

Memorandum

Date: May 12, 2025

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Region 2

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From: Russ Hyatt, P.E., Project Coordinator
Gowanus Canal Environmental Remediation Trust

Subject: RTA1 Supplemental Mitigative Action Scope of Work

1. INTRODUCTION

This memorandum has been prepared by Geosyntec Consultants and its affiliated New York engineering company, B&B Engineers & Geologists (Geosyntec), on behalf of the Gowanus Canal Environmental Remediation Trust (Trust) to present the scope of the proposed RTA1 Supplemental Mitigative Action and sequence of work in response to post-supplemental dredging observations at the Douglass St. end along the western bulkhead between approximately Sta. 1+00 and 1+85.

Further information on the conditions observed at the head end of RTA1 following the completion of supplemental dredging activities are described in a technical memorandum provided to EPA by the Trust on March 19, 2025. Based on the post-supplemental dredging observations, the Trust developed this Supplemental Mitigative Action plan to remove observed NAPL impacts and eliminate associated potential pathways along the western bulkhead between approximately Sta. 1+00 and 1+85.

2. SUPPLEMENTAL MITIGATIVE ACTION SCOPE OF WORK

The proposed Supplemental Mitigative Action scope includes: (i) preparation activities; (ii) corrective action; and (iii) supporting activities, and are described herein this memorandum. **Figure 1** presents the key elements and planned sequence of the Supplemental Mitigative Action

work scope. Additionally, each key element shown on **Figure 1** is tied to a Potential Pathway identified in the Post-Supplemental Dredging Observations memorandum (B&B 2025).

As depicted in **Figure 1**, the objectives of the proposed supplemental mitigative action scope of work are to: (i) address the area where NAPL impacts were observed near the “Southern Closure Sheet” located at the southern end of the Douglass St. end (Steps 1a and 2a targeting the Potential Pathway #3 identified in the Post-Supplemental Dredging Observations memorandum); and (ii) proactive measures to create a continuous seal along Douglass St. end to prevent migration of NAPL to the Canal regardless of the source (Steps 1b, 2b, 2c, and 3).

During supplemental dredging activities completed in July 2024, the mound of compacted material located between the old concrete wall and the new steel sheet pile wall was removed, along with the top 2-feet of underlying native alluvial material, and replaced with 0.5-ft of AquaBlok and 1.5-ft of structural concrete. The extent of this work completed in July 2024 is provided in **Figure 1**. This activity did not extend to areas immediately near the closure sheets.

2.1. Preparation Activities

The Contractor will complete the preparation activities described in this section prior to the start of the corrective action described in **Section 2.2**.

The Contractor will perform diver or underwater remote operated vehicle (UROV) assisted inspection of the Canal bottom and façade of the old concrete wall and the new steel sheet pile wall on the western side of the Canal between approximately Sta. 1+00 and 1+85. The areas to be inspected are presented in **Figure 1** as Steps 1 through 3. The purpose of the visual inspection is to assess the nature and extent of NAPL impacts prior to commencing the Supplemental Mitigative Action, and, if needed, incorporate any new findings into the Supplemental Mitigative Action scope.

Following the underwater visual inspection, and prior to any activities that could suspend deposited solids and adversely affect the water quality, the Contractor will install and operate sediment and floatables containment to: (i) minimize suspended solids and NAPL migration from the vicinity of the work; and (ii) minimize suspended solids and NAPL migration south of Sta. 2+00. **Figure 1** shows the locations of the sediment and floatables containment. The sediment and floatables containment will meet the requirements of RTA1 100% Design Specification Section 02 60 16.

2.2. Corrective Action Activities

Upon completion of the preparation activities described in **Section 2.1**, the Contractor will complete the activities in the sequence described in this section and shown in **Figure 1**.

2.2.1. Jet Grouting of Sediment Behind the Northern and Southern Closure Sheets

As discussed in the Post-Supplemental Dredging Observations memorandum, the primary suspected pathway is the migration of the NAPL beneath the “Southern Closure Sheet” (i.e., Potential Pathway #3) located south of the Flushing Tunnel near Sta. 1+50. **Figure 2** further illustrates the details and specific features described in Potential Pathway #3.

Based on consideration of the sediment stratigraphy and limited width of the treatment area (i.e., 2 to 4 ft wide due to angulation of the new steel sheet pile wall) as it relates to the overall objective of extending the vertical extent of the northern and southern closure sheets by creating a cementitious barrier, low-pressure jet grouting is selected as the treatment technology as opposed to permeation grouting or other potential treatment options. Low-pressure jet grouting is a form of in-situ solidification/stabilization, where grout is delivered with a nozzle and mixing of the cementitious grout and the targeted sediment is achieved through pressure of the injected grout. In areas depicted by Steps 1a and 1b, the low-pressure jet grouting work will take place with the drill equipment and spoils collection located on a 30 feet (ft) x 80 ft Flexifloat barge (“Drill Barge”) mobilized within the Canal (as depicted in **Figure 3**). Anchor points will be added to the Butler St. bulkhead at the headwall and at the DeGraw St. end to keep the drill barge secured, as no spudding of barges will be allowed through the cap.

The low-pressure jet grouting will include installation of a series of overlapping 2.5-ft and 0.67-ft diameter jet grouting columns within the specified treatment zones between the old concrete wall and the new steel sheet pile wall. Surface casings will be installed at each jet grouting column location. The surface casings will be steel or polyvinyl chloride (PVC) and will be nominally 10-inch in diameter. The surface casings will extend from the existing ground surface (approximately at El. +6 ft NAVD88) through the gravel and AquaBlok backfill layers to the top of the jet grouting treatment zone (i.e., the top of the underlying backfilled sediment).

Jet grouting columns will extend from the bottom of the AquaBlok backfill, ~El. -9 to -7 ft NAVD88 at the northern section (see **Figure 4** for the jet grouting column layout) and ~El. -13 to -11 ft NAVD88 at the southern section (see **Figure 5** for the jet grouting column layout), down to El. -30 ft NAVD88. This would effectively extend the existing closure sheets an additional 10 feet below the top of existing cap/cover surface.

Spoils will be captured at each drilling location using a diverter. The spoils will then be pumped to the discharge bag houses located on a barge using a vacuum pump. The vacuum pump and engine will be set at the Douglass St. end. The delivery of the grout is anticipated to be via barges.

2.2.2. Targeted Removal and Replacement of Material

During supplemental dredging completed in July 2024, the top 2-ft of material located between the Flushing Tunnel opening and the new steel sheet pile wall was removed and replaced with 0.5-ft AquaBlok SW3070 and 1.5-ft of structural concrete. This excluded 3 to 5 feet wide areas adjacent to the northern and southern closure sheets (refer to **Figures 1 and 2**) that is outside the existing Flushing Tunnel opening.

Upon completion of the jet grouting work described in **Section 2.2.1**, targeted removal and replacement of material will commence. This work involves targeted removal of the top 3-ft (min) of material located between the Flushing Tunnel (or old concrete wall) and the new steel sheet pile wall by divers in Steps 2a and 2b, and replacement of the removed material with 1-ft (min) of AquaBlok SW3070 and 2-ft (min) of structural concrete.

Additionally, divers will investigate the area between the articulated concrete block (ACB) mattress and the tie-in of the Trust installed Douglass St. end and third party installed 479 DeGraw St. bulkheads (Step 2c). The diver-assisted investigation will focus on confirming the presence of a concrete seal. If the diver investigation concludes that the seal is in place with full coverage and not compromised (i.e., no indication of possible impacts and structurally intact), then the area will be left as is. If the diver-assisted investigation confirms that the structural concrete seal is missing or found to be compromised, then the top 3-ft (min) of material between the tie-in of the new steel sheet pile walls and ACB mat (i.e., Step 2c) will be removed, and replaced with 1-ft (min) of AquaBlok SW3070 and 2-ft (min) of structural concrete.

A push-boat will be used to receive and transport the hand excavated material, as well as deliver the replacement AquaBlok and any other necessary tools. The removed material will be stored in 55-gallon steel drums and labeled accordingly. Placement of the new structural concrete will be performed using a small pump truck to be staged at the Douglass St. end, similar to the setup put in place during ACB mattress installation in RTA1.

2.2.3. Targeted Cleanup and Repairs to Old Concrete Wall Façade

Upon completion of the diver-assisted targeted removal and replacement activities, divers will conduct an inspection of the façade of the old concrete wall and the new steel sheet pile wall at low tide. The diver-assisted inspection will identify any cracks or defects that could serve as a potential pathway to the Canal. This effort is a proactive measure to seal any cracks if the visual

inspection of the façade of the old concrete wall suggests migration through existing cracks and imperfections is a possibility.

After identifying cracks and imperfections to be addressed (if any), the divers will drill and install a series of ports directly into the crack or defect and pressure-inject epoxy sealant. This is a standard process to seal cracks in concrete structures. The injection will continue until the backpressure prevents further injection and returns are visibly observed that cover the crack or defect.

Additionally, any staining identified on the face of the new steel sheet piles will be power washed and removed.

Upon completion of targeted cleanup and repairs, the Contractor will perform a diver-assisted visual inspection to document post Supplemental Mitigative Action conditions and identify/remove any residual NAPL impacts.

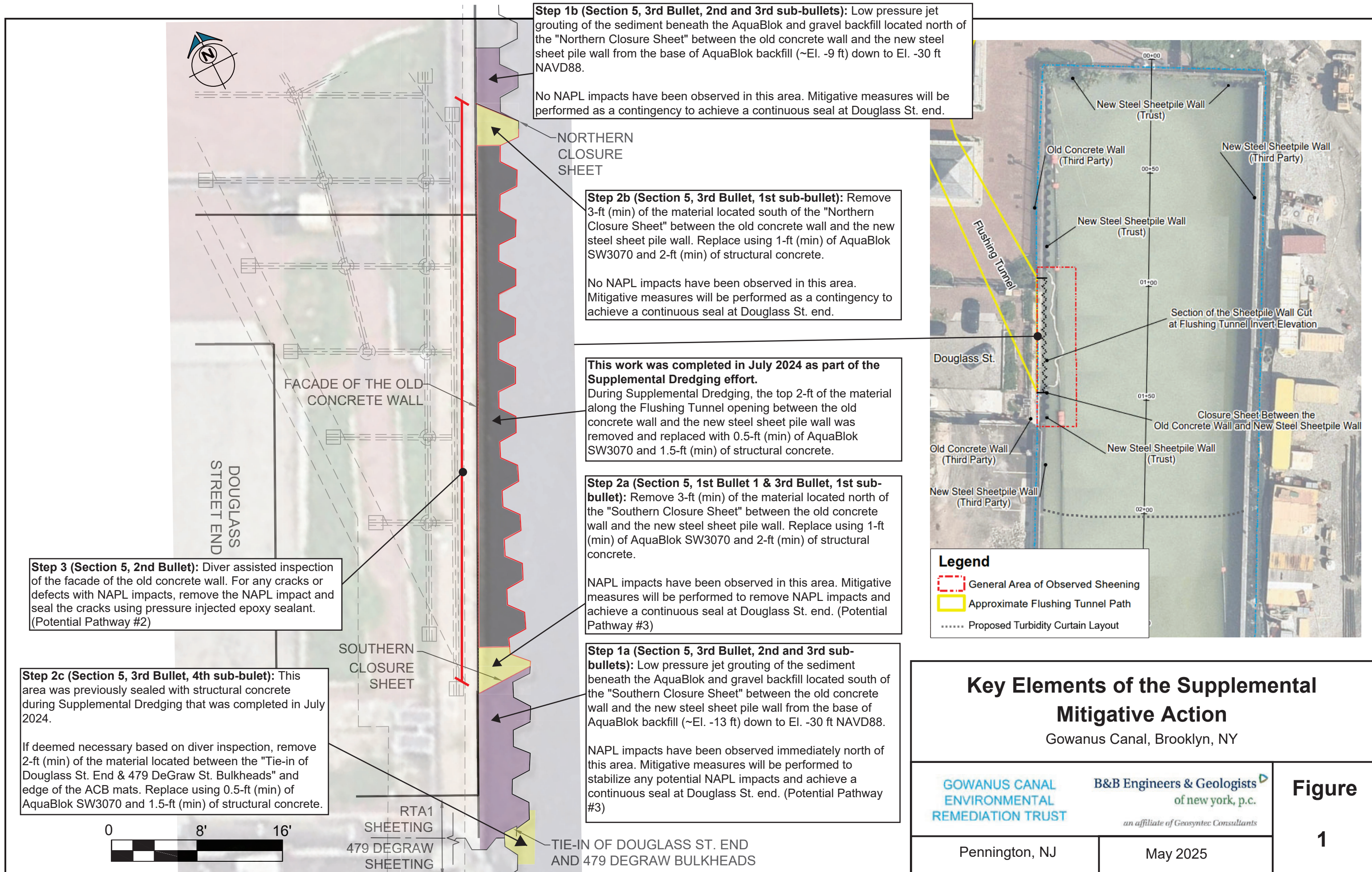
2.3. Support Activities

The Contractor will perform activities described in this section to support the corrective action detailed in **Section 2.2**. Support activities include management, transportation and disposal of the spoils generated during low-pressure jet grouting and material removed in targeted areas.

The spoils and the material removed during Supplemental Mitigative Actions will be periodically transferred to mini-hoppers and transported to the Clean Earth facility in Claremont, NJ for processing and disposal.

* * * * *

Figures



Step 1b (Section 5, 3rd Bullet, 2nd and 3rd sub-bullets): Low pressure jet grouting of the sediment beneath the AquaBlok and gravel backfill located north of the "Northern Closure Sheet" between the old concrete wall and the new steel sheet pile wall from the base of AquaBlok backfill (~El. -9 ft) down to El. -30 ft NAVD88.

No NAPL impacts have been observed in this area. Mitigative measures will be performed as a contingency to achieve a continuous seal at Douglass St. end.

Step 2b (Section 5, 3rd Bullet, 1st sub-bullet): Remove 3-ft (min) of the material located south of the "Northern Closure Sheet" between the old concrete wall and the new steel sheet pile wall. Replace using 1-ft (min) of AquaBlok SW3070 and 2-ft (min) of structural concrete.

No NAPL impacts have been observed in this area. Mitigative measures will be performed as a contingency to achieve a continuous seal at Douglass St. end.

This work was completed in July 2024 as part of the Supplemental Dredging effort.
 During Supplemental Dredging, the top 2-ft of the material along the Flushing Tunnel opening between the old concrete wall and the new steel sheet pile wall was removed and replaced with 0.5-ft (min) of AquaBlok SW3070 and 1.5-ft (min) of structural concrete.

Step 2a (Section 5, 1st Bullet 1 & 3rd Bullet, 1st sub-bullet): Remove 3-ft (min) of the material located north of the "Southern Closure Sheet" between the old concrete wall and the new steel sheet pile wall. Replace using 1-ft (min) of AquaBlok SW3070 and 2-ft (min) of structural concrete.

NAPL impacts have been observed in this area. Mitigative measures will be performed to remove NAPL impacts and achieve a continuous seal at Douglass St. end. (Potential Pathway #3)

Step 1a (Section 5, 3rd Bullet, 2nd and 3rd sub-bullets): Low pressure jet grouting of the sediment beneath the AquaBlok and gravel backfill located south of the "Southern Closure Sheet" between the old concrete wall and the new steel sheet pile wall from the base of AquaBlok backfill (~El. -13 ft) down to El. -30 ft NAVD88.

NAPL impacts have been observed immediately north of this area. Mitigative measures will be performed to stabilize any potential NAPL impacts and achieve a continuous seal at Douglass St. end. (Potential Pathway #3)

Step 3 (Section 5, 2nd Bullet): Diver assisted inspection of the facade of the old concrete wall. For any cracks or defects with NAPL impacts, remove the NAPL impact and seal the cracks using pressure injected epoxy sealant. (Potential Pathway #2)

Step 2c (Section 5, 3rd Bullet, 4th sub-bullet): This area was previously sealed with structural concrete during Supplemental Dredging that was completed in July 2024.
 If deemed necessary based on diver inspection, remove 2-ft (min) of the material located between the "Tie-in of Douglass St. End & 479 DeGraw St. Bulkheads" and edge of the ACB mats. Replace using 0.5-ft (min) of AquaBlok SW3070 and 1.5-ft (min) of structural concrete.

Legend
 [Red dashed box] General Area of Observed Sheening
 [Yellow box] Approximate Flushing Tunnel Path
 [Dotted line] Proposed Turbidity Curtain Layout

Key Elements of the Supplemental Mitigative Action
 Gowanus Canal, Brooklyn, NY

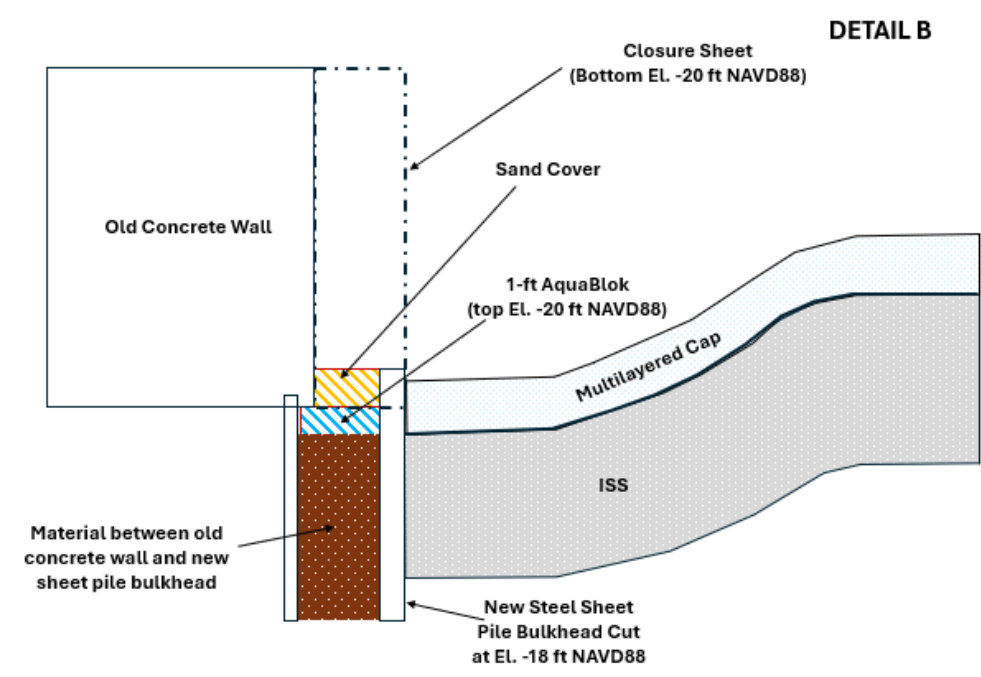
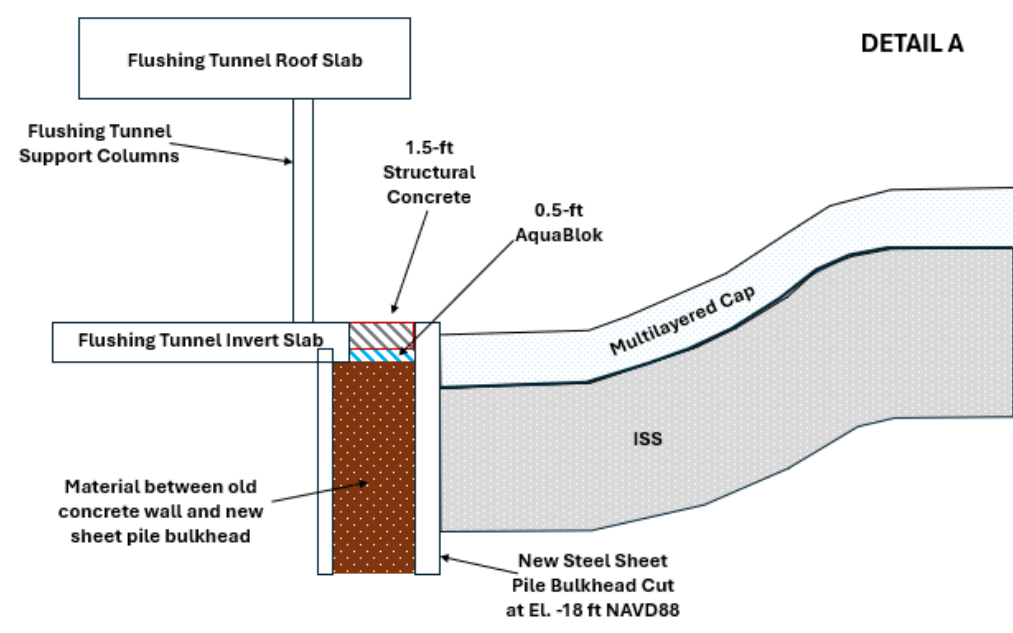
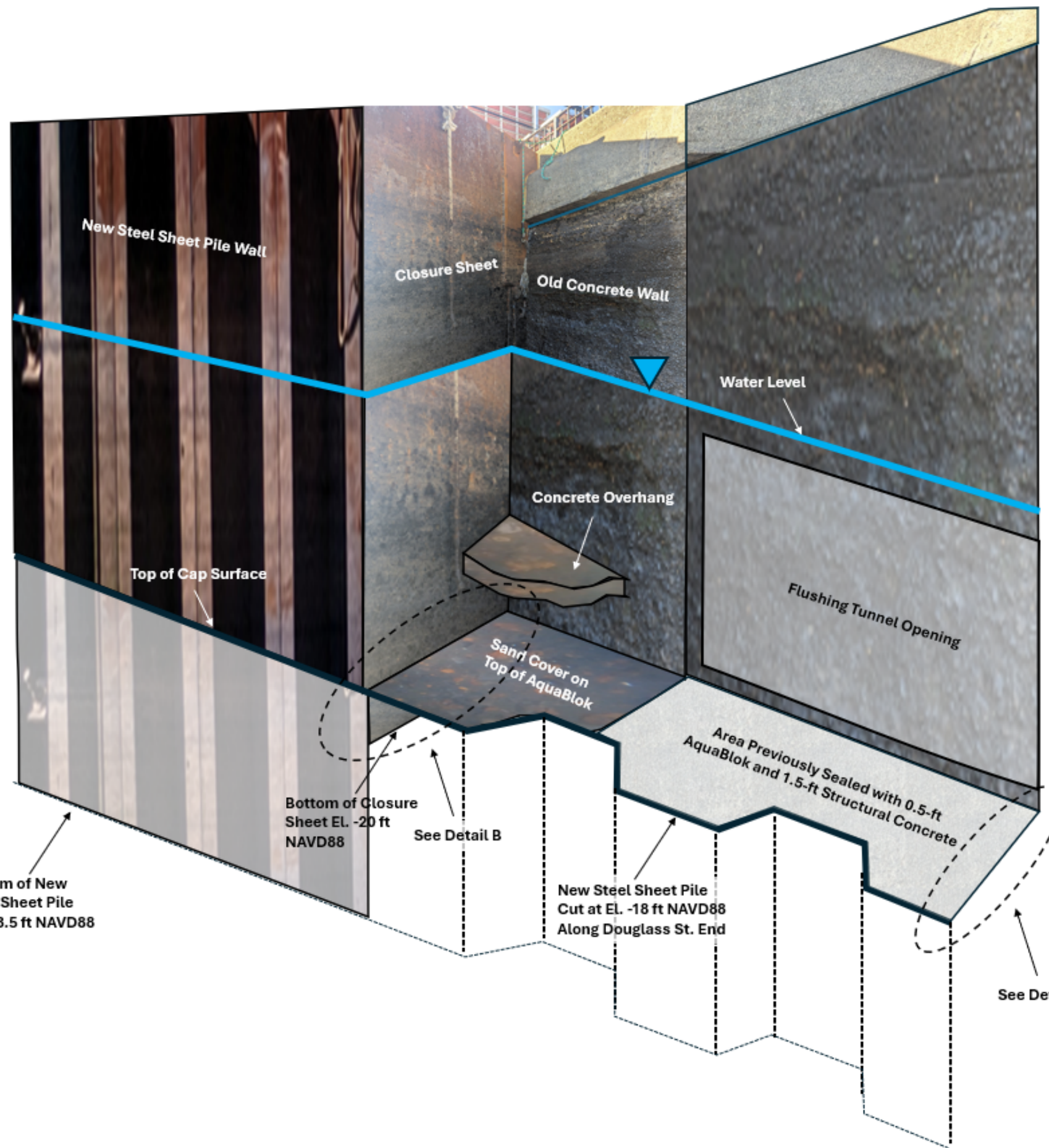
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Figure 1



Detailed Illustration of Potential Pathway #3
Gowanus Canal, Brooklyn, NY

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Drill Barge Layout for Low Pressure Jet Grouting

Gowanus Canal, Brooklyn, NY

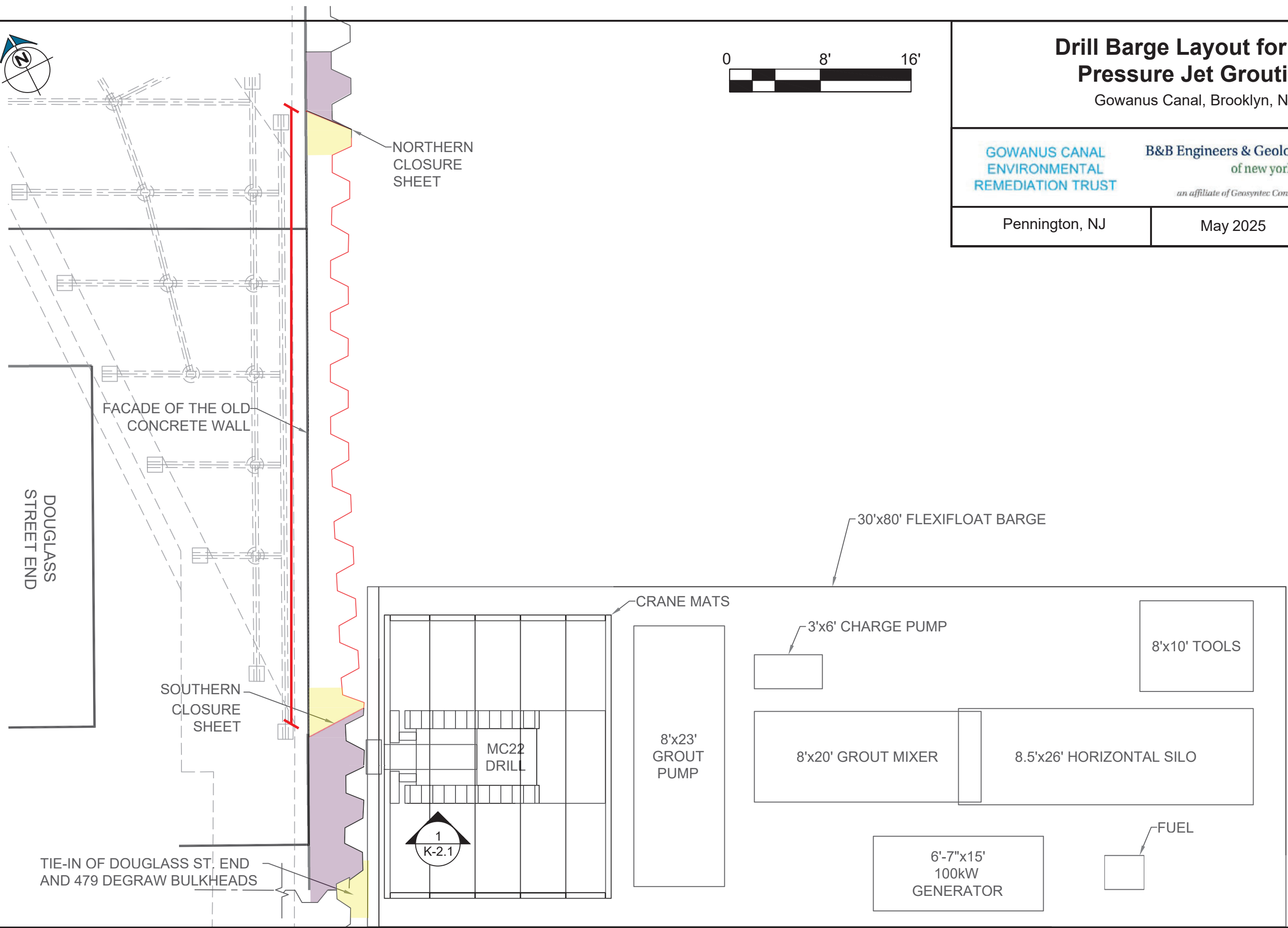
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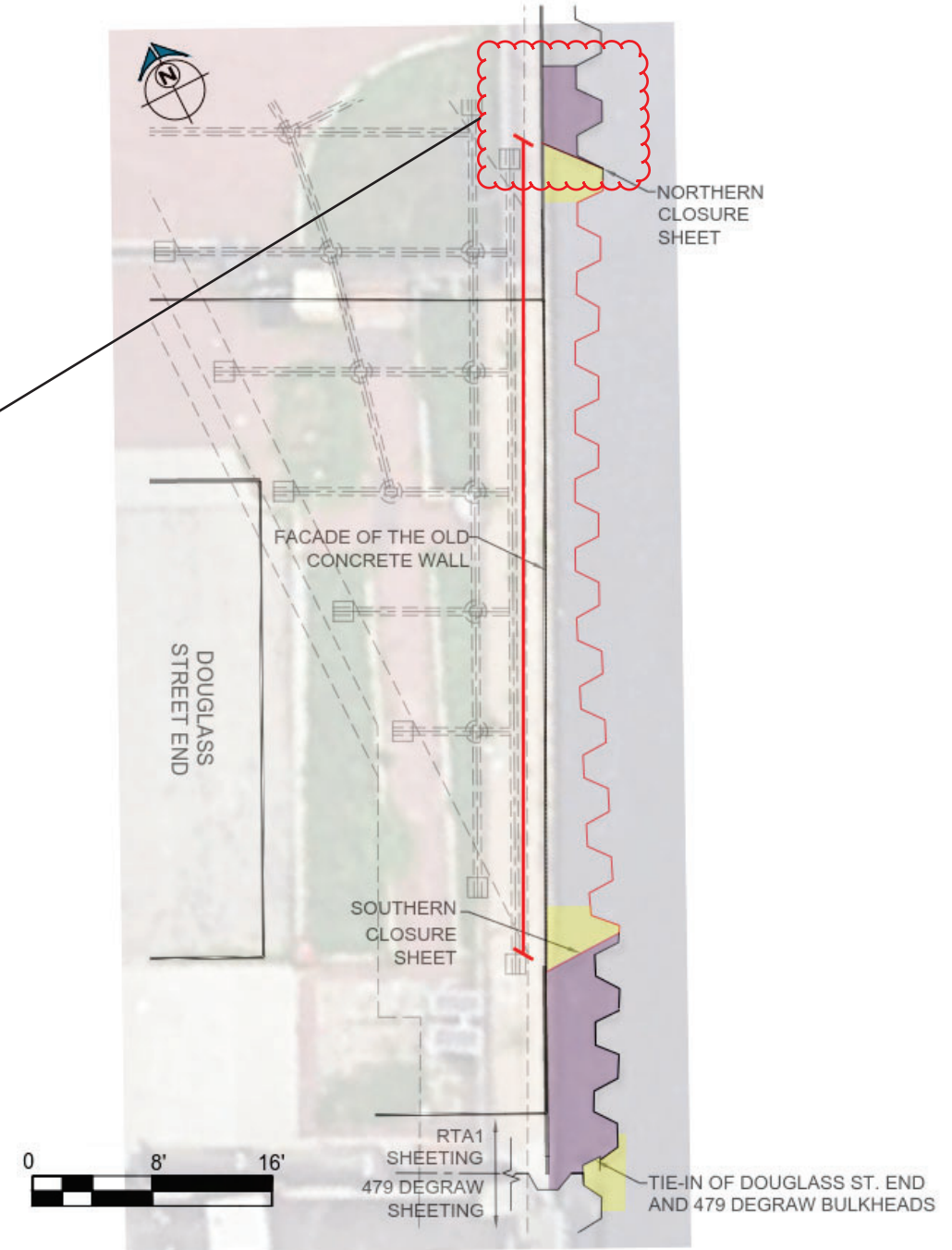
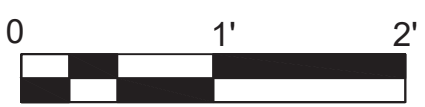
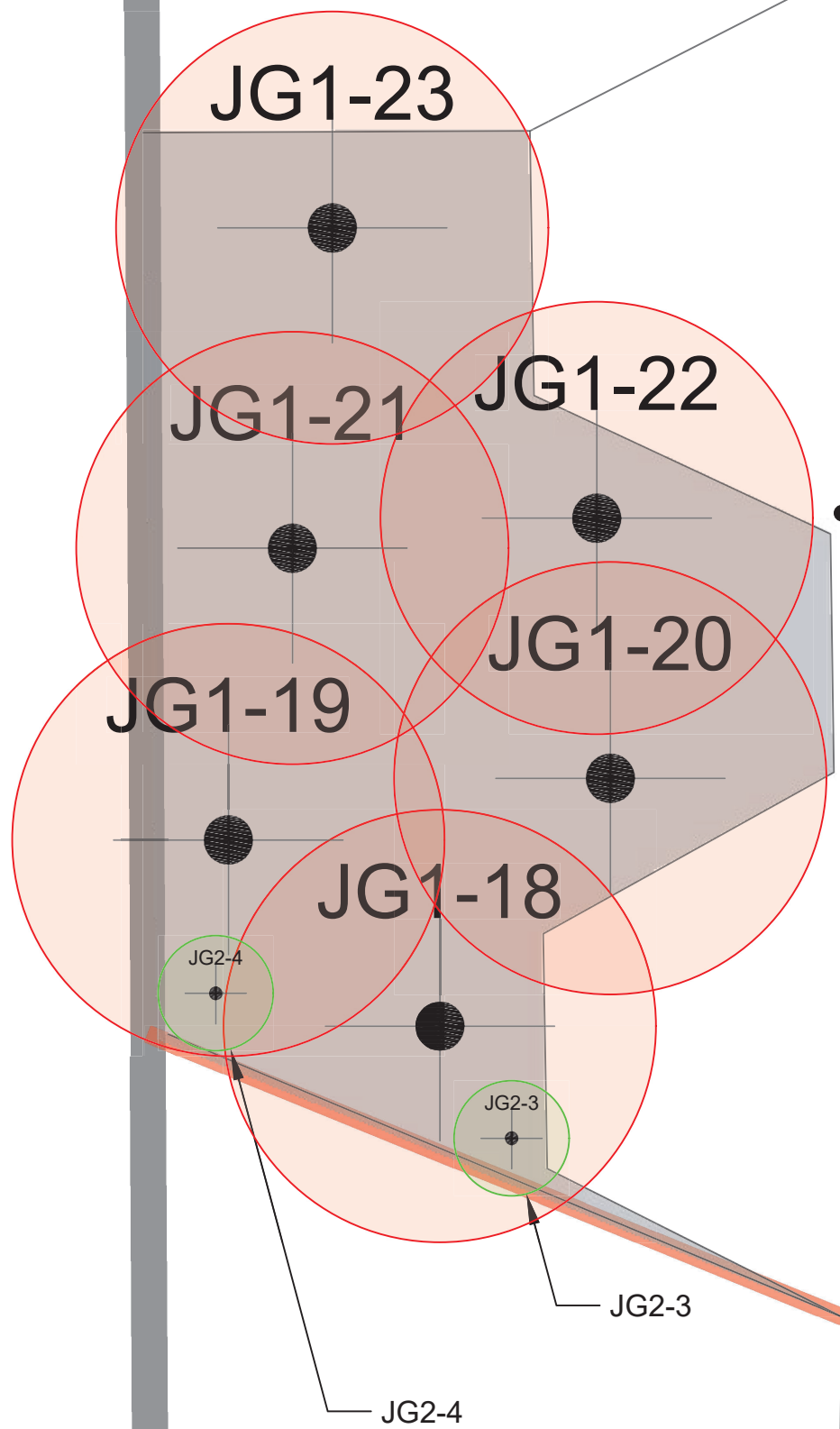
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Figure
3

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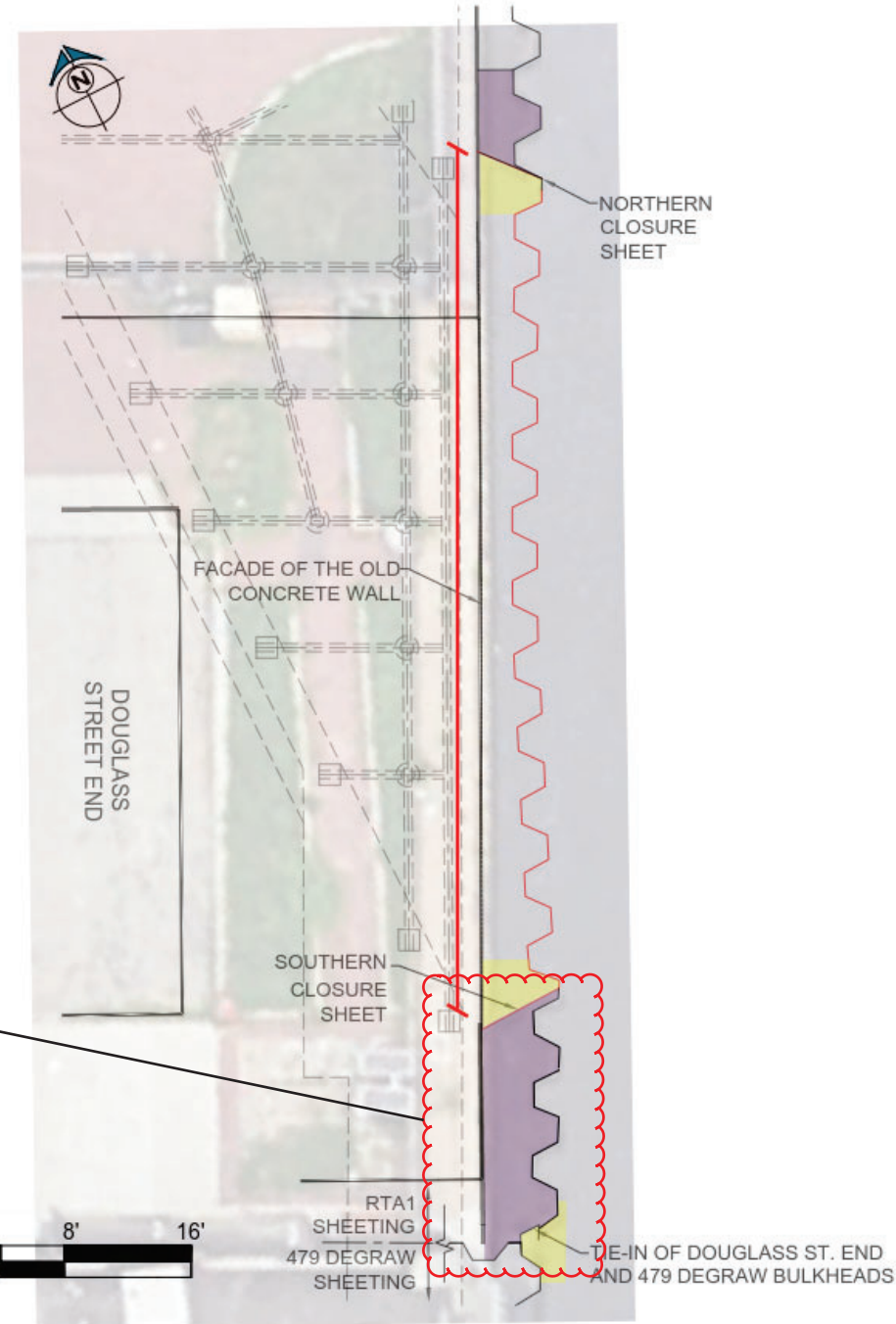
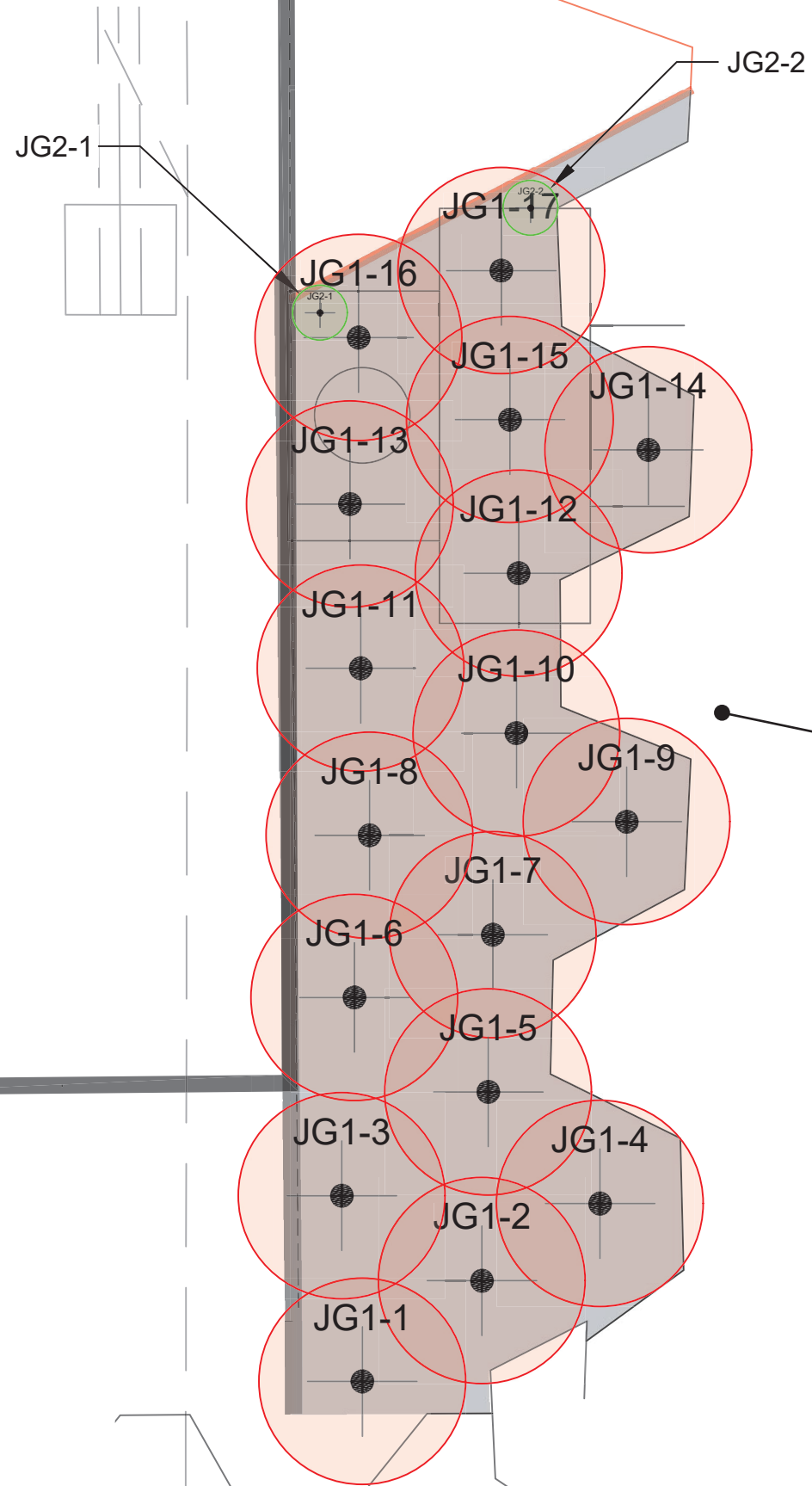




LEGEND:

- Ø2.5' JET GROUT COLUMN
- Ø0.67' JET GROUT COLUMN

Jet Grouting Column Layout at the Northern Section Gowanus Canal, Brooklyn, NY		Figure 4
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LEGEND:

- Ø2.5' JET GROUT COLUMN
- Ø0.67' JET GROUT COLUMN

Jet Grouting Column Layout at the Southern Section Gowanus Canal, Brooklyn, NY		Figure 5
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