

December 16, 2024

Nicholas Wasilik
Fisheries and Oceans Canada
Suite 301-5240 50th Avenue
Yellowknife, NT Z1A 1E2

Re: 2024/25 Norman Wells Upper Bosworth Creek Bridge Repair – Phase 2
Imperial Oil Resources N.W.T. Limited (Imperial)
DFO – Application Submission

Dear Mr. Wasilik,

Imperial Oil Resources N.W.T Limited (Imperial) is submitting a proposed repair plan for the Operation's Upper Bosworth Creek Bridge to the DFO for review. In July 2024, Imperial retained Allnorth Consultants Limited (Allnorth), to conduct a field assessment of the suspected failing east abutment wingwall of the Upper Bosworth Creek bridge located on Canol Dr. also known as the Bypass Road at the following location: Latitude 65.290317, Longitude -126.874806. Location of the bridge is highlighted below in Figure 1, positioned NE of Imperial's mainland Norman Wells Operations. Imperial also owns and operates a Lower Bosworth Creek bridge within the operation which is highlighted for reference.



Figure 1 - Upper and Lower Bosworth Creek Bridges

Based on the findings of the inspection completed by Allnorth, repairs to the east abutment wall were recommended to maintain the integrity of the bridge for future use. Several failed tie back rods were identified on the east whaler beam in addition to three tieback anchors missing. As a result, a deflection of the top of the wall beyond the downstream end of the capbeam and downstream wingwall was identified. See below for a photo of the eastern abutment for reference in Figure 2.

While the repair plan was under development this summer, immediate actions per Allnorth recommendations were taken to restrict traffic to the northern 4m of the east approach road and speed limits were reduced to 20 km/hr to reduce impact loading to the structure before the repairs are completed. See Figure 3 below outlining restrictive safeguards currently in place.



Figure 3 – Restrictive Safeguards installed

Allnorth's proposed repair plan (Appendix A) can be broken down into two separate distinct phases:

- **Phase 1:** East abutment sheet pile wall repair including installation of new upper tie back rods, new tie back dead man wall and modifications to existing tie back dead man wall. This entire scope of work will be executed via equipment access from the eastern approach road side of the bridge through an excavation. Existing W-Beams, guardrails and posts will be re-used and re-installed once the tie-back repairs are completed. All execution details can be found in Appendix A, drawing numbers 2401823-000-1960-201 to 207. **Phase 1 work was completed November 18th 2024**
- **Phase 2:** Installation of rock toe ballast along the creek side base of the sheet pile wall with an as per the original design to reduce lateral loading, prevent further scouring and guide the channel around the bend to prevent direct impingement on the abutment. During the inspection it was noted that a large majority of the existing armour rock installed during bridge construction in 1982 had eroded away downstream. Scope would include the placement of ~180 m³ of Class C (0.3 m average dimension) and Class D (1 m average dimension) rip rap armour rock along the creek-side edge of the sheet pile wall with an excavator as depicted in drawing number 2401823-000-1960-203 in Appendix A.

For the Phase 2 armouring, the proposed access right of way (ROW) shown in Figure 4 will be cleared and graded using a dozer and excavator to facilitate access for the required equipment and materials. Any crossing of Bosworth Creek required to access the worksite will follow DFO's Code of Practice: Ice bridges and snow fills. A small staging area will be utilized on the southside by the creek bank.

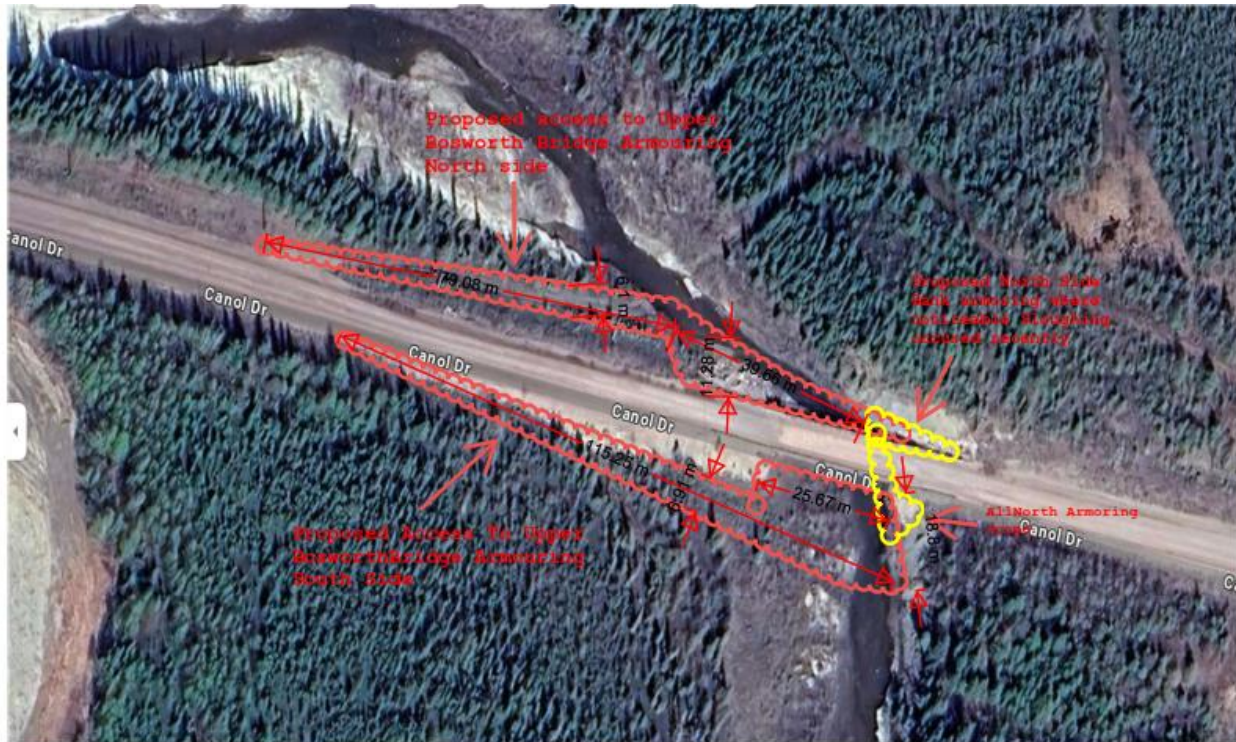


Figure 4 – Phase 2 Access requirements

Imperial plans to implement erosion and sediment control (ESC) measures while executing Phase 2 of the repair.

During execution, appropriate safety and environmental protection measures will be applied in accordance with the Imperial's existing Safety Plan, Environmental Protection Plan, Emergency Response Plan, OA-1210-001, S13L1-007, COGDPR, CLC Part II and the OGOSHR. Imperial plans to communicate the upcoming repairs and bridge closure with the Town of Norman Wells to outline any required detour routes utilizing the Lower Bosworth Creek bridge during the duration of the scope.

Preventive Measures to Minimize Impact

Several preventive measures have been implemented for this proposed bank armoring scope to minimize impacts to Bosworth Creek and the aquatic life while working under the high water mark. These include:

- Executing the scope of work during frozen conditions if possible in February 2025, minimizing any potential sediment issues and impacts to aquatic habitat.
- Avoiding the removal of any existing vegetation and root structures within creek bank section.
- All equipment will be cleaned and washed prior to the work.
- Refueling and parking of equipment will be outside of Bosworth Creek work area on the mainland. Drip trays will be used, and spill kits will be available.



- Any rock fines that may accumulate on the ice or staging area will be removed to designated area on the mainland along with any loose sloughed debris material that is removed during preparatory work prior to the placement of material

Imperial is currently targeting a start date of February 1, 2025. Imperial acknowledges the accelerated timeline for regulatory review and appreciates DFO's prompt review of the scope of work. If there are any questions concerning the proposed repair plan outlined in this submission, please don't hesitate to reach out for further clarification. Imperial is also completing the required notifications and reviews for this scope of work with other applicable regulators including the CER 12010 (OA Condition 5 Notification) and SLWB/CIRNAC (Water License S13L1-007 – Part G (1a) Modification).

Sincerely,

A handwritten signature in black ink, appearing to read "Jacki Costley".

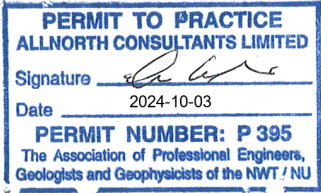
Jacki Costley,
Environment & Regulatory Advisor
Imperial

Cc –
John Gregory, Conventional Operations Superintendent, Imperial
Alysa Fischbein, Norman Wells Technical Supervisor, Imperial

Appendix A: Allnorth Upper Bosworth Creek East Abutment Sheet Pile Wall Repair Plan



UPPER BOSWORTH CREEK
EAST ABUTMENT
ALTERNATE
SHEET PILE WALL REPAIR



DRAWING LIST		
DRAWING NO	DRAWING TITLE	REVISION
2401823-000-1960-201	GENERAL NOTES AND SPECIFICATIONS	0
2401823-000-1960-202	EXISTING ABUTMENT APPROACH AND CREEK	0
2401823-000-1960-203	REPAIRED ABUTMENT SHEET PILE WALL AND CREEK IMPROVEMENTS	0
2401823-000-1960-204	EXISTING ABUTMENT GENERAL ARRANGEMENT	0
2401823-000-1960-205	ABUTMENT REPAIR GENERAL ARRANGEMENT	0
2401823-000-1960-206	ABUTMENT REPAIR DETAILS SHEET 1	0
2401823-000-1960-207	ABUTMENT REPAIR DETAILS SHEET 2	0

0	24/10/03	ISSUED FOR CONSTRUCTION	SAP	DDW	DDW
A	24/09/23	ISSUED FOR REVIEW	SAP	DDW	DDW
REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD



DESCRIPTION: ISSUED FOR CONSTRUCTION
ISSUE DATE: 24/10/03

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PROJECT NO:	2401823	DSGN:	NRW	DATE:	24/09/16
DRAWING SIZE:	ANSI "B"	CHKD:	DDW	DATE:	24/09/23
SCALE:	AS NOTED	APVD:	DDW	DATE:	24/09/23
DWG NO:	2401823-000-1960-200	REV:	0		

DESIGN LOADS:

1. DEAD LOAD - UNIT WEIGHTS AND MATERIALS ARE AS FOLLOWS:
STRUCTURAL STEEL = 77 kN/m³
SOIL (ASSUMED SOIL FRICTION ANGLE = 34°) = 22 kN/m³
2. LIVE LOAD SURCHARGE ON WALL = 6.2 kPa.

DESIGN SPECIFICATIONS:

1. DESIGN IN ACCORDANCE WITH CAN/CSA-S6-19.

STEEL NOTES:

1. ALL STEEL (INCLUDING PLATE) SHALL BE IN ACCORDANCE WITH CSA G40.21 GRADE 300W.
2. SHEET PILES ASSUMED TO BE GRADE 230 MPa STEEL.
3. THREADBAR, NUTS, AND BEVELED WASHERS TO BE DYWIDAG-SYSTEMS INTERNATIONAL GRADE 690 OR BETTER.
4. WELDING SHALL BE IN ACCORDANCE WITH CSA STANDARD W-59. WELDING ELECTRODES TO BE COMPATIBLE WITH BASE METAL. ALL WELDS TO BE 6mm UNLESS OTHERWISE NOTED ON DRAWINGS.
5. FABRICATORS RESPONSIBLE FOR WELDED CONSTRUCTION MUST BE CERTIFIED FOR DIVISION 1 OR DIVISION 2 OF C.S.A. STANDARD W47.1 - CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL STRUCTURES. CERTIFICATION TO BE IN EFFECT THROUGHOUT THE PERIOD OF MANUFACTURE.
6. ALL SHOP AND FIELD WELDS SHALL BE 100% VISUALLY INSPECTED IN ACCORDANCE WITH CSA W59 WITH THE EXCEPTION THAT THE CANADIAN WELDING BUREAU (CWB) CERTIFIED "WELDING SUPERVISOR" IN THE FABRICATION SHOP OR ON THE CONSTRUCTION SITE CAN PERFORM THE VISUAL INSPECTIONS. VISUAL INSPECTIONS TO BE DOCUMENTED BY THE "WELDING SUPERVISOR" MARKING THE WORK AFTER IT HAS BEEN INSPECTED AND ACCEPTED.

EARTH WORKS:

1. EXISTING BACKFILL AND RIPRAP WITHIN THE ESTIMATED EXCAVATION EXTENTS (AS SHOWN ON DRAWING 102) TO BE STOCK PILED FOR RE-USE.
2. BACK FILL OF EAST APPROACH SHALL GENERALLY CONFORM TO THE LINES SHOWN ON THE DRAWINGS AND SHALL BE PLACED IN LIFTS NOT EXCEEDING 305mm THICK, WELL COMPACTED USING A MINIMUM 1000lbs VIBRATORY PLATE COMPACTOR. MATERIAL SHALL BE RE-USED EXISTING BACKFILL OR NEW CLEAN, FREE DRAINING, WELL GRADED GRANULAR FILL OF 75mm MAXIMUM SIZE OR APPROVED EQUIVALENT.
3. RIPRAP TO BE WELL GRADED BLEND BETWEEN MINIMUM CLASS "C" (0.3m AVERAGE DIMENSION) AND MAXIMUM CLASS "D" (1.0m AVERAGE DIMENSION) DURABLE ROCK. CLASS "C" AND "D" SPECIFICATIONS PROVIDED BY IMPERIAL.

DESIGN LIFE:

1. WALL REPAIR DESIGN LIFE IS ESTIMATED TO BE 10 TO 15 YEARS AND IS LIMITED BY THE REMAINING EXISTING BRIDGE SERVICE LIFE.

MAINTENANCE:

1. RIPRAP TO BE MONITORED AND MAINTAINED TO ENSURE WALL HAS ADEQUATE SUPPORT.

HYDROLOGY:


1. THE IMPACT OF INTRODUCING RIPRAP TO THE HYDROLOGY OF THE CREEK AND CROSSING HAS NOT BEEN ASSESSED.

REFERENCE DRAWINGS

DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
-	-	1

PERMIT TO PRACTICE:


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ALLNORTH CONSULTANTS LIMITED

Signature 

Date 2024-10-03

PERMIT NUMBER: P 395
The Association of Professional Engineers,
Geologists and Geophysicists of the NWT / NU

ENGINEER SEAL:





2024-10-03

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CLIENT:





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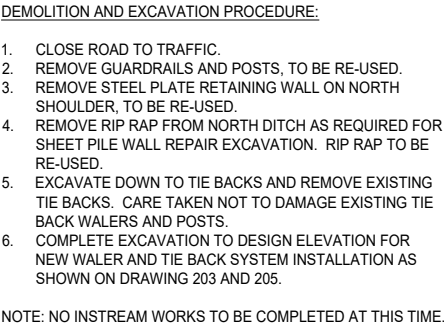
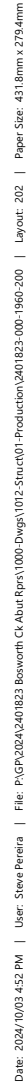
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UPPER BOSWORTH CREEK
EAST ABUTMENT
ALTERNATE
SHEET PILE WALL REPAIR

TITLE:

GENERAL NOTES
AND SPECIFICATIONS

DWG NO: 2401823-000-1960-201	REV: 0
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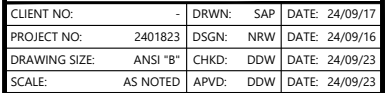


NOTES:

1. RECORD DRAWINGS AND 3D SCAN INFORMATION UTILIZED TO CREATE THE EAST ABUTMENT ARRANGEMENT.
2. ALL DIMENSIONS ASSUMED ± AND ARE TO BE FIELD CONFIRMED.

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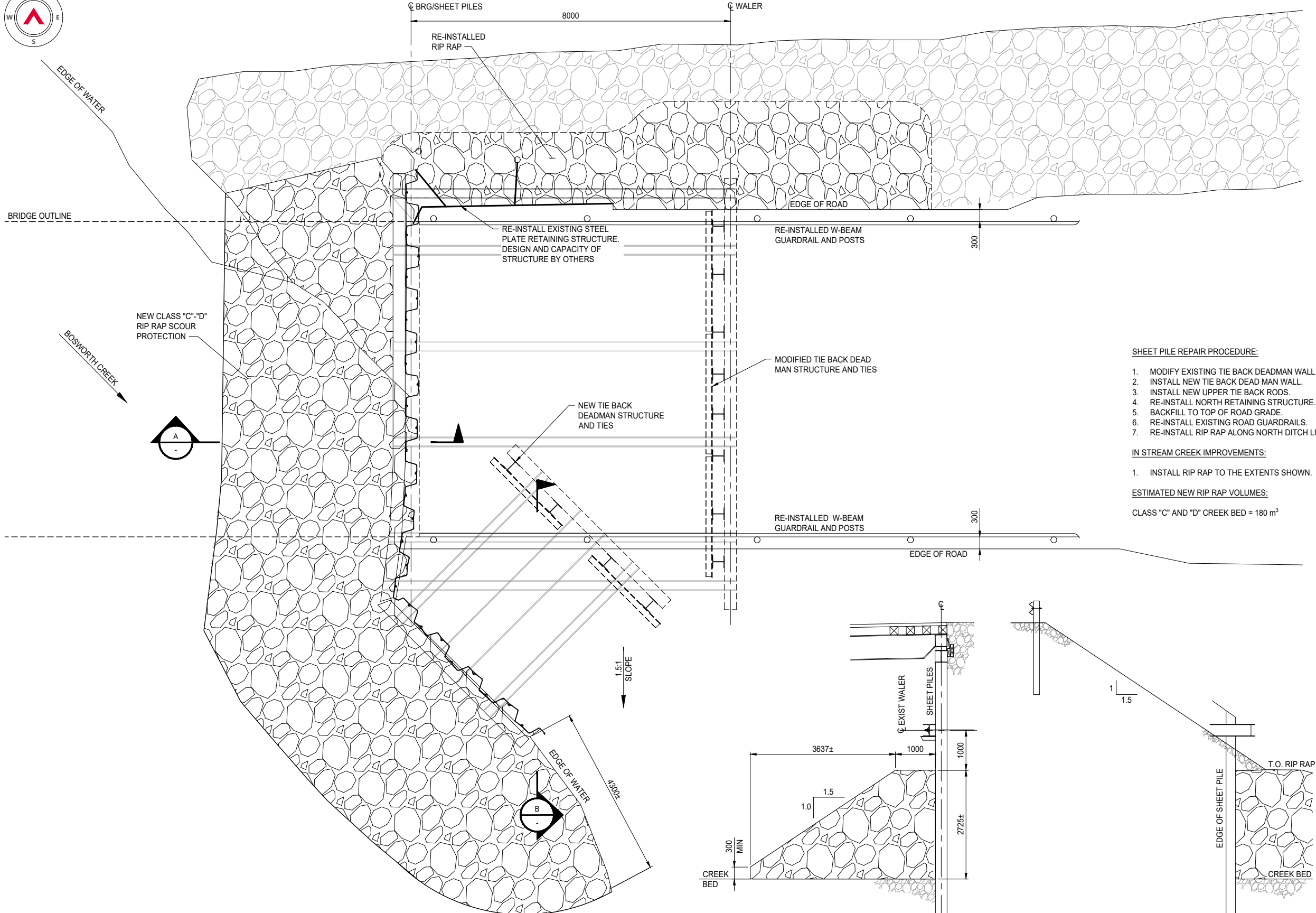
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**UPPER BOSWORTH CREEK
EAST ABUTMENT
ALTERNATE
SHEET PILE WALL REPAIR**

**EXISTING ABUTMENT
APPROACH AND CREEK**

DWG NO:	REV:
2401823-000-1960-202	0



SITE PLAN
SCALE: 1:100

SECTION A
SCALE: 1:100

SECTION B
SCALE: 1:100

SHEET PILE REPAIR PROCEDURE:

1. MODIFY EXISTING TIE BACK DEADMAN WALL.
2. INSTALL NEW TIE BACK DEAD MAN WALL.
3. INSTALL NEW UPPER TIE BACK RODS.
4. RE-INSTALL NORTH RETAINING STRUCTURE.
5. BACKFILL TO TOP OF ROAD GRADE.
6. RE-INSTALL EXISTING ROAD GUARDRAILS.
7. RE-INSTALL RIP RAP ALONG NORTH DITCH LINE.

IN STREAM CREEK IMPROVEMENTS:

1. INSTALL RIP RAP TO THE EXTENTS SHOWN.

ESTIMATED NEW RIP RAP VOLUMES:

CLASS "C" AND "D" CREEK BED = 180 m³

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
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- NOTES:
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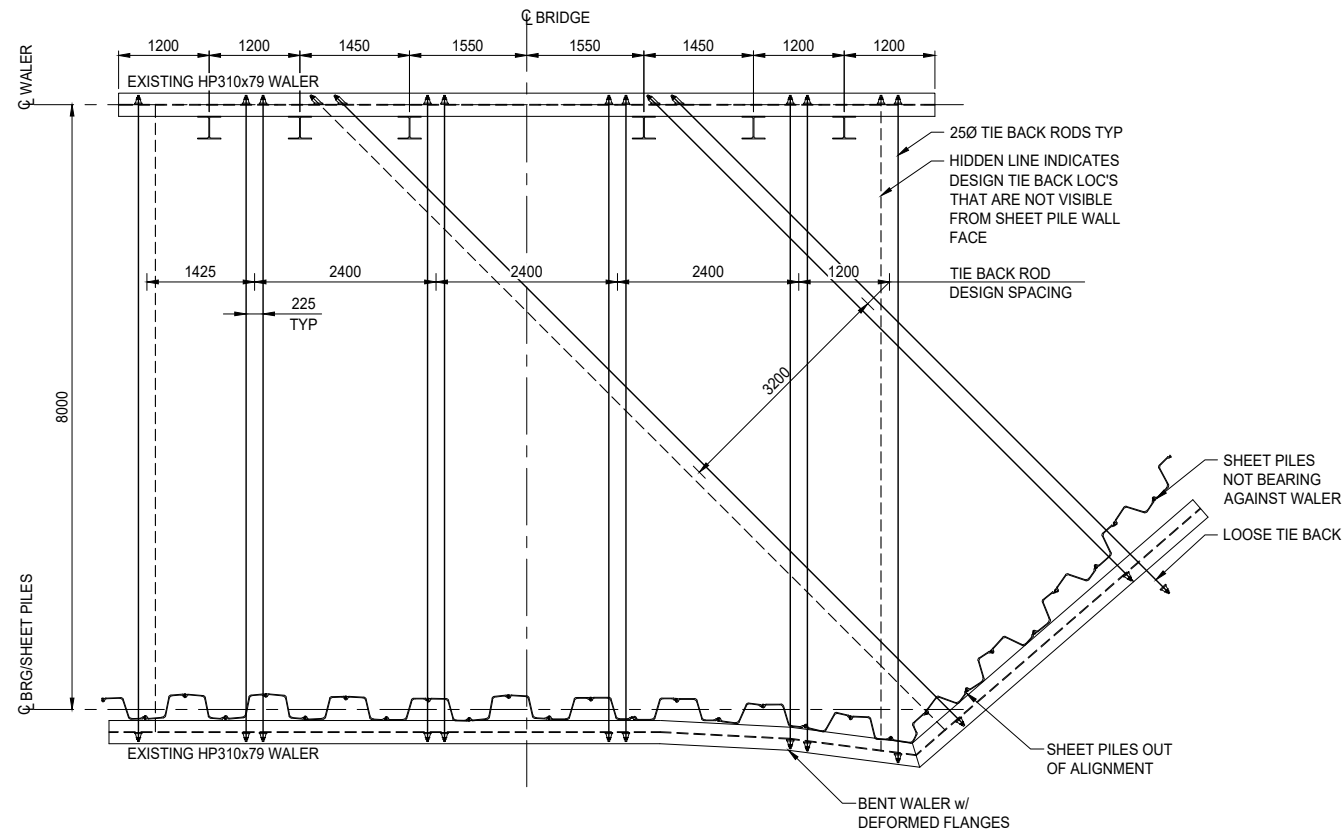
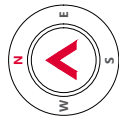
PROJECT:

UPPER BOSWORTH CREEK
EAST ABUTMENT
ALTERNATE
SHEET PILE WALL REPAIR

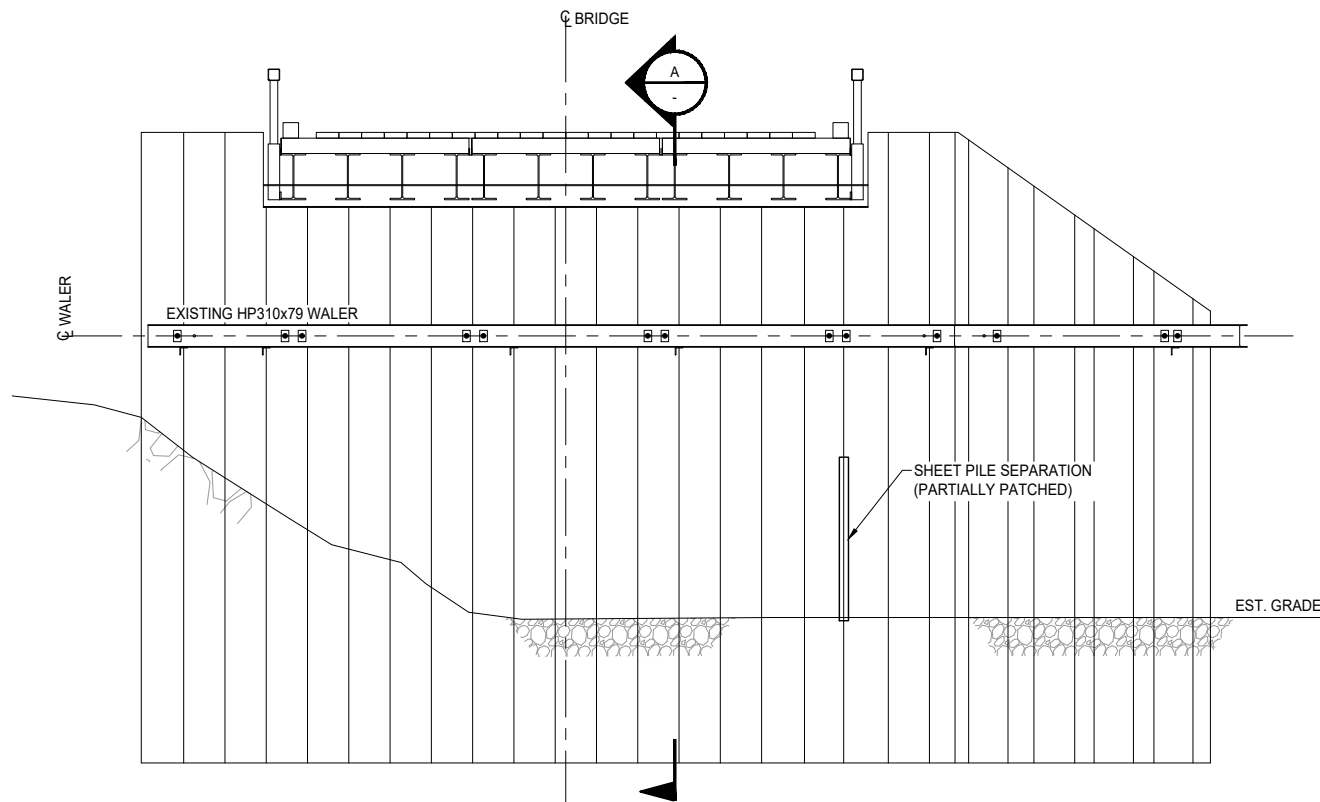
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REPAIRED ABUTMENT
SHEET PILE WALL AND
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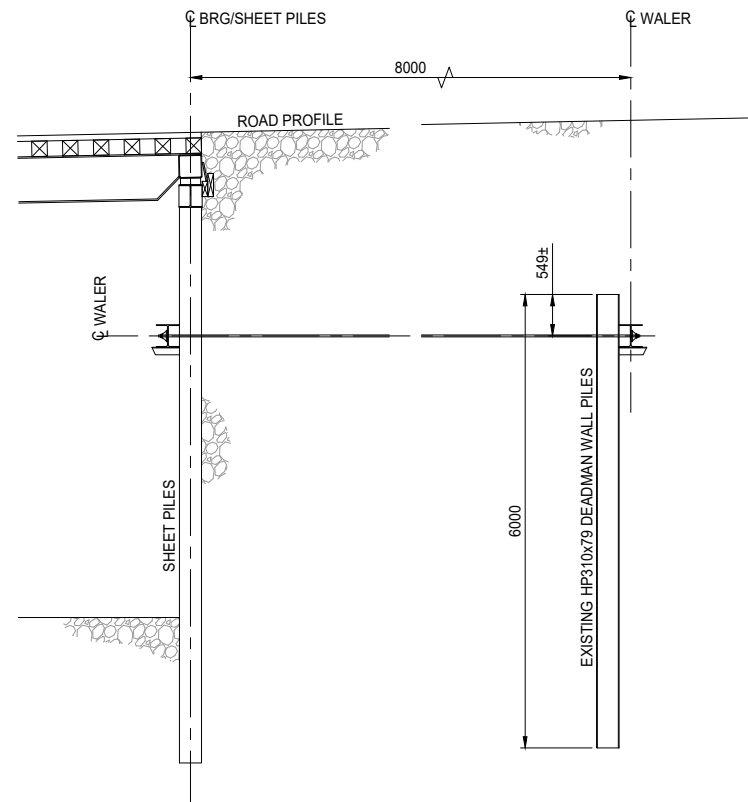
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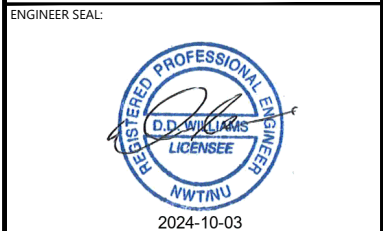
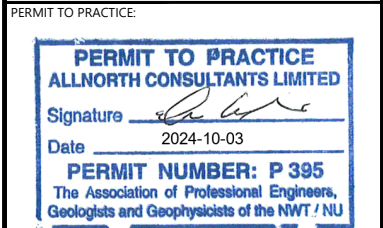
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SECTION
SCALE: 1:100

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- NOTES:
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 - ALL DIMENSIONS ASSUMED ± AND ARE TO BE FIELD CONFIRMED.



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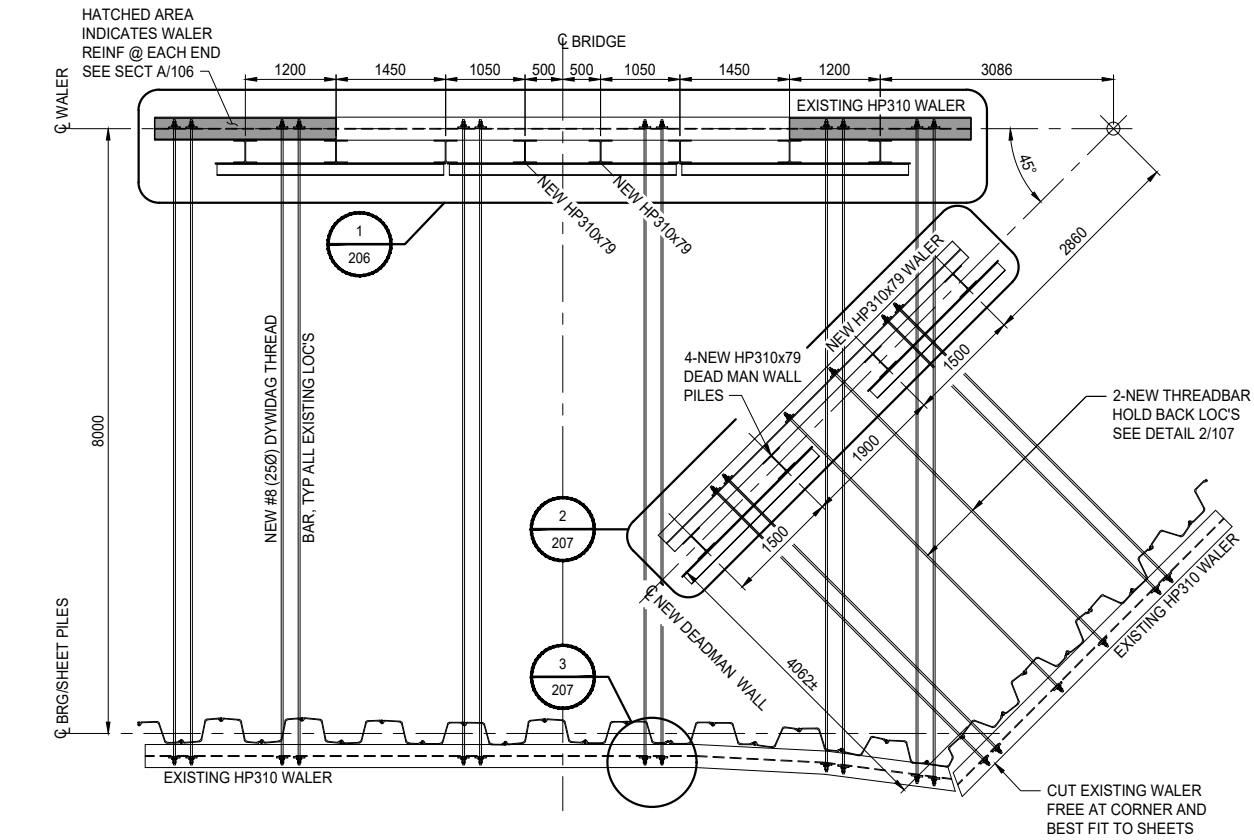
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EAST ABUTMENT
ALTERNATE
SHEET PILE WALL REPAIR**

TITLE:

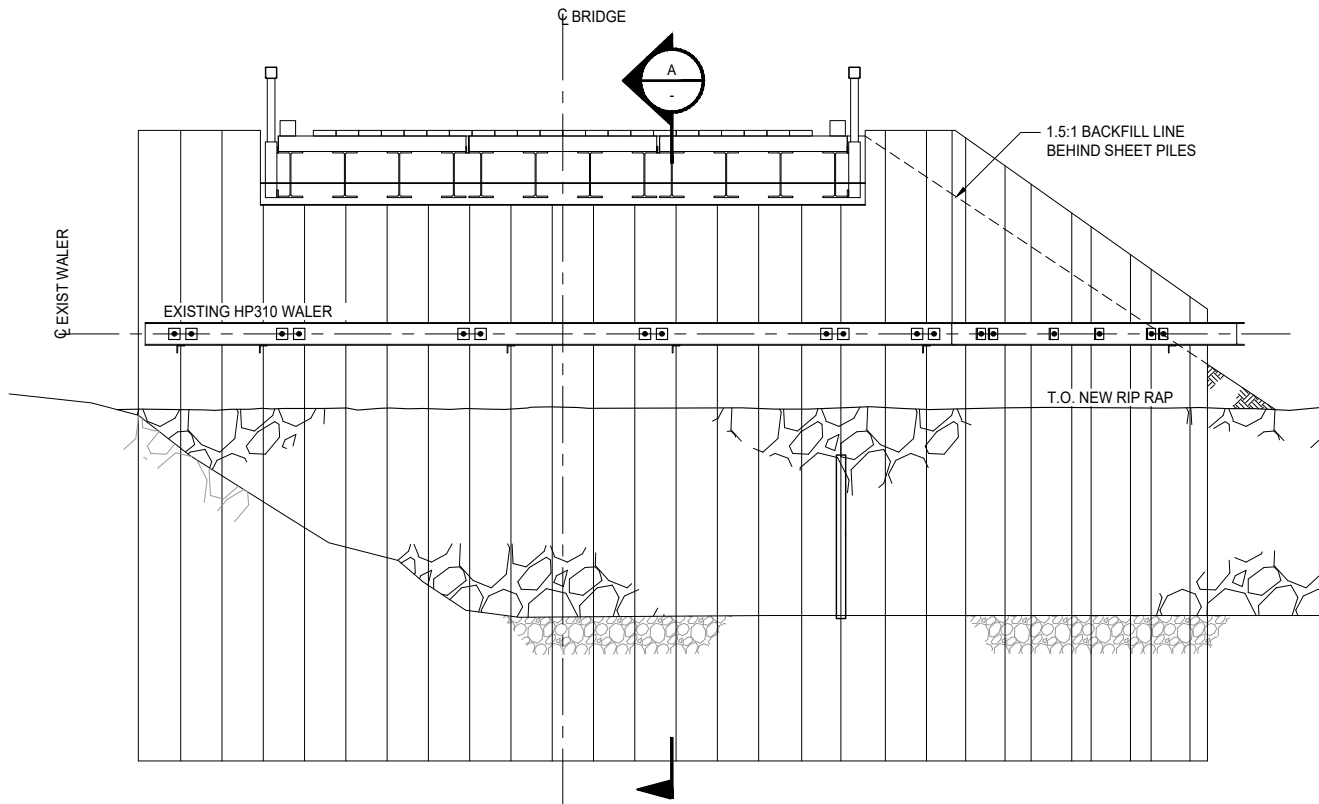
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GENERAL ARRANGEMENT**

DWG NO:	2401823-000-1960-204	REV:	0
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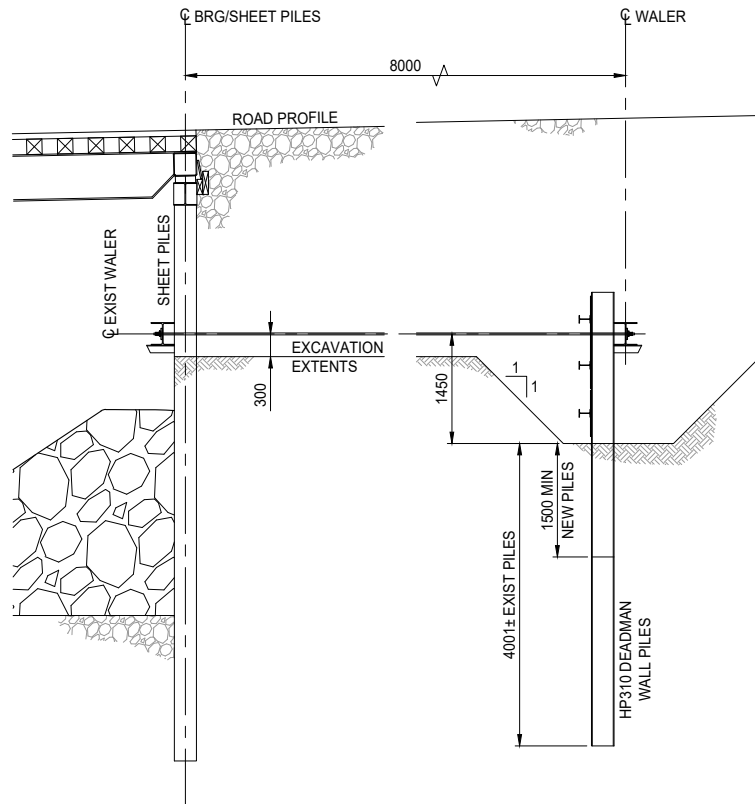
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WATER PLAN
SCALE: 1:100



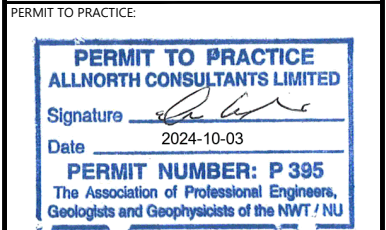
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SCALE: 1:100



SECTION A
SCALE: 1:100

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
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- NOTES:
- SEE DRAWING 2401823-000-1960-201 FOR GENERAL NOTES AND SPECIFICATIONS.
 - SEE DRAWING 2401823-000-1960-204 FOR EXISTING MATERIALS AND GEOMETRY NOT SHOWN.



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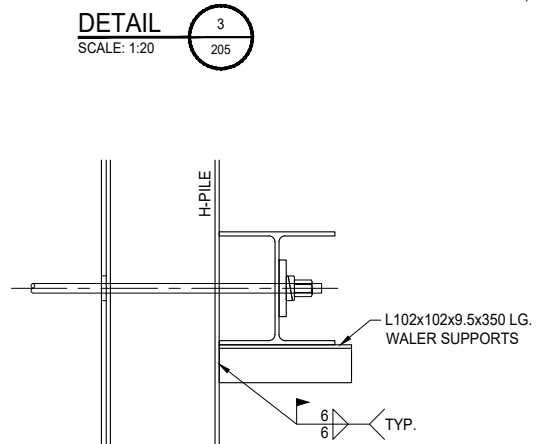
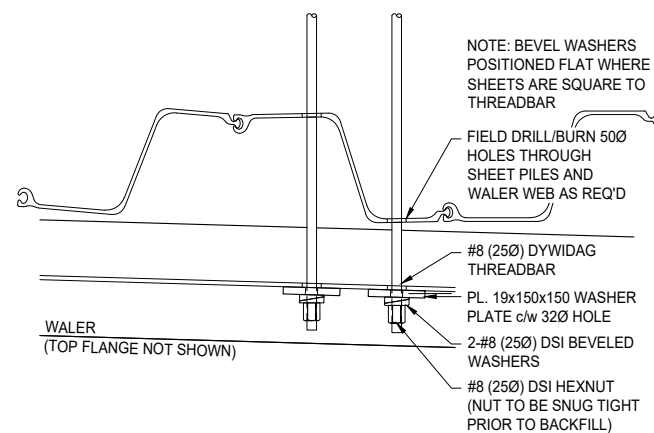
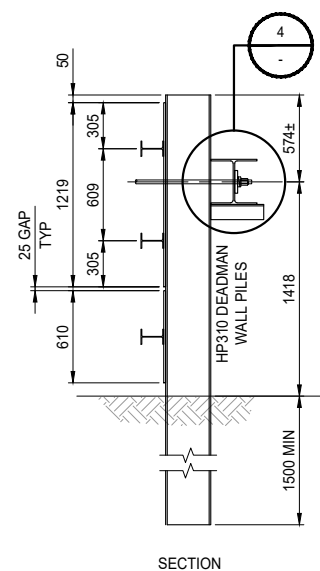
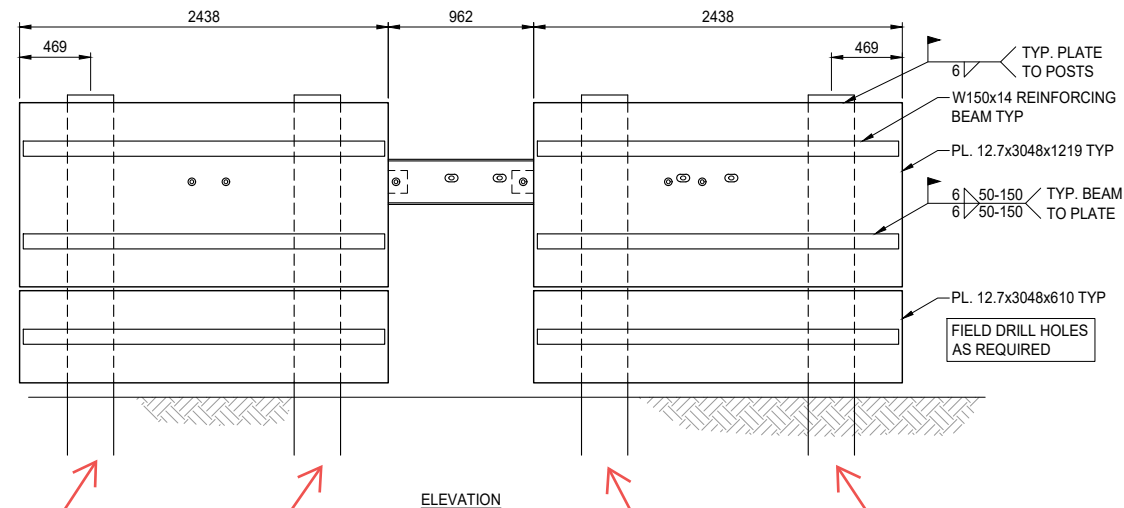
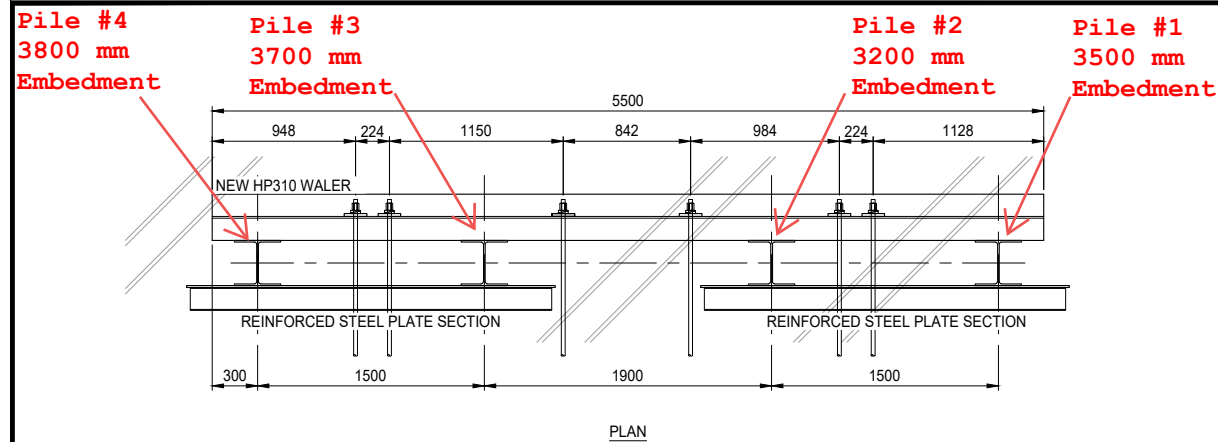
PROJECT:

UPPER BOSWORTH CREEK
EAST ABUTMENT
ALTERNATE
SHEET PILE WALL REPAIR

TITLE:

ABUTMENT REPAIR
GENERAL ARRANGEMENT

DWG NO:	2401823-000-1960-205	REV:	0
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NOTES:

1. SEE DRAWING 2401823-000-1960-201 FOR GENERAL NOTES AND SPECIFICATIONS..

PERMIT TO PRACTICE

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ALLNORTH CONSULTANTS LIMITED


Signature 

Date 2024-10-03

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[illegible]

CLIENT:

 Imperial



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TITLE:

**ABUTMENT REPAIR
DETAILS SHEET 2**

DWG NO:	REV:
2401823-000-1960-207	0