion of the alignment in rugged mountainous areas of Oregon's Coast Range and Cascade Range. A portion of the alignment traverses the Tyee Core Area with in the Coast Range. This area is characterized by steep slopes, erosive soils, rapidly moving landslides, and deep-seated landslide activity. During routing of the Pipeline, Applicant generally aligned the pipeline along ridgelines, where feasible, to minimize cut and fill requirements, traversing steep slopes, and conflicts with other potential geologic hazards. However, in numerous areas the pipeline must descend and ascend steep slopes to cross stream valleys.

5.2 Waterbody Crossings

The proposed 229-mile pipeline would affect approximately 352 waterbodies (not including wetlands). Of these, 69 have been identified as perennial streams and 270 as intermittent streams. The pipeline route would also affect some ponds and ditches, and the Coos Bay estuary. For intermittent streams that are not flowing at the time of construction, Applicant proposes standard overland construction techniques consistent with FERC national guidelines. Applicant expects to bury the top of the pipe to at least five feet below the streambed at all crossings.

For most streams that are flowing at the time of construction, Applicant proposes to use one of three dry open cut crossing methods. These methods temporarily divert the flowing stream around the crossing location to allow construction to proceed in a dewatered work area. Dry open-cut techniques include:

Diverted Open-Cut

Applicant proposes a diverted open-cut for the eastern (second) crossing of the South Umpqua River at about MP 94.7. This is the only crossing where a diverted open-cut is proposed. Applicant would achieve this crossing by diverting the river's flow into half of the channel while work is performed on the opposite half. Upon completion, flow would be routed to the opposite side of the channel to complete the installation. Applicant prepared a site-specific plan for crossing the South Umpqua River at MP 94.7.39. The river is approximately 125 wide at this location.

Fluming and Dam-and-Pump Techniques

Both fluming and dam-and-pump techniques rely on diverting upstream flow around the work area. Fluming systems use gravity flow through a series of pipes, while dam-and-pump techniques use mechanical pumps to transfer flow around the isolated work area. Both are generally used on crossings under 100 feet in width. These techniques require the temporary installation of an upstream and downstream dam to isolate the work area and create a pool of water to be diverted, as well as a dewatering system to remove water from the active work area. Details of the waterbody crossing techniques proposed by Applicant are described further in Section 2.2.5 of Resource Report 2.

Direct Pipe

Direct Pipe is a trenchless technology that provides a continuously supported hole during installation. Direct Pipe installations use an articulated, steerable micro-tunnel boring machine mounted to the leading end of the pipe or casing. Applicant would use bentonite slurry to increase lubrication and advance the micro-tunnel boring machine. Direct Pipe uses lower internal pressures and eliminates the reaming and pullback requirements of a horizontal directional drill. Applicant provides an overview of Direct Pipe technology in Appendix J.2 of Resource Report 2 including a report on the proposed direct pipe crossings beneath Interstate I-5, Dole Road, a railroad, and the South Umpqua River at MP 71.30.

Horizontal Directional Drill

Applicant proposes to install the pipeline using trenchless, horizontal directional drilling techniques beneath two sections of the Coos Bay Estuary (MP 0.3–1.0 and MP 1.5–3.0), three major waterbodies (Coos River at MP 11.1R; Rogue River at MP 122.7; and Klamath River at MP 199.4). HDD installations require establishing a pilot hole along the drill path and enlarging the hole with successive passes of a reaming tool until Applicant can install the pipe . During drilling and reaming operations, Applicant would advance high pressure drilling fluid consisting of bentonite slurry through the drill pipe. Return fluid flows back through the annular space to the maintain borehole and provide lubrication. Maintaining proper pressure within the borehole is critical. Low pressure can cause the installation to seize. However, internal drilling pressures exceeding the resistive overburden forces can cause escape of drilling fluids to the overlying waterway.

5.3 Construction and Maintenance of Roads

Access to the pipeline right-of-way during construction and operation would require the use of existing access roads, the construction of new temporary and permanent access roads, and transportation of equipment within the construction and permanent right-of-ways. Roads under heavy loads represent a significant potential source of sediment input to hydrologically connected streams.

Applicant has identified over 660 miles of existing access roads that it would use to access the pipeline during construction.[10] These include roads on federal, municipal and private lands. Applicant identifies numerous miles of these existing access roads as gravel, dirt, rock, and pit run surfaced roads. Applicant has not provided a field inventory of these roads to ensure a realistic understanding of upgrades and/or best management practices that would be needed to prevent sediment runoff to receiving streams.

Applicant is also proposing the new construction of approximately 25 segments of Temporary Access Roads and Permanent Access Roads to connect the construction right-of-way with existing access roads identified above. Lastly, Applicant would use a 229-mile construction access road in the construction right-of-way to allow construction equipment and vehicles to perform trenching and pipeline construction activities. Temporary Access Roads and Permanent Access Roads must be designed, built and maintained according to minimum design standards to prevent sediment discharge during pipeline construction.

5.4 Permanent Pipeline Right-of-Way

JCEP would maintain a permanent easement for the long-term operation and maintenance of the pipeline. The permanent easement would occupy approximately 1,374 acres based on the proposed 50-foot width. Applicant would control the vegetation in 30-feet of this 50-foot permanent easement as described below. To allow access along the right-of-way for inspections and maintenance, Applicant would maintain the permanent easement in an herbaceous state within a 10-foot corridor centered on the pipeline. In addition, Applicant would maintain vegetation in a small shrub and herbaceous state within 5 feet beyond the 10-foot corridor described above. Applicant would not alter the revegetated area beyond 15 feet of the pipeline centerline.

Development and maintenance of the permanent easement would alter surface hydrology within the permanent right-of-way. To manage post-construction stormwater and groundwater flow beneath the pipeline, Applicant proposes to install permanent erosion control devices including of trench breakers, slope breakers or waterbars, and perform revegetation measures to permanently stabilize disturbed areas. DEQ recognizes stormwater runoff from permanently maintained portions of the Project right-of-way as potential sources of pollution to hydrologically connected streams and waterways. This Evaluations and Findings Report evaluates the effectiveness of BMPs and controls proposed by the JCEP to reduce the impact on water quality of stormwater from the permanent right-of-way.

5.5 Terminal and Off-Site Project Area Stormwater

DEQ requires a post-construction stormwater management plan from applicants for section 401 water quality certifications if the project will add or reconstruct impervious surface areas.[11] On September 7, 2018, DEQ requested JCEP prepare and submit a post-construction stormwater management plan developed according to DEQ's March 2018 guidelines. The plan must address proper management of process chemicals, spill containment controls, best management practices, and a maintenance schedule for engineering controls.

Applicant must also address the discharge of stormwater from off-site areas. DEQ also recognizes that stormwater discharges from these areas may contact off-site placement of dredged material causing sediment discharge, turbid

[10] Table A.8-1 (Access Road Table), Part 2, Appendix B, Section 404 Permit Application

[11] Post-Construction Stormwater Management Plan Submission Guidelines. DEQ, March 2018.

flows, and decant water (i.e., leachate) to public waters. For freshwater wetlands, the discharge of saline decant water can alter aquatic species composition. This Evaluations and Findings Report evaluates the effectiveness of BMPs proposed by the JCEP to reduce the impact on water quality of stormwater from Terminal and Off-Site Project Area stormwater.

5.6 Jordan Cove LNG Terminal Dredging

JCEP proposes to dredge portions of the North Spit of Coos Bay to construct its LNG Export Terminal. The principle areas include the marine slip, and access channel connecting the slip to the existing Federal Navigation Channel, and four areas abutting the current boundary of the navigation channel between RM 2 to RM 7 (figure 2.1-1). Dredging would modify the physical morphology of the channel, by widening four turns along the channel, to allow for more efficient transit of LNG carriers. The proposed dredging would be sloped to an angle of three feet horizontal to one foot vertical (3:1). The access channel and slip would have a depth of 45 feet (deeper than the current navigation channel, which is currently maintained at 37 feet). The proposed dredging would generate approximately 6.32 million cubic years of material. Dredged material would be used to elevate the proposed LNG Terminal facilities, and disposed of at a combination of other sites including Roseburg Forest Products, the Al Pierce Company (APCO), and at Kentuck slough (a 140-acre wetlands mitigation site). The Project would require ongoing maintenance dredging as well as the initial dredge operations.

6.0 Water Quality Compliance Evaluation

6.1 Statewide Narrative Criteria

6.1.1 Applicable Standard

Oregon Administrative Rule 340-041-0007 contains Oregon's statewide narrative criteria, which supplement Oregon's numeric water quality standards and Oregon's antidegradation policies. In pertinent part, this rule provides that:

(1) Notwithstanding the water quality standards contained in this Division, the highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels. * * *

(7) Road building and maintenance activities must be conducted in a manner so as to keep waste materials out of public waters and minimize erosion of cut banks, fills, and road surfaces. * * *

(11) The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry may not be allowed.

6.1.2 DEQ Evaluation

6.1.2.1 Pipeline construction

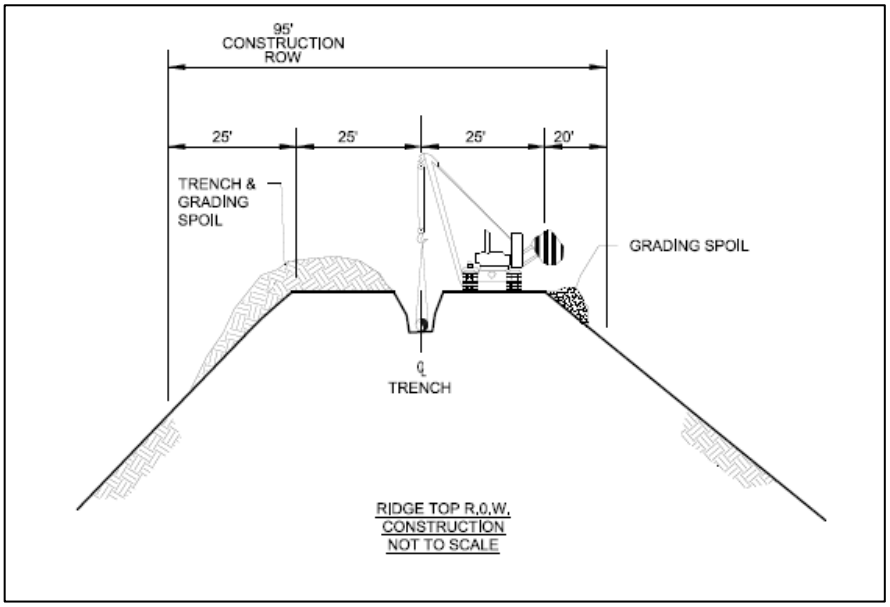
JCEP's proposed development of the construction right-of-way does not exhibit the highest and best controls and does not demonstrate that these improvements would minimize the erosion of and discharge of inorganic and organic debris, turbid flows, and sediment from cut banks, fills, and road surfaces. As noted above, pipeline construction necessitates the development of a construction right-of-way (ROW) including a construction access road for trenching and pipe laying equipment and Temporary Extra Work Areas (TEWAs) for construction staging and for storing equipment, material, and construction overburden. In developing the construction ROW, JCEP proposes to clear all trees and shrubs in this ROW. The width of this vegetation clearing would be 95 feet and

narrow down to 75 feet through wetlands and waterbody crossings. The development of TEWAs would increase the 95 foot width in upland areas and near streams and wetlands. In upland areas, JCEP would limit stump removal to the trench line and areas where grading is necessary to construct a safe, level working plane.[12] In the TEWAs, JCEP would store equipment and materials as well construction overburden (i.e., rock, soil, slash) for disposal or reuse.

The grading to level the surface in the ROW and TEWAs would include grading on steep slopes and ridgetops as depicted in Figure 3 below (Drawing Number 3430.34-X-0018).[13] This schematic is not drawn to scale as noted and does not reflect site-specific loads (trench/grading spoil and fill from leveling) placed on steep and potentially unstable slopes from the removal of rock and soil from ridgetops.

Although not delineated on JCEP's Environmental Alignment Sheets (Resource Report 1, Appendix H.1) or discussed in their Erosion Control and Revegetation Plan, typical drawings for right-of-way cross-sections in Resource Report 1 clearly show the use of a construction access road in the right-of-way. Without a durable surface, the soil in this corridor would experience compaction during the construction of the right-of-way, and during the trenching for pipe installation. The resulting soil compaction would increase runoff and, subsequently, erosion of native soils via rill and gully erosion without additional BMPs for the construction access road surface.

Figure 3: Schematic of Ridgetop Right-of-Way



JCEP has not provided BMPs for the 229-mile construction access roadway in the form design standards, specifications, and measures necessary to support the anticipated traffic load.[14] For example, design standards would inform the construction of the road surface based on estimated traffic load. Design manuals are available that provide BMPs for a stabilized construction roadway where displacement of soil occurs due to vehicle traffic.[15,]

[12] Pacific Connector Gas Pipeline. 2018. *Right-of-Way Clearing Plan for Federal Land*. Appendix E, Plan of Development Report U. Section 401 Water Quality Package

[13] Pacific Connector. 2017. *Erosion Control and Revegetation Plan*.

[14] Federal Highway Administration. 2000. *Gravel Roads – Maintenance and Design Manual*. U.S. Department of Transportation Local Transportation Assistance Program.

[15] State of California Department of Transportation. 2003, *Construction Site Best Management Practice Field Manual and Troubleshooting Guide*. CTSW-RT-02-007

[16] During a rain event, a durable unpaved road surface is essential to prevent fine soil particles from migrating to the road surface under truck traffic. Once on the road surface, stormwater entrains this soil during wet weather transporting it to swales (e.g., zero order streams), first order streams (e.g., bedrock hollows), and to streams. With the proposed pipeline alignment traversing 117 miles of steep slopes and 94 miles of severe erosion potential soils, careful selection of BMPs and the application of treatment methods are essential for water quality protection.

Construction access road design standards and specifications as well as design drawings should also guide construction of the 229-mile access road drainage system and the treatment controls for its discharge. These standards and specifications and their inclusion in design plans would influence the selection of discharge points that direct stormwater discharge to structural stormwater treatment controls or vegetated areas with permeable soils.

To avoid initiating a landslide on the extensive area of unstable slopes along the pipeline ROW, JCEP must identify the location of discharge points for concentrated stormwater flow from swales and channels collecting this runoff. In the sections below, DEQ documents the potential water quality impacts to streams that would likely result from discharges of stormwater to landslide prone slopes, as well as from the placement of fill or spoils on such slopes. JCEP has not provided specific designs for the construction access road stormwater management system adjacent to steep slopes (>30%) and landslide susceptibility zones. Rather, in Section 4.1 of the proposed ECRP, JCEP proposes a list of temporary erosion control BMPs for the construction ROW that DEQ evaluates below.

Construction Right-of-Way BMPs

JCEP would use temporary slope breakers (i.e., water bars) to prevent rill and gulley erosion when construction stormwater discharges from the ROW, the 229-mile construction access road, and the non-working side of the ROW. If properly spaced, slope breakers may effectively serve as a runoff control, preventing rill and gully erosion in the construction ROW and construction access road. However, JCEP has not provided information on how JCEP would ensure their proper function under anticipated traffic loads. Without additional design considerations, this traffic would compact the berm of the slope breaker and modify the excavated channel form, potentially modifying its flow path (see Resource Report 1, Drawing Number 3430.34-X-0008). Stormwater moving out of slope breaker and back onto the ROW would form rill and gully erosion and potentially affect the proper function of downstream temporary slope breakers.

Stormwater with suspended sediment from the construction ROW and construction access road would collect in the excavated channel in front of each slope breaker and would flow towards a discharge point. JCEP has not provided DEQ with specific information demonstrating that there are BMPs, for example, to prevent (1) rill and gully erosion from concentrated flow at discharge points and (2) sediment discharge from exposed soil to zero order streams. Zero order streams refer to swales such as bedrock hollows and are an integral part of stream networks serving as conduits to first order streams.[17] JCEP has not provided DEQ with information on the distance between the discharge point of slope breakers and other erosion control BMPs and zero order streams. Moreover, JCEP has not demonstrated that it would avoid stormwater discharge to areas of landslide susceptibility connected to zero order streams as discussed below in more detail. JCEP's proposed construction ROW would place grading spoils and, if needed, fill to level working surface. Construction of the pipeline appears likely to discharge stormwater to these landslide susceptibility zones commonly referred to convergent headwalls, as exhibited in Figure 4 below. As discussed in more detail and supported below, research and technical manuals indicate that adding water and weight to unstable slopes should be avoided during design of linear infrastructure projects.

In Section 4.1.4 of the ECRP, JCEP proposes to use mulch (i.e., effective ground cover). The application of mulch to exposed soil is an effective BMP presuming stormwater run-on controls are in place to prevent stormwater from

[16] Nevada Department of Transportation. 2004. *TC-2: Stabilized Construction Roadway*. Storm Water Quality Handbooks

[17] Gomi, Takashi, Roy C. Sidle, and John S. Richardson. 2002. *Understanding Processes and Downstream Linkages of Headwater Systems*. Bioscience, Volume 52(10): 905-916

mobilizing the mulch in runoff as discussed by Burroughs (1990). JCEP states that it would use this BMP when permanent stormwater controls such as reseeding and permanent slope breakers installed on the operational ROW are delayed beyond 20 days. During wet weather, exposed soil is subject to splash erosion initiating runoff and the potential for rill and gully erosion carrying sediment to streams. The criteria of a 20-day delay in installing permanent controls places water quality at risk. During wet weather, absent applying mulch to exposed soils within the construction ROW and control run-on to these mulched areas where construction activity is not occurring or planned in the immediate future, excessive sediment is likely to reach streams. Moreover, on its Environmental Alignment Sheets, JCEP has not delineated the travel ways into and within TEWAs or selected a durable surface for these travel way as a source control for these exposed soil surfaces. As discussed in construction stormwater manuals from California and Nevada cited above, durable surfacing for construction travel ways is a typical BMP that was not addressed in JCEP's erosion control planning.

To control sediment discharge from the 229-mile construction access road and construction right-of-way, JCEP proposes to use a silt fence parallel to the ROW. The construction ROW with its construction access road on ridgetops above steeps slopes has numerous adjacent areas with zero order streams that would serve as a channel carrying sediment from the ROW to first order streams. For areas of concentrated flow such as a swale, a silt fence is not designed to treat concentrated flow nor treat silt or clays deeper than sheet or overland flow.[18, 19] Additionally, according to the U.S. Environmental Protection Agency cited above, a silt fence has limits on the drainage area it can treat. In its submittal, JCEP provides no evaluation for the drainage area for silt fences, and does not identify alternative means of managing flow where a silt fence is inadequate. Sediment discharge overland within 200 feet of a waterbody *or a swale connected to a waterbody* has the potential to discharge sediment to this water body.[20, 21] JCEP appears to have limited its analysis to roadways and other land disturbances within 200 feet of a perennial or intermittent stream.[22]

[18] Minnesota Stormwater Manual. *Sediment Control Practices – Check Dams (Ditch Checks, Ditch Dikes)*

[19] Washington State Department of Ecology. 2017. BMP CW233: Silt Fence. Stormwater Management Manual for Western Washington

[20] Brake, D.M., Molnau, and J.G. King. 1997. *Sediment Transport Distances and Culvert Spacing on Logging Roads with the Oregon Coast Mountain Range*. Presented at the 1997 Annual Internationa ASAE Meeting Mineapolis, NM. Paper No. IM-975018

[21] Megahan, W.F. and G.L. Ketcheson. 1996. Prediction Downslope Travel of Granitic Sediments from Forest Roads in Idaho. Water Resources Bulletin Volume 32, No. 2, pages 371-382

[22] See, e.g., DEIS at 4-101.

Figure 4: Examples of Convergent Headwalls

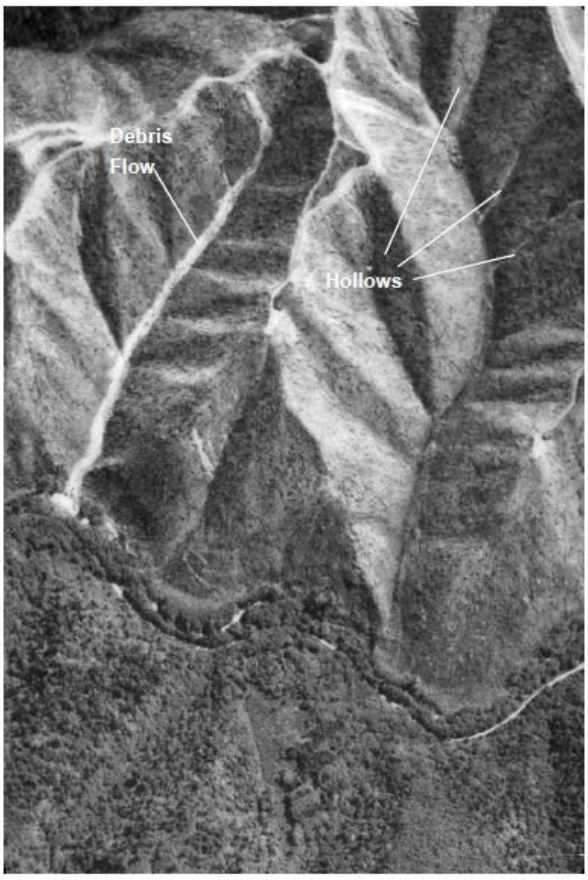


Figure 4a. Aerial View of a High Density of Bedrock Hollows in the Central Oregon Coast Range. This photo graph also shows a landslide in a bedrock hollow, triggered by a logging road, that transformed into a debris flow that deposited sediment into a larger stream. Source: Benda, Lee, Curt Veldhuisen, Dan Miller, Lynne Rodgers Miller. 1998. *Slope Instability and Forest Land Managers – A Primer and Field Guide*. Earth Systems Institute

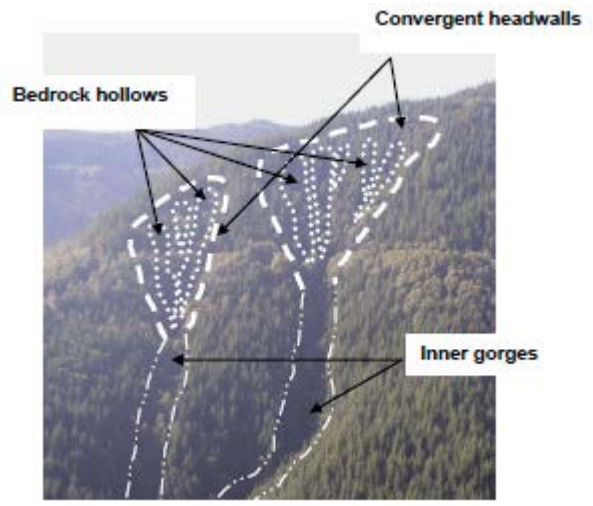


Figure 4b. Common hillslope relationship: bedrock hollows in convergent headwalls draining to inner gorges (photo and drawing by Jack Powell, DNR 2003). Source: Washington Department of Forestry. 2000. *Part 4. Characteristics of Unstable and Potentially Unstable Slopes and Landforms*. Forest Practices Board Manual

JCEP may also use biobags, straw wattles, and slash filter windrows to control sediment discharge from the construction ROW. According to the Minnesota and Washington manuals referenced above, check dams constructed of biobags and straw wattles are only moderately effective in trapping sediment and preventing channel erosion if properly spaced. Moreover, when used in a drainage swale according to the Minnesota manual, they provide only a secondary design benefit. Therefore, their application requires primary controls such as durable construction access road surfacing, stormwater management to avoid concentrated flows as well as other source controls. Additionally, JCEP would use slash filter windrows as a perimeter control for the construction right-of-way as indicated on JCEP's Environmental Alignment Sheets.

Slash filter windrows are typically placed on a contour at the toe of constructed road fill slopes to intercept sediment.[23] The research shows these windrows can reduce sediment leaving a fill slope by 75 to 85 percent

[23] Washington Department of Forestry. 2000. Forest Practices Board Manual

indicating that JCEP would need additional best management practices in a treatment train.[24] However, the literature does not indicate these controls are effective and designed for treating concentrated flows in rills, swales, and drainage channels arising from construction areas. JCEP has not provided information showing that forest slash when placed on soil surfaces dissected with rills, swales, and natural drainage channels would provide a continuous "seal" along the soil surface. Such a seal at the surface assures that a control measure for sheet runoff would trap suspended sediment. This seal at the soil surface may be achieved with a properly installed straw wattle countersunk into the soil. However, the rigid structure of forest slash would leave depressions from rills, swales, and channels below the windrow providing a path of least resistance for runoff and the sediment it carries.

In the Tyee Core Area, for example, JCEP proposes to place slash filter windrows below fill and spoils storage on headwalls. For example, in Drawing Number 3430.29-006 (Sheet 6 of 226) in the Environmental Alignment Sheets, JCEP proposes to use windrows on the border of the construction ROW where fill and/or grading spoils would be placed. JCEP would locate these windrows in a zero order stream below steep headwalls located along Pipeline Mileposts 8.56 to 8.75 (see Figure 5). These windrows and their construction stormwater discharged are directly connected to zero order streams (i.e., bedrock hollows) and, ultimately, first order streams. Absent supporting evidence demonstrating that the application of a slash filter windrow, by itself, is effective erosion control for these sensitive areas serving as conduits for first-order streams, DEQ finds this proposed method is insufficient to prevent violations of water quality. Additional information is required to demonstrate how construction stormwater would be managed above these sensitive areas.

As discussed above, JCEP proposes to use temporary slope breakers to concentrate and channel stormwater away from the construction ROW and construction access road. According to Burroughs (1990), research shows that rills and gullies resulting from concentrated road surface discharge reduces the effectiveness of mulch treatments on fill slopes and carries sediment long distances below these slopes. Burroughs (1990) also documents that uniform drainage from the road surface minimizes erosion on the fill slopes. In areas of steep slopes, JCEP is proposing to use temporary slope breakers (i.e., water bars) that – depending on its discharge point – would concentrate stormwater discharge onto fill slopes above slash filter windrows. These slash filter windrows are intended to manage sheet flow on fill slopes rather than concentrated flow from a temporary slope breaker.

In its December 20, 2018 supplemental information request, DEQ requested that JCEP use modeling to evaluate the efficacy of its proposed construction ROW BMPs to ensure JCEP is providing the highest and best treatment controls (see Page 1 – 2 of Attachment A). DEQ believes this modeling is essential to determining consistency with Oregon's statewide narrative water quality standard given the prevalence of steep slopes and zero order streams in close proximity to the construction ROW.[25] Models such as the Revised Universal Soil Loss Equation Version 2 (RUSLE2) are designed to evaluate the efficacy of BMPs proposed for concave, convex, and uniform slopes as well as cut and fill slope scenarios.[26] Practitioners of soil conservation have used versions of this model for decades. Moreover, Wisconsin requires comparable modeling for construction sites as a demonstration of compliance with a sediment performance standard.[27] JCEP has not performed an evaluation using RULSE2 or a comparable model to identify the most effective suite of BMPs given the site-specific conditions and constraints associated with its proposed activities.

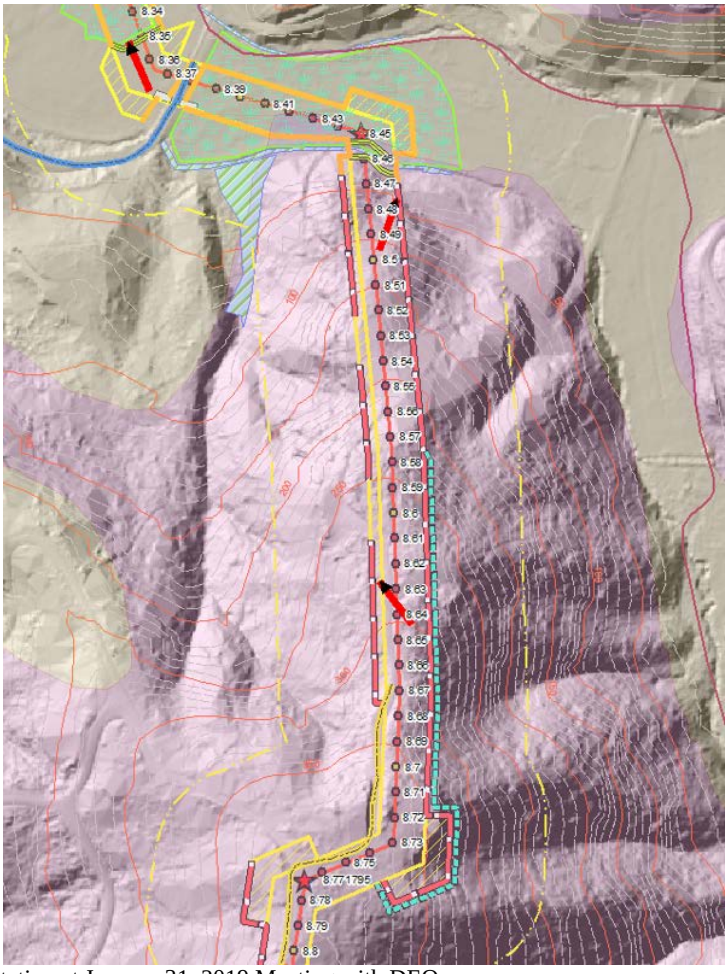
[24] Burroughs, E.R., Jr. 1990. *Predicting Onsite Sediment Yield from Forest Roads*. Proceeding of Conference XXI, International Erosion Control Association. Erosion Control: Technology in Transition. Washington, DC.

[25] See Attachment A, Page 1 and 2 of DEQ's December 20, 2018 Supplemental Information Request.

[26] USDA Natural Resource Conservation Service. Revised Universal Soil Loss Equation Version 2

[27] State of Wisconsin. 2017. *Construction Site Soil Loss and Sediment Discharge Calculation Guidance*. Bureau of Watershed Management Program Guidance, Wisconsin Department of Natural Resources. EGAD Number: 3800-2017-03

Figure 5: Spoil Placement on Headwalls for Construction ROW and TEWA 8.72-W between MP 8.56 – 8.75



Source: Pacific Connector Presentation at January 31, 2019 Meeting with DEQ.

Construction ROW Along Unstable Slopes

JCEP has not provided specific engineering drawings for its stormwater management system for the construction ROW and the 229-mile construction access road in areas of steep slopes and landslide susceptibility zones discussed below. JCEP is proposing to place grading spoils and, potentially, fill to level working surfaces, on geologically unstable slopes to support the 95-foot construction ROW including the Temporary Extra Work Areas (TEWAs). JCEP's Geologic Hazard Maps show geologically unstable slopes such as mapped landslides and rapidly moving landslide hazard areas in close proximity to the construction ROW.[28] The Oregon Department of Geology and Mineral Industries (DOGAMI) has documented landslide hazards in Oregon and, as discussed below, developed peer-reviewed procedures for identifying site-specific landslide hazards.[29] For example, the Tyee Core Area in Oregon's Coastal Range is an area of high landslide activity including both shallow and deep-seated landslides. The proposed pipeline traverses the Tyee Core Area from approximately Milepost 6 to 55. Research and technical references on slope stability are clear that land managers should avoid adding water or weight to unstable slopes and

[28] Appendix F, Geologic Hazards Maps for Pacific Connector Gas Pipeline. Part 2: Appendix C, Resource Report 6

[29] Oregon Department of Geology and Mineral Industries. Landslide Hazards in Oregon. State of Oregon

avoid cutting into unstable slopes without appropriate geotechnical engineering.[30, 31, 32, 33, 34] Oregon has seen other linear infrastructure development (i.e., roads, pipelines) initiate landslides, particularly in the Oregon coast range (State Highway 20, and Coos County Natural Gas Pipeline).[35]

Depending on the landslide type and proximity to streams, landslides can deposit substantial amounts of organic and inorganic debris into streams impacting the aquatic life dependent on these streams. Although landslides are a natural geomorphic process for streams in the Coast and Cascade Ranges, human-caused debris torrents affect water quality by changing the natural cycles of sediment delivery to stream systems.[36] For this reason as well as public safety, the Oregon Department of Forestry issued rules and technical guidance under the Oregon Forest Practice Act. The goal of these rules is to ensure forest operations such as road use and building do not initiate landslides.[37] As discussed in DEQ's December 20, 2018 supplemental information request (see Pages 13 and 19 of Attachment A), the Oregon Department of Forestry uses the Forest Practices Act rules to comply with Oregon water quality standards.[38] OAR 629-625-0200 provides that "operators shall avoid locating roads on steep slopes, slide areas, high landslide hazard locations, and in wetlands, riparian management areas, channels or floodplains where viable alternatives exist." OAR 629-625-0310(2)-(4) provides that "(2) operators shall end-haul excess material from steep slopes or high landslide hazard locations where needed to prevent landslides[;] (3) Operators shall design roads no wider than necessary to accommodate the anticipated use[;] (4) Operators shall design cut and fill slopes to minimize the risk of landslides[;] (5) Operators shall stabilize road fills as needed to prevent fill failure and subsequent damage to waters of the state using compaction, buttressing, subsurface drainage, rock facing or other effective means. Similarly, OAR 629-625-0330 includes other direction on management of drainage from forest land roads.

In the December 20, 2018 supplemental information request, DEQ provided JCEP with the basis for its concerns about slope stability along the ROW and the potential for pipeline ROW construction and ROW stormwater discharge to initiate landslides (see Pages 68 – 79 of Attachment A). DEQ also requested that JCEP use one of three slope stability models to objectively identify landslide risk areas and guide the siting of stormwater discharge points from slope breakers (i.e., water bars), the siting of grading and trench spoil storage, and design of fill on landslide susceptibility zones within or adjacent to the ROW. In preparation for a January meeting to discuss DEQ's comment, JCEP provided DEQ with several preliminary responses to DEQ's information request. These responses included a reference to a summary of JCEP's evaluation of slope stability in siting the pipeline alignment. DEQ's review of JCEP's landslide hazard assessment as presented in Resource Report 6 on Geologic Resources is summarized below.

---

[30] Benda, L.E., Veldhuisen, C., Miller, D.J., and Rodgers-Miller, L. 2000. Slope instability and forest land managers: A primer and field guide. Seattle, Wash., Earth Systems Institute

[31] State of Washington. Forest Practices Board Manual. Section 16 Guidelines for Evaluating Potentially Unstable Slopes and Landforms

[32] Sidle, R.C. 1985. *Factors Influencing the Stability of Slopes*. Proceedings of a Workshop on Slope Stability: Problems and Solutions in Forest Management. USDA Forest Service. General Technical Report PN W-180

[33] Seaward, J.H. and T. Blackwood. 1998. Loading-induced Slope Failures on Bedding Planes in Sedimentary Geology of the Central Oregon Coast Range. In: Burns, S. (Editor), Environmental, Groundwater and Engineering Geology: Applications from Oregon. Belmont, California. Pages 497 – 506

[34] Hearn, G.J. 2011. Slope Engineering for Mountain Roads. Geological Society Engineering Geology Special Publication No. 24

[35] Hofmeister, R.J., D. J. Miller, K.A. Mills, J.C. Hinkle, A. Beier. 2002. Hazard Map of Potential Rapidly Moving Landslides in Western Oregon. GIS Layer for Local Governments in Implementation of Senate Bill 12. Interpretive Map Series IMS-22. Oregon Department of Geology and Mineral Industries

[36] Castro, Janine and Frank Reckendorf. 1995. Effects of Sediment on the Aquatic Environment: Potential NRCS Actions to Improve Aquatic Habitat. Working Paper No. 6. USDA Natural Resources Conservation Service

[37] Oregon Department of Forestry. 2003. *High Landslide Hazard Locations, Shallow, Rapidly Moving Landslides and Public Safety*: Screening and Practices. Forest Practice Technical Note Number 2

[38] Memorandum of Understanding between the Oregon State Department of Environmental Quality and the Oregon State Department of Forestry. April 16, 1998

Identification of Shallow Landslide Susceptibility

In Section 4.5.1 of Resource Report 6 (Geologic Resources), JCEP presents their three-phase methodology for a landslide hazard evaluation. Phase I involved an office review of geologic maps and publications, county and state hazard maps, Natural Resource Conservation Services soil surveys, topographic maps, LiDAR hillshade models, and stereo aerial photographs. Phase II involved an aerial reconnaissance, and Phase III involved a surface reconnaissance. In Section 4.5.2, JCEP clarifies its statements of risk in the landslide hazards evaluation report for Resource Report 6. For JCEP's hazard evaluation, risk only evaluated the potential for damage or failure of the pipeline from earth movements. JCEP's landslide hazard evaluation did not consider the risk of pipeline construction and operation initiating a landslide impacting water quality.

In Section 4.5.3.1, JCEP recognizes that rapidly moving landslides typically occur on steep slopes within zero order stream basins. In this section, JCEP notes that these landscape features can fail and generate a debris torrent that travels great distances along defined stream channels such a zero order streams and first order streams. DEQ provides examples of this type of unstable landscape feature in Figure 4 above.

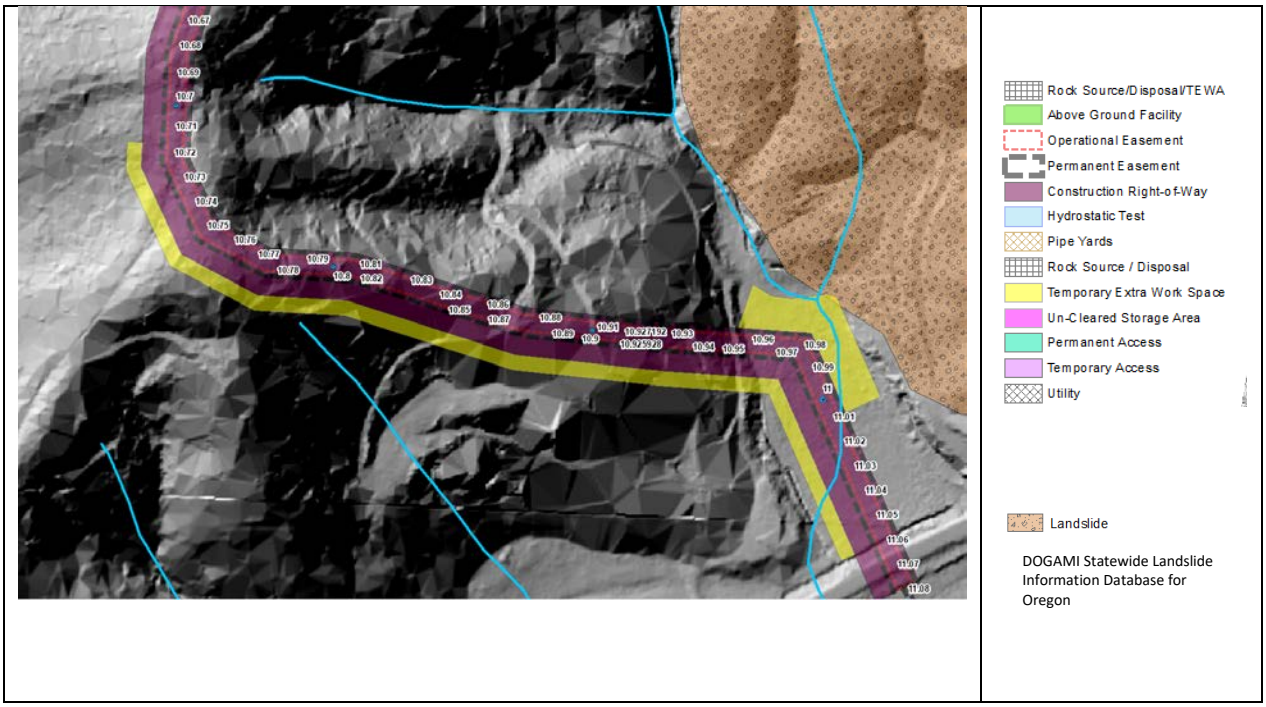
In the January 31, 2019 meeting to discuss the September 7, 2018 information request, JCEP presented a segment of the pipeline overlay on a Light Detection and Ranging Map (see Figure 5). This LiDAR map segment clearly shows the working side of the construction ROW with its construction access road and Temporary Extra Work Area above three headwalls (i.e., unstable slopes). As discussed above, these areas would support trenching and grading spoils and may require fill to level this working surface. The weight of the fill and/or trench and grading spoils, the anticipated traffic loads, and the stored material in combination with additional runoff due to the lack of a forest canopy present a substantial water quality risk to streams as well as a risk to worker and public safety.

Given its concern about slope stability above zero order streams, DEQ requested and received in February 2019 the LiDAR shapefiles used in their landslide hazard evaluation. DEQ performed a preliminary review of the LiDAR maps in a sample section of the Tyee Core Area and found many areas of concern. Two of these areas are illustrated below in Figures 6 and 7. DEQ searched for site-specific geo-engineering measures for fills and cuts on unstable slopes in information provided to-date by JCEP but found this information lacking as noted in DEQ's December 20, 2018 supplemental information request (see Page 70 – 73 and 75 to 79 of Attachment A).

Given the proposed placement of trench and grading spoils and, potentially, fill placed on the rapidly moving landslide risk area from Pipeline Milepost 8.56 to 8.75 (see Figure 5), DEQ reviewed Table B-3a in Resource Report 6 as a quality assurance check on JCEP's Phase I landslide hazard evaluation. Table B-3a summarizes the sites investigated in JCEP's Phase II field reconnaissance. In its review of this table, DEQ determined that JCEP did not include the area from between Milepost 8.56 to 8.75 in its field data collection and risk assessment. JCEP also did not conduct a surface reconnaissance for the areas of concern featured in Figures 6 and 7. Given this, DEQ referenced the methodology for identifying moderate and high rapidly moving landslide (RML) risks in Resource Report 6 as described below.

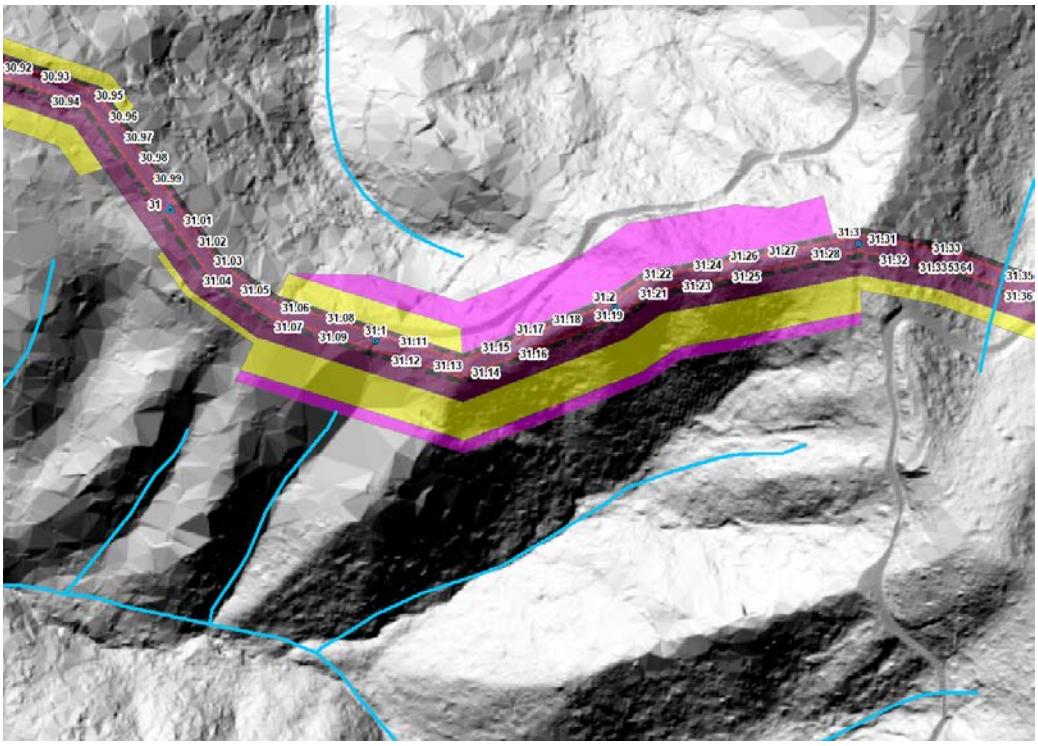
On Page 31 in Section 4.5.3.2 of Resource Report 5 (Geologic Resources), JCEP indicates it used LiDAR, 10-meter DEM, and aerial photography to identify moderate and high RML sites. This section provides the risk criteria JCEP used to identify the RML sites selected for surface reconnaissance and included in Table B-3a. JCEP's selection criteria was to identify the potential for a RML to induce strain on the pipeline and for RML erosion to expose a pipeline. These two selection criteria would not ensure the identification of RML sites posing a risk to streams and water quality. The above quality assurance check confirmed DEQ's concerns presented in the December 20, 2018 information request that JCEP's landslide hazard evaluation did not consider the landslide hazard risks to streams initiated by the construction and operational ROW.

Figure 6: Fill Placement on Headwalls for Construction Right-of-Way and TEWA 10.71-W MP 10.78 – 10.87



Source: LiDAR and pipeline ROW data from Pacific Connector

Figure 7: Fill Placement on Headwalls for Construction Right-of-Way and TEWA 31.06-W MP 31.07 – 31.28.


Source: LiDAR and pipeline ROW data from Pacific Connector

Landslide Hazard Evaluation

DEQ consulted with the Oregon Department of Geology and Mineral Industries (DOGAMI) to identify an accepted methodology for evaluating landslide susceptibility. DOGAMI provided DEQ with protocols for inventorying existing landslides, for mapping shallow landslide susceptibility, and for mapping deep-seated landslide susceptibility.[39] While regional studies of published landslide information such as DOGAMI's State Landslide Information Database for Oregon can be useful as a screening tool, in areas of high potential risk DOGAMI recommends a site-specific landslide evaluation.

For site-specific landslide hazard evaluations, DOGAMI considers the method in Special Paper 42 (SP-42) as state-of-the-practice.[40] To evaluate this protocol, DOGAMI compared remote sensing data for effectiveness in a pilot study.[41] Findings from this study indicate the use of LiDAR data resulted in 3 to 200 times the number of landslides identified compared to regional studies using already published information. A SP-42 landslide inventory results in an Arc-GIS format geodatabase of landslide data including landslide type, size, scarp height, estimated depth to failure plane, and confidence of identification. As noted below, the results from an inventory using this protocol support the identification of shallow-landslide and deep-seated landslide susceptibility zones to complete a landslide hazard assessment.

Using the SP-42 inventory, DOGAMI recommends following the procedure in Special Paper 45 (SP-45) to identify shallow landslide susceptibility maps.[42] DOGAMI is using this procedure to produce standardized shallow landslide maps for areas in Oregon. Use of a SP-45 map to identify shallow landslide susceptibility zones is necessary to reduce landslide risk through planning and engineering. For identifying deep-seated landslide susceptibility zones, DOGAMI recommends following the procedure in Special Paper 48 (SP-48).[43] Using the site-specific landslide inventory from SP-42, the procedure in SP-48 can assist in identifying and mitigating existing deep-seated landslides and slopes. The use of SP-42 in conjunction with SP-45 and SP-48 ensures identification of all the sites within and along the pipeline ROW where geo-engineering controls are needed to prevent spoil storage, cuts, and fills from pipeline construction and stormwater discharge from initiating landslides depositing organic and inorganic debris into streams.

BMPs to Mitigate Landslides

As discussed above and supported by references, JCEP's proposed activities create a significant risk of sediment transport to both perennial and intermittent streams. In Section 4.6.1 of Resource Report 6 (Geologic Resources), JCEP identifies two primary ways that pipeline construction methods would reduce slope stability and create a risk of sediment transport. Those are deep excavation perpendicular to the slope (i.e., creating a cut across a slope), and capturing and concentrating stormwater along the ROW and discharging this stormwater to potentially unstable slopes. Placing fill on a headwall is a third way that pipeline construction would reduce slope stability.

In Section 4.6.2 of Resource Report 6, JCEP states that it would engineer fill slopes constructed at gradients of 30 percent or greater to ensure long-term slope stability. JCEP states that it would identify side-slope ROW construction segments on steep slopes during the final design phase for this project. In its December 20, 2018 supplemental information request, DEQ reviewed and noted the deficiencies in the conceptual BMPs with regard to JCEP's Erosion Control and Revegetation Plan (see Pages 76 – 77 of Attachment A).

[39] Wang, Yumei. March 20, 2019. Email to Chris Bayham Regarding DOGAMI SLIDO Data.

[40] Burns, William, J and Ian P. Madin. 2009. *Protocol for Inventory Mapping of Landslide Deposits from LiDAR Imagery*. Special Paper 42. Department of Geology and Mineral Industries. State of Oregon

[41] Burns, W.J. 2007. Comparison of Remote Sensing Datasets for the Establishment of a Landslide Mapping Protocol in Oregon. AEG Special Publication 23: Vail, Colorado, Conference Presentations. First North American Landslide Conference

[42] Burns, W.J., Ian P. Madin, and Katherine A. Mickelson. 2012. *Protocol for Shallow-Landslide Susceptibility Mapping*. Special Paper 45. Department of Geology and Mineral Industries. State of Oregon

[43] Burns, William J and Katherin A.Mickelson. 2016. Protocol for Deep Landslide Susceptibility Mapping. Special Paper 48. Department of Geology and Mineral Industries. State of Oregon

In Section 4.6.2.1 of Resource Report 6, JCEP references its Erosion Control and Revegetation Plan for BMPs to manage surface water and groundwater near unstable slopes. For BMPs to address stormwater near steep slopes, JCEP identifies the use of temporary and permanent slope breakers (i.e., water bars). As discussed above in this Evaluation and Findings Report, slope breakers concentrate stormwater in an excavated channel in front of a berm (see Resource Report 1, Drawing Number 3430.34-X-0008). Runoff would substantially increase after JCEP removes the forest and shrub canopy and herbaceous vegetation. During construction and for several years post-construction, the drainage area for each temporary slope breaker is the 95-foot wide construction ROW and the 100 feet of ROW to the next temporary slope breaker based on FERC's spacing requirements. JCEP has not provided DEQ with the location of the discharge points for the concentrated flow in temporary slope breakers near unstable geologic features. Without additional BMPs near unstable slopes, temporary slope breakers increase the likelihood for this discharge to reduce slope stability identified by JCEP and highlighted above.

Without more developed information about the extent of areas of landslide risk and BMPs, DEQ is unable to determine what engineering controls for the design and construction of the pipeline are both feasible and reasonably likely to succeed in keeping waste materials out of public waters and minimizing erosion of cut banks, fills, and road surfaces. DEQ also is unable to determine whether JCEP can or would utilize the highest and best practicable treatment and/or control of wastes, activities, and flows so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels. As a result, DEQ concludes that it is unable to determine that JCEP's proposed activities would be conducted in a manner that would not violate the statewide narrative criteria in OAR 340-041-0007.

6.1.2.2 Waterbody Crossings

JCEP's proposal to install a pipeline across streams does not exhibit the highest and best controls, does not demonstrate that these improvements would minimize the erosion of and discharge of inorganic and organic debris, turbid flows, and sediment from cut banks, fills, and road surfaces. Pipeline construction would affect about 352 waterbodies.[44] JCEP would install the pipeline below the stream bed of waterbodies using either trenchless methods (conventional bore, horizontal directional drill, or Direct Pipe® technique) or dry open–cut methods (diverted open cut, fluming, dam-and-pump) techniques. An evaluation of the potential water quality impacts of these waterbody crossing procedures is provided below.

Trenchless Waterbody Crossings – Horizontal Directional Drill

JCEP proposes to use the horizontal directional drill method for two crossings under the Coos Bay Estuary (MPs 0.3–1.0 and 1.5–3.0) and crossings of three major waterbodies (Coos River at MP 11.1R; Rogue River at MP 122.7; and Klamath River at MP 199.4). DEQ describes the horizontal directional drill method in section 5.2 of this report. JCEP prepared a HDD Feasibility Report that includes geotechnical engineering, recommendations, and HDD design criteria for the three proposed HDD river crossings. The report also includes a feasibility analysis of completing a HDD crossing beneath Coos Bay estuary. However, JCEP's consultant states that the "* * *feasibility evaluation of the proposed Coos Bay East HDD is based on limited subsurface data. Our conclusions should be considered preliminary pending completion of a subsurface exploration program. Resource Report 2, Appendix G.2. The feasibility analysis generally finds a low risk of drilling fluid releases. However, at the east end of the crossing approaching Kentuck Slough there is a high risk of hydraulic facture and drilling fluid surface release. Resource Report 2, Appendix G.2., at 9. The evaluation identifies potential mitigation for this risk, but it is unclear what specific mitigation measures JCEP is currently proposing.

On March 11, 2019, DEQ requested additional information to confirm the proposed HDD routes beneath the Coos

[44] There is some inconsistency between FERC's DEIS, DEIS at 2-60, which states that the pipeline would cross 352 waterbodies and Pacific Connector Gas Pipeline Resource Report 2, Appendix 2/A.2-2. September 2017, which provides that the number of crossings would be 326. DEQ has not, as this time, been able to determine the reason(s) for the discrepancy, and uses the more recent figure of 352 from the FERC DEIS here.

Bay estuary, the drilling fluid containment plans, the response procedures, and other information. As of the date of preparation of this report, DEQ had not received formal responses to this request. It is possible that some or all of this information was included in the materials submitted to DEQ on April 30, 2019. However, the timing of that submission did not provide any meaningful opportunity for DEQ review. Accordingly, because the available information evaluated to-date does not adequately characterize the proposed activities and mitigation measures, or the potential effects on water quality, DEQ cannot conclude there is a reasonable assurance that the proposed HDD crossings of the Coos Bay estuary would be conducted in a manner that would not violate the statewide narrative criteria in OAR 340-041-007.

Open Cut Waterbody Crossings

JCEP would perform dry open-cut crossing procedures at most waterbody crossings that are flowing at the time of construction (conventional trenching would be used to cross intermittent streams without flow). Both fluming and pumping methods rely on isolating a stream section with temporary dams, dewatering the work area, and bypassing flow around the isolated work area. Upon completion of pipeline installation activities JCEP proposes to restore waterways and embankments using the restoration and revegetation procedures discussed in the Erosion Control and Revegetation Plan.

The following proposed actions of the JCEP are evaluated for compliance with the Statewide Narrative Criteria:

Stream Crossings and Restoration:

To reduce impacts, JCEP proposes to complete these stream crossings in dewatered areas isolated from normal streamflow using temporary dams. JCEP's Stream Fluming Procedures and Dam and Pump Procedures describe the method for removing the flume upon completion. Upon removal, JCEP expects that short-term turbidity "could increase considerably" as the "streambed flushed clean of sediments left over from construction".[45, 46] DEQ has identified three waterbody crossings that are listed on the DEQ's 2012 303(d) list as impaired for sedimentation (S. Fork Little Butte Cr., MP 162.45; Spencer Cr. MP 171.07; Clover Cr. MP 177.76). In these particular areas, any increase in sediment loading is prohibited, at least until completion of a Total Maximum Daily Load that includes an allocation for the proposed activity, or until completion of an implementation plan that demonstrates that increased loading would be avoided. Under a Clean Water Act Section 404 Permit, DEQ would allow limited duration turbid discharges, but only if the project applies all practicable turbidity controls to minimize these discharges. JCEP's proposed methodologies include dewatering of construction areas, and dewatering and removal of temporary dams. JCEP has not presented how it would minimize sediment and turbid discharges during these activities.

DEQ's information request dated March 11, 2019, requested specific waterbody construction and restoration plans for stream crossings involving an open trench cut. These plans are necessary to demonstrate that JCEP has considered all construction concerns and constraints, restoration design alternatives, and selected the highest and best treatment alternatives to minimize pollution discharge in compliance with provisions of Oregon's Statewide Narrative Criteria. The importance of careful, detailed, site-specific planning for pipeline crossing construction and stream restoration is well-documented in the construction of the Ruby Pipeline. In the Ruby Pipeline project, a team of experts developed an approach to minimize impacts at 849 stream crossings.[47] DEQ's March 11, 2019 information request is consistent with the approach used in the Ruby Pipeline project.

Detailed construction planning is important for water quality protection. For example, on steep unstable slopes, a dewater structure can saturate the area round the structure creating a positive soil pore pressure. A positive soil pressure can destabilize a slope causing a small slope failure that discharges a debris flow into a stream. In addition, on steep slopes, spoils from trenching can discharge sediment to the stream if JCEP does not properly site

[45] September 2017. Stream Fluming Procedures. Pacific Connector Gas Pipeline. Appendix C.2 Resource Report 2

[46] September 2017. Dam and Pump Procedures. Pacific Connector Gas Pipeline. Appendix D.2 Resource Report 2

[47] Castro, J.M., A. MacDonald, E. Lynch, and R. Thorne. 2014 *Risk-based Approach to Designing and Reviewing Pipeline Stream Crossings to Minimize Impacts to Aquatic Habitats and Species*. River Research and Applications

these spoils and prevent the decant water with suspended sediment from discharging into the stream. In fact, on page 10 of JCEP's Stream Fluming Procedures, the drawing in Figure 8 of these procedures show turbid discharges of decant water from spoils placed on the construction access road and right-of-way discharging into the stream channel. This would constitute a violation of DEQ's NPDES 1200-C General Construction Stormwater Permit. Moreover, documenting and restoring the bankfull width and depth is important to avoid aggradation in front of the crossing or stream incision below the crossing.[48] DEQ has not yet received the requested plans. For this reason, DEQ cannot determine at this time that there is a reasonable assurance that the proposed action would be conducted in a manner that would not violate OAR 340-041-0007(1).

Dewatering Discharge:
JCEP describes general procedures for dewatering work areas during dry open-cut waterbody crossings. These methods rely on upland containment areas to promote sediment settling and infiltration of the turbid discharge. JCEP expects to site these structures in areas that can infiltrate the overflow from the dewatering structure into the surrounding area.

Discharging water to upland areas can locally saturate shallow soils causing slope failure and mass movement. DEQ identified several crossing locations where existing terrain and soil conditions may cause slope instability. For example, the pipeline alignment crosses Steinnon Creek at two locations, at MP 20.02BR, and 24.32BR. Steinnon Creek is a Level 0 stream and is upstream of spawning and rearing habitat for Endangered Species Act (ESA) listed Coho salmon. In Table B.3-4, JCEP notes steep topographic conditions for this reach near Milepost 20.20BR. Roering et al. (2005) and JCEP's Geologic Hazard Map (see Figure 5 of 47) identify contrasting steep and dissected terrain and a bench-like, low gradient form adjacent to this reach suggesting remnants of a deep-seated landslide and therefore an unstable slope. Steinnon Creek is crossed again at MP 24.32BR using a dry open cut procedure. The slopes adjacent to this crossing are landslides 126 and 127 identified from the Department of Geology and Mineral Industries Open File Report. JCEP has not provided DEQ with the proposed location of each dewater structure and the number of these structures for each crossing. JCEP has not presented the maintenance schedule for these dewater structure. DEQ noted additional crossing locations characterized by aquatic habitat value and steep, potentially unstable hillsides.[49]

The pipeline alignment is located in portions of the Tyee Core Area of the Oregon Coast Range characterized by steep hillsides and shallow rapidly moving landslides. To reduce the risk of landslides, the Oregon Department of Forestry recommends not discharging water or placing material on or near headwall areas. JCEP's general waterbody crossing procedures do not include site-specific information necessary to conclude that JCEP would would site and operate the dewatering structures to prevent turbid discharge, sediment discharge, and debris flows into streams. On March 11, 2019, DEQ requested information on dewatering procedures, spoil placement locations and monitoring procedures. DEQ requests this information to confirm that dewatering activities would not cause turbid discharge, sedimentation, or a discharge of organic or inorganic deposits to receiving waters as prohibited by Oregon's Statewide Narrative Criteria. DEQ has not received responses from JCEP. For this reason, DEQ also cannot find reasonable assurance that the proposed activities would be conducted in a manner that would not violate OAR 340-041-0007(1) and (11).

6.1.2.3 Road Construction and Maintenance

During pipeline construction, JCEP proposes to improve and maintain several hundred miles of existing access roads. Pipeline construction would also require the development of 25 segments of Temporary Access Roads and Permanent Access Roads. JCEP proposes to decommission the Temporary Access Roads after pipeline construction is complete, while the Permanent Access Roads would remain in use during pipeline operation. Oregon's Statewide Narrative Criteria include measures to prevent or minimize the discharge of pollutants from impacting waterbodies.

[48] Simon, Andrew, Sean J. Bennett, and Janine M. Castro. 2011. *Stream Restoration in Dynamic Fluvial System: Scientific Approaches, Analyses, and Tools*. Geophysical Monograph 194. American Geophysical Union, Washington, DC

[49] See waterbody crossings at mileposts 34.46, 44.21, 55.71, 55.90, 55.94, 56.28, 56.34, 57.11, and others.

DEQ's evaluation of the anticipated effects of JCEP's road maintenance and construction is presented below.

Existing Access Roads

JCEP proposes to use approximately 660 miles of existing access road to construct the pipeline. JCEP identifies numerous miles of these existing access roads as gravel, dirt, rock, and pit run surfaced roads. As presented on Drawing Number 3430.31-Y-Map 1 through 34 of the submittal, many of these access roads traverse steep slopes and landslide hazard areas that are in close proximity to zero order streams discussed above.

During wet weather, the existing roads would experience traffic loads moving heavy equipment, logs, and construction overburden (e.g., soil, rock, slash) during the preparation for and the construction of the pipeline. Unpaved roads require careful attention to the selection of construction design and maintenance standards to support their anticipated traffic loads. Proper selection of design standards for road surfaces prevent the failure of these surfaces under traffic loads. Heavy traffic on unstable road surfaces can result in sediment discharge to streams during wet weather. [50, 51]

JCEP would use both existing privately-owned and public access roads to clear trees from the construction right-of-way, Temporary Extra Work Areas, and other areas necessary for building and operating the pipeline. Tree harvesting on non-federal lands would require compliance with Oregon's Forest Practices Act (FPA) rules. Oregon Department of Forestry (ODF) administers these FPA rules. FPA rules regulate road construction and maintenance on privately owned roads during forest harvesting operations in wet weather. [52, 53, 54] ODF uses the FPA rules to ensure forest operations comply with water quality standards such as OAR 340-041-0007(1), (7), and (11). [55]

Maintenance Standards for Public and Private Roads

Tree harvesting and pipeline construction would also require compliance with road construction and maintenance standards for the U.S. Department of Agriculture Forest Service and U.S. Department of Interior Bureau of Land Management. These Forest Service and BLM standards include potential BMPs that could help assure compliance with the Statewide Narrative Criteria for road building and maintenance. These construction and maintenance standards would also help asssure compliance with the turbidity water quality standard discussed in Section 6.10 of this report. When DEQ lists waterbodies as water quality limited (not meeting standards) on the Clean Water Act 303(d) list, these two federal agencies develop Water Quality Restoration Plans (WQRP) to guide Forest Service and BLM actions to protect water quality standards. [56, 57, 58] In its December 20, 2018 supplemental information request, DEQ provided JCEP with an example WQRP for the South Umpqua. This WQRP identified roads as a source of sediment from erosion (see Page 43, Attachment A).

---

[50] Grace III, J.M. and Clinton, B.D. 2007. Protecting Soil and Water in Forest Road Management. USDA Forest Service/University of Nebraska-Lincoln Faculty Publication Volume 50(5):1579-1584. 2007 American Society of Agricultural and Biological Engineers ISSN 0001-2351

[51] Furniss, M.J., T.D. Roelofs, and C.S. Yee. 1991. *Road Construction and Maintenance*. American Fisheries Society Special Publication 19:297-323

[52] Oregon Department of Forestry. 2003. *Wet Weather Road Use*. Forest Practice Technical Note Number 9

[53] Oregon Department of Forestry. 1999. *Road Maintenance*. Forest Practices Technical Note Number 4

[54] Oregon Department of Forestry. 2003. *Installation and Maintenance of Cross Drainage Systems on Forest Roads*. Forest Practice Technical Note Number 8

[55] Memorandum of Understanding between the Oregon State Department of Environmental Quality and the Oregon State Department of Forestry. April 16, 1998

[56] *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters* (May 1999, Version 2.0)

[57] Memorandum of Understanding Between United States Department of Interior Bureau of Land Management and the State or Oregon Department of Environmental Quality to Meet State and Federal Water Quality Rules and Regulations. BLM Agreement Number BLM-OR930-1702

[58] Memorandum of Understanding Between State of Oregon Department of Environmental Quality and the USDA, Forest Service Pacific Northwest Region. OMB 0596-0217, FS-1500-15

In addition, in this supplemental information request, DEQ provided JCEP with example requirements from the Forest Service regarding road maintenance (see Page 30 of Attachment A). These Forest Service requirements stem from the Forest Service Handbook and provide JCEP with water quality BMPs in the form of design and maintenance standards for unpaved roads on federal forestlands. In its October 25, 2018 response to DEQ's September 7, 2018 information request, JCEP referred DEQ to Table A.8-1 in Part 2 of Appendix B of it submittal. In DEQ's December 20, 2018 supplemental information request, DEQ reviewed Table A.8-1. In its review, DEQ highlighted the lack of information on maintenance treatments and needed road improvements in this table (see Page 41 – 42 of Attachment A).

Once tree harvesting is complete, JCEP proposes to grade a construction right-of-way including a construction access road for trenching and pipe laying equipment. This construction access road would require a durable surface to support heavy traffic loads. As discussed and referenced above in Section 6.1.2.1 on Pipeline Construction, a durable road surface prevents fine soil particles from being pushed to the road surface and carried by stormwater to drainage swales along the construction right-of-way. This durable surface as well as its stormwater management system would require monitoring and periodic maintenance to avoid erosion and subsequent sediment discharge to, for example, zero order and first order streams on ridge tops and along steep slopes. JCEP has not provided DEQ with information demonstrating that this monitoring would occur nor information on how JCEP would perform maintenance on this construction access road as well as existing access roads.

Planning for Erosion Control

JCEP proposes to use its Transportation Management Plan and Erosion Control and Revegetation Plan to identify BMPs for road construction and maintenance to minimize erosion of road cut slopes, fills, and surfaces. In reviewing these plans do not address, DEQ found no demonstration of compliance with the Oregon Forest Practice Act's road construction and maintenance requirements for non-federal, privately owned forest road segments. hydrologically connected to streams. Additionally, DEQ did not find County, Forest Service, BLM, and Bureau of Reclamation road construction and maintenance standards for unpaved road hydrologically connected to streams. In fact, a As noted in the December 20, 2018 information request (Pages 20-22 of, Attachment A) , DEQ found blank pages in the Appendices. JCEP referenced these pages in the Transportation Management Plan as containing information on JCEP's road operation and maintenance actions. Finally, DEQ did not find any discussion of the 229-mile construction access road and JCEP's maintenance plan to protect water quality while operating this road during pipeline construction.

Given this missing information, DEQ requested that JCEP provide a detailed maintenance and improvement plan for existing access roads in its September 7, 2018 information request (see Page 8 of 15 of Attachment B). DEQ also requested JCEP inventory the existing access roads to identify unpaved road segments needing improvements to support anticipated traffic loads and to ensure compliance with Forest Practices Act rules. DEQ requested that JCEP's road maintenance and improvement plan use road assessment protocols such as the Geomorphic Road Assessment and Inventory Package (GRAIP) to evaluate the potential for road surface erosion risk, gully risk, and landslide risks along the existing access roads.

In an October 25, 2018 response to these requests, JCEP indicated it would provide DEQ with a revised Table A.2-6 from Appendix A.2 of Resource Report 2 identifying BMPs for water bodies crossed by or within 100 feet of Temporary and Permanent Access Roads. In its December 20, 2018 supplemental information request, DEQ informed JCEP that lists of generic BMPs in a summary table were not responsive to DEQ's concerns regarding traffic loads on existing access roads (see Pages 40 – 41 of Attachment A). DEQ requested specific design and maintenance standards and specification by road ownership. DEQ also noted that JCEP's selection criteria for existing access roads in its inventory was not acceptable. More specifically, limiting the inventory to road segments that cross by or within 100 feet of a perennial or intermittent stream would not capture many existing access road segments that are hydrologically connected to streams. As one example, a road segment may be several hundred feet from a stream but still discharge sediment from its road surface if it has an in-slope drainage ditch with no cross drains. If its road surface is unstable during wet weather, a ditch with this design would discharge sediment

directly to a stream. Given these concerns, DEQ requested that JCEP use models such as GRAIP or the Washington Road Surface Erosion Model (WARSEM) to evaluate its proposed use of road segments. These models provide detailed protocols for determining which unpaved road segments are hydrologically connected to a stream.

In a January 2019 meeting and a February 20, 2019 response, JCEP proposed using WARSEM to perform the DEQ-requested inventory of unpaved roads to develop the DEQ-requested road maintenance and improvement plan.[59] During further discussions in conference calls, JCEP proposed to perform a Level I Inventory in WARSEM of existing access roads. A Level I Inventory is a desktop analysis using maps. In Section 4.3.2.2 of the Draft Environmental Impact Statement (DEIS) for this project activity (see Page 4-102), JCEP concludes that only 21 existing access roads could potentially deliver sediment to streams. As explained below, this conclusion is clearly erroneous given the numerous road-stream interactions in areas traversed by the construction right-of-way and given the procedures for determining hydrologic connectivity in a road system.

As a sample of road-stream intersections in the highly dissected drainage basins of the Coast and Cascade Ranges, Figure 8 shows the number of BLM road-stream crossings in just one of numerous subwatersheds where the construction ROW is located. This map does not include cross drains for roads that are also within 200 feet of a stream and, therefore, hydrologically connected to this stream. If a field inventory included cross drains, the number of road-stream interactions on this map would be greater than currently displayed in Figure 8. Many of the BLM roads depicted in the map below would serve as an existing access road for pipeline construction. Given this small area, JCEP's estimate of 21 existing access roads that could potentially deliver sediment is a significant underestimation.

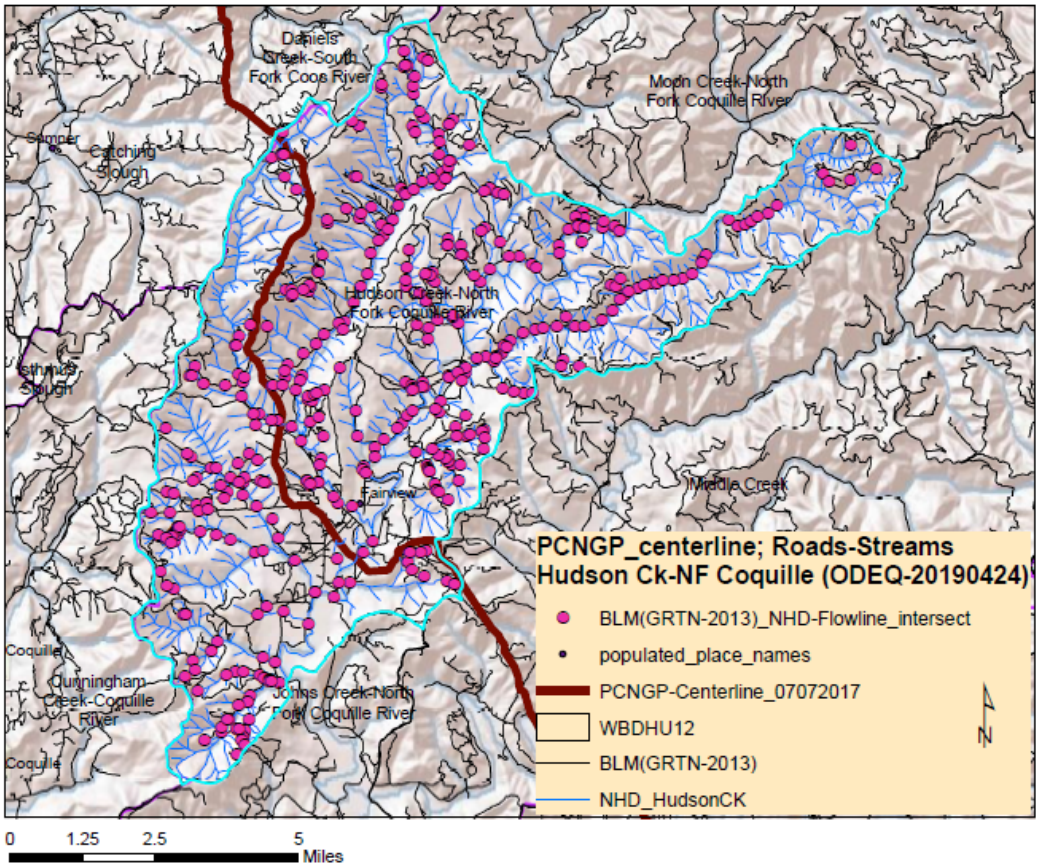
DEQ informed JCEP during the January 2019 meeting and subsequent conference calls that JCEP needed to perform an inventory of all roads segments to identify those hydrologically connected to streams. These road segments using maps during a desktop analysis. In Table 2 of the WARSEM Manual, the authors of this model clearly indicate that a determination of hydrologic connectivity requires field verification. As a result, DEQ requested a Level IV Inventory using WARSEM as this allows JCEP to document the erosion reduction from road surfaces using JCEP's maintenance and improvement plan. JCEP's conclusion that only 21 existing access roads have the potential to discharge sediment to streams is based upon road system surveys using aerial photos, maps, or other remote sensing tools. Remote sensing tools cannot serve as a substitute for a field inventory as explained below.

For example, JCEP cannot determine using maps if the surface of a road segment is out-sloping and, therefore, draining overland via the road's fill slope and undisturbed landscape. In addition, maps cannot indicate if the surface of a road segment is in-sloping and draining to a ditch carrying stormwater to a stream over several hundred feet or more downslope from this road segment. Moreover, maps cannot indicate if a road surface drains to an in-slope ditch that drains to a cross culvert (or drain) which discharges to a zero order stream connected to a first order stream. Given this, JCEP's desktop analysis of road segments is making significant assumptions that incorporate considerable error into its estimate of the number and location of road segments hydrologically connected to streams.

Such errors place surface water quality at risk from unpaved roads discharging sediment from their surface if JCEP does not maintain or improve these roads to support the anticipated traffic loads. To eliminate these errors, a WARSEM inventory protocol requiring field verification such as a Level IV Inventory or comparable analysis must be used. Further, development of a Transportation Management Plan for nonfederal roads is also required (the TMP in the 401 submittal did not discuss these roads).

[59] Dube, Kathy, Walt Megahan, and Marc McCalmon. 2004. *Washington Road Surface Erosion Model*. State of Washington Department of Natural Resources.

Figure 8: Map of Hudson Creek-North Fork Coquille Subwatershed



Road Construction

JCEP's proposed improvements of access roads include the widening of roads, the recommissioning of roads, the installation and removal of a temporary bridge, the development of turnouts, replacement of culverts at stream crossings, and the installation and removal of a temporary culvert at a stream crossing. JCEP would also build 25 segments of Temporary Access Roads and Permanent Access Roads. These proposed improvements and additions involve land disturbance that may lead to sediment and turbid discharges to streams and wetland depending on the site constraints at each improvement (Furniss et al. 1991). In Table 1.2-1 of Resource Report 1, JCEP estimates that road improvements would disturb 22.70 acres. On September 7, 2018, DEQ requested designs and specifications for these improvements and for the new roads. JCEP has not provided DEQ with the requested information regarding these improvements.

Road improvement designs and specifications as well as plan drawings showing constraints such as landslide susceptibility zones, sensitive receptors such as streams and wetlands, and BMPs are not available for DEQ to review and evaluate at this timeIn Section 1.3.4 of JCEP's Resource Report 1, JCEP notes that it would not conduct civil surveys to prepare engineering designs until the fourth quarter of 2019 for the road improvements. JCEP has only provided the general location of erosion controls proposed for the construction right-of-way on the Environmental Alignment Sheets submitted with JCEP's NPDES 1200-C Permit Application. These do not provide the engineering detail necessary to describe how JCEP would manage and treat stormwater from improved and new roads. The information submitted to date does not provide the engineering detail sufficient to describe how JCEP would stabilize road cut and fill slopes in landslide susceptibility zones.

Additionally, DEQ has not received the 1200-C required erosion control and sediment plan for these improvements to evaluate their compliance with Permit Schedule A.8.b on prevention of earth slides and A.10 on water quality

standards. In its December 20, 2018 supplemental information request (see Pages 46 – 50 and Page 80 of Attachment A), moreover, DEQ provided JCEP examples of new roads where JCEP did not provide design information, drawings, or site-specific BMPs. In providing these examples, DEQ identified its water quality concerns and the information DEQ needed to evaluate JCEP's actions to control road construction actions and road design elements that can lead to sediment and turbid discharges to streams.

As discussed in more detail above, when widening existing access roads, JCEP would cut into and the place fill on steep and/or unstable slopes. These proposed actions can initiate landslides discharging turbid flows and sediment with organic matter into zero order streams (i.e., bedrock hollows) as depicted in Figures 6 and 7. [60] DEQ detailed the potential water quality impacts of road construction and the deficiencies in JCEP's submittal in DEQ's December 20, 2018 supplemental information request (see Pages 18 – 25 of Attachment A). For example, while excavating a culvert from a stream crossing, sediment and fine soil particles generating turbid flows can discharge into streams and riverine wetlands. However, JCEP has not detailed how JCEP would address these discharges. JCEP's reliance on an Environmental Inspector to ensure effective sediment and turbidity controls during the construction process does not provide DEQ a reasonable assurance that the proposed activities will be conducted in a manner that will not violate the statewide narrative criteria.

In addition, JCEP must prepare for wet weather with an erosion and sediment control plan. Ten percent of the rain falls in the summer in Southwestern Oregon. [61] Although the probability is considerably lower, rain does occur during Oregon's in-water work period. Culvert replacements may involve the removal of substantial amounts of fill depending on the topography and road alignment relative to this topography. For its proposed culvert replacements projects, JCEP has not provided plans for locating and managing large stockpiles of excavated fill to avoid sediment and turbid discharges while JCEP installs a new culvert.

For culvert replacement projects, JCEP may clear riparian vegetation and grub their stumps from the soil adjacent to stream crossing approaches to create space for the crossing's footprint. These actions can discharge turbid flows and sediment to streams as well as increase thermal loading from the loss of riparian shade. JCEP has not documented these impacts or demonstrated what BMPs JCEP would deploy and where. Road recommissioning may involve the removal of water bars (i.e., slope breakers), reshaping the unpaved road surface to manage drainage, and reshaping drainage ditches. These land disturbing actions also can lead to sediment discharges and turbid flows into streams and wetlands during wet weather. If a decommissioned road was restored to approximate the natural contours, recommissioning may involve substantial regrading to create a travel way. This regrading may involve the development of cut and fill slopes on steep slopes and/or unstable slopes requiring geotechnical engineering to prevent landslides altering the roads' drainage system and leading to sediment and turbid discharges during wet weather.

JCEP presents it the Erosion Control and Revegetation Plan and Transportation Management Plan with their BMPs as its approach for managing water quality impacts from roads. DEQ reviewed these plans and identified their deficiencies in its December 20, 2018 supplemental information request (see Pages 10 – 25 of Attachment A). Based on DEQ's evaluation, JCEP's proposed access road improvements do not exhibit the highest and best controls, do not demonstrate that these proposed BMPs would minimize the erosion of and discharge of inorganic and organic debris, turbid flows, and sediment from cut banks, fills, and road surfaces.

6.1.2.4 Post-Construction Operation and Maintenance of Pipeline Right-of-Way

On steep slopes and near stream crossings, JCEP proposes to use permanent slope breakers to manage post-construction stormwater on the permanent ROW in compliance with 2013 FERC guidelines.[62] As discussed in Section 6.1.2.1 of this Evaluation and Findings Report, slope breakers (i.e., water bars) concentrate stormwater and

[60] Hearn, G.J. 2011. Slope Engineering for Mountain Roads. Geological Society Engineering Geology Special Publication No. 24

[61] National Climate Data Center. 2006. *Climate in Oregon*. National Oceanic and Atmospheric Administration

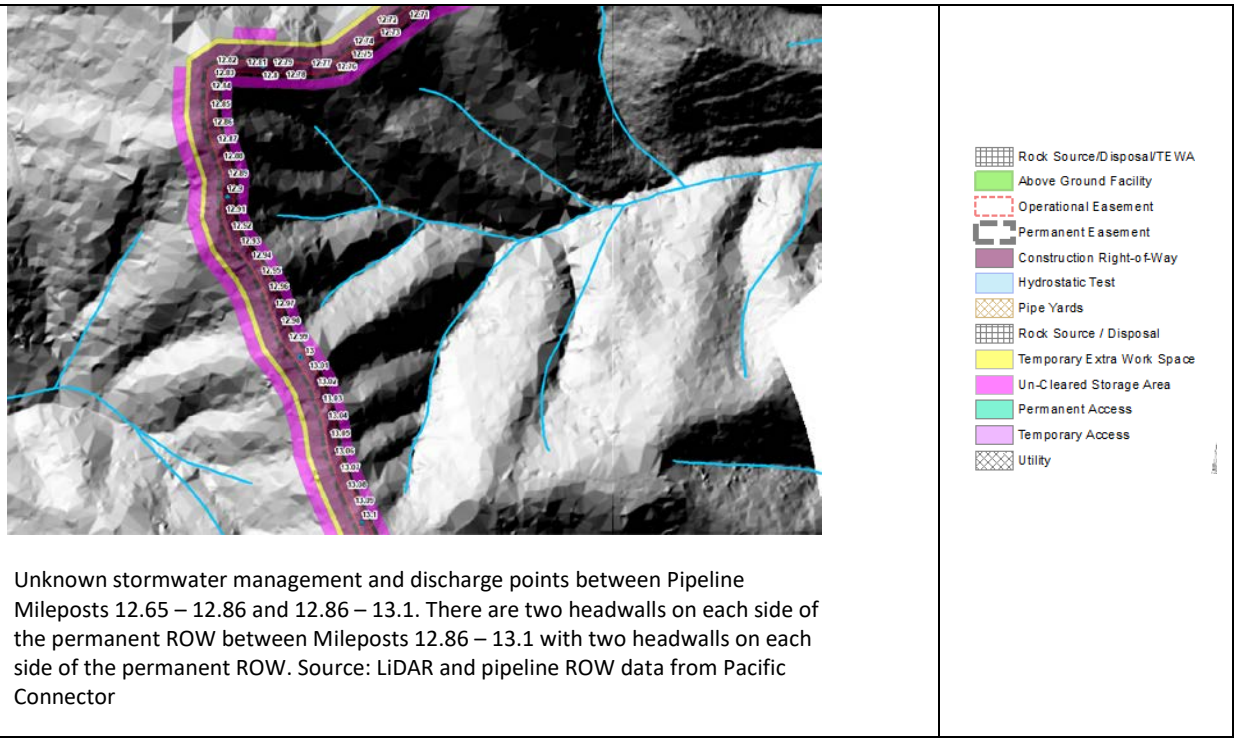
[62] Federal Energy Regulatory Commission. 2013. Upland Erosion Control, Revegetation and Maintenance Plan

discharge it outside the ROW. In the September 7, 2018 information request, DEQ requested JCEP evaluate the post-construction stormwater discharge from the 30-foot permanent ROW during the development of a post-construction stormwater management plan (see page 11 of 15 of Attachment B). For several years following the pipeline's construction, the drainage area for each permanent slope breaker on steep slopes would include 95-feet of the construction ROW width and the 100-feet of ROW to the next permanent slope breaker. This drainage area would decrease to 30 feet by 100 feet once a more mature canopy develops over several decades in the restored construction ROW. As referenced in preceding sections of this Evaluation and Findings Report, concentrating stormwater and discharging it to unstable slopes can produce positive soil pore pressures that initiate landslides.

Stormwater Discharge Relative to Unstable Slopes

To ensure compliance with statewide narrative criteria OAR 340-041-0007(1), DEQ developed the *Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines* (March 2018). In Section E.2.2 of these plan submission guidelines, DEQ requests that project proponents determine if infiltration of stormwater discharge should be avoided due to steep slopes or landslide risks (see Page 9). The proposed permanent ROW traverses over and along unstable slopes in numerous locations. For example, Figure 9 below shows sections of the permanent ROW above headwalls. JCEP has not provided DEQ with a post-construction stormwater plan for the permanent ROW demonstrating how JCEP would manage stormwater along the permanent ROW and, in particular, along landslide susceptibility zones. As discussed in Section 6.1.2.1 of this Evaluation and Findings Report, the stormwater discharge from slope breakers can reduce slope stability.

Figure 9: Construction Right-of-Way Above Headwall



Unknown stormwater management and discharge points between Pipeline Mileposts 12.65 – 12.86 and 12.86 – 13.1. There are two headwalls on each side of the permanent ROW between Mileposts 12.86 – 13.1 with two headwalls on each side of the permanent ROW. Source: LiDAR and pipeline ROW data from Pacific Connector

Stormwater Discharge Near Streams

In its December 20, 2018 supplemental information request, DEQ stressed that the permanent ROW is functioning as a primitive road (see Page 6 and 7 of Attachment A). Additionally, the permanent ROW would have soil compaction from pipe installation and post-construction maintenance, necessitating the need for a stormwater collection system in the form of slope breakers (i.e., water bars). Information from JCEP supports these concerns. For example, on Page 19 of JCEP's Erosion Control and Revegetation Plan (ECRP), JCEP states that it would not mitigate soil compaction over the pipeline's trench line. On page 24 of JCEP's Resource Report 6 (Geologic

Resources), JCEP notes that it would compact the fill over the pipeline after installation. In addition, on page 71 of Resource Report 1, JCEP states that – depending on trench settlement and its damage to slope breakers – sections of the pipeline would require additional fill. The compaction of this additional fill would also lead to soil compaction within the permanent right-of-way during regrading and repair of the permanent slope breakers. These activities as well as those noted below would increase runoff and sediment discharge into the permanent slope breakers.

In its Erosion Control and Revegetation Plan, JCEP references the 2013 FERC Upland Erosion Control, Revegetation and Maintenance Plan. On Page 17 of these guidelines, FERC requires pipeline operators to routinely mow or clear a corridor of 10-feet in width centered on the pipeline. This purpose of this corridor is to maintain this area in an herbaceous state. FERC also requires routine mowing and clearing at least every 3 years to maintain the remaining portion of the 30-foot right-of-way in an herbaceous and small shrub state. A pipeline industry survey indicates that more than 80% of the pipeline operators use mechanical mowing for post-construction ROW maintenance.[63] This mechanical mowing would also contribute to soil compaction. Grass surface roads discharge 50% of the sediment that discharges from a native soil surface road.[64] In fact, the authors of the Washington Road Surface Erosion Model (WARSEM) assign grass surface roads a higher erosion factor for road surfacing than gravel roads with ruts.

Figure 10 shows one of several examples of the permanent ROW crossing or paralleling streams on the 303(d) list for sediment or crossing streams discharging to these sediment-listed streams. Based on its proposed conceptual approach for operating the ROW, the permanent ROW has the potential to discharge sediment at stream crossings. Ongoing increases in sediment loading to a waterbody that is listed on the 303(d) list for sediment in not allowed without either a TMDL allocation, or an implementation plan showing that there will be no increase in loading. OAR 340-41-0004(7)("Water quality limited waters may not be further degraded except in accordance with paragraphs (9)(a)(B), (C) and (D) of this rule."[65]JCEP has not provided the analyses for the discharges that would

[63] Nowak, C., B. Ballard, P. Appelt, and D. Gartman. 2002. *Integrated Vegetation Management of Gas Pipeline Rights-of-Way*. Gas Technology Institute. GRI-01/0096

[64] Swift, L.W. 1984. Gravel and Grass Surfacing Reduces Soil Loass from Mountain Roads. Forestry Science Volume 30 Pages 657-670

[65] (9) Exceptions. The commission or department may grant exceptions to this rule so long as the following procedures are met:

(a) In allowing new or increased discharged loads, the commission or department must make the following findings:

(A) The new or increased discharged load will not cause water quality standards to be violated;

(B) The action is necessary and benefits of the lowered water quality outweigh the environmental costs of the reduced water quality. This evaluation will be conducted in accordance with DEQ's "Antidegradation Policy Implementation Internal Management Directive for NPDES Permits and section 401 water quality certifications," pages 27, and 33-39 (March 2001) incorporated herein by reference; and

(C) The new or increased discharged load will not unacceptably threaten or impair any recognized beneficial uses or adversely affect threatened or endangered species. In making this determination, the commission or department may rely on the presumption that, if the numeric criteria established to protect specific uses are met, the beneficial uses they were designed to protect are protected. In making this determination the commission or department may also evaluate other state and federal agency data that would provide information on potential impacts to beneficial uses for which the numeric criteria have not been set;

(D) The new or increased discharged load may not be granted if the receiving stream is classified as being water quality limited under sub-section (a) of the definition of "Water Quality Limited" in OAR 340-041-0002, unless:

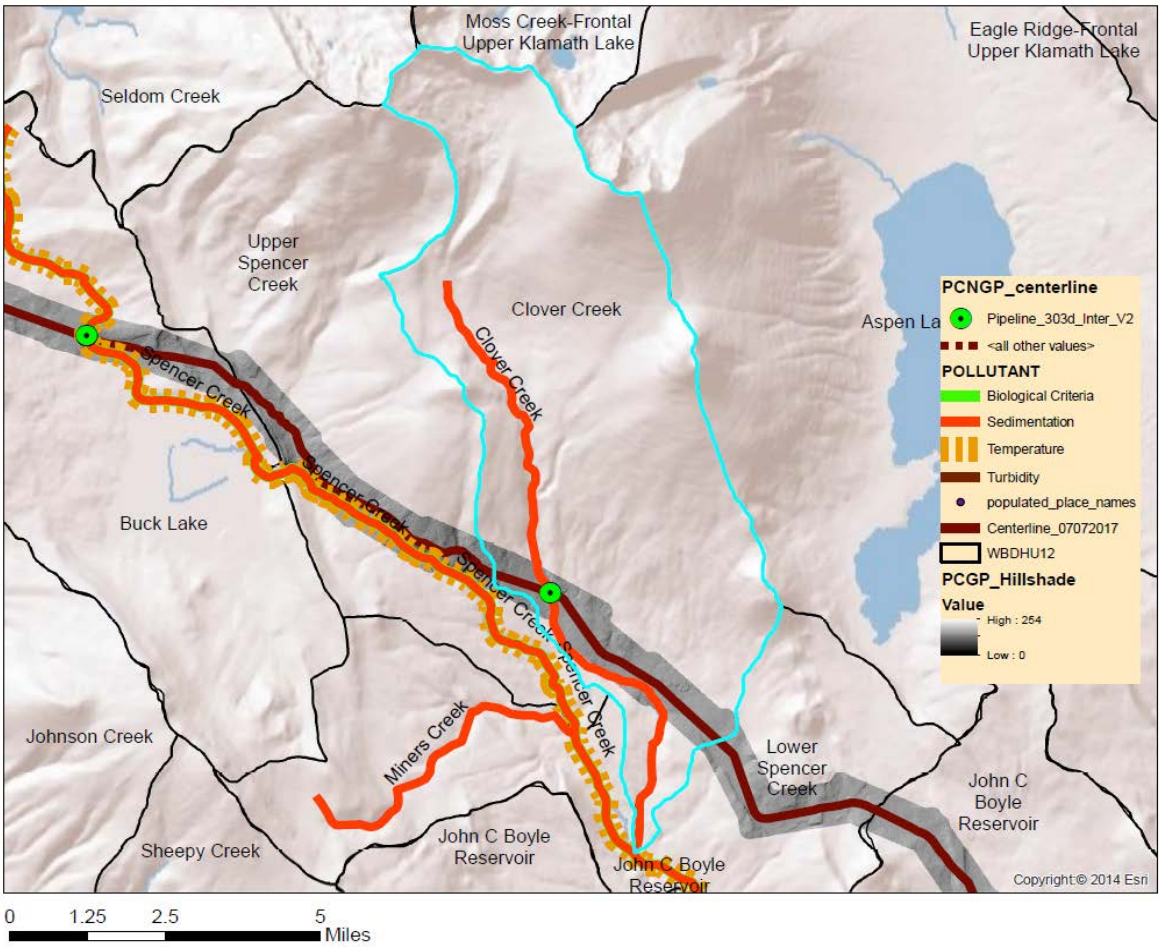
(i) The pollutant parameters associated with the proposed discharge are unrelated either directly or indirectly to the parameter(s) causing the receiving stream to violate water quality standards and being designated water quality limited; or

(ii) Total maximum daily loads (TMDLs), waste load allocations (WLAs) load allocations (LAs), and the reserve capacity have been established for the water quality limited receiving stream, compliance plans under which enforcement action can be taken have been established, and there will be sufficient reserve capacity to assimilate the increased load under the established TMDL at the time of discharge; or

(iii) Effective July 1, 1996, in water bodies designated water-quality limited for dissolved oxygen, when establishing WLAs under a TMDL for water bodies meeting the conditions defined in this rule, the department may at its discretion provide an allowance for WLAs calculated to result in no measurable reduction of dissolved oxygen (DO). For this purpose, "no measurable reduction" is defined as no more than 0.10 mg/L for a single source and no more than 0.20 mg/L for all anthropogenic activities that influence the water quality limited segment. The allowance applies for surface water DO criteria and for Intergravel dissolved oxygen (IGDO) if a determination is made that the conditions are natural. The allowance for WLAs applies only to surface water 30-day and seven-day means; or

occur at each slope breaker for each stream crossing. In addition, JCEP has not performed an analysis to demonstrate that the herbaceous area in the permanent ROW between the last slope breaker and stream is an effective BMP by itself and would not contribute to or cause a water quality standard violation, particularly near waterbodies that are not meeting standards for sediment. As noted in DEQ's September 7 (Page 11 of 15 of, Attachment B) and December 2018 (Page 66 – 68 of Attachment A) information requests, DEQ requested that JCEP evaluate the efficacy of these proposed BMPs using modeling. JCEP has not provided DEQ with this evaluation of the water quality impacts from this slope breaker discharge nor has it provided DEQ with the analysis of the proposed treatment for the discharge from slope breakers immediately upslope of a steam..

Figure 10: Pipeline Parallel to and Crossing Spencer Creek and crossing Clover Creek, near Milepost 177



(iv) Under extraordinary circumstances to solve an existing, immediate and critical environmental problem, the commission or department may, after completing a TMDL but before the water body has achieved compliance with standards, consider a waste load increase for an existing source on a receiving stream designated water quality limited under sub-section (a) of the definition of "Water Quality Limited" in OAR 340-041-0002. This action must be based on the following conditions:

(I) That TMDLs, WLAs and LAs have been set; and

(II) That a compliance plan under which enforcement actions can be taken has been established and is being implemented on schedule; and

(III) That an evaluation of the requested increased load shows that this increment of load will not have an unacceptable temporary or permanent adverse effect on beneficial uses or adversely affect threatened or endangered species; and

(IV) That any waste load increase granted under subparagraph (iv) of this paragraph is temporary and does not extend beyond the TMDL compliance deadline established for the water body. If this action will result in a permanent load increase, the action must comply with sub-paragraphs (i) or (ii) of this paragraph.

On page 63 to 68 (Attachment A) of the December 20, 2018 supplemental information request, DEQ provided JCEP with the basis for DEQ's request for the analyses described in Section E.3, E.6, and E.7 of DEQ's submission guidelines for post-construction stormwater management plans. On Page 78 to 80 of Attachment A in its December 20, 2018, supplemental information request, DEQ provided JCEP with an example of a landslide prone slope combined with erosive soils and stormwater to create soil slumping on a power line right-of-way intersecting JCEP's proposed pipeline right-of-way. These examples illustrate the site-specific challenges and need for effective BMPs to control sediment at stream crossings along the permanent right-of-way.

Based upon its evaluation, DEQ is unable to conclude that JCEP's proposed permanent pipeline right-of-way exhibits the highest and best controls, and demonstrates that proposed BMPs would minimize the erosion of and discharge of inorganic and organic debris, turbid flows, and sediment from cut banks, fills, and road surfaces. OAR 340-041-0007.

6.1.2.5 Terminal and Off-Site Project Area Stormwater

JCEP proposes to build and operate a LNG Export Terminal that would generate stormwater. JCEP proposes to use an oily waste collection system to collect and transport stormwater from drainage areas with various containment systems for tanks and bulk storage containers holding gas, diesel, and process chemicals such as amine and other chemicals yet to be identified. This oily waste system conveys stormwater to an oil/water separator that in turn discharges to an existing industrial wastewater pipeline that discharges to the Pacific Ocean. In its September 25, 2018 information request, DEQ requested JCEP identify the significant material transported within, stored, and used at the Terminal. JCEP has not identified the type of amine it would use or other process chemicals at the Terminal. This information is necessary to evaluate the water quality impacts of JCEP's proposed activities.

Additionally, the construction of the Terminal necessitates the excavation of uplands to create the Marine Slip for the Terminal and dredging to create the Access Channel and Material Offloading Facility. JCEP would use this excavated soil and dredged material as fill in the Terminal's Ingram Yard and South Dunes areas as well as in several Off-Site Project Areas such as the Roseburg Forest Products Property.[66] The leachate from dredged estuarine deposits would potentially drain to sensitive receptors such the freshwater wetlands.[67] To address during construction and post-construction stormwater discharges from the Terminal and the Off-Site Project Areas, JCEP proposed the November 2017 Storm Water Management Plan. For managing discharges transporting dredge material and the leachate from dredged material disposal, JCEP proposes to use specified Potential Dredge Disposal Locations featured in Enclosures 19 – 22 of Part 1, Appendix N-5. DEQ reviewed these documents and, based on this review, issued the information requests noted below.

In its review of the Terminal Stormwater Management Plan, DEQ used the March 2018 Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines. DEQ developed these guidelines to ensure project proponents used the highest and best practicable treatment control as required in Statewide Narrative Criteria OAR 340-041-0007(1). In its September 25, 2018 information request, DEQ provided JCEP with comments describing how the stormwater management plan did not address these guidelines. DEQ also requested that JCEP seek a National Pollutant Discharge Elimination System 1200-C Permit Application for the Terminal and the Off-Site Project Areas noted in its plan.

In an October 25, 2018 response to this information request, JCEP informed DEQ that it would address DEQ's comments in the first quarter of 2019. On April 1, 2019, DEQ received a revised plan entitled LNG Terminal Stormwater Management Plan. JCEP revisions partially addressed DEQ's information request. However, as noted below, JCEP has not yet demonstrated it would manage stormwater discharge with the highest and best practicable

[66] Drawing 21, Potential Dredge Disposal Locations Plan View. Section 401 Water Quality Submittal, U.S. Army Corps of Engineers Joint Permit Application. Jordan Cove Energy Project.

[67] Page 17, Table 4-1. Wetland and Estuarine Resources, LNG Terminal Stormwater Management Plan. March 2019

treatment controls, manage construction access road building and maintenance to reduce erosion, and prevent the deposit of organic and inorganic deposits deleterious to aquatic life. Moreover, JCEP has not yet demonstrated that the construction stormwater discharges would comply with applicable turbidity and biocriteria standards.

To manage construction stormwater, JCEP has not provided DEQ with a NPDES 1200-C General Permit Application(s) for construction stormwater in the Terminal, Off-Site Project Area as well as construction access roads proposed for these construction sites. The 1200-C permit application requires JCEP to submit an Erosion and Sediment Control Plan with the application. This ESCP must contain among other requirements areas of soil disturbance, drainage patterns, discharge points, sensitive receptors such as wetlands, and sediment and erosion controls including installation techniques (see Page 13 – 14 of 30, Schedule A.12, NPDES 1200-C Permit). DEQ does not have an ESCP to determine if the management of construction stormwater at these sites would violate OAR 340-041-0007(1), (7), and (11) as well as Schedule A.10 of the 1200-C permit. Schedule A.10 on In-stream Water Quality Standards states that compliance with this permit would result in stormwater discharges being controlled as necessary to meet water quality standards in the absence of information demonstrating otherwise. Without the information in the ESCP, DEQ cannot determine if the construction stormwater discharge would comply with the turbidity standard. Moreover, DEQ cannot reasonably determine that construction stormwater discharge would sufficiently protect aquatic life in wetlands and in Coos Bay.

For the revised LNG Storm Water Management Plan, DEQ's review noted significant progress in addressing DEQ's 401 plan submission guidelines. However, among the deficiencies in this revised plan, DEQ identified two proposed categories of action that do not demonstrate JCEP would meet OAR 340-041-0007(1) given the information provided in this plan. JCEP has provided incomplete information for spill containment within the Terminal. JCEP has not provided DEQ the design information for stormwater controls in the Terminal's abandoned Construction Facility Areas in the Terminal. These two deficiencies are detailed below.

In Section 5.5.2.1 of the JCEP's revised plan, JCEP proposes three categories of spill containment. In each category, JCEP provides qualitative information on proposed controls. In addition, in its April 1, 2019 response to DEQ's September 25, 2018 information request, JCEP directed DEQ to its proposed Spill Prevention, Control, and Countermeasure Plan for spill containment controls for the Terminal Stormwater Management Plan.[68] The cover of JCEP's SPCC Plan contains a note that this plan is a preliminary version. DEQ reviewed this plan and determined that it is not a complete or final plan. For example, in Table 1-1 of the SPCC Plan, the list of bulk storage containers and their secondary containment system is incomplete. JCEP does not provide information on the secondary containment for transformers. JCEP also notes that other oil storage systems and their containment controls are to be determined in the future. Additionally, Section 8 of this plan is preliminary information and JCEP notes that it would update this plan to reflect as-built controls.

In the final SPCC Plan, DEQ is seeking information on where exactly JCEP would locate on its stormwater site plan the proposed loading aprons, lined earthen berms, double walled tanks, and other containment structures designed to contain spills as well as information on the specific design features of these controls. For reasonable assurance, DEQ needs to know if JCEP would size the containment berms coupled with the containment capacity of the oil/water to capture the largest anticipated spill. Statements in the current draft SPCC Plan that JCEP would comply with federal regulations are not a demonstration that JCEP's proposed control concepts have the capacity to prevent a discharge to surface water. Site-specific information on proposed structural spill controls is essential for DEQ to evaluate their potential to control discharges to surface water. JCEP's containment controls must demonstrate consistency with the statewide narrative criteria for highest and best practicable controls to prevent the release of toxic substances to the Pacific Ocean. Site-specific design information is missing in the SPCC Plan and the revised Terminal Stormwater Management Plan.

For the abandoned Construction Facility Areas at the Terminal, JCEP did not provide DEQ with the drainage area

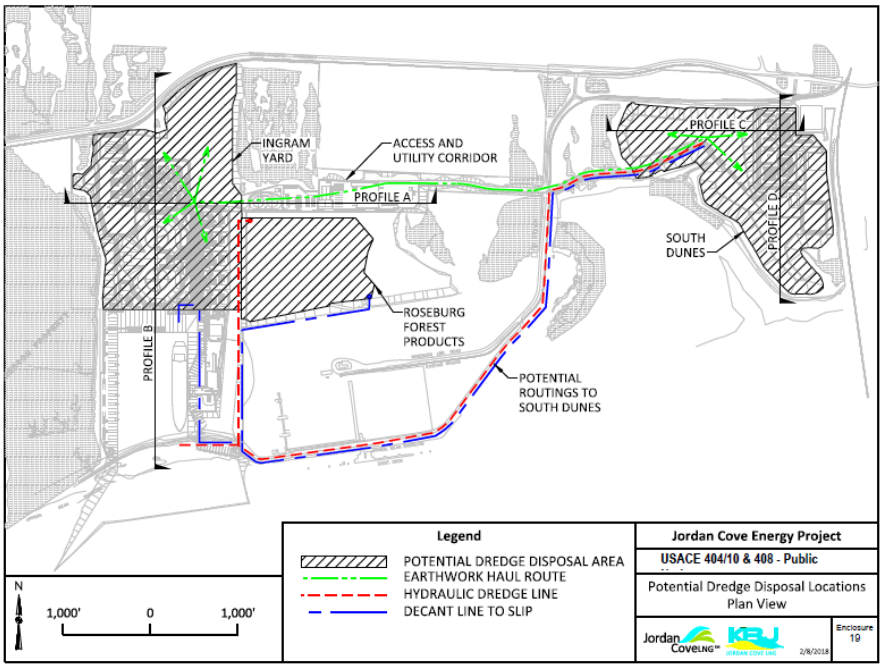
[68] Spill Prevention, Control, and Countermeasure Plan – Operation. August 29, 2017. Part 1: Appendix K, Section 401 Water Quality Package

for each infiltration control for these areas. JCEP did not provide the designs for each infiltration control that DEQ requests in Section E.7 of its 401 plan submission guidelines. Construction designs and specifications that DEQ requests in Section E.8 of these guidelines are necessary to demonstrate JCEP would prevent sediment inundation and erosion in all control prior to their operation (i.e., commissioning). Moreover, JCEP needs to provide design information to demonstrate that the infiltration controls can contain the volume of stormwater they receive without altering the hydrology of adjacent groundwater fed wetlands. Inundating these wetlands with surface water would convert them into stormwater detention ponds thus altering their resident aquatic biological communities by altering their values and functions. At present, JCEP's submittal does not demonstrate that the stormwater infiltration controls in the Construction Facility Areas provide the highest and best practicable controls of flows to meet OAR 340-041-0007(1).

For managing discharges transporting dredge material and the leachate from dredged material disposal, DEQ identified deficiencies in JCEP's proposed documents for managing dredging operations and dredge material to prevent discharges to wetlands and Coos Bay. Specifically, in its December 20, 2018 supplemental information request (see Pages 85 - 87, Attachment A), DEQ informed JCEP did not demonstrate in its submittal that the highest and best treatment controls were proposed to meet statewide narrative criteria OAR 340-041-0007(1) and (11). For example, DEQ noted that JCEP did not provide details on how JCEP would manage leachate from discharging to surround freshwater or estuarine wetlands altering their chemical composition and turbidity. Increasing turbidity in and inundating freshwater wetlands with saline leachate would alter their capacity to support the aquatic biological communities dependent on these wetlands.

In its October 8, 2018 response to DEQ's September 7, 2018 information request, JCEP referred DEQ to Potential Dredge Disposal Locations featured in Enclosures 19 – 22 of Part 1, Appendix N-5 of the 401 Water Quality Package. DEQ presents Enclosure 19 below to highlight the lack of detailed practices to manage the wetlands – shaded gray – adjacent to proposed dredging disposal areas:

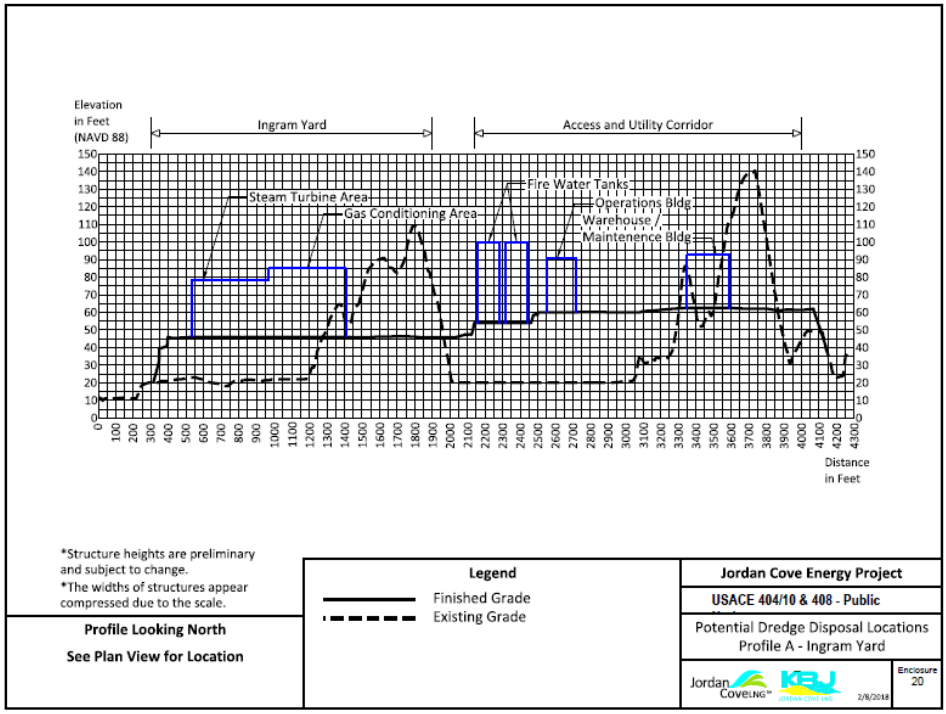
Figure 11: Potential Dredge Disposal Areas Relative to LNG Terminal and Adjacent Wetlands



Enclosure 19 does not show structural controls to demonstrate saline leachate or decant from dredged material would not discharge to adjacent freshwater wetlands. JCEP has not indicated how it would place containment

structures around the dredged material nor change the grade to direct decant to the dredge line, size a collection basin to capture the decant, operate a pump to transfer the decant to a discharge location, or propose a discharge location. Enclosures 20 – 22 only provide the elevation of dredge material as shown in Figure 12.

Figure 12: Proposed Finish Grade of Dredge Soil Locations



For upland confined dredge disposal facilities, the State of New Jersey requires project proponent to consider five factors in the placement of dredged material. These factors are illustrative on what DEQ would consider in evaluating a proposal with the required information. These factors are:

- Location of facility and site-specific condition including compatibility with adjacent and nearby land use.
- Characterization of the dredged material proposed for placement at the facility.
- Design and construction of the facility.
- Operation of the facility.
- Final closure of the facility.[69]

At present, JCEP's submittal does not demonstrate that controls for the disposal of dredged material provide the highest and best practicable controls of flows to meet OAR 340-041-0007(1) and prevent the deposit sediment deleterious to aquatic life to meet OAR 340-041-0007(11). Given this, DEQ cannot conclude that the JCEP's proposed disposal of dredge material would be conducted in a manner that would comply with the turbidity standard and biocriteria standard.

6.1.2.6 Dredging

JCEP's dredging in the North Spit of Coos Bay would reduce water quality by increasing turbidity above the numeric limits established in Oregon's Turbidity water quality standard.[70] JCEP provides an overview of dredging

[69] State of New Jersey. October 1997. Dredging Technical Manual, "The Management and Regulation of Dredging Activities and Dredge Material Disposal in New Jersey's Tidal Waters." Pages 73

[70] [70] Hydrodynamic Studies – Turbidity Analysis, Moffat and Nichol, November 2017.

procedures in the Dredge Material Management Plan and preferred locations for dredge material disposal but does not address procedures to minimize adverse effects of these actions on water quality. In particular, the plan does not specify methods to manage dredge spoil disposal in a manner that protects water quality. In one example, the plan recommends hydraulically transferring dredged material to the APCO sites and discharge of the slurry material to temporary containment berms. Hydraulic transfer requires large volumes of water to maintain dredge material in suspension during transfer. JCEP's Dredge Material Management Plan includes no proposal to manage and treat discharge from these containment areas to remove suspended material and reduce turbidity.

On September 7 and December 20, 2018, DEQ requested JCEP provide additional information, including a Dredging Pollution Prevention Plan, to describe specific dredging methods and procedures. In particular, DEQ requested the following information from JCEP to describe measures to reduce project effects on water quality:

- The type of pollution controls JCEP would use including its design and specifications.
- The specific applications for these controls.
- The specific location where JCEP would employ these controls relative to sensitive sites as well as other landscape features (e.g., drainage pattern, vegetation, etc.).
- The maintenance schedule for each control.
- A monitoring plan for evaluating the efficacy of all proposed controls and compliance with the turbidity standard.[71]

Oregon's Statewide Narrative Criteria requires applicants to demonstrate the activity includes the highest and best treatment controls and measures to prevent the discharge of organic and inorganic material into waterways. Absent a plan demonstrating JCEP has addressed these requirements, DEQ cannot confirm that JCEP has selected the highest and best treatment options to minimize anticipated project-effects in compliance with Oregon's Statewide Narrative Criteria.

6.1.3 DEQ Findings

Based on the preceding evaluation of Project effects, DEQ adopts the following findings related to OAR 340-041-0007 (Statewide Narrative Criteria):

1. JCEP has not demonstrated that the proposed pipeline construction, access road construction and maintenance, and pipeline right-of-way activities would employ the highest and best treatment to control pollution, as required by OAR 340-041-0007(1);
2. JCEP has not demonstrated that the proposed road construction and maintenance activities would be conducted in a manner to keep waste materials from cut banks, fills, and road surfaces out of public waters, as required by OAR 340-041-0007(7);
3. JCEP has not demonstrated that the proposed pipeline construction, access road construction and maintenance, and pipeline right-of-way activities would employ state-of-practice methods to identify landslide susceptibility zones and mitigate landslide risks to control discharge of organic or inorganic debris, as required by OAR 340-041-0007(11);
4. JCEP's failure to provide requested specific waterbody crossing and restoration plans, or plans that include descriptions of methods to construct and maintain roads in a manner to keep waste materials out of public waters and descriptions of methods to control discharge of organic or inorganic debris, prevented the department from being able to process the application within the time allowed by law. OAR 340-048-0020(3);and,
5. JCEP has not demonstrated that the proposed LNG Export Terminal and associated facilities will comply with Oregon's statewide narrative criteria. DEQ makes this finding because:
    a. JCEP did not provide details for spill containment for Terminal.
    b. JCEP did not provide details for infiltration controls for Construction Facility Areas.

[71] Supplemental Information Request. DEQ, December 20, 2018.

c. JCEP did not provide details for dredged material disposal controls.
d. JCEP did not demonstrate that proposed construction stormwater controls are the highest and best treatment options to control pollution as required by OAR 340-041-0007(1).
e. JCEP's proposed dredging activities do not employ the highest and best treatment options for preventing or minimizing turbidity as required by OAR 340-041-0007(1); and,
f. JCEP's proposed dredging activities do not employ sufficient methods to keep organic or inorganic material out of public waters as required by OAR 340-041-0007(11).

Based upon these findings, violations of the statewide narrative criteria are likely to occur and DEQ concludes that it does not have a reasonable assurance that the proposed activities will be conducted in a manner that will not violate the Statewide Narrative Criteria.

6.2 Biocriteria

6.2.1 Applicable Standard

Oregon Administrative Rules 340-041-0011:

Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

DEQ's Biocriteria narrative water quality standard is intended to avoid detrimental changes to biological communities caused by pollution. EPA guidance recommends using biological community assessments as an indicator for measuring support for aquatic life.[72] DEQ has developed procedures to characterize the existing condition of benthic communities as a means to assess whether detrimental changes affecting water quality are likely to occur.[73] DEQ's methods use information from reference sites throughout Oregon to assess existing and future conditions of biological communities resulting from anthropogenic activities.

This narrative criterion recognizes that compliance with individual criteria may not fully capture synergistic effects resulting from multiple stressors and cumulative impacts on aquatic species and resident biological communities. The biocriteria standard complements parameter-specific standards by extending broad protections to all designated beneficial uses with the implicit assumption that if the most sensitive beneficial use is protected, then all uses would be protected. Application of the biological criteria standard is intended to assess the overall impact to the aquatic community from water quality changes attributable to an anthropogenic activity.

Definitions applicable to the biocriteria standard include (OAR 340-041-0002):

(5) "Appropriate Reference Site or Region" means a site on the same waterbody, or within the same basin or ecoregion that has similar habitat conditions, and represents the water quality and biological community attainable within the areas of concern.

(6) "Aquatic Species" means plants or animals that live at least part of their life cycle in waters of the state.

(17) "Designated Beneficial Use" means the purpose or benefit to be derived from a water body, as designated by the Water Resources Department or the Water Resources Commission.

[72] US EPA, July 29, 205, Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act, page 41.
[73] Methodology for Oregon's 2018 Water Quality Report and List of Water Quality Limited Waters, November 2018. Oregon Department of Environmental Quality: https://www.oregon.gov/deq/FilterDocs/ir2018assessMethod.pdf.

(19) "Ecological Integrity" means the summation of chemical, physical and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region.
(50) "Resident Biological Community" means aquatic life expected to exist in a particular habitat when water quality standards for a specific ecoregion, basin, or water body are met. This must be established by accepted biomonitoring techniques.

(75) "Without Detrimental Changes in the Resident Biological Community" means no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region.

6.2.2 Evaluation of Biocriteria

6.2.2.1 Pipeline construction

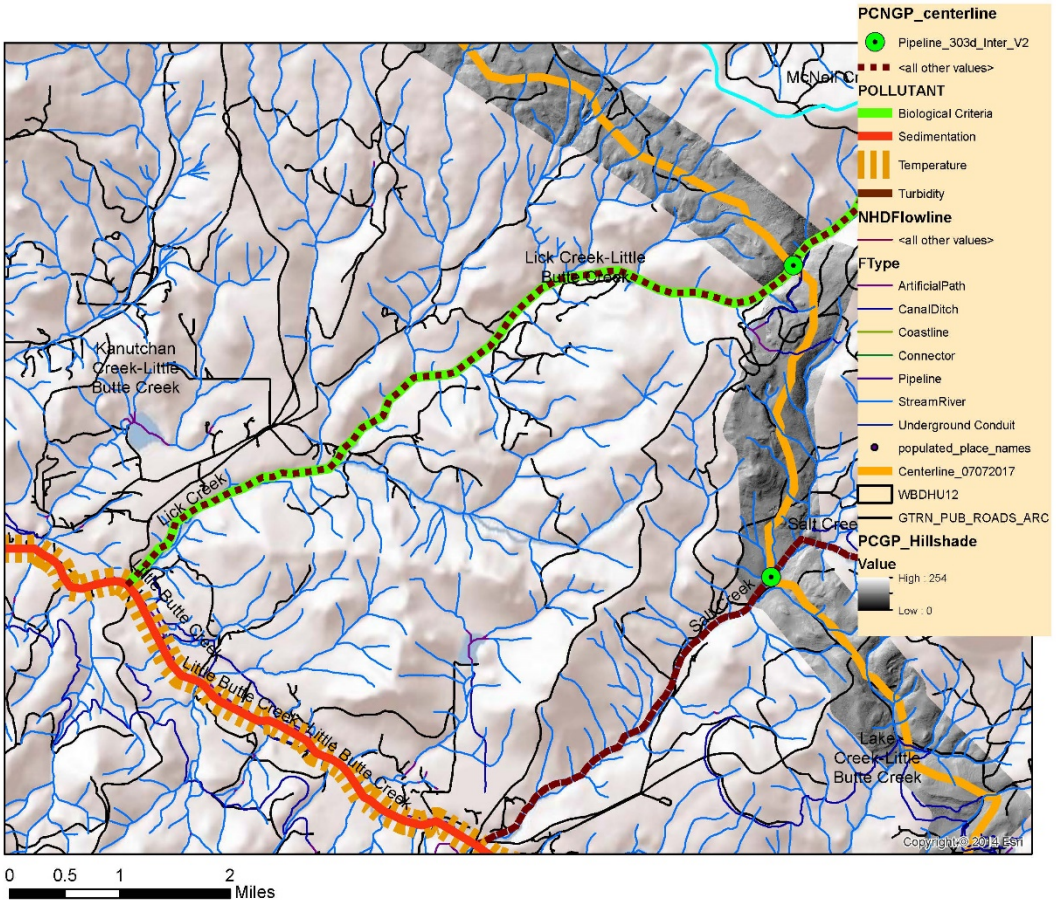
Section 6.1.2.1 of this report provides an evaluation of pipeline construction effects in areas of known or suspected landslide occurrence. In particular, portions of the Tyee Core Area in the Oregon Coast Range are characterized by historical land movement including rapidly moving landslides. Many of these areas form the upper drainages of headwater streams. Debris flows triggered by the placement of material and/or the management of stormwater can result increase landslide frequency that causes sediment discharge to receiving waters. Discharge of sediment and turbid flows to headwater (i.e., zero order) streams would commonly and adversely impact habitat and beneficial uses protected by the biocriteria standard. Information provided by JCEP does not demonstrate that pipeline construction would sufficiently avoid these impacts to provide reasonable assurance that the activities would not violate this standard by resulting in a loss of ecological integrity when compared to natural conditions.

DEQ refers the reader to Section 6.1.2.1 of this Report for DEQ's evaluation of JCEP's proposal to develop a construction right-of-way and a construction access road to install approximately 229 miles of pipeline. The evaluation in Section 6.1.2.1 is also relevant to DEQ's evaluation of JCEP's compliance with Oregon's biocriteria while developing the construction right-of-way (ROW) and the construction access road to build the pipeline. DEQ briefly summarizes this evaluation below.

In Section 6.1.2.1, DEQ summarizes JCEP's proposal to grade an access road and construct a 229-mile line pipeline. DEQ describes how this action would likely result in both the temporary and ongoing discharge of sediment without adequate BMPs.

Figure 13 shows the JCEP Gas Pipeline crossing tributaries to Lick Creek and crossing Lick Creek near Milepost 140.27. Lick Creek is listed on the 303(d) List for biocriteria. Sediment discharge from pipeline construction and debris flows from landslides initiated by the construction of the right-of-way could affect aquatic life in Lick Creek and the attainment of the biocriteria standard in this impaired waterbody. As noted earlier in this report, for a 303(d) listed waterbody, without a TMDL, no ongoing detrimental impact is authorized. Although natural landslides are an integral part of stream form and function, human-caused debris torrents and sedimentation impact water quality by changing the natural cycles of sediment delivery to systems, which impacts the aquatic environment; thus, affecting aquatic life (Castro and Reckendorf 1995).

Figure 13: Lick Creek and Little Butte Creek Vicinity



JCEP has not demonstrated that methods employed in pipeline construction, the development of the construction ROW, and the use of the construction access roads would sufficiently protect State waters to avoid detrimental changes in resident biological communities to comply with Oregon's biocriteria standard. The following information would be needed in order for DEQ to have a reasonable assurance that the biocriteria standard will be met:

- Modeling demonstrating that proposed right-of-way erosion controls are the most effective.
- A landslide hazard assessment following state-of-practice protocols, including both construction-induced risks and post-construction risks.
- Designs for stormwater management above unstable slopes in the right-of-way.
- Designs for fill, trenching spoils, and/or grading spoils placed on unstable slopes.

JCEP's identified siting, design and construction methods provide an inadequate analysis of Project hazards and inadequate measures to reduce potential impacts to streams and the aquatic life dependent upon these streams. DEQ cannot conclude from JCEP's proposed methods and available information that construction of the pipeline will comply with the biocriteria standard.

6.2.2.2 Waterbody Crossings

The JCEP gas pipeline would cross approximately 252 waterbodies, and in most cases, use dry open-cut crossing

techniques.[74] Dry open-cut crossings rely on diverting water around the work area to allow trenching and pipe placement to proceed across the temporarily dewatered stream. JCEP expects to backfill and restore the trench site according to the FERC's Wetland and Waterbody Procedures for most dry open-cut crossings. FERC's procedures call for one foot of clean gravel or native cobbles in all streams that contain coldwater fisheries. JCEP, however, has proposed to modify the approach where the existing substrate is not gravel or cobbles and site access is limited.[75] In these cases, JCEP would attempt to match the natural streambed material size, gradation, and composition as closely as possible.

Potential Effects on Biocriteria

Waterbody crossings can cause short- and long-term alterations of stream habitat and hydrology. The biocriteria standard extends protections to waterbodies to provide full support for beneficial uses affected by project-related actions. These actions include dry open-cut trenching, backfill placement, and restoration actions as discussed further below.

JCEP proposes a minimum of five-feet of cover above pipeline segments beneath stream crossings. The resulting trenches would temporarily displace native soils that can alter in-situ characteristics including intrinsic permeability. Zones of higher permeability can cause local infiltration, partial stream capture, and create a fish passage barrier. Project-related actions that reduce streamflow may limit habitat availability, alter channel hydrology, and modify hyporheic exchange in riparian areas.

In addition, trenches installed in consolidated rock may require blasting, rock-sawing, or jackhammering to achieve excavation specifications. Open cut trenches in bedrock-dominated stream channels are susceptible to upstream propagation of knickpoints created by fractures and joints in the stream's bedrock created during the excavation process.[76] Knickpoint propagation in bedrock-dominated streams can alter stream geomorphology and potentially develop into barriers to fish migration.

Last, general construction practices related to flume installation and removal, site-restoration, and other Project-related activities can increase stream sediment releases. Sediment releases can have an adverse effect on substrate characteristics, oxygen availability, and habitat complexity.

Evaluation

Project-related activities including trenched waterbody crossings may affect stream habitat and reduce support for beneficial uses. JCEP must identify appropriate mitigation or restoration procedures that address the specific negative impacts to the biological communities present at each waterbody crossing to demonstrate compliance with this standard. While the biocriteria standard extends protections to all waterbodies, DEQ has identified that the pipeline would cross five stream segments listed as impaired for the biocriteria water quality standard. Two of these crossings, Olalla Creek (MP 58.78) and North Myrtle Creek (MP 79.12), include spawning and rearing habitat for Endangered Species Act-listed Oregon Coast ESU Coho salmon. JCEP has classified these crossings as Level 2 with a high potential for migration, avulsion and/or scour. In addition, JCEP proposes numerous waterbody crossings for headwater streams that are hydrologically connected with upper-watershed habitat networks. Maintaining protections at each affected waterbody crossing is critical to protecting state waters and designated beneficial uses to comply with the biocriteria water quality standard.

DEQ requested information on March 11, 2019, including specific field data to characterize the pre-development hydrology, geomorphic characteristics, and habitat features. DEQ based this request on protocol developed by the U.S. Fish and Wildlife Service in conjunction with Ruby Pipeline, LLC for assessing risks from pipeline stream

[74] Pacific Connector Gas Pipeline Resource Report RR2, Appendix 2/Table A.2-2.

[75] Pacific Connector Gas Pipeline, Erosion Control and Revegetation Plan. October 2017.

[76] Selander, Jacob. 2004. Processes of Knickpoint Propagation and Bedrock Incision in the Oregon Coast Range. Department of Geologic Sciences. University of Oregon.

crossings.[77] The site assessments DEQ requested for planning construction and restoration actions are necessary for DEQ to evaluate compliance with the biocriteria standard. Without this information DEQ is unable to find that the proposed waterbody crossing methods will comply with OAR 340-041-0011.

6.2.2.3 Road Construction and Maintenance

For pipeline construction, JCEP would need to improve and maintain several hundred miles of existing access roads. JCEP would also need to develop a 229-mile construction access road in the construction right-of-way. Moreover, JCEP would need to construction 25 segments of Temporary Access Roads and Permanent Access Roads. The improvement of existing access roads would involve resurfacing, widening of the travel way, culvert replacements, installation of temporary bridges, and other actions necessary to provide transportation access during construction. As documented in Section 6.1.2.3 of this report, road surfaces, fills, and cut slopes serve as a potential source of sediment input to streams. Sedimentation from road can significantly affect habitat function and availability.

DEQ refers the reader to Section 6.1.2.3 of this Report for DEQ's evaluation of JCEP's proposed road use and construction during pipeline construction. The evaluation in Section 6.1.2.3 is relevant to DEQ's evaluation of JCEP's compliance with the biocriteria standard while using existing access roads, improving existing roads, and constructing new roads. DEQ briefly summarizes this evaluation below.

In Section 6.1.2.3, DEQ describes how JCEP's use of existing access roads can cause sediment discharge to streams. DEQ also describes the lack of clear BMPs that JCEP would use to maintain and, if needed, improve these roads to prevent sediment discharge to streams during pipeline construction. In addition, DEQ evaluates the Erosion Control and Revegetation Plan and Transportation Management Plan that JCEP proposed to control sediment discharge from roads. The evaluation of these plans documents their deficiencies. Finally, DEQ evaluates JCEP's actions to conduct an inventory of unpaved existing access roads to develop a DEQ-requested maintenance and improvement for these roads. DEQ documents the incomplete inventory that JCEP conducted to identify hydrologically connected existing access road segments. This incomplete inventory provides a gross underestimate of the access road segments that have the potential to discharge sediment to streams.

In its December 20, 2018 supplemental information request, DEQ summarized the scientific literature and technical resources concerning the importance of nonpaved road design to protect water quality for aquatic life (see Page 18 - 19 of Attachment A). Notably, the National Marine Fisheries Service identified routine road maintenance as a needed action to assist in the recovery of salmonids listed under the Endangered Species Act (see Page 18 of Attachment A). Castro and Reckendorf (1995) summarize the impact of sediment in aquatic environments and its effect on aquatic life.

JCEP has not demonstrated that methods employed in pipeline construction and the design of the construction access road would avoid detrimental changes to resident biological communities as required by Oregon's biocriteria standard. Specifically, the application lacks the following information necessary to evaluate project effects on the biocriteria standard:

- Comprehensive inventory of hydrologically connected existing access road segments.
- Comprehensive maintenance and improvement plan for existing access roads.
- Information supporting proposed erosion controls on unstable cut and fill slopes on improved/new roads.
- Modeling demonstrating that the proposed erosion controls on roads are the most effective.
- A landslide hazard assessment including post-construction landslide hazards.

[77] Castro, J.M., A. MacDonald, E. Lynch, and R. Thorne. 2014 *Risk-based Approach to Designing and Reviewing Pipeline Stream Crossings to Minimize Impacts to Aquatic Habitats and Species*. River Research and Applications

Without this information, DEQ is unable to find that the proposed road construction and maintenance activities will comply with OAR 340-041-0011.

6.2.2.4 Pipeline Right-of-Way

JCEP proposes to manage the pipeline permanent easement in such a way to provide access and maintenance in perpetuity. Pipeline corridor management includes maintaining stormwater controls along the alignment. Sediment runoff is a potential source of pollutants to receiving streams. Proper runoff controls and management practices are necessary to avoid discharges that reduce support for aquatic receptors.

DEQ refers the reader to Section 6.1.2.4 of this report for DEQ's evaluation of the potential effects of JCEP's permanent pipeline right-of-way. DEQ's analysis in Section 6.1.2.4 is relevant to the potential effects of stormwater discharge and the management of cut and fill slope on the biocriteria standard. DEQ briefly summarizes this evaluation below.

In Section 6.1.2.4, DEQ evaluates the function of a permanent slope breaker (i.e., water bar) and describes how this stormwater collection system concentrates stormwater discharge along the permanent ROW. DEQ details the initial and final drainage area for permanent slope breakers on steep slopes. In addition, DEQ notes the potential for JCEP to discharge post-construction stormwater from the permanent ROW to landslide susceptibility zones. DEQ points out that JCEP did not provide DEQ with a post-construction stormwater management plan following DEQ's 2018 guidelines for post-construction stormwater plan submissions which request project proponents consider steep and landslide risks when siting discharge points.

In the evaluation in Section 6.1.2, DEQ evaluates the permanent slope breakers closest to pipeline stream crossings and their potential to discharge sediment and other pollutants to streams. DEQ explains how the permanent ROW is functioning as primitive road due soil compaction in the ROW during pipeline construction and during post-construction maintenance. DEQ finds that the permanent ROW may discharge sediment streams at a rate equivalent to a gravel road with ruts. Additionally, DEQ's finds that discharges from slope breakers within 200 feet of streams would likely deliver sediment to these streams. Moreover, DEQ notes that the area between the stream and permanent slope breaker upslope from the stream is a source of sediment delivery to streams. Given these sources of discharge, DEQ is unable to find that the proposed permanent operation and maintenance of the pipeline right-of-way will comply with OAR 340-041-0011.determine that the proposed activities will

In its December 20, 2018 supplemental information request (see Pages 66 - 68 of Attachment A), DEQ's explained its rationale for its request for modeling and engineering analysis for the permanent ROW stormwater discharges to stream described above. This evaluation further documents the potential sources of sediment discharge that can contribute to or cause a violation of Oregon's biocriteria standard.

6.2.2.5 Terminal and Off-Site Project Area Stormwater

Section 6.1.2.5 of this report provides an evaluation of Jordan Cove's proposed actions to manage stormwater in the construction and operation of the Terminal and Off-site Areas. DEQ refers the reader to Section 6.1.2.5 for DEQ's evaluation of these proposed actions. The evaluation in Section 6.1.2.5 is also relevant to DEQ's evaluation of Pacific Connector's compliance with Oregon's biocriteria while managing construction stormwater in the Terminal and Off-Site Project areas, managing stormwater and decant from dredge material disposal sites, and managing post-construction stormwater during the operation of the Terminal. DEQ notes particularly that the proposed stormwater discharge is via an existing ocean outfall. DEQ has not evaluated the effects of this aspect of the proposed activity on biological receptors in the vicinity of the outfall.

6.2.2.6 Dredge Material Management

JCEP proposes to dredge and excavate 6.32 million cubic yards to create the project's slip and access channel, as well as marine waterway modifications. JCEP proposes to dispose of this material at the LNG facility, the APCO sites, and at the Kentuck mitigation site. JCEP anticipates disposing much of the material at the Jordan Cove facility to increase the site elevation to a minimum of 34.5 feet NAVD88 consistent with design-level tsunami mitigation criteria.[78,79] Several upland wetland areas are known to exist in the immediate vicinity of developed portions of the LNG site. These are identified as Wetlands 2013-2, 2013-3, and 2013-4 on Figure 14 and include seasonally flooded Palustrine emergent wetlands whose hydrology is influenced by seasonally high groundwater conditions.

JCEP proposes to avoid site development that directly affects the wetland areas referenced above. However, placement of dredge material near these locations can permanently alter surface hydrology necessary to maintain hydrologic function of the wetland habitat. Further, runoff from marine dredged material may alter salinity and water quality characteristics of these areas. Hydrologic and chemical alteration of wetland habitats may reduce support for biological communities adapted to freshwater, seasonally flooded wetland environments. Oregon's biocriteria requires that water quality be preserved to provide support for aquatic species without detrimental changes in the resident biological communities. On December 20, 2018, DEQ requested JCEP provide information to demonstrate what measures JCEP would undertake to demonstrate protection of water quality given the proposed potential disposal of such materials in proximity to wetlands. Specifically, DEQ requested:

- How would JCEP manage the fresh and/or saline decant water if discharged from these sites to the surrounding landscape?
- How would the management of the decant water comply with Oregon's biocriteria (OAR 340-041-0011) if this decant water is discharged to waters of the state such as fresh or estuarine wetlands?[80]

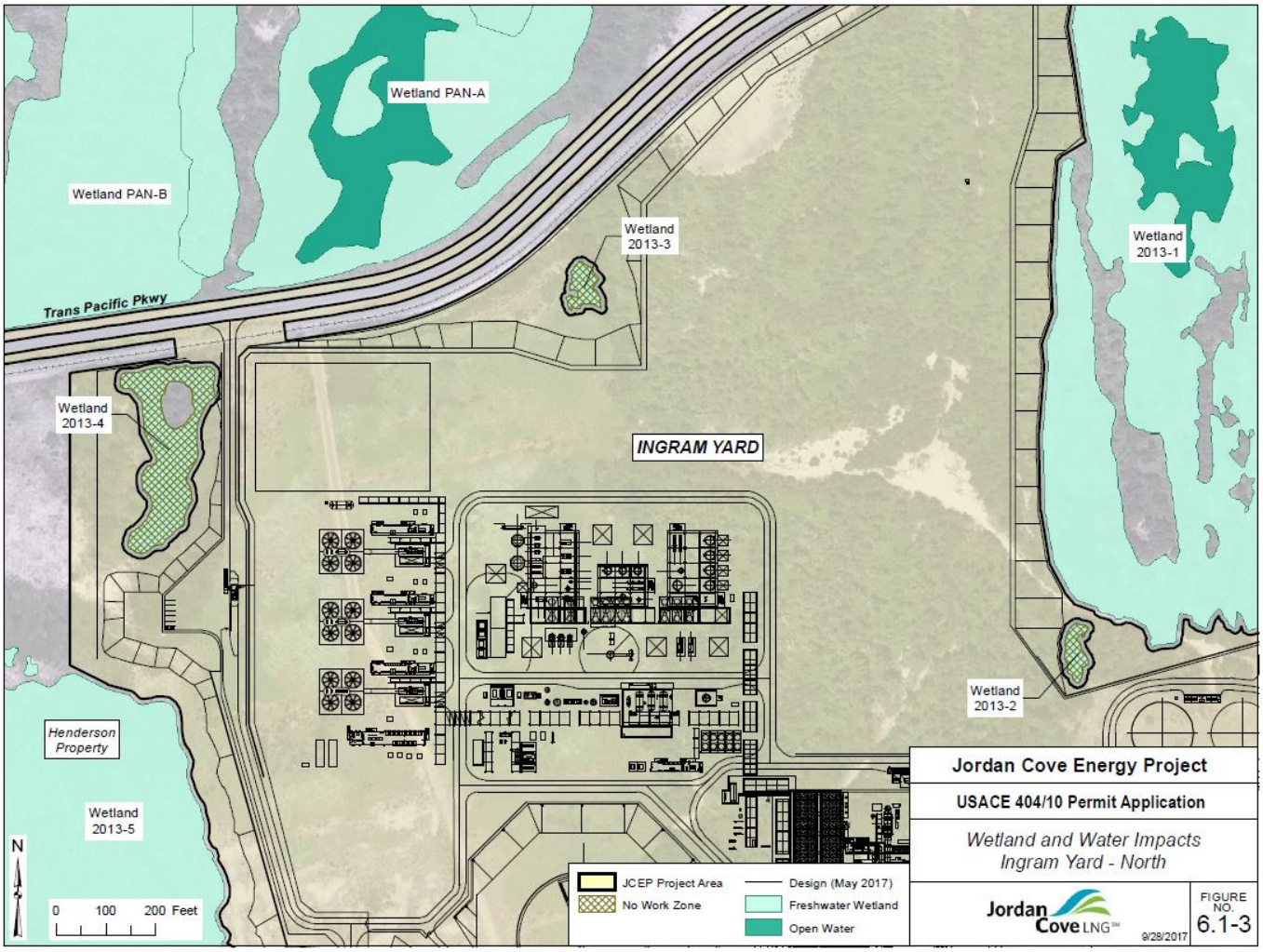
In correspondence dated February 20, 2019, JCEP proposed to address measures to demonstrate compliance with the biocriteria standard in a Dredging Pollution Prevention Plan. JCEP has not submitted a Dredging Pollution Prevention Plan that demonstrates how JCEP would minimize or mitigate the known likely violations of biocriteria standard. Accordingly, for the reasons discussed above, DEQ in unable to determine that JCEP's proposed management of dredged material will comply with OAR 340-041-0011.

[78] North American Vertical Datum of 1988.

[79] Jordan Cove Resource Report 1. September 2017.

[80] Supplemental Information Request. DEQ, December 20, 2018.

Figure 14: Wetland Areas Adjacent to LNG Terminal and Dredge Spoil Placement



6.2.3 DEQ Findings

Based on the preceding evaluation of Project effects, DEQ adopts the following findings related to OAR 340-041-0011 (Biocriteria):

1. JCEP has not demonstrated that the proposed pipeline construction, access road construction and maintenance, and pipeline right-of-way activities would avoid or mitigate detrimental changes in habitat structure and function, flow and resident biological communities;
2. JCEP has not demonstrated that the proposed road construction and maintenance activities would be conducted in a manner to avoid or mitigate detrimental changes in the resident biological communities;
3. JCEP has not demonstrated that the proposed pipeline construction, access road construction and maintenance, and pipeline right-of-way activities would identify and avoid or mitigate increases in landslide frequency that would result in detrimental changes in the resident biological communities;
4. JCEP's proposed management of stormwater in the Terminal and Off-Site Project Areas during construction and operation of the Project is likely to cause short and long-term alterations to wetland hydrology, turbidity, and form with sediment deposits, and these changes would result in detrimental alterations to the resident biological community dependent on these wetlands.
5. JCEP's management of stormwater and decant water during construction and operation of dredged material disposal sites is likely to cause short and long-term alterations to wetland hydrology, turbidity, and form with sediment deposits, and these alterations likely would result in detrimental changes to the resident biological community dependent on these wetlands.
6. JCEP proposes the permanent placement of marine sediments in upland locations that may alter the hydrologic and chemical characteristics of nearby wetland areas in a manner that would likely lead to violation of biocriteria, OAR 340-041-0011. Absent a plan to avoid or mitigate these effects, DEQ finds no reasonable assurance that these proposed activities would not violate the biocriteria standard. OAR 340-041-0011, OAR 340-048-0020(3).

6.3 Dissolved Oxygen

6.3.1 Applicable Standard

Oregon Administrative Rules 340-041-0016 set forth the state's water quality standards for dissolved oxygen. For spawning areas, the criteria range between 8.0 and 11.0 mg/l. For cold-water aquatic life, 8.0 mg/l is an absolute minimum. For cool water aquatic life, and for estuaries, dissolved oxygen may not be less than 6.5 mi/l: See, OAR 340-041-0016.

Dissolved oxygen is a principal parameter necessary to support of aquatic life. Adequate dissolved oxygen is vital to fish, invertebrates, and other aquatic life and can vary with life stages (egg, larvae, and adults). Maintaining adequate dissolved oxygen within gravels is particularly important during incubation of salmonid embryos.

Along the route of the proposed pipeline, the following waterbodies are listed as water quality limited for dissolved oxygen:

- North Fork of the Coquille River (all year)
- Middle Fork of the Coquille River (all year)
- South Umpqua River (all year)
- Bilger Creek (all year)
- North Myrtle Creek (May 15 – Oct 15)
- South Myrtle Creek (May 15 – Oct 15)
- Days Creek (May 15 – Oct 15)
- West Fork Trail Creek (Summer)
- Lick Creek (Summer)

- Klamath River (all year)
- Lost River (all year)

6.3.2 DEQ Evaluation: Dissolved Oxygen

6.3.2.1 Pipeline construction

Land disturbance during construction can cause organic and inorganic sediment discharge to streams as described above in section 6.1. Sediment loading directly impacts oxygen saturation potential and can reduce oxygen availability in spawning gravels.. In addition to sediment, the placement of slash and vegetation in waterbodies from land clearing activities can result in a reduction of dissolved oxygen, as can the introduction of runoff from lands that are fertilized for re-establishment of vegetation. Jordan Cove would need to manage these activities carefully in order to avoid adding pollutants that could reduce dissolved oxygen levels.

6.3.2.2 Waterbody Crossings

As discussed in Section 6.1.2.2 of this report, JCEP proposes to cross about 252 waterbodies (not including wetlands) using dry open-cut techniques. For the second South Umpqua River crossing (MP 94.73) JCEP proposes a diverted open cut crossing. For all other dry open-cut locations, JCEP proposes to temporarily dewater the work area using either fluming or dam-and-pump techniques.

Streamflow diversions can depress dissolved oxygen in several ways. First, bypassing streamflow through channelized diversions can alter natural stream function and reduce stream reaeration. Impoundments above the isolated work area may also reduce hydraulic energy that can further reduce saturation potential. In addition, solar gain and/or mechanical warming from transfer pumps may increase water temperature and reduce the dissolved oxygen saturation potential. Last, sediment releases following removal of the dam can increase oxygen demand below the work area.

JCEP states they intend to conduct stream crossings during seasonally low flow conditions. However, seasonally low flow conditions reduce the waterbody's capacity to assimilate pollutant loads without detrimental changes to water quality. According to DEQ's Antidegradation policy, up to a 0.1 mg/l decrease in dissolved oxygen from the upstream end of a stream reach to the downstream end of the reach is not considered a reduction in water quality so long as it has no adverse effects on threatened and endangered species.[81]

During pipeline construction, and as detailed above, JCEP proposes to cross 11 streams identified as impaired for dissolved oxygen. In these areas, no additional degredation of dissolved oxygen levels is allowed. These areas include the West Fork Trail Creek (MP 118.89), a perennial stream in a bedrock-dominated channel. This reach includes rearing and spawning habitat for ESA-listed Southern Oregon Northern California Coho salmon. JCEP proposes a dry open-cut crossing at this location, and JCEP provides no specific measures to mitigate water quality impacts. In addition, JCEP provides no water quality measures in the site specific restoration plan developed for this proposed crossing.[82]

The waterbody crossing at West Fork Trail Creek is impaired for dissolved oxygen and cannot assimilate additional pollutant loading without causing a violation of the standard. Because the actions proposed by JCEP are known to affect streamflow in ways that may decrease oxygen saturation potential, DEQ expects dry open-cut waterbody crossings would cause a violation of water quality standards. Furthermore, because smaller streams are more susceptible to water quality degradation from environmental stressors than streams with higher base flow, DEQ expects the JCEP's proposed actions would likely reduce oxygen saturation potential at other locations, as well.

[81] OAR 340-041-0004(3)(d).

[82] Stream Crossing Risk Analysis Addendum, Exhibit C-6. Pacific Connector Gas Pipeline, April 2018.

6.3.2.3 Road construction and Maintenance

Depending on the design, new road construction and the management of stormwater on existing roads can initiate debris flows into streams in landslides susceptibility zones. As noted in Sections 6.1.2.1 and 6.1.2.3, JCEP has not performed a comprehensive landslide hazard assessment to identify potential landslide risks associated with JCEP's proposed road use and construction. This assessment is necessary to mitigate landslide risks. Moreover, as noted in Section 6.1.2.3, JCEP has not conducted an inventory of existing access roads to identify road segments hydrologically connected to streams. This inventory is necessary for the development of a maintenance and improvement plan for existing access road to prevent and minimize sediment discharge to streams.

Debris flows initiated by roads can deposit substantial quantities of soil, coarse woody debris, and leaves into streams. Sediment discharge from road use also contains organic matter. The decomposition of this organic matter in streams can reduce dissolved oxygen. Given the lack of a comprehensive landslide hazard assessment and a road maintenance and improvement plan from JCEP, DEQ cannot conclude the proposed road use and construction would be conducted in a manner consistent with the dissolved oxygen standard.

6.3.2.4 Permanent Pipeline Right-of-Way

Depending on the design and operation of the pipeline right-of-way, the design cut and fill slopes and/or the stormwater management system can initiate debris flows into streams in landslides susceptibility zones. As noted in Sections 6.1.2.4, JCEP has not performed a comprehensive landslide hazard assessment to identify potential landslide risks associated with JCEP's pipeline right-of-way. This assessment is necessary to mitigate landslide risks. The design of the stormwater management system in the right-of-way can also discharge sediment containing organic matter into streams at crossings and near discharge points. The decomposition of organic debris in streams can reduce dissolved oxygen levels.

In a September 7, 2018 information request, DEQ requested that JCEP provide a post-construction stormwater management plan addressing DEQ's 401 plan submission guidelines as discussed in Section 6.1.2.4. JCEP has not provided DEQ with this post-construction stormwater management plan. DEQ does not have sufficient information from JCEP to evaluate whether minimization or mitigation measures would be sufficient to prevent or offset increases in dissolved oxygen levels caused by JCEP's proposed activities, including but not limited to its maintenance of the pipeline permanent right-of-way.

6.3.3 DEQ Findings: Dissolved Oxygen

Based on the preceding evaluation of Project effects, DEQ adopts the following findings related to OAR 340-041-0016 (Dissolved Oxygen):

1. JCEP has not demonstrated that the proposed pipeline construction, access road construction and maintenance, and pipeline right-of-way activities would avoid or mitigate adverse effects on dissolved oxygen, particularly in the 11 waterbody crossings where standards are not currently met and no additional loading is allowed. JCEP's proposed construction and use of temporary and permanent rights of way are land disturbance activities that would likely reduce oxygen availability in spawning gravels and likely result in organic and inorganic sediment discharge to streams in amounts inconsistent with dissolved oxygen standard.
2. JCEP's proposed activities do not include sufficient methods to minimize or mitigate for potential Project-related reductions in dissolved oxygen at proposed waterbody crossings or from the impacts of roads, including plans to avoid increases in the frequency of landslides from road construction and use.

Based upon these findings, DEQ concludes that it does not have a reasonable assurance that the proposed activities will be conducted in a manner that will not violate the Dissolved Oxygen water quality standard at OAR 340-41-0016.

6.4 Nuisance Phytoplankton Growth

6.4.1 Applicable Standard

The Nuisance Phytoplankton Growth standard is found in Oregon Administrative Rules 340-041-0019

The standard establishes average Chlorophyll-a values for water bodies where phytoplankton may impair the recognized beneficial uses.

6.4.2 DEQ Evaluation: Nuisance Phytoplankton Growth

Although several waterbodies are identified as water quality limited for Chlorophyll, DEQ does not expect the proposed Project to significantly affect conditions that would cause nuisance phytoplankton growth.

6.4.3 DEQ Findings

DEQ is reasonably assured the proposed Project will comply with the Nuisance Phytoplankton Growth water quality standard.

6.5 Hydrogen Ion Concentration (pH)

6.5.1 Applicable Standard

Oregon Administrative Rules 340-041-0021 provides that:

1) Unless otherwise specified in OAR 340-041-0101 through 340-041-0350, pH values (Hydrogen ion concentrations) may not fall outside the following ranges:

(a) Marine waters: 7.0-8.5;

(b) Estuarine and fresh waters: See basin specific criteria (OAR 340-041-0101 through 340-041-0350).

The applicable basin-specific criteria are presented in the table below.

Table 4: Basin-Specific Criteria: pH

	South Coast	Umpqua	Rogue	Klamath
Fresh (except Cascade lakes)	NA	NA	NA	6.5 – 9.0[a]
Estuarine & Fresh	6.5 – 8.5	6.5 – 8.5	6.5 – 8.5	NA
Marine	7.0 – 8.5	7.0 – 8.5	7.0 – 8.5	NA
Cascade lakes above 3,000 feet elev.	NA	6.0 – 8.5	6.0 – 8.5	NA
Cascade lakes above 5,000 feet elev.	NA	NA	NA	6.5 – 8.5

[a] When greater than 25 percent of ambient measurements taken between June and September are greater than pH 8.7, and as resources are available according to priorities set by the Department, the Department would determine whether the values higher than 8.7 are anthropogenic or natural in origin.

6.5.2 DEQ Evaluation: pH

Surface waters are susceptible to changes in pH caused by several factors including chemical releases, elevation, temperature, and biological processes such as photosynthesis and algal respiration. Surface water pH varies regionally throughout Oregon. External factors that cause aquatic pH to exceed regional ranges may stress biological functions of aquatic receptors. In addition, water column pH also determines the solubility and

biological availability of chemical constituents such as nutrients (e.g., phosphorus, nitrogen, and carbon) and heavy metals (e.g. lead and copper). In the case of certain heavy metals, water column pH also determines their toxicity.

The South Umpqua (Clark Branch) is water quality limited for pH. JCEP proposed to place the pipeline under the river bed via the direct pipe method.

Days Creek also is water quality limited for pH during the summer, as is the Rogue River. The Rogue River crossing is proposed as a HDD boring under the river bed. Butte Creek also is water quality limited for pH during the summer, as is the Klamath River (HDD bore).

6.5.2.1 Road Construction and Maintenance

Depending on the design, new road construction and the management of stormwater on existing roads can initiate debris flows into streams in landslides susceptibility zones. As noted in Sections 6.1.2.1 and 6.1.2.3, JCEP has not performed a comprehensive landslide hazard assessment to identify potential landslide risks associated with JCEP's proposed road use and construction. Debris flows initiated by roads can deposit substantial quantities of soil, coarse woody debris, and leaves into streams. The pH of the soil input, the pH the receiving water, the underlying bedrock geology, and the composition of the stream microbial community interact to influence the decomposition of this deposited organic matter. The decomposition of these organic matter inputs may alter stream pH. For example, over time, decaying leaves in streams can increase pH.[83] The decomposition of roots, wood, and bark release tannins such as tannic acid, which can lower stream pH. Without site-specific information on the source of debris flow, the chemistry of the receiving stream, and a comprehensive landslide hazard assessment, DEQ cannot conclude there is a reasonable assurance that the proposed road use and construction will be conducted in a manner that will not violate the pH standard.

6.5.2.2 Pipeline Right-of-Way

The pipeline's permanent easement would alter the surface hydrology and local stormwater runoff characteristics. Increased sediment loading to hydrologically connected streams may likely affect certain water quality characteristics including increasing pH in such waterbodies. On September 7, 2018, DEQ requested JCEP prepare and submit a post-construction stormwater management plan with procedures to manage the discharge of pollutants from the 1,373.66 acres of permanent right-of-way occupied by the pipeline. Because JCEP has not provided DEQ with the required management plan, DEQ cannot determine whether the proposed operation of the pipeline would meet the pH standard.

6.5.3 DEQ Findings

Based upon these findings, violations of the pH standard may occur in a few locations where the standard is not currently being met. JCEP has not identified methods to assure that no additional loading will occur in these areas whether the pipeline would cross a waterbody that is limited for pH. DEQ concludes that it does not have a reasonable assurance that the proposed activities will be conducted in a manner that will not violate the pH water quality standard at OAR 340-41-0021.

6.6 Temperature

Oregon's water quality standard for temperature is complex. Oregon Administrative Rules 340-041-0028. It include biologically based numeric criteria for waterbodies supporting salmonids, a numeric standard for the ocean and bays, a standard for waterbodies supporting cool water species, and a standard for protecting cold water in salmon, steelhead and bull trout waterbodies. In the numerous waterbodies that do not meet these standards, if there is a TMDL, the TMDL will contain allocations for non-point sources, and require implementation plans,

[83] Deano, Paula M. and J. W. Robinson. 1985. *The Effect of Decaying Leaves on pH and Buffer Capacity of Waters*. Journal of Environmental Science and Health. Volume 20: 903-911

including from the BLM and the USFS. Typically, these plans limit the increase in temperature from all anthropogenic sources to no more than 0.3 degrees C. If no TMDL has been adopted, a new source may be allowed only if it is demonstrated that the source will not add to temperature loads. This could be done through a temperature implementation plan, and could include mitigation, so long as the mitigation is in the same watershed.

Biologically based numeric temperature criteria applicable to the Project are determined by the Fish Use and Spawning Maps presented as Figures 340A and 340B of Oregon Administrative Rule 340, Division 041. Figure 340A designates the entire project as suitable habitat for bull trout. The seven-day-average maximum temperature of a stream identified as having bull trout spawning and juvenile rearing use is 12.0 degrees Celsius year round.

6.6.1 Applicable Standard

Oregon Administrative Rules 340-041-0028:

(1) Background. Water temperatures affect the biological cycles of aquatic species and are a critical factor in maintaining and restoring healthy salmonid populations throughout the State. Water temperatures are influenced by solar radiation, stream shade, ambient air temperatures, channel morphology, groundwater inflows, and stream velocity, volume, and flow. Surface water temperatures may also be warmed by anthropogenic activities such as discharging heated water, changing stream width or depth, reducing stream shading, and water withdrawals.

(2) Policy. It is the policy of the Commission to protect aquatic ecosystems from adverse warming and cooling caused by anthropogenic activities. The Commission intends to minimize the risk to cold-water aquatic ecosystems from anthropogenic warming, to encourage the restoration and protection of critical aquatic habitat, and to control extremes in temperature fluctuations due to anthropogenic activities. The Commission recognizes that some of the State's waters will, in their natural condition, not provide optimal thermal conditions at all places and at all times that salmonid use occurs. Therefore, it is especially important to minimize additional warming due to anthropogenic sources. In addition, the Commission acknowledges that control technologies, best management practices and other measures to reduce anthropogenic warming are evolving and that the implementation to meet these criteria will be an iterative process. Finally, the Commission notes that it will reconsider beneficial use designations in the event that man-made obstructions or barriers to anadromous fish passage are removed and may justify a change to the beneficial use for that water body.

(3) Purpose. The purpose of the temperature criteria in this rule is to protect designated temperature-sensitive, beneficial uses, including specific salmonid life cycle stages in waters of the State.

(4) Biologically Based Numeric Criteria. Unless superseded by the natural conditions criteria described in section (8) of this rule, or by subsequently adopted site-specific criteria approved by EPA, the temperature criteria for State waters supporting salmonid fishes are as follows:

(a) The seven-day-average maximum temperature of a stream identified as having salmon and steelhead spawning use on subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 130B, 151B, 160B, 170B, 220B, 230B, 271B, 286B, 300B, 310B, 320B, and 340B, may not exceed 13.0 degrees Celsius (55.4 degrees Fahrenheit) at the times indicated on these maps and tables;

(b) The seven-day-average maximum temperature of a stream identified as having core cold water habitat use on subbasin maps set out in OAR 340-041-101 to 340-041-340: Figures 130A, 151A, 160A, 170A, 180A, 201A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 16.0 degrees Celsius (60.8 degrees Fahrenheit);

(c) The seven-day-average maximum temperature of a stream identified as having salmon and trout rearing and migration use on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130A, 151A, 160A,

170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit);

(d) The seven-day-average maximum temperature of a stream identified as having a migration corridor use on subbasin maps and tables OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 151A, 170A, 300A, and 340A, may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit). In addition, these water bodies must have cold water refugia that are sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body. Finally, the seasonal thermal pattern in Columbia and Snake Rivers must reflect the natural seasonal thermal pattern;

(e) The seven-day-average maximum temperature of a stream identified as having Lahontan cutthroat trout or redband trout use on subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Tables 121B, 140B, 190B, and 250B, and Figures 180A, 201A, 260A and 310A may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit);

(f) The seven-day-average maximum temperature of a stream identified as having bull trout spawning and juvenile rearing use on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130B, 151B, 160B, 170B, 180A, 201A, 260A, 310B, and 340B, may not exceed 12.0 degrees Celsius (53.6 degrees Fahrenheit). From August 15 through May 15, in bull trout spawning waters below Clear Creek and Mehlhorn reservoirs on Upper Clear Creek (Pine Subbasin), below Laurance Lake on the Middle Fork Hood River, and below Carmen reservoir on the Upper McKenzie River, there may be no more than a 0.3 degrees Celsius (0.5 Fahrenheit) increase between the water temperature immediately upstream of the reservoir and the water temperature immediately downstream of the spillway when the ambient seven-day-average maximum stream temperature is 9.0 degrees Celsius (48 degrees Fahrenheit) or greater, and no more than a 1.0 degree Celsius (1.8 degrees Fahrenheit) increase when the seven-day-average stream temperature is less than 9 degrees Celsius.

(5) Unidentified Tributaries. For waters that are not identified on the “Fish Use Designations” maps referenced in section (4) of this rule, the applicable criteria for these waters are the same criteria as is applicable to the nearest downstream water body depicted on the applicable map. This section (5) does not apply to the “Salmon and Steelhead Spawning Use Designations” maps.

(6) Natural Lakes. Natural lakes may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the natural condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life. Absent a discharge or human modification that would reasonably be expected to increase temperature, DEQ will presume that the ambient temperature of a natural lake is the same as its natural thermal condition.

(7) Oceans and Bays. Except for the Columbia River above river mile 7, ocean and bay waters may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the natural condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life. Absent a discharge or human modification that would reasonably be expected to increase temperature, DEQ will presume that the ambient temperature of the ocean or bay is the same as its natural thermal condition.

(8) Natural Conditions Criteria. Where the department determines that the natural thermal potential of all or a portion of a water body exceeds the biologically-based criteria in section (4) of this rule, the natural thermal potential temperatures supersede the biologically-based criteria, and are deemed to be the applicable temperature criteria for that water body.

NOTE: On August 8, 2013, the Environmental Protection Agency disapproved rule section OAR 340-041-0028(8). Consequently, section (8) is no longer effective as a water quality criterion for purposes of CWA Section 303(c) and it cannot be used for issuing certifications under CWA Section 401, permits under CWA Section 402, or total maximum daily loads under CWA section 303(d).

(9) Cool Water Species.

(a) No increase in temperature is allowed that would reasonably be expected to impair cool water species. Waters of the State that support cool water species are identified on subbasin tables and figures set out in OAR 340-041-0101 to 340-041-0340; Tables 140B, 190B and 250B, and Figures 180A, 201A and 340A.

(b) See OAR 340-041-0185 for a basin specific criterion for the Klamath River.

(10) Borax Lake Chub. State waters in the Malheur Lake Basin supporting the Borax Lake chub may not be cooled more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) below the natural condition.

(11) Protecting Cold Water.

(a) Except as described in subsection (c) of this rule, waters of the State that have summer seven-day-average maximum ambient temperatures that are colder than the biologically based criteria in section (4) of this rule, may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the colder water ambient temperature. This provision applies to all sources taken together at the point of maximum impact where salmon, steelhead or bull trout are present.

(b) A point source that discharges into or above salmon & steelhead spawning waters that are colder than the spawning criterion, may not cause the water temperature in the spawning reach where the physical habitat for spawning exists during the time spawning through emergence use occurs, to increase more than the following amounts after complete mixing of the effluent with the river:

(A) If the rolling 60 day average maximum ambient water temperature, between the dates of spawning use as designated under subsection (4)(a) of this rule, is 10 to 12.8 degrees Celsius, the allowable increase is 0.5 Celsius above the 60 day average; or

(B) If the rolling 60 day average maximum ambient water temperature, between the dates of spawning use as designated under subsection (4)(a) of this rule, is less than 10 degrees Celsius, the allowable increase is 1.0 Celsius above the 60 day average, unless the source provides analysis showing that a greater increase will not significantly impact the survival of salmon or steelhead eggs or the timing of salmon or steelhead fry emergence from the gravels in downstream spawning reach.

(c) The cold water protection narrative criteria in subsection (a) do not apply if:

(A) There are no threatened or endangered salmonids currently inhabiting the water body;

(B) The water body has not been designated as critical habitat; and

(C) The colder water is not necessary to ensure that downstream temperatures achieve and maintain compliance with the applicable temperature criteria.

(12) Implementation of the Temperature Criteria.

(a) Minimum Duties. There is no duty for anthropogenic sources to reduce heating of the waters of the State below their natural condition. Similarly, each anthropogenic point and nonpoint source is responsible only for controlling the thermal effects of its own discharge or activity in accordance with its overall heat contribution. In no case may a source cause more warming than that allowed by the human use allowance provided in subsection (b) of this rule.

(b) Human Use Allowance. Insignificant additions of heat are authorized in waters that exceed the applicable temperature criteria as follows:

(A) Prior to the completion of a temperature TMDL or other cumulative effects analysis, no single NPDES point source that discharges into a temperature water quality limited water may cause the temperature of the water body to increase more than 0.3 degrees Celsius (0.5 Fahrenheit) above the applicable criteria after mixing with either twenty five (25) percent of the stream flow, or the temperature mixing zone, whichever is more restrictive; or

(B) Following a temperature TMDL or other cumulative effects analysis, waste load and load allocations will restrict all NPDES point sources and nonpoint sources to a cumulative increase of no greater than 0.3 degrees Celsius (0.5 Fahrenheit) above the applicable criteria after complete mixing in the water body, and at the point of maximum impact.

(C) Point sources must be in compliance with the additional mixing zone requirements set out in OAR 340-041-0053(2)(d).

(D) A point source in compliance with the temperature conditions of its NPDES permit is deemed in compliance with the applicable criteria.

(c) Air Temperature Exclusion. A water body that only exceeds the criteria set out in this rule when the exceedance is attributed to daily maximum air temperatures that exceed the 90th percentile value of annual maximum seven-day average maximum air temperatures calculated using at least 10 years of air temperature data, will not be listed on the section 303(d) list of impaired waters and sources will not be considered in violation of this rule.

(d) Low Flow Conditions. An exceedance of the biologically-based numeric criteria in section (4) of this rule, or an exceedance of the natural condition criteria in section (8) of this rule will not be considered a permit violation during stream flows that are less than the 7Q10 low flow condition for that water body.

(e) Other Nonpoint Sources. The department may, on a case-by-case basis, require nonpoint sources (other than forestry and agriculture), including private hydropower facilities regulated by a 401 water quality certification, that may contribute to warming of State waters beyond 0.3 degrees Celsius (0.5 degrees Fahrenheit), and are therefore designated as water-quality limited, to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or an applicable load allocation in a TMDL pursuant to OAR 340-042-0080.

(A) Each plan must ensure that the nonpoint source controls its heat load contribution to water temperatures such that the water body experiences no more than a 0.3 degrees Celsius (0.5 degree Fahrenheit) increase above the applicable criteria from all sources taken together at the maximum point of impact.

(B) Each plan must include a description of best management practices, measures, effluent trading, and control technologies (including eliminating the heat impact on the stream) that the nonpoint source intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure.

(C) The Department may periodically require a nonpoint source to revise its temperature management plan to ensure that all practical steps have been taken to mitigate or eliminate the temperature effect of the source on the water body.

(f) Compliance Methods. Anthropogenic sources may engage in thermal water quality trading in whole or in part to offset its temperature discharge, so long as the trade results in at least a net thermal loading decrease in anthropogenic warming of the water body, and does not adversely affect a threatened or endangered species. Sources may also achieve compliance, in whole or in part, by flow augmentation, hyporheic exchange flows, outfall relocation, or other measures that reduce the temperature increase caused by the discharge.

(g) Release of Stored Water. Stored cold water may be released from reservoirs to cool downstream waters in order to achieve compliance with the applicable numeric criteria. However, there can be no significant adverse impact to downstream designated beneficial uses as a result of the releases of this cold water, and the release may not contribute to violations of other water quality criteria. Where the Department determines that the release of cold water is resulting in a significant adverse impact, the Department may require the elimination or mitigation of the adverse impact.

(13) Site-Specific Criteria. The Department may establish, by separate rulemaking, alternative site-specific criteria for all or a portion of a water body that fully protects the designated use.

(a) These site-specific criteria may be set on a seasonal basis as appropriate.

(b) The Department may use, but is not limited by the following considerations when calculating site-specific criteria:

(A) Stream flow;

(B) Riparian vegetation potential;

(C) Channel morphology modifications;

(D) Cold water tributaries and groundwater;

(E) Natural physical features and geology influencing stream temperatures; and

(F) Other relevant technical data.

(c) DEQ may consider the thermal benefit of increased flow when calculating the site-specific criteria.

(d) Once established and approved by EPA, the site-specific criteria will be the applicable criteria for the water bodies affected.

6.6.2 DEQ Evaluation

6.6.2.1 Pipeline construction

In developing the construction right-of-way and construction access roads for the pipeline, JCEP would clear all trees and shrubs. The width of this vegetation clearing would be 95 feet and, according to JCEP, would "neck down" (i.e., narrow) to 75 feet through wetlands and waterbody crossings. However, JCEP's Environmental Alignment Sheets do not show this narrowing of the construction ROW at any of the stream crossings as indicated in Section 1.2.1.1 of Resource Report 1 (see Figures 15 and 16). Further, it appears that JCEP's analysis fails to include consideration of the pipeline alignment when in runs parallel to waterbodies, as it does in the vicinity of Spencer Creek (discussed in more detail below). The analysis also fails to account for changes in vegetation and warming as a result of new roadways, widening of existing roadways and the development of Temporary Extra Work Areas (TEWAs). All of these activities would increase thermal loading to waterbodies unless they are adequately set back. The riparian protection rules adopted by the Oregon Department of Forestry to comply with Oregon's temperature standard require retention of all trees within specified distances of streams with salmon, steelhead or bull trout (typically 60 to 80 feet for small and medium-sized streams). OAR 629-642-0105.

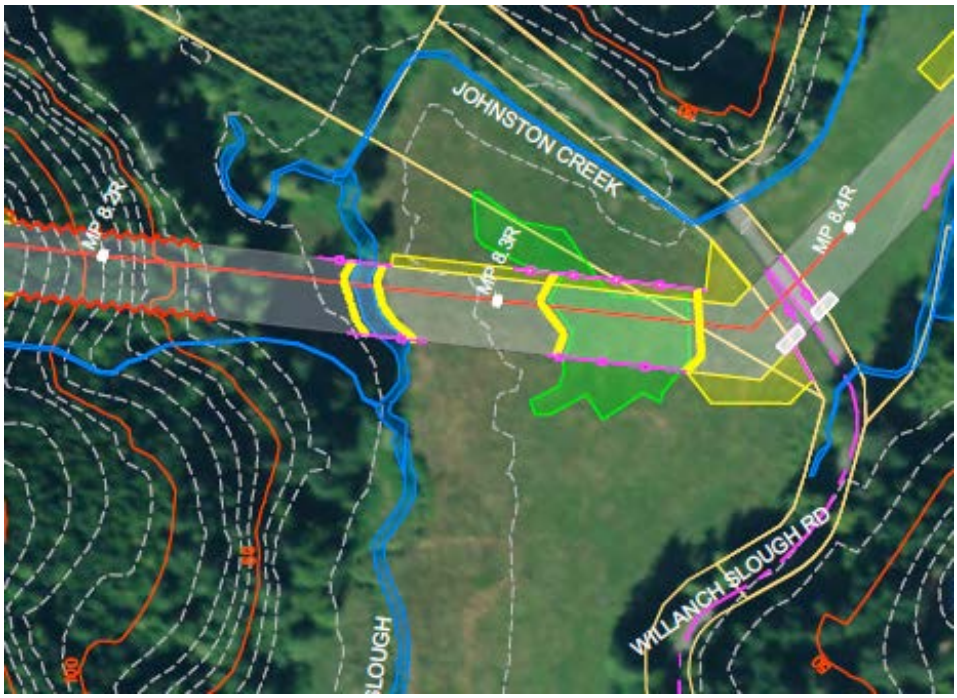
After the installation of the pipeline, JCEP would restore the vegetation removed during construction except within the 30-foot permanent right-of-way as discussed in Section 6.7.2.4 below. As a result, there would be a time lag between the removal of vegetation providing shade to waterbodies, and the reestablishment of that shade cover.

Based on FERC requirements its Wetland and Waterbody Procedures, JCEP can develop the construction right-of-way within 15 feet of streams when paralleling a stream. These procedures are significantly less protective than Oregon water quality requirements, and would allow increased thermal gain for these areas. On Forest Service and Bureau of Land Management administered public lands, JCEP proposes to site TEWAs 50 feet from streams, thereby providing somewhat more protection from increased thermal radiation to adjacent waterbodies. JCEP has not provided DEQ information regarding the setback for TEWAs at stream crossings on private land.

In its September 7, 2018 information request, DEQ requested that JCEP evaluate compliance with Total Maximum Daily Load allocations and with Designated Management Agencies' Total Maximum Daily Implementation Plans. DEQ has not received information on JCEP's compliance with TMDL allocations for temperature.

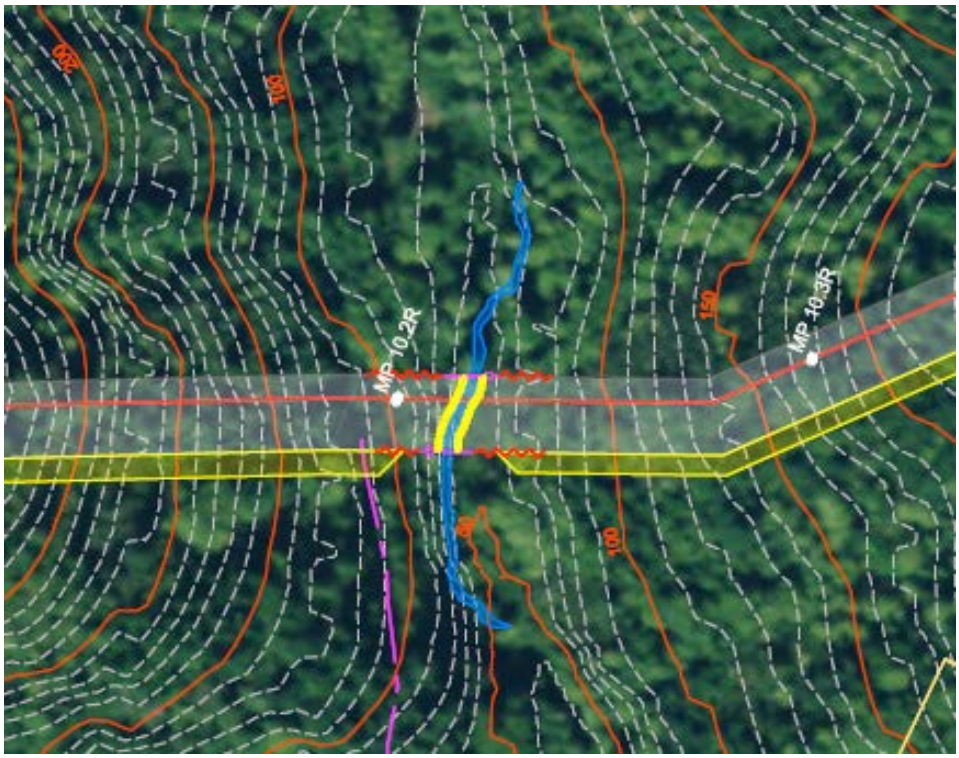
As an illustration of the reasons for DEQ's concerns about the temperature impacts of the proposed Project, at pipeline stream crossing at Milepost 58.78, Ollala Creek is limited for temperature year round and is under an approved TMDL. Similarly, DEQ has placed Rice Creek (Milepost 65.76), South Umpqua River (Milepost 71.27), North Myrtle Creek (Milepost 79.12), South Myrtle Creek (Milepost 81.19), and many others on the 303(d) list for temperature. These streams are under an approved temperature TMDL.

Figure 15: Pipeline Crossing at Wetland S1-04 (Willanch Slough) showing no "neckdown" of the ROW



Source: Environmental Alignment Sheet, Drawing Number 3430.29-006, Sheet 6 of 226.

Figure 16: Pipeline Crossing at Tributary to Cooston Channel showing no "neckdown" of ROW



Source: Environmental Alignment Sheet, Drawing Number 3430.29-008, Sheet 8 of 226.

For streams listed as impaired for temperature on the 303(d) list but not under temperature TMDL, Pacific Connector may not increase thermal loading leading to higher stream temperatures without effective mitigation. In Oregon's 2012 Integrated Report Assessment Database and 303(d) list, these streams are assigned an assessment category of five indicating a TMDL is needed to ensure these streams achieve the water quality standard. The lack of a temperature TMDL for Category 5 streams means DEQ has not established a human use allowance and reserve capacity for these streams. The reserve capacity in a TMDL ensures that loading capacity has been set aside for a safety margin and is otherwise unallocated.[84] Moreover, the human use allowance in the temperature standard does not permit a source to cause more warming than allowed under this allowance as stated in OAR 340-041-0028(12)(b).[85] Pacific Connector proposes to remove effective riparian shade on the following temperature limited Category 5 streams: North Fork Coquille River at Milepost 23.06, Middle Creek at Milepost 27.04, East Fork Coquille River at Milepost 29.85, Elk Creek at Milepost 32.40, Upper Rock Creek at Milepost 44.21, Middle Fork Coquille River at Milepost 50.28, Spencer Creek at Milepost 171.07, and Lost River at Milepost 212.07.

In evaluating compliance with TMDL Implementation Plans, DEQ's request was – in part – to determine if JCEP evaluated the thermal impact to streams from riparian vegetation removal during the development of the proposed 922.64 acres of TEWAs. DEQ was also seeking to determine JCEP's compliance with FERC's 15-foot buffer requirements noted above impacted riparian vegetation and if these impacts were evaluated in the 2017 Thermal Impact Assessment.

For example, given the proposed pipeline route, Figure 10 shows the potential for the loss of effective shade from the construction right-of-way as the pipeline parallels Spencer Creek near Milepost 177. Spencer Creek is listed as impaired for temperature. JCEP informed DEQ that the riparian impacts from TEWAs and impacts from FERC's 15-feet buffer requirement, noted above, were not included in the 2017 Thermal Impact Assessment. DEQ requested that JCEP include these impacts in a revised assessment. To-date, JCEP has not provided this revision.

Additionally, in the Draft Environmental Impact Statement for this proposed project (see Figure 3.4-2), JCEP is considering a pipeline route change referred to as the Blue Ridge Variation. This potential route change would also necessitate adjustments to the 2017 Thermal Impact Assessment. Moreover, in its September 7, 2018 information request (see Page 6 of 15, Attachment B), DEQ also requested information summarizing JCEP's action to first avoid riparian impacts then, if avoidance is not possible, minimize these impacts prior to siting TEWAs and the construction right-of-way parallel to streams. In DEQ's information request, DEQ noted it was seeking the location of these riparian impacts and the detailed rationale justifying these impacts. Specifically, DEQ was seeking information on the specific constraints and operational procedures at each site preventing avoidance or minimization.

In January 2019, DEQ received information from JCEP that the detailed justification for riparian impacts that DEQ was seeking was in Table A.1-1 of the Department of State Lands and Army Corps of Engineers Joint Permit Application. DEQ reviewed this information and found that it focuses primarily on wetland impacts associated with the siting of a TEWA rather than riparian impacts and temperature changes in streams. The modification rationale presented in this table provides no information regarding alternative locations for TEWAs that JCEP considered and provides no detailed explanation why these alternative locations were unsuitable. Moreover, DEQ cannot determine from the information in Table A.1-1 if riparian impacts from the construction ROW are a result of FERC's 15-foot buffer guidelines or some other factor, as the columns of information in this table present only information on the wetlands impacted, Cowardin Type for each wetland impacted, and TEWAs involved in the impact. From Table A.1-1, DEQ cannot find information on why JCEP could not avoid or minimize impacts to effective shade to streams when siting TWEAs and the construction ROW parallel to a stream.

In sum, DEQ cannot determine if JCEP avoided or minimized proposed impacts to riparian shade particularly for streams listed as impaired for temperature and currently under a TMDL such as Spencer Creek shown in Figure 10.

[84] Oregon Administrative Rule OAR 340-041-0002(49)

[85] Oregon Administrative Rule OAR 340-041-0028(12)(a)

Absent revision to the 2017 Thermal Impact Assessment, DEQ does not have a thermal impact assessment considering the riparian shade impacts described above (additional impacts from roadway alterations are addressed below).

In addition, DEQ has not received a detailed mitigation plan from JCEP identifying the following:

1. The mitigation site location.
2. The site-specific schedule for mitigation.
3. The site-specific riparian restoration plan including drawings.
4. Proposed planting density.
5. A proposed plant species composition.
6. A strategy to ensure seedling survival.
7. A maintenance schedule to ensure the trees are free to grow.
8. Performance standards for mitigation sites.
9. A mechanism for ensuring the mitigation persists in perpetuity.
10. Access for DEQ to evaluate the mitigation actions.

It appears from the FERC DEIS that JCEP is proposing some mitigation for losses to riparian areas on USFS and BLM lands. However, the proposed mitigation appears to be located in watersheds other than those where impacts would occur. In order for mitigation to be considered in relation to Oregon's temperature standard, it must occur in the same watershed.

Given the incomplete thermal impact assessment from pipeline construction (including TEWAs) and the lack of thermal mitigation plan to restore and protect effective shade, DEQ determines that it does not have a reasonable assurance that Pacific Connector's pipeline construction will comply with the applicable temperature standards.

6.6.2.2 Waterbody Crossings

The information JCEP provided to evaluate thermal loading from proposed water body crossings is incomplete and does not demonstrate JCEP would prevent stream temperature increases when constructing the pipeline through streams. Pipeline installations at the trenched open-cut waterbody crossings proposed by JCEP require the management of surface and groundwater resources in a manner that may negatively affect temperature. For waterbody crossings completed using dry open-cut methods, JCEP would isolate the work area using temporary upstream and downstream dams. The excavation through the work area would presumably capture shallow groundwater as well as seepage through the temporary flume dams. Water from the excavation would be pumped to dewater structures in upland areas where it would infiltrate into soil.

Many of the proposed dry open-cut crossings occur in headwater streams that are tributaries to fish-bearing streams lower in the watershed. Headwater streams provide a critical source of cold water particularly in summer months when flows decline and a higher fraction of base flow is derived from subsurface groundwater. In addition, JCEP proposes many waterbody crossings at streams listed as impaired for temperature on Oregon's 303(d) list of impaired waterbodies. Dewatering actions proposed by JCEP would reduce the volume of cold groundwater available for hyporheic exchange in the reach below each waterbody crossing. This reduction in groundwater exchange below crossings would reduce the assimilative capacity for thermal loading. JCEP proposes to alter groundwater flow at numerous stream to construct its pipeline. Many of these streams are currently impaired for temperature. For example, at pipeline stream crossing at Milepost 58.78, Ollala Creek is limited for temperature year round and is under an approved TMDL. Similarly, DEQ has placed Rice Creek (Milepost 65.76), South Umpqua River (Milepost 71.27), North Myrtle Creek (Milepost 79.12), South Myrtle Creek (Milepost 81.19), and many others on the 303(d) list for temperature. These streams are under an approved temperature TMDL.
In its September 7, 2018 information request, DEQ requested information on JCEP's Shallow Groundwater Study revised August 24, 2017. Under Oregon Administrative Rule 340-048-0042(2)(e), DEQ was seeking to determine if potential modifications of groundwater flows during pipeline construction would affect surface water quality

and, in particular, stream temperature from the alteration of groundwater flows into streams (see Page 14 of 15, Attachment B). In its October 8, 2018 response to DEQ's request, JCEP informed DEQ that the purpose of shallow groundwater study was to aid pipeline design to account for buoyancy in areas of shallow groundwater and referred DEQ to the Erosion Control Revegetation Plan for practices regarding trench dewatering to manage groundwater inflows. In DEQ's December 20, 2018 response to JCEP's response, DEQ again requested a completed shallow groundwater study, provided the rationale for this specific information request, and provided guidance on the specific information DEQ was seeking. DEQ has not received the information requested.

As noted, dry crossings accomplished by flumed or pumped diversions would rely on an impoundment above the crossing where pumps or gravity-operated flume pipes can bypass streamflow below the work area. Impoundments typically would increase temperature by exposing an increased wetted surface area to solar gain. Given this increase in thermal load as well as the reduction in groundwater flows into streams, proposed activities are likely to cause violations of the temperature standard.

DEQ expects that trenched open-cut waterbody crossings would increase thermal loading of streams below certain crossing locations. The potential for thermal loading is greatest in headwater streams with low seasonal baseflow. DEQ has requested additional information on the effect of these actions on shallow groundwater, but to date has not received the requested information. Based on the information currently available DEQ cannot determine that trenched open-cut waterbody crossings will not violate the temperature water quality standard. The FERC DEIS refers to the 2017 GeoEngineers report prepared for JCEP. That report identified average impacts for fifteen streams (0.03 degrees F) and a maximum increase of 0.3 degree F. However, as noted above this analysis did not consider the impacts of stream crossings together with TEWAs, new and altered roadways, or areas where the pipeline alignment (or roadways) parallel streams.

6.6.2.3 Road construction and Maintenance

JCEP's road improvements include replacing existing culverts in stream crossings, installing temporary bridges, and widening roads. JCEP may clear riparian vegetation adjacent to the approaches for road-stream crossings to create space for the increased crossing footprint. This increased crossing footprint may reduce effective shade at a reach. This reduction in effective shade may be permanent. JCEP has not provided information regarding these impacts for DEQ to evaluate the duration of impact. In addition, road widening that parallels a stream may reduce effective shade in the riparian areas between the access road and stream.

JCEP provided DEQ with a 2017 Thermal Impact Assessment (GeoEngineers 2017) addressing projected thermal impacts of the pipeline crossings of selected waterbodies, but it appears that riparian impacts from proposed improvements to existing and new access roads were not evaluated in this report.

Moreover, DEQ has not received a detailed mitigation plan from JCEP.

For these reasons, DEQ is unable to determine that JCEP's proposed roadway construction and maintenance associated with the Project will comply with Oregon's water quality standard for temperature, particularly with regard to the many water quality limited streams potentially affected by the Project.

6.6.2.4 Permanent Pipeline Right-of-Way

The information JCEP provided to evaluate thermal loading from pipeline operation is incomplete and does not demonstrate JCEP would be able to mitigate unavoidable permanent thermal loading consistent with applicable temperature standard. In developing the permanent rights-of-way, JCEP would clear all trees and shrubs. Initially, the width of this vegetation clearing would be 95 feet and, according to JCEP, "neck down" (i.e., narrow) to 75 feet through wetlands and waterbody crossings. After the construction ROW, JCEP would maintain a 30-foot permanent ROW in herbaceous and herbaceous/small shrub vegetative condition. Specifically, to protect the pipeline from tree roots, JCEP would maintain 10 feet of the permanent ROW in an herbaceous state centered on the pipeline. JCEP would maintain the remainder of the 30-foot permanent ROW in an herbaceous/small shrub

condition for the operational life of the pipeline. For riparian areas permanently impacted by the operational right-of-way, JCEP would propose sites it would use to mitigate the permanent loss of riparian shade at the pipeline's stream crossings. DEQ has received no details regarding the mitigation of riparian shade impacts.

Moreover, based on FERC requirements its Wetland and Waterbody Procedures, JCEP may develop the rights-of-way within 15 feet of streams when paralleling a stream. This proximity reduces effective shade on these streams. In its September 7, 2018 information request, DEQ requested that JCEP evaluate compliance with Total Maximum Daily Load allocations and with Designated Management Agencies' Total Maximum Daily Implementation Plans for temperature.

For streams listed as impaired for temperature on the 303(d) list but not under temperature TMDL, Pacific Connector may not increase thermal loading leading to higher stream temperatures. In Oregon's 2012 Integrated Report Assessment Database and 303(d) list, these streams are assigned an assessment category of five indicating a TMDL is needed to ensure these streams achieve the water quality standard. The lack of a temperature TMDL for Category 5 streams means DEQ has not established a human use allowance and reserve capacity for these streams. The reserve capacity in a TMDL ensures that loading capacity has been set aside for a safety margin and is otherwise unallocated.[86] Moreover, the human use allowance in the temperature standard does not permit a source to cause more warming than allowed under this allowance as stated in OAR 340-041-0028(12)(b).[87] Pacific Connector proposes to remove effective riparian shade permanently on the following temperature limited Category 5 streams: North Fork Coquille River at Milepost 23.06, Middle Creek at Milepost 27.04, East Fork Coquille River at Milepost 29.85, Elk Creek at Milepost 32.40, Upper Rock Creek at Milepost 44.21, Middle Fork Coquille River at Milepost 50.28, Spencer Creek at Milepost 171.07, and Lost River at Milepost 212.07.

Figure 10 shows the potential for the loss of effective shade from the permanent right-of-way as the pipeline parallels Spencer Creek near Milepost 177. DEQ listed Spencer Creek as impaired for temperature. JCEP informed DEQ that the riparian impacts from FERC's 15-feet buffer requirement, noted above, were not included in the 2017 Thermal Impact Assessment. DEQ requested that JCEP include these impacts in their assessment and provide a revised assessment.

Given the incomplete thermal impact assessment and the lack of thermal mitigation plan to restore effective shade DEQ is unable to determine that JCEP's operation of the pipeline will comply with Oregon's temperature standard.

6.6.3 DEQ Findings

Based upon the foregoing findings, DEQ determines that the proposed pipeline and associated work areas and roadways are likely to violate Oregon's water quality standard for temperature, particularly in areas that are not currently meeting numeric standards. JCEP has adequately identified methods to avoid or mitigate these impacts, particularly by providing for mitigation in the watersheds where the impacts will occur. DEQ concludes that it does not have a reasonable assurance that the proposed activities will be conducted in a manner that will not violate the temperature water quality standards at OAR 340-41-0028 and TMDLs adopted to meet those standards.

6.7 Total Dissolved Gas

6.7.1 Applicable Standard

Oregon Administrative Rule 340-041-0031:

> *(1) Waters would be free from dissolved gases, such as carbon dioxide hydrogen sulfide, or other gases, in sufficient quantities to cause objectionable odors or to be deleterious to fish or other aquatic life, navigation, recreation, or other reasonable uses made of such water.*

[86] Oregon Administrative Rule OAR 340-041-0002(49)

[87] Oregon Administrative Rule OAR 340-041-0028(12)(a)

(2) Except when stream flow exceeds the ten-year, seven-day average flood, the concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection may not exceed 110 percent of saturation. However, in hatchery-receiving waters and other waters of less than two feet in depth, the concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection may not exceed 105 percent of saturation.

6.7.2 DEQ Evaluation: Total Dissolved Gas

Water discharged to a receiving waterbody may entrain ambient atmospheric gases causing the concentration of dissolved gases to increase. Certain hydraulic conditions (e.g., deep laminar flow reaches or glides) prevent equilibration and can cause total dissolved gases concentrations to increase above levels deemed safe for aquatic life.

JCEP does not propose actions that may increase the concentration of total dissolved gas in Project waterways.

6.7.3 DEQ Findings

DEQ is reasonably assured the JCEP's specified proposed actions considered in this focused Evaluations and Findings Report would not violate the Total Dissolved Gas water quality standard.

6.8 Toxic Substances

6.8.1 Applicable Standard

Oregon Administrative Rule 340-041-0033:

(1) Toxic Substances Narrative. Toxic substances may not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations that may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety, or welfare or aquatic life, wildlife or other designated beneficial uses.

(2) Aquatic Life Numeric Criteria. Levels of toxic substances in waters of the state may not exceed the applicable aquatic life criteria as defined in Table 30 under OAR 340-041-8033.

(2) Human Health Numeric Criteria. The criteria for waters of the state listed in Table 40 under OAR 340-041-8033 are established to protect Oregonians from potential adverse health effects associated with long-term exposure to toxic substances associated with consumption of fish, shellfish and water.

6.8.1 DEQ Evaluation: Toxic Substances

6.8.2.1 Pipeline construction

Hazardous substances are known to exist at certain locations along the route of the proposed pipeline. These substances include high concentrations of naturally occurring minerals such as arsenic and mercury, post-process wastes from former mercury mining operations, and chemical contaminants from spills at current and former industrial sites. These substances may be present at concentrations that exceed applicable human health and/or aquatic life numeric criteria. DEQ evaluates the effects of ground-disturbing activities on toxic substances in the sections below.

Naturally Occurring Mineralization

A study in 2009 investigated naturally occurring mercury mineralization between MP 109 and the East Fork Cow Creek.[88] Local geology includes mercury mineralization at concentrations sufficient to support commercial mining

[88] Potential for natural-occurring mercury mineralization to enter the aquatic environment between M.P. 109 and East Fork

operations in the early to mid-1900s. [89] The study confirmed "very low concentrations of mercury mineralization" near the proposed pipeline route. The study also identified two intermittent streams that cross the final pipeline alignment. These studies noted that the streams "lack connectivity to the main stem East Fork Cow Creek. However, JCEP did not provide the methodology to evaluate hydrologic connectivity. Finally, the study concludes that JCEP may minimize the discharge of sediments containing mercury mineralization by implementing procedures in the Erosion Control and Revegetation Plan. In Sections 6.1.2.1, 6.1.2.3, and 6.1.2.4 of this report, DEQ identifies necessary information absent from in the JCEP's erosion control and landslide mitigation analysis and practices in both JCEP's Erosion Control and Revegetation Plan and its Transportation Management Plan. JCEP also proposes to use the Transportation Management Plan to control sediment discharge during road use and construction. DEQ summarizes the deficiencies in JCEP's proposed Transportation Management Plan in Section 6.1.2.3.

Metals

In response DEQ's March 2010 information request, JCEP provided information on the effects of Project-related activities on certain contaminants including turbidity, nutrients, and metals.[90] In particular, the study found the increase of suspended mercury due to expected sediment loading (0.017 ng/l) is far lower than the Human Health Numeric Criteria of 144 ng/l.

Existing Solid and Hazardous Waste Sites

The Draft Environmental Impact Statement (FERC, 2019) identified 116 sites with documented existing or historical soil and/or groundwater contamination within 0.25 mile of the pipeline route. The Draft Environmental Impact Statement further directs JCEP, before close of the public comment period, to consult with DEQ "regarding existing soil and groundwater contamination at the sites listed in appendix G. The DEIS further directs JCEP to file the results of this consultation along with any proposed site-specific soil or groundwater handling, management, and disposal procedures. DEQ anticipates JCEP would submit additional requested information to allow DEQ to evaluate the effects of pipeline construction.

6.8.2.2 Waterbody Crossings

Trenched crossings across waterbodies can increase the mobilization, solubility, and availability of soil contaminants. As discussed above, sources of soil contaminants include naturally occurring minerals, legacy wastes from mining operations, and chemical contaminants from industrial operations.

On March 11, 2019, DEQ requested JCEP develop site-specific water body crossing and restoration plans for each waterbody affected by the pipeline. The plans are necessary to address methods needed to restore hydrologic and habitat function to predevelopment conditions. At locations where toxic or hazardous substances may be present, DEQ would rely on these plans to determine that construction and site restoration is completed in a manner that prevents the mobilization of soil contaminants.

DEQ has not yet received the waterbody crossing plans from JCEP. Absent such plans, DEQ cannot conclude that project actions avoid or minimize activities that discharge toxic substances into waters of the state.

6.8.2.3 Road construction and Maintenance

DEQ recognizes that stormwater runoff from road surfaces represents a significant source of potential pollutants, including toxic substances present in soils. Referring to our evaluation in Section 6.1.2.3, additional information is

Cow Creek. Larry Broeker, November 18, 2009 (Revised February 3, 2010).

[89] Potential for natural-occurring mercury mineralization to enter the aquatic environment between M.P. 109 and East Fork Cow Creek. Larry Broeker, November 18, 2009 (Revised February 3, 2010).

[90] Turbidy Nutrients Metals Water Quality Impacts Analysis, GeoEngineers August 29, 2017.

needed to evaluate potential risks presented by potentially toxic substances. Absent such plans, DEQ cannot conclude that measures to prevent or minimize the discharge of toxic substances to waters of the state during road construction and maintenance would not cause an exceedance to the toxic substances water quality standard.

6.8.2.4 Pipeline Right-of-Way

JCEP would maintain portions of the permanent right-of-way in an herbaceous state to facilitate access for pipeline maintenance and inspection. Methods to control vegetation are described in the Erosion Control and Revegetation Plan and include the application of herbicides and pesticides. The plan references procedures in FERC's Waterbody and Wetland Construction and Mitigation Procedures that prohibit chemical applications within 100 feet of wetlands or waterbodies except as allowed by federal or state authorities.

To comply with the Toxic Substances water quality standard, applicants must comply with state regulations regarding the application of chemical herbicides and pesticides at locations that may directly or indirectly affect waters of the state.

6.8.2.5 Terminal and Off-Site Area Stormwater

Jordan Cove's LNG terminal would create that would cause stormwater discharging to Coos Bay, groundwater fed wetlands, and the Pacific Ocean.

In Section 5.5.2.1 of the revised Terminal Storm Water Management Plan (March 2019), Jordan Cove proposes three categories of spill containment. In each category, Jordan Cove provides qualitative information on proposed controls. In addition, in its April 1, 2019 response to DEQ's September 25, 2018 information request, Jordan Cove directed DEQ to its proposed Spill Prevention, Control, and Countermeasure Plan for spill containment controls for the Terminal Storm Water Management Plan.[91] The cover of Jordan Cove's SPCC Plan contains a note that this plan is a preliminary version. DEQ reviewed this plan and determined that it is not a complete or final plan. For example, in Table 1-1 of the SPCC Plan, the list of bulk storage containers and their secondary containment system is incomplete. Jordan Cove does not provide information on the secondary containment for transformers. Jordan Cove also notes that other oil storage systems and their containment controls are to be determined in the future. Additionally, Section 8 of this plan is preliminary information and Jordan Cove notes that it would update this plan to reflect as-built controls.

In the final SPCC Plan, DEQ is seeking information on where exactly Jordan Cove would locate on its stormwater site plan the proposed loading aprons, lined earthen berms, double walled tanks, and other containment structures designed to contain spills as well as information on the specific design features of these controls. For reasonable assurance, DEQ needs to know if Jordan Cove would size the containment berms coupled with the containment capacity of the oil/water to capture the largest anticipated spill. Statements in the current draft SPCC Plan that Jordan Cove would comply with federal regulations are not a demonstration that Jordan Cove's proposed control concepts have the capacity to prevent a discharge to surface water. Site-specific design information on all proposed structural spill controls is essential for DEQ to evaluate their potential to control discharges to surface water. This detailed information meets DEQ's need for reasonable assurance that Jordan Cove's containment controls would achieve the toxic substances standard by selecting and designing the highest and best practicable controls to prevent the release of toxic substances to the Pacific Ocean. This design information is missing in the SPCC Plan and the revised Terminal Stormwater Management Plan.

6.8.2 DEQ Findings

1. DEQ expects JCEP would consult with DEQ and provide additional information as directed by FERC to identify potential hazardous waste and cleanup sites within the project area. Absent this information,

[91] Spill Prevention, Control, and Countermeasure Plan – Operation. August 29, 2017. Part 1: Appendix K, Section 401 Water Quality Package

violations of toxicity water quality standards are likely, and wouldDEQ concludes there is no reasonable assurance that the proposed activities would be conducted in a manner that would not violate the Toxic Substances water quality standard. OAR 340-041-0033, OAR 340-048-0020(3).

2. JCEP proposes a stormwater management plan that does not demonstrate the spill containment controls are designed, for example, to capture a spill from the largest storage vessel in a drainage area.
    a. Without this demonstration, DEQ does not have reasonable assurance that Jordan Cove designed and located spill containment controls in manner to prevent a spill from causing a violation of the toxic substance standard. OAR 340-041-003.

6.9 Turbidity

6.9.1 Applicable Standard

Oregon Administrative Rule 340-041-0036

Oregon Administrative Rule 340-041-0036 provides, in pertinent part, that " No more than a ten percent cumulative increase in natural stream turbidities may be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity. However, limited duration activities necessary to address an emergency or to accommodate essential dredging, construction or other legitimate activities and which cause the standard to be exceeded may be authorized provided all practicable turbidity control techniques have been applied * * *."

For activities authorized under a Clean Water Act Section 401 Water Quality Certification, CWA Section 404 Permit, and emergency activities coordinated with the Oregon Department of Fish and Wildlife, this standard may allow limited duration exceedances of the standard for dredging and construction activities. However, as set forth above, for a temporary exceedance, the project proponent must apply all practicable turbidity control techniques.

6.9.2 DEQ Evaluation: Turbidity

6.9.2.1 Pipeline construction

The information JCEP provided to DEQ does not demonstrate that pipeline construction and use of the construction access roads would avoid exceedances of the turbidity standard. DEQ refers the reader to Section 6.1.2.1 of this Report for DEQ's evaluation of JCEP's proposal to develop a construction right-of-way and a construction access road to install approximately 229 miles of pipeline. The evaluation in Section 6.1.2.1 is also relevant to DEQ's evaluation of JCEP's compliance with Oregon's turbidity standard while developing the construction right-of-way and the construction access road within it. DEQ briefly summarizes this evaluation below.

In Section 6.1.2.1, DEQ summarizes JCEP's proposal to grade and construct 229 miles construction access road to build the pipeline in the construction ROW. DEQ describes how this action would discharge sediment in stormwater without appropriate BMPs. DEQ evaluates JCEP's proposed erosion control BMPs for the construction ROW and the construction access road. DEQ highlights the lack of modeling in JCEP's submittal to evaluate the efficacy of its proposed BMPs for the construction ROW and its access road. DEQ considers the numerous landslide susceptibility zones in close proximity the ROW and, in many locations, beneath the fill of the ROW and the construction access road. DEQ notes the lack of engineering designs with support for construction ROW above and potentially discharging stormwater. Moreover, DEQ evaluates JCEP's methodology to identify landslide susceptibility zones and its criteria for addressing these zones during pipeline construction and operation. Finally, DEQ evaluates JCEP's BMPs to avoid pipeline construction initiating landslides.

In its December 20, 2018 supplemental information request, DEQ documents scientific literature concerning JCEP's proposed actions that can initiate a landslide (see Page 12 - 18 of Attachment A). In this supplemental request, DEQ also reviews JCEP's proposed BMPs relative to the information presented in literature to avoid

landslides initiated by linear infrastructure projects (see Page 71 – 77 of Attachment A). Human-caused debris torrents impact water quality by changing the natural cycles of sediment delivery to streams, which increases turbidity and this impacts the aquatic environment; thus, affecting aquatic life (Castro and Reckendorf 1995).

Given the following, JCEP has not demonstrated that pipeline construction and the use of the construction access road would avoid exceedances of the turbidity standard for the following reasons:

- Lack of technical support for erosion controls on unstable slopes.
- Lack of modeling demonstrating proposed erosion controls are the most effective.
- A landslide hazard assessment that does not follow state-of-practice protocols.
- A landslide hazard assessment that does not evaluate construction induced landslide hazards.
- Lack of engineering design and their support for mitigating landslide risk during pipeline construction.
- Lack of engineering designs for stormwater management above unstable slopes.

6.9.2.2 Waterbody Crossings

JCEP proposes pipeline installation using dry open-cut techniques at many minor waterbody crossings. This technique relies on temporary dams to isolate the work area thereby allowing the use of standard overland construction techniques to complete the waterbody crossing. JCEP provided general techniques and best management practices in their reports on dry open-cut waterbody crossings. The plans state, "For the first 10 to 30 minutes, turbidity downstream of the crossing area could increase considerably."[92]

Oregon's Turbidity water quality standard authorizes turbidity to increase more than ten percent above background levels *provided* all practicable turbidity control techniques have been applied. On March 11, 2019, DEQ requested JCEP to develop specific crossing plans for each waterbody crossed by the pipeline. DEQ would utilize this information to determine whether all practicable turbidity control techniques are employed to reduce Project-effects on turbidity. Because DEQ has not received the requested plans, DEQ cannot determine that pipeline installation would comply with the turbidity standard.

6.9.2.3 Road construction and Maintenance

The information JCEP provided to DEQ does not demonstrate that existing access road use and new road construction would avoid exceedances of the turbidity standard. The information provided for road improvements at stream crossings does not demonstrate that JCEP would apply all practicable turbidity controls during potential limited duration exceedances of the turbidity standard. DEQ refers the reader to Section 6.1.2.3 of this Report for DEQ's evaluation of JCEP's proposed use of existing access roads for pipeline construction. The evaluation in Section 6.9.2.1 is also relevant to DEQ's evaluation of JCEP's compliance with Oregon's turbidity while using existing access roads. DEQ briefly summarizes the evaluation in Section 6.1.2.3 here.

In Section 6.1.2.3, DEQ describes how JCEP's use of existing access roads can cause sediment and turbid discharges to streams. DEQ also describes the lack of clear BMPs that JCEP would use to maintain and, if needed, improve these roads to prevent sediment discharge to streams during pipeline construction. In addition, DEQ evaluates the Erosion Control and Revegetation Plan and Transportation Management Plan that JCEP proposed to control sediment discharge from roads. DEQ also evaluates JCEP's actions to conduct an inventory of unpaved existing access roads to develop a DEQ-requested maintenance and improvement for these roads. Finally, DEQ provides examples of proposed new roads where JCEP did not provide design information to demonstrate the cut and fills on these roads would prevent landslides from discharging to streams

[92] Stream Fluming Procedures, September 2017.

In its December 20, 2018 supplemental information request, DEQ summarizes the scientific literature and technical resources concerning the importance of non-paved road design to protect water quality for aquatic life (see Page 18 - 19, Attachment A). In this supplemental request, DEQ stresses to JCEP that the National Marine Fisheries Service identified routine road maintenance as a needed action to assist in the recovery of salmonids listed under the Endangered Species Act (see Page 18 of Attachment A). Castro and Reckendorf (1995) summarize the impact of sediment and turbid discharges in aquatic environments and its effect on aquatic life.

JCEP has not demonstrated that existing access road use and construction would avoid exceedances of the turbidity standard for the following reasons:

- Lack of a comprehensive inventory of unpaved roads hydrologically connected to streams.
- Lack of a comprehensive and complete maintenance and improvement plan for unpaved roads hydrologically connected to streams.
- A landslide hazard assessment that does not follow state-of-practice protocols.
- A landslide hazard assessment that does not evaluate construction induced landslide hazards.
- Lack of engineering designs with specifications demonstrating effective turbidity controls and landslide prevention measures for road construction.

6.9.2.4 Pipeline Right-of-Way

The information JCEP provided to DEQ does not demonstrate that pipeline operation would avoid violations of the turbidity standard. DEQ refers the reader to Section 6.1.2.4 of this Report for DEQ's evaluation of JCEP's proposal to maintain a permanent right-of-way (ROW) to operate the pipeline. The evaluation in Section 6.1.2.4 is also relevant to DEQ's evaluation of JCEP's compliance with Oregon's biocriteria while operating a permanent ROW. DEQ briefly summarizes the evaluation in Section 6.1.2.4 below.

In Section 6.1.2.4, DEQ evaluates the function of a permanent slope breaker (i.e., water bar) and describes how this stormwater collection system concentrates stormwater discharge along the permanent ROW. DEQ details the initial and final drainage area for permanent slope breakers on steep slopes. In addition, DEQ notes the potential for JCEP to discharge post-construction stormwater from the permanent ROW to landslide susceptibility zones. DEQ points out that JCEP did not provide DEQ with a post-construction stormwater management plan following DEQ's 2018 guidelines for post-construction stormwater plan submissions which request project proponents consider steep and landslide risks when siting discharge points.

In the evaluation in Section 6.1.2.4, DEQ evaluates the permanent slope breakers closest to pipeline stream crossings and their potential to discharge sediment and other pollutants to streams. DEQ explains how the permanent ROW is functioning as primitive road due soil compaction in the ROW during pipeline construction and during post-construction maintenance. Based on the information in JCEP's submittal, DEQ's demonstrates that the permanent ROW may discharge sediment streams at a rate equivalent to a gravel road with ruts. Moreover, DEQ notes that the area between the stream and permanent slope breaker upslope from the stream is a source of sediment delivery to streams. Given these sources of discharge, DEQ's requested that JCEP perform modeling; however, JCEP has not completed modeling and an engineering analysis of these discharges.

In its December 20, 2018 supplemental information request (see Pages 66 - 68, Attachment A), DEQ's evaluation provides the rationale for its request for modeling and engineering analysis for the permanent ROW stormwater discharges to stream described above. This rationale is also emphasized in the evaluation presented in Section 6.4.2.3. This evaluation documents the potential sources of sediment and turbid discharges that can contribute to or cause a violation of Oregon's turbidity standard.

JCEP has not demonstrated that pipeline operation would avoid violations of the turbidity standard for the following reasons:

- Lack of an engineering analysis and modeling for the right-of-way discharge at stream crossings.
- Lack of engineering designs and analysis for stormwater management above unstable slopes.
- Lack of post-construction stormwater management plan following DEQ guidelines.

6.9.2.5 Terminal and Off-Site Project Area Stormwater

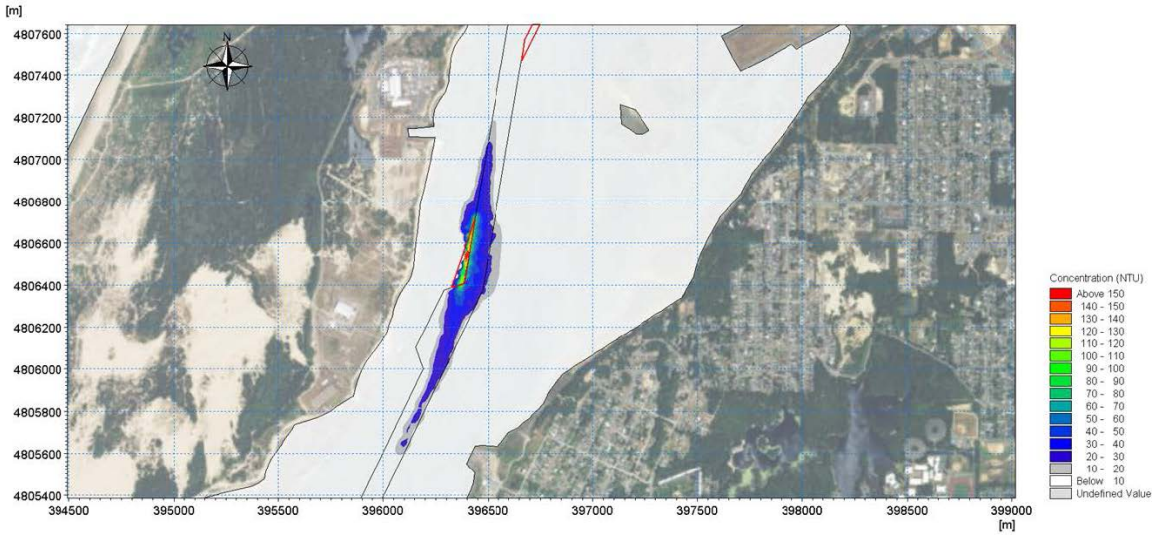
Section 6.1.2.5 of this report provides an evaluation of Jordan Cove's proposed actions to manage stormwater in the construction and operation of the Terminal and Off-site Areas. DEQ refers the reader to Section 6.1.2.5 for DEQ's evaluation of these proposed actions. The evaluation in Section 6.1.2.5 is also relevant to DEQ's evaluation of Pacific Connector's compliance with Oregon's turbidity standard while managing construction stormwater in the Terminal and Off-Site Project areas, managing stormwater and decant from dredge material disposal sites, and managing post-construction stormwater during the operation of the Terminal.

6.9.2.6 Dredging

Development of the proposed Slip and Access Channel would require the excavation and dredging of approximately 5.70 million cubic yards (mcy) of material. JCEP developed a Dredge Material Management Plan to guide dredging operations.[93] The DMMP describes three potential dredging methodologies, clamshell, hydraulic cutter-head, hydraulic hopper dredging, but acknowledges that the final dredging methods would depend on the equipment availability and the contractors' individual experience.

In addition, JCEP modeled the effects of turbidity at each of the proposed dredging locations using clamshell, hydraulic suction dredging, and excavation methods.[94] The modeling confirmed turbidity exceeding 10 NTU above background levels extending a total of more than one mile above and below the Navigational Reliability Improvement dredge locations. The modeling also confirmed elevated but comparatively localized turbidity plumes at the Slip, Access Channel, and eelgrass mitigation dredge locations. The report recommends that both capital and maintenance dredging operations incorporate construction BMPs, although the "nature and extent of BMPs should be determined through coordination with the regulatory agencies".

Figure 17: Modeled Turbidity from Capital and Maintenance Dredging at NRI-3



Oregon's Turbidity water quality standard allows DEQ to issue Section 401 water quality certifications that

[93] Dredge Material Management Plan. David Evans & Associates, Inc. October 2017.
[94] Hydrodynamic Studies – Turbidity Analysis, Moffat and Nichol, November 2017.

authorize actions to exceed numeric turbidity limits provided the applicant employ all practicable turbidity control techniques. On September 7, 2018, DEQ requested additional information related to JCEP's proposed dredging methods and measures to avoid or minimize turbidity. Specifically, DEQ requested a Dredging Pollution Control Plan. In particular, the request was for a "description of water pollution controls (operational controls, structural such as floating turbidity curtain etc.) that JCEP would use in dredging and transporting dredged material".

JCEP has not submitted a Dredging Pollution Prevention Plan. DEQ finds JCEP's proposed activities would cause turbidity to increase in excess of numeric limits, and absent any Dredging Pollution Prevention Plan, JCEP has failed to demonstrate its methods include sufficient controls to prevent exceedance of turbidity standard in OAR 340-041-0036.

6.9.3 DEQ Findings: Turbidity

DEQ's preceding evaluation of Project results in the following findings related to OAR 340-041-0036:

1. JCEP's proposed activities do not employ the highest and best treatment to control turbid discharges by failing to:
    a. Demonstrate the deployment of effective BMPs during pipeline construction and operation.
    b. Demonstrate the use of effective BMPs during road maintenance.
    c. Provide a site-specific waterbody crossing and restoration plans to minimize turbid discharges and restore stream form and function supporting water quality.
2. JCEP's proposed activities do not employ methods to construct and maintain roads in a manner to prevent turbid discharges to public waters by minimizing erosion of cut bank, fills, and roads.
3. JCEP's proposed activities do not employ methods to control turbid discharges generated by organic or inorganic debris from landslides during pipeline construction, pipeline operation, waterbody construction planning, and road maintenance, and road construction.
4. JCEP has not provided site-specific waterbody crossing and restoration plans that sufficiently describe required methods to avoid, minimize, and mitigate for turbidity. DEQ relies on the plans and information described above to confirm the project has considered the highest and best treatment techniques for minimizing turbidity during construction activities. Absent these plans and information, DEQ does not have a reasonable assurance that the JCEP's proposed activities will comply with the turbidity water quality standard. OAR 340-048-0020(3).
5. JCEP's proposed activity would likely violate the Turbidity water quality standard for the following reasons:
    a. JCEP has not provide an NDPDES 1200-C required Erosion and Sediment Control Plan demonstrating sediment and erosion controls with installation techniques have been properly deployed during the construction of the Terminal and Off-Site Project Areas to control turbidity from construction activities.
    b. JCEP proposes the disposal of dredged material producing turbid discharges from the leachate (i.e., decant flows), from this disposed material, and from exposed soils without demonstrating the deployment of site-specific controls to prevent exceedance of turbidity standard in OAR 340-041-0036.
6. JCEP's modeling conducted confirms that dredging at the Navigational Reliability Improvement locations, the Slip, and Access Channel would cause turbidity levels to increase above allowable numeric limits.
7. JCEP did not provide a Dredging Pollution Prevention Plan that sufficiently demonstrates JCEP considered and proposed all practicable turbidity control techniques to avoid, minimize, and mitigate these effects as required by OAR 340-041-0036.

Based upon these findings, violations of the turbidity water quality standard are likely to occur and DEQ concludes that it lacks a reasonable assurance that the proposed activities will be conducted in a manner that will not violate the Turbidity water quality standard.

6.10 Antidegradation

Oregon water quality standards have three main elements: beneficial uses; numeric and narrative criteria designed to protect those uses; and an antidegradation policy that is design to assure that water quality continues to improve. When the Department considers issuing a permit or a water quality certificate that would allow the existing water quality to be diminished in some way, the Department action must comply with the antidegradation provisions of the water quality standards.

6.10.1 Applicable Standard

Oregon's antidegradation policy provides a process to protect, maintain, and enhance water quality, support beneficial uses, and guide decision-making to prevent further degradation from new or increased point and nonpoint pollution sources. The antidegradation policy supplements other provisions of DEQ's water quality rules and is further implemented through guidance provided in Oregon's Antidegradation Internal Management Directive.

Oregon's antidegradation policy recommends a complete antidegradation review for new discharge sources requiring a Section 401 water quality certification. DEQ has established antidegradation review procedures for waterbodies classified as Outstanding Resource Waters, High Quality Waters, and Water Quality Limited Waters. The policy establishes a process in which DEQ may authorize actions that lower water quality in High Quality and Water Quality Limited Waters providing the action does not violate water quality standards, the action maintains support for beneficial uses, and feasible alternatives were implemented to reduce water quality impacts. If no feasible alternatives exist, the antidegradation policy may consider whether the action's social and economic benefits outweigh the environmental costs of reduced water quality.

The proposed Project does not affect any waterbodies classified as Outstanding Resource Waters.
Oregon Administrative Rule OAR 340-041-0004:

(1) Purpose. The purpose of the Antidegradation Policy is to guide decisions that affect water quality to prevent unnecessary further degradation from new or increased point and nonpoint sources of pollution, and to protect, maintain, and enhance existing surface water quality to ensure the full protection of all existing beneficial uses. The standards and policies set forth in OAR 340-041-0007 through 340-041-0350 supplement the Antidegradation Policy. * * *

(3) Nondegradation Discharges. The following new or increased discharges are subject to this division. However, because they are not considered degradation of water quality, they are not required to undergo an antidegradation review under this rule:

* * *

(c) Temperature. Insignificant temperature increases authorized under OAR 340-041-0028(11) and (12) are not considered a reduction in water quality.

(d) Dissolved Oxygen. Up to a 0.1 mg/l decrease in dissolved oxygen from the upstream end of a stream reach to the downstream end of the reach is not considered a reduction in water quality so long as it has no adverse effects on threatened and endangered species. * * *

(6) High Quality Waters Policy: Where the existing water quality meets or exceeds those levels necessary to support fish, shellfish, and wildlife propagation, recreation in and on the water, and other designated beneficial uses, that level of water quality must be maintained and protected. However, the commission, after full satisfaction of the intergovernmental coordination and public participation provisions of the continuing planning process, and with full consideration of sections (2) and (9) of this rule, and 340-041-0007(4), may allow a lowering of water quality in these high quality waters if it finds:

(a) No other reasonable alternatives exist except to lower water quality; and

(b) The action is necessary and benefits of the lowered water quality outweigh the environmental costs of the reduced water quality. This evaluation will be conducted in accordance with DEQ's "Antidegradation Policy Implementation Internal

Management Directive for NPDES Permits and section 401 water quality certifications," pages 27, and 33-39 (March 2001) incorporated herein by reference;

(c) All water quality standards will be met and beneficial uses protected; and

(d) Federal threatened and endangered aquatic species will not be adversely affected.

(7) Water Quality Limited Waters Policy: Water quality limited waters may not be further degraded except in accordance with paragraphs (9)(a)(B), (C) and (D) of this rule.

(8) Outstanding Resource Waters Policy. Where existing high quality waters constitute an outstanding State or national resource such as those waters designated as extraordinary resource waters, or as critical habitat areas, the existing water quality and water quality values must be maintained and protected, and classified as "Outstanding Resource Waters of Oregon." * * *

6.10.2 DEQ Evaluation

The preceding sections of this Evaluation and Findings report conclude that proposed activity would affect certain water quality standards and result in a lowering of water quality. Oregon's antidegradation policy requires DEQ to undertake a review of these actions in accordance with procedures established in the Antidegradation Internal Management Directive. The construction and operation of the Pacific Connector Pipeline would not meet the minimum requirements of Oregon's antidegradation policy because the applicant has not fully considered feasible alternatives to avoid, minimize, or mitigate for impacts to waters of the state. Absent an evaluation of feasible alternatives DEQ is prevented from considering the economic and social benefits of the proposed action against the environmental impacts of lowered water quality.

Temperature

Section 6.6 of this Evaluation and Findings Report finds that the temporary and permanent pipeline right-of-way would increase thermal impacts to waterbodies. JCEP has not provided a Source Specific Implementation Plan to propose methods to mitigate these impacts. Absent such a plan, DEQ finds the project does not meet the Antidegradation policy by failing to consider and implement alternative methods.

Turbidity and Sedimentation

Sections 6.1 and 6.9 of this Evaluation and Findings Report finds the proposed project would increase sedimentation and turbidity. JCEP has not submitted plans to address mitigation of project-related effects for road construction and maintenance, waterbody crossings, pipeline construction, and right-of-way maintenance. Information in plans is necessary to demonstrate JCEP proposed methods that would result in the least impact to water quality. Absent plans that support this requirement, DEQ finds the project does not meet the antidegradation policy by failing to consider and implement alternative methods.

Biocriteria

Section 6.2 of this Evaluation and Findings Report finds that trenched waterbody crossings would affect aquatic and riparian habitat and may cause detrimental changes to resident biological communities. JCEP has not submitted specific waterbody crossing and restoration plans for each proposed crossing. DEQ finds the project does not meet the Antidegradation policy's requirements by failing to demonstrate that alternative methods were considered.

6.10.3 DEQ Findings

DEQ's antidegradation policy requires a complete antidegradation review for projects subject to section 401 water quality evaluation. OAR 340-041-0004. Upon completion of such a review, DEQ may authorize projects that result in reduced water quality providing certain conditions are demonstrated. As discussed more fully in preceding

sections, JCEP failed to provide information necessary to complete such a review. Absent plans that demonstrate JCEP considered methods to avoid and minimize water quality impacts to temperature, turbidity, sedimentation, and biocriteria, DEQ finds the project does not meet the requirements of DEQ's antidegradation policy.

Based on the preceding evaluation, DEQ finds the proposed Project does not comply with Oregon's antidegradation policy.

7 Evaluation of Compliance with Sections 301, 302, 303, 306 and 307 of the Federal Clean Water Act

To certify a project pursuant to Section 401 of the federal Clean Water Act, DEQ must find that the project complies with applicable provisions of Sections 301, 302, 303, 306 and 307 of the Act and state laws and regulations adopted to implement these sections. Sections 301, 302, 306 and 307 of the federal Clean Water Act deal with effluent limitations, water quality related effluent limitations, national standards of performance for new sources and toxic and pretreatment standards. All of these requirements relate to point source discharges and are the foundation for conditions in National Pollutant Discharge Elimination System permits issued to the point sources.

Section 303 of the Clean Water Act relates to Water Quality Standards and Implementation Plans. EPA has adopted regulations to implement Section 303 of the act. The Environmental Quality Commission adopted water quality standards consistent with the requirements of Section 303 and the applicable EPA rules. The commission standards are in Oregon Administrative Rules Chapter 340, Division 41. EPA has approved the Oregon standards pursuant to the requirements of Section 303 of the act and has approved TMDLs that implement those standards in basins where standards are not currently being met. For the reasons set forth in the preceding sections of this report, DEQ finds that the proposed Project would not comply with Oregon Water Quality Standards and, in certain aspects, applicable TMDLs.

8.0 Evaluation Of Other Appropriate Requirements Of State Law

Pursuant to § 401(d) of the Clean Water Act, DEQ may condition a water quality certification to assure compliance with other appropriate requirements of state law. Such requirements are "appropriate" if they have any relation to water quality, Arnold Irrigation Dist. v. DEQ, 79 Or.App. 136 (1986), PUD No.1 of Jefferson Co. v. Washington Dept. of Ecology, 511 U.S. 700 (1994). Because DEQ is denying the requested water quality certification for the proposed Project for the reasons stated above in this report, DEQ has not fully evaluated what conditions would be necessary to comply with other appropriate requirements of Oregon law. However, DEQ lists below the requirements that it would consider should JCEP make a new request for certification.

Department of Land Conservation and Development

While the denial of certification may not be based on land use considerations, land use regulations protecting water quality and aquatic resources must be considered by DEQ. DEQ has determined that JCEP has not provided an adequate land use exhibit, as required by OAR 340-048-0020(i). This section of this report provides background for this determination and provides information that may be helpful should the application be resubmitted.

General Land Use Requirements under ORS 197.180

Unlike most states, Oregon has a system of statewide laws governing land use. The system includes 19 rules designated as statewide goals. The goals encompass a range of issues relating to land use, land development, and environmental protection, including goals and rules directly relating to water quality and to estuaries. OAR chapter 660, division 15. Local governments have the primary responsibility for implementing these statewide rules. Under ORS 197.180, however, state agencies also must comply with the statewide planning goals and act in a manner that is compatible with local comprehensive plans and land use regulations when taking actions in programs affecting land use.

A state agency generally complies with the statewide planning goals by acting compatibly with applicable comprehensive plans and local land regulations when such plans and regulations are acknowledged to comply with the statewide planning goals. OAR 660-030-0065(2); Schreiner's Gardens v. DEQ, 71 Or. App. 381(1984). Under the general rules adopted by the Land Conservation and Development Commission (LCDC) to implement ORS 197.180 and the specific rules governing DEQ, the agency may, and generally does, rely on determinations by local governments concerning whether a proposed use is compatible with acknowledged local plans and regulations. OAR 660-030-0070; OAR 340-018-0050. These determinations are known as "land use compatibility statements" or as a "LUCS". In situations where a local government cannot or does not provide a satisfactory LUCS, DEQ must determine for itself whether a proposed project or activity complies with the statewide goals, and is compatible with applicable acknowledged local plans and regulations.

Special Limitations Under CWA Section 401

The section 401 certification program is a program affecting land use for purposes of ORS 197.180. OAR 340-018-0030(4)(g). To the extent permitted by law, the DEQ certification decision must comply with the statewide planning goals and be consistent with acknowledged local land use plans and regulations as described above. Oregon case law, however, limits the application of ORS 197.180 in the context of certifications issued under CWA Section 401. Specifically, DEQ may apply applicable state and local land use regulations only to the extent that they relate to water quality, and then only for purposes of determining whether to impose conditions to assure compliance with those regulations (and not for purposes of approval or denial). Such provisions are "other appropriate requirement of State law" for purposes of CWA Section 401(d). Arnold Irrigation Dist. v. DEQ, 79 Or.App. 136 (1986).

Oregon's rule implementing the CWA, ORS 197.180 and the Arnold Irrigation Dist. decision requires:
(i) An exhibit that:
(A) Includes land use compatibility findings for the activity prepared by the local planning jurisdiction;
(B) If land use compatibility findings have not been obtained, identifies the specific provisions of the local land use plan and implementing regulations applicable to the activity and describes the relationship between the activity and each of the land use provisions identified in paragraph (A) of this subsection; and
(C) Discusses the potential direct and indirect relationship to water quality of each finding or land use provision.

OAR 340-048-0020.

On January 28, 2019, JCEP submitted to DEQ a land use exhibit pursuant to OAR 340-048-0020(2)(i). As discussed below, however, it is incomplete and otherwise inadequate to satisfy the rule.

JCEP has not supplied valid or complete LUCSs from the counties where the facility and pipeline would be located. Accordingly, before a certificate can issue, DEQ would be required to make its own determination regarding

whether the Project is compatible with water quality related requirements in the local comprehensive plans and land use regulations and complies with water quality related requirements in the statewide planning goals. (In the context of this application, DEQ has determined that elements of statewide Goals 5, 6, 12, and 16 (and their implementing regulations) are applicable.)

To the extent that a local government has applicable acknowledged local land use plans and regulations, and the Project components in the county would be compatible with those plans and regulations, DEQ generally would rely on the compatibility findings to determine goal compliance. To the extent a county does not have acknowledged plans and regulations addressing the project or DEQ cannot determined that the project is compatible with such provisions, DEQ would make its own finding regarding goal compliance and local compatibility. As noted above, however, in the context of Section 401 certifications, the findings would be limited to water quality related provisions. ORS 197.180(1)(b). The following subsections of this report describe DEQ's current evaluations of these issues.

Klamath County

Klamath County provided a LUCS dated January15, 2019, that covers both the proposed pipeline and compressor station. The LUCS states that both uses are compatible with the acknowledged comprehensive plan and allowed by conditional use permit. The County has issued a conditional use permit (CUP 5-15) for the proposed compressor station. The County has not issued a permit or approval from the pipeline, however, because it believes its authority to do so has been pre-empted by FERC. Although the LUCS acknowledges that approvals have not been issued for the pipeline, it incorporates proposed findings prepared by the JCEP for the LUCS previously issued in 2015 and a review of plan and regulation amendments that occurred after 2015. The proposed findings indicate that the pipeline would be approvable if the County were to exercise its land use jurisdiction.

Based on the County's findings and the supporting information provided by the JCEP to DEQ and the County, DEQ believes that the compressor station is compatible with the local acknowledge comprehensive plan and regulations and with the statewide goals. Based on the statements in the LUCS and proposed findings of the JCEP, DEQ has sufficient information at this time to determine the other elements of the Project within Klamath County are compatible with the County's comprehensive plan and land use regulations and would be approved or permitted if the County were to assert its land use jurisdiction. Because the pipeline use would be compatible with the County's acknowledged comprehensive plan and land use regulations, the Project elements in Klamath County could be deemed to comply with the statewide land use goals as well.

Jackson County

JCEP has provided an unsigned and undated LUCS from Jackson County. The LUCS states that the Project within Jackson County is allowed, but only because the Project is not subject to the County's comprehensive plan and land use regulations. The unsigned LUCS indicates that the County's refusal to assert jurisdiction arises from County policy number 17 relating to linear transmission facilities. The County does not take a position on whether the pipeline would be allowed outright or by conditional use permit if it were subject to the County's plan and land use regulations. JCEP provided proposed findings prepared in September 15, 2015, that purport to demonstrate that the Project would be compatible with the County's comprehensive plan and land use regulations if the County were to assert jurisdiction. JCEP has also provided evidence that there have been no relevant changes in the plan and land use regulations after 2015.

Without confirmation from the County that it concurs with the proposed findings, DEQ declines to determine at this time whether the pipeline is compatible with acknowledged comprehensive plan provisions and land use regulations for Jackson County. Some of the provisions in the comprehensive plan and land use regulations, including those relating to approval of conditional uses for linear facilities, appear to be water quality related. JCEP's land use exhibit, however, does not attempt to identify specifically which applicable plan provisions and implementing regulations are water quality related.

Douglas County, Non-Coastal Zone

JCEP provided a LUCS from Douglas County dated January 23, 2019, stating the pipeline use is allowed, but this is based on findings that County zoning authority over portions of the pipeline outside the coastal zone are pre-empted by the Natural Gas Act. JCEP has also provided proposed findings prepared in September 15, 2015, purporting to demonstrate that the project would be compatible with the County's comprehensive plan and land use regulations if the County were to assert jurisdiction.. JCEP has also supplied evidence that there have been no relevant changes to the plan and regulations after 2015. The LUCS acknowledges but does not incorporate or approve the proposed findings submitted by the JCEP.

Without confirmation from the County that it concurs with the proposed findings, DEQ declines to determine at this time whether the pipeline is compatible with acknowledged comprehensive plan provisions and land use regulations. Some in the plan and land use regulations, including those relating to approval of linear facilities, appear to be water quality related. JCEP's exhibit, however, does not attempt to identify specifically which applicable plan provisions and implementing regulations are water quality related.

Douglas County, Coastal Zone

The County provided a LUCS dated January 23, 2019, stating the pipeline use is allowed based on the prior issuance of conditional use permit and the findings supporting that permit. On this same day, however, the Douglas County Circuit Court determined that the conditional use permit issued by the County for construction of the pipeline on lands within the coastal zone is void based on the failure of the County to grant timely extension of the permit. McLaughlin et al. v. Douglas County, 17CV32687, 17CV41672 and 18CV04396. Under the provisions of OAR 340-018-0050(2)(a)(G), DEQ cannot base compatibility with acknowledge local plans and regulations and the applicable statewide planning goals on the basis of a LUCS that has been invalidated.

JCEP's land use exhibit is predicated on establishing compatibility with the comprehensive plan and land use regulations. Some of the provisions in the comprehensive plan and land use regulations, including those relating to approval of conditional uses for linear facilities, appear to be water quality related. JCEP's exhibit, however, does not attempt to identify specifically which applicable plan provisions and implementing regulations are water quality related.

The conditional use permit in question appears to be a requirement for the project under the regulations implementing the federal Coastal Zone Management Act. Consequently. DEQ anticipates that the JCEP would reapply for the CUP. If the permit is re-issued, DEQ would be able to determine the pipeline with in the Coastal Zone in Douglas County is compatible with the acknowledged plan and land use regulations.

Coos County

Coos County issued a LUCS dated December 17, 2018, that states the Project is not compatible with local comprehensive plan and land use regulations. This determination is based on several factors including necessary conditional use permits and plan amendments that have not yet been obtained for the pipeline and roadways, and the invalidation and remand of county decisions approving the LNG terminal itself. Ocean Shores Conservation Coalition v. Coos County, LUBA No. 2016-095 (2017). LUBA's decision was subsequently affirmed by the Oregon Court of Appeals.

With respect to the terminal, LUBA concluded that the County's findings were inadequate or improper. The remand involves, but is not limited to, the following water quality related issues:

- Findings relating to the need and substantial benefit required under Coos Bay Estuary Management Plan

policy 5(I) with respect to the dredging required in areas zoned 5-DA and 6-DA;
- Findings of no unreasonable interference with the public trust rights required under Coos Bay Estuary Management Plan policy 5(I) with respect to the dredging required in areas zoned 5-DA and 6-DA;
- Findings relating to whether the public need and gain from the project warrants the loss or modification to the estuarine system under Policy 4 and 4(a); and
- Mitigation findings with respect to its approval for filling a portion of the estuary in the 7-D zone.

Because key elements of the proposed Project are not currently allowed under the county's acknowledged comprehensive plan and land use regulations, DEQ cannot (at this time) determine that the Project is compatible with the acknowledged comprehensive plan and land use regulations. Some aspects of these decisions are clearly water quality related.

City of Coos Bay

As JCEP acknowledges, the Project requires a land use goal exception, comprehensive plan change, zoning map amendments, and a conditional use permit from the City of Coos Bay. These land use actions are needed at least in part to comply with water quality related requirements of the statewide land use goals as implemented through the city's comprehensive plan and land use regulations. As a result, DEQ cannot (at this time) determine that the Project is compatible with the acknowledge comprehensive plan and land use regulations.

City of North Bend

As JCEP acknowledges, conditional use permits from the City of North Bend are required in order for the Project to be compatible with the acknowledged comprehensive plan and land use regulations. These permits implement water quality related requirements of the statewide land use goals.

Laws Administered by the Oregon Department of State Lands
ORS 196.795 to 196.990 requires that permits be obtained from the Department of State Lands (DSL) prior to any fill or removal of material from the bed or banks of any stream.

Laws Administered by the Oregon Department of Fish and Wildlife
ORS 496.012 sets wildlife policy for prevention of depletion of indigenous species and toward wildlife resource decisions to be made in the best social, economical and recreational interests of all user groups

ORS 496.164 provides for cooperation and technical assistance to other agencies with regard to wildlife resource management

ORS 496.170 to 496.192 requires collection and analysis of scientific data to determine and inventory biological status of species, develop conservation strategies, and provide recommendations to other agencies regarding actions affecting threatened or endangered species

OAR 635-007-0502 et. seq. native fish conservation policy – protection of natural ecological communities and habitats tailored to individual watersheds and situations

OAR 635-059-0000 et. seq. aquatic invasive species control

OAR 635-100-0135 Survival Guidelines for Species Listed as Threatened or Endangered – lower Columbia coho

OAR 635-100-0150 requires consultation with ODFW on affects to endangered species OAR 635-410-0000 natural resource losses

OAR 635-412-0005 et. seq. addresses fish passage

OAR 635-413-0000 et. seq. fish habitat mitigation policy OAR 635-425-0000 et. seq. in-water blasting

OAR 635-500-0002 et. seq. addresses fish management plans

Laws Administered by the Oregon Department of Environmental Quality

ORS 459.005 – 418 Solid Waste Management Law

ORS 466.020, 075, 105, and 195 Hazardous Waste Management Law

ORS 468B.155 prevention of groundwater contamination

ORS 468B.160 (5) triggers action to prevent groundwater contamination or restore acceptable levels

OAR 340-040-0030 permitted operation (5) action requirements and (6) remedial action requirements

OAR 340-045 pertaining to NPDES and WPCF permits

OAR 340-143-0000 pertaining ballast water management

Laws Administered by the Oregon Department of Water Resources

OAR 690-009 groundwater interference with surface water OAR 690-010 appropriation and use of groundwater
OAR 690- 012 out-of-basin diversion OAR 690-020 dam safety

OAR 690-28 surface water registrations

OAR 690-033 standards for new appropriations

OAR 690-077 instream water rights
OAR 690-086 water management and conservation plans

Laws Administered by the Oregon Watershed Enhancement Board

ORS 541-351 et. seq. Oregon Plan for Salmon and Watersheds

9.0 Public Comment

The Corps' and DEQ's public comment period for the Project was originally from May 22, 2018 through July 21, 2018. The agencies extended the public comment period until August 20, 2018. DEQ received about 42,000 public comments electronically and by mail.

This document does not include responses to these public comments because DEQ is denying certification based, in part, upon the failure of the applicant to provide necessary information; therefore, a complete response to public comments has not been prepared.

10.0 Conclusion

For the reasons set forth in this report, DEQ denies Jordan Cove's request for 401 WQC for the Project. DEQ does not have a reasonable assurance that the construction and operation of the Project will comply with applicable state water quality standards, as described in this report. DEQ's decision, however, is made without prejudice. Jordan Cove may reapply for a 401 WQC for the Project, and DEQ will consider additional information that is responsive to the bases for denial in this decision.

Attachment A

Additional Information Requests

Oregon
Kate Brown, Governor

Department of Environmental Quality
Western Region Eugene Office
165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838
FAX (541) 686-7551
OTRS 1-800-735-2900

September 7, 2018

Derik Vowels
Jordan Cove LNG, LLC
Consultant, Lead Environmental Advisor
111 SW 5th Ave., Suite 1100,
Portland OR 97204

Re: Additional Information Request
Jordan Cove Energy Project (FERC Project No. CP17-494)
Pacific Connector Gas Pipeline (FERC Project No. CP17-495)
U.S. Army Corps of Engineers (Project No. NWP-2017-41)

Dear Mr. Vowels:

The Oregon Department of Environmental Quality (DEQ) is currently reviewing an application from Jordan Cove LNG, LLC (Jordan Cove) for Clean Water Act section 401 water quality certification for a Section 404 permit from the U.S. Army Corps of Engineers necessary for construction of the Jordan Cove Energy Project and Pacific Connector Gas Pipeline (collectively, "the Project"). Jordan Cove proposes to construct a liquefied natural gas export facility near North Bend, Oregon, and a 232-mile natural gas pipeline connecting the terminal with existing pipelines near Malin, Oregon.

Section 401 of the Clean Water Act bars federal agencies from issuing a license or permit for an action that may result in a discharge to Oregon waters without first obtaining water quality certification from DEQ. DEQ anticipates Jordan Cove's construction and operation of the Project will require authorizations from multiple federal agencies, including but not limited to a Section 404 permit from the U.S. Army Corps of Engineers and authorizations from the Federal Energy Regulatory Commission (FERC) pursuant to the Natural Gas Act. DEQ is conducting a comprehensive section 401evaluation of the Project's direct, indirect, and cumulative effects on water quality. DEQ currently expects to develop a single certification decision based on this comprehensive evaluation of the Project that will be applicable to both the Corps and FERC decisions on the Project.

DEQ is processing the applications pursuant to Section 401 of the Clean Water Act, 33 USC §1341, ORS 468B.035 through 468B.047, and DEQ's certification rules found in Oregon Administrative Rules 340, Division 048. To certify the Project, DEQ must have a

reasonable assurance that the proposed Project, as conditioned, will comply with Sections 301, 302, 303, 306, and 307 of the Clean Water Act, Oregon water quality standards, and any other appropriate requirements of state law.

DEQ has conducted a preliminary review of the application package material submitted February 6, 2018, by David Evans and Associates, Inc. on behalf of Jordan Cove. The information described in the attachments to this correspondence is necessary to complete DEQ's analysis of the Project's compliance with applicable standards. Please file a complete response to this additional information request within 30 days of the date of this letter. Please forward your responses to:

Christopher Stine
Oregon Department of Environmental Quality
165 East 7th Avenue, Suite 100
Eugene, Oregon 97401

If Jordan Cove cannot provide certain information within the requested period, please indicate which items will be delayed and provide a projected filing date. You may reference previously submitted documents, in whole or in part, to support your responses to the requests in Attachments A through B

DEQ reserves the right to request additional information as necessary to complete its analysis and fulfill its obligations under state and federal law.

If you have any questions, please contact me directly at (541) 686-7810, or via email at stine.chris@deq.state.or.us.

Christopher Stine, PE
Water Quality Engineer

ec: Mike Koski, mkoski@pembina.com
Rose Haddon, rhaddon@pembina.com
Keith Andersen, Dave Belyea, Steve Mrazik, Chris Bayham, Mary Camarata, Sara Christensen/DEQ
Tyler Krug, Tyler.J.Krug@usace.army.mil
John Peconom, John.Peconom@ferc.gov
Sean Mole, sean.mole@oregon.gov

ATTACHMENT A

Jordan Cove Energy Project / Pacific Connector Gas Pipeline
Additional Information Request

1. Application for Certification
   Oregon Administrative Rule (OAR) 340-048-0020(2) identifies the minimum requirements for applications to the Oregon Department of Environmental Quality for section 401 water quality certification. Please provide complete responses to the application requirements given in OAR 340-048-0020(2)(a-j). If Jordan Cove has previously submitted portions of this information, please reference the location and include any supplemental or clarifying information, as necessary, to provide complete responses.

2. Proposed Action
   Jordan Cove must provide and update DEQ with a complete and current description of the construction and operation of the proposed Project and the impacts of these actions on affected waterbodies. DEQ recognizes that Jordan Cove may revise project elements during the design process. Jordan Cove must provide DEQ with timely submissions describing changes to the proposed activity that may directly or indirectly affect water quality. Jordan Cove must also specify clearly that it is requesting that DEQ accept these submissions as changes to the proposed activity and consider the effects of the revised action in our section 401 water quality evaluation.

3. Submission of Application Information
   Jordan Cove's application to DEQ for section 401 water quality certification must provide DEQ with a comprehensive description of the proposed action including all resource reports, maps, electronic data files, and supporting documentation provided to federal agencies from whom Jordan Cove is seeking permits or authorizations. DEQ's certification rules require applicants to file information directly with the Department. For this reason, DEQ does not consider the availability of information on external websites or other sources as a submittal unless the applicant explicitly directs DEQ to obtain application materials from these sources.

4. Water Quality Standards
   Oregon's water quality standards consist of beneficial uses, numeric and narrative criteria developed to support these uses, and an antidegradation policy that prohibits an activity from further degrading water quality. Applicants for water quality certification must provide sufficient information to demonstrate the activity will comply with Oregon water quality standards (OAR 340-048-0020(g)).

   Provide information to demonstrate how the Project will comply with the water quality standards found in OAR 340 Division 041. For project activities that do not affect State waters, note how the Project will not violate applicable standards. For project activities that do impact State waters, note how Jordan Cove is proposing to mitigate, reduce, or prevent impacts so as to ensure the Project, as proposed, does not violate applicable water quality standards. Project impacts should be assessed in terms of direct, indirect, and cumulative effects of the activity on state water quality.

ATTACHMENT B

Jordan Cove Energy Project / Pacific Connector Gas Pipeline
Additional Information Request

Preliminary evaluation of the proposed activities to determine compliance with the requirements for a Certification Decision as described in Oregon Administrative Rules 340-048-0042(2):

Oregon Administrative Rule	Requirement	Information Requested
340-048-0042(2)	Compliance with Clean Water Act Sections 301 and 302	Please provide a NPDES 1200-C Permit Application demonstrating that land disturbing activities associated with the construction of Jordan Cove Energy Project's Liquefied Natural Gas Terminal as well as the following: • Land disturbing activities associated with the dry excavated portion of this terminal's Marine Slip, • Land disturbing activities associated with all offsite project areas associated with this terminal and its construction including those areas described in Section 5.3 of this terminal's stormwater management plan (Part 1, Attachment A3). • Land disturbing activities associated with roads used to access this terminal and offsite project areas. • Land disturbing activities associated with any other facilities (staging areas, refueling areas, employee parking etc.) that Jordan Cove Energy Project will use to construct of this terminal. DEQ will need to determine if these land disturbing activities will comply with the technology-based effluent limits of this permit. DEQ will also need an erosion and sediment control plan that, for example, addresses Schedule A.12.b.v and other conditions in this permit. For DEQ to evaluate the water quality impacts of the construction process on waters of the state, DEQ needs this information in an erosion and sediment control plan.
		Please provide a NPDES 1200-C Permit Application for land disturbing activities associated with the construction of Pacific Connector's gas pipeline and with the construction of all associated facilities such as communication towers, roads (existing and new), disposal sites, block valve facilities, and compressor stations. DEQ will need to determine if these land disturbing activities will comply with the technology-based effluent limits of this permit. DEQ will also need an erosion and sediment control plan that, for example, addresses Schedule A.12.b.v and other conditions in this permit. For DEQ to evaluate the water quality impacts of the construction process on waters of the state, DEQ needs this information in an erosion and sediment control plan.
		Please provide a NPDES 1200-A Permit Application demonstrating that the proposed 20 sites to obtain rock for Pacific Connector's gas pipeline construction and maintenance. DEQ will need to determine if these land disturbing activities will comply with the technology-based effluent limits of this permit.
		Please provide a NPDES 1200-A Permit Application demonstrating that the concrete batch plant proposed for the offsite project area referred to as Boxcar Hill in the LNG Terminal's stormwater management plan (Section 5.3,

		page 19). DEQ will need to determine if rock quarries will operate in compliance with the technology-based effluent limits of this permit.
		Please provide a NPDES Individual Permit Application for the LNG Terminal's two domestic wastewater facilities discharging to surface water. DEQ will use the information in this permit application to develop a discharge permit containing technology-based and water quality-based effluent limits associated with this permit.
		Please provide a NPDES Individual Permit Application for discharges of non-contact cooling wastewater discharged from Liquefied Natural Gas carriers using the Marine Slip at the LNG Terminal. DEQ will use this permit application to develop a discharge permit containing technology-based and water quality-based effluent limits.
		If the discharge from wastewater treatment plants proposed for the LNG Terminal has a design flow capacity of 1 million gallons per day or more or requires pretreatment under 40 CFR §403, please provide a NPDES 1200-Z Permit Application demonstrating that the Terminal's stormwater management plan will comply with the technology-based and water quality-based effluent limits in this permit.
		Please provide an application for a NPDES Individual Permit for the discharge of vehicle and equipment washwater to surface water during the operation of the LNG Terminal. DEQ will use this permit application to develop technology-based and water quality-based effluent limits for this permit if the operations.
		Please provide an application for a NPDES Individual Permit for the discharge of vehicle and equipment washwater to surface water during the construction and operation of the gas pipeline and all its associated facilities. DEQ will use this permit application to develop technology-based and water quality-based effluent limits for this permit.
	Compliance with Clean Water Act Section 302	DEQ will evaluate compliance with CWA Section 302 upon the receipt of information requested above.
	Compliance with CWA Section 303	In compliance with OAR 340-041-0007(8), please provide an assessment of Pacific Connector Gas Pipeline's compliance with all applicable DEQ-approved Total Maximum Daily Load Implementation Plans or compliance programs for the following: • United States Department of Agricultural Forest Service Water Quality Restoration Plans and the USDA National Best Management Practices for Water Quality Management on National Forest System Lands (Volume 1: National Core BMP Technical Guide) noted in DEQ's Memorandum of Understanding with the Forest Service. • US Department of Interior Bureau of Land Management's Water Quality Restoration Plans. • Oregon Department of Forestry's Forest Practices Act Program. • Oregon Department of Agriculture's Water Quality Plans. • Coos County Total Maximum Daily Load Implementation Plan. • Douglas County Total Maximum Daily Load Implementation Plan. • Jackson County TMDL Implementation Plan. • Klamath County TMDL Implementation Plan. In this compliance assessment, please also note all the support documents such as design manuals, guidance documents, road permits etc. that PCGP will follow when complying with these Implementation Plans. In addition, please identify all proposed amendments to federal land and resource management plans that would necessitate amendments to current Forest Service, Bureau of Land Management, or Bureau of Reclamation Total

		Maximum Daily Load Implementation Plans covering the pipeline's construction and operation. Federal Water Quality Restoration Plans represent the Forest Service's and BLM's plan for activities on these federal lands serving as a source of point and nonpoint source pollutants including pollutants addressed in a Total Maximum Daily Load. Finally, for determining compliance with TMDL allocations covering federal lands, please provide for DEQ's review and approval all proposed Forest Service, Bureau of Land Management, and Bureau of Reclamation road permits and access grants or right-of-way permits. For determining compliance with TMDL allocations on non-federal lands, please provide for DEQ's review and approval all proposed easements, agreements, and access or right-of-way permits. This compliance assessment must also include a summary of the steps taken to first avoid and then minimize impacts to the Designated Management Agency's riparian buffer protection areas prior to: • Siting Temporary Extra Work Areas for the pipeline construction • Siting of the construction and the permanent right-of-way for the pipeline. DEQ is requesting this information in response to Pacific Connector Gas Pipeline's proposal to locate TEWAs 50 feet from a waterbody and wetland boundary (see page 25 of Resource Report 1 for the gas pipeline). For example, this setback will not comply with the Forest Service's and Bureau of Land Management's riparian buffer protection requirements as presented in their Water Quality Restoration Plans which serve as their TMDL Implementation Plans. In Resource Report 1 noted above, PCGP notes that there are 922.64 acres of TEWAs. Please identify the location of each TEWA that PCGP will locate within one and two potential tree heights away to 50 feet from waters of the state. For streams, please indicate the distance of each TEWA from the ordinary high water mark of the stream or riverine wetland. Additionally, please note the land ownership where each TEWA is located. In addition, on page 58 of Resource Report 1 for the gas pipeline, PCGP indicates that the pipeline – in some places – will impact riparian vegetation while paralleling streams. Specifically, this report notes that the "proposed route will avoid paralleling a waterbody within 15 feet or less, where feasible." In this report, PCGP notes that this placement is consistent with the Section V.B.2.a of FERC's Wetland and Waterbody Procedures. However, 15 feet of riparian buffer would violate DMA riparian buffer protection requirements. Moreover, based on the literature, a 15-foot riparian buffer for thermal regulation of streams may result in thermal gain to the adjacent water body. As result, please identify each segment of the pipeline's construction right-of-way and permanent right-of-way that is parallel to waters of the state and within two site potential tree heights from waters of the state. Please provide the location and a detailed rationale for siting TEWAs closer to streams than authorized by a DMA's riparian buffer protection requirements and when siting sections of the construction and permanent right-of-way. For example, the PCGP's rationale in Resource Report 1 (page 58) for not proposing setbacks larger than 50 feet in Riparian Reserves is that larger setbacks "would render the TEWA useless for the stream crossing." PCGP should justify its proposal for non-standard riparian buffer protections by providing the following information:

		• A description of the specific constraints at each site preventing the use of a TEWA in an area. • The specific rationale why the TEWA must be closer to the stream crossing. Without this specific information, DEQ cannot determine that Pacific Connector Gas Pipeline attempted to first avoid and minimize riparian impacts to the maximum extent practicable before seeking to mitigate these impacts. This compliance assessment must also identify other locations where PCGP will not comply with Designated Management Agencies' riparian protection areas when siting the following: • Temporary and Permanent Access Roads, • Staging areas, • Material storage areas, and • Other components (e.g., compressor stations, metering stations) of the pipeline. Please include a detailed justification for seeking alternative riparian buffer protection requirements when siting these facilities within riparian areas. Pacific Connector Gas Pipeline must evaluate the thermal impacts from all noncompliance with DMA riparian protection requirements requested above where PCGP has provided and DEQ has approved the following information: • Detailed information demonstrating it considered all actions to first avoid or then minimize impacts to riparian areas to the maximum extent practicable. • Detail rationale for proposing nonstandard widths for riparian buffer protections. This evaluation must be included in PCGP's Thermal Impacts Assessment noted in the comments below on compliance with state water quality standards.
		There is no information presented in Pacific Connector Gas Pipeline's Appendices for Timber Removal and Construction in the Transportation Management Plan (Part 2, Appendix E-8). Please provide the location of the approximately 660 miles of existing public and private roads that PCGP proposes to use to construct the gas pipeline and/or support its operation. In this updated plan, please delineate these existing public and private roads by ownership as follows: • Private road on land zoned for forest use • Private road on land zoned for agricultural use • Private road on land zoned residential/commercial/industrial use by Coos/Douglas/Jackson/Klamath County • Public road owned and operated by Coos/Douglas/Jackson/Klamath County • Public road on the Umpqua/Rogue-Siskiyou/Winema-Fremont National Forest • Public road on land in the Bureau of Land Management Coos Bay District/Roseburg District/Medford District/Klamath Resource Area • Public road on Bureau of Reclamation land

		DEQ will use this information to evaluate compliance with the Section 303 of the Clean Water Act as noted above. There is also no information presented in PCGP's Appendices for Operations and Maintenance in the Transportation Management Plan. Please provide the documentation demonstrating that PCGP inventoried these existing roads to identify necessary maintenance actions and needed improvements to protect water quality prior to their use. This documentation should also include: • The results of the inventory for each road segment and the recommended maintenance prescription for each segment. • The road assessment protocols used (e.g., USDA Forest Service Water/Road Interaction Field Guide) and the evaluation tool (e.g. Geomorphic Road Analysis and Inventory Package) used to evaluate the surface erosion risk, gully risk, landslide risk, and stream crossing failure risk during road use. Please also provide a detailed maintenance and improvement plan for the approximately 660 miles of existing roads. This plan must demonstrate that PCGP will implement all maintenance actions and improvements necessary to protect water quality – identified during the road inventory – prior to road use for pipeline construction or operation. This maintenance and improvement plan must also: • Implement the Designated Management Agencies' DEQ-approved TMDL Implementation Plans. • Comply with maintenance standards, requirements, and/or other design standards developed and used by DMAs to implement these TMDL Implementation Plans. Additionally, please identify the location of all existing roads that PCGP will use to access the gas pipeline during its operation. Please provide a maintenance plan for these existing roads that includes: • A description of the level of use these roads will experience during the pipeline's operation. • A description of the maintenance practices to protect water quality and a schedule for performing these practices and supporting this level of use.
		Please provide the location of the propose 25 miles of new Temporary and Permanent Access Roads and the selection criteria used to site these new roads to avoid and minimize impacts to water quality. Please delineate these new roads by land ownership (e.g., private ownership on land zoned for forest use) consistent with the information request noted above. DEQ will need this delineation by land ownership to evaluate compliance with Section 303 of the Clean Water Act. To ensure these roads will not serve as a source of sediment to and hydromodification of waters of the state and as a source of debris flows into streams from road-related landslides, please include the design standards and specifications for constructing these roads including their drainage systems, cut-slopes, and fill-slopes. Please identify the proposed designs to stabilize fillslopes and cutslopes and manage stormwater on new temporary and permanent roads located on the steep slopes (i.e., slopes greater than 30%) and engineering support for these designs. This information is necessary for DEQ to evaluate compliance with the statewide water quality criteria for

		road building and maintenance (OAR 340-041-0007)(7) and for ensuring that PCGP uses the highest and best practicable treatment control (OAR 340-041-0007(1). Additionally, please provide detailed best management practices and design standards for DEQ review and approval for decommissioning the Temporary Access Roads.
	Compliance with Clean Water Act Section 306	DEQ will complete its review upon the receipt of information requested above.
	Compliance with Clean Water Act Section 307	DEQ will complete its review upon the receipt of information requested above.

	Compliance with other appropriate requirements of state law	DEQ has not completed this review at this time but will consult in the future with other DEQ programs and other state agencies concerning compliance with other state statutory requirements such as:
		
		• Oregon Revised Statute 468B.035 and 105 (Enabling Legislation for Implementing the Coastal Zone Amendments and Reauthorization Act)
		• ORS 783.620 through 640 and 783.990 through 992 (Ballast Water Management Law)
		• ORS 466.020, 075, 105, and 195 (Hazardous Waste Management Law)
		• ORS 196.795 through 990 (Removal-Fill Law)
		• ORS 496.172 – 496.192 (Oregon Threatened and Endangered Species Act)
		• ORS 496.012, 496.138, and ORS 506.109
		  ○ Fish and Wildlife Habitat Mitigation Policy
		  ○ In-water Timing and In-water Blasting Permits
		• ORS 509.585 (Fish Passage Requirements)
		• ORS 498 (Fish Screening)
		• ORS 497.298 (Scientific Taking Permit)
		• ORS 537 (Water Rights Law)
		• ORS 197 (Oregon Land Use Planning Law)
		• ORS 390.235 (Permits for Removal of Archaeological or Historical Material)
		• ORS 569 (Weed Control Law)
		• ORS 527 (Forest Practices Act)
		
		At this time, please provide applications for Construction and Demolition Landfill Permits required under Oregon Revised Statute 459.005 through 418 (Solid Waste Management Law) for the several proposed disposal sites associated with the construction or operation of the gas pipeline.

340-048-0042(2)(a)	Potential Alterations to Water quality standards in OAR 340 Division 41	DEQ is reviewing the Jordan Cove Energy Project's proposed stormwater management plan for the Liquefied Natural Gas Terminal. DEQ will provide comments in another information request.
		In compliance with OAR 340-041-0007(8), please provide for DEQ review and approval the resource and land management plans, guidance, design standards, design manuals, access permits or grants, and other programs from the U.S. Bureau of Reclamation that Pacific Connector Gas Pipeline will use to protect water quality during the following:

		• Siting Temporary and Permanent Access Roads and the construction/permanent right-of-way on U.S. Bureau of Reclamation land, over BOR water-bearing infrastructure (e.g., canals), or paralleling this infrastructure. • Maintaining both Temporary and Permanent Access Roads for pipeline construction and operation. • Siting other components to necessary to construct and operate such as staging areas, material storage areas, and other components (e.g., compressor stations, metering stations) of the pipeline. • Installing the construction and permanent right-of-way for the gas pipeline. • Operating the permanent right-of-way for the pipeline. Please identify any proposed amendments and changes to existing BOR resource and land management plans and other documents noted that are necessary to construct, use, or maintain access roads and the permanent right-of-way on BOR land.
		The scope of work in Pacific Connector Gas Pipeline's August 31, 2017 Thermal Impacts Assessment suggests that PCGP evaluated only stream crossings for their potential to influence or regulate thermal properties of streams. Please indicate if this Thermal Impacts Assessment of the gas pipeline's construction and operation includes the following: • An analysis of the impacts from the 50-foot setbacks from waterbodies in riparian areas currently proposed for the Temporary Extra Work Areas. • An analysis of the impacts from siting the pipeline alignment within riparian areas as close as 15 feet from streams as currently proposed when paralleling these waterbodies. • An analysis of the impacts from siting Temporary and Permanent Access Roads, Staging Areas, material storage area, and other pipeline components (e.g., compressor stations, metering stations) within riparian areas. DEQ is requesting this clarification because the scope of work from the Thermal Impacts Assessment suggests that the estimate of solar loading for stream crossings under both the construction (i.e., 75-95 foot wide) corridor and the permanent (i.e., 30-foot wide) corridor using the Shade-A-Lator tool did not consider the impact of these TEWAs. The use of TEWAs during pipeline construction extends the construction corridor beyond 75 and 95 feet. Currently, the Pacific Connector Gas Pipelines proposes to site TEWAs 50 feet from waterbodies as noted in the comment above. In addition, the scope of work in this assessment does not indicate PCGP evaluated the influence on stream thermal properties when the pipeline's construction and permanent corridor closely parallels streams and comes within 15 feet or less of these streams. For a comprehensive analysis of PCGP's compliance with the temperature standard, PCGP's Thermal Impact Assessment must also evaluate these impacts as well as other impacts (e.g., roads, staging areas etc.) as requested in the comments above on compliance with Section 303 of the Clean Water Act.
		In compliance with OAR 340-041-0007(1) and (7), please provide a post-construction stormwater management plan addressing DEQ's Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines for all the road stream crossings that Cove Energy Project and Pacific Connector Gas Pipeline will: • Replace or improve to construct and/or operate the gas pipeline and

		• Result in an increase in impervious surface area during the replacement/improvement process. This information is necessary (see OAR 340-048-0042(2)(a)) to determine whether the stormwater discharge from the pipeline's road stream crossings will contribute to or cause violations of water quality standards.
		In compliance with OAR 340-041-0007(1) and (7), please provide a post-construction stormwater management plan addressing DEQ's Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines for all stream crossings for the pipeline. The focus of this plan should be the drainage area for the right-of-way approaches that discharge stormwater into the stream crossing. To ensure compliance with OAR 340-048-0042(2)(a), please evaluate if the discharge from the pipeline's permanent 30 foot right-of-way at all stream crossings for the pipeline will contribute to or cause violations of water quality standards. In compliance with OAR 340-048-0042(2)(a), please propose the analytical model(s) (e.g., X-DRAIN) that Pacific Connector Gas Pipeline will use to evaluate if the stormwater discharge from the permanent 30 foot right-of-way with its 10 feet of compacted soil overlying the gas pipeline will contribute to or cause violations of water quality standards. In compliance with OAR 340-041-0002(1), this evaluation must also consider the impact of the change in stormwater volume discharged to receiving waters from the vegetation conversion (i.e., from forest canopy to herbaceous vegetation) during pipeline construction. The evaluation of this impact is necessary to determine if pipeline's permanent right-of-way will cause bed and bank erosion and, therefore, violate Oregon's biocriteria water quality standard (i.e., OAR 340-041-0011).
		In compliance with OAR 340-041-0007(1) and (7), please provide a post-construction stormwater management plan addressing DEQ's Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines for the 30-foot permanent right-of-way for the approximately 117 miles of the proposed pipeline right-of-way traversing steeps slopes (i.e., slopes greater than 30%). This information is necessary before Pacific Connector Gas Pipeline, in compliance with OAR 340-048-0042(2)(a), can determine whether the discharge from the pipeline right-of-way will contribute to or cause violations of water quality standards. The information provided in PCGP's documents (e.g., 401 Application Submittal, drafts of Resource Reports) – made available to DEQ – only provides generic diagrams and erosion controls practices. DEQ can find no information on PCGP's field investigations or remote sensing for these areas to evaluate slope stability when siting the pipeline alignment. DEQ can find no information on the specific designs and practices that PCGP will use on cutslopes and fillslopes located on these steep slopes. In developing this plan in compliance with OAR 340-041-0007(1) and (7), please provide information on the designs and engineering support for these designs for the permanent controls Pacific Connector Gas Pipeline proposes to stabilize cut-slopes and fill slopes for the right-of-way sited along the steep slopes. The purpose of these controls is to prevent sediment discharge in stormwater and debris flows from landslides discharging into streams. Please note these on the post-construction stormwater plan in the information request above. Additionally, please identify where the 117 miles of proposed pipeline noted above coincide with the 94 miles of the proposed pipeline that would be located in soils that PCGP has identified as having a high or severe erosion

		potential. Please provide the designs and engineering support for these designs for the permanent controls in these areas of high/severe erosion potential and steep slopes. In compliance with OAR 340-041-0007(1) and (7), the engineering support must indicate that these permanent controls are sufficient to: • Manage stormwater to prevent erosion on the permanent right-of-way, its cut-slope, and its fill-slope. • Prevent debris flows into streams from landslides from cut-slope and fill-slope failures. On the post-construction stormwater management plan requested above, please also provide the location for these controls along the 117 miles of pipeline on steep slopes (>30%).
		In compliance with OAR 340-041-0007(1) and (7), please provide post-construction stormwater management plans for the proposed 25 miles of new permanent and temporary roads addressing DEQ's Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines. This information is required before Pacific Connector Gas Pipeline can determine whether the discharge from these new roads will contribute to or cause violations of water quality standards. In compliance with OAR 340-048-0042(2)(a), please propose the analytical model(s) (e.g., X-DRAIN) that Pacific Connector Gas Pipeline will use to evaluate if the stormwater discharge from these 25 miles of proposed new roads will contribute to or cause violations of water quality standards.
		Please provide an evaluation of compliance with water quality standards if Jordan Cove Energy Project and Pacific Connector Gas Pipeline will use dredged material in the construction of facilities in uplands and drainage from this dredge material will discharge to waters of the state. This request is to expand upon the Portland Sediment Evaluation Team's assessment (PSET Letters, January 19, 2016) that considered these constructed upland facilities to be outside federal Clean Water Act jurisdiction for the dredged material suitability determination. However, upland constructed facilities using dredged material are not outside the effects considered in a 401 Water Quality Certification of a FERC application for the construction of a gas pipeline.
		Please provide a post-construction stormwater management plans addressing DEQ's Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines for North Point Workforce Housing Project noted in the Part 1, Section 404 Permit Application, Attachment F, Portland Sediment Evaluation Team Letters, Section 404 Permit Application. (If this site is not going to be used for the North Point Workforce Housing, please provide the post-construction stormwater plans for the proposed uses.) In addition, please provide the results of the Phase II environmental assessments evaluating the potential for contaminated soils summarized in the "FEIS, Section 4.3.1.3 (Soil Limitations) as noted in these PSET Letters.
		The 401 Water Quality Submittal package provides insufficient information concerning the dredging operations for the Marine Slip, Access Channel, and Material Offloading Facility. DEQ used a copy of Resource Report 1 (Section 1.5.5.2) for the development of an Environmental Impact Statement to obtain general information on the dredging operation. To direct the reader to additional information, this resource report references to the Dredge Material Management Plan and Resource Report 7 (Section 7.3.2.5). These two additional references provide few details regarding the water pollution control practices in the Marine Slip and Access Channel dredging operations. In compliance with OAR 340-041-0007(1) and -0036, please provide for DEQ review and approval a detailed pollution control plan for constructing the Access Channel and Marine Slip that provides at least the following information:

		• A detailed description of the sequencing of all construction dredging activities associated with the in-water Marine Slip construction, Access Channel construction, and Material Offloading Facility construction. • A site map of these construction actions and location of all structural controls to protect water quality. The site maps must include the following information: o A delineation of the areas in the Marine Slip that Jordan Cove will dry excavate and dredge. ▪ Please include the pollution controls for the dry excavation activities in response to the request above for an Erosion and Sediment Control Plan for a NPDES 1200-C Permit Application. o The location of the natural earthen berm separating the upland area of the Marine Slip that Jordan Cove will dry excavate from the remaining portion of the Marine Slip adjacent to the bay that Jordan Cove will dredge. o The location of the in-water dredging for the Access Channel and Material Offloading Facility. o The location of the slurry/hydraulic transport pipeline(s) for the transportation of the dredged material. o The location of all containment systems and/or spill response materials. • A construction dredging plan providing the following: o Dredging schedule for the Marine Slip, Access Channel, and Material Offloading Facility. o Type (e.g., cutter-suction dredging) and number of dredging plants that Jordan Cove will use during the dredging of the Marine Slip, Access Channel, and the Material Offloading Facility. o A description of water pollution controls (operational controls, structural such as floating turbidity curtain etc.) that Jordan Cove will use in dredging and transporting dredged material. o Detailed spill response procedures including all emergency shut-off procedures and procedures for a spill associated with the hydraulic transport pipeline. o A description of all operational and structural water pollution controls for breaching and removing the natural earthen berm noted in Section 1.5.5.4 of the Jordan Cove's Resource Report 1. o A dredging monitoring plan for DEQ review and approval to evaluate the effectiveness of all proposed controls. • A maintenance dredging plan providing the following: o A site map containing the following: ▪ The location of all areas Jordan Cove will dredge. ▪ The location of the slurry/hydraulic transport pipeline(s) for the transportation of the dredged material. ▪ The location of all containment systems and/or spill response materials. o Dredging schedule. o Type (e.g., cutter-suction dredging) and number of dredging plants that Jordan Cove will use during the maintenance dredging. o A description of water pollution controls (operational controls, structural controls such as floating turbidity curtain etc.) that Jordan Cove will use and the location of all structural controls to minimize the migration of turbid water from maintenance dredging activities, o Detailed spill response procedures including all emergency shut-off procedures and procedures for a spill associated with the hydraulic transport line. o A dredging monitoring plan for DEQ review and approval to evaluate the effectiveness of all proposed controls.
		In compliance with OAR 340-041-0007(1) and -0036, please provide for DEQ review and approval a detailed water pollution control plan presenting all practicable operational and structural control techniques that Jordan Cove

		Energy Project will employ when constructing the Material Offloading Facility east of the opening for the slip at the Liquefied Natural Gas Terminal. Please include in this plan a characterization of the fill material Jordan Cove will use to construct this facility that evaluates this fill material for contamination.
340-048-0042(2)(b)	Existing and potential designated beneficial uses of surface water or groundwater that might be affected by the activity	DEQ will perform this review upon the receipt of information requested elsewhere in this matrix.
340-048-0042(2)(c)	Potential water quality impacts from the use, generation, storage, or disposal of hazardous substances	DEQ will perform this review upon the receipt of information requested elsewhere in this matrix.
340-048-0042(2)(d)	Potential modifications of surface water quality or quantity affecting water quality	DEQ will perform this review upon the receipt of information requested above. In addition to these requests for information, please provide to DEQ an application for an Individual Industrial Water Pollution Control Facility Permit for the proposed discharges of the hydrostatic testing wastewater. Please provide the location of each point of discharge. If Jordan Cove Energy Project or Pacific Connector Gas Pipeline expects to discharge washwater to the ground from vehicle and equipment washing, please provide an application for a Water Pollution Control Facility Individual Permit for these discharges. Please provide the location of each point of discharge.
340-048-0042(2)(e)	Potential modifications of groundwater quality that might affect surface water quality.	DEQ will perform this review upon the receipt of information requested elsewhere in this matrix. In addition to these requests for information, please provide a copy of the results from the first phase (i.e., desktop data review with maps) of the Shallow Groundwater Study (Revised August 24, 2017 by GeoEngineers) showing suspected locations of shallow groundwater along the pipeline right-of-way. Please expand the maps proposed in this study to include suspected locations of shallow groundwater along the proposed route for the 25 miles of Temporary or Permanent Access Roads. When complete, please provide the results from the implementation of the subsurface exploration plan proposed for phase two of this study with an analysis of how the construction and permanent right-of-way will impact shallow groundwater as well as the construction of any proposed new roads. Moreover, please propose practices for how Pacific Connector Gas Pipeline will avoid, minimize, and, if necessary, mitigate the impacts identified in the Shallow Groundwater Study noted above.

340-048-0042(2)(f)	Potential water quality impacts from the construction of intake, outfall, or other structures associated with the activity.	DEQ will perform this review upon the receipt of information requested elsewhere in this matrix.
340-048-0042(2)(g)	Potential water quality impacts from wastewater discharges.	DEQ will perform this review upon the receipt of information requested elsewhere in this matrix.
340-048-0042(2)(h)	Potential water quality impacts from construction activities.	DEQ will perform this review upon the receipt of information requested elsewhere in this matrix.
340-048-0042(2)(i)	Compliance with plans applicable under Section 208 of the CWA.	Please provide signed Land Use Compatibility Statements from Coos, Douglas, Jackson, and Klamath Counties.

Oregon
Kate Brown, Governor

Department of Environmental Quality
Western Region Eugene Office
165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838
FAX (541) 686-7551
TTY 711

December 20, 2018

Derik Vowels
Jordan Cove LNG, LLC
Consultant, Lead Environmental Advisor
111 SW 5th Ave., Suite 1100,
Portland OR 97204

Re: Supplemental Information Request
Response to October 8, 2018 Jordan Cove Correspondence

Jordan Cove Energy Project (FERC Project No. CP17-494)
Pacific Connector Gas Pipeline (FERC Project No. CP17-495)
U.S. Army Corps of Engineers (Project No. NWP-2017-41)

Dear Mr. Vowels:

The Oregon Department of Environmental Quality (DEQ) is currently reviewing an application from Jordan Cove LNG, LLC (Jordan Cove) for Clean Water Act section 401 water quality certification for a Section 404 permit from the U.S. Army Corps of Engineers necessary to construct the Jordan Cove Energy Project and Pacific Connector Gas Pipeline (collectively, "the Project").

On September 7, 2018, DEQ requested additional information from Jordan Cove to assist with our project analysis. Jordan Cove provided responses to the information request on October 8, 2018. In general, DEQ finds that many of Jordan Cove's responses do not fully address the information requests in our September 7, 2018, correspondence. Certain responses, for example, provide qualitative descriptions of best management practices or refer to previously submitted information. To be clear, measures proposed to reduce project-related water quality impacts must be supported by quantitative data, such as engineering specifications or output from appropriate numerical models, to demonstrate compliance with applicable water quality objectives.

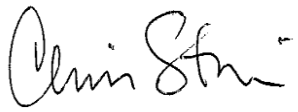
DEQ has supplemented its September 7, 2018, information request. The supplemental data request, provided as Attachment A, provides comments and clarifies, as needed, the information deemed necessary to meet certification requirements. For consistency, Attachment A retains the numbering format initiated by Jordan Cove in their October 8, 2018, response.

Please file a complete response to this supplemental information request by January 22, 2019, to:

Christopher Stine
Oregon Department of Environmental Quality
165 East 7th Avenue, Suite 100
Eugene, Oregon 97401

If Jordan Cove cannot provide certain information within the requested period, please indicate which items will be delayed and provide a projected filing date.

If you have any questions, please contact me directly at (541) 686-7810, or via email at stine.chris@deq.state.or.us.



Christopher Stine, PE

Water Quality Engineer

Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing

ec: Mike Koski, mkoski@pembina.com
Natalie Eades, Neades@pembina.com
Tyler Krug, Tyler.J.Krug@usace.army.mil
John Peconom, John.Peconom@ferc.gov
Sean Mole, sean.mole@oregon.gov
DEQ: Keith Andersen, Dave Belyea, Steve Mrazik, Chris Bayham, Mary Camarata, Sara Christensen
FERC Dockets: CP17-494-000, CP17-495-000

Comment No.	September 7, 2018 Information Request	Jordan Cove Response	DEQ's Review and Response to Jordon Cove's Response
1, 2	Must provide and timely update DEQ with complete description of construction/operation activities and specify clearly DEQ's acceptance of submissions as changes to proposed activities.	Jordan Cove will notify DEQ to update 401 application materials.	DEQ accepts response.
3	Must provide directly to DEQ a comprehensive description of the propose action including all resource reports, maps, electronic data files etc.	Jordan Cove will provide links to DEQ to access all information.	DEQ accepts response.
4, 5	Comment 4: Water Quality Standards Oregon's water quality standards consist of beneficial uses, numeric and narrative criteria developed to support these uses, and an antidegradation policy that prohibits an activity from further degrading water quality. Applicants for water quality certification must provide sufficient information to demonstrate the activity will comply with Oregon water quality standards (OAR 340-048-0020(g)). Comment 5: Provide information to demonstrate how the Project will comply with the water quality standards found in OAR 340 Division 041. For project activities that do not	The JCEP 401 Water Quality Memorandum (Part 1) and PCGP 401 Water Quality Summary Table (Part 2, Appendix A) in the application specifically address the Project's compliance with Oregon water quality standards.	**Summary Statement: Jordan Cove references previously submitted material that describes Best Management Practices to reduce project effects on water quality. Citing potential BMPs by themselves is insufficient. DEQ recognizes BMPs as one part of a broader strategy that must also consider existing water quality, local environmental conditions, the anticipated magnitude of project-related effects, and appropriate engineering controls to mitigate negative effects on water quality. Proposed BMPs must be well-supported using quantitative analyses such as modeling, manufacturer's technical specifications, results of pilot tests, or other quantitative data to support their site-specific use to effectively achieve water quality objectives. Please provide a plan that demonstrates how proposed BMPs or other engineering controls will protect water quality at each location where project actions may directly or indirectly affect waters of the state. The plan should provide a site-specific analysis of each proposed activity and technical justification for each proposed remedy as discussed more fully in the following section.** Jordan Cove's responses must provide a comprehensive analysis of potential project-related water quality impacts or the quantitative data necessary to evaluate proposed remedies. Jordan Cove's responses frequently refer to plans that rely on qualitative descriptions of BMPs with no site-specific reference to individual waterbodies, water quality conditions, or a discussion of proposed activities. Applications that propose BMPs to mitigate water quality impairment must identify the location, design details including engineering technical data, and a maintenance schedules to ensure adequate protection during use. In developing its response, Jordan Cove should refer to the information below. Jordan Cove must include quantitative and/or engineering support for the proposed controls or best management practices. For example, DEQ suggests using models such as Geomorphic Road Analysis and Inventory Package (GRAIP) and X-DRAIN to provide DEQ with the requested evaluation of potential water quality impacts from PCGP's proposal to use existing roads and to build new roads. Adequate quantitative analysis is necessary to demonstrate that current and future

	affect State waters, note how the Project will not violate applicable standards. For project activities that impact State waters, note how Jordan Cove is proposing to mitigate, reduce, or prevent impacts so as to ensure the Project, as proposed, does not violate applicable water quality standards. Project impacts should be assessed in terms of direct, indirect, and cumulative effects of the activity on state water quality.		erosion control planning will not "cause or contribute to a violation of in-stream water quality standards" as required in Schedule A.10.a of the NPDES 1200-C General Permit and OAR 340-048-0042(2)(a). Jordan Cove's response does not include estimates of sediment discharge from the construction and post-construction right-of-way. Models such as the Revised Universal Soil Loss Equation Version 2 (RULSE2), Watershed Assessment Tool for Environmental Risk (WATER), and/or Soil and Water Assessment Tool (SWAT) may be used to quantitatively estimate sediment control practices. PCGP can use GRAIP noted above to evaluate the need for BMPs on existing access roads for pipeline construction and operation.[1, 2, 3] Qualitative descriptions of proposed erosion and sediment control practices do not adequately demonstrate that measures will sufficiently mitigate risks to water quality. Jordan Cove must provide well-supported quantitative analyses of proposed engineering remedies based on site-specific understanding of water quality conditions. DEQ's comments on PCGP's response to Comment 15 provide additional examples of information required to demonstrate compliance with Oregon water quality standards.
6, 7	Comment 6: Please provide a NPDES 1200-C Permit Application demonstrating that land disturbing activities associated with the construction of Jordan Cove Energy Project's Liquefied Natural Gas Terminal as well as the following: • Land disturbing activities associated with the dry excavated portion of this terminal's Marine Slip, • Land disturbing activities associated with all offsite project areas associated	Jordan Cove's will submit its permit application for construction & land disturbing activities at the LNG Terminal to DEQ in Q4 2018.	**Summary Statement: DEQ will need detailed Site Map and Drawings for an NPDES 1200-C General Permit for:** • **Constructing the LNG Terminal and all its associated components.** • **Constructing the entire length of the pipeline and all associated components for constructing and operating this pipeline.** **The Site Maps and Drawings for these two construction projects must fully address Schedule A.12 of this permit as well as all the other applicable permit conditions. In developing these drawings, PCGP will need to provide geo-engineering analyses and the technical support for these analyses for the following concerns:** • **All cut and fill areas for the construction right-of-way and road improvements (Schedule A.12.b.v.3.b).** • **Construction stormwater discharge points for the construction right-of-way and road improvements (Schedule A.12.b.v.3.d).** • **Areas used for storage of logs, soils, or wastes (Schedule A.12.b.v.3.e).** **DEQ requests that PCGP use one of three modeling options noted in the section below to identify potential unstable slopes requiring further geotechnical analyses and engineering. Additionally, in the section below, DEQ provides**

[1] Natural Resource Conservation Service and USDA Agricultural Research Service. 2008. Revised Universal Soil Loss Equation, Version 2 (RULSE2)
[2] Wilson, Bruce N. Aleksey Sheshukov, and Reid Pulley. 2006. Erosion Risk Assessment Tool for Construction Sites (Final Report). Office of Research Administration. Minnesota Department of Transportation
[3] Gassman, P.W., M.R. Reyes, C.H. Green, and J.G. Arnold. 2007. The Soil and Water Assessment Tool: Historical Development, Applications, and Future Research Directions. American Society of Agricultural and Biological Engineers. Volume 50(4): 1211-1250

	with this terminal and its construction including those areas described in Section 5.3 of this terminal's stormwater management plan (Part 1, Attachment A3). • Land disturbing activities associated with roads used to access this terminal and offsite project areas. • Land disturbing activities associated with any other facilities (staging areas, refueling areas, employee parking etc.) that Jordan Cove Energy Project will use to construct of this terminal. Comment 7: DEQ will need to determine if these land disturbing activities will comply with the technology-based effluent limits of this permit. DEQ will also need an erosion and sediment control plan that, for example, addresses Schedule A.12.b.v and other conditions in this permit. For DEQ to evaluate the water quality impacts of the construction process on waters of the state, DEQ needs this information in an erosion and sediment control plan.		**examples of the level of detail DEQ is seeking from Jordan Cove and the data gaps in Jordan Cove's current planning documents. DEQ provides the rationale for this information request in the section below.** A complete NPDES 1200-C Permit Application is necessary for Jordan Cove to comply with the following: • NPDES 1200-C General Permit Conditions (Schedule A.1,10, and 12 in particular) • OAR 340-041-0007(1) and (7) • OAR 340-048-0042(2) Jordan Cove's response to Comment 6 only recognizes the need to address construction/land disturbing activities associated with the LNG Terminal. Jordan Cove's response does not address the need to develop a required erosion and sediment control plan for the approximately 229 miles of pipeline as noted in comments in AIR-1. As noted in the sources covered by the NPDES 1200-C General Permit, these include construction activities that are part of a common plan of development. For example, this includes land disturbing activities to widen an existing road, develop employee parking, lodging for workers, and develop communication towers. To comply with the technology-based effluent limits in this permit and, in particular, Schedule A.12 of this permit, Jordan Cove will need to demonstrate that the Site Map and Drawings for approximately 229 miles of pipeline construction right-of-way contains the following: *a. Preparation.* *i. The permit registrant must ensure that an ESCP is prepared and revised as necessary to reflect site conditions for the construction activity regulated by this permit, and submit revisions to DEQ or Agent in accordance with requirements of this permit. The design, installation, and maintenance of erosion and sediment controls must be adequate to address factors such as the amount, frequency, intensity, and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.* *ii. Qualifications to Prepare ESCP.* *1. For construction activities disturbing 20 or more acres, the ESCP must be prepared and stamped by a Certified Professional in Erosion and Sediment Control, Certified Professional in Storm Water Quality, Oregon Registered Professional Engineer, Oregon Registered Landscape Architect, or Oregon Certified Engineering Geologist.* *2. If engineered facilities such as sedimentation basins or diversion structures for erosion and sediment control are required, the ESCP must be prepared and stamped by an Oregon Registered Professional Engineer.* *b. The ESCP must include the following elements:* *i. Name of the site.* *ii. Local Government Requirements. Include any procedures necessary to meet applicable local government erosion and sediment control or stormwater management requirements.*

	Please provide a NPDES 1200-C Permit Application for land disturbing activities associated with the construction of Pacific Connector's gas pipeline and with the construction of all associated facilities such as communication towers, roads (existing and new), disposal sites, block valve facilities, and compressor stations. DEQ will need to determine if these land disturbing activities will comply with the technology-based effluent limits of this permit. DEQ will also need an erosion and sediment control plan that, for example, addresses Schedule A.12.b.v and other conditions in this permit. For DEQ to evaluate the water quality impacts of the construction process on waters of the state, DEQ needs this information in an erosion and sediment control plan.		*iii. Erosion and Sediment Control Inspector.* *1. Inspections must be conducted by a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact stormwater quality, is knowledgeable in the correct installation of the erosion and sediment controls, and is able to assess the effectiveness of any sediment and erosion control measures selected to control the quality of stormwater discharges from the construction activity.* *2. Beginning January 1, 2017, for projects that are five or more acres, inspections must be conducted by a person certified in an erosion and sediment control program that has been approved by DEQ. DEQ has approved the following programs:* *a. Certified Professional in Erosion and Sediment Control,* *b. Certified Professional in Storm Water Quality,* *c. Washington State Certified Erosion and Sediment Control Lead, or* *d. Rogue Valley Sewer Services Erosion and Sediment Control Certification.* *3. Inspections must be conducted by the Erosion and Sediment Control Inspector identified in the ESCP.* *4. Provide the following for all personnel that will conduct inspections:* *a. Name and title;* *b. Contact phone number and, if available, e-mail address; and* *c. Description of experience and training.* *iv. Narrative Site Description.* *1. Description of the construction activity;* *2. Proposed timetable indicating when each erosion and sediment control BMP is to be installed and the duration that it is to remain in place;* *3. Estimates of the total area of the permitted site and the area of the site that is expected to undergo clearing, grading or excavation;* *4. Nature of the fill material to be used, and of the site soils prior to disturbance;* *5. Names of the receiving water(s) for stormwater runoff;* *6. The types of pollutants that could be found in stormwater and their likely sources;* *7. Any authorized non-stormwater discharges; and* *8. If a surface water of the state is within 50 feet of the permitted activities,* *a. Description of area within 50 feet of project site (including any natural buffer), and* *b. Description of approach to manage the natural buffer zone, if any (for example, maintain natural buffer, reduce natural buffer and increase BMPs, or eliminate flow through natural buffer).* *v. Site Map and Drawings.*

			1. *The site map and drawings must be kept on site and must represent the actual BMP controls being used onsite;* 2. *The site map must show sufficient roads and features for DEQ or Agent to locate and access the site;* 3. *The site map and drawings must include (but is not limited to) the following features (as applicable):* *a. Total property boundary including surface area of the development;* *b. Areas of soil disturbance (including, but not limited to, showing cut and fill areas and pre- and post-development elevation contours);* *c. Drainage patterns before and after finish grading;* *d. Discharge points;* *e. Areas used for the storage of soils or wastes;* *f. Areas where vegetative practices are to be implemented;* *g. All erosion and sediment control measures or structures;* *h. Impervious structures after construction is completed (including buildings, roads, parking lots and outdoor storage areas);* *i. Springs, wetlands and other surface waters on site or adjacent to the site;* *j. Temporary and permanent stormwater conveyance systems;* *k. Onsite water disposal locations (for example, for dewatering);* *l. Storm drain catch basins depicting inlet protection, and a description of the type of catch basins used (for example, field inlet, curb inlet, grated drain and combination);* *m. Septic drain fields;* *n. Existing or proposed drywells or other UICs;* *o. Drinking water wells on site or adjacent to the site;* *p. Planters;* *q. Sediment and erosion controls including installation techniques;* *r. Natural buffer zones and any associated BMPs for all areas within 50 feet of a water of the state; and* *s. Detention ponds, storm drain piping, inflow and outflow details.* The requirements noted above are critical for evaluating the potential efficacy of JCEP's/PCGP's erosion and sediment control program and proposed structural erosion and sediment controls as applied on the landscape along the entire pipeline alignment. This information is also critical for ensuring compliance with 1200-C permit requirements when construction is in progress. For example, in PCGP's Erosion Control and Revegetation Plan [Part 2, Appendix B, 404-10 JPA), Section 3.3.4] states:

			Temporary erosion control measures will be installed after vegetation clearing and immediately prior to/after initial soil disturbance…Section 4.0 of the ECRP describes in detail the temporary erosion control procedures or BMPs that will be implemented during construction to minimize impacts from erosion and sedimentation.. This information does not indicate to DEQ where, for example, PCGP will locate construction storage areas for soils, logs, boulders, and other construction debris. This information does not indicate where PCGP will locate stormwater discharge points as required in the NPDES 1200-C General Permit. PCGP does not indicate where PCGP will install erosion and sediment controls in the construction right-of-way and associated facilities during the construction phase. DEQ needs this information to determine if PCGP will store logs, rock, soil, and other construction debris from forest clearing operations and construction materials on or at the head mapped landslides or areas identified Potential Rapidly Moving Landslides Hazards. The Tyee Core Area is prevalent in the Oregon Coast Range where PCGP proposes to install the pipeline. The Tyee Core Area is commonly associated with thick sandstone beds that have few fractures. These beds allow water to concentrate in shallow soils overlying these beds creating positive soil pressure and the hazard of shallow, rapidly moving landslides. Human-caused landslides diminish water quality when they discharge into surface waters. Placement of additional weight and the discharge of construction or post-construction stormwater on to an unstable slope in the Tyee Core Area can initiate a landslide/debris torrent affecting water quality. In DEQ's desktop analysis of PCGP's proposed pipeline construction activities using maps provided by PCGP as well as aerial photos and datasets available to DEQ, DEQ has identified numerous potential constraints along the proposed pipeline alignment. If PCGP does not identify and address these in the construction and operation planning, these constraints have the potential to impact water quality. Constraints such as mapped landslide areas and convergent headwalls (see examples in the review, below) are numerous along the pipeline alignment. PCGP has provided limited analysis and recommendations and no site-specific engineering plans, specifications, and supporting technical analyses for how PCGP will construct and operate the pipeline among these constraints. As discussed in DEQ's comments below, the pipeline right-of-way with its area of soil compaction above the gas pipeline is essentially functioning as a permanent, primitive road alignment. Therefore, research and engineering evaluations such as those concerning roads on steep and/or unstable slopes are suitable technical references for identifying constraints that – if not addressed – may impact water quality. PCGP will need to formulate site-specific controls to prevent, for example, debris flows into streams initiated from pipeline construction and operation. DEQ will not accept the generic best management practices currently presented in PCGP's Erosion Control and Revegetation Plan as a substitute for the detailed information requested above and below in this review. During its desktop analysis, DEQ identified several landscape features or constraints discussed in more detail in the technical reference in *Slope Engineering for Mountain Roads* (Hearn 2011). In DEQ's review of PCGP's response to Comment 15, DEQ highlights below several examples of these constraints. These examples represent potential site-specific

			constraints that could impact water quality that PCGP did not address in its 401 Water Quality Certification submittal. In developing its Certification decision, DEQ must evaluate PCGP's efforts to identify and, if needed, develop engineering solutions to site-specific constraints encountered during its planning and field investigations for the following: (1) constructing and operating the pipeline, (2) using existing access roads, (3) improving/reconstructing existing access roads, and (4) building new roads. In reviewing the Section 4.0 of the PCGPs Erosion Control and Revegetation Plan for more detail, DEQ can find no information on where exactly PCGP will locate stormwater discharge from the construction right-of-way, the Temporary Extra Work Areas, and other areas cleared of vegetation. DEQ is seeking this information to determine how PCGP will manage construction stormwater discharge to streams, wetlands, Areas of Potential Rapidly Moving Landslide Hazards, and mapped landslides. Without this detailed information regarding how PCGP will address these significant constraints during the construction process, DEQ can only assume that PCGP will execute its erosion and sediment control program in an impromptu fashion consequently placing waters of the state at risk. DEQ requests PCGP employ one of the slope stability models noted below to identify potential unstable slopes. This information would guide the following: • Siting of log, construction debris, and/or equipment storage. • Design of the construction stormwater management and discharge system. • Design of the post-construction stormwater management and discharge system. • Design of cut and fill slopes for the pipeline alignment and access roads. To identify potential unstable slopes needing further geotechnical analyses and engineering, DEQ request the application of one of the following models: • Deterministic Level I Stability Analysis (DLISA) and Probabilistic Level I Stability Analysis (LISA).[4] • Shallow Landsliding Stability Model (SHALSTAB).[5] • Map-based Probabilistic Infinite Slope Analysis Program (PISA-m).[6] In DEQ's review of PCGP's response to Comment 15 below, DEQ highlights examples where PCGP is proposing to discharge construction/post-construction stormwater and store logs/construction spoils/etc. along concave-shaped slopes without providing DEQ with a slope stability analysis in its submittal. As discussed below, human actions initiate many debris flows within concave-shaped slopes and water plays a key role in destabilizing slopes.

[4] Koler, Thomas E. 1998. Evaluating Slope Stability in Forest Uplands with Deterministic and Probabilistic Models. Environmental & Engineering Geoscience, Volume IV, No. 2, pp. 185-194

[5] Montgomery, David R. Montgomery and William E. Dietrich. 1994. A Physically Based Model for the Topographic Control on Shallow Landsliding. Water Resources Research. Vol. 30, No. 4, pp. 1153-1171

[6] Haneberg, William C., William F. Cole, and Gyimah Kasali. 2009. High-Resolution Lidar-Based Landslide Hazard Mapping and Modeling. Bulletin of Engineering Geology and the Environment. 68:263-276

8	Please provide a NPDES 1200-A Permit Application demonstrating that the proposed 20 sites to obtain rock for Pacific Connector's gas pipeline construction and maintenance. DEQ will need to determine if these land disturbing activities will comply with the technology-based effluent limits of this permit.	PCGP will obtain rock commercially.	PCGP will not need coverage under NPDES 1200-A for rock material that is obtained commercially. PCGP will need to update the information in the 401Water Quality submittal package to reflect this revision to its proposal.
9	Please provide a NPDES 1200-A Permit Application demonstrating that the concrete batch plant proposed for the offsite project area referred to as Boxcar Hill in the LNG Terminal's stormwater management 9 plan (Section 5.3, page 19). DEQ will need to determine if rock quarries will operate in compliance with the technology-based effluent limits of this permit.	Jordon Cove's contractor KBJ will obtain a permit prior to operating.	DEQ understands Jordan Cove's contractor will apply for and receive coverage under NPDES 1200-A General Permit for the concrete batch plant at Boxcar Hill.
10, 11, 13	Comment 10: Please provide a NPDES Individual Permit Application for the LNG Terminal's two domestic wastewater facilities discharging to surface water. DEQ will use the information in this permit application to develop a discharge permit containing technology-based and water quality-based effluent limits associated with this permit.	JCEP is preparing an application for submittal in Q4 2018 to modify existing Permit No. 101499. JCEP provided a Discharge Characterization Memo to DEQ on May 25, 2018.	DEQ anticipates a response to this request in Q4 2018. The information provided in JCEP's Discharge Characterization Memo is insufficient for DEQ to draft a NPDES Individual Permit for the LNG Terminal's domestic wastewater discharge.

	Comment 11: Please provide a NPDES Individual Permit Application for discharges of non-contact cooling wastewater discharged from Liquefied Natural Gas carriers using the Marine Slip at the LNG Terminal. DEQ will use this permit application to develop a discharge permit containing technology-based and water quality-based effluent limits. Comment 13: Please provide an application for a NPDES Individual Permit for the discharge of vehicle and equipment washwater to surface water during the operation of the LNG Terminal. DEQ will use this permit application to develop technology-based and water quality-based effluent limits for this permit if the operations.		
12	If the discharge from wastewater treatment plants proposed for the LNG Terminal has a design flow capacity of 1 million gallons per day or more or requires pretreatment under 40 CFR §403, please provide a NPDES 1200-Z Permit Application demonstrating that the Terminal's stormwater	JCEP submitted a stormwater management plan to DEQ on February 6, 2018.	Information provided by JCEP indicates operation of these two small treatment plants would not require coverage under a NPDES 1200-Z General Permit. For this reason, JCEP will not need to submit an application to DEQ for a NPDES 1200-Z General Permit for the LNG Terminal.

	management plan will comply with the technology-based and water quality-based effluent limits in this permit.		
14	Please provide an application for a NPDES Individual Permit for the discharge of vehicle and equipment washwater to surface water during the construction and operation of the gas pipeline and all its associated facilities. DEQ will use this permit application to develop technology-based and water quality-based effluent limits for this permit.	JCEP and PCGP is preparing a NPDES 1200-C permit application and the ESCP in this application will describe how this wastewater will be treated before discharge under this 1200-C General Permit.	Schedule A.6.a-c of the NPDES 1200-C General Permit prohibits the discharge of wastewater from construction operations and vehicle/equipment washing operations. To comply with NPDES 1200-C General Permit requirements and OAR 340-045-0015(1)(a), PCGP must submit a separate NPDES and/or WPCF Individual Permit Application for the discharge of equipment and vehicle wash water to waters of the state.
15	In compliance with OAR 340-041-0007(8), please provide an assessment of Pacific Connector Gas Pipeline's compliance with all applicable DEQ-approved Total Maximum Daily Load Implementation Plans or compliance programs for the following: • United States Department of Agricultural Forest Service Water Quality Restoration Plans and the USDA National Best Management Practices for Water Quality Management on National Forest System Lands (Volume 1: National Core BMP Technical Guide) noted in DEQ's	PCGP provided DEQ Appendix A of Part 2 of the 401 Water Quality Package to DEQ demonstrating compliance with water quality standards and the plans used to meet water quality standards. The conditions in the Federal ROW grants will ensure compliance with applicable water quality plans.	**<u>Summary Statement</u>:** **PCGP's response does not fully address the requirements described in Comment 15. DEQ requires a comprehensive analysis using appropriate quantitative support to demonstrate compliance with water quality objectives, including TMDLs. As requested in Comment 15 and more fully described below, please describe how PCGP will comply with the Federal, State, and County plans/programs for complying with TMDLs. Please include or identify relevant supporting documents (e.g., design manuals, standards, and specifications) that each Designated Management Agency uses to implement their TMDL compliance programs. DEQ will need to review the conditions in all Federal access or right-of-way grants to ensure these conditions comply with OAR 340-048-0042(2).** Plans referenced by Jordan Cove provide a qualitative analysis of proposed BMPs. As discussed previously, DEQ requires BMPs to be supported by an evaluation of existing water quality, the impact of the proposed activity on water resources, and a quantitative assessment of mitigation provided by the proposed BMPs. For example, PCGP briefly describes BMPs in a table in Part 2 Attachment G that PCGP asserts will comply with water quality standards. In making this assertion, PCGP lists various plans developed to comply water quality standards. PCGP includes no analysis to demonstrate these BMPs will prevent a water quality violation for all pollutant discharges. Certain portions of the project that occur on state and federal lands are governed by existing TMDLs. PCGP has not demonstrated to DEQ that proposed activities such as right-of-way construction, road maintenance, and road construction will comply with USDA Forest Service, U.S. Department of Interior BLM, Bureau of Reclamation, Oregon Department of Forestry, and County Total Maximum Daily Load compliance plans and programs. DEQ developed these TMDL to achieve compliance with water quality standard in water bodies impaired by specific pollutants. For an example of this deficiency in PCGP's response to AIR-1, please refer to DEQ's review of PCGP's response to Comment 24 demonstrating that some

	Memorandum of Understanding with the Forest Service. • US Department of Interior Bureau of Land Management's Water Quality Restoration Plans. • Oregon Department of Forestry's Forest Practices Act Program. • Oregon Department of Agriculture's Water Quality Plans. • Coos County Total Maximum Daily Load Implementation Plan. • Douglas County Total Maximum Daily Load Implementation Plan. • Jackson County TMDL Implementation Plan. • Klamath County TMDL Implementation Plan. In this compliance assessment, please also note all the support documents such as design manuals, guidance documents, road permits etc. that PCGP will follow when complying with these Implementation Plans.		of PCGP's proposed activities will not comply with Forest Service, BLM, ODF, and County TMDL compliance programs without the submittal of additional information. Under state rules, TMDL compliance plans are enforceable when Designated Management Agencies such as the Forest Service, BLM, and ODF, for instance, fail to implement these plans. Right-of-way permits are not the only mechanism these Federal agencies will use to ensure compliance with their Water Quality Restoration Plans.[7, 8, 9] WQRPs can and do address road impacts on water quality. Federal agencies address these impacts in their efforts to comply with Clean Water Act requirements such as Section 303. DEQ provides PCGP an example of how federal agencies use WQRPs to address road impact on water quality in DEQ's review of PCGP's response to Comments 26 and 27 below. For this reason, DEQ will review all proposed road permits to cover all access roads Jordan Cove will use to construct and operate the terminal and gas pipeline. If acceptable, DEQ will use the conditions provided in Federal road permits when developing its Certification Decision. In Appendix A of Part 2 of the 401 Water Quality Package cited in PCGP's response to Comment 15, PCGP lists in a table the following: • Potential impairment parameters. • Sources and activities associated with these potential impairment parameters. • PCGP's proposed plans/BMPs developed to comply with water quality standards. In many of these plans and reports, PCGP provides only a qualitative description of actions or BMPs PCGP will use to avoid violations of water quality standards. DEQ highlights specific examples below. For example, PCGP provides no quantitative analysis or engineering designs with technical support demonstrating that the construction of the pipeline and operation of the pipeline right-of-way will prevent water quality impairments from landslides and sediment discharge resulting from the following: • Design and maintenance of roads. • Design of both the construction and permanent pipeline right-of-way. PCGP's qualitative analysis of compliance with water quality standards does not even list the more than 660 miles of access roads as a source of sediment. The scientific literatures clearly shows roads as a major source of sediment and soil erosion in forested watersheds. The scientific literature identifies road maintenance practices, road construction decisions,

[7] USDA Forest Service and DOI Bureau of Land. 1999. *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters*. USDA Forest Service, Pacific Northwest Region
[8] Memorandum of Understanding Between State of Oregon Department of Environmental Quality and the USDA, Forest Service Pacific Northwest Region. OMB 0596-0217, FS-1500-15
[9] Memorandum of Understanding Between United States Department of Interior Bureau of Land Management and the State or Oregon Department of Environmental Quality to Meet State and Federal Water Quality Rules and Regulations. BLM Agreement Number BLM-OR930-1702

			road construction and maintenance standards, road improvements, and decommissioning standards as key elements in protecting soil and water quality.[10] Among the proposed pollution control plans and reports in Appendix A of Part 2 that PCGP presents to avoid or minimize potential water quality impairments are: • Resource Report 6 (Geologic Resources) • Erosion Control and Revegetation Plan • Transportation Management Plan The information below demonstrates how these two plans and this report – with their current information – do not address how PCGP's proposed activities will comply with water quality standards. These two plans and this report lack either the quantitative analysis or engineering analysis and technical support to give DEQ reasonable assurance that PCGP's actions will not contribute to or cause a violation of water quality standards. **Examples of Inadequate Engineering Analysis and Support** **1. Unclear Drainage Management and Storage Activities Adjacent to Potentially Unstable Slopes** In areas where there is a potential for rapidly moving landslides such as the Tyee Core Area, PCGP should avoid certain activities. As recommended by authorities regulating forest management on unstable slopes, PCGP should avoid placing additional weight from (1) construction debris and logging and (2) water onto the upper or mid-scarp areas of unstable slopes such as those associated with: • Convergent headwalls/concave-shaped slopes • Bedrock hollows

[10] Grace III, J.M. and Clinton, B.D. 2007. Protecting Soil and Water in Forest Road Management. USDA Forest Service/University of Nebraska-Lincoln Faculty Publication Volume 50(5):1579-1584. 2007 American Society of Agricultural and Biological Engineers ISSN 0001-2351

			• Inner gorges with steep slopes.[11, 12, 13, 14, 15, 16, 17] In fact, the Oregon Department of Forestry issued rules under the Forest Practice Act that ODF uses to comply with the Clean Water Act requirements such as Total Maximum Daily Loads and to achieve Oregon's water quality standards.[18] Among these FPA rules is a rule OAR 629-625-0330 to ensure forest operations provide a stable forest roads that protect water quality when in use. As discussed in DEQ's review of PCGP's response to Comment 34, PCGP's pipeline right-of-way is functioning as a primitive road. Specifically, this forest road drainage rule for the FPA states: *(1) The purpose of this rule is to provide a drainage system on new and reconstructed roads that minimizes alteration of stream channels and the risk of sediment delivery to waters of the state. Drainage structures should be located based on the priority listed below. When there is a conflict between the requirements of sections (2) through (6) of this rule, the lowest numbered section takes precedence, and the later-numbered and conflicting section shall not be implemented.* *(2) Operators shall not concentrate road drainage water into headwalls, slide areas, high landslide hazard locations, or steep erodible fillslopes.* *(3) Operators shall not divert water from stream channels into roadside ditches.* *(4) Operators shall install dips, water bars, or cross drainage culverts above and away from stream crossings so that road drainage water may be filtered before entering waters of the state.* *(5) Operators shall provide drainage when roads cross or expose springs, seeps, or wet areas.*

[11] State of Washington. Forest Practices Board Manual. Section 16 Guidelines for Evaluating Potentially Unstable Slopes and Landforms
[12] State of Oregon. Landslide Hazards in Oregon. Oregon Department of Geology and Mineral Industries
[13] Jones & Stokes. 2008. Volume I: *Draft Environmental Impact Statement for Elliot State Forest Section 3.2.5 on Slope Stability*. Prepared for U.S. Fish & Wildlife Service and National Marine Fisheries Service.
[14] Report to the 70th Legislative Assembly. 1998. Joint Interim Task Force on Landslides and Public Safety.
[15] Hofmeister, R.J., D. J. Miller, K.A. Mills, J.C. Hinkle, A. Beier. 2002. Text to Accompany the Hazard Map of Potential Rapidly Moving Landslides in Western Oregon. GIS Layer for Local Governments in Implementation of Senate Bill 12. Interpretive Map Series IMS-22. Oregon Department of Geology and Mineral Industries
[16] Sidle, R.C. 1985. *Factors Influencing the Stability of Slopes*. Proceedings of a Workshop on Slope Stability: Problems and Solutions in Forest Management. USDA Forest Service. General Technical Report PN W-180,
[17] Benda, L.E., Veldhuisen, C., Miller, D.J., and Rodgers-Miller, L. 2000. Slope instability and forest land managers: A primer and field guide. Seattle, Wash., Earth Systems Institute, 74 p.
[18] Memorandum of Understanding between the Oregon State Department of Environmental Quality and the Oregon State Department of Forestry. April 16, 1998

(6) Operators shall provide a drainage system using grade reversals, surface sloping, ditches, culverts and/or waterbars as necessary to minimize development of gully erosion of the road prism or slopes below the road.

PCGP has not demonstrated in the Erosion Control and Revegetation Plan or Transportation Management Plan that PCGP will avoid discharging road drainage water into headwalls, slide areas, high landslide hazard locations, or steep erodible fill slopes. Moreover, PCGP has not addressed any of the ODF requirements noted below regarding forest road maintenance. ODF established FPA rule OAR 629-625-0600 to comply with water quality standards by timely maintenance of all active and inactive roads.

DEQ excerpted the following sketches and photographs from technical manuals designed to prevent landslides during forest operations. DEQ used these technical manuals during its desktop analysis of PCGP's proposed actions to identify potential unstable slopes that could initiate debris flows into water bodies. The examples depict convergent headwalls (i.e., concave-shaped slopes) and bedrock hollows. These landscape features can be found adjacent to the proposed PCGP pipeline alignment in numerous locations:

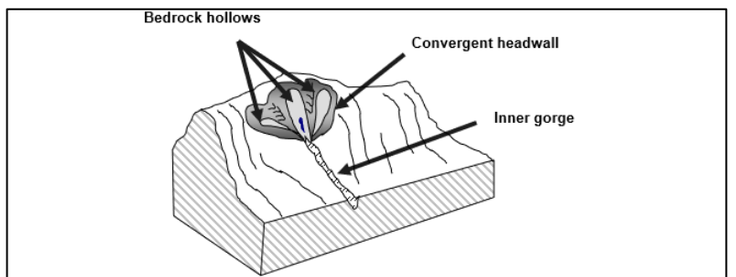


Figure 8. Typical hillslope relationships between bedrock hollows, convergent headwalls, and inner gorges (drawing by Jack Powell, DNR 2003).

Source: Text to Accompany the Hazard Map of Potential Rapidly Moving Landslides in Western Oregon (Hofmeister et al. 2002)

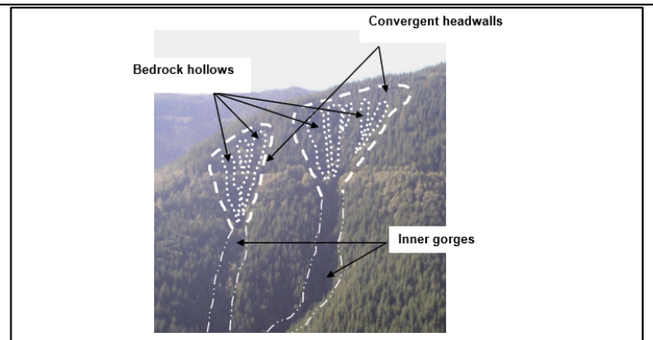


Figure 9. Common hillslope relationship: bedrock hollows in convergent headwalls draining to inner gorges (photo and drawing by Jack Powell, DNR 2003).

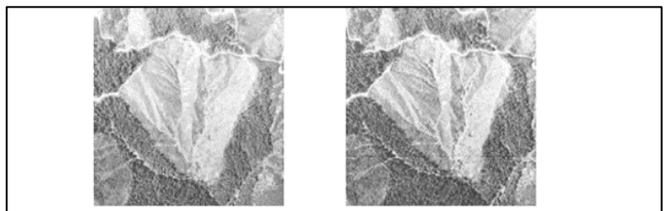
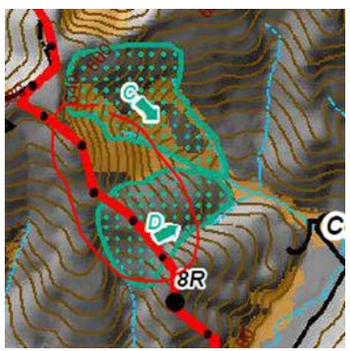


Figure 14a. Stereo pair of a clearcut convergent headwall in Pistol Creek basin, North Fork Calawah River, Washington.

Source: State of Washington Forest Practices Board Manual

These three examples are among many that PCGP can identify when reviewing its Geologic Hazards Map in combination with aerial photos showing the pipeline's right-of-way and other components such as the Temporary Extra Work Areas relative to Areas of Rapidly Moving Landslide Hazard, convergent headwalls, and bedrock hollows. The light brown areas in the excerpt of PCGP's Geologic Hazards Maps are Potential Rapidly Moving Landslide Hazards. The accompanying excerpt of aerial photos show unstable slope features from the Statewide Landslide Information Database for Oregon (SLIDO). These excerpts from the aerial photos also show the pipeline right-of-way (in yellow) and Temporary Extra Work Areas (in light blue).

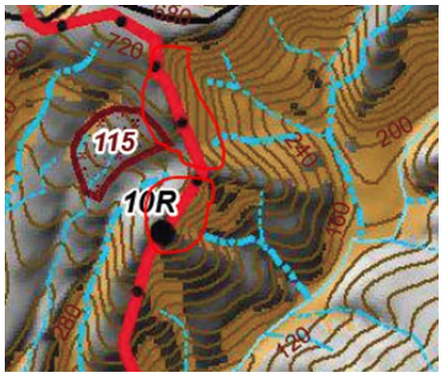
Figure 2 of 47 from PCGP's Geologic Hazards Maps (Northwest of Milepost 8R):

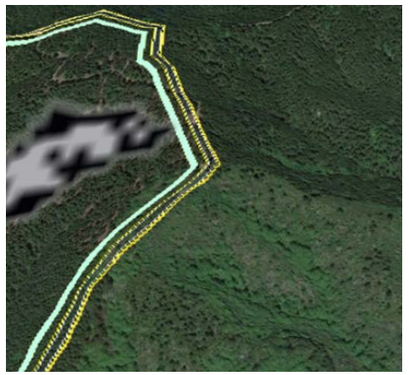




			PCGP's Erosion Control and Revegetation Plan does not indicate if the Temporary Work Area above the unstable slope feature will be used to store spoils (soil, boulders, root wads) and logs from forest clearing. However, PCGP's Resource Report 1 indicates that PCGP may use these work areas for these purposes. The ECRP does not detail how PCGP will manage construction stormwater above this unstable feature. Stormwater discharge at the top of convergent headwalls and bedrock hollow adds load to the top of this unstable slope. This stormwater discharge may create a positive soil pore pressure leading to a landslide. PCGP has not provided DEQ with an engineered post-construction stormwater management plan for the permanent pipeline right-of-way for this area and others indicating how PCGP will manage drainage above unstable slope features. On page 35 of Resource Report 6, PCGP discusses two primary ways in which pipeline construction has the potential to adversely impact slope stability. PCGP notes in Report 6 that routing drainage to potentially unstable slopes has the potential to adversely impact slope stability. However, PCGP does not provide DEQ with an analysis using the slope stability models to identify unstable slopes noted in DEQ's review of PCGP's response to Comments 6 and 7. Additionally, PCGP does not provide DEQ with a construction and post-construction stormwater management plan demonstrating how specifically PCGP will manage stormwater along these unstable landscape features. PCGP only identifies slope breakers along the construction and permanent right-of-way as the only technique to manage construction and post-construction stormwater. PCGP does not discuss, for example, or demonstrate the application of cutoff trenches presented in technical manuals on stabilizing slopes. PCGP does not detail the grade and placement of slope breakers on the ground in engineering plans for the construction and permanent right-of-way. Without this information as well as the drainage pattern, DEQ is unable to determine if the proposed use of slope breakers alone is sufficient to prevent the addition of weight from stormwater and an increase in soil pore pressure on an unstable slope. With the current submittal, DEQ cannot determine if the proposed slope breakers highlighted in the Erosion Control and Revegetation Plan will prevent landslides due to pipeline construction and operation. Additionally, in Resource Report 6 and the proposed ECRP, PCGP does not address site-specific constraints (i.e., roads, unstable landforms on each side of the right-of-way etc.) that may limit the application of slope breakers to route drainage away from unstable slopes. PCGP is proposing to remove trees and shrubs to install this gas pipeline. This loss of tree interception will increase the volume of runoff generated along pipeline's construction and permanent right-of-way. The discharge of this additional runoff among these unstable slope features has the potential to impact water quality. The following are two more examples highlighting similar concerns discussed in DEQ's review immediately above.

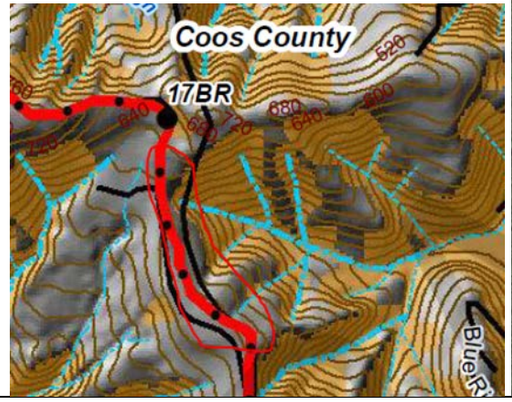
Figure 2 of 47 (Northwest and South of Milepost 10R) – Area No. 115 delineated in red is an identified landslide from the Department of Geology and Mineral Industries:





PCGP's ECRP does not show the engineering analysis and its technical support for how PCGP will manage the construction and post-construction stormwater above the Area of a Rapidly Moving Landslide Hazard and convergent headwall as well as the mapped landslide 115 identified by the Oregon Department of Geology and Mineral Industries..

Figure 4 of 47 (Southeast of Milepost 17 BR) – Blue square is a hydrostatic test location while the magenta polygon is an uncleared storage area:





			PCGP's ECRP does not show the engineering analysis and its technical support for how PCGP will manage the construction and post-construction stormwater above the Area of a Rapidly Moving Landslide Hazard and convergent headwall. **2. No Engineering Designs for Fill Slopes on Steep, Unstable Slopes and/or Steep Slopes with Erosive Soils** In Resource Report 6 (Geologic Resources), PCGP provides few specifics regarding controls to stabilize slopes to prevent landslides. Moreover, as noted in DEQ's review of PCGP's response to Comment 35 below, PCGP provides no engineering designs and the technical support for these designs for stabilizing fill slopes on steep, unstable slopes greater than 30% including slopes with highly erosive soils. PCGP identifies this deficiency on page 35 of Section 4.6.2 of Resource Report 6 by stating the following: *Steep side slope Pipeline construction segments will be identified during the final design phase of the Pipeline project. Fill slope construction details and specifications will be designed for the identified steep side slope Pipeline segments.* In Section 11.0 (Steep and Rugged Terrain), PCGP provides only a qualitative description of how it may approach fill slopes on steep, unstable slopes starting at the bottom of page 47. However, this mostly qualitative discussion does not consider terracing on erosive soils nor does it thoroughly address the management of stormwater on a terraced fill slope. The management of drainage on these steep slopes, the use of geotextiles or other engineering techniques to support terracing, and the need to reinforce the toe of slope are also not addressed in PCGP's submittal. These are issues typically addressed in technical references developed to construct linear infrastructure such as roads on steep slopes. However, PCGP does not discuss or addressed these issues in PCGP's submittal. **3. Unclear Design Standards/Specifications for Needed Road Improvements and Maintenance Standards/Specifications for Existing Access Roads** PCGP is proposing to use more than 660 miles of roads to construct this gas pipeline and its associated components. PCGP lists the Transportation Management Plan in Appendix A part 2 of the Water Quality Package as PCGP's approach to comply with water quality standards. As highlighted below, PCGP has not provided DEQ with specific road maintenance standards for access roads PCGP will use to construct and operate the pipeline. As highlighted below, PCGP has not provided DEQ with designs and specifications for any identified improvement to these existing access roads nor has PCGP demonstrated it conducted an inventory of the current condition of all access roads to determine their capacity to support the proposed level of use while minimizing the impact of these access roads on water quality.

			The scientific literature is replete with research documenting the importance of non-paved road design for protecting water quality. There are a number of references providing information on designing stable roads, including improving existing roads, and maintaining non-paved roads to protect water quality.[19, 20, 21, 22, 23] PCGP has not provided DEQ with engineering design details and their technical support for site-specific cut and fill slopes. PCGP has provided no information in the Transportation Management Plan on the improvements to protect water quality that PCGP proposes for existing access roads nor has PCGP presented for DEQ approval the methodology it will use to evaluate the potential water quality impact when using existing access roads given their current condition and design. Requesting that PCGP provide the engineering designs and specifications used to improve roads for pipeline construction and operation is essential for protecting water quality and, at minimum, assuring compliance with water quality standards and, in particular, OAR 340-041-0007(7). As noted in DEQ's review of PCGP's response to Comment 15, the scientific literature is replete with research documenting the importance of routine road maintenance for protecting water quality. For example, routine road maintenance for water quality is important to maintaining water quality necessary for the recovery of salmonids listed under the Endangered Species Act and found in streams receiving runoff from PCGP's proposed access roads. The National Marine Fisheries Service issued the Limit 10 Section 4(d) rule concerning routine road maintenance to protect water quality for ESA-listed salmon. For decades, the scientific community has established the harmful effects of roads on streams.[24] DEQ is requesting that PCGP provide the specific maintenance standards PCGP will apply to access roads while in use for pipeline construction. As discussed above, this is essential for protecting water quality and, at minimum, assuring compliance with water quality standards and, in particular, OAR 340-041-0007(7). Additionally, the Oregon Department of Forestry has rules for road maintenance and road building on private forest roads. ODF developed these rules to address public safety and water quality given the risk of landslides, road failure, and sediment discharge from road use and construction.[25, 26, 27, 28] ODF uses road maintenance and building requirements associated with the Forest Practices Act to comply with Clean Water Act requirements such as those associated with Total Maximum Daily Loads and water quality standards. However, PCGP does not provide DEQ with information on how

[19] Choctawatchee, Pea, and Yellow Rivers Watershed Management Authority. 2000. Recommended Practices Manual – A Guideline for Maintenance and Service of Unpaved Roads
[20] Berkshire Regional Planning Commission. 2001. The Massachusetts Unpaved Roads BMP Manual – A Guidebook on How to Improve Water Quality While Addressing Common Problems
[21] Gordon Keller and James Sherar. 2003. Low-Volume Roads Engineering – Best Management Practices Field Guide. US Agency for International Development and USDA Forest Service
[22] R. Jonathan Fanin and Joachim Lorbach. 2007. Guide to Forest Engineering in Mountainous Terrain. Forestry Harvesting and Engineering Working Paper 2. Food and Agricultural Organization of the U.N.
[23] Hearn, G.J. 2011. Slope Engineering for Mountain Roads. Geological Society Engineering Geology Special Publication No. 24
[24] Furniss, M.J., T.D. Roelofs, and C.S. Yee. 1991. Road Construction and Maintenance. American Fisheries Society Special Publication 19:297-323
[25] Oregon Department of Forestry. 2003. *Wet Weather Road Use*. Forest Practice Technical Note Number 9
[26] Oregon Department of Forestry. 1999. *Road Maintenance*. Forest Practices Technical Note Number 4
[27] Oregon Department of Forestry. 2003. *Installation and Maintenance of Cross Drainage Systems on Forest Roads*. Forest Practice Technical Note Number 8
[28] Oregon Department of Forestry. 2003. *High Landslide Hazard Locations, Shallow, Rapidly Moving Landslides and Public Safety*: Screening and Practices. Forest Practice Technical Note Number 2

			specifically PCGP will address OAR 629-625-0700 (Wet Weather Road Use). ODF's Wet Weather Road Use rule requires the following: *…durable surfacing or other effective measures to resist deep rutting or the development of a layer of mud on top of the road surface on road segments that drain directly to streams that will be used for log hauling and moving construction equipment during wet periods.* In its Forest Practices Technical Note 9, ODF provides a discussion of aggregate surfacing, road use, and turbidity in streams. DEQ can find no information in any of the plans included in PCGP's analysis of its compliance with water quality standards that addresses the issues raised in this ODF technical note and in Forest Practices Act rules. Moreover, for public safety, under OAR 629-623-0000 – 0800, a forest harvesting operator must submit to ODF a detailed road design for all new or reconstructed roads crossing high landslide hazard locations. For water quality protection and compliance with OAR 340-041-0007(7), DEQ is requesting in Comment 31 that PCGP provide detailed road designs for new or reconstructed roads in landslide hazard areas and other locations where these roads are hydrologically connected to waters of the state. PCGP must demonstrate in its plans and supporting documents where and when exactly PCGP is applying these designs on the proposed access roads for pipeline construction and operation. As with ODF's requirements for private forest roads, Counties have authority to establish road construction designs and specifications for County roads.[29] At minimum, these county requirements will ensure that an unpaved county road will support PCGP's proposed level of use while protecting the stability of the road surface and, consequently, water quality for roads hydrologically connected to waters of the state. In its proposed Transportation Management Plan, PCGP has not identified any maintenance standards as well as design and specifications for reconstructed County roads used as access roads. Additionally, PCGP has not provided DEQ with Forest Service, Bureau of Land Management, and Bureau of Reclamation road permits roads containing maintenance standards and design and specifications for reconstructed federal roads proposed by PCGP for use as access roads. These road permits must provide PCGP with clear and enforceable standards and specifications. The following is an example of the maintenance standards PCGP has proposed in its Transportation Management Plan in Section 2.2.2: *PCGP will perform or make commensurate share payment(s) for maintenance on existing Agency roads used during construction and any subsequent non-casual use in accordance with USDA-FS Manual Chapter 7730, the USDA-FS Handbook section 7709.59, Chapter 60, BLM Manual 9100 Series and the various BLM District Resource Management Plans and as shown*

[29] Association of Oregon Counties. 2014. Chapter 13: Design and Specification for Roads. County Road Manual

			in TMP Appendices C1, C2, C3, D, and D1. *Existing Agency-jurisdiction Roads will be maintained to ensure compliance with any applicable Road Use Permit, Reclamation standards for "Engineering and O&M Guidelines for Crossings" (Exhibit H of the Grant and TUP), the Grant and TUP, this TMP and in consultation with the Agencies regarding current standards for the maintenance level identified for the Road(s). Roads constructed by PCGP on Agency lands will be maintained to standards approved by the Agency.* *To facilitate consistency across the Pipeline Project, Agencies have agreed to utilize the most current USDA-FS, Pacific Northwest Region (Region 6), standard timber sale road maintenance specifications ("T-specs") and Pipeline Project specific supplemental specifications as appropriate. Agency Roads requiring PCGP maintenance and associated specifications are shown on maps in TMP Appendices B and B1 and in tables in TMP Appendices C, C1, C2, C3, D, and D1. Copies of the specifications are available from the Supervisor's Office of any National Forest in Region 6.* *Paved Roads will be kept free of mud and other debris that may be deposited by construction equipment. Track-driven equipment would cross paved Roads on tires or equipment pads to minimize Road damage. Any paved, gravel, or dirt roadways damaged by construction activities will be repaired to a condition equal to or better than the condition prior to damage. Agencies may require PCGP to provide selected pre-use Road and/or sign condition surveys, including photos or video, to aid in assessing use-induced changes.* Similarly, in Section 2.2.3, PCGP proposes road improvements to accommodate equipment for pipeline construction and roads slated for improvements are described in: *TMP Appendices B and B1 maps* *TMP Appendices C, C1, C2, C3, and D1 tables* However, PCGP has provided no information in Appendices B, B1, C1, C2, C3, D, and D1 as PCGP has left these pages in the Transportation Management Plan blank. PCGP indicates in the excerpt above that PCGP will maintain existing "Agency-jurisdiction Roads" to ensure compliance with any applicable road use permit and other standards. However, PCGP provides no road permits for DEQ to review nor any applicable road maintenance standards and specifications for all the access roads. In DEQ's Comment 15, DEQ requests that PCGP provide supporting documents such as design standards and road permits that PCGP will use when complying with TMDL Implementation Plans such as Federal Water Quality

			Restoration Plans. However, in PCGP's response to DEQ's Comment 15, PCGP indicates that Right-of-Way Grants will ensure compliance with water quality plans. DEQ disagrees with this assertion and provides the rationale for this disagreement in DEQ's review of PCGP's response to Comment 15. Moreover, the statement below from PCGP's Transportation Management Plan undermines this assertion regarding right-of-way grants. In the TMP, PCGP states that roads "will be maintained to ensure compliance with any applicable Road Use Permit." Although PCGP intends to use compliance with applicable road use permits to comply with water quality standards and, therefore, obtain a 401 Water Quality Certification, PCGP does not consider road use permits essential for demonstrating compliance with a Total Maximum Daily Load. Additionally, in the excerpts from PCGP's Transportation Management Plan above, PCGP does not provide the actions it will take to maintain Coos, Douglas, Jackson, and Klamath County and private forest roads that PCGP will use to access pipeline right-of-way for construction and operation. What are the County road maintenance standards that PCGP will follow? For private forest roads used to haul harvested trees, Oregon Department of Forestry has issued a road drainage rule to implement the Forest Practices Act.[30] As noted above, ODF uses the FPA and its administrative rules to regulate road maintenance for water quality and compliance with the Clean Water Act and, in particular, water quality standards. ODF requires the operator of private forest roads used for forest harvesting to install additional drainage such as cross drains where needed to filter stormwater from roads to protect water quality. In ODF's Technical Note Number 8 referenced above, ODF provides technical guidance to address ditch erosion and the sediment it produces. Specifically, ODF presents typical minimum culvert spacing for erosion control in a roadside ditch. As the grade of a road increases, this drainage becomes increasingly important. In OAR 629-625-600(9), ODF requires the following: *Where needed to protect water quality, as directed by the State Forester, operators shall place additional cross drainage structures on existing active roads within their ownership prior to hauling to meet the requirements of OAR 629-625-0330.* PCGP must determine in collaboration with ODF the need for additional cross drainage structures prior to using access roads for pipeline construction and operation. As discussed above, PCGP must include this determination as well as the evaluation of the current condition and design of existing access roads in its submittal for Water Quality Certification. DEQ will review this information when developing the Certification Decision. Additionally, in its Transportation Management Plan excerpted above, PCGP does not indicate specifically how PCGP will keep paved roads free of mud and other debris PCGP may deposit with its construction equipment. How specifically will PCGP keep paved roads free of mud and other debris? What BMPs will PCGP use to implement this stated goal? Will PCGP operate a wheel wash station at access road crossings with the construction right-of-way? DEQ cannot fully evaluate

[30] Oregon Department of Forestry. 2003. Installation and Maintenance of Cross Drainage System on Forest Roads. Forest Practices Technical Note Number 8 (Version 1.0)

			the efficacy of the proposed Transportation Management Plan on general statements unless PCGP follows these statements with specific practices applied to specific locations with a schedule identifying when PCGP will implement these practices. In PCGP's Transportation Management Plan excerpted above, PCGP has not provided road permits showing maintenance standards that DEQ can review. PCGP has not provided DEQ with proposed "T-specs" to review nor demonstrated that these "T-specs" will comply with County and ODF Forest Practice Act requirements developed to comply with Clean Water Act requirements. As requested in Comment 23 and 24, PCGP has not identified access requiring maintenance and improvements to protect water quality nor standards and specifications noted in the Transportation Management Plan excerpt above. Additionally, PCGP has not provided maintenance specifications for Forest Service roads. As noted in DEQ's Comment 15 and Comment 29, DEQ must ensure compliance with Section 303 of the CWA and other appropriate requirements of state law in developing its Certification Decision. To protect water quality and to comply with water quality standards such as OAR 340-041-007(7), PCGP must design needed access road improvements to ensure these improvements do not cause landslides. Moreover, PCGP must maintain access roads to prevent water quality impacts during logging truck and heavy equipment traffic. Regarding any proposed improvements to proposed access roads, PCGP provides few details that DEQ can use to evaluate the efficacy of proposed controls to prevent erosion and sedimentation. For DEQ's concerns regarding slope stability and the construction and operation of the pipeline, DEQ can find only the following information in Section 3.5 of the Transportation Management Plan: *Refer to Slope Stability Stipulation D.20 of the Grant and TUP.* PCGP has not provided the Grant (Right-of-Way Grant, Serial No. OR 63542-01) and the TUP (Temporary Use Permit, Serial No. OR 63542) for DEQ to review to determine if the grant and permit contain enforceable details regarding road maintenance and improvements. Our review of the "Grant and TUP" is essential for the development of the Certification Decision and determining PCGP's compliance rules for developing this decision as stated in OAR 340-048-0042. Given the above, DEQ is unable to determine what this "Slope Stability Stipulation" entails and how PCGP will respond to it. PCGP's Introduction in Section 1.0 of the Transportation Management Plan states that this plan: *…includes details regarding timber removal and construction access Road improvements, Road maintenance and management of use before, during, and after construction. A final TMP will be submitted by PCGP to the Agencies for approval prior to issuance of the TUP and Grant. This TMP applies to Agency-jurisdiction Roads located on Agency and privately-owned land.* To date, PCGP's Transportation Management Plan does not contain and PCGP has not provided DEQ with any detailed information in engineering plans on how and where exactly PCGP will perform road improvements to prepare the proposed

			access roads for their proposed use and to protect water quality. In the Transportation Management Plan, PCGP also states the following: *…where construction schedules require Road use outside the normal operating season, more substantial work such as surfacing or resurfacing of may be necessary.* The season of rainfall is typically from mid-October to mid-July. Timber and ridgetop removal as well as heavy equipment access for pipeline construction are levels of use that have the potential to generate sediment discharge to receiving waters if the non-paved roads are not reconstructed and maintained to support this proposed use during the season of rainfall. To date, PCGP has not provided DEQ with a road maintenance plan for all access roads to ensure that during the season of rainfall road use will not impact water quality. PCGP states in its Transportation Management Plan that: *All maintenance and improvements will be completed in accordance with Pipeline Project requirements and Agency, state, county and private landowner standards.* PCGP has not provided DEQ with any information on road maintenance standards and road improvement design standards in this Transportation Management Plan or any other document PCGP included in it 401 Water Quality Certification Submittal. In Section 2.2.1 of PCGP's Transportation Management Plan, DEQ states the following: *PCGP will be responsible for performing Road maintenance on all newly constructed Roads on Federal Lands and decommissioning of temporary Roads as specified in this plan.* PCGP has not presented in this plan any road decommissioning standards. Rather, PCGP only provides the following information and references to documents that are currently unavailable to DEQ: *TARs and previously decommissioned Roads that are constructed or reconstructed for use during the Pipeline Project will be reclaimed or decommissioned as specified by the Agency. In addition, as mitigation for impacts to various late-successional and riparian-dependent species as well as soil productivity losses, PCGP proposes to decommission off-site Roads in cooperation with the Agency in accordance with Agency specifications and the Compensatory Mitigation Plan (Exhibit G, Appendix CC to the Grant and TUP).*

			As noted in the USDA Forest Service's review of the science regarding road construction and maintenance, unmaintained roads are a substantial source of sediment delivery to streams in forest watersheds.[31] Given this and other research on water quality impacts from road design and maintenance, DEQ requested information in AIR-1 on road decommissioning to develop its Certification Decision. Although PCGP provides a definition of decommissioning in Appendix E of the Transportation Management Plan, PCGP does not indicate in this plan what roads PCGP will decommission nor provide detailed management practices and design standards that PCGP will employ at each decommissioned road segment. DEQ requested this information in Comment 28 of AIR-1. The definition of decommissioning used in PCGP's Transportation Management Plan indicates that treatments may include stabilizing slopes, pulling back road shoulder, removing unstable road fills, or installing water bars. How will PCGP carry out these treatments at each site to ensure roads on landslide prone, steep slopes are not destabilized further? Does stabilizing slopes refer to unstable cut slopes if the road prism is left in place? If so, what are PCGP's proposed designs for stabilizing unstable cut slopes? If PCGP uses slope breakers or water bars to manage stormwater on a decommissioned road surface, who will maintain this system for managing stormwater and are there financial resources to maintain this system for the operational life of this pipeline? PCGP has not demonstrated to DEQ that it has thought through the details of decommissioning road segments to protect water quality.
16	In addition, please identify all proposed amendments to federal land and resource management plans that would necessitate amendments to current Forest Service, Bureau of Land Management, or Bureau of Reclamation Total Maximum Daily Load Implementation Plans covering the pipeline's construction and operation. Federal Water Quality Restoration Plans represent the Forest Service's and BLM's plan for activities on these federal lands serving as a source of point and nonpoint source pollutants including	The Forest Service provided in a Notice of Intent a preliminary list of plan amendments required for the pipeline in Federal Register 27473 (June 15, 2017). In this notice of intent, BLM reviewed the proposed route and determined plan amendments required to accommodate the pipeline including changes to right-of-way Avoidance Areas where the pipeline would cross. BLM indicated that it will identify additional pathways via scoping or further analysis and that minor design modifications are needed for conformance with approved	**Summary Statement: DEQ requests that the Federal agencies not proceed with proposed amendments to land management plans until DEQ can determine how these changes may affect the Federal agencies' compliance with existing Total Maximum Daily Loads. DEQ makes this request so that DEQ can develop a Certification Decision in compliance with OAR 340-048-0042(2). In the section below, DEQ provides examples how these proposed plan amendments currently undermine Federal agency compliance with TMDLs.** **The proposed plan amendments to allow additional soil compaction suggest the surface of the proposed permanent right-of-way will have increased runoff similar to that of a primitive road. As such, DEQ requires PCGP to provide a quantitative assessment of the post-construction stormwater discharge from the permanent right-of-way at all stream crossings. This assessment should demonstrate this stormwater discharge complies with water quality standards. PCGP must also include design information for all stormwater treatment controls used at these stream crossings as requested in DEQ's submission guidelines for post-construction stormwater management. In Comment 34 of AIR-1, DEQ requested this information, but PCGP has not yet provided it.** **The BMPs and plans noted in PCGP's response do not fully address the Erosion and Sediment Control Plan requirements of a NPDES 1200-C General Permit. In the section below, DEQ details its concerns and the specific information DEQ is seeking in Comment 16 as well as the rationale for the information requested in this comment.** **1. Proposed Federal Land Use Plan Amendments**

[31] Furniss, M.J., T.D. Roelofs, and C.S. Yee. 1990. Road Construction and Maintenance. American Fisheries Society Special Publication 19:297-323

	pollutants addressed in a Total Maximum Daily Load.	plans. Four streams are proposed and presented for dry open cut crossings on Federal lands. Appendix A to Part 2 of the JPA details BMPs and plans PCGP to avoid and minimize effects to water quality when constructing waterbody crossings.	Federal Register 27473 (June 15, 2017) does not contain the information presented in JCEP's response to DEQ comments. Given this, DEQ cannot verify the information provided and requests that Jordan Cove provide the correct Federal Register citation. Although not referenced in JCEP's response to comments, Federal Register 28837 (June 26, 2017) presents proposed amendments to Federal land and resource management plans associated with PCGP's proposed gas pipeline construction. The proposed land and resource management amendments listed below may lead to amendments of the Forest Service's Total Maximum Daily Loads Implementation Plans referred to as Water Quality Restoration Plans. Changes to the Forest Service's Water Quality Restoration Plans may affect compliance with TMDLs. For example, proposed amendments entitled UNF-1, UNF-2, RRNF-5, and WNF-5 affecting effective shade and riparian areas may affect compliance with a temperature load allocation in a TMDL. For this reason, DEQ requests that proposed amendments to Forest Service land and resource management plans not proceed until PCGP has provided DEQ the information requested in Comment No. 19. In particular, DEQ request information on PCGP's effort to first avoid, then minimize and, if unavoidable, mitigate impacts to shade in riparian areas. DEQ also requests more information regarding BLM's proposed Resource Management Plan amendments to (1) make changes to land use allocations along the pipeline route and (2) make changes to right-of-way Avoidance Areas to determine if these areas contribute to the implementation of or alter BLM's Water Quality Restoration Plans. Water Quality Restoration Plans are the Forest Service's and BLM's TMDL Implementation Plans. **Umpqua National Forest** The following two proposed plan changes below are relevant to DEQ concerns regarding TMDL compliance: (1) effects of proposed amendments on Riparian Reserves and (2) detrimental soil conditions from the project. • Amendment (UNF-2) would allow the pipeline to run parallel to the East Fork of Cow Creek for .1 mile between MP 109.5 and 109.6 and will impact 1 acre of riparian vegetation. • Amendment (UNF-3) would remove for this proposed project established limits for soil compaction (i.e., no more than 20% allowed of the project area). This proposed amendment supports DEQ's concern and request in AIR-1 (see Comment 34) for a (1) post-construction stormwater management plan for the permanent right-of-way particularly as it discharges to streams and (2) for modeling to evaluate the impact of this discharge. The proposed amendment also supports DEQ's concern raised in AIR-1 regarding the impacts to riparian vegetation and the shade it provides streams with PCGP's proposal to use FERC guidelines that allow clearing for the pipeline alignment within 15 feet of a water body. This information in the proposed amendment supports the need for PCGP to address DEQ's Comment 32. **Rogue National Forest**

			Two of these proposed changes below are relevant to DEQ's concerns and both involve soil compaction. One area of soil compaction is in a restricted riparian area and the other is in all management areas. • Amendment (RRNF-5) potentially affects approximately 2.5 acres of the Restricted Riparian Management Strategy at one perennial stream crossing on South Fork of Little Butte Creek around MP 162.45. • Amendment (RRNF-6) would exempt PCGP from the requirement to limit soil compaction to 10% of the activity area (not including permanent roads or landings) upon completion and to limit soil compaction to no more than 20% from management practices. This proposed amendment supports DEQ's concern and request in AIR-1 (see Comment 34) for a (1) post-construction stormwater management plan for the permanent right-of-way particularly as it discharges to streams and (2) for the modeling of this impact of this discharge. **Winema National Forest** Two of these proposed changes below are relevant to concerns raised in DEQ's comments in AIR-1 and both involve soil compaction. This soil compaction is in all management areas and the other involves a specific riparian area. • Amendment (WNF-4) would exempt PCGP in all management areas from the requirement to limit soil compaction to 20% of the activity area. This proposed amendment supports DEQ's concern and request in AIR-1 (see Comment 35) for a (1) post-construction stormwater management plan for the Permanent ROW particularly as it discharges to streams and (2) for the modeling of this impact of this discharge. • Amendment (WNF-5) would exempt PCGP in Management Area 8. Management Area 8 is a riparian area where the pipeline affects approximately .5 mile or an estimated 9.6 acres of this particular management area and where the limit to soil compaction is 10% of the total riparian zone. Given the information in the Federal Register notice, DEQ cannot determine if the extent of potential water quality impacts are limited to soil compaction or riparian vegetation removal or both. DEQ requests that PCGP clarify the extent of potential water quality impacts associated with this proposed plan amendment for the Winema National Forest. Considering the proposed amendments above, DEQ has concerns with soil compaction's influence on the movement and volume of stormwater on the landscape and, ultimately, its erosive force over the landscape and potential to cause hydromodification in streams. Given the documentation in the Federal Register citation above, the operation of the gas pipeline will result in permanent soil compaction and this soil compaction will exceed the level permitted in the Forest Service's current land management plan. As a result, to evaluate compliance with OAR 340-041-0007(1), DEQ is

			requesting that PCGP submit for DEQ's review and approval a soil compaction monitoring plan clearly delineating the following: • Area of the right-of-way that PCGP will address soil compaction. • Area of the ROW where soil compaction will occur to support the operation of the pipeline. This monitoring plan must identify all the locations where PCGP will evaluate soil compaction from construction activities and include the methodology selected for soil compaction testing and quality assurance measures to support the accuracy and precision of soil compaction measurements. **2. BMPs and Plans to Avoid and Minimize Water Quality Impacts to Water Body Crossings** BMPs in Waterbody Crossing Plans and Figures in Resource Report 2 Appendix E.2 referenced in PCGP's response to DEQ's Comment 16 lack specific information required in, for example, the NPDES 1200-C General Permit's Schedule A.12.b.v. Compliance with this permit schedule will help demonstrate that PCGP will implement specific controls to avoid and minimize effects to water quality during the development of these water body crossings. The general description of BMPs excerpted below and referenced in PCGP's response when referring DEQ to PCGP's Wetland and Waterbody Crossing Plan will not comply with the NPDES 1200-C General Permit: *…Sediment barriers will be installed immediately after clearing and prior to initial ground disturbance (i.e., grading). Sediment barriers will be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete and revegetation has stabilized the disturbed areas…* To evaluate the efficacy of proposed BMPs to control pollutant discharge during the construction of all waterbody crossings, DEQ requests that PCGP include in its permit application for a NPDES 1200-C General Permit the information requested in Schedule A.12 including the Site Map and Drawings for all waterbody crossings. DEQ also requests that PCGP propose a model to demonstrate quantitatively that the application of these construction BMPs will not cause or contribute to a violation of in-stream water quality standards. This analysis is needed to comply with NPDES 1200-C General Permit Schedule A.10.a and OAR 340-048-0042(2)(a).
17	Finally, for determining compliance with TMDL allocations covering federal lands, please provide for DEQ's review and approval all proposed Forest Service,	PCGP submitted an application to BLM, Forest Service, and BOR for issuance of a right-way-grant across federal lands including a plan of development containing BMPs	**<u>Summary Statement</u>: The information provided in Federal agency road permits and access/right-of-way grants is critical to the process of developing a Certification Decision given its potential to protect water quality. DEQ is requesting that PCGP provide DEQ with drafts of all federal agency road permits and access/right-of-way grants to review and, if necessary, request modifications and/or additions to these permits/access grants/right-of-way grants. DEQ provides the rationale for this information request in the section below and the level detail it expects in a future response to Comment 17.**

	Bureau of Land Management, and Bureau of Reclamation road permits and access grants or right-of-way permits.	and PCGP commitments during and after construction. PCGP will provide a revised Table A.2-6 from Appendix A.2 of Resource Report 2. This revised table will identify BMPs for waterbodies crossed by or within 100 feet of the pipeline.	PCGP's response to Comment 17 did not address DEQ's request to review and approve road permits from Federal agencies that support or will support Federal agency compliance with Section 303 of the Clean Water Act. DEQ presents the rationale for requesting this information in DEQ's review of PCGP's response to Comment 15 provided above and to Comment 17 below. In summary, the intent of DEQ's information request in Comment 17 is to determine if the practices in these permits and right-of-way grants will protect water quality and, for example, comply with Total Maximum Daily Loads. As part of the 401 Certification process, DEQ will need to review and – if needed – request changes and/or additions to the conditions in road permits for Federal road and access/right-of-way grants to use Federal lands. This request supports DEQ's compliance with rules governing the development of a certification decision [OAR 340-048-0042(2)]. This request will also contribute to Federal agency compliance with the Presidential Order to coordinate environmental review and permitting.[32] To obtain an access or right-of-way grant from the Forest Service, PCGP must submit an application for a special-use authorization. In applying for this authorization, PCGP will submit with other information an environmental protection plan including actions to ensure environmental protection and rehabilitation during construction and maintenance of the gas pipeline.[33] The Forest Service uses the information in this required environmental protection plan to develop the right-of-way grant for PCGP. DEQ is seeking to review the environmental protections included in this grant to evaluate their efficacy in protecting water quality and complying with Federal agency programs for compliance with Total Maximum Daily Loads. PCGP's response to Comment 17 indicates that PCGP is providing Federal agencies with the same information PCGP provided DEQ in its submittal for a Section 401 Water Quality Certification. At this point in DEQ's review of PCGP's submittal, PCGP has not provided documents containing site-specific information such as plans with drawings and specifications identifying best management practices on the landscape designed to prevent water quality impacts. PCGP has provided some generic drawings and best management practices along with limited information in the narrative of plans included in its submittal as noted in elsewhere in this DEQ review. However, these generic drawings do not address site-specific landscape constraints such as fill and cut slopes on steep and, in many cases, unstable slopes (e.g., potential Areas of Rapidly Moving Landslide Hazards) and/or soils with a high erosion potential. These generic drawings do not provide the engineering designs and the technical support for these designs to demonstrate to DEQ that PCGP has considered these challenging landscape constraints and developed engineered solutions to protect water quality. Given the information provided in PCGP's Transportation Management Plan, DEQ anticipates PCGP will seek a road permit or similar authorizations to use Federal roads to build and operate the pipeline. These road permits or authorizations will contain conditions specifying how PCGP will use and maintain these existing roads. For example, Federal road permits may contain conditions specifying design standards for road improvements, road reconstruction, and/or road maintenance

[32] Presidential Executive Order. August 15, 2017. Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure

[33] USDA Forest Service. Obtaining a Special-Use Authorization with the Forest Service – The Application Process

			standards from handbooks, manuals, or other technical documents these Federal agencies use to implement their Water Quality Restoration Plans (Forest Service and BLM) or will use to implement their TMDL Implementation Plans (BOR). Federal agencies develop these plans to meet allocations for Total Maximum Daily Loads. Federal agencies may require in a road permit that PCGP address specific maintenance standards prior to, during, and after pipeline construction.[34] Many of these standards will protect water quality while preparing the road for its intended use as noted elsewhere in DEQ's review of PCGP's response to AIR-1. For example, the Forest Service provides the following direction in its Forest Service Handbook regarding the required road maintenance work prior to using National Forest road: *Prehaul work must be accomplished prior to commercial hauling to make a road suitable and safe for commercial use as well as any other anticipated traffic, such as recreation use. Prehaul maintenance includes such activities as surface blading, ditch and drainage maintenance, slide and slough removal, brush removal, and road opening. It does not include reconstruction work.*[35] Prehaul work that establishes, for instance, a durable surface on nonpaved roads will protect water quality and, therefore, are relevant to the development of DEQ's Certification Decision. This handbook also addresses road damage and extraordinary repairs as follows: *Commercial road users are responsible for repairing road damage caused by their operations or by their failure to perform proper or timely maintenance. The Forest Service is responsible to repair damage caused by noncommercial use, provided the commercial user has complied with contract or permit requirements for placement and operation of traffic control devices.* *Extraordinary repairs involve physical blockage or loss of the roadbed or its structures, damage that cannot be corrected by routine maintenance equipment (such as end loaders, graders, backhoes, and dump trucks) operating from the level of the roadbed. This is work that is outside the scope of maintenance specifications or that requires additional engineering drawings or design. To this, forests may add further definitions that fit their particular situations. Extraordinary repairs will generally be handled as reconstruction.* Such road repairs are critical to protect water quality as noted elsewhere in DEQ's review of PCGP's response to AIR-1. These road repairs will help ensure compliance with water quality standards while PCGP uses access roads for pipeline construction and operation. Consequently, in developing its Certification Decision, DEQ needs assurances that the road maintenance and reconstruction standards and specifications are required when PCGP uses a Federal access road. As a condition of using a federal road, DEQ also wants assurances in PCGP's submittal that PCGP will execute site-specific

[34] Ruiz, Leo. 2005. Guidelines for Road Maintenance Levels. USDA Forest Service. Technology & Development Program 7700-Transportation Management o577 1205-SDTDC

[35] USDA Forest Service. 2003. Chapter 10 – Maintenance of Forest Development Roads. Forest Service Handbook 7709.58 (Transportation System Maintenance Handbook. R6 Supplement FSH-7709.58-2003-1

			actions to prevent and, if necessary, quickly address road damage as it arises. Moreover, for example, the Forest Service Handbook in Section 12.42 (Region 6 Supplement) on Maintenance Standards references performance-based road maintenance specifications covering maintenance issue relevant to water quality protection such as: • Surface maintenance • Surface stabilization • Drainage Structure installation or removal • Roadway drainage system maintenance • Disturbed area treatment • Roadway vegetation maintenance[36] At minimum, such specifications provide verifiable indicators or measures of compliance with the Forest Service's road maintenance standards. As documented in this DEQ review of PCGP's response to AIR-1, road maintenance is critical for water quality protection. Consequently, DEQ is seeking these verifiable measures of compliance as it develops its Certification Decision. More importantly, these specifications provide DEQ assurance the Forest Service – a Designated Management Agency under a TMDL – can enforce compliance with maintenance standards and, if needed, suspend work until the permitted or authorized entity such as PCGP achieves compliance when using a Forest Service road. In its effort to ensure compliance with the conditions of a Certification Decision, for example, DEQ may request that the Forest Service use their authority to suspend work until PCGP restores the condition of the Federal road to protect water quality. As PCGP is revising its submittal to provide DEQ with more specific information regarding PCGP's practices on access road and in the pipeline right-of-way, DEQ is requesting the level of detail in PCGP's response provided in the examples above for all proposed maintenance and reconstruction actions on Federal, County, and private roads. If PCGP chooses to revise Table A.2-6 from Appendix A.2 of Resource Report 2 in response to Comment 17, then DEQ anticipates receiving from PCGP the level of detail highlighted in DEQ's review above regarding right-of-way or access grants and road permits. Moreover, as noted elsewhere in DEQ's review, DEQ will not accept PCGP's arbitrary decision to focus BMPs on waterbodies crossed by or within 100 feet of the pipeline. PCGP must apply all BMPs to protect water quality to all access roads and the pipeline's construction and permanent right-of-way hydrologically connected to water bodies. To determine objectively hydrologic connectivity of access roads and the right-of-way, PCGP can use Geomorphic Road Analysis and Inventory Package (GRAIP) or a comparable analytical tool approved by DEQ.
18	Provide for DEQ's review and approval all proposed easements, agreements, and access or right-of-way permits for non-federal lands.	PCGP is working with private stakeholders to secure proposed easement and access or right-of-way permits. PCGP will provide a revised Table	**Summary Statement: OAR 340-048-0020(3) authorizes DEQ to request and receive information necessary to review and evaluate applications for section 401 water quality certification. DEQ considers access to all locations of the proposed project both reasonable and necessary to fulfill our Clean Water Act obligations. For this reason and as more fully discussed in the following section, DEQ is requesting copies of all proposed easements, agreements, and access or right-of-way permits for non-federal lands.**

[36] USDA Forest Service. 2007. Performance Based Road Maintenance Specifications. Transportation System Operations and Maintenance. Pacific Northwest Region

		A.2-6 from Appendix A.2 of Resource Report 2 that will identify BMPs for waterbodies crossed by or within 100 feet of the pipeline. Private agreements are not prerequisites for issuing a 401 WQ Certification.	As discussed elsewhere, DEQ will require a site-specific analysis of existing water quality, project-related effects, and a technically supported analysis of proposed engineering measures to mitigate for project-related effects. Revisions to Table A.2-6 must provide site-specific support for these proposed measures. Moreover, DEQ questions PCGP's proposal to focus BMPs on water bodies crossed by or within 100 feet of the pipeline. BMPs are required to protect water quality from impervious surfaces throughout all portions of the construction and permanent right-of-way that are hydrologically connected to water bodies. To determine the hydrologic connectivity of access roads and the right-of-ways, PCGP can use Geomorphic Road Analysis and Inventory Package (GRAIP) or a comparable analytical tool approved by DEQ. DEQ requires review and approval of all private easement agreements to assess potential impacts to water quality. DEQ seeks information how PCGP will use and maintain non-federal access roads and manage stormwater as well as other sources of pollutant discharge during construction and operation of the pipeline under all easements, agreements, and access/right-of-way permits on non-federal lands. DEQ is making this information request Comment 18 to ensure that all proposed easements, agreements, and access or right-of-way permits for both non-Federal and Federal lands will implement PCGP's proposed BMPs included in its submittal comply – for example – with TMDLs. To date, PCGP has not provided DEQ with the conditions, engineering designs/specifications, and/or requirements attached to private agreements to secure access to private lands for pipeline construction and operation. To develop a Certification Decision, DEQ must review and – if needed – request changes/additions to these conditions, engineering designs/specifications, and/or requirements in its efforts to evaluate compliance with water quality standards.
19	This compliance assessment must also include a summary of the steps taken to first avoid and then minimize impacts to the Designated Management Agency's riparian buffer protection areas prior to: • Siting Temporary Extra Work Areas for the pipeline construction • Siting of the construction and the permanent right-of-way for the pipeline.	PCGP will provide a response to DEQ in Q4 of 2018.	DEQ anticipates PCGP's response in Q4 2018.

	DEQ is requesting this information in response to Pacific Connector Gas Pipeline's proposal to locate TEWAs 50 feet from a waterbody and wetland boundary (see page 25 of Resource Report 1 for the gas pipeline). For example, this setback will not comply with the Forest Service's and Bureau of Land Management's riparian buffer protection requirements as presented in their Water Quality Restoration Plans which serve as their TMDL Implementation Plans. In Resource Report 1 noted above, PCGP notes that there are 922.64 acres of TEWAs. Please identify the location of each TEWA that PCGP will locate within one and two potential tree heights away to 50 feet from waters of the state. For streams, please indicate the distance of each TEWA from the ordinary high water mark of the stream or riverine wetland. Additionally, please note the land ownership where each TEWA is located. In addition, on page 58 of Resource Report 1 for the gas		

	pipeline, PCGP indicates that the pipeline – in some places – will impact riparian vegetation while paralleling streams. Specifically, this report notes that the "proposed route will avoid paralleling a waterbody within 15 feet or less, where feasible." In this report, PCGP notes that this placement is consistent with the Section V.B.2.a of FERC's Wetland and Waterbody Procedures. However, 15 feet of riparian buffer would violate DMA riparian buffer protection requirements. Moreover, based on the literature, a 15-foot riparian buffer for thermal regulation of streams may result in thermal gain to the adjacent water body. As result, please identify each segment of the pipeline's construction right-of-way and permanent right-of-way that is parallel to waters of the state and within two site potential tree heights from waters of the state. Please provide the location and a detailed rationale for siting TEWAs closer to streams than authorized by a DMA's riparian buffer protection requirements and when siting sections of the construction and permanent		

	right-of-way. For example, the PCGP's rationale in Resource Report 1 (page 58) for not proposing setbacks larger than 50 feet in Riparian Reserves is that larger setbacks "would render the TEWA useless for the stream crossing." PCGP should justify its proposal for non-standard riparian buffer protections by providing the following information: • A description of the specific constraints at each site preventing the use of a TEWA in an area. • The specific rationale why the TEWA must be closer to the stream crossing. Without this specific information, DEQ cannot determine that Pacific Connector Gas Pipeline attempted to first avoid and minimize riparian impacts to the maximum extent practicable before seeking to mitigate these impacts.		
20	This compliance assessment must also identify other locations where PCGP will not comply with Designated Management Agencies' riparian protection areas when siting the following:	PCGP will provide a response to DEQ in Q4 of 2018.	DEQ anticipates PCGP's response in Q4 2018.

	• Temporary and Permanent Access Roads, • Staging areas, • Material storage areas, and • Other components (e.g., compressor stations, metering stations) of the pipeline.		
21a	Please include a detailed justification for seeking alternative riparian buffer protection requirements when siting these facilities within riparian areas.	PCGP will provide a response to DEQ in Q4 of 2018.	DEQ anticipates PCGP's response in Q4 2018.
21b	Pacific Connector Gas Pipeline must evaluate the thermal impacts from all noncompliance with DMA riparian protection requirements requested above where PCGP has provided and DEQ has approved the following information: • Detailed information demonstrating it considered all actions to first avoid or then minimize impacts to riparian areas to the maximum extent practicable. • Detail rationale for proposing nonstandard widths for riparian buffer protections.	PCGP will provide a response to DEQ in Q4 of 2018.	DEQ anticipates PCGP's response in Q4 2018.

	This evaluation must be included in PCGP's Thermal Impacts Assessment noted in the comments below on compliance with state water quality standards.		
22	There is no information presented in Pacific Connector Gas Pipeline's Appendices for Timber Removal and Construction in the Transportation Management Plan (Part 2, Appendix E-8). Please provide the location of the approximately 660 miles of existing public and private roads that PCGP proposes to use to construct the gas pipeline and/or support its operation. In this updated plan, please delineate these existing public and private roads by ownership as follows: • Private road on land zoned for forest use • Private road on land zoned for agricultural use • Private road on land zoned residential, commercial, and industrial use by Coos, Douglas, Jackson, and Klamath County • Public road owned and operated by Coos, Douglas, Jackson, Klamath County	Maps of access roads proposed for use for construction of the pipeline are included in Appendix B to Part 2 of the JPA (see pdf page 183 and 661 – please note that the same set of maps are provided twice, as their own attachment and as an appendix to the overall Project Description). A list of the roads is included in Table A.8-1 on pdf page 143. Table A.2-6 is in Appendix A.2 to Resource Report 2 (Attachment C of the PCGP JPA package) lists waterbodies crossed by or within 100 feet of temporary and permanent access roads or existing access roads where improvements will be required prior to use. PCGP will provide a revised table A.2-6 is in Appendix A.2 to Resource Report 2 (Attachment C of the PCGP JPA package) that will identify best management practices for waterbodies crossed by or within 100 feet of temporary and permanent access roads.	**<u>Statement Summary</u>: PCGP's response to Comment 22 did not identify the ownership of all the access roads PCGP proposes to use. In the section below, DEQ provides specific examples where ownership is unknown. DEQ requires site-specific, detailed information on road maintenance and road improvement actions PCGP will need to perform to protect water quality when using the more than 660 miles of access roads. DEQ provides the rationale for this information request in the section below as well as examples of the level of required detail. In particular, DEQ refers PCGP to a tool to identify roads that are hydrologically connected to water bodies. Please provide responses to Comment 22 using the examples and guidance provided below.** Information in submittal documents do not include all the information requested in Comment 22 of AIR-1. For example, on Sheet 1 of 55 of Drawing No. 3430.31-Y-Map 1, the specific ownership of the following roads as well as others is not identified: • Logging Spur 6.64R – 7.34R • Carlson Heights Road 7.34R – 7.44R • Willanch Slough 8.44R • Logging Spur 8.17R These are just a few examples among many on PCGP's drawings. Without information on the specific ownership of each road, DEQ cannot evaluate compliance with TMDL allocations as required in OAR 340-048-0042(2). As requested in AIR-1, please delineate these public and private roads by ownership where ownership is unclear. Additionally, PCGP provides only limited information in Table A.8-1 regarding the improvements needed for PCGP to use various access roads for pipeline construction and/or operation. For example, PCGP provides only the following information: requires pothole filling, blading/grading, brush limbing, widening and/or turnouts. As explained using an example in DEQ's review of PCGP's response to Comment 23 below, this information does not tell DEQ that PCGP evaluated these roads for their potential impact to water quality. DEQ is most interested in an assessment of the roads with dirt, gravel, bituminous, and rock surfaces for their potential impact to water quality under different levels of use noted in Table A.8-1. Moreover, given the information provided in PCGP's submittal, many of these road these access roads will experience loads from the following activities: • Haul heavy equipment for road building and improvements to support forest harvesting.

	• Public road on the Umpqua, Rogue-Siskiyou, and Winema-Fremont National Forest • Public road on land in the Bureau of Land Management Coos Bay District, Roseburg District, Medford District, Klamath Resource Area • Public road on Bureau of Reclamation land DEQ will use this information to evaluate compliance with the Section 303 of the Clean Water Act as noted above.	PCGP anticipates submitting the revised table to ODEQ in Q4 2018.	• Provide access to the approximately 300 miles of pipeline alignment for logging trucks and logging equipment to clear the construction right-of-way of vegetation. • Haul logs from the construction right-of-way. • Provide access for truck traffic for reforestation of the construction ROW. • Haul stumps as well as a portion of the slash that will not be left in the 30-foot swath of the 50-foot permanent right-of-way as this right-of-way needs to be clear for periodic vegetation management and future pipeline repairs. • Haul heavy equipment to construct a construction right-of-way that will require the removal of mountain ridgetops in the Coastal and Cascade Mountain Ranges. • Haul rock and soil to disposal sites that PCGP removed from ridgetops to create the permanent right-of-way. • Haul heavy equipment for laying the pipeline. • Haul heavy equipment to rip/subsoil or scarify compacted soil during the restoration of the construction right-of-way. To develop its Certification Decision, DEQ requested and must receive in response to Comment 22 the following: • An evaluation of each access road segment's current condition relative to applicable standards and specifications. • An evaluation of needed improvements to protect water quality as requested in Comment 23 below. This information is critical for DEQ to evaluate PCGP's compliance with Total Maximum Daily Load Implementation Plans of Designated Management Agencies as requested in Comments 15 and 16 noted above. In fact, the Oregon Department of Forestry – a Designated Management Agency – developed a Technical Note 8 to guide the implementation of Forest Practices Act rule that states: *Road drainage must be improved when there is the likelihood of substantial sediment delivery if the drainage system is not upgraded. Inspection of the road drainage on inactive roads prior to active road use is essential. Evidence of potential sediment delivery include the following conditions:* *ROAD USE CHANGING - LIKELY SEDIMENT DELIVERY* • *No cross drain structure (for filtering) within 200 feet of a stream crossing* • *Streams running in roadside ditches* *ROAD USE NOT CHANGING - LIKELY SEDIMENT DELIVERY ON ANY ROAD* • *When gullies (over 100 feet in length) exist in a ditch, or below a cross drain* • *Surface drainage waters flow into cracks on the outside edge of the road*

			• *When more than 30 percent of the road system draining directly to streams or into gullies (a goal for a superior road is 15 percent)* *REPAIRS FOR OLDER ROADS* *When repairing older roads, streams running down ditches need to be put back into the original channel. Other common repairs are adding cross drains for filtering above stream crossings, and installing new cross-drains where gullies have formed in the ditch or at culvert outlets. In general, the information on drainage of new roads as described earlier in this Technical Note are also appropriate for maintenance of older roads. Use any technique that efficiently fixes the problem.* As discussed in more detail in the review of PCGP's response to Comment 15, this information is necessary to ensure compliance Oregon Administrative Rule 629-625-0600. Oregon Department of Forestry uses this Forest Practices Act rule regarding road maintenance to protect water quality by requiring the timely maintenance of all active and inactive roads. ODF uses this rule to comply with Total Maximum Daily Loads and water quality standards as noted elsewhere in DEQ's review. The information request in Comment 22 is essential for evaluating PCGP's practices to protect water quality on PCGP's proposed private access roads as well as proposed public access roads. In Section 2.1.1 of the Transportation Management Plan, PCGP states only the following: *PCGP will obtain landowner agreements for any use of private roads. All conditions agreed to with the landowner must be met by the Contactor for continued use of the road. Where access is not available to Agency lands or Roads, and in cases of private roads of mutual interest, PCGP will coordinate with the appropriate Agency(ies) in the identification and acquisition of access rights related to the right-of-way locations for the Grant and TUP.* At minimum, to formulate a Certification Decision, DEQ must receive and review all private landowner agreements for use of private roads to ensure compliance with Forest Practices Act rules administered to comply with water quality standards as noted above and in DEQ's review of PCGP's response to Comment 15. To protect water quality, these private agreements must include: • PCGP's evaluation of the current conditions of these roads to protect water quality. • PCGP's reconstruction plan – if needed to protect water quality/comply with the Forest Practices Act – to prepare these private forest roads for their proposed use. • PCGP's maintenance plan for these roads once PCGP makes needed improvements to protect water quality.

			To develop the Certification Decision, DEQ requires PCGP to provide specific information on where PCGP will apply specific maintenance actions and when PCGP will apply these actions. This information is required for all the private and public access roads. In preparing AIR-1, DEQ reviewed Table A.2-6 in Appendix A.2 of Resource Report 2. The information in this table does not provide DEQ with a detailed maintenance and improvement plan for the approximately 660 miles of access roads to construct and/or operate this pipeline requested in Comment 24. As noted in the University of Nebraska's/USDA Forest Service's review of forest roads entitled Protecting Soil and Water in Forest Management, road maintenance is critical to protecting water quality. Given the research on roads and water quality, DEQ is most concerned with the dirt, gravel, bituminous, and rock surfaced access roads given their high potential to discharge sediment to waters of the state when under use for forest clearing and pipeline construction as documented elsewhere in DEQ's review of PCGP's response. Additionally, PCGP's table referenced in its response only identifies access road segments within 100 feet of waterbodies. Road conditions and their use beyond 100 feet of waterbodies can affect these waterbodies. PCGP must address all roads hydrologically connected to waterbodies in its pursuit of a Section 401 Water Quality Certification for its proposed activities. To identify objectively these hydrologically connected roads, PCGP may use Geomorphic Road Assessment and Inventory Package (GRAIP) or a comparable analytical tool approved by DEQ. DEQ is very skeptical that PCGP will provide the level of detail DEQ is requesting in AIR-1 in PCGP's update to the information presented in Table A.2-6. For an example of the detail that DEQ is expecting, please see DEQ's review of PCGP's response to Comments 23 and 24 below. This review provides examples of the level of detail DEQ is requesting and expecting to receive from PCGP to develop the Certification Decision.
23	Provide documentation demonstrating that PCGP inventoried these existing roads to identify necessary maintenance actions and needed improvement to protect water quality. The documentation should include (1) the results for the inventory for each road segment and recommended maintenance prescription and (2) the road assessment protocols used to perform this inventory, and (3) the evaluation tool used to assess the surface erosion risk, gully	PCGP will provide a revised Table A.2-6 from Appendix A.2 of Resource Report 2 that will identify best management practices for waterbodies crossed by or within 100 feet of temporary and permanent access roads.	**Summary Statement: Revising the table of proposed BMPs for waterbodies crossed or within 100 feet of temporary and permanent access roads does not address the central concerns expressed in Comment 23. Please refer to DEQ's Summary Statement for Comments 4 and 5. BMPs are a tool to reduce water quality impairment but do not represent a strategy to ensure water quality protection. DEQ requires a comprehensive inventory of temporary and permanent access roads, road inventory assessment protocols, and – most importantly – an analysis of surface erosion, gully formation, landslide potential, crossing failure, and other risks associated with predicted use of temporary and permanent roads. The section below describes a tool to identify roads hydrologically connected to water bodies and examples of detail required to adequately address project impacts. Please address the data request in Comment 23 based on the analysis and examples provided below.** DEQ does not believe PCGP's proposed additions to Table A.2-6 in Appendix A.2 of Resource Report 2 will provide DEQ with the level of detail regarding road maintenance prescriptions as well as road improvements needed to ensure the use of existing access roads will protect water quality. First, the road segments presented in the table reference in PCGP's response (i.e., Table A.2-6) includes only those segments within 100 feet of a waterbodies. DEQ is requesting PCGP's inventory evaluate all existing access roads hydrologically connected to waterbodies. To identify objectively these hydrologically connected roads, PCGP may use Geomorphic Road Assessment and Inventory Package (GRAIP) or a comparable analytical tool approved by DEQ.

	risk, landslide risk, and stream crossing failure risk.		Including these access roads will allow PCGP to assess all the potential impacts on receiving water quality. Secondly, in Comment 23, DEQ did not request that PCGP identify BMPs. DEQ is requesting documentation demonstrating that PCGP conducted an inventory of all existing access roads to evaluate their potential impact to water quality when used by heavy equipment and large truck traffic to construct and operate the gas pipeline. Please provide this information for all access roads hydrologically connected to water bodies. PCGP's evaluation of water bodies crossed by or within 100 feet of access roads is too narrow to protect water quality. To identify objectively these hydrologically connected roads, PCGP may use Geomorphic Road Assessment and Inventory Package (GRAIP) or a comparable analytical tool approved by DEQ To evaluate the effectiveness of PCGP's inventory of existing access roads for potential water quality impacts, DEQ requests the road assessment protocols and the evaluation tool used by PCGP to perform this inventory (e.g., USDA Forest Service Water/Road Interaction Field Guide and the Geomorphic Road Analysis and Inventory Package noted in DEQ's AIR-1). Currently, DEQ cannot evaluate the road assessment protocols and evaluation tool PCGP used to identify road maintenance treatment and road improvements needed for the approximately 660 miles of access roads. PCGP's Table A.8-1 in Part 2 of Appendix B in the Joint Permit Application provides only the following footnotes regarding maintenance needs along the approximately 660 miles of access roads: • Footnote 1: requires potholing filing • Footnote 2: blading/grading • Footnote 3: brush limbing • Footnote 4: widening and/or turnouts These footnotes do not indicate to DEQ that PCGP has inventoried all the access roads or evaluated their potential for water quality impacts. DEQ's goal with this information request is to determine if PCGP is taking proactive measures to protect water quality prior to using access roads. The scientific literature concerning the water quality impacts associated from forest roads is extensive as noted elsewhere in DEQ's review, and there are tools to evaluate the potential for water quality impacts from forest roads. DEQ requires assurance that roads conditions are fully evaluated to identify structural deficiencies that may lead to water quality impairment because of heavy industrial use. Non-paved roads will be a source of sediment delivery to stream unless, if needed, PCGP designs their construction and maintenance to support this proposed level of use.[37] For example, a footnote referring to potential potholes must also address the effect this maintenance action may have on water quality. PCGP must also describe information on the formation of potholes. Did the potholes form due to a soft

[37] Grace III, J.M. and B.D. Clinton. 2007. Protecting Soil and Water in Forest Road Management. USDA Forest Service/University of Nebraska-Lincoln. Faculty Publication Volume 50(5):1579-1584. 2007 American Society of Agricultural and Biological Engineers ISSN 0001-2351

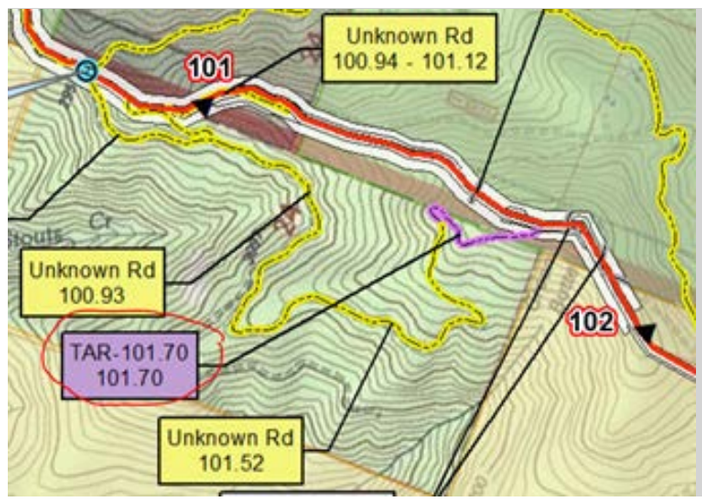
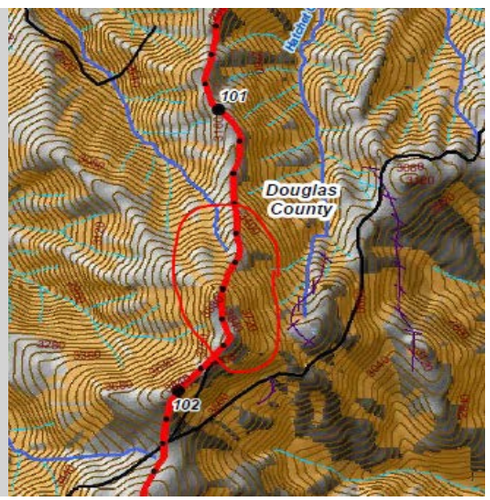
			subgrade and/or poor drainage from a non-paved road surface? Does the gravel road surface need replacement and geotextile fabric reinstalled to improve drainage from the road surface? Further, PCGP should include a strategy for monitoring road conditions, prioritizing maintenance actions, a decision matrix to identify and apply appropriate remedies, post-remedial monitoring, communication, and documentation. The information DEQ is requesting in Comment 23 is essential and necessary to protect water quality and to ensure the construction of this pipeline has the potential to comply with water quality standards. Given the limited budgets in the public and private sectors, deferred road maintenance is common. For example, in its submittal, PCGP notes that certain access roads will need improvements to move equipment into construction right-of-way. If PCGP inventories these access roads using evaluation criteria designed to protect water quality, this inventory will likely identify necessary improvements to achieve the following water quality protections: • Stabilize non-paved road surfaces to prevent sediment discharge into roadside ditches. • Improve stormwater management systems for roads to limit stormwater discharge into water bodies. • Design stable fill and cut slopes particularly for roads experiencing years of deferred maintenance. For example, in PCGP's General Location Map Drawing Number 3430.31-Map 12, Unknown Road 73.70 and Badger Creek Road (BLM 29-5-11) will experience widening in the Tyee Core Area. When these road improvements are evaluated in the context of PCGP's Geologic Hazard Maps (Figures 16 and 17 of 47), DEQ has concerns regarding PCGP's controls for maintaining slope stability when improving these roads. Hearn (2011) summarizes the issues and concerns for improving existing roads on slopes as follows: *Excavation into the hillside may reactivate landslides and trigger new slope failures: widening onto fill will invariably require additional retaining wall construction with considerations of bearing capacity and foundation stability. There may also be issues with stability of previous uncompacted construction spoil that has since become vegetated, giving the appearance of being in situ ground.* *On Balance, if suitable foundations and adequate compaction can be achieved it is preferable to widen onto fill, but each section of road will require its own assessment. If there is any uncertainty over the bearing capacity and foundation stability for walls or stability of natural slopes and fill slopes below the road, then it is preferable to widen into cut. A balance of cut and fill, either in cross-section or over relatively short alignment lengths, is the preferred solution if the cut material is suitable as fill (Section C2). On low-cost improvement schemes, the ease of excavation and the costs and difficulties associated with fill and retaining wall construction usually mean that widening takes place as cut to spoil, frequently to the detriment of slope stability. Engineering geological assessments and ground investigations will be required (Section B) before such important decisions are made.*

			The information PCGP provides in its submittal does not indicate to DEQ that PCGP has considered these complex issues. PCGP provided DEQ their proposed site-specific designs for these road segments in steep and potentially unstable slopes and the technical support for these designs. PCGP will need to provide DEQ information on where specifically (e.g., geo coordinates) PCGP will perform road maintenance actions and when PCGP will perform these actions. Once the inventory requested above is performed, PCGP will also need to provide DEQ with information on where specifically (e.g., geo coordinates) PCGP will improve access roads to protect water quality.
24	Provide a detailed maintenance and improvement plan for the approximately 660 miles of existing roads. This plan must demonstrate that PCGP will implement all maintenance actions and improvements necessary to protect water quality – identified during the road inventory – prior to road use for pipeline construction or operation. This plan must also (1) implement Designated Management Agencies' DEQ-approved TMDL Implementation Plans and (2) comply with maintenance standard, requirements, and/or other design standards developed and used by DMAs to implement these TMDL Implementation Plans.	PCGP is currently working with USFS, BLM, and BOR to provide the necessary information for the federal agencies to issue right-of-way grants for federal lands. An operations and maintenance plan will be prepared if required by the agencies during that process.	***Summary Statement:*** ***Notwithstanding information required for right-of-way grants on federal lands, DEQ requires PCGP to develop a maintenance and improvement plan to address, as authorized by OAR 340-041-0007(7) and OAR 340-048-0042(2), to address water quality impairments from access roads on all public and private lands. Please develop and submit a maintenance and improvement plan consistent with the data requested in Comment 24 and the examples provided in the following section.*** DEQ's request for a detailed maintenance and improvement plan is not contingent upon Federal agencies requiring PCGP to develop a plan. DEQ's authority under OAR 340-041-0007(7) and 340-048-0042(2) require PCGP to develop a maintenance and improvement plan for all public and private project-related roads. DEQ presents the scientific basis for this information request in the references included in DEQ's review of PCGP's response to DEQ's comments noted above. DEQ's administration of Section 303 of the Clean Water Act requires Designated Management Agencies operating under a Total Maximum Daily Load address road management activities including road maintenance. For example, DEQ's Memorandum of Understanding with the USDA Forest Service Pacific Northwest Region presents DEQ's and Forest Service's strategy for controlling point and nonpoint source water pollution and addressing Clean Water Act requirements such as TMDLs. This MOU establishes procedures to implement State and Federal water quality rules. These procedures reference a foundation for action for protecting water quality on U.S. Forest Service lands. This foundation is entitled the *National Best Management Practices for Water Quality Management*.[38] These practices include a section on road operations and maintenance. Moreover, Federal agency Water Quality Management Plans also serve as TMDL Implementation Plans as noted elsewhere in this DEQ review of PCGP's response to AIR-1. These plans may identify roads and their management as sources of nonpoint source pollution to be address in Federal agency actions to implement these plans. The Forest Service and BLM document this fact in the *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters* (May 1999, Version 2.0). For example, the BLM's Water Quality Restoration Plan for the South Umpqua (March 2, 2001) identifies sediment from roads and road encroachment as a key issue for protecting water quality on BLM lands. Similarly, the North Fork Coquille River WQRP (November 2001) identifies roads as creating water quality impacts from increasing peak flows in streams and sediment discharge into streams. This plan states the following as a management action for this WQRP:

[38] USDA Forest Service. 2012. National Best Management Practices for Water Quality Management. Volume I: National Core BMP Technical Guide. FS-990A

			…continuing to decommission, improve, or maintain federally administered roads will reduce the potential fine sediment supply and the potential increases in peak flows. Finally, as noted elsewhere in DEQ's review of PCGP's response to AIR-1, the scientific literature is replete with research documenting that road construction and maintenance has a substantial impact on water quality. With Comment 24, DEQ is exercising its authority to ensure compliance with water quality requirements and standards during the process of developing a Certification Decision. DEQ notes below examples of the level of detail DEQ is requesting in Comment 24. Specifically, DEQ is most interested in the current condition of dirt, gravel, bituminous, and rock surfaced access roads prior to use by PCGP for pipeline construction and operation. For the requested maintenance and improvement plans, DEQ is interested in receiving information on the specific location (i.e., delineated by GPS coordinates) for all the road maintenance treatments PCGP proposes to implement to protect water quality on all access roads that are currently hydrologically connected to waterbodies. This geographical information will allow DEQ to evaluate compliance and more effectively exercise its enforcement authority when ensuring compliance with a Certification Decision. Maintenance treatments could include, for example, the following: • Installation of geotextile fabric for soft and weak subgrades • Installation of a durable surface • Gravel road rehabilitation • Application of dust palliatives • Reshape surface and shoulder • Reshaping entire cross section • Re-establish the out-slope • Re-establish the in-slope and ditch • Removal of high shoulders (secondary ditches) • Reshape and vegetate ditch to prevent erosion • Rock ditches to prevent erosion • Installation of check dams in ditch to prevent erosion • Installation of cross drains to prevent gully formation and sediment discharge in ditches • Relocating road drainage discharge away from steep slopes, headwalls, bedrock hollows, active landslides areas, areas with high potential for rapidly moving landslide

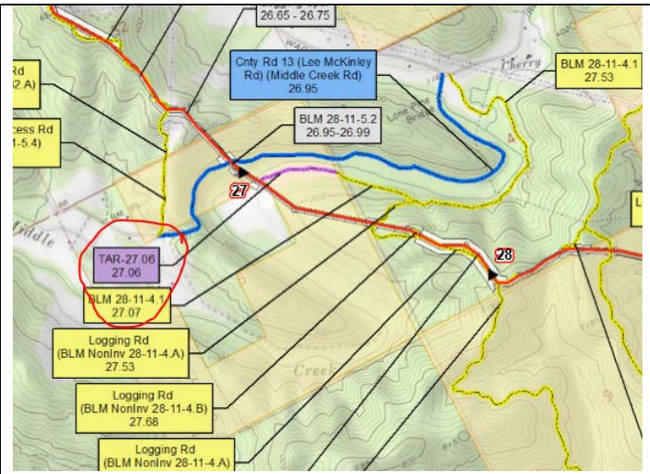
			In issuing treatment prescriptions based on PCGP's road inventory requested in DEQ's review of PCGP's response above, DEQ expects PCGP to provide the detailed maintenance standards and specifications that PCGP will use for all identified treatments.
25	Identify the location of all existing roads that PCGP will use to access the gas pipeline during its operation. Provide a maintenance plan for these existing roads that includes: • A description of the level of use these roads will experience during the pipeline's operation. • A description of the maintenance practices to protect water quality and a schedule for performing these practices and supporting this level of use.	Outside of federal lands, PCGP's use of public roads are not subject to federal licensing or permitting, and therefore no certification is required under Section 401. PCGP is not required under federal or state law to prepare operations and maintenance plans to use public roads. PCGP anticipate employing less than 15 operational staff. The operation traffic will be incidental to the existing traffic on existing road.	DEQ will review all proposed project-related activities that require a federal permit or permits and that may cause or contribute to a discharge to waters of the state. OAR 340-041-0007(7) and 340-048-0042(2) authorize DEQ to require maintenance plans to address discharge from temporary and permanent roadways. This includes permanently maintained access roads to service portions of the pipeline and its aboveground facilities. Given their potential to impact water quality through sediment discharge, DEQ is particularly concerned with the maintenance and operations planning for non-paved PARs when PCGPs uses these roads for pipeline repair and reconstruction given the heavy equipment traffic associated with these activities.
26, 27	Comment 26: Please provide the location of the proposed 25 miles of new Temporary and Permanent Access Roads and the selection criteria used to site these new roads to avoid minimize impacts to water quality. Please delineate these new roads by land ownership (e.g., private ownership on land zoned for forest use) so DEQ can evaluate compliance with Section 303 of the Clean Water Act. Comment 27:	Appendix B in Part 2 (Table 1.2-2 on pdf page 329) provides a table of the ten (10) temporary and 15 permanent access roads by milepost and landownership. There are not 25 miles of Temporary and Permanent access roads; the roads total approximately 2.2 miles (and 5.96 acres), not 25 miles as stated in the comment. They are shown on the maps included in the PCGP JPA (beginning on pdf page 660). Table 2.2-5 (pdf page 1104) lists those temporary and permanent access roads within 100 feet of waterbodies, all of which are located on private	**Summary Statement: DEQ requests that PCGP provide the selection criteria used to evaluate and choose road segments proposed in their application. In particular, DEQ wishes to review the decision-making criteria used to ensure road development would avoid conflicts with streams, wetlands, and waterbodies to the maximum extent practicable. DEQ further requests PCGP conduct an analysis to determine hydraulic connectivity of road surfaces and waters of the state using the analytical tools and the design standards addressed in the following section.** DEQ located the 25 (10 temporary and 15 permanent) segments of new road building proposed for the construction and operation of the pipeline in the maps included in PCGP's Joint Permit Application on pdf page 660. As discussed elsewhere in DEQ's review of PCGP's response to AIR-1, DEQ is requesting the level of detail provided in the examples below to evaluate the impacts of PCGP's proposed new roads to build and operate the pipeline. As noted elsewhere in DEQ's review of PCGP's response, new roads or existing roads do not have to be within 100 feet of a water body to have a potential impact on water quality. PCGP refers DEQ to Table A.2-6 in Appendix A.2 of Resource Report 2 for temporary and permanent access roads crossed by or within 100 feet waterbodies. This scope of analysis and the limited information provided in Table 2.2-5 is inadequate for DEQ to evaluate the potential impacts to water quality. PCGP must evaluate all Temporary and Permanent Access Roads hydrologically connected to water bodies. To evaluate objectively evaluate the impact of these Temporary and Permanent Access Roads on water quality, PCGP may use X-DRAIN or a comparable analytical tool approved by DEQ.

	To ensure these roads will not serve as a source of sediment to and hydromodification of waters of the state and as a source of debris flows into streams from road-related landslides, please include the design standards and specifications for constructing these roads including their drainage systems, cut-slopes, and fill-slopes. Please identify the proposed designs to stabilize fill slopes and cut slopes and manage stormwater on new temporary and permanent roads located on the steep slopes (i.e., slopes greater than 30%) and engineering support for these designs. This information is necessary for DEQ to evaluate compliance with the statewide water quality criteria for road building and maintenance (OAR 340-041-0007)(7) and for ensuring that PCGP uses the highest and best practicable treatment control (OAR 340-041-0007(1).	lands. Four waterbodies will be crossed by permanent access roads, and three of those waterbodies are ditches. Appendix A in Part 2 of the 401 Water Quality Package issued to DEQ on February 6, 2018 outlines PCGP's compliance with all applicable water quality standards and where plans have been developed for the Pipeline to ensure compliance with those standards, including compliance with requirement for TMDLs on federal and non-federal lands. Table A.2-6 is in Appendix A.2 to Resource Report 2 (Attachment C of the PCGP JPA package) lists waterbodies crossed by or within 100 feet of temporary and permanent access roads. PCGP will revise table A.2-6 (Appendix A.2 to Resource 2 – Attachment C of the PCGP JPA package) to identify best management practices for waterbodies crossed by or within 100 feet of temporary and permanent access roads. PCGP anticipates submitting	Without design details and their technical support, DEQ is unable to determine if PCGP is designing new permanent and temporary roads hydrologically disconnected to water bodies by the design of their drainage system. The Oregon Department of Forestry established rules to address drainage from forest roads as highlighted in DEQ's review of PCGP's response to Comment 15 above. ODF developed these rules to comply with water quality standards. The design of a road drainage system and a non-paved road surface, for example, influences the level of sediment delivery into water bodies as discussed elsewhere in DEQ's review of PCGP's response to AIR-1. Moreover, the location of cut and fill slopes and their design can destabilize slopes and lead to the failure of unstable, landslide prone slopes. As noted elsewhere in DEQ's review of PCGP's response, the literature is replete with information demonstrating that linear infrastructure such as roads can cause slope failures leading to landslides and sending debris flows into stream channels. Human-caused debris torrents impact water quality by changing the natural cycles of sediment delivery to stream systems.[39] PCGP has not provided DEQ with the selection criteria PCGP will use to site proposed new roads to avoid impacts to water quality. For example, PCGP directed DEQ to Table 1.2-2 (Temporary and Permanent Access Roads for the Pipeline). In this table, the Temporary Access Road labeled as TAR 101.70 appears to be on both Private and National Forest Land (Umpqua National Forest). This TAR provides an example of DEQ's concerns regarding the siting of these new roads. As shown in the following map excerpts below, PCGP has located TAR 101.70 in a Potential Rapidly Moving Landslide Hazard Area when DEQ compares PCGP's USGS Quad-Based General Location Maps with PCGP's Geologic Hazards Maps:  

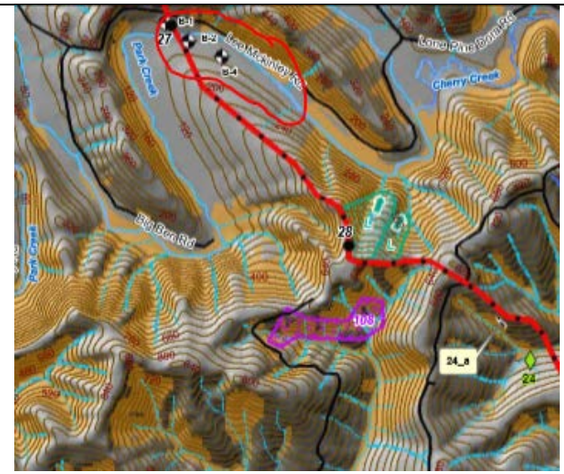
[39] Castro, Janine and Frank Reckendorf. 1995. Effects of Sediment on the Aquatic Environment: Potential NRCS Actions to Improve Aquatic Habitat. Working Paper No. 6. USDA Natural Resources Conservation Service

		the revised table to ODEQ in Q4 2018.	Location of TAR 101.70 near Milepost 102 in Part 2 JPA Appendix B, General Location Maps, Drawing No. 340.31-Y-Map 14, Sheet 27, 55 Area where TAR 101.70 will be located in Resource Report 6, Appendix F, Figure 22 of 47. **Note**: the light brown areas are Potential Rapidly Moving Landslide Hazard As noted in DEQ's review of PCGP's response to Comment 15, the Oregon Department of Forestry uses rules developed under the Oregon Forest Practices Act to comply with Total Maximum Daily Loads and with water quality standards. In ODF's memorandum of understanding with DEQ referenced in DEQ's review above, ODF states that it has adopted water protection rules in the form of BMPs for forest operations "including, but not limited to, OAR Chapter 629, Divisions 635-660." With the limited information that PCGP provides, DEQ is unable to determine if PCGP is complying with the following Forest Practices Act rule (OAR 629-625-0200): ***Road Location*** *(1) The purpose of this rule is to ensure roads are located where potential impacts to waters of the state are minimized.* *(2) When locating roads, operators shall designate road locations which minimize the risk of materials entering waters of the state and minimize disturbance to channels, lakes, wetlands and floodplains.* *(3) Operators shall avoid locating roads on steep slopes, slide areas, high landslide hazard locations, and in wetlands, riparian management areas, channels or floodplains where viable alternatives exist.* *(4) Operators shall minimize the number of stream crossings.* *(5) To reduce the duplication of road systems and associated ground disturbance, operators shall make use of existing roads where practical. Where roads traverse land in another ownership and will adequately serve the operation, investigate options for using those roads before constructing new roads.* Moreover, PCGP has not provided DEQ with any information indicating that it has investigated the constraints associated with the proposed site for TAR 101.70. PCGP has not developed engineering solutions – with associated technical support – to avoid debris flows into East Fork Stouts Creek or the intermittent streams below the fill slope of this proposed road sited in an area identified as hazard for Rapidly Moving Landslides. Hearn 2011 provides techniques for planning new road construction on steep mountainous terrain and include the following as stated in his book: *B1.2.1 New Road Construction* *The techniques listed in Table B1.3 are variously applicable to all project phases, but they offer the greatest application to new road construction projects as an aid to route corridor selection and*

			the development of the engineering design. The order in which the techniques are listed in the table, and described in Section B2-F5, is the approximate order in which they should be applied. *B1.2.4 Road Operation and Maintenance* *During road operation and maintenance, the focus of attention will be directed towards existing cut and fill slopes and the management of drainage. Systematic routine observation, slope monitoring and condition surveys will form the basis of the records necessary for ongoing assessment of slope stability. Field mapping, cross-section survey and ground investigation or monitoring at high-risk site may be required for the reinstatement and remedial works for slopes and section of road that have failed (Part D).* Hearn's recommendations for road construction, operation, and maintenance serve as one of several reasons for DEQ's request for additional information in Comment 26 and 27. Such recommendations and applicable regulatory requirements also serve as the basis for DEQ's information request in Comment 24. Hearn's recommendations provide examples of the information DEQ expects PCGP to provide DEQ when furnishing information on its maintenance plans for both Permanent Access Roads and existing access roads. Since PCGP needs access roads for PCGP's operation of the pipeline and the controlling authorities for these access roads cannot decommission these roads to avoid their associated water quality risks, these roads present potential impacts to water quality that PCGP must address in it 401 Water Quality Certification submittal. As a result, for access roads on steep and/or unstable slopes necessary for pipeline operation, PCGP must provide a maintenance plan that periodically evaluates the influence of these access roads on slope stability and evaluates the need to adjust the road design to help maintain the stability of the slope below and above the PAR. For another example of the lack of information provided by PCGP for proposed PARs and TARs, PCGP proposes to build Temporary Access Road labeled TAR 27.06. This TAR parallels the stream Park Creek and would extend a BLM road (BLM 29.11-4.1 27.53) when County Road 13 is also available to reach the temporary extra work area near Milepost 27. PCGP does not provide information detailing how PCGP will manage drainage from this proposed new access road and the extent, condition, or existence of a vegetated buffer between TAR 27.06 and Park Creek. PCGP does not provide information on the design of the cut slope for this TAR nor indicate with designs and technical support how PCGP will stabilize this cut slope to prevent small slides into the roadside stormwater conveyance system or perhaps prevent larger slides conveying debris flows into Park Creek directly. PCGP does not provide a discussion of the other alternatives to reach this TEWA. PCGP does not provide the rationale for building this new access road nor does PCGP provide the design details for DEQ to evaluate if this design has the potential to protect water quality.

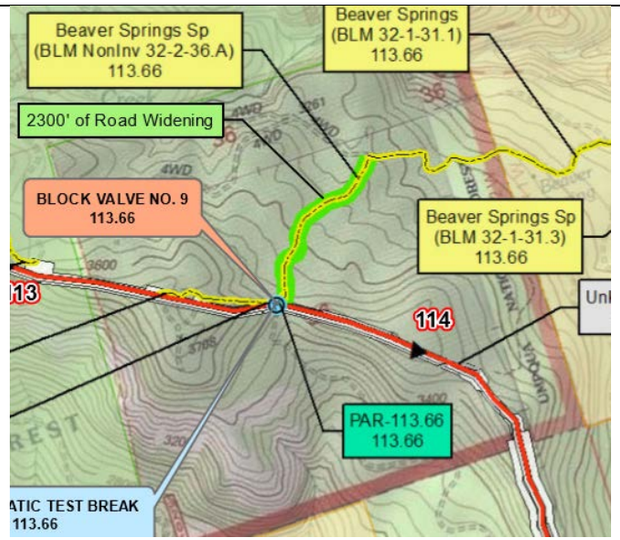


Location of TAR 27.06 near Milepost 27 on the General Location Maps. Drawing No. 3430.31-Y-Map 5, Sheet 6 of 55

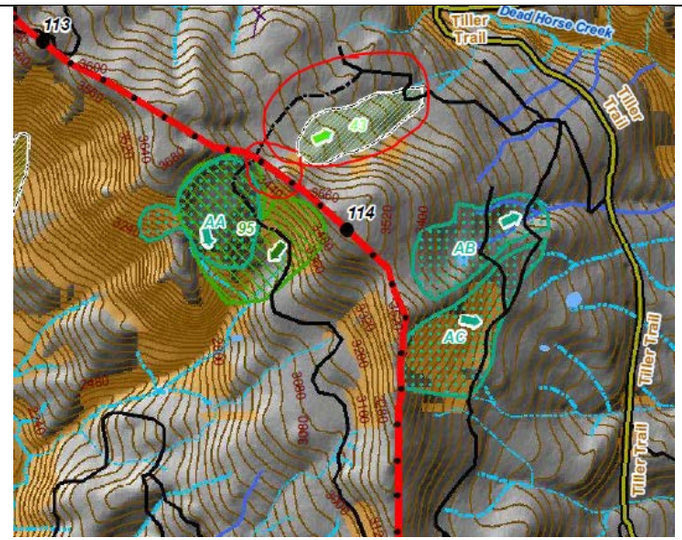


Location of TAR 27.06 near Milepost 27 on the Geologic Hazards Maps. Figure 8 of 47. **Note**: the light brown areas are Potential Rapidly Moving Landslide Hazard

PCGP is proposing to site another proposed new road labeled as PAR-132.66 and shown in the map excerpt below. PCGP proposes to locate this PAR in a Potential Rapidly Moving Landslide Hazard Area. This proposed PAR is also near landslides identified from Aerial Photos and from LiDAR. Moreover, PCGP is proposing to reconstruct BLM's Beaver Springs road (BLM Noninv 32-2-36.A) by widening it. According to PCGP's Geologic Hazard Map, this BLM road identified for widening is located above a landslide area that drains to intermittent stream discharging into Dead Horse Creek. PCGP has not provided DEQ with design information regarding the need for the creation of fill slopes for this proposed new road in an area with unstable slopes. PCGP has not provided DEQ with design information for the reconstruction of the BLM road above unstable slopes. Has PCGP conducted a geotechnical investigation of this road-widening project? If performed, does this geotechnical investigation indicate the need for reinforced fill for this road-widening project? Where will PCGP discharge the post-construction stormwater for this PAR? Given the lack of design details, these questions surface for DEQ while reviewing PCGP's submittal.



Location of PAR-113.66 and the reconstruction of BLM Noninv 32-2-36.A. Drawing No. 340.31-Y-Map 14, Sheet 32, 55



Location of PAR-113.66 and Proposed Road Reconstruction relative to landslide features. Figure 25 of 47. **Note**: the light brown areas are Potential Rapidly Moving Landslide Hazard

As discussed in DEQ's review of PCGP's response to Comment 15, the management of stormwater discharge and the design of cut and fill slopes are important engineering considerations when constructing roads on steep and unstable slopes. The intent of DEQ's request for information on PCGP's selection criteria is to evaluate PCGP's efforts to minimize impacts to water quality from debris flows during new road construction. As noted below, PCGP should analyze the various options for accessing sections of the pipeline alignment for construction and operation as part of its efforts to address the National Environmental Protection Act requirements and, based on this analysis required by NEPA, determine the need to build new roads such as TAR 101.70 discussed above. To evaluate PCGP's efforts to avoid and minimize impacts to water quality, DEQ is requesting that PCGP provide its selection criteria for determining the need and location of TARs and PARs that PCGP used in its alternative analyses to comply with NEPA.

DEQ is highlighting the information below to provide PCGP with an example of the level of detail DEQ is anticipating in PCGP's revision of Table A.2-6. DEQ requests this detailed information to evaluate PCGP's compliance with Clean Water Act requirements such as Total Maximum Daily Loads. For example, as noted above, the Forest Service and Bureau of Land Management use Water Quality Restoration Plans to comply with Clean Water Act requirements concerning nonpoint source pollution and Total Maximum Daily Loads. The BLM's Water Quality Restoration Plan for the Elk Creek

			Watershed applies to a portion of the pipeline where PCGP is proposing to place the pipeline alignment. Forest Service and BLM Roads are within the Elk Creek Watershed. In its WQRP, BLM identifies sediment input from roads as the primary human-caused sediment source from BLM-administered lands in the plan area and an influence on channel morphology with effects on stream temperature. BLM's restoration goals in this plan include: • Reduce road densities. • Maintain and improve road surfacing. • Minimize future slope failures through stability review and land reallocation if necessary. To achieve their restoration goals when roads are an element, BLM and the Forest Service have manuals and handbooks for locating new roads, engineering road construction/reconstruction, and conducting road maintenance. These technical manuals and references are the tools and strategies the Forest Service and BLM use to implement their WQRPs and, consequently, comply with TMDLs issued by DEQ. As noted elsewhere in this review, TMDLs are DEQ's plan to ensure a water body impaired by pollutant discharge ultimately achieves water quality standards. For example, the Forest Service Manual states: *Perform route or site selection, location, geotechnical investigation, survey, and design to a technical level sufficient for the intended use of the facility, the investment to be incurred, and the affected resource values.* *Ensure that road preconstruction activities receive peer reviews, and that the adequacy of road designs and cost estimates is attested to in writing by qualified engineers.*[40] In the Forest Service Handbook 7709.56 on Section 22.2 (Location Marking), the Forest Service provides the following directive for determining the location of a proposed road: *22.1 - Initial Field Examination* *Make an on-the-ground examination of the corridor in which the road is to be located.* *Verify the control points, critical areas, and resource and management direction identified in the applicable environmental, logging system, travel analysis, and transportation analysis documents and during the office location studies. Identify and document features within or adjacent to the corridor that would affect previous and subsequent decisions.*

[40] USDA Forest Service. 2014. Chapter 7720 – Transportation System Development. Forest Service Manual 7700 on Transportation Management

			If possible, document these features on maps and photos. Consult with appropriate specialists and land managers to resolve conflicts or address specific problems. *22.2 - Location Marking* *Using information from the office location studies and the initial field examination, mark road locations on the ground that conform to those identified on the maps and photos that are compatible with the design criteria and other management direction. It may be necessary to mark more than one location of a road or road segment, especially in the vicinity of critical areas such as topographic features affecting logging systems, landing locations, riparian areas, intersections, switchbacks, and private land. If a new NEPA document is being produced, these alternative locations will be analyzed for effects, according to FSH 1909.15, section 15.41* As noted in this reference, the National Environmental Policy Act influences the selection of the road location and this influence by NEPA is detailed in the Forest Service Handbook as follows: *15 - ESTIMATE EFFECTS OF EACH ALTERNATIVE* *Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial. (40 CFR 1508.8(b))* *For each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative*.[42] This required analysis for locating a new road on National Forest Land would provide DEQ with specific BMPs and the level of detail DEQ is seeking to evaluate PCGP's selection a location for a TAR and PAR. DEQ is seeking this information to evaluate PCGP's efforts to protect water quality and comply with TMDL and other Clean Water Act requirements. This represents the level of detail DEQ is expecting from PCGP as they respond to Comment 26 and 27. DEQ's request for more detail on the practices PCGP will employ and engineering PCGP will use to protect water quality is consistent with and supportive of the NEPA process. PCGP should be supporting this NEPA process during its

[41] USDA Forest Service. 2011. Chapter 20 – Road Location. Forest Service Handbook 7709.56 on Road Preconstruction Handbook WO Amendment 7709.56-20111-1

[42] USDA Forest Service. 2012. Chapter 10 – Environmental Analysis. Forest Service Handbook 1909.15 on National Policy Act Handbook 1909.15-2012-3

			application to Federal Energy Regulatory Commission to construct and operate this gas pipeline. Given this NEPA requirement, PCGP should have developed selection criteria for choosing both the need for and the location of new access roads for pipeline construction and operation to minimize impacts to water quality among other concerns as discussed above in DEQ's review of PCGP's response to Comment 26.
28	Additionally, please provide detailed best management practices and design standards for decommissioning the Temporary Access Roads.	Best management practices for construction of temporary and permanent access roads are contained in the Erosion Control and Revegetation Plan in Attachment A, Appendix B.1 of the PCGP JPA package.	**<u>Summary Statement</u>:** The **Erosion Control and Revegetation Plan does not provide site-specific plans describing how PCGP will decommission temporary roads. PCGP should also address how road closures will comply with applicable TMDL Implementation Plans. Please provide site-specific plans for achieving these objectives as described more fully in the following section.** Unused and unmaintained roads are a source of sediment and debris flows into waterways.[43, 44, 45] For this reason, DEQ is requesting that PCGP provide DEQ with the specific road decommissioning treatments for each Temporary Access Road. DEQ reviewed PCGP's Erosion Control and Revegetation Plan and can find no design details and technical support these details in this plan. PCGP has not clearly detailed how PCGP will specifically decommission the 10 segments of Temporary Access Roads. Moreover, DEQ can find no discussion of how PCGP will treat closed Forest Service, BLM, Bureau of Reclamation, Private, and/or County roads that PCGP's project activated for the sole purpose of constructing the pipeline. The Forest Service, BLM, and ODF's Forest Practices Act Program have specific requirements concerning road decommissioning developed, in part, to address water quality impairments from nonpoint source pollution and comply with Total Maximum Daily Loads. In reviewing their requirements along with PCGP's Erosion Control and Revegetation Plan, PCGP has not clearly addressed the decommissioning or closing requirements of these TMDL Designated Management Agencies. To develop its Certification Decision, PCGP must provide DEQ the site-specific details for how it will decommission all Temporary Access Roads as well as close access roads that PCGP's project opened to build this pipeline. Evaluating compliance with Section 303 of the Clean Water Act is a requirement for developing DEQ's Certification Decision. PCGP must demonstrate that a road no longer in use for pipeline construction and/or operation will not become a source of sediment and debris flows into water bodies. As noted above in DEQ's review of PCGP's response to Comment 24, 26, and 27, road closures are often a goal of an agency Total Maximum Daily Load Implementation Plan. The Forest Service defines road decommissioning as "activities

[43] Swanston, D.N. and Frederick J. Swanson. 1976. *Timber Harvesting, Mass Erosion, and Steepland Forest Geomorphology in the Pacific Northwest*. In Geomorphology and Engineering. Dowden, Hutchinson and Ross Editors.

[44] Wolfe, Mitchell Dean. 1982. *The Relationship between Forest Management and Landsliding in the Klamath Mountains of Northwestern California*. Earth Resources Monograph 11, USDA Forest Service Region 5

[45] Elliot, William J. and Laurie M. Tysdal. 1999. *Understanding and Reducing Erosion from Insloping Roads*. Journal of Forestry. 97(8):30-34

			that result in the stabilization and restoration of unneeded roads to a more natural state.[46] As noted in DEQ's review above, the Forest Service uses the Forest Service Manual and Handbook to implement Water Quality Restoration Plans in its efforts to comply with TMDLs. According to this manual, the only road management option for temporary roads is decommissioning. The Forest Service Manual identifies the following five road decommissioning treatments that may be used in combination depending on the particular site: • Blocking entrance • Revegetation and water barring • Removing fills and culverts • Establish drainage ways and remove unstable road shoulders • Full obliteration by recontouring and restoring natural slopes[47] For private forest roads regulated under Forest Practices Act rules, the requirements for vacating these roads are as follows: ***Vacating Forest Roads*** *(1) The purpose of this rule is to ensure that when landowners choose to vacate roads under their control, the roads are left in a condition where road related damage to waters of the state is unlikely.* *(2) To vacate a forest road, landowners shall effectively block the road to prevent continued use by vehicular traffic, and shall take all reasonable actions to leave the road in a condition where road related damage to waters of the state is unlikely.* *(3) Reasonable actions to vacate a forest road may include removal of stream crossing fills, pullback of fills on steep slopes, frequent cross ditching, and/or vegetative stabilization.* *(4) Damage which may occur from a vacated road, consistent with Sections (2) and (3) of the rule, will not be subject to remedy under the provisions of the Oregon Forest Practices Act.*[48] As noted elsewhere in this DEQ review, the Oregon Department of Forestry uses the Forest Practices Act rules to comply with Total Maximum Daily Loads and water quality standards. Jordan Cove must provide DEQ with the site-specific designs and specification for each segment of road that Jordan Cove will decommission after terminal and pipeline construction.
29	DEQ has not completed this review at this time but will consult in the future with other	JCEP and PCGP are actively working with the respective agencies to obtain approvals	**<u>Summary Statement</u>: PCGP's Resource Report 1 describes excess material generated during development as "construction debris", which meets the definition of "demolition and construction materials" found in ORS 459.005(24).**

[46] 36 Code of Federal Regulations §212.1
[47] USDA Forest Service. 2001. 7712.11 – Exhibit 01, Chapter 7710 – Transportation Atlas, Records, and Analysis. Transportation System, FSM 7710-2001-3
[48] Oregon Administrative Rules 629-625-0650

	DEQ programs and other state agencies concerning compliance with other state statutory requirements such as: • Oregon Revised Statute 468B.035 and 105 (Enabling Legislation for Implementing the Coastal Zone Amendments and Reauthorization Act) • ORS 783.620 through 640 and 783.990 through 992 (Ballast Water Management Law) • ORS 466.020, 075, 105, and 195 (Hazardous Waste Management Law) • ORS 196.795 through 990 (Removal-Fill Law) • ORS 496.172 – 496.192 (Oregon Threatened and Endangered Species Act) • ORS 496.012, 496.138, and ORS 506.109 o Fish and Wildlife Habitat Mitigation Policy o In-water Timing and In-water Blasting Permits o ORS 509.585 (Fish Passage Requirements) o ORS 498 (Fish Screening)	outlined to the extent required by law. There are no landfills associated with the PCGP, therefore, ORS 459.005 is not applicable.	PCGP's submittal for a Section 401 Water Quality Certification references in several locations PCGP's plan to identify several disposal sites along the pipeline right-of-way. DEQ is providing PCGP excerpts below of these references to disposal sites. Please review your submittal and revise it to reflect PCGP's most current intent on managing the solid waste from the pipeline construction and operation. Without these revisions, DEQ will assume PCGP will develop and use disposal sites for construction debris. References to proposal sites in PCGP's submittal will require a Construction and Demolition Landfill Permit during the development of DEQ's Certification decision. **1. Overburden and Excess Material Disposal Plan, page 2 and Attachment A, Table 1** **2.3 PERMANENT DISPOSAL LOCATIONS** At permanent disposal sites, excess material will be deposited and treated in a manner that will be agreed upon with the corresponding federal land-managing agencies. PCGP will provide a Site Development and Reclamation Plan that will include surveyed drawings of the permanent disposal sites that identify the storage location of material based on material type and material size for agency approval. The disposal drawings will also show any temporary and/or permanent erosion control measures that may be required. Attachment B – Typical 1 shows the information that would be included in the sample quarry drawing for permanent disposal sites. **Attachment A** **Table 1** **Rock Source and Disposal Sites Identified for Construction of the Pipeline Project on Federal Lands**

Rock Source and/or Permanent Disposal Sites	Size (acres)	Pipeline MP location	Purpose	Jurisdiction	Land Use	Permanent/ Temporary Use	Vegetation	Access
Douglas County								
Signal Tree Road Quarry – Sec. 3 (3430.26-X-0004)	1.22	45.86	Rock source and overburden disposal; spoil storage, staging	BLM-Roseburg district	Quarries	Permanent or Temporary	Industrial, Douglas fir-W, Hemlock W., red cedar (regenerating)	Upper Signal Tree (BLM 28-9-35) 45.85 - 45.92 (3430-31-Y-008)
Signal Tree Road Quarry – Sec. 35 (3430.26-X-0002)	1.09	47	Rock source and overburden disposal	BLM-Coos Bay district	Quarries	Permanent or Temporary	Industrial, Douglas fir-W, Hemlock W., red cedar (regenerating)	Upper Signal Tree (BLM 28-9-35) 45.85 - 45.92 (3430-31-Y-008b)
Weaver Road Quarry Site 1 (3430.26-X-0003)	1.62	47	Rock source and overburden disposal	BLM-Coos Bay district	Quarries	Permanent or Temporary	Industrial, Douglas fir-W, Hemlock W., red cedar	Weaver Road (BLM 28-8-18) 42.03 – 42.50 (3430-31-Y-008b)
Weaver Road Quarry Site 2 (3430.26-X-0003)	1.30	47	Rock source and overburden disposal	BLM-Coos Bay district	Quarries	Permanent or Temporary	Industrial, Douglas fir-W, Hemlock W., red cedar	Weaver Road (BLM 28-8-18) 42.03 – 42.50 (3430-31-Y-008b)
Signal Tree Quarry Site – Sec. 15 (3430.26-X-0005)	1.75	47	Rock source and overburden disposal	BLM-Roseburg district	Quarries	Permanent or Temporary	Industrial, Douglas fir-W, Hemlock W., red cedar	Lower Signal Tree (BLM 29-9-36.0) 46.51 (3430-31-Y-008)
TEWA 79.85-N (BLM Quarry Site) [1]	3.61	79.85	Overburden disposal, PI, spoil storage, log landing, steep slope staging	BLM-Roseburg district	Transportation, communication, utilities corridors, regenerating evergreen forest land; quarries	Permanent or Temporary	Roads, corridors, Douglas fir dominant - mixed conifer	Pack Saddle Road (BLM 29-4-17) 79.89 - 80.42 & Construction Right-of-Way (3430-31-Y-013)
Hatchet Quarry MP 102.30 (3430.26-X-0018)	2.00	102.30	Log (mitigation) storage	FS-Umpqua	Strip mines, quarries, gravel pit and evergreen	Permanent	Industrial	FS 3220000 (3430-31-Y-016c)

	o ORS 497.298 (Scientific Taking Permit) • ORS 537 (Water Rights Law) • ORS 197 (Oregon Land Use Planning Law) • ORS 390.235 (Permits for Removal of Archaeological or Historical Material) • ORS 569 (Weed Control Law) • ORS 527 (Forest Practices Act) At this time, please provide applications for Construction and Demolition Landfill Permits required under Oregon Revised Statute 459.005 through 418 (Solid Waste Management Law) for the several proposed disposal sites associated with the construction or operation of the gas pipeline.		**2. Sanitation and Waste Management Plan, page 4** **8.0 ROCK REMOVAL/EXCESS OVERBURDEN** FERC's Upland Plan requires the removal of excess rock from the top 12 inches of soil to the extent practicable in all rotated and permanent croplands, hayfields, pastures, residential areas, and other areas as agreed between landowner and PCGP. In these areas, PCGP will clean up excess rock to a condition similar to adjacent portions of the construction right-of-way (e.g., size, density, and distribution of rock) unless the landowner and PCGP negotiate different stipulations. Excess rock and spoil materials will be redistributed along the construction right-of-way in upland areas during restoration regrading in a manner that reflects the original contours and preconstruction drainage patterns. Excess materials will be disposed of in existing quarries and in permanent disposal sites that have been identified along the construction right-of-way. Appendix Q to the POD provides PCGP's Overburden and Excess Material Disposal Plan which describes how these materials will be stored and disposed of on federal lands. (Table A.8-4 in Appendix A.8 to Resource Report 8 of PCGP's Certificate application also identifies the permanent disposal areas that will be located on private lands.) Large rock may be provided to the federal land-managing agencies to be used for instream restoration projects and habitat features. Large rocks and boulders may also be used as OHV barriers along the right-of-way and at road crossings to block access at OHV points to restrict traffic on the right-of-way as described in the Recreation Management Plan (Appendix S to the POD). Additionally, large rocks and boulders may be piled in upland areas along the construction right-of-way to create habitat diversity features where approved by the EI or PCGP's authorized representative and the landowner or land-managing agency. The use of alternate disposal locations will be approved by FERC and, if on federal lands, the respective land-managing agency. **3. Resource Report 1, General Project Description, page 61**

			Excess Rock Removal. FERC's Upland Plan (see Section V.A.3) requires the removal of excess rock from the top 12 inches of soil in cultivated or rotated croplands, hayfields, pastures, residential areas, and other areas at the landowner's request. PCGP will comply with FERC's Upland Plan. In these areas, PCGP will clean up excess rock to a condition (size, density, and distribution) similar to adjacent portions of the construction right-of-way. In rangeland, forestlands, or other non-agricultural or residential lands where shallow bedrock is encountered and rock excavation is required, excess rock will be buried in cuts during restoration to reestablish approximate original contours and scattered across the right-of-way and TEWAs according to landowner agreements. Where excess rock requires disposal, PCGP will consider this material construction debris. The disposal sites have been identified in Resource Report 8, and PCGP will obtain the appropriate approvals prior to use. As noted above, excess rock may be incorporated into habitat diversity structures and stacked or piled along the right-of-way to provide wildlife habitat diversity features to benefit mammals, birds, reptiles, amphibians, and the prey base they depend upon. These habitat features would be created within the Pipeline's certificated construction limits where approved by the EI or PCGP's authorized representative and the landowner or land management agency. These features are also included in Section 10.14 of the ERCP (see Appendix B.1).
31	In compliance with OAR 340-041-0007(8), please provide for DEQ review and approval the resource and land management plans, guidance, design standards, design manuals, access permits or grants, and other programs from the U.S. Bureau of Reclamation that Pacific Connector Gas Pipeline will use to protect water quality during the following: • Siting Temporary and Permanent Access Roads and the construction/permanent right-of-way on U.S. Bureau of Reclamation land, over BOR water-bearing infrastructure (e.g.,	Please refer to the Response to #17. The Klamath Project Facilities Crossing Plan (Appendix E.3 to Part 2 of JPA), which is specific to BOR facilities, is under review as part of the POD and, once approved, would be implemented as part of the Right-of-Way Grant. PCGP is currently working with BOR to provide the necessary information for the federal agencies to issue right-of-way grants for federal lands. An operations and maintenance plan will be prepared if required by the agencies during that process. Proposed amendments and changes to existing BOR resource and land management plans are not	**<u>Summary Statement</u>: Amendments to federal plans that authorize new or modify existing discharge to waters of the state are considered federal authorizations and are, therefore, subject to review by states under Section 401(a) of the Clean Water Act. DEQ requests PCGP identify any proposed amendments and changes to existing BOR resource and land management plans as more fully described in the following section.** See also DEQ's response to Comment 18, above, for related responses to Comment 31. The U.S. EPA is currently reviewing DEQ's Upper Klamath and Lost River Total Maximum Daily Load first issued in May 2010. In this TMDL, DEQ address the impairment of a number of creeks segments by sedimentation and impairment of water bodies by nutrients including nutrient discharge via sediment as follows as follows: *DEQ is not developing a TMDL for a number of creek segments impaired by sedimentation or for biological criteria (Table 1-3). At the time of the writing of this TMDL, DEQ is in the process of developing a sedimentation assessment methodology that could be used for implementing the narrative sedimentation standard and possibly the biological criteria impairment, as well. When the methodology and associated guidance is completed, the agency will establish sedimentation TMDLs for those waterways on the 303(d) list. (page 11)* Given these pending TMDL actions, DEQ is requesting specific information from PCGP in the form of road design standards and specifications, road maintenance standards and specification, and – if appropriate – the technical support for these engineering designs. DEQ is requesting specific information from PCGP in the form of design standard and specification and engineering designs with their technical support for treating stormwater discharge from the pipeline's permanent right-of-way to BOR operated water conveyance structures connected to waters of the state.

	canals), or paralleling this infrastructure. • Maintaining both Temporary and Permanent Access Roads for pipeline construction and operation. • Siting other components necessary to construct and operate such as staging areas, material storage areas, and other components (e.g., compressor stations, metering stations) of the pipeline. • Installing the construction and permanent right-of-way for the gas pipeline. • Operating the permanent right-of-way for the pipeline. Please identify any proposed amendments and changes to existing BOR resource and land management plans and other documents noted that are necessary to construct, use, or maintain access roads and the permanent right-of-way on BOR land.	prerequisites for issuing a 401 Water Quality Certification.	DEQ reviewed the Klamath Project Facilities Crossing Plan referenced in PCGP's response to Comment 31 and finds the following information gaps relevant to DEQ's Comment 31: • Information on how PCGP will manage all BOR access roads (including the 25 Permanent and Temporary Access Roads) while in use to construct and operate the pipeline such as the: o Inventory method PCGP uses to evaluate the current condition of existing BOR roads and current capacity to protect water. o Need for maintenance treatments prior to use by PCGP based on the inventory discussed above. o Design standards and specifications for reconstruction that PCGP will use to ensure PCGP improves these access roads if the above inventory identifies needed improvements to protect water quality under the proposed use (e.g., durable surfacing for non-paved roads, cross drains etc.). o If applicable, design standards and specifications that PCGP will use to ensure PCGP constructs proposed Permanent Access Roads and Temporary Access Roads to protect water quality. o Standards and specifications for maintenance that PCGP will use to ensure existing and proposed new BOR. • Information on the selection criteria PCGP used to site the proposed PARs and TARs on BOR land if applicable. • Information provided to BOR in a Use Authorization Application and the Application for Transportation and Utility Systems and Facilities on Federal Lands as described in the directions for this application and highlighted below in DEQ's review of PCGP's response to Comment 31.[49, 50, 51] • Information referenced in Section 6.0 (Environmental Considerations) of the Crossing Plan that is relevant to Plans of Development (e.g., Transportation Management Plan, Erosion Control and Revegetation Plan) but lacking sufficient information for DEQ to use in its Certification decision as noted above in DEQ's review of PCGP's response to DEQ's comments in AIR-1 (e.g., Comment 15). • Information on the designs standards and specifications as well as engineering designs PCGP will use to construction stormwater treatment controls for the post-construction stormwater discharge to the BOR water conveyance structures connected to waters of the state. DEQ needs to review all easements, agreements, access/right-of-way grants, authorizations, and permits that are established to construct and operate this pipeline on all federal and nonfederal land. DEQ's receipt of this requested information and its evaluation by DEQ is required under OAR 340-048-0042(2) while developing a Certification Decision. DEQ will review and evaluate all final designs as well as standards and specifications – such as those referenced in the Klamath Project Facilities Crossing Plan and associated design package – as part of the required Certification Decision.

[49] Standard Form 7-2540 (09/30/2015). Bureau of Reclamation Use Authorization Application. OMB Control No.: 1006-0003

[50] Standard Form 299 (Revised 5/2009). Application for Transportation and Utility System and Facilities on Federal Lands. Prescribed by DOI/USDA/DOT under Public Law 96-487 and Federal Register Notice 5-22-95

[51] USDI Bureau of Reclamation Website. Last Updated 10/18/17. What do I have to do to apply?

			At minimum, DEQ anticipates receiving the information PCGP provides in response to the application requirements in BOR's use authorization application and the application for transportation and utility systems and facilities. DEQ provides examples below of the minimum level of detail DEQ is seeking from PCGP that BOR initially requires when an entity seeks to use BOR land, resources, and facilities. Depending on the potential level of impact to water quality, this minimum level of information may not be sufficient to develop a Certification Decision. However, the information provided in PCGP's submittal to date lacks the level of detail required for a BOR use authorization application and an application for transportation and utility system and facilities. For timber harvesting, removal of commercial forest products, and use of BOR roads, the BOR Use Authorization Application requests the following information: *4. Location of the proposed use. Submit two copies of all maps or drawings and other information clearly demonstrating the location for the proposed use, including township, range, and section. Under 43 CFR 429.13(a), Reclamation may request additional information needed to process your application, such as legal land descriptions and detailed construction specifications.* 5. *Description of the proposed use. Examples of additional information to provide, depending upon the use, are as follows:* *• maximum number of anticipated participants/spectators/crew;* *• number and types of vehicles to be on site;* *• description of props, tents, tractors, trailers, and other equipment;* *• description of facilities you intend to provide, such as sanitation facilities, emergency personnel, food services or vendors, or other applicable information (attach plans); and* *• description of your intended use of Reclamation on-site roads or trails.* In its Application for Transportation and Utility System and Facilities on Federal Lands, for example, BOR will require or has required the following from PCGP for its proposed pipeline and roads: *7. Project description (describe in detail): (a) Type of system or facility, (e.g., canal, pipeline, road); (b) related structures and facilities; (c) physical specifications (Length, width, grading, etc.); (d) term of years needed: (e) time of year of use or operation; (f) Volume or amount of product to be transported; (g) duration and timing of construction; and (h) temporary work areas needed for construction (Attach additional sheets, if additional space is needed.).* *13. a. Describe the reasonable alternative routes and modes considered.* *b. Why were these alternatives not selected?*

			SPECIFIC INSTRUCTIONS (Items not listed are self-explanatory) *7. Attach preliminary site and facility construction plans. The responsible agency will provide instructions whenever specific plans are required.* *13. Providing information on alternate routes and modes in as much detail as possible, discussing why certain routes or modes were rejected and why it is necessary to cross Federal lands will assist the agency(ies) in processing your application and reaching a final decision. Include only reasonable alternate routes and modes as related to current technology and economics.* Consistent with DEQ's comments in AIR-1 and its review of PCGP's response to AIR-1, DEQ will need to know if PCGP inventoried/investigated the current condition of BOR roads for their proposed use. As noted elsewhere in this review, this inventory is important to evaluate potential impacts to water quality from this proposed use. PCGP can use the Geomorphic Road Inventory and Assessment Package (GRAIP) or a comparable analytical tool if approved by DEQ to perform this inventory. DEQ will also need to know that PCGP uses this inventory/investigation to identify maintenance treatments or road improvements necessary to protect water quality. Finally, DEQ anticipates that BOR will provide PCGP with the design standards and specifications applicable to BOR road maintenance, reconstruction, and construction projects. If DEQ provides these design standards and specifications, DEQ will review and – if needed – make modifications and addition to these during the development of a Certification Decision. If BOR does not provide these standards and specifications, DEQ expects PCGP to propose road maintenance, reconstruction, and construction standards and specification for DEQ review and approval.
32	The scope of work in Pacific Connector Gas Pipeline's August 31, 2017 Thermal Impacts Assessment suggests that PCGP evaluated only stream crossings for their potential to influence or regulate thermal properties of streams. • An analysis of the impacts from the 50-foot setbacks from waterbodies in riparian areas currently	The most recent version of the Draft Thermal Impact Assessment plan was provided to ODEQ as Attachment C / Appendix Q.2 of 404-10 JPA Part 2 provided as Appendix B of 2/6/18 401 WQ Package. PCGP is assessing all areas that may fall within riparian areas (one site potential tree height) that are outside the stream crossings listed in the Thermal Impact Assessment. Following receipt of ODEQ's comments on the Thermal	Please provide DEQ with an estimated schedule for the revision to the thermal analysis. PCGP should identify all the impacts to riparian vegetation that PCGP did not consider in its August 31, 2017 draft Thermal Impact Assessment. PCGP should also account for the effects of all cleared areas (e.g., TEWA, parallel stream-pipeline alignment, etc.) that were not previously included in the thermal load analysis.

	proposed for the Temporary Extra Work Areas. • An analysis of the impacts from siting the pipeline alignment within riparian areas as close as 15 feet from streams as currently proposed when paralleling these waterbodies. • An analysis of the impacts from siting Temporary and Permanent Access Roads, Staging Areas, material storage area, and other pipeline components (e.g., compressor stations, metering stations) within riparian areas. DEQ is requesting this clarification because the scope of work from the Thermal Impacts Assessment suggests that the estimate of solar loading for stream crossings under both the construction (i.e., 75-95 foot wide) corridor and the permanent (i.e., 30-foot wide) corridor using the Shade-A-Lator tool did not consider the impact of these TEWAs. The use of TEWAs during pipeline construction extends the construction corridor beyond 75 and 95 feet. Currently, the Pacific Connector Gas Pipelines	Impacts Assessment, updates or revisions to the assessment will be completed at that time.	

	proposes to site TEWAs 50 feet from waterbodies as noted in the comment above. In addition, the scope of work in this assessment does not indicate PCGP evaluated the influence on stream thermal properties when the pipeline's construction and permanent corridor closely parallels streams and comes within 15-feet or less of these streams. For a comprehensive analysis of PCGP's compliance with the temperature standard, PCGP's Thermal Impact Assessment must also evaluate these impacts as well as other impacts (e.g., roads, staging areas etc.) as requested in the comments above on compliance with Section 303 of the Clean Water Act.		
33, 34, 35, 36	Comment 33: In compliance with OAR 340-041-0007(1) and (7), please provide a post-construction stormwater management plan addressing DEQ's *Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines* for all the road	The JCEP 401 Water Quality Memorandum (Part 1) and PCGP 401 Water Quality Summary Table (Part 2, Appendix A) in the application specifically address project compliance with Oregon water quality standards.	**Summary Statement: The responses provided by PCGP do not fully address the information requested by DEQ. Please provide the information requested in Comments 33 through 36 and more fully described in the following section. See also DEQ's Summary Statements related to Comments 4, 5, and 15 for additional guidance.** **Comment 33 of DEQ's AIR-1 (Road Stream Crossings PCGP Will Improve)** In its response to Comment 33, PCGP has not address guidance materials found in DEQ's Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines. DEQ requested this information to evaluate fully PCGP's actions to treat the discharge from roads at stream crossings such as culverts and bridges. DEQ is requesting this information since these stream crossings serve as a discharge point for sediment arising from the travel ways, cut slopes, and in-slope ditches of non-paved roads.[52] The information regarding the

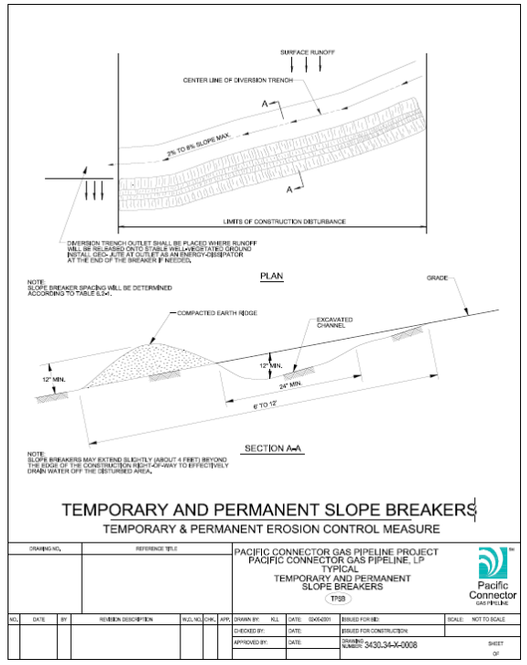
[52] Holley, A. Gordon, A. Gordon; Conner, Kristina F.; Haywood, James D., eds. 2015. *Sediment Deposition from Forest Roads at Stream Crossings as Influenced by Road Characteristics*. Proceedings of the 17th Biennial Southern Silvicultural Research Conference. General Technical Report. SRS-203. Asheville, NC: U.S. Department of Agricultural Forest Service, Southern Research Station. 551 p.

	stream crossings that Jordan Cove Energy Project and Pacific Connector Gas Pipeline will: • Replace or improve to construct and/or operate the gas pipeline and • Result in an increase in impervious surface area during the replacement/improvement process. This information is necessary [see OAR 340-048-0042(2)(a)] to determine whether the stormwater discharge from the pipeline's road stream crossings will contribute to or cause violations of water quality standards. Comment 34: In compliance with OAR 340-041-0007(1) and (7), please provide a post-construction stormwater management plan addressing DEQ's *Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines* for all stream crossings for the pipeline. The focus of this plan	Details pertaining to post-construction stormwater management for the pipeline are provided in the PCGP Erosion Control and Revegetation Plan (Part 2 Attachment A / Appendix B.1 of 404-10 JPA Part 2 provided as Appendix B of 2/6/18 401 WQ Package). The general location maps showing proposed access roads are referenced in Appendix G.1 to Resource Report 1 (Part 2 Attachment A of 404-10 JPA provided as Part 2 Appendix B of 2/6/18 401 WQ Package, see pdf pages 183 and 661). The waterbodies within 100 feet of existing roads needing improvement are detailed in Table A.2-6 in Appendix A.2 of Resource Report 2 (Part 2 Attachment C / Appendix A.2 of 404-10 JPA provided as Part 2 Appendix B of 2/6/18 401 WQ Package). Table A.2-6 will be updated to include the water quality BMPs for each crossing and provided to ODEQ in Q4 2018. Further, impacts associated with vegetation removal are detailed in the PCGP Revised	design of these stormwater treatment systems requested in these submission guidelines enables DEQ to evaluate the efficacy of PCGP's proposed stormwater treatment controls. Given the potential for pollutant discharge at stream crossings, DEQ is requesting the engineering designs and technical support for each water quality BMP proposed for each stream crossing that PCGP proposes to identify in a future update to Table A.2-6 in Q4 2018. DEQ will not accept a qualitative description of a treatment practice in lieu of these engineering designs and their technical support. Even for a simple stormwater treatment control such as a grass swale, several design variables influence the performance of a grass swale. For example, a simple statement that PCGP will use a grass swale to treat the roadside ditch runoff prior to discharge to a stream provides DEQ no information regarding the pollutant removal performance for this swale. As an illustration for PCGP's consideration in preparing to submit information to DEQ, Minton 2005 provides a brief discussion of these design variables for a grass swale in the following excerpt: *Although grass swales are commonly viewed as filters (biofiltration), they are properly classified as shallow basins or biosettlers. Flow-through grass swales function as treatment devices if vegetation remains erect. Erect grass reduces shear stress in the channel, reducing its capacity to carry sediment. Careful selection of the Manning's n is critical to proper sizing (Chapter 5).* *Length was first established at 200 feet (60 m) based on a study of a grass-lined freeway ditch. 60 percent of the TSS was removed in 100 feet and 80 percent in 200 feet. More recently, others have specified a minimum length of 100 feet combined with a minimum hydraulic residence time of 9 minutes. The specified residence time results in lengths considerably greater than 100 feet.* *…Swales and strips designed for treatment appear to give reasonable performance, on the order of 70 to 80 percent TSS removal if the hydraulic residence time is on the order of 10 minutes.*[53] A table of water quality BMPs employed at stream crossing without corresponding engineering analysis and its technical support will not allow DEQ to evaluate the potential water quality impacts from the stormwater discharge at these stream crossings. In developing the Certification Decision, DEQ must evaluate all proposed activities that would either contribute to or cause violations of water quality standards from road drainage discharged at stream crossings [OAR 340-048-0042(2)(a)]. To perform this evaluation, DEQ needs PCGP to submit a quantitative assessment using, for example, models and/or engineering designs and the technical support for these designs.

[53] Minton, Gary. 2005. *Stormwater Treatment – Biological, Chemical and Engineering Principles*. Sharidan Books, Inc.

	should be the drainage area for the right-of-way approaches that discharge stormwater into the stream crossing. To ensure compliance with OAR 340-048-0042(2)(a), please evaluate if the discharge from the pipeline's permanent 30-foot right-of-way at all stream crossings for the pipeline will contribute to or cause violations of water quality standards. In compliance with OAR 340-048-0042(2)(a), please propose the analytical model(s) (e.g., X-DRAIN) that Pacific Connector Gas Pipeline will use to evaluate if the stormwater discharge from the permanent 30 foot right-of-way with its 10 feet of compacted soil overlying the gas pipeline will contribute to or cause violations of water quality standards. In compliance with OAR 340-041-0002(1), this evaluation must also consider the impact of the change in stormwater volume discharged to receiving waters from the vegetation conversion (i.e., from forest canopy to herbaceous vegetation) during pipeline	Draft Thermal Impact Assessment (Part 2 Attachment C / Appendix Q.2 of 404-10 JPA provided as Part 2 Appendix B of 2/6/18 401 WQ Package).	**<u>Comment 34 of DEQ's AIR-1 (Permanent Right-of-Way Post-construction Discharge at Stream Crossings)</u>** In its response to Comment 34, PCGP did not provide DEQ with the information requested in DEQ's *Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines*. As discussed in DEQ's review of PCGP's response to DEQ's Comment 16 and again emphasized below, the permanent right-of-way for the pipeline will have areas of compacted soil particularly over the gas pipeline. Given this, the permanent right-of-way is essentially functioning as primitive road as the compacted soil above the pipeline is serving as a travel way. Compacted soil will limit stormwater infiltration and promote surface runoff. As a result, PCGP must treat the stormwater at the crossing of each pipeline right-of-way prior to its discharge into streams. As noted elsewhere in DEQ's review of PCGP's response to AIR-1, road stream crossings are a source of pollutant discharge. The proposed slope breakers or water bars noted below are serving as this primitive road system's cross drains for stormwater. Given this fact, DEQ draws upon the numerous studies on the impact of roads on receiving water quality to anticipate the potential water quality impacts from PCGP's proposed right-of-way. One of these studies, referenced elsewhere in DEQ's review of PCGP's proposal, summarizes DEQ's concerns as follows: *If there is a moderate distance between the road and stream, then mitigation to reduce both road erosion and channel erosion may decrease sediment delivery. Channel treatment options include lining the channel with rock or similar materials, establishing vegetation, or installing control structures. These mitigation techniques are expensive and may be ineffective during severe runoffs.* (Elliot 1999). PCGP is proposing the use slope breakers discussed and presented below to manage stormwater on the permanent right-of-way for the gas pipeline. A slope breaker is essentially a stormwater ditch (see drawing below) with a berm to control the direction of stormwater flow. Slope breakers represent a potential hydrological connection between streams and the permanent right-of-way when these slope breakers are located near stream crossings. PCGP must propose to DEQ a defensible approach to treating any pollutants mobilized in the permanent right-of-way, transported in the ditches of slope breakers, and discharged near stream crossings. Unless PCGP can provide the engineering analysis to demonstrate otherwise, DEQ considers the proposed slope breakers near stream crossings to be stormwater conveyance systems rather than stormwater treatment systems. As noted above, compacted soil will limit the infiltration of stormwater. Raindrop splash erosion on bare soil and stormwater moving downslope will mobilize sediment where soil is exposed and/or compacted and vegetation is limited due to this compaction around the pipeline. Moreover, PCGP's proposed vegetation maintenance for pipeline right-of-way will limit the extent vegetation types allowed in the right-of-way particularly above and adjacent to the gas pipeline. PCGP's response to Comment 34 did not address DEQ's request to evaluate the discharge from this permanent 30-foot right-of-way with its 10-feet, at minimum, of compacted soil overlying the pipeline. During its

	construction. The evaluation of this impact is necessary to determine if pipeline's permanent right-of-way will cause bed and bank erosion and, therefore, violate Oregon's biocriteria water quality standard (i.e., OAR 340-041-0011).
	
	Comment 35: In compliance with OAR 340-041-0007(1) and (7), please provide a post-construction stormwater management plan addressing DEQ's Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines for the 30-foot permanent right-of-way for the approximately 117 miles of the proposed pipeline right-of-way traversing steeps slopes (i.e., slopes greater than 30%). This information is necessary before Pacific Connector Gas Pipeline, in compliance with OAR 340-048-0042(2)(a), can determine whether the discharge from the pipeline right-of-way will contribute to or cause violations of water quality standards.
	
	The information provided in PCGP's documents (e.g., 401 Application Submittal, drafts of
			review of proposed federal resource and land management plans, DEQ confirmed its concern regarding post-construction stormwater discharge from slope breakers at stream crossings carrying sediment from compacted soil. DEQ documents this concern in DEQ's review of PCGP's response to Comment 16 presented above. PCGP will need these amendments to federal soil compaction standards to build the gas pipeline.
			
			The application of a model such as X-DRAIN will help PCGP estimate the level of sediment discharge from the proposed permanent right-of-way. In AIR-1, DEQ requested from PCGP this quantitative evaluation to develop DEQ's Certification Decision. However, PCGP has not indicated in its response to AIR-1 that this evaluation is forthcoming. In formulating a Certification Decision, DEQ must determine if the potential alterations to water quality would either contribute to or cause violations of water quality standards [OAR 340-048-0042(2)(a)]. As noted above, a slope breaker installed near stream crossings is a stormwater conveyance component rather than a stormwater treatment component unless PCGP provides the engineering analysis to demonstrate otherwise. Moreover, DEQ does not see how PCGP's updating Table A.2-6 with brief, qualitative descriptions of water quality BMPs will provide the engineering design and its technical support that DEQ is requesting from PCGP.
			
			In PCGP's response to Comment 34, PCGP refers DEQ to PCGP's proposed Erosion Control and Revegetation Plan. In this plan, PCGP provides a description of its permanent post-construction stormwater control referred to a "permanent slope breakers (waterbars)." Below, DEQ provides an excerpt of this description as well as design details for slope breakers. This description and design details do not provide the information to answer the following questions:
			
			• Is PCGP proposing to install slope breakers/water bars in floodplains?
			  o Will these installations trigger local government floodplain regulations and, if yes, will these installations comply with these land use regulations or prevent the signing of a required Land Use Compatibility Statement.
			  o If PCGP does not intend to use slope breakers in floodplains, how is PCGP proposing to manage post-construction stormwater in floodplains.
			• What is PCCP's proposed setback from the Army Corps of Engineer's and Oregon Department of State Land's ordinary high water mark for permanent slope breakers?
			  o How will PCGP infiltrate (i.e., treat) the discharge from the slope breaker installed above this setback during periods of rainfall, high groundwater table, saturated soil conditions reducing infiltration of runoff, and a limited vegetation buffer to treat surface runoff?
			  o How will PCGP manage post-construction stormwater and provide treatment for this stormwater within this setback?
			  ▪ Is PCGP proposing to infiltrate (i.e., treat) the runoff within the setback during periods of high rainfall, high groundwater table, and saturated soil conditions or will this runoff discharge into streams untreated as surface runoff into streams?

	Resource Reports) – made available to DEQ – only provides generic diagrams and erosion controls practices. DEQ can find no information on PCGP's field investigations or remote sensing for these areas to evaluate slope stability when siting the pipeline alignment. DEQ can find no information on the specific designs and practices that PCGP will use on cut slopes and fill slopes located on these steep slopes. In developing this plan in compliance with OAR 340-041-0007(1) and (7), please provide information on the designs and engineering support for these designs for the permanent controls Pacific Connector Gas Pipeline proposes to stabilize cut-slopes and fill slopes for the right-of- way sited along the steep slopes. The purpose of these controls is to prevent sediment discharge in stormwater and debris flows from landslides discharging into streams. Please note these on the post-construction stormwater plan in the information request above. Additionally, please identify where the 117 miles of proposed pipeline noted above		• If PCGP will setback slope breakers from the ordinary high water mark to comply with Corps and DSL permit requirements, how will the discharge from these slope breakers prevent hydromodication of smaller streams and, therefore, bed and bank erosion in these streams with its effect on Oregon's biocriteria? **4.2.2 Permanent Slope Breakers** Permanent slope breakers (waterbars) will be installed across the right-of-way on slopes. The purpose of these structures is to minimize erosion by reducing runoff velocities by shortening slope lengths, preventing concentrated flow, and by diverting water off the right-of-way. Slope breakers are also intended to prevent sediment deposition into sensitive resources. Slope breakers will be constructed with a two to eight percent outslope so that water does not pool or erode behind the breaker. Outflow will be diverted to a stable area off the right-of-way consistent with FERC's Upland Plan. Slope breakers may extend slightly (about 4 feet) beyond the edge of the construction right-of-way to effectively drain water off the disturbed area. If a stable area is not present, a temporary energy-dissipating device will be installed at the end of the slope breaker. Slope breakers will be installed along the right-of-way based on slope gradient and soil characteristics (see Table 4.2-2). The frequency of slope breakers will be installed based on a combination of FERC's Upland Plan (see Attachment A) and input from the Forest Service and BLM. Because of the range in variation between agency recommendations and because of the complex landownership pattern, a single slope breaker spacing was developed based on slope gradient and soil type to ensure installation practicality across the various private and federal lands. The permanent slope breakers will be installed in all areas except agricultural fields, hayfields, pastures, and lawns. A typical drawing of a slope breaker is provided in Attachment C as Drawing 3430.34-X-0008. **Table 4.2-2** **Permanent Slope Breaker Spacing** **Spacing Based on Soil Characteristics[1]** **Slope Percent** / **Highly Erosive Granitic Soils[2] (feet)** / **Moderate/Low Erosion Soil Types (feet)** 0-5 / None Required / None Required >5-15 / 100 / 200 to 300 >15-30 / 50 to 75 / 75 to 100 >30 / 50 / 50 [1] Actual spacing will be determined at the time of installation based on site-specific topographic conditions on the right-of-way to ensure proper slope breaker construction and proper drainage to stable off-site areas. On the Umpqua National Forest between about MPs 109 and 110, where the alignment crosses the historic Thomason cinnabar claim group, waterbars are to be installed at 50-foot intervals as recommended by the Forest Service (see the Contaminated Substances Discovery Plan/Appendix E of the POD). [2] Granitic formations are crossed by the alignment between about: MPs 79.1 to 80.5; 81.6 to 82.2; 87 to 88.8; 97.0 to 101.2; 103.0 to 105.4; and 114.8 to 115. Section 4.2.2 on Slope Breakers from PCGP's Erosion Control and Revegetation Plan  Drawing Number 3430.34-X-0008 of Slope Breakers DEQ is seeking answers to the questions above because PCGP has provided limited information on its proposed post-construction stormwater controls at the stream crossings of the permanent right-of-way. In Comment 34, DEQ requested PCGP use DEQ's Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines. Using these guidelines would provide DEQ with information needed to evaluate the efficacy of PCGP's proposed use of slope breakers at stream crossings. For example, PCGP is proposing to discharge stormwater from slope breakers and, presumably, infiltrate this discharge into the surrounding soils for treatment. According to DEQ submission guidelines for a post-construction stormwater management plan, the PCGP should design structural controls for any conditions that warrant special water quality considerations such as:

	coincide with the 94 miles of the proposed pipeline that would be located in soils that PCGP has identified as having a high or severe erosion potential. Please provide the designs and engineering support for these designs for the permanent controls in these areas of high/severe erosion potential and steep slopes. In compliance with OAR 340-041-0007(1) and (7), the engineering support must indicate that these permanent controls are sufficient to: • Manage stormwater to prevent erosion on the permanent right-of-way, its cut-slope, and its fill-slope. • Prevent debris flows into streams from landslides from cut-slope and fill-slope failures. On the post-construction stormwater management plan requested above, please also provide the location for these controls along the 117 miles of pipeline on steep slopes (>30%).		• *Size infiltration structural stormwater controls such that there is sufficient depth to groundwater to facilitate drainage (e.g., soil pore storage volume ≥ volume of stormwater designed to infiltrate (Table 2, page 19).* • *The bottom of the structural stormwater control should be sufficiently above the highest anticipated seasonal groundwater to facilitate drainage. Generally, the volume of the post-construction stormwater runoff the structural control is designed to infiltrate should not exceed the storage volume within the soil pores of the subgrade (Section E.7.2.1, page 20).* PCGP's references the proposed Erosion Control and Revegetation Plan in its response to Comment 34. However, this plan does not provide any details regarding the natural area or structural controls PCGP intends to install to infiltrate stormwater discharged from slope breakers near stream crossings. PCGP does not provide any infiltration testing for the area receiving the slope breaker discharge as requested in Section E.3 of DEQ's submission guidelines. PCGP does not provide DEQ with any design criteria such as those suggested by Pazwash 2016. For example, Pazwash provides the following example criteria for a filtering system: *…the entire treatment system (including pretreatment) hold at least 75% of the WQ_v prior to infiltration. Minimum filter bed thickness is typically 18 in (45cm) for infiltration basins and 12 inches (30 cm) for sand filters. e. Swales: Swales are designed to treat the full WQ_v and may be dry swale or wet swale…Dry swale is basically a vegetated open channel, and wet swale has an expanded basin with wetland vegetation and constricted outlet. Figure 5.6 shows a schematic plan view of a wet swale. Design criteria for swales (open channel) area:* 1. *Swales shall be designed for the 10-year storm.* 2. *The peak flow velocity for the 10-year storm shall be nonerosive.* 3. *Channels will have moderate side slopes (flatter than 3:1) – in no case, steeper than 2:1.* 4. *A minimum ponding time of 30 minutes is recommended for WQv treatment. The maximum allowable ponding time shall be less than 48 hours. An underdrain system shall be provided in dry swales to meet the maximum ponding time requirement.*[54] PCGP provides none of the detailed information provided in the example above for how PCGP will manage and treat the stormwater discharge from slope breakers at stream crossings. Without additional information, PCGP is essentially asking DEQ to accept – without any engineering analysis or technical support – that the soils and vegetation in between the slope breaker's discharge point and the stream will treat this stormwater discharge. Additionally, when the permanent right-of-way is in operation, PCGP does not provide DEQ with the water quality

[54] Pazwash, Hormoz. 2016. *Urban Storm Water Managemen*t (Second Edition). CRC Press

	Comment 36: In compliance with OAR 340-041-0007(1) and (7), please provide post-construction stormwater management plans for the proposed 25 miles of new permanent and temporary roads addressing DEQ's Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines. This information is required before Pacific Connector Gas Pipeline can determine whether the discharge from these new roads will contribute to or cause violations of water quality standards. In compliance with OAR 340-048-0042(2)(a), please propose the analytical model(s) (e.g., X-DRAIN) that Pacific Connector Gas Pipeline will use to evaluate if the stormwater discharge from these 25 miles of proposed new roads will contribute to or cause violations of water quality standards.		design storm that the proposed slope breaker collection system and/or natural area will treat. Moreover, PCGP does not demonstrate that the natural area (i.e., buffer area) between stream and the slope breaker's discharge point is capable of adequately treating the discharge from the water bar. In the absence of this detailed information, DEQ can only assume that PCGP does not sufficiently treat the runoff from the permanent right-of-way at stream crossings once discharged from the slope breaker to the stream. In Comment 34, DEQ requested that PCGP evaluate the water quality impacts from this discharge by using a model such as X-DRAIN. PCGP has not provided this evaluation in its response nor indicated it will provide this information to DEQ in the near future. **Comment 35 of AIR-1 (Post-construction Stormwater Discharge from ROW to Steep/Unstable/Erosive Slopes** In PCGP's response to DEQ's Comment 35, PCGP refers DEQ to the Erosion Control and Revegetation Plan. As noted in DEQ's Comment 35, PCGP only provides generic diagrams for certain erosion control practices. This information does not provide site-specific information for how PCGP will avoid discharging post-construction stormwater to unstable slopes such as headwalls, Areas of Potential Rapidly Moving Landslide Hazards, and mapped landslides along the entire pipeline alignment. In DEQ's review of PCGP's response to Comment 15 noted above, DEQ provides the regulatory and technical basis for avoiding post-construction discharges to steep, unstable slopes from the pipeline's right-of-way. For example, in its Erosion Control and Revegetation Plan, PCGP indicates that it will use permanent slope breakers (i.e., water bars) across the right-of-way on slopes to: *…minimize erosion by reducing runoff velocities by shortening slope lengths, preventing concentrated flow, and by diverting water off the right-of-way. Slope breakers are also intended to prevent sediment deposition into sensitive resources*. DEQ addresses the deficiencies of this plan excerpt from the ECRP in DEQ's review of PCGP's response to Comment 34 above. This represents all the information PCGP provided to DEQ in its submittal. The information that PCGP has provided in its submittal, to date, lacks site-specific information regarding the discharge points for these slope breakers. Also, without additional information, DEQ is unable to determine if these discharge points will: • Add additional water to unstable slopes (e.g., headwalls, high Rapidly Moving Landslide Hazard Potential Areas, mapped landslides) • Produce positive soil pore pressures that may cause landslides that impact water quality. As noted PCGP's submittal, slope breakers are specialized drainage ditches to prevent stormwater from eroding the right-of-way and creating rills and gullies in this right-of-way. PCGP's response did not provide DEQ with a post-construction stormwater management plan for the management of stormwater for the approximately 117 miles of the proposed pipeline right-of-way traversing steeps slopes (i.e., slopes greater than 30%).

			Technical Basis for DEQ's Information Request In a discussion of slope stability and linear infrastructure such as roads, Benda et al. 2007 notes the following: *Surface runoff that is concentrated and diverted through ditches onto steep slopes can saturate soils or road fills much more than natural intense precipitation events (Megahan, 1972; Sidle et al., 1985), thus increasing the potential for landsliding and/or gully initiation (e.g., Montgomery, 1994; see Figure 31).* *Road drainage that is diverted onto hillslopes is a major factor in landslide initiation (Figure 32 and Table 2). Ditch water that is diverted into naturally landslide-prone bedrock hollows (such as is shown in Figure 1) can trigger shallow landslides and initiate debris flows.* *…Figure 34 illustrates how the design of road drainage can lead either to landsliding or reduce the likelihood of landsliding.* Moreover, drawing on geotechnical experts, research, and references, the USDA Forest Service stresses the role of water in the cause and mitigation of landslides as follows: *There are two categories of water with which we will be concerned: surface water and ground water. Concentrations of surface water, seeps, springs, and vegetation changes indicate topographic changes that can provide critical clues about what may be happening with the ground water.* *Water plays a very important role in the cause and mitigation of most landslides. It is important to learn as much as possible about surface water and ground water because changes in ground water levels and pore water pressures alter effective normal stress and, as a result, modify shear strength.* *It is therefore critical that the source of ground water, changes in ground water levels, and the relationships among surface water, ground water, and the local geology be understood if landslide activity is to be managed.*[55]

[55] Hall, David E., Michael T. Long, and Michael D. Remboldt (Editors). 1994. Slope Stability Reference Guide for National Forests in the United States Volume III. USDA Forest Service EM-7170-13. Washington, DC

			PCGP is proposing to clear ridgetops of trees and other vegetation in Tyee Core Area, other locations with mapped landslide features, steep slopes, and slopes with soil that has a high erosion potential. PCGP is also proposing to level these ridgetops to install a gas pipeline. These activities dramatically alter the interception of rainfall from trees and the movement of stormwater on these ridgetops. These alterations will result in a substantial increase in stormwater generated on these ridgetops relative to their undisturbed condition. However, PCGP has not provided DEQ with specific information for how PCGP will manage the stormwater generated on these ridgetops supporting the permanent right-of-way. As highlighted in references DEQ presented above, stormwater discharge has the potential to cause landslides. Landslides caused by stormwater discharge from pipeline construction activities and the operation of the permanent pipeline right-of-way have the potential to migrate into stream channels affecting water quality. As discussed in DEQ's review above, the permanent right-of-way for the pipeline is functioning as a primitive road. To ensure compliance with OAR 340-041-0007(1) and (7), DEQ is requesting additional information that PCGP would generate during the development of a post-construction stormwater management plan for its permanent right-of-way. DEQ provides guidelines for the development of a post-construction stormwater management plan. For example, in Section E.2.2 of DEQ's *Post-Construction Stormwater Management Plan Submission Guidelines*, DEQ requests that applicants seeking a 401 Water Quality Certification perform the following actions: *Check the topography and Oregon Department of Geology and Mineral Industries' Statewide Landslide Information Database (http://www.oregongeology.org/sub/slido/index.htm). Consult with an Oregon-registered geotechnical engineer or engineering geologist in areas with steep slopes or landslide risk to see if excavation and/or infiltration should be avoided.* Since stormwater discharge may cause a landslide as noted above, DEQ provides the above post-construction stormwater plan guidelines to project proponents in DEQ's effort to administer statewide narrative criteria OAR 340-041-0001(1). PCGP has not demonstrated to DEQ that it has selected appropriate discharge points for its slope breakers/water bars to avoid stormwater discharge to unstable slopes. In the limited field investigations for landslides that PCGP has performed (i.e., PCGP's Submittal, Part 2, Appendix C) and discussed in DEQ's review below, PCGP's focus was primarily on the potential risk to the pipeline and did not include a comprehensive evaluation of the risk to water quality. Moreover, the limited field investigations only evaluated the risk of deep-seated landslides and not shallow rapidly moving landslides. PCGP did not perform field investigations for landslide risks for constructing and operating this gas pipeline along the many miles of potential rapidly moving landslide hazards particularly in the Tyee Core Area. ***Examples of Information Lacking in PCGP's Erosion Control & Revegetation Plan***

			PCGP has not provided DEQ with a post-construction stormwater management plan as requested in Comment 35 addressing the plan submission guidelines noted above. PCGP has not demonstrated in its ECRP that it will strategically divert stormwater from the right-of-way to stable and non-convergent slopes. In DEQ's Comment 35, DEQ requested that PCGP develop a post-construction stormwater management plan by providing engineering designs and their technical support for permanent controls for cut and fill slopes. However, PCGP has not provided DEQ this information. In fact, PCGP notes the following in Resource Report 6 for Geologic Resources for BMPs on slopes steeper than 30%: *Steep side slope Pipeline construction segments will be identified during the final design phase of the Pipeline project. Fill slope construction details and specifications will be designed for the identified steep side slope Pipeline segments.* As indicated in DEQ's comments, the purpose of DEQ's request for engineered designs for these controls is to evaluate PCGP's efforts to prevent sediment discharge in stormwater and to prevent debris flows from landslides discharging into streams. Although PCGP refers DEQ to its Erosion Control and Revegetation Plan for this information, the ECRP does not provide this level of detail as noted elsewhere in DEQ's review. In the Erosion Control Revegetation Plan, PCGP provides DEQ with Section 11 on Seep and Rugged Terrain. This section provides no information regarding the discharge points for stormwater relative to unstable slope features. In this section, PCGP provides no information on how it will store construction spoils (e.g., root wads, soil, rock, slash) and logs to avoid adding additional weight to the top of unstable slopes (e.g., headwalls, rapidly moving landslide areas, mapped landslides). The following is what PCGP provides DEQ in its ECRP: *A significant portion of the Pipeline crosses rugged topography as it traverses the Coast and Cascade Mountain Ranges and foothills. Where the Pipeline passes through the dissected Coast Range and foothills between the Coos River and Myrtle Creek (MPs 9.00 to 81.00) most of the ridgelines run in the opposite direction of the proposed alignment. The orientation of the ridges requires the Pipeline, in numerous areas, to descend and ascend steep ridge slopes to cross stream drainages so that the alignment can proceed in a southeasterly direction toward Myrtle Creek and ultimately the terminus of the pipeline near Malin, Oregon. This similar condition also occurs between MPs 81.00 and 121.00 where the Pipeline traverses the Cascade Range and foothills. During routing, PCGP optimized the alignment along ridgelines, where feasible, to minimize crossing steep slopes and potential geologic hazards, to minimize waterbody crossings, and to minimize the amount of cuts and fill slopes that would be required which reduces the erosion hazard. Areas of steep side slopes (greater than 50% grade) were also avoided as much as practical during routing to minimize the complications associated with construction in these areas as well as potential long-term slope instability hazards.*

			The Geohazards and Mineral Resources Report (see Resource Report 6) provides a geotechnical hazards review that was conducted during routing and describes the avoidance mitigation measures that were implemented (i.e., minor reroutes) to avoid potential high risk geological hazards areas. Resource Report 7 of PCGP's FERC Certificate application also identifies the miles of soils crossed by the Pipeline which are associated with steep slopes and high erosion hazards. PCGP has noted areas where the proposed route traverses steep, narrow ridges and where it will be infeasible to return these ridges to their original preconstruction contours during final grading. Drawing 3430.34-X-0018 in Attachment C provides a typical construction right-of-way configuration in these sharp ridgeline areas. This drawing shows the construction techniques that will be utilized to ensure safe and feasible construction; minimize overall construction disturbance; and ensure the long-term safety, stability, and integrity of the pipeline. Avoidance of these areas is not feasible because stable alternate pipeline routes were not present along the alignment, except for other similar ridgeline features that would have the same conditions. *During construction across rugged topography, PCGP will utilize the same construction procedures outlined in this ECRP to minimize construction, geologic, and erosion hazards as well as to ensure the integrity of the pipeline. In summary these procedures include:* *• routing the pipeline to ensure safety and integrity of the pipeline;* *• identifying adequate work areas to safely construct the pipeline;* *• utilizing appropriate construction techniques to minimize disturbance and to provide a safe working plane during construction (i.e., two-tone construction; see Drawing 3430.34-X-0019 in Attachment C);* *• Spoil storage during trench operations on steep slopes (greater than the angle of repose) will be completed using appropriate BMPs to minimize loss of material outside the construction right-of-way and TEWAs. Examples of BMPs that may be used include the use of temporary cribbing to store material on the slope or temporarily end-hauling the material to a stable upslope area and then hauling and replacing the material during backfilling;* *• optimizing construction during the dry season, as much as practicable;* *• utilizing temporary erosion control measures during construction (i.e., slope breakers/waterbars);* *• installing trench breakers in the pipeline trench to minimize groundwater flow down the trench which can cause in-trench erosion;* *• backfilling the trench according to PCGP's construction specifications;*

			• restoring the right-of-way promptly to approximate original contours or to stable contours after pipe installation and backfilling; *• installing properly designed and spaced permanent waterbars;* *• revegetating the slope with appropriate and quickly germinating seed mixtures;* *• providing effective ground cover from redistributing slash materials, mulching, or installing erosion control fabric on slopes, as necessary; and* *• monitoring and maintaining right-of-way as necessary to ensure stability.* From the information PCGP provides above, the following - for example - is missing: • The design details for BMPs used to stabilize spoil storage on steep slopes to address the geotechnical concerns associated with adding additional weight to the head of unstable slopes. • The use of reinforced fill slopes on steep unstable slopes where PCGP notes that "the proposed route traverses steep, narrow ridges" as recommended in technical manuals for linear infrastructure projects. • The location of construction and post-construction stormwater discharge points relative to unstable landscape features/steep slopes/mapped landslides/Potential Rapidly Moving Landslide Hazards. • The location the discharge points for the hydrostatic test water, trench dewatering, and vehicle/equipment wash water relative to unstable landscape features/steep slopes/mapped landslides/Potential Rapidly Moving Landslide Hazards. • The stormwater management system for the construction right-of-way, for Temporary Extra Work Areas, and for other areas cleared of vegetation relative to unstable landscape features/steep slopes/mapped landslides/Potential Rapidly Moving Landslide Hazards. DEQ requests this additional information to determine if the location of construction and post-construction stormwater discharge, other discharge (i.e., hydrostatic, trench dewatering, and equipment wash water), and construction spoil/log storage have the potential to cause a landslide that flow into streams. DEQ also needs information from a geo-engineer's field investigations to identify suitable locations for discharging stormwater to minimize their potential to cause landslides. The limited filed investigations performed by PCGP and highlighted in DEQ's review below do not provide the information necessary to site the discharge of construction stormwater, post-construction stormwater, hydrostatic test water, trench water, and equipment washwater. PCGPs limited investigation of landslide risks focus only on deep-seated landslide risks for only mapped landslides. PCGPs *Potential Deep-Seated Landslide Evaluation Forms* did not include evaluations of risks associated with discharging stormwater to areas identified as rapidly moving landslides hazards and other unstable landscape features such as headwalls. As noted in the excerpt below, these filed investigation forms and their conclusions focused primarily on the potential risk to the pipeline. PCGP did not

evaluate the risks to water quality, for example, from rapidly moving landslides or deep-seated landslides from pipeline construction and operation.

Below is an excerpt from *Potential Deep-Seated Landslide Evaluation Form* for Landslide 34. Landslide 34 is an identified landslide from a published map. PCGP notes this landslide in Figure 24 of 47 in PCGP's Geologic Hazard Maps along Milepost 108.86 - 109.44 of the proposed gas pipeline.

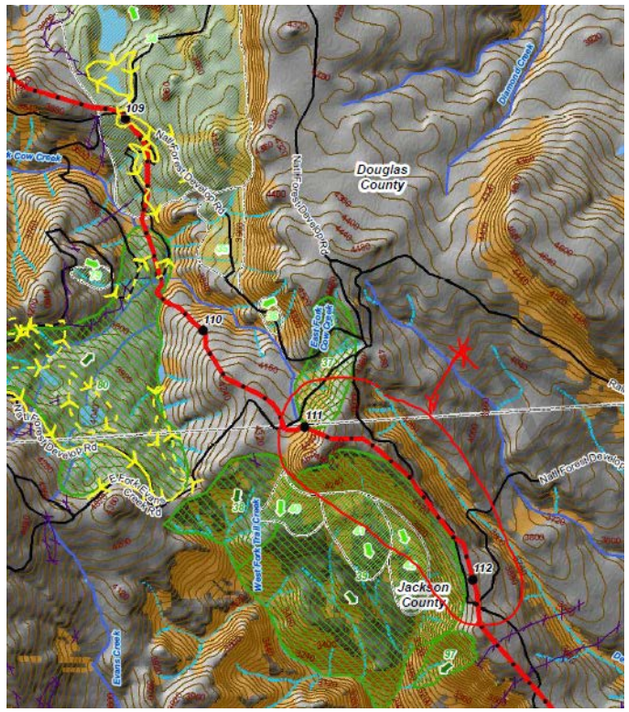
CONCLUSIONS BASED ON SURFACE OBSERVATIONS

Factors Contributing to Cause of Landslide (natural, anthropogenic):
Volcanic and tectonic activity.

Potential Risk to Pipeline: **Low**
We developed a geologic cross section through LS-34. Based on the location of the inferred slide plane and existing slope geometry, it is our interpretation that the failure plane for this very large landslide feature occurs approximately 100 feet below the ground surface at the location of the proposed pipeline. Excavation for pipeline construction will be typically less than 10 feet in depth and is not anticipated to encounter the inferred basal slide plane of LS-34. The volume of earthwork and depth of excavation required for the pipeline construction is small relative to the size of the landslide and likely depth of the slide plane. For this reason, it is our opinion that there is a low risk of construction adversely impacting the stability of this dormant-mature landslide.

The observations noted in the excerpt above do not address the additional stormwater discharge to this unstable landscape feature particularly above East Fork Cow Creek.

Moreover, PCGP's field investigation in this area as well as many other areas was limited in scope. For example, PCGP did not investigate the steep slopes surrounding the propose pipeline locations between Mile Posts 109 and 109.8 and between Mile Posts 111 and 112.2 (see the Geologic Hazard Map excerpt below). At these two sections of the proposed gas pipeline, PCGP has not indicated how PCGP will manage stormwater from the pipeline's construction and post-construction operations nor stabilize the fill slopes or the cut slopes. PCGP's proposed pipeline at Mile Post 109.4 and 109.5 is altering the toe of slope in areas identified as mapped Landslide 34 and as an Area of Rapidly Moving Landslide Hazard. However, PCGP does not provide DEQ with information regarding its design for loading the toe of this cut slope in these areas to prevent destabilizing it and causing a debris torrent to discharge into the East Fork Cow Creek.

			As documented in DEQ's review above, water plays a key role in the cause and mitigation of landslides. Referring to the map excerpt below, PCGP has not provided DEQ with information on how it will manage stormwater to avoid causing a debris flow below the pipeline in the rapidly moving landslide hazards on each side of the pipeline from Mile Post 111 to Mile Post 112.2. These Areas of RML also coincide with Landslides 37, 38, 42, and 80. Landslide 37, 38, 42, and 80. These are identified landslides from aerial photos. However, PCGP did not include them as part of its field evaluations of landslide risks. PCGP has not provided DEQ with engineering designs to stabilize the proposed pipeline's fill slopes for Landslides 37 and 42 as well as the cut and fill slopes for Landslide 38 and 80. There are numerous other areas of landslide risks where PCGP has provided no field evaluations or engineering analysis for protecting water quality from debris flows potentially precipitated by: • Loading additional stormwater at the top of unstable slopes when constructing and operating the gas pipeline. • Cutting into an unstable slope when constructing and operating the gas pipeline.  Geologic Hazard Map (Figure 24 of 47) from Resource Report 6 featuring several identified landslides including 34, 37, and 42 discussed

			In addition to PCGP's typical construction methods noted in the Erosion Control and Revegetation Plan excerpt above, PCGP identifies steep side slopes requiring restoration. PCGP provides the fill slope specifications below to ensure slope stability: *Fill slopes will be constructed in order to return the site to the approximate pre-construction topography. Fill slopes which exceed a gradient of 3H:1V (Horizontal:Vertical), will be constructed in accordance with the following specifications under the supervision of PCGP's qualified representative:* *<u>Materials</u>* *1. Fill materials used for constructing slopes exceeding 3H:1V will be considered structural fill.* *2. Materials used as structural fill should be free of roots, organic matter, and other deleterious materials.* *3. Fill materials will be at a moisture content suitable for compaction.* *4. If on-site soils are unsuitable for use as structural fill, imported structural fill will consist of pit or quarry run rock, crushed rock, crushed gravel and sand, or sand that is fairly well graded between coarse and fine, contains no clay balls, roots, organic matter or other deleterious materials, and has less than 5 percent passing the U.S. No. 200 Sieve.* *<u>Slope Preparation</u>* *1. Slopes to receive fills will be prepared by stripping the existing organic material and topsoil.* *2. Construct steps or benches on existing slopes to receive fills that exceed 3H:1V. The bench height to width ratio will be adjusted to match the existing slope gradient.* *<u>Fill Placement and Compaction</u>* *1. Fill soils will be compacted at a moisture content that is suitable for compaction. The maximum allowable moisture content varies with the soil gradation, and will be evaluated during construction. Silt and clay and other fine granular soils may be difficult or impossible to compact during persistent wet conditions.* *2. Fill material will be placed in uniform, horizontal lifts. Minimum lift thickness will vary based on material compacted and the type of compaction equipment used.* *3. Compact each lift by operating, hauling, and spreading equipment uniformly over the full*

			width of each layer until there is no visible deflection under the load of the hauling and spreading equipment. If each lift of fill cannot be accessed by the hauling and spreading equipment to achieve compaction, then other suitable compaction equipment will be used to obtain the required compaction. Alternative compaction equipment and methods may include tamping with a trackhoe bucket, vibratory plate compactors (hoe-pack) or rollers. Based on a review of available technical manuals for slope stabilization, PCGP's generic specifications presented above do not implement the recommendations in several technical guides on stabilizing slopes. PCGP does not provide need site-specific engineering analysis or technical support for the proposed fill slope specifications referenced above to demonstrate these practices are sufficient for each site where PCGP needs to stabilize fill slopes. As noted in PCGP's Resource Report 6 and 7, the alignment for the gas pipeline will traverse the Tyee Core Area an area known for its landslide activity as well as areas with steep slopes and highly erosive soils. The following information is missing from PCGP's specifications for the placement of the alignment on or above steep unstable slopes that are common along a substantial portion of the proposed alignment: • Information (i.e., engineering designs and their technical support) for the application of reinforced fill (embankments), retaining walls, buttresses or other techniques designed to stabilize unstable slopes along the gas pipeline alignment such as Areas of Rapidly Moving Landslide Hazards, Headwalls, and Mapped Landslides. • Information (i.e., engineering designs and technical support) on how PCGP will manage stormwater and groundwater on cut slopes into unstable slopes along the gas pipeline such as Areas of Rapidly Moving Landslide Hazards, Headwalls, and Mapped Landslides. • Information (i.e., engineering designs and technical support) on how PCGP will manage runoff onto fill slopes and manage stormwater on terraces constructed on unstable slopes such as Areas of Rapidly Moving Landslide Hazards, Headwalls, and Mapped Landslides.[56, 57] Moreover, for steep slopes with erosive soils and/or with landslide features, PCGP's proposed revegetation BMPs highlighted in the Erosion Control Revegetation Plan may not be sufficient practices. DEQ reviewed the information presented in PCGP's ECRP and found it lacking in engineering designs and their technical support. PCGP's proposed update to address DEQ's Comment 35 must contain engineering designs and their technical support. These engineering designs and technical support must address site-specific

[56] Hall, David E., Michael T. Long, and Michael D. Remboldt (Editors). 1994. *Slope Stability Reference Guide for National Forests in the United States Volume III*. USDA Forest Service EM-7170-13. Washington, DC

[57] Chatwin, S.C., D.E. Howes, J.W. Schwab, and D.N. Swanston. 1994. *A Guide for Management of Landslide-Prone Terrain in the Pacific Northwest* (2nd Edition). Research Branch of the Ministry of Forests. British Columbia.

constraints encountered as PCGP prepares the erosion and sediment control plan for a NPDES 1200-C Permit and the post-construction stormwater control plan for this proposed gas pipeline. In the development of the Certification Decision, DEQ will not accept qualitative descriptions of BMPs in an updated table as an adequate response to Comment 35.

DEQ photographed an Electrical Power Line right-of-way featured in the October 2, 2018 photo below that is close to the PCGP's proposed pipeline alignment. Within the right-of-way for this power line, two small slides developed after the operators established herbaceous and woody vegetation in the right-of-way. PCGP's BMPs for this area are simply to revegetate the slope with herbaceous vegetation following specifications designed for particular land ownership (i.e., Forest Service, BLM, etc.). This power line right-of-way is just east of the proposed gas pipeline alignment in the Tyee Core Area. The power line right-of-way featured in the photo below is on a slope in an area identified as a mapped landslide in the Statewide Landslide Information Database for Oregon. The power line right-of-way is also located in an area identified as an Area of Rapidly Moving Landslide Hazard in PCGP's Geologic Hazard Map Figure 2 of 27 (See Aerial Photo and Map Figure below). The area where this power line is exhibiting small slope failures and where the proposed gas pipeline alignment is proposed has the following soil types with the following erosion hazard rating:

Dominant soil type(s)

Soil Type	Erosion Hazard Rating	Hydric Rating	Percent Area
Salander silt loam, 50 to 75 percent slopes	Severe	No	32.07 %
Templeton silt loam, 30 to 50 percent slopes	Severe	No	17.97 %
Millicoma-Templeton complex, 50 to 75 percent slopes	Severe	No	9.94 %
Templeton silt loam, 50 to 70 percent slopes	Severe	No	7.96 %
Geisel silt loam, 12 to 30 percent slopes	Severe	No	7.27 %
Templeton-Millicoma complex, 12 to 50 percent slopes	Severe	No	7.00 %
Templeton silt loam, 30 to 50 percent slopes	Severe	No	6.73 %
Nestucca-Willanch complex	Slight	Yes	4.47 %
Geisel silt loam, 12 to 30 percent slopes	Severe	No	2.73 %
Templeton silt loam, 7 to 30 percent slopes	Severe	No	1.22 %

Results from Oregon Explorer's Oregon Rapid Wetland Assessment Protocol and Stream Function Assessment Method Map Viewer for soils in area containing the Electrical Power Line Right-of-Way and a section of PCGP's proposed gas pipeline west of the power line ROW.



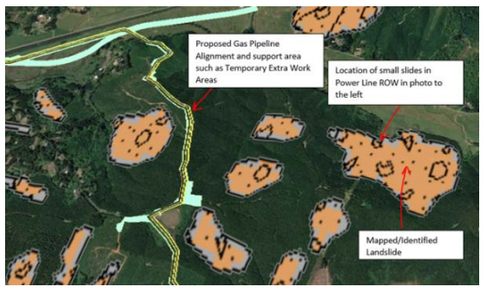




Photo to the left taken by DEQ on October 2, 2018 showing two small slides on a revegetated slope of an Electrical Power Line Right-of-Way. Aerial photo in the middle shows this power line right-of-way featured in the photo to the left relative to identified landslides. The topographical map to the right is PCGP's Geologic Hazard Map of this same area delineating the Areas of Rapidly Moving Landslide Hazards in light brown. This topographical map shows that the Electrical right of way moves down an unstable landscape feature referred to as a convergent headwall discussed in DEQ's review of PCGP's response to Comment 15. This unstable landscape feature also contains soils with a severe erosion potential as noted above.

PCGP is proposing to construct and operate a right-of-way for a gas pipeline at many locations with similar site constraints without providing DEQ with engineering designs developed to address site constraints presenting real risks to water quality over time. DEQ's request for the detailed information noted above is essential to demonstrate that PCGP will construct and operate this gas pipeline preventing sediment discharge in stormwater and preventing landslides discharging debris flows into streams.

Comment 36 of AIR-1 (Post-construction Stormwater Plan for Access Roads/Modeling WQ Impact)

For DEQ's review of PCGP's response to Comment 36, please see DEQ's review of PCGP's response to Comments 26 and 27 provided above. This review for Comment 26 and 27 is also applicable to PCGP's response to Comment 36. Additionally, DEQ does not believe that PCGP's additions to Table A.2-6 in Appendix A.2 of Resource Report 2 will provide DEQ with the level of detail regarding maintenance prescriptions as well as road improvements needed to ensure the use of existing access roads will protect water quality.

First, the road segments presented in the table PCGP references in its response (i.e., Table A.2-6) include only those segments within 100 feet of a water body. DEQ is requesting that PCGP's inventory evaluate all existing access roads hydrologically connected to water bodies. The use of an arbitrary distance of 100 feet

			does not provide DEQ reasonable assurance that PCGP's proposed measures will protect water quality. In AIR-1, DEQ requested the use of a model such as the Geomorphic Road Analysis and Inventory Package (GRAIP) to inventory roads for surface erosion, gully risk, and landslide risk. Using an analytical tool such as GRAIP is a more objective approach rooted in knowledge gained from evaluating the impact of roads on water quality. GRAIP can also identify road segments hydrologically connected to water bodies. To develop its Certification Decision, DEQ will not accept PCGP's focus on only roads within 100 feet of water bodies and a listing of qualitative BMPs in the proposed updated table without the following information: • Objective and quantitative support using a model (e.g., GRAIP or comparable model approved by DEQ) to identify the need for BMPs on road segments hydrologically connected to water bodies. • Engineering designs and their technical support addressing the concerns identified employing this model or analytical tool. • A plan requested in DEQ's *Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines* identifying where these BMPs are located on the landscape, their proposed design, and technical support accompanying this design. Finally, PCGP's response to Comment 36 does indicate that PCGP will propose and, once approved, use an analytical model such as X-DRAIN to evaluate siting alternatives for roads and their potential impact to water quality. This is particularly important for the construction of access roads of significant length in locations with steep slopes, unstable slopes, and erosive soils such as Temporary Access Road 101.70 between Mile Posts 101 and 102 discussed in more detail in DEQ's review of PCGP's response to Comment 26 and 27.
37	Please provide an evaluation of compliance with water quality standards if Jordan Cove Energy Project and Pacific Connector Gas Pipeline will use dredged material in the construction of facilities in uplands and drainage from this dredge material will discharge to waters of the state. This request is to expand upon the Portland Sediment Evaluation	The management of water quality during the construction of the LNG Terminal, APCO 2, and Kentuck, where dredge material characterized in the referenced 2016 PSET letters, will be addressed in respective 1200-C permits. As noted above, JCEP and PCGP are currently preparing respective 1200-C application materials and anticipate submitting	DEQ anticipates PCGP's response in Q4 2018.

	Team's assessment (PSET Letters, January 19, 2016) that considered these constructed upland facilities to be outside federal Clean Water Act jurisdiction for the dredged material suitability determination. However, upland constructed facilities using dredged material are not outside the effects considered in a 401 Water Quality Certification of a FERC application for the construction of a gas pipeline.	applications to DEQ in Q4 2018.	
38	Please provide a post-construction stormwater management plans addressing DEQ's *Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines* for North Point Workforce Housing Project noted in the Part 1, Section 404 Permit Application, Attachment F, Portland Sediment Evaluation Team Letters, Section 404 Permit Application. (If this site is not going to be used for the North Point Workforce Housing, please provide the post-construction stormwater plans for the proposed uses.) In addition, please provide the results of the Phase II	The location of workforce housing has changed from the North Spit (a.k.a. APCO Sites 1 and 2) to the South Dunes site to minimize overall project impacts. The nature of existing soil and groundwater conditions for South Dunes has been characterized in a report titled Data Gaps Investigation Report which was provided to ODEQ in August 2018. JCEP is currently preparing a 1200-Z permit application for the LNG terminal which will include South Dunes and anticipates submitting to ODEQ in Q4 2018.	DEQ anticipates PCGP's response in Q4 2018.

	environmental assessments evaluating the potential for contaminated soils summarized in the "FEIS, Section 4.3.1.3 (Soil Limitations) as noted in these PSET Letters.		
39, 40, 41, 43	Comment 39: The 401 Water Quality Submittal package provides insufficient information concerning the dredging operations for the Marine Slip, Access Channel, and Material Offloading Facility. DEQ used a copy of Resource Report 1 (Section 1.5.5.2) for the development of an environmental Impact Statement to obtain general information on the dredging operation. To direct the reader to additional information, this resource report references to the Dredge Material Management Plan and Resource Report 7 (Section 7.3.2.5). These two additional references provide few details regarding the water pollution control practices in the Marine Slip and Access Channel dredging operations. In compliance with OAR 340-041-0007(1) and -0036, please provide for DEQ review and approval a detailed pollution control plan for constructing the Access Channel and Marine	Additional details regarding the construction of the Marine Slip, Access Channel and Material Offloading Facility is provided in the following areas: • Construction Methodology: Part 1, Attachment A.1 of the 404-10 Application (included as Appendix M of the 401 Water Quality Package, issued to ODEQ on 2/6/18). • Dredge Disposal Location at Roseburg Forest Products: Enclosures 19 - 22 of Part 1, Appendix N-5 of the 401 Water Quality Package issued to ODEQ on 2/6/18. • Section 2.1.1.2, Dredging and Shore Protection at 2-21 - 2-26 of the Applicant Prepared Draft Biological Assessment (APDBA), Submitted 9/14/18. • Sections 3.5.1.3 and 3.5.4.3, Turbidity Effects from Dredging in Coos	**Summary Statement: DEQ anticipates JCEP will submit additional dredging information, including a pollution control plan, in Q1 2019. Please incorporate responses to the questions in the following section in JCEP's pollution control plan.** As JCEP is developing the advanced engineering details regarding dredging execution for Q1 2019, DEQ is providing JCEP with several examples of the questions that arose during DEQ's review of its Section 401 Water Quality submittal and the references JCEP provided in its response to Comments 39, 40, 41, and 43. The information provided in JCEP's response does not change DEQ's request in AIR-1 for a detailed pollution control plan for constructing the Access Channel and Marine Slip. Additionally, in JCEP's response to Comment 43, JCEP must provide information concerning the characterization of dredged material that JCEP proposes to use as fill in various locations. In developing additional information for Q1 2019. DEQ requests JCEP provide this information to ensure that dredged material used as fill does not contaminate the identified disposal sites and lead to pollutant discharge to waters of the state via decant water. In reviewing the recently provided references, DEQ is unable to locate Enclosures 19-22 of Part 1 (Appendix N-5 of the 401 Water Quality Package) that JCEP references in its response to Comment 39, 40, 41, and 43. The references JCEP provided in its response do not provide the detailed pollution control plan requested in AIR-1. To ensure compliance with Oregon's turbidity standard (OAR 340-041-0036), JCEP must demonstrate in the pollution control plan requested in Comment 39 that "all practicable turbidity controls have been applied" during JCEP's dredging activities. JCEP's information in the references noted in its response provide a conceptual approach to minimize turbidity and other pollutant discharges. JCEP has not fully developed the details of all its proposed controls and this creates uncertainty regarding their efficacy. For example, PCGP's proposed pollution control plan for dredging must clearly identify: • The type of pollution controls JCEP will use including its design and specifications. • The specific applications for these controls. • The specific location where JCEP will employ these controls relative to sensitive sites as well as other landscape features (e.g., drainage pattern, vegetation, etc.). • The maintenance schedule for each control. • A monitoring plan for evaluating the efficacy of all proposed controls and compliance with the turbidity standard.

	Slip that provides at least the following information: • A detailed description of the sequencing of all construction dredging activities associated with the in-water Marine Slip construction, Access Channel construction, and Material Offloading Facility construction. <u>Comment 40</u>: • A site map of these construction actions and location of all structural controls to protect water quality. The site maps must include the following information: o A delineation of the areas in the Marine Slip that Jordan Cove will dry excavate and dredge. o Please include the pollution controls for the dry excavation activities in response to the request above in an Erosion and Sediment Control Plan for a NPDES 1200-C Permit Application. o The location of the natural earthen berm	Bay on North American Green Sturgeon at 3-316 – 3-320) of the APDBA, Submitted 9/14/18. • Section 3.5.4.3, Turbidity Effects from Dredging in Coos Bay on Oregon Coast Coho Salmon at 3-522 – 3-525 of the APDBA, Submitted 9/14/18. Further advanced engineering details regarding dredging execution will be provided to ODEQ in Q1 2019.	For example, the Construction Methodology in Part 1 (Attachment A.1) of JCEP's submittal notes the following: *To the extent feasible, dredging of the access channel and slip will be performed with a CS dredge to minimize turbidity.* *The hydraulic dredge transport pipeline for hydraulic transportation of excavated materials (including the decant water return line) will follow the shoreline of the site of the Roseburg Forest Products chip loading facility and will not result in additional land disturbance.* *At all points along the pipeline route where the slurry pipeline could rupture and the contents could potentially enter the waters of Coos Bay, secondary containment will be provided around the slurry pipeline.* *Eelgrass and estuarine habitat disturbances resulting from the pipeline will be minimized by spanning these eelgrass areas or avoidance through the use of temporary structures or floats.* *Material removed by the hydraulic CS dredges will be sent via a submerged and/or floating pipeline to approved disposal sites, where dewatering would occur.* *Dredged or other excavated material will be placed on areas having stable slopes, and will be prevented from eroding back into waterways and estuarine wetlands.* This information raises the following questions for DEQ that must be addressed in a detailed pollution control plan as DEQ develops its Certification Decision: • When a Construction Suction (CS) dredge is not feasible, what other dredge will JCEP use as an alternative? • What control(s) will JCEP use to minimize pollutant discharge when using various dredging equipment? What are the designs and specifications for these controls? How and where will JCEP employ these controls? How will JCEP monitor their effectiveness for complying with the turbidity standard? • What controls – including designs and specifications – will JCEP use to prevent a spill from the hydraulic dredge transport pipeline? Where specifically will JCEP locate these controls on the landscape? What is their containment capacity? Is this capacity sufficient for anticipated spills? Does JCEP have contingency controls to protect sensitive resource should the proposed containment fail?

	separating the upland area of the Marine Slip that Jordan Cove will dry excavate from the remaining portion of the Marine Slip adjacent to the bay that Jordan Cove will dredge. o The location of the in-water dredging for the Access Channel and Material Offloading Facility. o The location of the slurry/hydraulic transport pipeline(s) for the transportation of the dredged material. o The location of all containment systems and/or spill response materials. <u>Comment 41</u>: • A construction dredging plan providing the following: o Dredging schedule for the Marine Slip, Access Channel, and Material Offloading Facility. o Type (e.g., cutter-suction dredging) and number of dredging plants that Jordan Cove		• What controls does JCEP propose as a contingency should the control for spanning the eelgrass and estuarine habitat fail? • If JCEP uses temporary structures or floats to minimize eelgrass and estuarine habitat disturbances, what are these structures/floats, what are their designs and specifications? Does JCEP have contingency controls should the temporary structures/floats fail? • What is the secondary containment including its designs and specifications for the submerged and/or floating pipeline for material removed by the hydraulic CS dredges? • Where is the specific location of the containment system for the placement of dredge material including information on key landscape features such as drainage patterns and the location of freshwater and estuarine wetlands, freshwater streams, salt-tolerant and non-salt tolerant vegetation? Where is the drainage system and the discharge points for decant water? Is the decant water saline or non-saline? What are the receptors for this decant water? For example, in JCEP's response, JCEP refers DEQ to Section 2.1.1.2 (Dredging and Shore Protection) from the Applicant Prepared Draft Biological Assessment for additional information. The draft Biological Assessment notes the following: *Dredging and Shore Protection* *For the capital dredging, about 5.7 million cubic yards (mcy) of material would be removed to create the slip basin and access channel. Of this, about 1.4 mcy would be dry excavated and about 4.3 mcy would be wet dredged. It is proposed that excavated and dredged material be distributed between Ingram Yard, the Roseburg site, the South Dunes site, and the Kentuck Project site.* *During the "fresh water" construction phase of the slip about 2.2 mcy of material would be dredged in the pocket behind a temporary construction berm. During the "salt water" construction phase of the slip, about 0.7 mcy (slip and berm) of material would be dredged during removal of the temporary construction berm and finish dredging of the marine slip, of which about 0.3 mcy may be used for the Kentuck Project. It is also possible that the 0.3 mcy required to facilitate the Kentuck Project could be sourced from the salt water dredge taken from the access channel between the FNC and the proposed LNG Terminal marine slip. A total of about 1.4 mcy of material would be dredged from the bay during construction of the access channel.*

	will use during the dredging of the Marine Slip, Access Channel, and the Material Offloading Facility. o A description of water pollution controls (operational controls, structural such as floating turbidity curtain etc.) that Jordan Cove will use in dredging and transporting dredged material. o Detailed spill response procedures including all emergency shut-off procedures and procedures for a spill associated with the hydraulic transport pipeline. o A description of all operational and structural water pollution controls for breaching and removing the natural earthen berm noted in Section 1.5.5.4 of the Jordan Cove's Resource Report 1. o A dredging monitoring plan for DEQ review and approval to evaluate the		*The northern slip face would be armored after the slip is dredged but before the earthen barrier berm is removed. The barrier berm would remain unarmored, because it would be removed during the later stages of slip construction.* *The estimated excavated and dredged material volumes and their proposed placement location are summarized in table 2.1.1-1 and further discussed in subsequent sections below.* This information raises the following questions for DEQ that must be addressed in a detailed pollution control plan as DEQ develops its Certification Decision: • Where specifically are the disposal sites for the dredged material deposited in the following locations: o Ingram Yard Site. o Roseburg Site. o South Dunes Site. o Kentuck Project Site. o And all other sites. • How will JCEP manage the fresh and/or saline decant water if discharged from these sites to the surrounding landscape? • How will the management of the decant water comply with Oregon's biocriteria (OAR 340-041-0011) if this decant water is discharged to waters of the state such as fresh or estuarine wetlands? • What specific controls will JCEP use to remove the temporary construction berm to ensure compliance with the Oregon's turbidity standard (OAR 340-041-0036) and how will JCEP monitor compliance with this standard? • What controls will JCEP use to prevent no more than a ten percent increase in turbidity when the temporary construction berm is removed and JCEP dredges the Access Channel? • Where specifically will JCEP locate the structural controls during the dredging of the Access Channel? In the development of AIR-1, DEQ reviewed the information related to the dredging of the Marine Slip, Access Channel, and Material Offloading Facility in the Dredge Material Management Plan. This information also does not provide DEQ with the level of detail to evaluate the efficacy of JCEPs proposed practices to ensure compliance with the turbidity standard. For example, this plan identifies the Ingram Yard as a disposal site for the dredge material as follows:

	effectiveness of all proposed controls. Comment 43: In compliance with OAR 340-041-0007(1) and -0036, please provide for DEQ review and approval a detailed water pollution control plan presenting all practicable operational and structural control techniques that Jordan Cove Energy Project will employ when constructing the Material Offloading Facility east of the opening for the slip at the Liquefied Natural Gas Terminal. Please include in this plan a characterization of the fill material Jordan Cove will use to construct this facility that evaluates this fill material for contamination.		*Section 4.4.4 Ingram Yard* *Disposal Methods* *Excavated and dredged material from the slip and access channel will be transported to the site in dump trucks. Material will be placed and compacted to meet project specifications. Additionally, hydraulically dredged material may be transported via pipeline and discharged within temporary containment berms, allowing material to settle and dewater. The berms will be constructed using existing on-site material initially, followed by incoming dredge material. The disposal methodology will be similar to that listed in Section 4.4.1 above. Decant water will be returned to the dredge as needed pending final design.* *Availability* *The Ingram Yard disposal site is within the JCEP project area and, therefore, availability of the site for dredged material disposal can be confirmed. JCEP also has access to the Roseburg Site and will manage the placement of material at this site.* The sampling of information in this plan raises the following questions for DEQ that JCEP must address in a detailed pollution control plan: • Will JCEP include the access roads for the dump trucks hauling dredged material and any needed erosion and sediment controls in the plan required for a NPDES 1200-C Permit? • Will JCEP place dredged material from a pipeline conveying dredged material to Ingram Yard and, if so, will JCEP provide secondary containment for this pipeline conveying dredged material? • Where will JCEP locate the containment berms for decanting water from dredged material? How will JCEP manage decant water from dredging to protect non-salt or salt tolerant vegetation in fresh and estuarine wetlands and water ways to comply with the Oregon's biocriteria (OAR 340-041-0011)? The above questions represent a sample of the detailed information DEQ is seeking from JCEP as it develops a detailed pollution control plan for DEQ's review and approval during the development of a Certification Decision.

42	• A maintenance dredging plan providing the following: o A site map containing the following: ▪ The location of all areas Jordan Cove will dredge. ▪ The location of the slurry/hydraulic transport pipeline(s) for the transportation of the dredged material. ▪ The location of all containment systems and/or spill response materials. o Dredging schedule. o Type (e.g., cutter-suction dredging) and number of dredging plants that Jordan Cove will use during the maintenance dredging. o A description of water pollution controls (operational controls, structural controls such as floating turbidity curtain etc.) that Jordan Cove will use and the location of all structural controls to minimize the migration	The JCEP Project detailed in the 404-10 application encompasses the dredging required for the Project (Appendix M of the 401 Water Quality Package, submitted to ODEQ on 2/6/18). Any future maintenance dredging activities will be requested under a separate 404-10/401 permit application and will be subject to a separate certification from ODEQ for compliance with section 401 of the CWA, if and when, such activities are required.	Maintenance dredging for the slip and access channel is estimated at 115,000 cy every three years for the first 10 years of operation and about 160,000 cy every five years thereafter. DEQ expects JCEP to apply for and receive authorization from the Army Corps of Engineers and section 401 water quality certification from DEQ prior to undertaking maintenance dredging activities.

	of turbid water from maintenance dredging activities, o Detailed spill response procedures including all emergency shut-off procedures and procedures for a spill associated with the hydraulic transport line. o A dredging monitoring plan for DEQ review and approval to evaluate the effectiveness of all proposed controls		
44	DEQ will perform this review upon the receipt of information requested above. In addition to these requests for information, please provide to DEQ an application for an Individual Industrial Water Pollution Control Facility Permit for the proposed discharges of the hydrostatic testing wastewater. Please provide the location of each point of discharge. If Jordan Cove Energy Project or Pacific Connector Gas Pipeline expects to discharge washwater to the ground from vehicle and equipment washing, please provide an application for a Water Pollution Control Facility Individual Permit for these	PCGP is currently preparing a Water Pollution Control Facility permit application for hydrostatic test water discharges during the construction of the pipeline and will submit to ODEQ in Q4 2018. PCGP is also preparing a 1200-C permit application for the construction of the pipeline. PCGP anticipates submitting the application to ODEQ in Q4 2018. The Erosion Control and Revegetation Plan (ECRP) provides details for equipment cleaning in Section 12.4 (pdf page 499 in Attachment A to Appendix B to Part 2 of the JPA) and a BMP typical for	**Summary Statement: PCGP cannot use an NPDES 1200-C General Permit and any plan associated with this stormwater permit to cover the discharge of wash water during pipeline construction. In the section below, DEQ includes a strategy for PCGP to manage wastewater discharges during pipeline construction in compliance with state rules. State rules for developing a Certification Decision require that PCGP's submittal demonstrate compliance with the effluent limitations of the NPDES 1200-C Permit. In the section below, DEQ identifies three potential wastewater discharges from PCGP's proposed actions that will require wastewater permit(s).** NPDES 1200-C Permit does not allow discharge of wastewater to waters of the state or to land. The NPDES 1200-C General Permit contains the following condition from Schedule A.6: *6. Prohibited Discharges* *Discharges of the following are not authorized by this permit:* *a. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;* *b. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;* *c. Soaps or solvents used in vehicle and equipment washing.* *d. Concrete truck wash-out, hydro-demolition water, and saw-cutting slurry.*

	discharges. Please provide the location of each point of discharge.	these types of operations as depicted and described in Drawing 3430.34-X-0020 in Attachment C to the ECRP). Note #8 in the drawing states, "Water used for cleaning shall not be allowed to flow into any waterbody, wetland or irrigation canal/ditch."	To manage the following discharges in compliance with state rules and permit requirements, PCGP must seek coverage for these discharges under a separate application for a Water Pollution Control Facility Individual Permit: • Hydrostatic test water • Vehicle and Equipment wash water • Trench dewatering DEQ is currently researching the feasibility of covering these three discharges under one WPCF Individual Permit.
45	DEQ will perform this review upon the receipt of information requested elsewhere in this matrix. In addition to these requests for information, please provide a copy of the results from the first phase (i.e., desktop data review with maps) of the Shallow Groundwater Study (Revised August 24, 2017 by GeoEngineers) showing suspected locations of shallow groundwater along the pipeline right-of-way. Please expand the maps proposed in this study to include suspected locations of shallow groundwater along the proposed route for the 25 miles of Temporary or Permanent Access Roads. When complete, please provide the results from the implementation of the subsurface exploration plan proposed for phase two of this study with an analysis of how the construction and permanent right-of-way will impact	The purpose of this plan was to aid pipeline design to account for buoyancy in areas of shallow groundwater. Please see the ECRP for how trench dewatering in shallow groundwater areas will be filtered and released for infiltration to minimize offsite sedimentation.	**<u>Summary Statement</u>: DEQ provides the rationale for the information requested below. As discussed in DEQ's review of PCGP's response to Comment 44, PCGP will need to submit a WPCF Permit Application to cover the trench dewatering discharge.** As noted in DEQ's review matrix from AIR-1, the intent of DEQ's Comment 45 is to determine compliance with OAR 340-048-0042(2)(e) when reviewing PCGP's proposed activities. The goal of DEQ's review is to determine if PCGP's proposed actions have the potential to modify groundwater quality and how these potential modifications affect surface water quality. Given the presence of Temperature Total Maximum Daily Loads and the influence of the pipeline's construction on compliance with these TMDLs, DEQ has concerns regarding PCGP's approach to mitigate the capture of shallow groundwater in the trench for the pipeline. DEQ will need this information to determine compliance with OAR 340-048-0042(2) (e.g., Section 303 of the Clean Water Act). In its response to Comment 45, PCGP indicates that the purpose of the Shallow Groundwater Study was to aid in pipeline design to account for buoyancy in areas of shallow groundwater. PCGP submitted this study in its 401 Water Quality Certification package to support the certification of the pipeline's construction and operation. When studies are included in a submittal, DEQ expects these studies to encompass water quality concerns in addition to, for example, pipeline stability concerns noted in PCGP's response. Both are important, and PCGP must address both in its submittal package. PCGP's referral to the submittal's Erosion Control and Revegetation Plan does not provide DEQ with sufficient detail to evaluate PCGP's effort to mitigate the capture of shallow groundwater during pipeline construction. DEQ requires the following information from PCGP: • Please provide a copy of the results from the first phase of the Shallow Groundwater Study showing suspected locations of shallow groundwater along the pipeline right-of-way. • Indicate if these areas of suspected shallow groundwater are in areas where PCGP proposes Temporary and Permanent Access Roads and, if so, propose mitigation measures to manage shallow groundwater.

	shallow groundwater as well as the construction of any proposed new roads. Moreover, please propose practices for how Pacific Connector Gas Pipeline will avoid, minimize, and, if necessary, mitigate the impacts identified in the Shallow Groundwater Study noted above.		• Provide an analysis demonstrating that the evapotranspiration losses from PCGP's two proposed mitigation approaches will not be significant to affect surface water quality (i.e., temperature) and will not require a third mitigation option such as discharging to an underground injection control device. • Identify PCGP's criteria for using the proposed mitigation measure of filter fabric/hay bales and the mitigation measure using a filter bag. • Provide the specific location for where PCGP will site all trench-dewatering measures. • Provide performance standards for mitigation measures to avoid overflow, prevent runoff, etc. In further reviewing PCGP's submittal, DEQ also has concerns about compliance with Oregon Water Rights Law and Division 33 rules (OAR 690-033) to administer this statute. As discussed above in DEQ's review of PCGP's response to AIR-1, DEQ is concerned that PCGP's proposed trench dewatering approach may cause landslides on unstable slopes by its effect on soil pore pressure depending on its location of discharge. To develop a Certification Decision, DEQ needs the following information from PCGP: • Please provide the geo-engineering analysis indicating that the discharge from the trench dewatering measure will not cause a landslide/debris flow when these measures are located above or on unstable landscape features such as headwalls, Areas of Potential Rapidly Moving Landslide Hazard, mapped landslides, steep slopes (greater than 30%), and highly erosive soils. Additionally, PCGP must submit a Water Pollution Control Facility Individual Permit Application to DEQ to cover the discharge from trench dewatering as required by OAR 340-045-0015(1)(a). DEQ considers this groundwater seepage into the pipeline's trench wastewater once it contacts one or more of the following: • Sediment from trench construction and potential pollutants (heavy metals such as arsenic, nutrients). • Pollutants arising from construction operations (e.g., oil and grease, welding slag, chemical coatings, etc.).
46	Please provide signed Land Use Compatibility Statements from Coos, Douglas, Jackson, and Klamath Counties.	Signed LUCS from Coos, Douglas, Jackson, and Klamath Counties will be provided in Q4 of 2018.	DEQ is awaiting PCGP's response.

Other References

Benda, L.E., Veldhuisen, C., Miller, D.J., and Rodgers-Miller, L. 2000. *Slope instability and forest land managers: A primer and field guide*. Seattle, Wash., Earth Systems Institute, 74 p.
Elliot, William J. and Laurie M. Tysdal. 1999. Understanding and Reducing Erosion from Insloping Roads. Journal of Forestry. 97(8):30-34
Hearn, G.J. 2011. Slope Engineering for Mountain Roads. Geological Society Engineering Geology Special Publication No. 24

Oregon
Kate Brown, Governor

Department of Environmental Quality
Western Region Eugene Office
165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838
FAX (541) 686-7551
OTRS 1-800-735-2900

March 11, 2019

Derik Vowels
Jordan Cove LNG, LLC
Consultant, Lead Environmental Advisor
111 SW 5th Ave.,
Suite 1100,
Portland OR 97204

Re: Additional Information Request – Waterbody Crossings
Jordan Cove Energy Project (FERC Project No. CP17-494)
Pacific Connector Gas Pipeline (FERC Project No. CP17-495)
U.S. Army Corps of Engineers (Project No. NWP-2017-41)

Dear Mr. Vowels:

The Oregon Department of Environmental Quality is currently reviewing an application from Jordan Cove LNG, LLC for Clean Water Act Section 401 water quality certification for a Section 404 permit from the U.S. Army Corps of Engineers necessary for construction of the Jordan Cove Energy Project and Pacific Connector Gas Pipeline.

Section 401 of the Clean Water Act bars federal agencies from issuing a license or permit for an action that may result in a discharge to Oregon waters without first obtaining water quality certification from DEQ. DEQ anticipates Jordan Cove's construction and operation will require authorizations from multiple federal agencies, including but not limited to a Section 404 permit from the U.S. Army Corps of Engineers and authorizations from the Federal Energy Regulatory Commission pursuant to the Natural Gas Act. DEQ is conducting a comprehensive section 401evaluation of the project's direct, indirect and cumulative effects on water quality. DEQ expects to develop a single certification decision based on this comprehensive evaluation of the project that will apply to the Corps and FERC decisions on the project.

DEQ is processing the applications pursuant to Section 401 of the Clean Water Act, 33 United States Code §1341, Oregon Revised Statutes 468B.035 through 468B.047, and DEQ's certification rules found in Oregon Administrative Rules 340, Division 048. To certify the project, DEQ must have a reasonable assurance that the proposed project, as conditioned, will comply with Sections 301, 302, 303, 306 and 307 of the Clean Water Act, Oregon water quality standards, and any other appropriate requirements of state law.

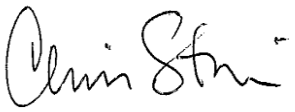
DEQ is reviewing the application submitted Feb. 6, 2018, by David Evans and Associates, Inc. on behalf of Jordan Cove. The information described in the attachments to this correspondence is necessary to complete DEQ's analysis of the project's compliance with applicable standards. Please provide a schedule for a complete response to this additional information request. Please forward your responses to:

Christopher Stine
Oregon Department of Environmental Quality 165
East 7th Avenue, Suite 100
Eugene, Oregon 97401

You may reference previously submitted documents to support your responses to the requests in Attachment A.

DEQ may request additional information as necessary to complete its analysis and fulfill its obligations under state and federal law.

If you have any questions, please contact me directly at 541-686-7810, or via email at stine.chris@deq.state.or.us.



Christopher Stine, PE
Water Quality Engineer

ec: Mike Koski, mkoski@pembina.com
Natalie Eades, neades@pembina.com
Shannon Luoma, sluoma@pembina.com
Keith Andersen, Dave Belyea, Steve Mrazik, Chris Bayham, Mary Camarata, Sara Christensen/DEQ
Tyler Krug, Tyler.J.Krug@usace.army.mil
John Peconom, John.Peconom@ferc.gov
Sean Mole, sean.mole@oregon.gov
FERC Dockets: CP17-494-000, CP17-495-000

ATTACHMENT A

Jordan Cove Energy Project / Pacific Connector Gas Pipeline Additional Information Request

Horizontal Directional Drilling

1. In September 2017, Pacific Connector submitted Horizontal Directional Drilling Feasibility Analysis reports for the proposed Coos Bay East Crossing and Coos Bay West Crossing. According to the reports, the "conclusions should be considered preliminary pending completion of a subsurface exploration program." Please provide a status update on geotechnical drilling and a schedule for finalizing the reports.
2. Pacific Connector describes two options (i.e., single Horizontal Directional Drilling Option and a Dual Horizontal Directional Drilling Option) to accomplish the Coos Bay East Horizontal Directional Drilling crossing. DEQ expects the design criteria supporting the selected procedure will be presented in the final design report. DEQ requests Pacific Connector address the following considerations in determining their proposed methodology.

   <u>Single Horizontal Directional Drilling Option</u>

   a) The single option places the bottom tangent at elevation -190 feet mean sea level. Pacific Connector expects the underlying geology at this depth will consist of competent bedrock, which is deemed critical to the feasibility of the single option. Please describe whether alternate design measures would allow use of the single option if the geotechnical investigation concludes the underlying geology does not consist of competent bedrock.

   <u>Dual Horizontal Directional Drilling Option</u>

   A final Horizontal Directional Drilling design report that proposes the Dual Horizontal Directional Drilling Option should address the following issues.

   b) The dual option relies on a shared tie-in workspace located in a tidal flat area south of Glasgow Point. Describe how the workspace will be isolated from open water during Horizontal Directional Drilling installation.

   c) The likelihood of inadvertent surface returns of drilling fluid is highest near entry points where drilling pressures can exceed the shear strength and pressure from overburden soils. Describe what special contingency measures will be employed to contain drilling fluids in this inter-tidal environment.

   d) What is the proposed final depth below surface of the installation at the tie-in location? What measures, if any, are proposed to ensure the pipeline remains buried for the life of the project?

   e) Describe the scope of open-water activities such as inter-tidal dredging for barge access to the shared tie-in workspace.

   f) Describe what procedures Pacific Connector will employ to avoid, minimize, or

mitigate the effects of this option on water quality.

3. The Horizontal Directional Drilling Mud Contingency Plan states a berm may be built around the drilling site and hay bales or silt fences may be placed on the river side of the drilling area. Because inadvertent surface returns may reasonably be expected near entry locations, Pacific Connector should identify measures that will be employed and maintained to contain fluids during installation.
4. Inadvertent fluid returns to surface waters are unacceptable. Pacific Connector must develop and implement an Horizontal Directional Drilling plan to continuously monitor engineering conditions during installation and provide for a rapid response in the event fluid loss is confirmed or suspected. The plan should establish procedures to monitor drilling pressure, fluid circulation, pilot hole location, axial loads, visual monitoring or other parameters deemed appropriate to interpret formational or surface loss of drilling fluid.

Waterbody Crossing Plans

The effects of pipeline construction across waterbodies can affect the physical, biological and chemical integrity of the aquatic environment. Pacific Connector will utilize dry open cut methods (fluming, dam and pump, or diverted open cut) on most of the proposed 326 waterbody crossings. Open cutting of streambeds can have direct, indirect and cumulative effects on water quality, habitat and stream hydrology. Changes to channel geometry may cause streams to reestablish equilibrium. These actions can increase sedimentation, reduce water quality, decrease habitat complexity and modify channel hydrology. Because, the effects of open trench waterbody crossings can propagate upstream, downstream, and laterally these impacts, may not be confined to the project area.

Waterbody crossing plans must describe site-specific construction procedures that Pacific Connector will undertake at each proposed crossing. The plans should identify the proposed crossing methodology, dewatering procedures, dewatering discharge sites, spoils placement locations, mobilization and demobilization, and monitoring procedures. The plans should be developed in consideration of local characteristics such as anticipated flow, local, geology, gradient, sensitive environmental conditions, slope stability at dewatering discharge points or other environmental factors that may influence the design and implementation of waterbody crossings. Pacific Connector should describe procedures for crossings that may require unique or challenging procedures (e.g., blasting consolidated rock). Last, site-specific crossing plans must address the removal of dams, dewatering locations, temporary bridges, or other temporary construction elements and include procedures to avoid or minimize sediment mobilization or turbidity

Waterbody crossing plans must also describe site-specific plans to restore each of the proposed waterbody crossings. Each plan must include sufficient local-scale information to provide an accurate baseline assessment of pre-construction environmental and ecological conditions to guide the design of the post-construction restoration. Each stream restoration plan must contain

site-specific designs and specifications to ensure PCGP fully mitigates the impact of open cut trenching in each stream and protects the beneficial uses. The data generated from the information requested below will support the development of site-specific waterbody crossing plans.

To develop a waterbody crossing plan for each open trench cut stream crossing, Pacific Connector must document and use the site-specific field data described below.

Hydraulic Assessment

Pacific Connector must conduct a hydraulic analysis on each proposed waterbody crossing. Site-specific information of local discharge is required to demonstrate that proposed pumping and fluming designs can adequately bypass anticipated flows. Pre-development local hydrology must also be characterized to inform stream restoration actions.

Pacific Connector should conduct the analysis using one of the following methods:

- Rational Method (for drainages up to 200 acres)
- NRCS Peak Flow Method using HydroCAD (for drainages larger than 200 acres)
- USGS StreamStats for Oregon

The hydraulic analysis should provide the following information:

- Drainage area above each proposed crossing
- Peak flow estimate at the time of construction
- Bankfull width, stage, and corresponding discharge
- Average gradient within the temporary crossing easement
- Mean two-year, five-year and 10-year discharge and velocity at the proposed crossing

Based on the hydraulic conditions at each crossing, Pacific Connector should confirm the design pumping capacity of the proposed fluming or pumping bypass system can sufficiently transfer maximum anticipated flows around the work area. Pacific Connector should further describe alternate or contingency methods in the event field conditions prevent successful dewatering. Waterbody crossing plans must include engineering data to support design criteria of proposed conveyance structures based on gradient, bypass length and anticipated flow.

Pacific Connector must also measure bankfull width, stage, and corresponding discharge at each crossing. Recognizing the bankfull width at each crossing is critical in designing and implementing restoration plans that maintain the geomorphological function of the stream segment.

Topographic Survey of Stream Channel

Restoring a stream's natural form and function requires a topographic survey of the pre-construction stream channel and floodplain form.[1] Pacific Connector provided this information for the South Umpqua Number 2 River crossing. However, this information is lacking for other crossings involving open trench cutting. This survey information will assist in the reconstruction of the natural stream channel. At minimum, Pacific Connector should include in each topographic survey a longitudinal survey of the stream profile, top and bottom of banks, and the top and bottom floodplain slopes. This topographic information should also include geometric data downstream and upstream of the pipeline crossing to assist the restoration design and to identify potential interactions with adjacent reaches.

Stream Function Assessment

Trenched waterbody crossings can alter stream function in ways that negatively affect aquatic habitats and ecosystems. Potential effects may include modified stream channel geometry, reduced habitat complexity, reduced streambank stability, impaired benthic production and increased sedimentation.

Pacific Connector must conduct a pre-construction ecological assessment of each waterbody crossing using the methodology presented in Stream Function Assessment Method for Oregon Version 1.0.[2] SFAM was developed jointly by EPA and Oregon Department of State Lands. The method provides a scientifically supported rapid assessment tool for gathering information on the functions and values associated with wadeable streams that may be subject to regulatory jurisdiction under Section 404 of the Clean Water Act and Oregon's Removal-Fill Law.

The assessment is needed to establish a pre-development ecological baseline and to inform site-specific practices necessary to mitigate the environmental effects of the action. Pacific Connector can also use this assessment method for post-construction monitoring of Pacific Connector's stream restoration actions over time.

More information can be found at:
https://www.oregon.gov/dsl/WW/Pages/Resources.aspx#assessment.

Biological Assessment

Oregon water quality rules prevent discharges to waters of the state that may reduce support for beneficial uses or cause changes in residential biological communities. To establish pre-construction conditions, Pacific Connector must conduct a benthic macroinvertebrate assessment to comply with the Biocriteria water quality standard (Oregon Administrative Rule 340-0410-0011). Benthic communities form the basis for food webs that support aquatic life and are susceptible to changes in sedimentation. Oregon DEQ has developed procedures to characterize

[1] Yokum, S.E. 2018. Guidance for Stream Restoration. Technical Note TN-102.4. National Stream Aquatic Ecology Center. USDA Forest Service

[2] Stream Function Assessment Method for Oregon Version 1.0. June 2018. U.S. Environmental Protection Agency and Oregon Department of State Lands. EPA 910-D-18-001.

the health of benthic communities to comply with this standard. Using procedures found in Methodology for Oregon's 2018 Water Quality Report and List of Water Quality Limited Waters,[3] Pacific Connector must perform pre-development benthic surveys using to the PREDictive Assessment Tool for Oregon (PREDATOR). The results of the PREDATOR surveys will enable DEQ to evaluate the direct, indirect, and cumulative effects of the action caused by stream channel modification, habitat loss, sedimentation or other potential project effects.

Streambed Material Assessment

Pacific Connector must characterize bed material composition at each trenched waterbody crossing. Substrate composition is critical to stream hydrology and provides interstitial refuge for egg incubation. Characteristics can vary considerably based on gradient, stream channel geometry, watershed hydrology and other factors. For this reason, site-specific knowledge of local bed material characteristics are necessary to inform restoration and mitigation actions following construction.

For streambeds characterized by unconsolidated substrates, Pacific Connector must conduct a pre-construction quantitative assessment of substrate material. The assessment should address the particle size, sorting, vertical variability and distribution of material.

Open cut trenches in bedrock-dominated stream channels are susceptible to upstream propagation of knickpoints created by joints in the stream's bedrock.[4] Knickpoint propagation in bedrock-dominated streams can cause changes in stream geomorphology and, potentially, barriers to fish migration. Pacific Connector should describe in detail how bedrock-dominated stream channels will be restored to prevent the creation of a joint in the bedrock that leads to the formation and propagation of a knickpoint in these channels.

Habitat Assessment

Naturally occurring material such as large wood and boulders provide gravel recruitment, cover for juvenile fish, thermal refugia, and hydraulic control. Pacific Connector must conduct a detail inventory of aquatic habitat features within the project area of each proposed crossing. Habitat features identified during this predevelopment inventory should be used to ensure restoration efforts result in no net loss of habitat function or complexity. In its Stream Crossing Risk Analysis document, Pacific Connector provides only general descriptions to address, for example, the reinstallation of boulders to maintain an existing bed profile and cascade/pool morphology during the stream restoration process. However, Pacific Connector's habitat assessments must capture such habitat features as noted above in sufficient design detail so that the construction contractor has clear direction in site-specific drawings to restore these habitat

[3] Methodology for Oregon's 2018 Water Quality Report and List of Water Quality Limited Waters, November 2018. Oregon Department of Environmental Quality: https://www.oregon.gov/deq/FilterDocs/ir2018assessMethod.pdf.
[4] Selander, Jacob. 2004. Processes of Knickpoint Propagation and Bedrock Incision in the Oregon Coast Range. Department of Geologic Sciences. University of Oregon

features during the stream restoration process.

Water Quality

Site-specific water body crossing plans should address the following water quality issues at each crossing proposed:

- Oregon DEQ may issue a section 401 water quality certification that allows the numeric turbidity criteria to be exceeded provided all practicable turbidity control techniques have been applied. Please identify what engineering controls (e.g., settling, filtration, flocculation, etc.) are proposed to reduce turbidity in streams during mobilization and removal of construction equipment.

- Describe procedures to backfill trenches in a manner that maintains predevelopment streambed material and habitat function. For example, backfilling procedures must clearly address how Pacific Connector will prevent the restored stream flow from moving completely into the subsurface of restored streambed material and creating a fish passage barrier. Additionally, crossing plans should clearly describe how fill material will be placed to prevent streambed and bank scour, sedimentation, and channel modification.

- For trench dewatering structures, please identify how sediment and fines removed from the isolated work area will be permanently managed following work completion.

Comments

1. Appendices C.2 and D.2 (Stream Fluming Procedures, Dam and Pump Procedures) of Resource Report 2 state, "Turbidity sampling will be conducted during all . . . crossings in accordance with the Stormwater Pollution Prevention Plan." DEQ cannot find the Stormwater Pollution Prevention Plan in Pacific Connector's application submittal to evaluate the proposed turbidity sampling.
2. Fluming and dam and pump procedures rely on upstream and downstream dams to isolate temporarily work areas during construction activities. Oregon's fish passage requirements found in Oregon Revised Statute 509.585 prevent activities that impede the volitional movement of fish. Pacific Connector should describe how proposed fluming and dam and pump procedures will comply with Oregon fish passage law.
3. Stream Classifications in Table A.2-2 in Resource Report 2 reference methods established by Oregon Department of Forestry and the Northwest Forest Plan. DEQ's biologically based numeric criteria are based on fish distribution maps developed by Oregon Department of Fish and Wildlife. Please consult with ODFW to identify fish use and classifications at the proposed waterbody crossing locations.
4. Appendix C.2 of Resource Report 2 (Fluming Procedures) indicates that scrap metal pipe may be used to construct flumes and that pipes may be steam-cleaned to remove oil and grease. Please identify on the crossing plans where Pacific Connector will discharge this wash water. DEQ expects that Pacific Connector will apply for and obtain coverage under the appropriate permit (i.e., either Water Pollution Control Facility or National

Pollutant Discharge Elimination System) based on the proposed activity.

5. Figure 8 of Appendix C.2 of Resource Report 2 (Fluming Procedures) illustrates procedures to divert stormwater runoff from the construction easement into the isolated stream section. Please note that NPDES 1200-C General Permit does not authorize the discharge of stormwater to waterways. Pacific Connector must control runoff from upland work areas to prevent discharge to stream channels.

Oregon
Kate Brown, Governor

Department of Environmental Quality
Western Region Eugene Office
165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838
FAX (541) 686-7551
TTY 711

March 13, 2019

Derik Vowels
Jordan Cove LNG, LLC
Consultant, Lead Environmental Advisor
111 SW 5th Ave., Suite 1100,
Portland OR 97204

Re: Additional Information Request #4
Jordan Cove Energy Project (FERC Project No. CP17-494)
Pacific Connector Gas Pipeline (FERC Project No. CP17-495)
U.S. Army Corps of Engineers (Project No. NWP-2017-41)

Dear Mr. Vowels:

The Oregon Department of Environmental Quality is currently reviewing an application from Jordan Cove LNG, LLC for Clean Water Act section 401 water quality certification for a Section 404 permit from the U.S. Army Corps of Engineers necessary to construct the Jordan Cove Energy Project and Pacific Connector Gas Pipeline (collectively, "the Project"). DEQ is evaluating the land use compatibility statements and application materials related to land use to determine if they meet state law requirements.

DEQ requests the following supplemental information on land use.

1. Provide a map of the Pacific Connector Project showing zoning designations and overlays applicable to the project.
2. In Resource 8, Jordan Cove provided maps with zoning designations. Have these maps been update to reflect any changes to land use and to include supplemental project updates (i.e., worker park and ride locations, rock apron to arrest channel mitigation, eelgrass donor and embayment areas, and mitigation sites)? See Jordan Cove Energy Project, Resource 8, Figures 8.1-3a and -3b.
3. Provide an exhibit that identifies the specific provisions of the local land use plans and implementing regulations applicable to the activity and a discussion of the potential direct or indirect relationship to water quality of each finding or land use provision per OAR 340-048-0020(2)(i).
4. Provide updated analyses for capability determinations that date back to 2015. Pacific Connector provided analyses in 2015 with updates in the Jan. 2019 LUCs submission for Klamath, Jackson, and Douglas County for the non-coastal zone. No updates were provided for Douglas County coastal zone or Coos County. The updated analyses need to affirmatively review whether any project changes since 2015 would affect those prior analyses.
5. Provide analyses for capability determinations for Coos County for Jordan Cove.

Please provide a schedule for a complete response to this supplemental information to:

Mary Camarata
Oregon Department of Environmental Quality
165 East 7th Avenue, Suite 100
Eugene, Oregon 97401

If you have any questions, please contact me directly at (541) 687-7435, or via email at camarata.mary@deq.state.or.us.

Mary Camarata
Project Coordinator

ec: Mike Koski, mkoski@pembina.com
Natalie Eades, Neades@pembina.com
Shannon Luoma, sluoma@pembina.com
Tyler Krug, Tyler.J.Krug@usace.army.mil
John Peconom, John.Peconom@ferc.gov
Sean Mole, sean.mole@oregon.gov
DEQ: Keith Andersen, Dave Belyea, Steve Mrazik, Chris Bayham, Mary Camarata, Sara Christensen
FERC Dockets: CP17-494-000, CP17-495-000