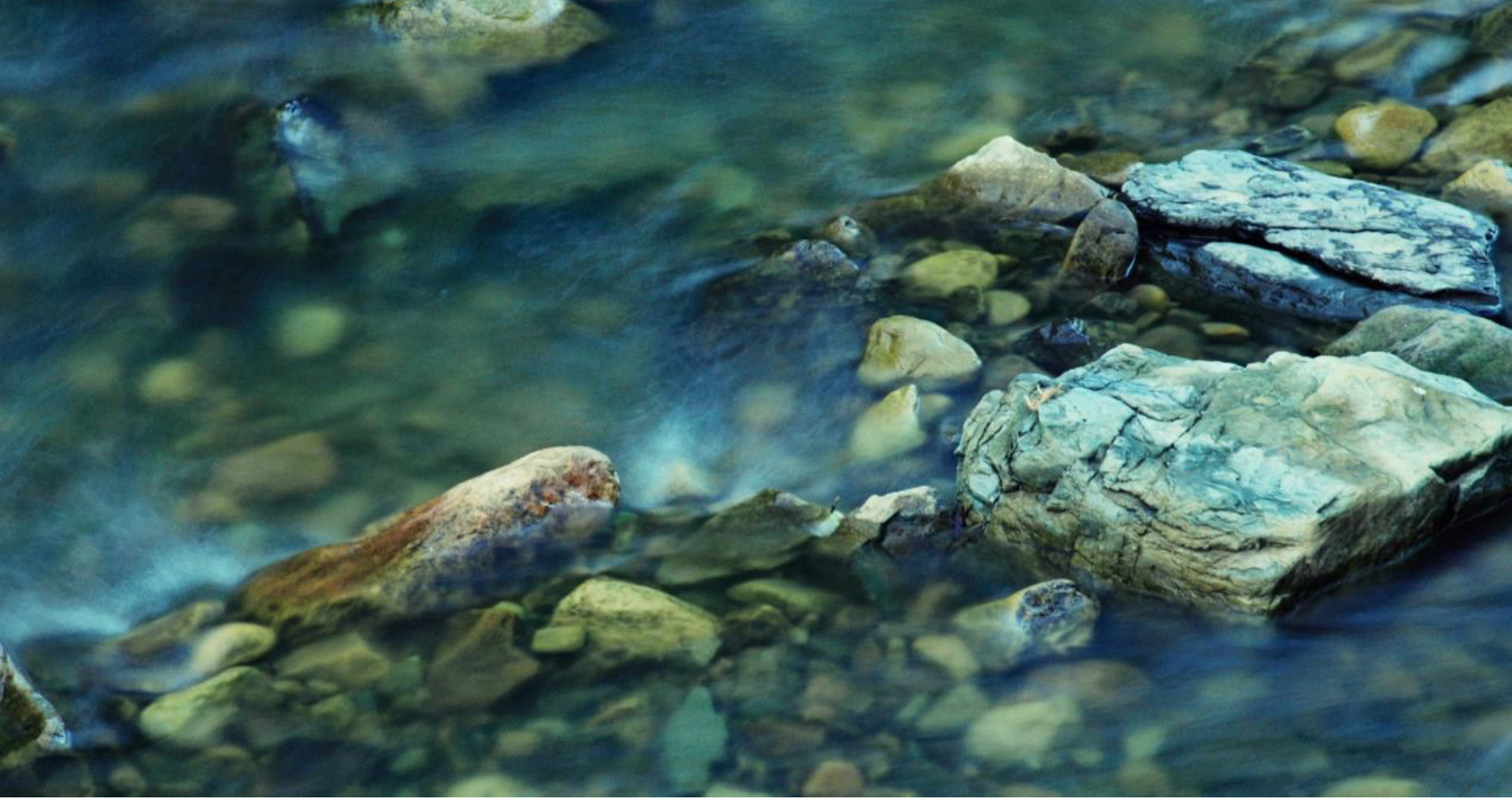

January 2022
Skagway Ore Terminal Sediment Remediation Project
Alaska Department of Environmental Conservation File No. 1526.38.004
Hazard Identification No. 401

ANCHOR QEA

Water Quality Monitoring Plan

Prepared for White Pass & Yukon Route

January 2022
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Water Quality Monitoring Plan

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TABLE OF CONTENTS

FIGURES

APPENDICES

ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
BMP	best management practice
cy	cubic yard
NTU	nephelometric turbidity unit
Project	Skagway Ore Terminal Remediation Project
Water Quality Modeling Memo	technical memorandum regarding Model Estimates of Water Quality Impacts During Dredging Operations Skagway Ore Terminal Remediation Project
WQMP	water quality monitoring plan

1 Introduction

White Pass & Yukon Route is conducting a remedial action to address legacy ore-related sediment contamination at the site (Figure 1). The remediation approach for the Skagway Ore Terminal Remediation Project (Project) was developed in consultation with the Alaska Department of Environmental Conservation (ADEC) based on site-specific environmental and risk assessment studies, as summarized in the *Remedial Approach Work Plan* (Anchor QEA 2019a). Remedial options were evaluated, and a preferred remedial action was selected in the *Remedial Action Options Analysis* (Anchor QEA 2019b), which was approved by ADEC in October 2019. The *Basis of Design Report* (Anchor QEA 2020a), which documents the key design assumptions and criteria for implementing the remedial action, was accepted by ADEC in June 2020.

Remedial activities will consist of mechanically dredging between 3,000 to 7,000 cubic yards (cy) of contaminated sediment, which will be passively dewatered on a barge, stabilized to facilitate safe barge transport, and shipped to an off-site transload facility (in Washington) for rail or truck transportation to a permitted upland disposal facility. Following sediment removal, approximately 700 cy of clean sand cover (i.e., a residual management cover) will be placed over the dredging footprint to address potential residual contamination. The in-water work is planned for winter 2021-2022 and is expected to take 1 to 3 weeks to complete.

This Water Quality Monitoring Plan (WQMP) has been prepared to support compliance with Section 401 of the federal Clean Water Act, the requirements of Alaska Water Quality Standards (18 Alaska Administrative Code [AAC] 70), the Certificate of Reasonable Assurance issued to White Pass & Yukon Route (for U.S. Army Corps of Engineers permit POA-1981-334), and the state's antidegradation policy (18 AAC 70.015) during construction activities. The water quality monitoring approach was developed in a technical memorandum regarding Model Estimates of Water Quality Impacts During Dredging Operations Skagway Ore Terminal Remediation Project (Water Quality Modeling Memo; Anchor QEA, 2020b). This WQMP provides additional detail necessary for implementation of water quality monitoring during construction activities. This WQMP includes the following information:

- Water quality monitoring program details (Section 2)
- Contingency measures (Section 3)
- Reporting requirements (Section 4)

2 Water Quality Monitoring Program

This section describes the proposed water quality monitoring program, including field methods for conducting water quality monitoring during remediation activities. This WQMP will be implemented in compliance with Section 401 of the Clean Water Act and the Alaska Water Quality Standards (18 AAC 70), as described in Section 2.1.

A health and safety plan will be adhered to during monitoring activities. If unsafe conditions are present that would put the field team or contractor at risk, water quality monitoring activities may be temporarily discontinued. Any deviations due to health and safety concerns will be documented during reporting procedures (see Section 4).

2.1 Water Quality Standards

Water quality standards for the Project were developed in the Water Quality Modeling Memo. The Water Quality Modeling Memo concluded that no acute and/or chronic water quality criteria exceedances for metals and total suspended solids are expected as a result of sediment resuspension during dredging activities, and, furthermore, that turbidity monitoring will be sufficient to provide real-time feedback of water quality conditions during dredging and provide a mechanism for corrective action(s) should resuspension become an issue. Due to the lack of an applicable Alaska State standard for short-term dredging activities, based on Anchor QEA, LLC's, experience with marine dredging projects in other states (e.g., Washington, Oregon, and California) and consistent with the relevant criteria in Washington State (Washington Administrative Code 173-201A-210(1)(e) for waters designated as "good" marine quality), a turbidity criterion of 10 Nephelometric Turbidity Units (NTU) above background at the edge of the designated mixing zone was selected as the compliance criterion for the Project.

2.2 Monitoring Locations and Depths

2.2.1 Background Monitoring Location

The background monitoring station will be located 1,000 feet from the Work Zone, in an area unaffected by the active work (Figure 2). The Work Zone is defined as the area that includes the dredging equipment that directly supports construction activities, including the derrick barge (dredge), material barge, and tug. The background station can be as close as 600 feet from the active in-water work area, as this is twice the distance as the point of compliance. This will be determined and documented in the field. The background station will be located southwest of the Work Zone (Figure 2) to measure the turbidity representative of Taiya Inlet. Measurements collected at this station will be used as baseline data for determining the appropriate background turbidity threshold for comparison purposes.

2.2.2 Monitoring Locations

Site-specific water quality modeling predicted that water quality criteria would not be exceeded for metals due to resuspension of sediment during dredging operations outside of the localized (300-foot) Mixing Zone. Based on these results, and considering the safety and practicability of sampling, an early warning station of 150 feet and a point of compliance of 300 feet from the Work Zone are recommended. One station will be measured on each radius, located downcurrent of the Work Zone (Figure 2). Actual monitoring locations will be based on the location of the active in-water Work Zone, the tidal cycle, and observations of the current. The early warning station will be located on a point along the 150-foot radius, downcurrent from the Work Zone, unless safety concerns require additional offset from the work.

Measurements at the early warning station will serve as an interim indicator of water quality closer to the Work Zone. Elevated measurements could indicate the potential for an exceedance at the point of compliance (compliance station), and this early warning would allow modification of dredging operations to potentially avoid an exceedance at the compliance station.

The compliance station will be located at a point along the 300-foot radius, downcurrent from the Work Zone. Measurements from the compliance station will be used to determine if water quality conditions meet water quality standards for the Project.

2.2.3 Monitoring Depth

Water depth will be determined using a lead line at the monitoring location and will be recorded on the Water Quality Monitoring Form (Appendix A). At each station, water quality parameters will be measured at 3 feet below the water surface, the mid-point of the water column, and 3 feet above the sediment bed. If the water column is 10 feet or less, no mid-point sample will be collected. If the water column is 100 feet or more, the deepest monitoring point will be set to 100 feet and the middle monitoring point will be set to 50 feet.

2.3 Field Monitoring Frequency and Schedule

Remedial dredging activities are anticipated to take 1 to 3 weeks to complete.

2.3.1 Monitoring Frequency

Two frequencies of in situ water quality monitoring are anticipated: intensive and routine monitoring.

Intensive monitoring will include 3 full days of monitoring for dredging, with water quality measurements collected at least twice per day. Intensive monitoring will begin at the onset of the first potential turbidity-generating activity. If no exceedances in turbidity (considering background station measurements and waterway vessel activity) are noted during the first 3 days of dredging, or if the contractor is successfully able to modify operations and/or implement additional best

management practices (BMPs) to mitigate the elevated turbidity conditions, then water quality monitoring activities will switch to a routine frequency. A change in activities (e.g., new dredge bucket or other change in equipment) will restart the intensive monitoring cycle.

Routine monitoring will occur 1 day per week that the potentially turbidity-generating activity occurs (e.g., dredging, passive dewatering, and sand cover placement) through completion of the Project. Routine monitoring activities will include twice-daily water quality measurements, at a minimum.

2.3.2 Daily Monitoring Routine

The first round of monitoring will be conducted approximately 1 hour after the start of dredging. An additional round will be conducted prior to sunset, or prior to the end of dredging activities, whichever occurs first. The background station will be measured before the early warning and compliance stations are measured for each round of water quality monitoring. Additional samples at the background station may be collected if field conditions change (e.g., extreme weather shifts or tidal current shifts) or if stormwater inputs are suspected to be causing increased turbidity. Field monitoring data will be recorded on the Water Quality Monitoring Form (Appendix A).

2.3.3 Visual Monitoring

Visual monitoring (e.g., identification of visible turbidity) will be performed by the water quality monitoring team during intensive and routine monitoring at each monitoring station and while moving between stations throughout the workday. Visual monitoring will also be conducted during construction by the contractor and/or other construction oversight staff or the owner's representatives.

If elevated turbidity is observed during visual monitoring at the compliance and early warning stations, then a turbidity monitoring event will be performed.

Field monitoring data and observations will be recorded on the Water Quality Monitoring Form (Appendix A).

2.4 Field Monitoring Methods and Equipment

This section includes information regarding monitoring location determination, water quality monitoring methods, and quality assurance/quality control.

2.4.1 Monitoring Location Determinations and Documentation

A range finder will be used to determine station locations at target monitoring distances in relation to dredging, dewatering, or sand placement activities. Once the vessel is on station, the vessel operator will maintain the position while monitoring occurs. GPS coordinates and the monitoring station name will be recorded on the Water Quality Monitoring Form (Appendix A). During each

round of monitoring, the background station will be monitored first, followed by the early warning station and then the compliance station.

2.4.2 Turbidity Measurements

Monitoring will be performed using a calibrated multi-probe meter (e.g., Hydrolab, YSI probe, or similar) and/or a Hach turbidity meter. The depth at each station will be measured, and turbidity measurements will be collected at three depths at each of the three monitoring stations, as detailed in Section 2.2.3.

2.4.3 Quality Assurance/Quality Control

All field staff will be trained in standardized field monitoring and data collection procedures, requirements, data management protocol, and quality assurance/quality control.

Instruments and equipment will be inspected before each monitoring event. Any field equipment that is faulty or not functioning properly will not be used for monitoring or sample collection. Each day and prior to use, a calibration check will be performed on the water quality meter using certified calibration standards. If water quality meter results are not consistent with standards, the manufacturer's guidelines will be used to recalibrate the instrument. Standard instrument operating procedures will be used for all field instruments.

3 Contingency Measures

This section describes response actions to an elevated measurement at the early warning and compliance stations during dredging. Typical BMPs during dredging are also outlined in this section.

3.1 Water Quality Elevation at Early Warning Station

If turbidity is elevated greater than 10 NTU above background at the early warning station, the following sequence of responses will be initiated:

1. A confirmation measurement will be taken 5 to 10 minutes after the initial reading.
    a. If the confirmation measurement meets the water quality criterion (less than 10 NTU above background), the monitoring crew will continue with the monitoring program.
    b. If the elevated measurement is confirmed, the field lead will visually assess the station vicinity for potential outside influences, such as storm drains or sediment disturbance from nearby vessels.
        i. If outside influences are observed, the field lead will inform the owner's representative. Additional discretionary measurements may be taken to understand the nature of the outside influence.
        ii. If the elevated measurement is attributed to construction activities, the field lead will contact the owner's representative to report the measurement. The owner's representative will notify the contractor to refine their work activity or their existing BMPs to minimize the chance for a confirmed exceedance at the compliance station.
2. The field crew will continue with the monitoring program.

3.2 Water Quality Exceedance at Compliance Station

If turbidity is measured greater than 10 NTU above background at the compliance station, the following sequence of responses will be initiated:

1. The field lead will wait 5 to 10 minutes and take a confirmation measurement at the station.
    a. If the confirmation measurement does not confirm exceedance of water quality criterion (10 NTU above background), the monitoring crew will resume the scheduled monitoring activities.
    b. If the exceedance is confirmed, the field lead will visually assess the station vicinity for potential outside influences, such as storm drains or sediment disturbance from nearby vessels.
        i. If outside influences are observed, the field lead will inform the owner's representative. Additional discretionary measurements may be taken to understand the nature of the outside influence.
        ii. If the elevated measurement is attributed to construction activities, the field lead will contact the owner's representative. The owner's representative will notify the

contractor, and the contractor will modify its work activity using BMPs to reduce water quality impacts.

iii. The field lead will retake measurements within 30 minutes to 1 hour of the initial exceedance at the compliance station. Additional confirmation measurements will be taken every 2 hours until compliance is met or it gets dark, whichever occurs first.

In addition, the observation of a turbidity plume at the compliance station will trigger monitoring of the plume.

3.3 Best Management Practices During Dredging

BMPs have been incorporated into the Project design to avoid or minimize environmental effects and the exposure of sensitive species to potential effects from dredging. The following BMPs will be implemented to avoid or minimize environmental impacts during the Project:

- The contractor is prohibited from taking multiple bites during dredging.
- The contractor is required to take complete dredge cuts—from the moment the bucket is closed at the mudline, the contractor will be required to return the bucket to the surface and deposit dredge material onto the barge before returning the bucket back to the mudline.
- The contractor is prohibited from overfilling dredge buckets to reduce spillage back to the seabed.
- The contractor is prohibited from leveling the bottom surface. Instead of leveling to remove high spots, the contractor will be required to make an additional dredging pass to remove any high spots that are identified during the post-construction survey.
- The contractor is prohibited from overloading the material barge beyond the top of the side rails.
- The barge will be managed such that the dredged sediment load does not exceed the capacity of the barge. The load will be placed in the barge to maintain an even keel and avoid listing.
- To minimize the release of suspended sediments, no overtopping of the barge sideboards will be allowed during placement of dredged sediment, and no free water from the dredged sediment will be directly discharged back into the surface waters without passing through the filter media.
- Contractor staging will occur on barges and in existing, developed upland areas.
- The contractor will prepare a Spill Prevention, Control, and Countermeasure Plan to be used for the duration of the Project to safeguard against an unintentional release of fuel, lubricants, or hydraulic fluid from construction equipment. The dredging contractor will inspect fuel hoses, oil or fuel transfer valves, and fittings on a regular basis for drips or leaks to prevent spills into the surface water.

Additional BMPs may be required and will be employed in the event of a water quality exceedance, such as slowing the dredge bucket cycle time or temporarily stopping work to reduce the loading of

suspended sediment into the water column. These additional BMPs are listed in the Project specifications as contingent BMPs in the event that water quality objectives are not met.

3.4 Stop Work Response

Some conditions require an immediate Stop Work response. These are as follows:

- Evidence of a significant oil sheen
- Evidence of distressed or dying fish
- Repeated confirmed exceedances of the water quality criterion at the compliance station requiring Stop Work to control water quality

If distressed or dying fish are observed, the monitor will immediately notify the owner's representative, who will report to the ADEC Area Response Team for Southeast Alaska at (907) 465-5340 during work hours or 1-800-478-9300 after work hours.

3.5 Water Quality Impacts During Sand Placement

The placement of clean sand could result in short-term water quality impacts due to the suspension of this material within the water column. However, unlike dredging, the short-term increase in turbidity associated with sand placement is not associated with contaminated material. For the Project, the monitoring proposed for dredging is also proposed for sand placement activities. However, these requirements may be reassessed based on field conditions.

4 Reporting

At the end of each monitoring day, a brief summary of water quality monitoring activities, field datasheets, and results of the monitoring will be provided to the owner's representative. At the end of the Project, a brief summary of overall results and a compilation of field datasheets will be included as part of the overall Project Closure Report.

In the event of a discharge of oil, fuel, or chemicals into surface waters of the state as defined in 18 AAC 70.990 or onto land with a potential for entry into surface waters of the state, containment and cleanup efforts will begin immediately per the Spill Prevention, Control, and Countermeasure Plan. If a spill occurs during the work, of any amount, the spill must be reported in accordance with Discharge Notification and Reporting Requirements (AS 46.03.755 and 18 AAC 75 Article 3). White Pass & Yukon Route or an assigned representative will immediately report the event to the ADEC representative listed in the water quality certification and ADEC's Southeast Regional Office at (907) 465-5340. If the spill occurs outside of normal business hours, it will be reported to the Division of Spill Prevention and Response's 24-hour number at 1-800-478-9300. Also, the owner's representative must contact the National Response Center at 1-800-424-8802.

5 References

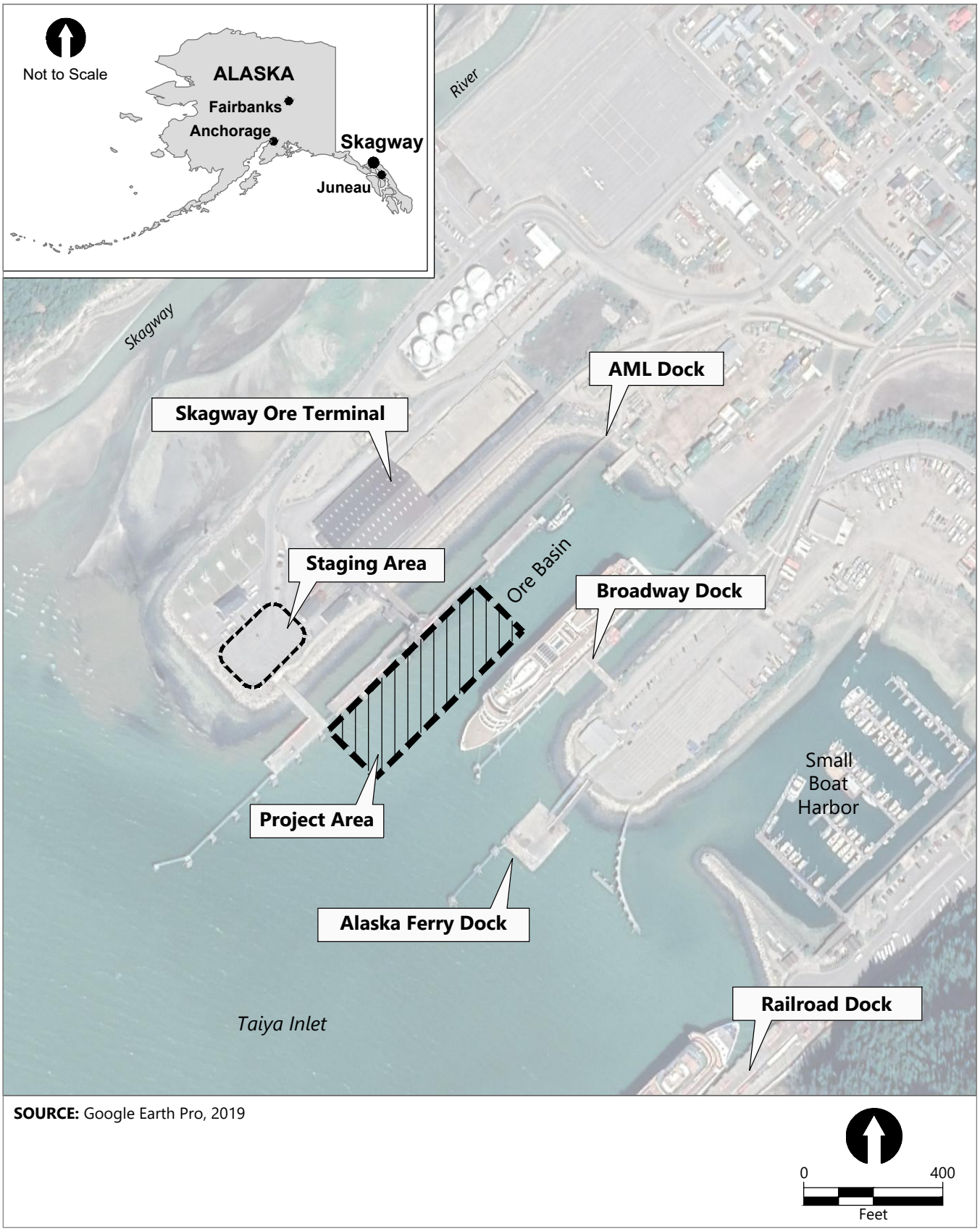
Anchor QEA (Anchor QEA, LLC), 2019a. *Remedial Approach Work Plan*. Skagway (Nahku) Ore Terminal, Hazard ID #401. Prepared for the Alaska Department of Environmental Conservation. May 2019.

Anchor QEA, 2019b. *Remedial Action Options Analysis*. Skagway (Nahku) Ore Terminal, Hazard ID #401. Prepared for Alaska Department of Environmental Conservation on behalf of White Pass & Yukon Route. October 2019.

Anchor QEA, 2020a. *Draft Basis of Design Report*. Skagway Ore Terminal Remediation Project. January 2020.

Anchor QEA, 2020b. Memorandum to: Kara Kusche, Angela Hunt, and Jim Rypkema (Alaska Department of Conservation). Regarding: Model Estimates of Water Quality Impacts During Dredging Operations. Skagway Ore Terminal Remediation Project. March 8, 2020.

Figures



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Filepath: K:\Projects\0159-KPFF Consulting Engineers\Ore Terminal Remediation Support_Water Quality Monitoring Plan\0159-WQMP-001 (VICINITY).dwg Figure 1

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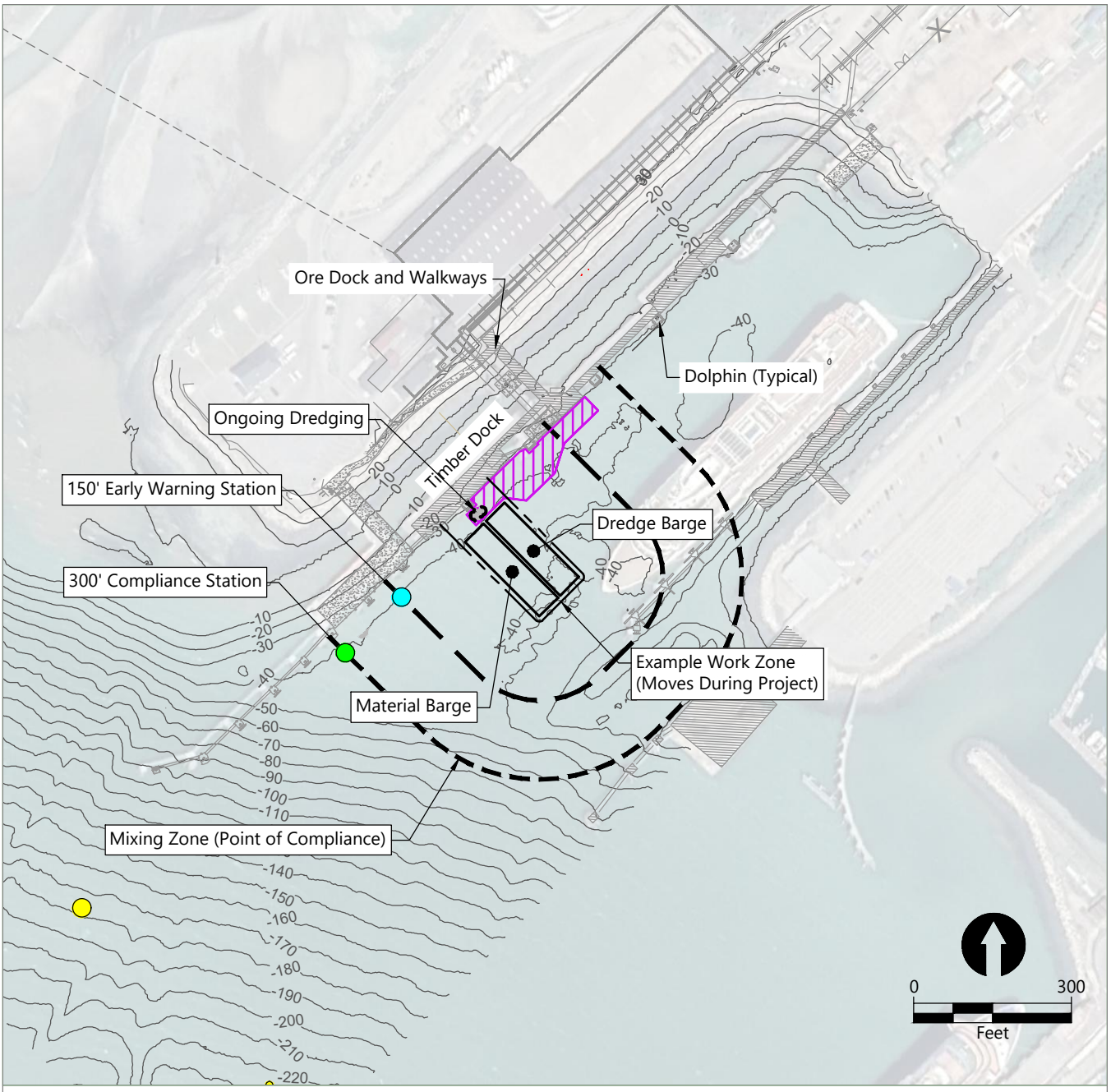
Figure 1
Project Area and Site Features

Water Quality Monitoring Plan
Skagway Ore Terminal Remediation Project



SOURCES: Base CAD files provided by KPFF. Bathymetric survey by Terrasond, dated October 28, 2014. Aerial image courtesy Google Earth Pro, 2019
HORIZONTAL DATUM: Alaska State Plane Zone 1, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: Mean Lower Low Water (MLLW)

NOTE:
Early warning and compliance station locations are selected to be downcurrent of the work zone and may shift depending on the tidal stage.

LEGEND:

- Existing Contours (2014, 10' Interval)
- Example Work Zone (Moves During Project)
- Dredge Footprint
- 150' Early Warning Boundary
- 300' Compliance Boundary
- Water Quality Monitoring Station
- Background Water Quality Monitoring Station (1,000 Feet from the Work Zone)

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Figure 2
Conceptual Water Quality Monitoring Station Diagram

Water Quality Monitoring Plan
Skagway Ore Terminal Remediation Project

Appendix A
Water Quality Monitoring Form

Remedial Dredging Water Quality Monitoring Form

Date:	Monitoring Start Time:	Monitoring Personnel:
Dredging Start Time:		Weather Observations:

Station ID	Time	Water Depth (feet)	Coordinates		Turbidity Reading (NTU)			Exceed	Notes
			Northing Latitude	Easting Longitude	Surface	Middle	Bottom	Yes/No*	

Notes:

***Water Quality Standard: Turbidity shall be < 10.0 NTU above BG.**

150EW = 150' Early Warning Station; 300**C** = 300' Compliance Station; **BG** = Background Station (1,000 feet up-current of in-water work location); **NTU** = Nephelometric Turbidity Unit

Tidal Elevations	Elevation	Time	Elevation	Time
High:				
Low:				