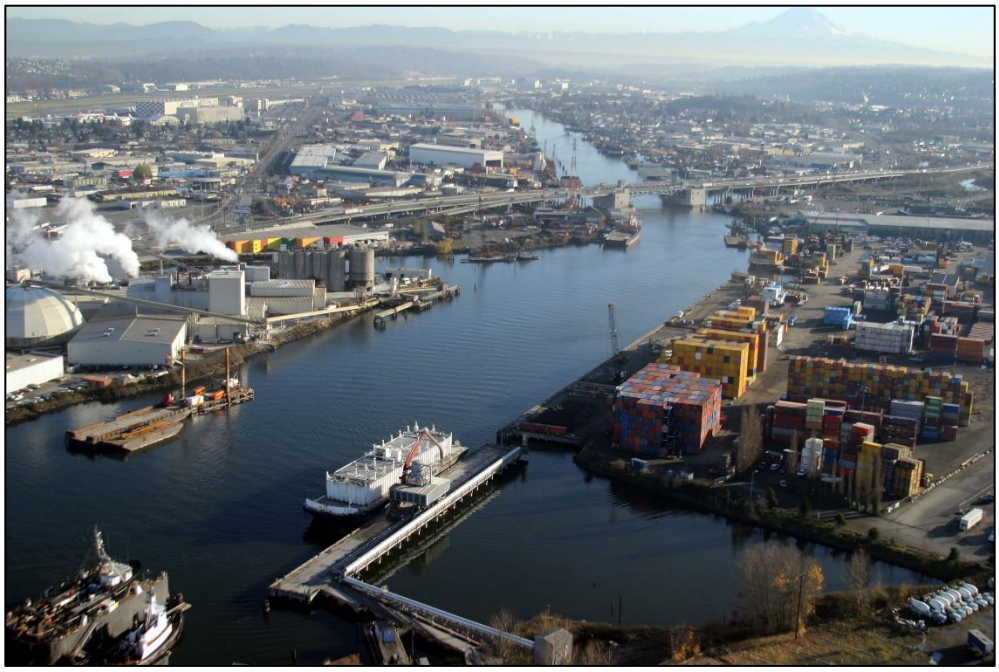
Material Placement Plan

Revision: 5

October 7, 2024



LOWER DUWAMISH WATERWAY

Upper Reach Remedial Action

Contract KC001065

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1.0 Introduction

This Material Placement Plan details the methods, equipment, and procedures for material placement activities in Sediment Management Areas (SMAs) including Engineered Caps A and B, Backfill Material, Amended Cover, Enhanced Natural Recovery (ENR), Required Residuals Management Cover (RMC), Inner Perimeter RMC, and Contingent Outer Perimeter RMC ensuring compliance with project Specifications Sections 35 37 10 and 31 05 10.

2.0 General Approach

2.1 Material Placement Overview

The Material Placement Plan for dredging operations on the Duwamish River involves executing placement activities for ENR, Amended Cover, Required RMC, Inner Perimeter RMC, Contingent Outer Perimeter RMC, and Engineered Caps A and B. These activities are essential for ensuring the effective and compliant placement of materials in accordance with project specifications and environmental guidelines. The plan specifies a sequenced approach to material placement, where each material type is applied in a specific order to achieve the desired stabilization and remediation outcomes. This sequencing is critical to maintaining structural integrity and minimizing environmental impact.

2.2 Placement Areas and Criteria

Materials will be placed within and along the perimeter of designated SMA footprints as depicted in the project Drawings. Each SMA has distinct criteria for material type, placement thickness, and coverage requirements to ensure compliance with project objectives. For instance, the minimum required Targeted Placement Thickness/Elevation are strictly defined to ensure precise material distribution and avoid over or under placement. Specification Section 35 37 10 requires that materials such as RMC, ENR, backfill, amended cover and Engineered Caps must meet specific placement thicknesses and tolerances to ensure effective isolation and containment of contaminated sediments. Additionally, placement activities must adhere to the horizontal and vertical placement tolerances and maximum overplacement allowances prescribed in the plans and specifications to achieve the necessary environmental protection and remediation standards.

3.0 Proposed Placement Equipment

Equipment cut sheets can be found in the umbrella RAWP document.

3.1 Construction Barges & Excavators & Loaders

CONSTRUCTION BARGES

Lash 4

For material placement in SMAs 4, 6, 7, 9, 11, 14, 15, 16, 17, and 18, PPM will use the “Lash 4” barge. The Lash 4 barge is 160’ long x 50’ wide x 12’ deep. It is a load lined barge and is equipped with 2 ea 24” outside diameter spuds that can be raised and lowered to allow the barge to be securely positioned. The Hitachi EX1200-6 excavator will be located on the Lash 4

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for material placement. This barge is a construction barge so it does not have walls, lining, or scuppers.

FlexiFloat

For SMAs 1, 2, 3, c1, and 14C material placement activities, the "FlexiFloat" barge will be utilized. The FlexiFloat barge consists of 16 ea 20' x 10' x 7' floats, which are combined to make a single float measuring 80' x 40' x 7'. It is outfitted with two spuds for anchoring and stability once in its desired location. The FlexiFloat will have the Hitachi ZX470LC-6 excavator on the deck for material placement operations. This barge is a construction barge so it does not have walls, lining, or scuppers.

WEB

For material placement operations in SMA 12, PPM will use the "WEB" barge. The Web barge consists of a 142-foot long by 58-foot wide by 11-foot deep scow. It is outfitted with two heavy-duty spuds for anchoring and stability once in its desired location. The spuds on the Web are 80-feet long, allowing it to anchor itself in 60+ feet of water. The Hitachi EX1200-5 excavator will be located on the deck of the WEB for material placement. This barge is a construction barge so it does not have walls, lining, or scuppers.

Judge Dredge

For material placement activities in SMA 13, PPM will utilize the Judge Dredge. The Judge Dredge is a 20'x50' modular barge that is equipped with two 40' spuds run by hydraulic winches that will be used to anchor the barge. The Hitachi ZX270 excavator will be located on the deck of the Judge Dredge for material placement. This barge is a construction barge so it does not have walls or lining, or scuppers. The barge will have an 8'x 7'x 10' steel hopper bin located on the deck to haul the amended sand cover.

MATERIAL PLACEMENT EXCAVATORS

HITACHI EX 1200-5

A HITACHI EX 1200-5 Excavator will be used to perform the material placement in SMA 12. The EX 1200-5 was built in 2006, has an operating weight of 238,099 lbs and is rated to lift 6 tons. It will be outfitted with 30' dredge arm and is powered by a 684hp Cummins QSK23478 diesel engine, with a reach of 33' ft below waterline. The hydraulic system on the excavator uses low toxicity, biodegradable hydraulic oil. To facilitate precise spatial tracking, the excavator will be equipped with inclinometers on the boom, stick and bucket, as well as heading sensors on the body of the excavator. The inclinometers will be used in conjunction with a RTK GPS system that uses HYPACK's DREDGEPACK software to facilitate positioning within the SMA prism. PPM's HITACHI EX 1200-5 excavator will be equipped with eTrac servos on the boom, stick and clamshell bucket, an inertial sensor, as well as on-board monitors and computer operating HYPACK 2023 software. These sensors will allow bucket position to be continually monitored, in real-time to approximately +/- 4-inch accuracy, through HYPACK's DREDGEPACK. In addition to the above sensors, two GPS antennas mounted on the rear of the excavator will provide positioning and directional data.

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HITACHI EX 1200-6

PPM proposes to utilize a HITACHI EX 1200-6 excavator for material placement in dredging SMAs 3, 4, 6, 7, 9, 11, 14, 15, 16, 17, and 18. The excavator was built in a 2015 with a 760hp and Operating Weight of 265,000 lbs. It is equipped with a custom boom from Jewell capable of digging 70' below the excavator or 43' below waterline. PPM's HITACHI EX 1200-6 excavator is equipped with eTrac servos on the boom and clamshell bucket, as well as on-board monitors and computer operating HYPACK & DREDGEPACK 2023 software. These sensors will allow bucket position to be continually monitored, in real-time to a 2-3-inch accuracy, through HYPACK & DREDGEPACK including bucket orientation, rotation and open/close position. In addition to the above sensors, two GPS antennas mounted on the rear of the excavator will provide positioning and directional data.

HITACHI ZX470LC-6 Excavator

A HITACHI ZX470LC-6 excavator (470) will be used for material placement at SMAs 1, 2, and 14C. The 470 excavator will be operated from the deck of the FlexiFloat barge. It has a 37' dredge arm with a 24'ft reach below waterline, and is powered by a 450 horsepower diesel engine. The 470 was built in 2005, weighs 108,952lbs. The hydraulic system on the excavator uses Clarity, a low toxicity biodegradable hydraulic fluid, made with zinc-free mineral oil (SDS will be available on all construction barges). The 470 excavator is equipped with eTrac servos on the boom and clamshell bucket, as well as on-board monitors and computer operating HYPACK'S DREDGEPACK 2023 software. These sensors will allow bucket position to be continually monitored, in real-time to a +/-3-inch accuracy, through HYPACK'S DREDGEPACK including bucket orientation, rotation and open/close position. In addition to the eTrac servos sensors, two GPS antennas mounted on the rear of the excavator will provide positioning and directional data.

HITACHI ZX270 Excavator

A HITACHI ZX270 excavator (270) will be used for material placement in SMA 13. The 270 will be operated from the deck of the Judge Dredge barge. It is equipped with a 27' dredge arm with a 14'ft reach below waterline, and is powered by a 188 horsepower engine. The 270 was built in 2010, weighs 61,729lbs. The hydraulic system on the excavator uses Clarity, a low toxicity biodegradable hydraulic fluid, made with zinc-free mineral oil (SDS will be available on all construction barges). The 270 excavator is equipped with eTrac servos on the boom and clamshell bucket, as well as on-board monitors and computer operating HYPACK'S DREDGEPACK 2023 software. These sensors will allow bucket position to be continually monitored, in real-time to a +/-3-inch accuracy, through HYPACK'S DREDGEPACK including bucket orientation, rotation and open/close position. In addition to the eTrac servos sensors, two GPS antennas mounted on the rear of the excavator will provide positioning and directional data.

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Loaders

John Deere 624

PPM proposes to utilize John Deere 624 Loaders on the Kumtux and/or Eglon material barges to stockpile the material for the excavators' clamshells to grab. The John Deere 624 Loader, built in 2020, features a 244hp engine and an operating weight of 38,750 lbs. It is equipped with a high-lift boom capable of reaching heights up to 13.5 feet, making it ideal for stockpiling aggregates. The standard bucket has a capacity of 3.75 cubic yards.

3.2 Tugboats & Workboats

Halle H

The HALLE H. features a steel hull, providing durability and strength essential for the demanding conditions of towing services. The HALLE H. is a twin-screw tug rated at 680 horsepower. With a length of 44.7 feet, a breadth of 17 feet, and a depth of 5.8 feet, she is a compact yet powerful vessel. Her gross tonnage is 37, with a net tonnage of 25, making her well-suited for a variety of towing tasks. The Halle H will be utilized to bring the barges to SMA 1, however the work skiffs will be utilized to complete the transition from under the bridge to the work sites.

Gretchen H

The GRETCHEN H. is a robust towing vessel powered by three Tier III compliant Cummins QSK19 diesel engines, providing a total rated horsepower of 2,250. These engines are coupled with Twin Disc MG5202DC reduction gears at a ratio of 6.1:1, driving three pitch propellers to ensure efficient and powerful propulsion. With a length of 80.6 feet, a breadth of 30 feet, and a depth of 11.1 feet, she is a substantial and capable vessel. Her gross tonnage is 96, with a net tonnage of 65, making her well-suited for the rigorous demands of towing operations. The GRETCHEN H. is registered with the US Coast Guard (1056824) and hails from Ketchikan, Alaska.

Jennifer H

The Jennifer H. features a steel hull, providing the durability and strength essential for demanding towing services. The Jennifer H. measures 64 feet in length, 22 feet in breadth, and 7.4 feet in depth. This robust towing vessel has a gross and net tonnage of 87 and is powered by an 800-horsepower engine with a twin-screw propulsion, she is well-suited for various towing tasks along the coastlines of Puget Sound, Alaska, and the Pacific Coast. Registered under USCG Doc. No. 1022583 and with the call sign WDC3573, the Jennifer H. offers coastwise unrestricted towing services and is based in Ketchikan, AK.

Fog Dog Survey Boat

The Fog Dog survey boat will be used to perform the bathymetric surveying. Additional details regarding the boat and survey procedures can be found in the Survey and Positioning Control Plan (Appendix H to the RAWP).

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Workboat Skiffs

Two to three small metal work skiffs ranging from 16’ to 21’ in length with outboard motors (50-100 horsepower). These skiffs will be used to transport personnel and supplies, as well as maintain turbidity curtains and assist barge movements.

3.3 Aggregate Haul Barges

Eglon

The Eglon barge will be used to haul aggregates for material placement at the in-water SMAs. The Eglon barge is 230’ long x 60’ wide and 16’ deep and capable of holding 3,700 tons of material. The barge is equipped with concrete wear decks and 4-foot high steel fences around the perimeter.

KumTux

The KumTux barge will be used to haul aggregates for material placement at the in-water SMAs. The KumTux barge is 220’ long x 64’ wide x 14’ deep and capable of holding 3,000 tons of material. The barge is equipped with concrete wear decks and 4-foot high steel fences around the perimeter.

Porpoise

The Porpoise will be utilized to haul aggregates for material placement in SMA 1A, 1B, 2A, and 2B in rotation with the P2 Hopper barge. The Porpoise barge dimensions are 140 feet long by 35 feet wide by 8.5 feet deep. The barge is equipped with a concrete wear deck and 4-foot high steel fence around the perimeter. This barge can hold approximately 530 tons of material. Material will be stacked to ensure that it cannot be lost from the barge during transport. This barge will be used for both clean material placement and dredging activities. Prior to hauling clean aggregates for material placement the barge will undergo a decontamination process to assure all hazardous materials have been removed prior to loading with clean aggregates. Please refer to Section 2.1 in the Decontamination Plan (Appendix AD).

Poseidon P2 Hopper Barge

For SMA 1, 2, c1, and 14C the Poseidon P2 Hopper barge will be used to short-haul and store aggregate materials for placement. The barge is 40’ x 20’ wide and consists of two 40’ Long x 10’ Wide x 8’ 5-3/4” Tall modular barges pinned together. The barge has two hoppers, one on each 40x10 unit. The hopper is set inside of the hull of the barge, it is 26’x 8’ x 8.5’ and capable of holding 50cubic yards. The hopper box has a 1.5’ tall fence extending above the deck of the barge to mitigate spillage during transport. With both units pinned together the 40’x20’ barge is capable of hauling 100 cubic yards per load. This will be the only barge used in SMA 1 which will require 2-3 trips per day under the 98th St Bridge. The tidal conditions will need to be at an approximate +4 elevation for the barge to pass through the channel in a loaded condition. Updated bathymetry will be needed to make final determinations on tidal windows for full/empty transition conditions of the barge. Prior to hauling clean aggregates for material placement the barge will undergo a decontamination process to assure all hazardous materials

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have been removed prior to loading with aggregates. Please refer to Section 2.1 in the Decontamination Plan (Appendix AD)

3.5 SMA 5 Placement Equipment

Below is the anticipated equipment to be utilized for SMA 5 material placement. Additional details will be provided in June of 2026 (prior to the 2026-2027 construction season) for Project Representative review and approval.

- 50 ton +/- 70' reach long reach excavator with digging and smooth lip buckets
- 50 ton +/- Standard front excavator with digging and smooth lip buckets
- 20 ton +/- standard front excavator with digging and smooth lip buckets.
- 5 cy bucket wheel loader
- 10-yd Haul Truck

3.6 In-water Placement Buckets

Young Environmental Bucket

The Young 5-cubic yard environmental bucket is engineered for high-precision material placement in dredging operations, particularly suited for environmentally sensitive projects. This closed clamshell bucket minimizes sediment resuspension and turbidity, essential for reducing environmental impact. Fabricated from high-strength, corrosion-resistant steel, the bucket features a watertight seal ensuring accurate containment and placement of imported clean materials. The bucket's volumetric capacity of 5 cubic yards allows for substantial material handling while its design facilitates controlled, even distribution of materials, maintaining specified grade lines and preventing overfill. The mechanism ensures smooth opening and closing actions, crucial for minimizing spillage and achieving precise placement. This bucket may be utilized for all material types and at SMAs 4, 6, 7, 8, 9, 11A, 11B, 12A, 12B, 14A, 14B, 14C, 14D, 15A, 15B, 16, 17 and 18. It will be interchanged between the 1200-5 and 1200-6 excavators. There is no specific SMAs that this bucket has been assigned to but instead will be at the discretion of the Superintendent to decide if the Young Environmental and Jewell Rehandle will be utilized at a given location and for a given material type.

Jewell Rehandle Bucket

The Jewell 4-cubic yard rehandle bucket is a specialized tool engineered for high-efficiency material placement in heavy-duty rehandling operations. Constructed from high-strength, wear-resistant steel, this bucket is designed to withstand the rigors of handling bulk materials with precision and reliability. Its volumetric capacity of 4 cubic yards is optimized for substantial material throughput, enhancing productivity and reducing cycle times in rehandling tasks. The bucket's structural integrity is reinforced through side plates and a closed design, akin to an environmental bucket, though without relief snorkels at the corners. This design ensures smooth, controlled placement, facilitating even distribution of materials and minimizing spillage. This precision is critical for maintaining specified grade lines and ensuring compliance with project specifications. This bucket may be utilized for all material types and at SMAs 4, 6, 7, 8, 9, 11A, 11B, 12A, 12B, 14A, 14B, 14D, 15A, 15B, 16, 17 and 18. It will be interchanged between the

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1200-5 and 1200-6 excavators. There is no specific SMAs that this bucket has been assigned to but instead will be at the discretion of the Superintendent to decide if the Young Environmental and Jewell Rehandle will be utilized at a given location and for a given material type.

Young Digging Bucket

The Young 3-cubic yard digging bucket is engineered for high-efficiency material placement, combining robust construction with precision handling. Fabricated from high-strength alloy steel, the bucket features reinforced wear edges and heavy-duty side. Its volumetric capacity of 3 cubic yards is optimized for substantial material handling, reducing cycle times and increasing operational efficiency. The interior design of the bucket is contoured to minimize material adherence and facilitate smooth unloading, thereby reducing spillage and wastage. The cutting edge is precision-machined for superior penetration and scooping efficiency, contributing to accurate and clean placement profiles. The bucket is a closed designed similar to an environmental bucket but does not have relief snorkels at the corners. This bucket will be utilized on the 470 Excavator only and will be utilized only for material placement in SMA 1, c1, 2, and 14C.

Young Rehandle Bucket

The Young 2-cubic yard rehandle bucket is a specialized tool engineered for high-efficiency material placement in heavy-duty rehandling operations. Constructed from high-strength, wear-resistant steel, this bucket is designed to withstand the rigors of handling bulk materials with precision and reliability. Its volumetric capacity of 2 cubic yards is optimized for substantial material throughput, enhancing productivity and reducing cycle times in rehandling tasks. The bucket's structural integrity is reinforced through side plates and a closed design, akin to an environmental bucket. The design ensures smooth, controlled placement, facilitating even distribution of materials and minimizing spillage. This precision is critical for maintaining specified grade lines and ensuring compliance with project specifications. This bucket will be utilized on the 270 Excavator only and will be utilized only for material placement in SMA 13.

4. Work Sequence and Timing

4.1 In-water Material Placement

For SMAs 1, 2, 3, 4, 6, 7, 9, 11, 12, 14, 15, 16, 17, and 18, following completion of Required Dredging and Contingency Re-Dredging (as directed) and acceptance of all remedial dredging activities in the given SMA by the Project Representative, and a successful practice placement demonstration, PPM will conduct material placement in the following sequence:

1. Placement of Backfill Material, as shown on the Drawings
2. Placement of Required RMC material over portions of the Dredge Prism footprint, as shown on the Drawings
3. Placement of Inner Perimeter RMC material, surrounding the Dredge Prism footprint and from top of dredge cut daylight, as shown on Drawings

4. Placement of Contingent Outer Perimeter RMC material, surrounding the Inner Perimeter RMC, based on post-dredge construction sediment sampling/testing results in locations directed by the Project Representative
5. Placement of additional Project Representative-directed RMC placement areas outside of the RMC placement areas shown on the Drawings
6. Conduct placement of ENR material as shown on the Drawings.

Placement of Area-Specific Technology B – Amended Cover (referred herein as Amended Cover) material as shown on the Drawings will have the following sequencing:

- SMA 7 - Amended Cover can be placed anytime after Project Representative acceptance of adjacent dredging activities
- SMA 13 - Amended Cover can be placed at anytime (no dredging or additional material placement is required at SMA 13)

Placement of materials in SMA 12B will have the following unique sequence:

1. Placement of Capping Isolation Layer
2. Placement of Capping Filter Layer
3. Placement of Capping Erosion Protection Layer
4. Placement of Backfill Material and/or Required RMC material, as shown on the Drawings
5. Placement of Inner Perimeter RMC material, surrounding the Dredge Prism footprint and from top of dredge cut daylight, as shown on Drawings
6. Placement of Contingent Outer Perimeter RMC material, surrounding the Inner Perimeter RMC, based on post-dredge construction sediment sampling/testing results in locations directed by the Project Representative
7. Placement of additional Project Representative-directed RMC placement areas outside of the RMC placement areas shown on the Drawings

Unless otherwise modified in the project schedule, in-water material placement will be conducted Monday through Friday 7am to 5pm.

Below are the preliminary ESTIMATED placement durations for each in-water SMA. Please review the baseline schedule for initial dates and sequencing of placement and afterwards the 3-week look ahead schedule as the baseline schedule dates are subject to changes based on factors such as need for contingency redredging and outer RMC placement needs.

- **SMA 1- Season 1: 12 days (20 cy/hr)**
  - Backfill: 8 days
  - RMC Inner: 2 day
  - RMC Outer: 1 day
  - ENR: 1 day
- **SMA c1- Season 1: 1 day (20 cy/hr)**
  - ENR: 1 day
- **SMA 2- Season 1: 3 days (20 cy/hr)**
  - Backfill: 1 day
  - RMC Inner: 1 day
  - RMC Outer: 1 day
- **SMA 3- Season 1: 4 days (35 cy/hr)**

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    - Backfill: 2 days
    - RMC Inner: 1 day
    - RMC Outer: 1 day
- **SMA 4- Season 1: 4 days (28 cy/hr)**
    - RMC Footprint & Inner: 3 days
    - RMC Outer: 1 day
- **SMA 6- Season 1: 7.1 days (90 cy/hr)**
    - Backfill: 5 days
    - RMC Inner: 1 day
    - RMC Outer: 1 day
    - ENR: 1hr
- **SMA 7- Season 1: 9 days (90 cy/hr)**
    - Backfill: 5 days
    - RMC Inner: 1 day
    - RMC Outer: 1 day
    - Amended Cover: 1 day
- **SMA 8- Season 1: 1 day (94 cy/hr)**
    - ENR: 1 day
- **SMA 9- Season 1: 12 days (90 cy/hr)**
    - Backfill: 10 days
    - RMC Footprint & Inner: 1 day
    - RMC Outer: 1 day
- **SMA 11- Season 1: 5 days (90 cy/hr)**
    - Backfill: 2 days
    - RMC Inner: 1 day
    - RMC Outer: 1 day
    - ENR: 1 day
- **SMA 12- Season 2: 21 days (90 cy/hr)**
    - Backfill: 11 days
    - RMC Footprint & Inner: 2 days
    - RMC Outer: 1 day
    - Cap B: 7 days
- **SMA 13- Season 1: 1 day (8 cy/hr)**
    - Amended Cover: 1 day
- **SMA 14- Season 2: 7 days (90 cy/hr)**
    - Backfill: 1 day
    - RMC Footprint & Inner: 4 days
    - RMC Outer: 1 day
    - ENR: 1 day
- **SMA 15- Season 2: 10 days (90 cy/hr)**
    - Backfill: 5 day
    - RMC Footprint & Inner: 3 days
    - RMC Outer: 1 day
    - ENR: 1 day
- **SMA 16- Season 2: 9 days (90 cy/hr)**
    - Backfill: 5 days
    - RMC Footprint & Inner: 3 days

  - RMC Outer: 1 day
- **SMA 17- Season 3: 12 days (90 cy/hr)**
  - Backfill: 8 days
  - RMC Footprint & Inner: 3 days
  - RMC Outer: 1 day
- **SMA 18- Season 3: 12 days (90 cy/hr)**
  - Backfill: 8 days
  - RMC Footprint & Inner: 3 days
  - RMC Outer: 1 day

4.2 SMA 5 Material Placement

For Material Placement in SMA 5 the activities will be conducted in the dry per project requirements which will require low tide hours, that are approximately 6pm to 6am during the winter months. The Project Representative will be notified in advance about nighttime SMA 5 activities.

SMA 5 material placement will begin immediately following the required excavation grades being achieved and after post-excavation sampling is completed. SMA 5 will have the Engineering Cap A applied to it in the following sequence:

1. Placement of Material Type 5 in toe trench to match elevation at SMA 6 Post Backfill Surface
2. Placement of Material Type 1A
3. Placement of Material Type 4
4. Placement of Material Type 5
5. Placement of Material Type 2
6. Placement of Material Type 1 as a surface layer on top of Engineering Cap A

Material Placement in SMA 5 will occur in Season 3 (2026-2027) and will take approximately 13 days.

5.0 Transportation of Clean Import Materials

5.1 Water-based Transportation

PPM will transport clean material Type 1, 1A, 2, 3, 4, and 5 from CalPortland's Dupont and Seattle Aggregate Yard via the Eglon and/or KumTux material barges equipped with a concrete wear deck and a 4-foot high steel fence around the perimeter.

Dupont

CalPortland's DuPont facility is located at 4301 Pioneer Ave, DuPont, WA 98327.Materials sourced from the Dupont yard will be loaded via a shipping conveyor that will carry the material via a belt to a materials barge. The conveyor can rotate 180-degrees to allow for uniform placement along the length of the barge. The material will be placed in rows from port to starboard until the barge is filled. The conveyor operator will be instructed to place the material approximately 2.5 to 3-feet high evenly across the barge so 2-feet of space is left from the material surface to the top of the barge walls. Once aggregates are placed into the materials barge, a tugboat will take the barge and transit north from CalPortland's DuPont facility and up the Duwamish Waterway. Boyer Logistics,

Inc. will provide tugboats Jennifer H, Gretchen H, and Halle H for barge movement throughout the duration of the Project. The transit time is approximately 6 hours from CalPortland's DuPont Facility to the Lower Duwamish Waterway. Please reference Appendix B of the RAWP for the Vessel Management Plan for additional details.

Seattle Aggregate Yard

CalPortland Seattle Aggregate Yard is located at 4002 W Marginal Way SW, Seattle, WA 98106. Materials sourced from the Seattle Aggregate Yard will be loaded via front end loaders and ramps onto the materials barge. The materials will be loaded on bow and stern concurrently, working their way toward the center of the barge. Boyer Logistics will tow the barge using the previously referenced tugboats, from CalPortland's Seattle Agg Facility to the Lower Duwamish Waterway, taking approximately 1hr for transit time.

5.2 Land-based Transportation

For SMA 5, clean materials will be loaded into truck and trailers using front end loaders. The truck and trailers will be covered and then haul the aggregate loads from CalPortland's Seattle Aggregate yard located 4002 W Marginal Way SW, Seattle, WA 98106 to the worksite, taking approximately 15 minutes transit time. More details regarding planned haul routes can be found in the Traffic Control and Notification Plan (Appendix AE of the RAWP).

5.3 Short-Haul Barge Transportation

For SMAs 1, 2, c1, 13, and 14C imported clean material will need to be transferred from the primary haul barges (Eglon and/or Kumtux) to the smaller short-haul barges. This is needed due to the primary haul barges being unable to access these restricted SMAs. The P2 Hopper barge and Porpoise barge will be the short-haul barge for SMAs 1, 2, c1, and 14C. The Judge Dredge will be the short-haul barge for SMA 13. A barge to barge transfer will need to happen between the primary haul barge and the short-haul barge. The transfer process is:

- The P2 Hopper,Porpoise, or Judge Dredge barge will be towed by Boyer and rafted to the bow of the primary haul barge.
- The 1200 excavator on the construction barge will then proceed to load the clean import material from Eglon or Kumtux and place it into in to one of the short-haul barges mentioned above. The swing path will be over both haul barges so that in the event that material is lost in the transloading process it will land on the deck of one of the barges for easy retrieval and placement into one of the barges for reuse.
- The P2 Hopper, Porpoise, or Judge Dredge barge are loaded to their capacities.
- The P2 Hopper, Porpoise, or Judge Dredge barge will then be towed by Boyer utilizing their tugs to whichever SMA the FlexiFloat or Judge Dredge barge is placing clean material in.

This process will be repeated 2 to 3 times per day depending on the SMA location. If this process proves to be too inefficient then PPM may elect to have the WEB or LASH construction barges perform the work at SMAs 2A and 2B, as approved by the Project Representative. The material placement activities at 1A-B, c1, 13, and 14C must use this process due to the restricted nature of those SMAs.

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6.0 Methods and Procedures

6.1 Material Acceptance

All submittals for materials must be accepted and approved by King County prior to delivery of materials to Project Site. Please see Section 9.3 of this plan as well as the Construction Quality Control Plan (Appendix N of the RAWP) for all required physical and chemical testing of imported clean materials. Please refer to the Baseline Project Schedule for required testing dates.

6.2 Practice Placement

The purpose of the practice placement is to ensure that the Contractor's proposed placement means and methods are adequate and effective in meeting the Targeted Placement Thicknesses for ENR and RMC. Please also reference the Construction Quality Control Plan for additional details regarding the practice placement.

Equipment and Materials

The practice placement will be conducted with the HITACHI EX 1200-6 excavator positioned on the Lash 4 barge. The Eglon barge will be loaded with import material and rafted alongside the Lash 4 barge.

Location and Setup

The practice placement will be conducted at PPM's 700 S Riverside yard. The placement will be conducted on top of two 20' x 10' steel sheets located on PPM's dock, giving a total practice placement area of 400 sqft. This setup allows for clear visual observation and measurement of the placed thickness. This proposed area must be reviewed and accepted by the Project Representative before proceeding.

Visible Measurement

During the practice placement, PPM will provide stakes every 10' to indicate the thickness of the placed material layer. The Project Representative will observe and verify the placement thickness during the practice placement.

Conducting the Practice Placement

PPM will conduct the practice placement for any operator that will be placing material by grabbing a bucket-full of RMC material with the HITACHI EX 1200-6 excavator and placing it onto the designated flat area from a height similar to what will be used in field conditions. PPM will ensure that the placement method replicates the full-scale placement process, including the speed of application, distribution techniques, and equipment operation. Each excavator operator and the superintendent will carefully monitor and adjust the placement process as necessary to achieve the Targeted Placement Thicknesses.

Observation and Acceptance

The Project Representative will closely observe the practice placement to ensure that the materials are being placed evenly and to the specified Targeted Placement Thickness. Measurements of the

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placed material will be taken and recorded for comparison against the Targeted Placement Thicknesses.

Adjustments and Re-Testing

If the practice placement does not meet the Targeted Placement Thicknesses, PPM will modify its means and methods accordingly. PPM will conduct additional practice placements as necessary to demonstrate compliance with the Specification requirements. All additional practice placements and modifications must be conducted at no additional cost to the County.

Documentation

PPM will document the entire practice placement process, including the operator(s) name(s), equipment and methods used, the measured thicknesses, any adjustments made, and the final results. A detailed report of the practice placement will be submitted to the Project Representative for review and acceptance.

6.3 Engineered Cap B – SMA 12B

When placing Engineered Cap B, Placement Post-Construction Surveys will be completed by PPM following placement of each Engineered Cap B layer (isolation, filter, and erosion protection layers). Each capping layer will meet the Minimum Required Placement Thicknesses as shown on the Drawings, prior to placing the next Engineered Cap B layer in that area.

Placement Acceptance Criteria of Isolation Layer:

- **Minimum Required Placement Thickness:** Place the isolation layer to achieve a 12-inch Minimum Required Placement Thickness, allowing for a 6-inch Maximum Overplacement Allowance.
- **Horizontal Acceptance Criteria:** At least 95% of the Engineered Cap B surface area must meet the Minimum Required Placement Thickness.

Placement Acceptance Criteria of Filter Layer:

- **Minimum Required Placement Thickness:** Place the filter layer to achieve a 6-inch Minimum Required Placement Thickness, allowing for a 6-inch Maximum Overplacement Allowance.
- **Horizontal Acceptance Criteria:** At least 95% of the Engineered Cap B surface area must meet the Minimum Required Placement Thickness.

Placement Acceptance Criteria of Erosion Protection Layer:

- **Minimum Required Placement Thickness:** Place the erosion protection layer to achieve a 12-inch Minimum Required Placement Thickness, allowing for a 6-inch Maximum Overplacement Allowance.
- **Horizontal Acceptance Criteria:** At least 95% of the Engineered Cap B surface area must meet the Minimum Required Placement Thickness.

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Adjustments

If any discrepancies are found during the surveys, necessary adjustments will be made to the placement methods and re-survey to confirm compliance.

6.4 ENR, RMC, and Backfill

Enhanced Natural Recovery (ENR)

Targeted Placement Thickness

- **Targeted Placement Thickness:** place ENR to achieve 9-inch Targeted Placement Thickness
- **Vertical Tolerance:** Thickness of +/-3 inch of Vertical Placement Tolerance from Targeted Placement Thickness
- **Horizontal Acceptance Criteria:** Minimum of 50% of surface area equal to or thicker than Targeted Placement thickness; 95% of ENR surface area will be at thickness of at least 6 inches

Placement Method

PPM will use controlled placement by the clamshell bucket to ensure even distribution of ENR materials over the designated area, ensuring gradual and even coverage to achieve the targeted placement thickness.

Adjustments

If any discrepancies are found during the surveys, necessary adjustments will be made to the placement methods and re-survey to confirm compliance.

Residuals Management Cover (RMC)

Targeted Placement Thickness

- **Targeted Placement Thickness for Required RMC (within the toe of the SMA dredge cut) and Inner and Contingent Outer Perimeter RMC:** place Required RMC and Inner/Contingent Outer Perimeter RMC to achieve 9-inch Targeted Placement Thickness
- **Targeted Placement Thickness for Required RMC (Exterior Side Slopes with 3H:1V placement):** place Required RMC in these areas to achieve 24-inch Targeted Placement Thickness
- **Vertical Tolerance:**
    - **For Required RMC (within the toe of the SMA dredge cut) and for Inner and Contingent Outer Perimeter RMC:** Thickness of +/-3 inches from Targeted Placement Thickness
    - **For Required RMC in Exterior Side Slopes:** Thickness of +/-6 inches from Targeted Placement Thickness
- **Horizontal Acceptance Criteria:**
    - **For Required RMC (within the toe of the SMA dredge cut) and for Inner and Contingent Outer Perimeter RMC:** Minimum of 50% of RMC surface area equal to or thicker than Targeted Placement Thickness; 95% at least 6 inches thick within the toe of the SMA dredge cut

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- **For Required RMC in Exterior Side Slopes:** Minimum of 50% of RMC surface area equal to or thicker than Targeted Placement Thickness; 95% at least 18 inches thicken exterior side slopes

Placement Method

PPM will use controlled placement by the clamshell bucket to ensure even distribution of RMC materials over the designated area, ensuring gradual and even coverage to achieve the targeted placement thicknesses.

Adjustments

If any discrepancies are found during the surveys, necessary adjustments will be made to the placement methods and re-survey to confirm compliance.

Additional Contingent Outer Perimeter RMC Placement

Based on sediment sampling/testing results, additional Contingent Outer Perimeter RMC placement may be directed by the Project Representative.

Backfill

Targeted Placement Elevation

- **Target Placement Elevation:** As shown on the project Drawings
- **Vertical Tolerance:** Elevation +/-6 inches from Targeted Placement Elevation (and grades)
- **Horizontal Acceptance Criteria:** 95% of backfill surface area will be backfilled to within the Vertical Placement Tolerance

Placement Method

When placing Backfill Material adjacent to Required RMC, place the Backfill Material first to provide a stable base. PPM will use controlled placement by the clamshell bucket to ensure even distribution of Backfill materials over the designated area, ensuring gradual and even coverage to achieve the Targeted Placement Elevation.

Adjustments

If any discrepancies are found during the surveys, necessary adjustments will be made to the placement methods and re-survey to confirm compliance.

6.5 Engineered Cap A - SMA 5

The placement of Engineered Cap A involves performing intertidal excavation and placement in the dry during low tide cycles. This method ensures that work below the +14 ft MLLW is conducted efficiently and within the constraints of tidal fluctuations. The following methods and procedures outline the steps to achieve accurate and effective placement of Engineered Cap A.

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Methods and Procedures

Preparation

- **Tide Cycle Planning:** Develop a detailed schedule and map of work segments based on tide charts to identify optimal low tide windows for excavation and placement activities. This ensures that the maximum volume can be removed and replaced with Engineered Cap A within each tide cycle.
- **Site Setup:** Prepare the site by marking boundaries with construction stakes and setting up necessary equipment with RTK GPS machine control. Ensure all personnel are briefed on the schedule and procedures for working within the tide cycles.

Temporary Stockpiling

- **Designated Stockpile Areas:** Clean material will be stockpiled in a designated paved area in the parking lot. These areas will be clearly marked and managed to prevent contamination. Additional details regarding the stockpile location and configuration can be found in the Temporary Facilities Plan (Appendix G of the RAWP) and the Erosion and Sediment Control Plan (Appendix W of the RAWP).
- **Stockpile Management:** Ensure that stockpiled materials are kept clean and dry. Use tarps or other protective coverings if necessary to protect materials from weather conditions.

Excavation and Placement Sequence

- **Excavation above MHHW:** Overburden, vegetation, and debris will be handled the same as excavation. All material will be excavated and placed into the trucks for disposal.
- **Intertidal Excavation:** Each excavated segment will be completed from top of cut to bottom of cut. Each Engineered Cap A placement cycle will be completed from bottom of cut to top of cut. All Engineered Cap A layers and survey is unlikely to be placed in single tide cycle. The minimum goal will be first layer placed prior to tide inundation.
- **Controlled Excavation:** Excavation equipment will utilize RTK GPS machine control. Exact equipment will be provided in a resubmittal in June 2026 (prior to the 2026-2027 construction season) for Project Representative review and approval. All excavations will proceed from top of cut to bottom of cut.
- **Collect Samples:** the County will collect samples after bank excavation is complete but before material placement. Analytical results will not be required to complete the material placement activities.

Placement of Engineered Cap A

Cap Layer Placement Sequencing and Approval

Placement of Engineered Cap A will follow a strict layer sequencing protocol to ensure stability and effectiveness. Please see Figure 1

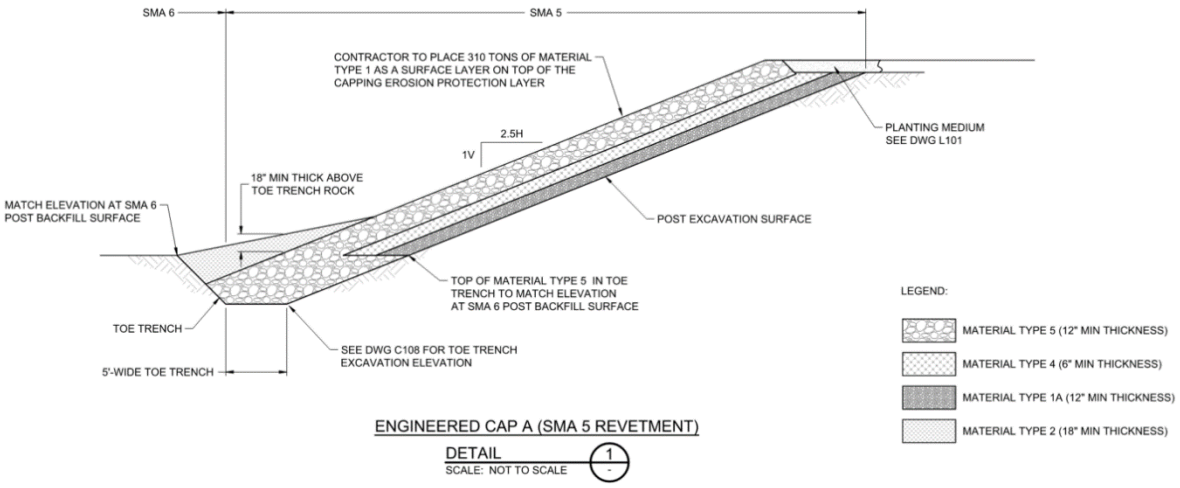

Figure 1- Engineered Cap A

Each Engineered Cap A layer must meet the specified minimum required placement thickness before the subsequent cap layer is placed. Placement will be performed in the dry during low tide cycles to prevent material displacement. Post-placement surveys will be conducted after each layer to verify compliance with the minimum required placement thickness.

Placement Acceptance Criteria

The targeted placement thickness for each layer is critical to achieving the desired performance of Engineered Cap A. The placement acceptance criteria are as follows:

- **Minimum Required Placement Thickness:**
  - **Isolation Layer**: minimum required placement thickness of 1 foot with a 0.5-foot maximum overplacement allowance.
  - **Filter Layer**: minimum required placement thickness of 0.5 foot with a 0.5-foot maximum overplacement allowance.
  - **Erosion Protection Layer**: minimum required placement thickness of 1 foot with a 0.5-foot maximum overplacement allowance.
- **Horizontal Acceptance Criteria:** 95% of the Engineered Cap surface area must meet the minimum required placement thickness. Placement activities will be documented through electronic placement records and weight tickets, ensuring that the material distribution adheres to project specifications.

Protection Measures:

- **Temporary Erosion and Sediment Control (TESC) Measures:** TESC measures will be implemented per the Erosion and Sediment Control Plan to protect the site during placement activities. This includes installing silt fences, sediment barriers, and other erosion control devices around the work area. Please refer to the Erosion and Sediment Control Plan for additional information.

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- **Site Stability:** Ensure that all protective measures are in place to prevent erosion and sediment runoff during and after placement activities. Inspect daily and maintain these measures to ensure their effectiveness.
- **Tidal Sequencing:** The excavation of SMA 5 will be conducted in a manner that aligns with the tidal cycles to ensure efficient and effective sediment removal and capping within the same tidal window. The excavation will be carried out in sections small enough to be both excavated and capped within a single tidal cycle, thus minimizing the risk of sediment resuspension and environmental impact. Portions of SMA 5 will be inundated; therefore, careful planning and execution are essential. Each excavation segment will be planned according to the tidal schedule, with operations beginning at low tide to maximize the work window. The area will be excavated, and the removed sediment will be immediately transported to a designated disposal site. Following the excavation, the placement of the Engineered Cap A layers – Isolation, Filter, and Erosion Protection – will commence promptly to ensure that at a minimum the isolation layer is completed before the area is inundated again. This approach ensures that the cap is effectively placed and secured, preventing any delay between excavation and capping, and maintaining the integrity of the remediation process.

Post-Placement Activities:

- **Verification Surveys:** After each cap layer placement, post-placement surveys will be conducted to verify that the Cap A materials have been placed to the specified thickness and coverage requirements.
- **Adjustments:** If any discrepancies are found during the surveys, necessary adjustments will be made to the placement methods and re-survey to confirm compliance.
- **Documentation:** Detailed records will be maintained of all excavation and placement activities, including the volumes removed, materials placed, and survey results. Records will be submitted to the Project Representative for review and acceptance.

6.6 Amended Cover

Amended cover is an area-specific technology referred to as Technology B – Amended Cover. It consists of Material Type 3 (composed of clean, well-graded gravelly sand material blended with granular activated carbon [GAC]) to meet specific environmental requirements. It will be placed in SMA 7 and SMA 13.

Targeted Placement Requirements

- **Targeted Placement Thickness:** place Amended Cover to achieve 12 inches
- **Vertical Placement Tolerance:** Thickness of +/-3 inches from the Targeted Placement Thickness
- **Horizontal Acceptance Criteria:**
- Minimum of 50% of the surface area equal to or thicker than the Targeted Placement Thickness; 95% of the Amended Cover surface area will be at a thickness of at least 9 inches

Methods and Procedures

PPM will prioritize the placement of Material Type 3 when river stage elevations are below the placement area to the maximum extent possible. This approach minimizes disturbance and ensures better control of material placement. If Material Type 3 is intended to be placed below

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the waterline, the bucket will be lowered below the water surface to place the material in a controlled manner. The bucket will not contact the waterway bed at any time during placement to avoid disturbing the existing sediments. The material will not be released from above the water surface or from higher than 2 feet above the waterway bed without acceptance by the Project Representative. PPM will place Material Type 3 from marine-based excavators at SMA 7 and SMA 13.

The placement of Amended Cover adjacent to Outfall 2073 requires careful execution to ensure a smooth transition and continuous coverage. The process involves the following steps:

1. Preparation of Bedding Surface: Create a generally smooth bedding surface beneath the Gabion Mattress within the interstices of the riprap. This will involve selectively repositioning riprap to achieve continuous coverage beneath the Gabion Mattress.
2. Smooth Transition Creation: Adjacent to and level with the Gabion Mattress edges, create a smooth transition between the Amended Cover material and the Gabion Mattress to ensure a seamless interface as shown in the project drawings.

7.0 Best Management Practices

The following Best Management Practices (BMPs) ensure that material placement activities are conducted in a manner that minimizes environmental impact, prevents mixing of materials, and protects existing structures and the integrity of the project site.

7.1 General BMPs for Material Placement

Prevent Mixing of Subgrade Materials:

Material placement will be completed in a manner that does not result in the mixing of the subgrade of placed materials. Certain techniques involve:

- Low-Drop Placement: When placing material from a bucket or similar equipment, release the material as close to the subgrade as possible to minimize the force of impact and prevent subgrade disruption.
- No alternating bucket loads: One material type will be placed in its entirety (where practical) prior to placing the next material type
- Clamshell Placement Only: Using a bottom dump barge for material placement is not allowed due to the excessive mixing that could occur.

Equipment and Method Approval:

PPM will use the proposed equipment as accepted by the Project Representative in this Material Placement Plan before starting material placement activities. This ensures that all equipment and methods are suitable for the specific conditions of the project site.

Closed Buckets

Utilize closed bucket for all material placement activities, which are designed to minimize the loss of material during placement operations by containing the clean import material more effectively and reducing the dispersion of the aggregates into the water column.

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Compliance with Vertical Placement Tolerances:

To ensure compliance with vertical placement tolerances, the following measures will be implemented:

- **Use of Experienced Operators**: Employ skilled and experienced operators who are proficient in precise material placement techniques.
- **Controlled Placement**: Implement controlled placement procedures to ensure accurate and even distribution of materials.
- **Routine Calibration of Positioning Software**: Regularly calibrate positioning software to maintain accuracy and reliability in material placement operations.

Adjustments

If any discrepancies are found during the surveys, necessary adjustments will be made to the placement methods and re-survey to confirm compliance.

Controlled Placement Techniques

For placement of material in-water, materials will be placed from the bottom (toe) of the slope, working up the slope to allow for complete coverage of the designated area and to minimize disturbance to the existing sediment bed surface. Rapid dumping of a barge or bucket load is not allowed. Materials will be placed in a controlled manner to ensure even distribution and to avoid creating high spots or causing excessive sediment disturbance.

Protection of Engineered Cap Layers

When placing multiple layers of the engineered cap, the operator will make slow and controlled placement utilizing the HYPACK software to not damage previously placed layers. This ensures the structural integrity and effectiveness of the cap.

Prohibition on Equipment Dragging

PPM will not drag equipment over areas with placed material to even out high spots. This practice could disturb the material layers and compromise their effectiveness.

7.2 BMPs for Material Placement Under Existing Structures

Field Verification

PPM will be responsible for field verifying dimensions, elevations, and horizontal and vertical clearances beneath structures. Accurate measurements ensure that material placement does not inadvertently damage or compromise the structures.

Cautious Navigation and Placement

PPM will proceed with caution when placing materials while maintaining, navigating, or transitioning floating vessels or other equipment under existing structures. This caution minimizes the risk of accidental damage. Identified structures will be loaded into the positioning software to help avoid structures during placement and transportation.

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Protection of Existing Structures

- Spudding to anchor the Contractor's equipment on the Lower Duwamish Waterway (LDW) is not allowed within 30 feet of the South Park Bridge's active submarine cable. PPM will perform its own utility locate prior to starting any placement activities. If PPM determines structure support is required it will submit detailed drawings of the proposed methods to support, protect, and buttress utilities affected by the Work 21 days prior to work in those areas. These drawings will include precise plans for temporary supports, shoring, bracing, and any other necessary protective measures. The proposed methods and detailed drawings are required to be reviewed and accepted by the affected utility companies. This ensures that the support systems meet the specific requirements and standards set by each utility provider.
- As required by the utility, PPM will protect, maintain, support in place, or relocate all water pipelines as needed depending on field conditions. This involves taking adequate precautions to ensure that water supply is not disrupted and that pipelines remain intact during the placement operations.
- PPM will shore up, brace, underpin, and protect as necessary the foundations and other parts of existing structures adjoining the Work Site that will be affected by the Work. This includes:
    - Shoring: Installing temporary supports to stabilize structures and prevent movement or collapse during the dredging operations.
    - Bracing: Using temporary braces to support walls, foundations, and other structural elements.
    - Underpinning: Reinforcing or extending the foundation of existing structures to ensure stability and support during and after the dredging activities.
- Regular inspections will be conducted to ensure that all temporary support systems are functioning correctly and that there are no signs of stress or failure. Any issues identified will be addressed immediately to prevent further complications.
- Detailed records of all inspections, maintenance activities, and any incidents will be maintained. This documentation will be shared with relevant stakeholders, including utility providers and the Project Representative, to ensure transparency and accountability.

Special Considerations Near South Park Bridge

The South Park Bridge will be closed to traffic for extended bridge openings to perform the required material placement. Please refer to the Traffic Control Plan for closure hours, duration, and procedures. PPM is responsible for reviewing structural as-builts and other conditions under the South Park Bridge and South 98th Street Bridge that will be encountered during placement activities (see Section 01 13 00 – Reference Material).

For Work conducted within 30 feet of the South Park Bridge:

- PPM will provide a spotter during Work conducted within 30 feet of the South Park Bridge.
- The spotter is responsible for advising the operator of any contact with any portion of the structure.

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- The spotter will have clear sight lines between the equipment and the bridge structure and will be within radio communication with the equipment operator.

Tidal Fluctuations and Limited Access

PPM will carefully select and implement means and methods for placing materials under existing structures to account for tidal fluctuations over the construction duration and limited access under the bridge. This includes considering both physical access limitations and fluctuating clearance to prevent damage to any portion of the existing structures.

7.3 Special Considerations in South Park Marina

The objective of this section is to outline the steps for the safe and efficient placement of amended sand cover in the South Park Marina while ensuring the protection of all vessels, marina structures, and the well-being of live-aboard tenants. This plan includes the use of spotters, UHF/VHF radio communication, in-person coordination, and measures to minimize impacts on residents.

Key Requirements:

- **Protection of Vessels and Marina Structures**: Ensuring that all vessels and marina structures are protected during material placement.
- **Unobstructed Public Access**: Ensuring that public access points are not blocked when the crew is not actively working in the marina.
- **Minimizing Impact on Live-Aboard Tenants**: Ensuring that the operations do not unduly disturb or negatively impact live-aboard tenants.

1. **Pre-Operation Coordination**:
    - Conduct a pre-operation meeting with all crew members, marina staff, and relevant stakeholders to discuss the scope of work, safety protocols, and communication procedures.
    - Identify key personnel responsible for overseeing vessel movements and material placement, including spotters and radio operators.
    - Engage with live-aboard tenants to inform them about the planned operations, expected timeline, and any measures being taken to minimize disturbances.
2. **Spotter Deployment**:
    - Deploy trained spotters at strategic locations around the marina to monitor and guide vessel movements.
    - Spotters will be positioned at marina entrances, near high-traffic areas, and at any points of conflict between construction activities and marina operations.
    - Spotters will be equipped with UHF/VHF radios to maintain constant communication with the vessel crew, other spotters, and marina personnel.
3. **Vessel Movement Coordination**:

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- Prior to moving the vessel into or out of the marina, the lead spotter will establish communication with the vessel operator via UHF/VHF radio.
- Spotters will provide clear instructions to the vessel operator regarding the safest path of travel, taking into account the location of moored vessels, marina structures, and ongoing activities.
- In-person communication will be used in conjunction with radio communication, especially in areas with limited visibility or high noise levels, to ensure clear and concise direction.
- Spotters will coordinate the timing of vessel movements to avoid conflicts with other marina operations and to minimize disruption to public access points.

4. **Material Placement**:
   - Material placement will be conducted in a manner that minimizes the risk of damage to vessels and marina structures. This includes using precise placement techniques and monitoring the position of equipment relative to marina assets.
   - The crew will work in designated zones, and material placement activities will be confined to these areas. Spotters will ensure that vessels are clear of these zones before work begins.
5. **Protection Measures**:
   - Physical barriers (e.g. barge fenders) will be used as needed to protect vessels and structures during material placement.
6. **Public Access Management**:
   - When not actively working in the marina, the crew will ensure that all equipment is moved out of the way and that no public access points are obstructed.
   - Signage will be placed to inform the public of ongoing operations and to direct them safely around the work areas.
7. **Minimizing Impact on Live-Aboard Tenants**:
   - **Noise Control**: Operations will be conducted in accordance with the Noise Control Plan to minimize noise pollution. This includes limiting work to daylight hours, using noise-dampening equipment, and avoiding high-noise activities during early morning or late evening hours.
   - **Light Management**: Lighting used during the operation will be shielded and directed downward to prevent light pollution, ensuring minimal disruption to tenants' living conditions. This will be done in accordance with the Light Control Plan.
   - **Air Quality**: Measures will be taken to minimize dust and airborne particulates during material placement, as outlined in the Air Control Plan. This includes using water spray systems to suppress dust and ensuring that all machinery is well-maintained to reduce emissions.
   - **Tenant Communication**: Live-aboard tenants will be kept informed of the work schedule and any changes that will affect them. Communication will be maintained

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through notices, direct communication, and updates on relevant community websites/bulletin boards.

8. **Ongoing Communication**:
    - Regular check-ins will be conducted via UHF/VHF radios to keep all personnel informed of the work progress and any changes in the marina environment.
    - Any issues or hazards identified by spotters or crew members will be immediately communicated to the project manager and/or superintendent and addressed before continuing operations.
9. **Post-Operation Review**:
    - At the end of each workday, a review will be conducted to assess the effectiveness of the safety measures and communication protocols.
    - Feedback from live-aboard tenants will be collected to identify any issues or concerns and to make adjustments as necessary.

8.0 Surveys and Documentation

Please refer to the Survey Positioning Control Plan and Construction Quality Control Plan for additional information regarding these sections.

8.1 Pre-Construction, Progress, and Post-Construction Surveys:

- Post-Dredge Surveys will be used to establish baseline conditions for each SMA and for placement of Engineered Caps A and B, Backfill Material, and Required RMC.
- Construction Season's Pre-Construction Survey will be used for ENR, Amended Cover, and Inner and Contingent Outer Perimeter RMC placement activities.
- Conduct Placement Progress Surveys to document ongoing placement activities and ensure compliance with the specifications.
- Conduct Placement Post-Construction Surveys immediately after completing material placement of each material type within an SMA to verify that the placement meets the Targeted Placement Elevation, Targeted Placement Thickness, and Minimum Required Placement Thickness.

Survey Compliance

- All surveys will be conducted in accordance with Section 02 21 00 (Site Surveys and Positioning Control).
- Notify the Project Representative at least 2 working days before completing material placement to allow for scheduling of the review process.
- The Placement Post-Construction Survey will be conducted within 1 working day after completing material placement activities within an SMA.
- PPM will submit the Placement Post-Construction Survey to the Project Representative within 1 working day after conducting the survey for review and acceptance.

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Survey Review and Acceptance

- The Project Representative will take up to 2 working days to review the Placement Post-Construction Survey and provide acceptance of the work as complete for material placement in the SMA.
- The Project Representative will review the Placement Post-Construction Survey and associated field data and, if satisfactorily completed, will accept the material placement activities for each layer of material and each SMA as complete.

8.2 Record Keeping

Daily and Weekly Construction Reports

- PPM will maintain detailed daily and weekly records summarizing placement activities, including equipment used, areas covered, volumes placed, and any incidents or deviations from the plan.
- PPM will include these records as part of the Daily and Weekly Construction Reports Section Article to ensure transparency and accountability.

Barge Displacement Measurements

- PPM will obtain barge displacement measurements for all loaded material barges as they arrive at the Work Site.
- PPM will collect and provide barge displacement measurements, both empty and full, as part of the Daily Construction Report at the end of each work shift.
- PPM will ensure that measurements are taken following the placement of all materials stockpiled on the Contractor material barges.

Electronic Records and Bucket Maps

- PPM will collect electronic records of each placement location, commonly referred to as "bucket maps."
- PPM will include bucket map reports in a format acceptable to the Project Representative as part of the Daily Construction Report.
- Bucket maps will clearly indicate the Material Type associated with each bucket and provide a detailed record of the placement process.

9.0 Import Material Compliance and Quality Control

9.1 Import Source

Supplier Information

All of the aggregate material types for the Lower Duwamish Waterway will be sourced from Glacier NW dba. CalPortland, (GNW).

Borrow Source

- **Material Type 1, 1A, 2:** CalPortland's Pioneer Aggregates (WSDOT ASA Pit Source ID #B-335) at 4301 Pioneer Way, DuPont, WA
- **Material Type 4 & 5:** CalPortland's White River Quarry (WSDOT ASA Pit Source ID #2A487) in Enumclaw, WA.

9.2 GAC Procedures

Pre-Soaking and Blending of Granular Activated Carbon (GAC):

- **Stockpile Location:** CalPortland's aggregate stockpile will be located at their facility in DuPont, Washington. The material is mined from the DuPont quarry and stockpiled within the facility. Materials will be transported directly from the stockpile to the hopper for blending as per each load requested.
- **Storage:** GAC material will be stored in 1,100-pound impermeable supersacks, supplied by the vendor, until the soaking and blending occurs.
- **Pre-Soaking**: GAC supersack bags will be placed in watertight soaking bins and soaked in water (fully submerged) and agitated via manual shoveling for a minimum of 24 hours prior to blending with Material Type 1. Once the GAC has soaked for the 24 hours the supersack bag will be removed from the soaking bin and the bag will be placed over the mixing hopper. The bag will then be cut open to allow the GAC to drain into the mixing hopper. Alternative soaking methods acceptable to the Project Representative will be used if PPM demonstrates that the method results in uniform distribution of GAC within the blended material and minimize differential settling patterns or excessive loss of GAC material.

Material Type 3 Blending & Wetting Requirements

- **Material Source Consistency:** Material Type 1 used for preparation of Material Type 3 will use the same source for all Material Type 1 on the project.
- **Blending Ratio:** Material Type 3 will be generated by uniformly blending GAC with Material Type 1 at a minimum dosage of 2.0% (by dry weight).
- **Preferred Blending Location:** PPM will elect to blend Material Type 3 at CalPortland's DuPont facility.
- **Process:** GNW Fine Material Blending System was originally developed to blend a granular activated carbon material with sand and gravel for in-water placement on an environmental capping project. The feeder consists of a hopper, equipped with an enclosed, internal auger. The auger is electronically speed controlled to meter material onto a shipping conveyor based on required project blend parameters. The control system monitors the feed rate of sand and gravel on the shipping conveyor from the output on a certified four idler belt scale; this information is monitored by the Programmable Logic Controller (PLC). The output from the PLC adjusts the speed of the calibrated auger to provide the required percentage of fine material. The GAC material will be thoroughly blended to reach the uniform target concentration of 2% GAC (Dry weight based on blending requirements for Material Type 3) at time of barge loading.
- **Verification:** PPM will provide total pounds of GAC and Material Type 1 utilized, and total tonnage of Material Type 3 produced as means of verifying the GAC content within the amended mixture, subject to acceptance by the Project Representative. The Project

Pacific Pile & Marine, LP
700 South Riverside Drive
Seattle, WA 98108

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Representative will observe blending and will collect samples of Material Type 3 to verify GAC content. PPM will provide the Project Representative at least 3 working days' notice of all Material Type 3 blending and barge loading activities. Any barges loaded without proper notification will result in rejection of material at the Project Representative's discretion and at the sole expense of PPM.

- **Stockpile Wetting:** After soaking and blending as described in the Pre-soaking section above, Material Type 3 will be kept wet (or re-wet as needed) prior to placement utilizing a 2" hose and nozzle set to a "fog" spray pattern so as to not apply a direct jet to the material which could cause unmixing. PPM will verify that Material Type 3 is wet before placement.

9.3 Testing & Inspections

Sample Collection and Chemical Testing

- **Representative Samples:** Prior to placement activities, PPM will submit a physical sample of each Material Type to be used for the Work. PPM will also collect one sample for every 10,000 cubic yards (CY; with an absolute minimum of two samples) of material sources of Material Types 1, 1A, 2, and 4 to be imported to the Work Site per specification section 35 37 10.
- **Grab Samples Method:** Samples will be collected in the following matter:
    1. Trained environmental personnel will collect all samples.
    2. Samples will be taken in situ from the active mine face, the source material to be tested.
        - Samples will be collected with sterilized stainless steel spoons or directly into laboratory sterilized and provided sample containers.
        - Samples will be taken directly from the active mine face to ensure they are representative of all material provided from the deposit. Grab samples contain constituents from what later becomes each individual material type.
    3. Sample containers will be immediately sealed and labeled.
    4. Chain of Custody documents will be completed at the time of sampling.
    5. Samples will be immediately stored in a secure place, such as a cooler, for transport to the laboratory.
        - For samples being shipped out of state, dry ice will be added to the cooler to ensure samples remain at the required temperature
- **Chemical & Gradation Testing:** The collected samples will undergo chemical and gradation testing to ensure compliance with project specifications. The results will be provided in report form, with the reports clearly identifying the following:
    1. 1. Source of samples
    2. 2. Sampling dates
    3. 3. Chain of custody
    4. 4. Sampling locations
    5. 5. Material Certification: Submit certification from material supplier that the materials meet specification requirements for gradation and chemical testing.
- **Accredited Laboratories:** CalPortland will utilize Analytical Resources, LLC for all analyses except PCBs by 1668c, which will be performed by Enthalpy Analytical lab in CA. Chemical testing will performed and submitted per Specification Section 35 37 10.

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Visual Inspections

Barges with placement materials will be visually inspected by PPM upon delivery to the Work Site. Placement materials will be inspected for the presence of foreign, recycled, reprocessed material or debris to ensure that imported materials are natural, native, virgin materials and free of contaminants (i.e., meet the requirements of this Section). The presence of foreign, recycled, or reprocessed materials or debris is to be reported to the Project Representative, who will determine if the import placement materials are acceptable for performance of the placement Work. In the event of rejections, it is the responsibility of PPM to remove all rejected material from the Work Site at no extra cost to the County. Acceptance or rejection of import placement materials brought to the Work Site will be provided within 1 working day of PPM reporting inspection of placement material results to the Project Representative.

9.4 Placement Deficiencies

Correction of Deficiencies

- **Non-Compliance:** If the Targeted Placement Elevation/Thickness requirements are not achieved within the Vertical Placement Tolerances, the Minimum Required Placement Thickness requirements are not achieved within the Maximum Overplacement Allowances, the horizontal area-based acceptance criteria are not met in all placement areas as shown on the Drawings, or Excessive Overplacement occurs, PPM will correct placement deficiencies.
- **Additional Surveys:** PPM will conduct additional associated Placement Post-Construction Surveys to the satisfaction of the Project Representative and at no extra cost to the County.
- **Notification and Rectification:** PPM will notify the Project Representative of any deficiencies and promptly address and rectify them to ensure compliance with all specified requirements.

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Attachment A- Sampling and Chemical Analysis Methods Attachment

Grab Sample Method

I. Trained environmental personnel collect all samples.
II. Samples are taken in situ from the active mine face, the source material to be tested.
    a. Samples are collected with sterilized stainless steel spoons or directly into laboratory sterilized and provided sample containers.
    b. Samples are taken directly from the active mine face to ensure they are representative of all material provided from the deposit. Grab samples contain constituents from what later becomes each individual product.
III. Sample containers are immediately sealed and labeled.
IV. Chain of Custody documents are completed at the time of sampling.
V. Samples are immediately stored in a secure place, such as a cooler, for transport to the laboratory.
    a. For samples being shipped out of state, dry ice will be added to the cooler to ensure samples remain at the required temperature.

Chemical Analyses

Analytical Resources, LLC
4611 S 134th Pl #100
Tukwila, WA 98168

Parameter	Method	Notes
Arsenic	EPA 6020B UCT-KED	
Cadmium	EPA 6020B UCT-KED	
Chromium	EPA 6020B	
Copper	EPA 6020B UCT-KED	
Lead	EPA 6020B	
Mercury	EPA 7471B	
Silver	EPA 6020B	
Zinc	EPA 6020B UCT-KED	
Total LPAH	N/A	Lab does not calculate LPAH. However, lab can analyze for all parameters included in the calculation.
2-Methylnapthalene	EPA 8270E	
Acenaphthene	EPA 8270E	
Anthracene	EPA 8270E	
Fluorene	EPA 8270E	

Naphthalene	EPA 8270E	
Phenanthrene	EPA 8270E	
Total HPAH	N/A	Lab does not calculate HPAH. However, lab can analyze for all parameters included in the calculation.
Benz[a]anthracene	EPA 8270E	Same as Benzo[a]anthracene
Benzo[a]pyrene	EPA 8270E	
Benzo[g,h,i]perylene	EPA 8270E	
Chrysene	EPA 8270E	
Dibenzo[a,h]anthracene	EPA 8270E	
Fluoranthene	EPA 8270E	
Indeno[1,2,3-c,d]pyrene	EPA 8270E	
Pyrene	EPA 8270E	
Total Benzofluoranthenes	EPA 8270E	
cPAH	N/A	Lab does not calculate cPAH. However, lab can analyze for all parameters included in the calculation.
Bis[2-ethylhexel]phthalate	EPA 8270E	
Butylbenzyl phthalate	EPA 8270E	
Dimethyl phthalate	EPA 8270E	
2,4-Dimethylphenol	EPA 8270E-SIM	
4-Methylphenol	EPA 8270E	
Benzoic acid	EPA 8270E	
Pentachlorophenol	EPA 8270E	
Phenol	EPA 8270E	
1,2,4-Trichlorobenzene	EPA 8270E-SIM	
1,2-Dichlorobenzene	EPA 8270E-SIM	
1,4-Dichlorobenzene	EPA 8270E-SIM	
Dibenzofuran	EPA 8270E	

Hexachlorobenzene	EPA 8270E-SIM	Rather than 8081b, lab uses 8270-SIM for RL of 5.0 ug/kg. Detection limit is 0.7 ug/kg.
n-Nitrosodiphenylamine	EPA 8270E-SIM	
Dioxin/furan TEQ	N/A	Lab does not calculate TEQ. However, lab can analyze for all parameters included in the calculation.
2,3,7,8-TCDD	EPA 1613B	RL 0.997 ng/kg. EDL 0.111 ng/kg.
1,2,3,7,8-PeCDD	EPA 1613B	RL 0.997 ng/kg. EDL 0.223 ng/kg.
1,2,3,4,7,8-HxCDD	EPA 1613B	RL 0.997 ng/kg. EDL 0.201 ng/kg.
1,2,3,6,7,8-HxCDD	EPA 1613B	RL 0.997 ng/kg. EDL 0.200 ng/kg.
1,2,3,7,8,9-HxCDD	EPA 1613B	RL 0.997 ng/kg. EDL 0.217 ng/kg.
1,2,3,4,6,7,8-HpCDD	EPA 1613B	RL 2.49 ng/kg. EDL 0.210 ng/kg.
OCDD	EPA 1613B	RL 9.97 ng/kg. EDL 0.336 ng/kg.
2,3,7,8-TCDF	EPA 1613B	RL 0.997 ng/kg. EDL 0.123 ng/kg.
1,2,3,7,8-PeCDF	EPA 1613B	RL 0.997 ng/kg. EDL 0.137 ng/kg.
2,3,4,7,8-PeCDF	EPA 1613B	RL 0.997 ng/kg. EDL 0.132 ng/kg.
1,2,3,4,7,8-HxCDF	EPA 1613B	RL 0.997 ng/kg. EDL 0.136 ng/kg.
1,2,3,6,7,8-HxCDF	EPA 1613B	RL 0.997 ng/kg. EDL 0.131 ng/kg.
1,2,3,7,8,9-HxCDF	EPA 1613B	RL 0.997 ng/kg. EDL 0.202 ng/kg.
2,3,4,6,7,8-HxCDF	EPA 1613B	RL 0.997 ng/kg. EDL 0.142 ng/kg.
1,2,3,4,6,7,8-HpCDF	EPA 1613B	RL 0.997 ng/kg. EDL 0.161 ng/kg.
1,2,3,4,7,8,9-HpCDF	EPA 1613B	RL 0.997 ng/kg. EDL 0.249 ng/kg.
OCDF	EPA 1613B	RL 2.49 ng/kg. EDL 0.252 ng/kg.

Enthalpy Analytical, LLC
1104 Windfield Way
El Dorado Hills, CA 95762

Parameter	**Method**	**Notes**
PCB congeners	EPA 1668c	