

Site C Clean Energy Project

WARNING BUOYS

Notice of Works

Canadian Navigable Waters Act

June 17, 2024

Submitted to:

Transport Canada
Suite 620-800 Burrard Street
Vancouver BC V6Z 2J8

Submitted by:

British Columbian Hydro and Power Authority
Site C Clean Energy Project
333 Dunsmuir Street
Vancouver BC V6B 5R3

INTRODUCTION

The *Canadian Navigable Waters Act* (CNWA) regulates the works that are in, on, over, under, through or across any navigable water in Canada. The CNWA includes a schedule of navigable waters requiring regulatory approval for works that risk a substantial interference with navigation. As part of the CNWA, the Minor Works Order is used to identify works that are likely to slightly interfere with navigation. Minor works require proponents to deposit a Notice of Work with Transport Canada. BC Hydro seeks approvals under the CNWA for works related to the construction and operation of the Site C Clean Energy Project (the Project) that occur on, over, under or through navigable waterways.

BC Hydro will commence reservoir filling for the Site C reservoir in the fall of 2024. Initial operations are planned to begin in the winter of 2024. The reservoir will be closed to the public during reservoir filling and for at least 1 year after inundation is complete. Once the Site C reservoir is operational and deemed safe for public access, BC Hydro will provide information to the public both online and at the boat launches indicating hazardous areas within the reservoir and the shoreline.

The section of the reservoir for a distance of approximately 2.5 km upstream of the damsite is referred to as the headpond has both dangerous and hazardous zones unique to the rest of the reservoir. BC Hydro has conducted a risk assessment of this portion of the reservoir and is proposing the installation of warning buoys at the start of the headpond.

This Notice of Work is being submitted for the installation of a total of 10 warning buoys at the start of the headpond of the Site C reservoir. The proposed locations of buoy installations as well as contour information are shown in attached Appendix A. These buoys will serve as an additional safety measure to warn users of the channel of hazards in the area.

PUBLIC USE AND HAZARDS

Once the Site C reservoir is operational and deemed safe for users, it is anticipated that there will be extensive boating throughout the entire length of the reservoir. To mitigate risks to public safety, BC Hydro is implementing measures to alert the public about the hazards within the reservoir and dangers at the headpond, approach channel and at the Site C damsite. In conjunction with information both online and at the boat launches, signage will be installed along the banks of the Peace River warning the public of hazards.

BC Hydro is also implementing safety measures at the approach channel where water is directed into the penstocks and spillway. There will be signage warning the public of increased hazards at the approach channel. Additionally BC Hydro will install a permanent debris boom at the start of the approach channel approximately 400m upstream of the dam and powerhouse. The purpose of the permanent debris is capture debris and serve as a physical barrier from entry to the area.

During periods of higher flows, the headpond will experience stronger currents, undercurrents and turbulence. To warn the public of the dangers of entering the area, BC Hydro is proposing the installation of 10 warning buoys as an additional control measure at this section of the reservoir.

DESCRIPTION OF WORK AND ACCESS

The proposed warning buoys will be installed prior to the commencement of reservoir filling on mainly dry land that will form part of the riverbed after inundation. The warning buoys will be installed individually and will be connected by chains to a single anchor chain that will sit across the bottom of the reservoir. This anchor chain will link the buoys to two existing sled anchors, and to lock block sled anchors located at the north and south banks. Installation will occur from left bank to right bank of the Peace River, using a winch line and boats. A Safety Management Plan has been developed for this work.

As shown in in Appendix A, the distance between the buoys is approximately 100 m, allowing boaters to navigate through in case of emergency. Construction specifications, details of the anchor plates, rock anchor and buoy layouts are shown in attached Appendix B Issued for Construction drawings. Access and transport of equipment and materials to the anchors will be by boat, excavators, dozers and A-frame trailer with a long boom and hook on the end. BC Hydro will source all equipment and materials that will meet the minimum Transport Canada, Canadian Coast Guard guidelines and Private Buoys Regulations.

All information set out in the Component Application Package is based on construction planning at the time of application. Activities may be somewhat different depending on final design and procurement, including contractors' preferences for equipment, sequencing of activities and construction means and methods. All activities will be carried out in accordance with the Site C Construction Environmental Management Plan (CEMP).¹

LOCATION

Anchor Location coordinates:

Anchor 1: Lat: 56.2068569 Long: -120.9432278 (Existing Sled Anchor)
Anchor 2: Lat: 56.2092491 Long: -120.9367181 (Existing Lock Block)
Anchor 3: Lat: 56.2109915 Long: -120.9319754 (Existing Lock Block)
Anchor 4: Lat: 56.2119742 Long: -120.9293001 (Existing Sled Anchor)

Buoy Location coordinates:

HB1: Lat: 56.2066016 Long: -120.941381364	HB2: Lat: 56.2070960 Long: -120.9400358
HB3: Lat: 56.2075905 Long: -120.938690267	HB4: Lat: 56.2080849 Long: -120.9373446
HB5: Lat: 56.2085794 Long: -120.935999034	HB6: Lat: 56.2090738 Long: -120.9346533
HB7: Lat: 56.2095682 Long: -120.933307680	HB8: Lat: 56.2100626 Long: -120.9319619
HB9: Lat: 56.2105569 Long: -120.930616149	HB10: Lat: 56.211051 Long: -120.9292703

SCHEDULE

The warning buoys and their anchors will be constructed and installed between July and August of 2024 during periods of low flows in the Peace River.

PUBLIC BOATER ACCESS

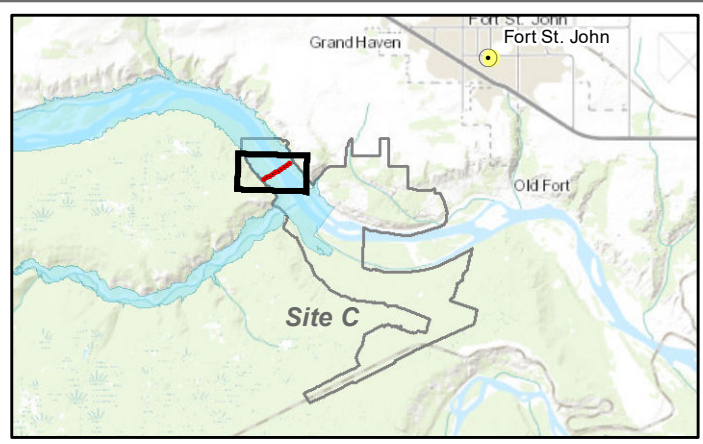
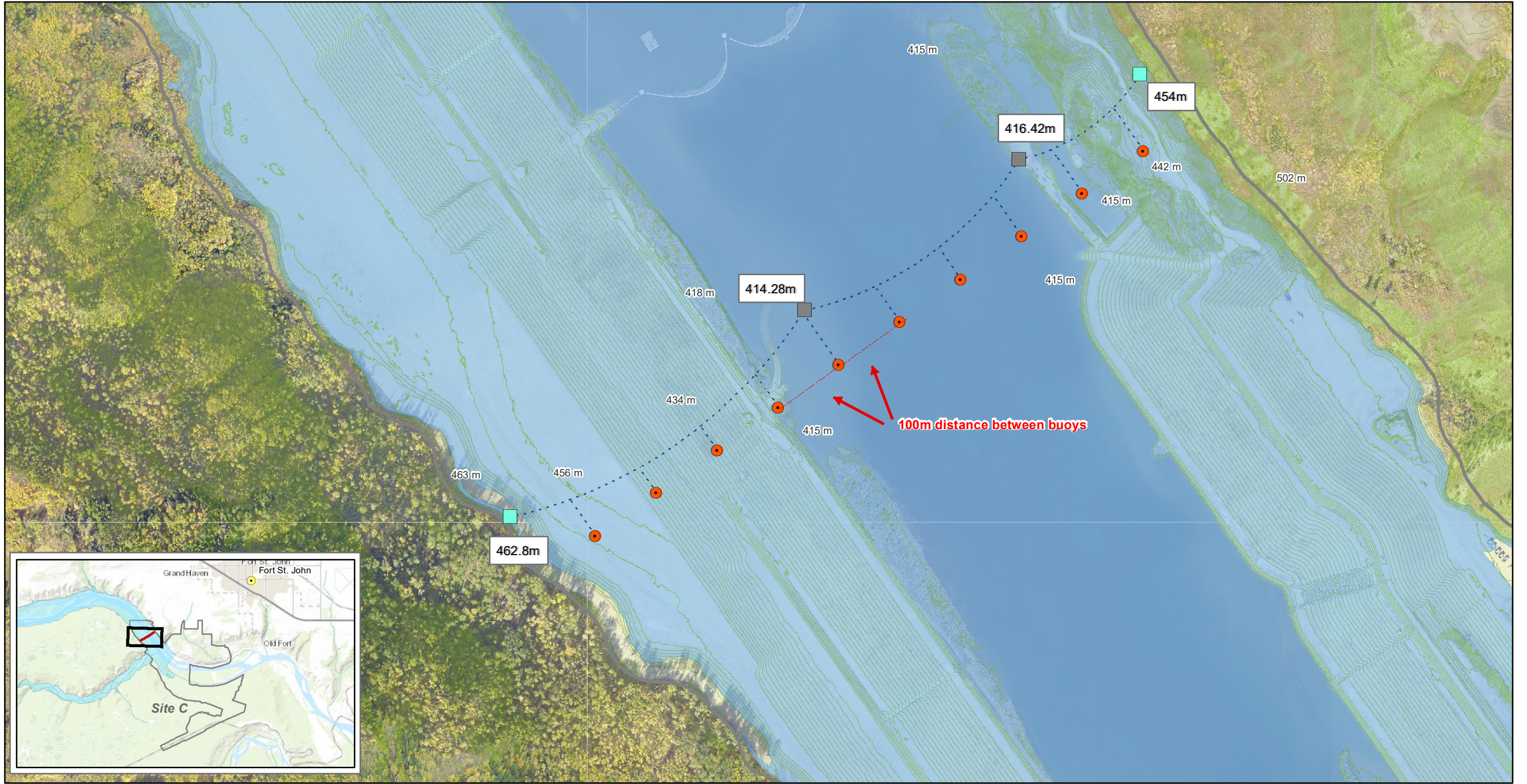
Communication to boaters will be done in accordance with the Boater Communication Protocol² set out in the Project's Construction Safety Management Plan and forthcoming Operations Safety Management Plan, as well as conditions included as part of any issued CNWA or Conditional Water Licences approvals.

¹https://www.sitecproject.com/sites/default/files/construction-environmental-management-plan-CEMP-rev-11_0.pdf

²<https://www.sitecproject.com/sites/default/files/construction-safety-management-plan-revision-2-20220309.pdf>

Appendix A

1016-N11-01991 Location and Contour Map



Map Notes:
 1. Datum: NAD83
 2. Projection: UTM Zone 10N
 3. Imagery: LIDAR Ortho captured Sep 2023
 4. Conture lines generated from the 50cm resolution LIDAR 2023

Legend

- Existing Anchor
- Sled Anchor
- Hazard Buoys
- Submerged Anchor Chain
- Contour 1m
- Dam Site Area
- Reservoir Full Supply Level 461.8m

1:5,000 0 250 m

Site C Headpond Buoys			
Date	Apr. 11, 2024	DWG NO	1016-N11-01991
			R 0

Path: X:\ArcGIS\Projects\Safety\PCN_Engines\HeadpondBuoys_Overview_1016-N11-01991.mxd

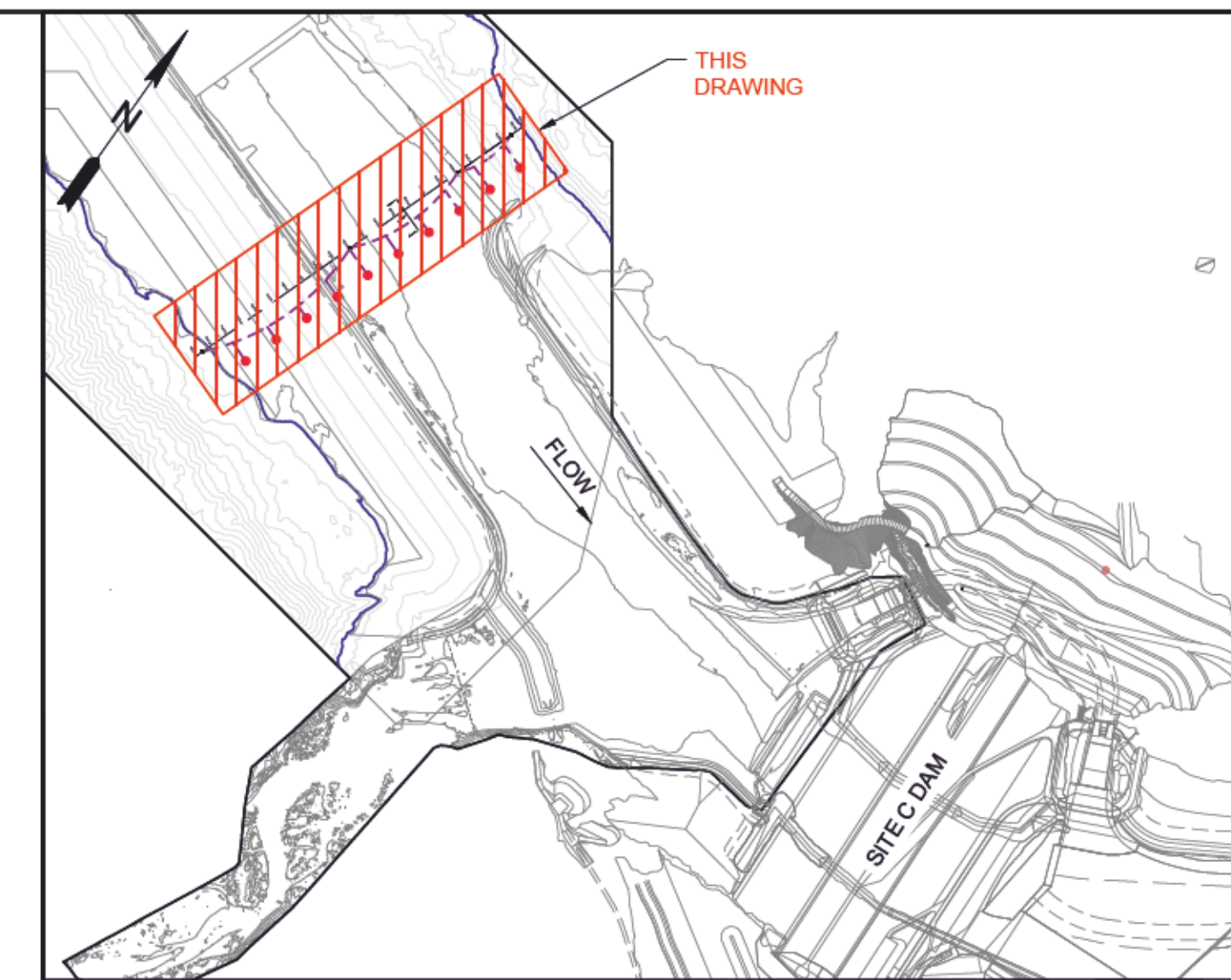
Appendix B
Issued for Construction Drawings

GENERAL NOTES:

- GENERAL SPECIFICATIONS:
 - THE CONTRACTOR IS RESPONSIBLE FOR ON-SITE INSTALLATION OF ALL ITEMS AS SPECIFIED AND SHOWN ON DRAWINGS.
 - FOR ANY CONFLICT ON THE DRAWINGS AND/OR SPECIFICATIONS AND/OR CODES, THE MOST STRINGENT REQUIREMENT SHALL APPLY.
 - THE CONTRACTOR SHALL PERFORM ALL SURVEYS NECESSARY TO LAYOUT AND EXECUTE THE WORK.
 - ALL WORK SHALL BE PERFORMED BY CONTRACTOR IN ACCORDANCE WITH APPLICABLE LOCAL, PROVINCIAL, AND NATIONAL CODES, LAWS, AND REGULATIONS.
 - CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL STIPULATIONS PRESENTED IN ENVIRONMENTAL PERMITS PERTAINING TO THIS PROJECT.
 - COMPLIANCE WITH ALL REGULATIONS GOVERNING THE SAFETY OF ALL ON-SITE WORKERS SHALL BE THE RESPONSIBILITY ON THE CONTRACTOR THROUGHOUT MOBILIZATION, CONSTRUCTION, AND DE-MOBILIZATION.
 - CONTRACTOR SHALL CONFORM TO ALL LAWS AND CODES GOVERNING SAFETY OF WORKERS IN AND AROUND WATER.
- HDPE CODES AND STANDARDS:
 - THE PUBLICATIONS LISTED BELOW (LATEST REVISION APPLICABLE) FORM A PART OF THIS SPECIFICATION TO THE EXTENT REFERENCED HEREIN. THE PUBLICATIONS ARE REFERRED TO WITHIN THE TEXT BY THE DESIGNATION ONLY.
 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) TEST METHODS:
 - ASTM D3350 SPECIFICATION FOR POLYETHYLENE PLASTICS PIPE AND FITTINGS MATERIALS, CLASS 445574 DE AND PE 100.
 - ASTM F894 STANDARD SPECIFICATION FOR POLYETHYLENE (PE) LARGE DIAMETER PROFILE WALL SEWER AND DRAIN PIPE.
 - THE PLASTICS PIPE INSTITUTE HANDBOOK OF POLYETHYLENE PIPE.
 - ASTM F1417 STANDARD PRACTICE FOR INSTALLATION ACCEPTANCE OF PLASTIC NON-PRESSURE SEWER LINES USING LOW-PRESSURE AIR.
 - ASTM D1505 STANDARD TEST METHOD FOR DENSITY OF PLASTICS BY THE DENSITY-GRADIENT TECHNIQUE.
 - ASTM D1238 STANDARD TEST METHOD FOR MELT FLOW RATES OF THERMOPLASTICS BY EXTRUSION PLASTOMETER.
 - ASTM D638 STANDARD TEST METHOD FOR TENSILE PROPERTIES OF PLASTICS.
 - ASTM D256 STANDARD TEST METHOD FOR DETERMINING THE IZOD PENDULUM IMPACT RESISTANCE OF PLASTICS.
 - ASTM D790 STANDARD TEST METHOD FOR FLEXURAL PROPERTIES OF UNREINFORCED AND REINFORCED PLASTICS AND ELECTRICAL INSULATING MATERIALS.

- MATERIALS:
 - HDPE BUOYS:
 - BUOY ENCASUREMENT SHALL HAVE A SMOOTH, NON-STICK SURFACE PROVIDING LOW FRICTION AND RESISTANCE TO BIO-FOULING.
 - BUOY DESIGN SHALL HAVE THE CAPACITY FOR HIGH DEFORMATION WITHOUT FRACTURE (STRAIN ABILITY).
 - PIPE SIZES, PIPE TOLERANCES AND PIPE OVALITY SHALL BE IN ACCORDANCE WITH ASTM D3035.
 - ALL FUSION WELDING SHALL BE CARRIED OUT BY CERTIFIED OPERATORS TRAINED IN FULL SURFACE BUTT FUSION WELDING.
 - POLYETHYLENE PIPE WELDING SHALL CONFORM TO ASTM F2620 HEAT FUSION JOINTS, F2620 PRACTICE FOR HEAT FUSION JOINING OF POLYETHYLENE PIPE AND FITTINGS, GUIDELINES FOR EXTRUSION WELDING REFERENCED IN ASTM F1904.
 - WELDING ELECTRODE SHALL BE DUAL SHIELD 7100 ULTRA OR EQUIVALENT FOR HDPE BOOM CONNECTIONS.
 - BUOY COMPONENTS SHALL BE JOINED TOGETHER BY FUSION WELDING EXCEPT IN AREAS OF GUSSETS OR WHERE FULL SURFACE WELDING IS NOT POSSIBLE.
 - ALL FUSION OPERATORS SHALL BE SKILLED WITH FULL SURFACE BUTT FUSION OF POLYETHYLENE PIPE USING HEATER PLATES AND OTHER METHODS OF FULL SURFACE FUSION WELDING.
 - STRUCTURAL STEEL:
 - DESIGN, SUPPLY, FABRICATION, ERECTION AND INSPECTION OF STRUCTURAL STEEL AND PLATEWORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF CISC HANDBOOK OF STEEL CONSTRUCTION.
 - ALL STRUCTURAL STEEL SHALL BE NEW MATERIAL TO CSA STANDARD CAN/CSA G40.20 & G40.21.
 - STRUCTURAL STEEL PLATES SHALL BE GRADE 355W, EXCEPT STEEL BUOY PLATEWORK IN WHICH 300W IS PERMITTED.
 - ALL PLATES AND PIPES SHALL BE HOT DIP GALVANIZED AFTER FABRICATION TO ASTM A123/A123M. APPLY ZINC-RICH PAINT TO DAMAGED AREAS IN ACCORDANCE WITH ASTM A780.

- WELDING ELECTRODES SHALL BE TYPE E490X, UNLESS NOTED OTHERWISE.
- WELDS SHALL CONFORM TO CSA STANDARD W59. FABRICATORS SHALL BE PROPERLY CERTIFIED IN ACCORDANCE WITH CSA W47.1.
- ALL BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AND CONFORM TO ASTM F3125 GRADE A325.
- ALL COTTER PINS SHALL BE BOWTIE STAINLESS STEEL COTTER PINS.
- GALVANIZED SURFACES DAMAGED DURING CONSTRUCTION SHALL BE TOUCHED UP WITH GALVAFROID AS PER MANUFACTURER'S RECOMMENDATIONS AT NO COST TO THE OWNER.
- SUBMIT SHOP DRAWINGS INCLUDING CONNECTION DETAILS, CLEARLY INDICATING PROFILES, SIZES, SPACING AND LOCATIONS OF ALL STRUCTURAL MEMBERS AND BRACING.
- BUOYS
 - FOAM FILL:
 - EXCEPT FOR BALLAST CHAMBER, ALL HDPE BUOYS SHALL BE FILLED WITH TYPE 1, CLOSED-CELL EXPANDED POLYSTYRENE FOAM BILLET PER ASTM C578.
 - FOAM MATERIAL SHALL BE BILLET FOAM AND COMPLY WITH ASTM C272 WATER ABSORPTION SHALL NOT EXCEED 0.08 LB/CU FT FOAM.
 - HDPE BUOYS SHALL BE BALLASTED WITH CONCRETE AS SHOWN ON DRAWINGS. ADDITIONAL TRIMMING OF HDPE BUOYS SHALL BE ACHIEVED WITH PEA GRAVEL (OR APPROVED ALTERNATIVE) FOR REGULAR OPERATING CONDITIONS.
 - ALL NAVIGATIONAL MARKINGS SHALL BE SCREEN PRINTED ON 2mm ALUMINUM SHEET WITH WHITE, RETRO-REFLECTIVE BACKGROUND USING 3M 8801 SERIES TRANSLUCENT INK.
- CONTRACTOR SUBMITTAL LIST:
 - CHAIN MILL CERTIFICATIONS.
 - ALL OTHER MATERIAL DATA SHEETS.
 - BUOY SHOP DRAWINGS, SUBMITTED TO ENGINEER FOR REVIEW A MINIMUM OF 2 WEEKS PRIOR TO DELIVERY TO SITE.



KEY PLAN
NTS

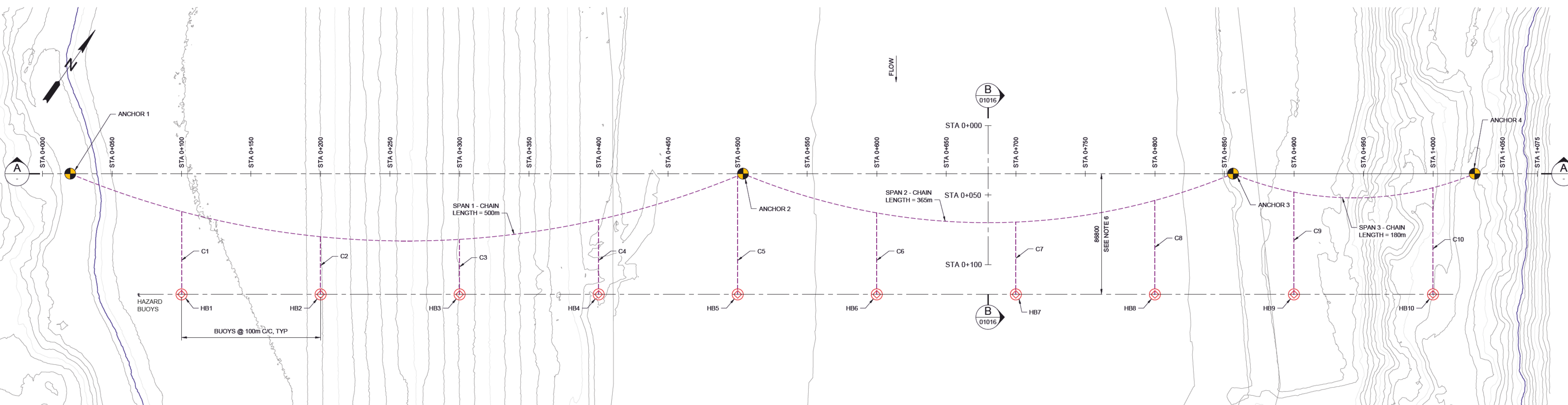
CHAIN LENGTH

CHAIN	LENGTH (m)
C1	61
C2	49
C3	60
C4	87
C5	120
C6	100
C7	93
C8	108
C9	106
C10	97
TOTAL	881

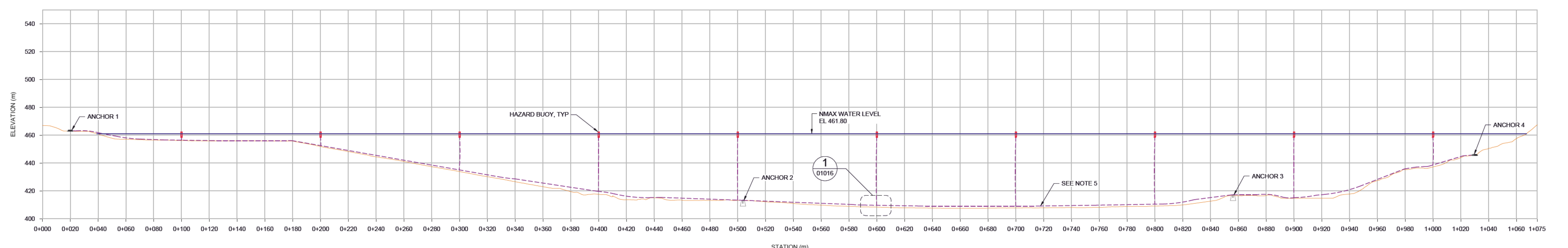
ANCHOR DATA TABLE

ANCHOR	EASTING	NORTHING	DESCRIPTION
A1	627579.9	6231006.0	SLED ANCHOR (EXIST)
A2	627975.7	6231284.2	BURIED CONC BLOCK (EXIST)
A3	628264.0	6231486.9	BURIED CONC BLOCK (EXIST)
A4	628406.2	6231586.9	SLED ANCHOR (EXIST)

FOR ANCHOR DETAILS SEE 1020-C18-01017



BUOY PLAN
SCALE: A



SECTION A
SCALE: A

- LEGEND:**
- ORIGINAL GROUND
 - SUBMERGED ANCHOR CHAIN
 - NMAX WATER LEVEL EL. 461.80
 - ANCHOR
 - HAZARD BUOY
 - HB# HAZARD BUOY NUMBER

- NOTES:**
- FOR DETAILS, SEE SEE 1020-C18-01016 AND 1020-C18-01017.
 - DO NOT SCALE DRAWINGS. FOR DIMENSION NOT SHOWN, REQUEST INFORMATION FROM HYDRO'S REPRESENTATIVE.
 - AS-CONSTRUCTED DRAWING ACCURACY SHALL BE +/- 1m.
 - COORDINATES ARE BASED ON NAD83/UTM ZONE 10N DATUM.
 - CHAIN SHALL BE INSTALLED ALONG THE RIVERBED.
 - APPROXIMATE ALIGNMENT OF BUOYS SHALL VARY WITH CHANGES IN FLOW PATTERNS AND WATER LEVELS.

BC Hydro Contract No. MSA 18632
ISSUED FOR CONSTRUCTION
By: _____ Date: _____
Hydro's Representative

SCALE: A 0 50m
1:1250
ALL DIMENSIONS IN MILLIMETRES, UNLESS NOTED OTHERWISE.
ALL ELEVATIONS IN METRES, UNLESS NOTED OTHERWISE.

C:\pwworking\hatch-bc-hydro\msa-18632\msa-18632-01016.dwg
DATE PLOTTED: 2024/04/22 11:30 AM

NO.	DRAWING NUMBER	REFERENCE DRAWING TITLE	NO.	REVISIONS
1	1020-C18-01017	PEACE RIVER UPSTREAM HAZARD BUOYS ANCHOR PLANS AND DETAILS	0	APPROVED FOR CONSTRUCTION
2	1020-C18-01016	PEACE RIVER UPSTREAM HAZARD BUOYS SECTIONS AND DETAILS		
3	1020-C18-00190-003	PEACE RIVER - TEMPORARY BOOM - CONCRETE ANCHOR BLOCK - PLANS AND SECTIONS		
4	1020-C18-00190-001	PEACE RIVER - TEMPORARY BOOM - DETAILS		
5	1020-C18-00190	PEACE RIVER - TEMPORARY BOOM - PLAN, DETAIL AND WORK POINT TABLE		

DESIGN NUMBER	DESIGN	DATE
0000	J. NEUFELD	
WORK ORDER NUMBER	INSP/CHK	DATE
CSA S250 ACCURACY NAD - UTM	J. WALKER	
	G. MENDIOLA	
	G. BUCKLEY	
	J. WALKER	
	J. WALKER	
	E. NEUFELD	

DATE	DIST	DRAWING NUMBER	REPORT NUMBER	FIG NO	REV
2024APR22		1020-C18-01015		E	0

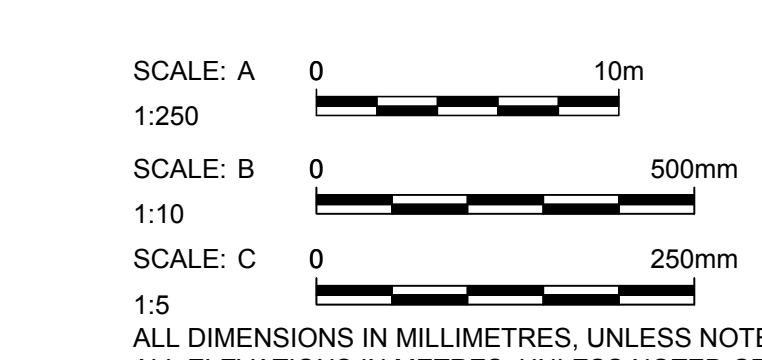
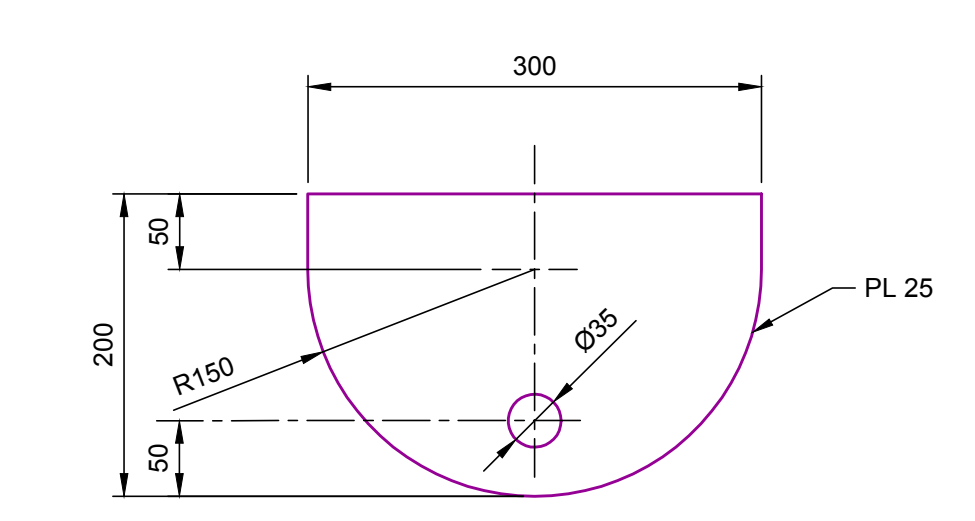
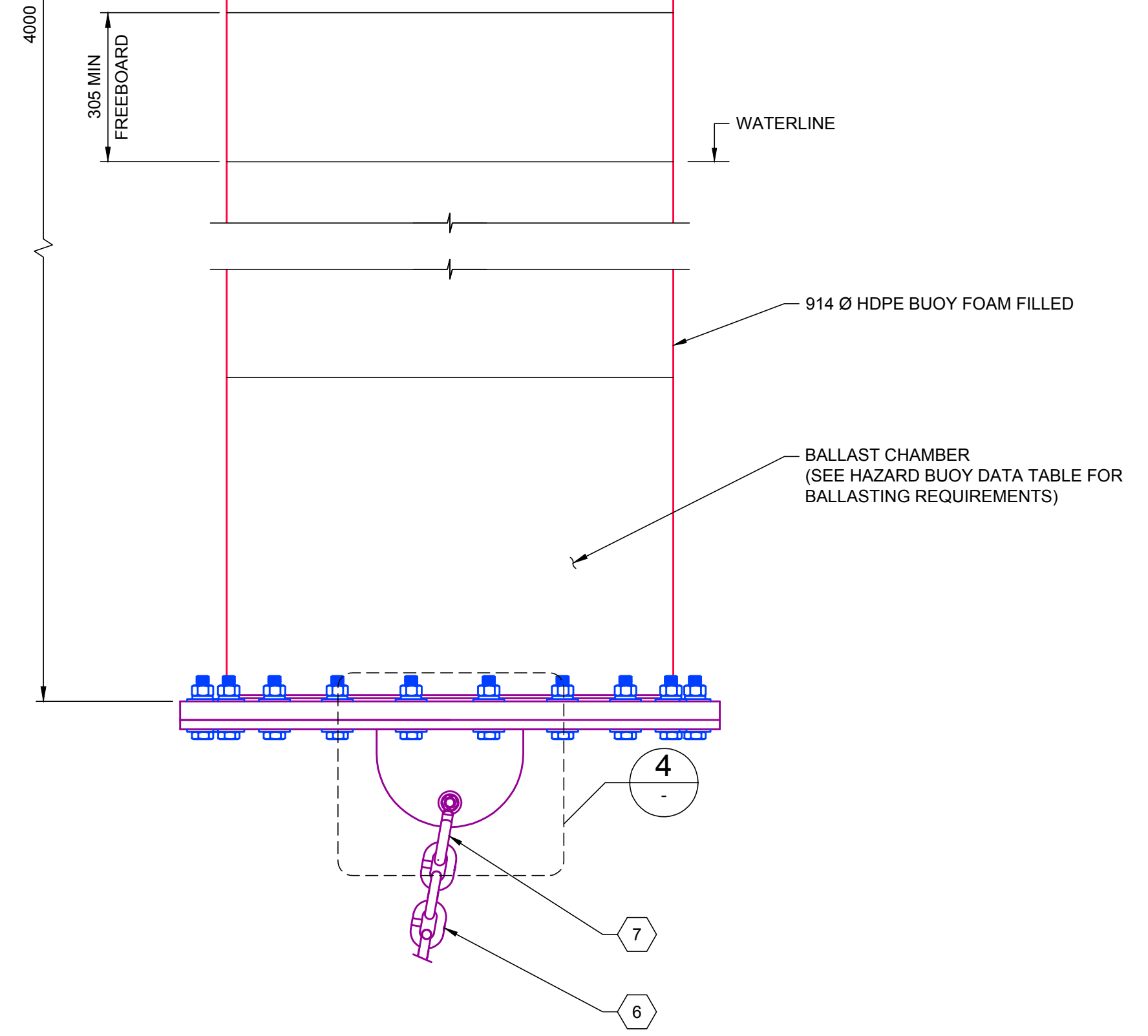
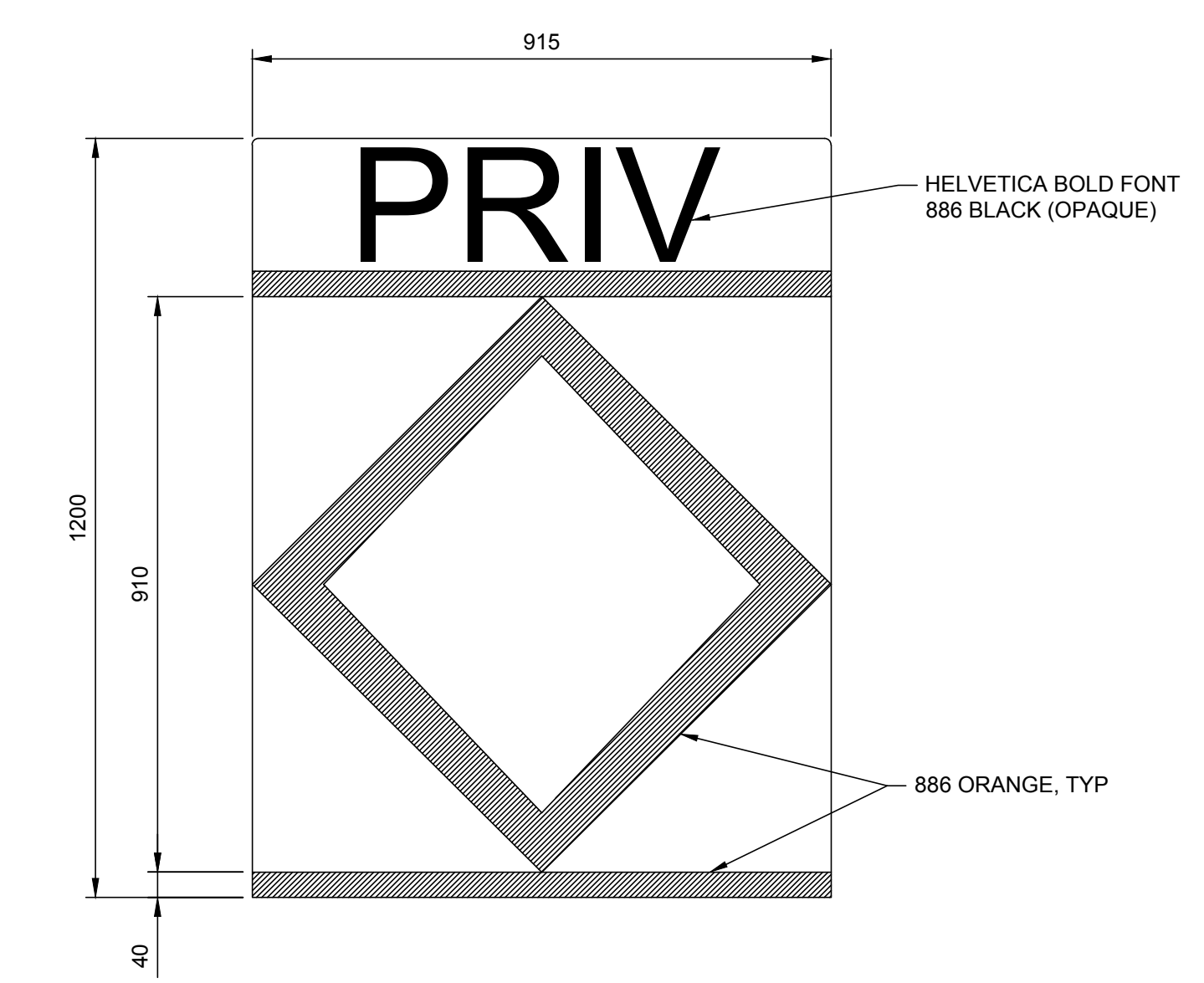
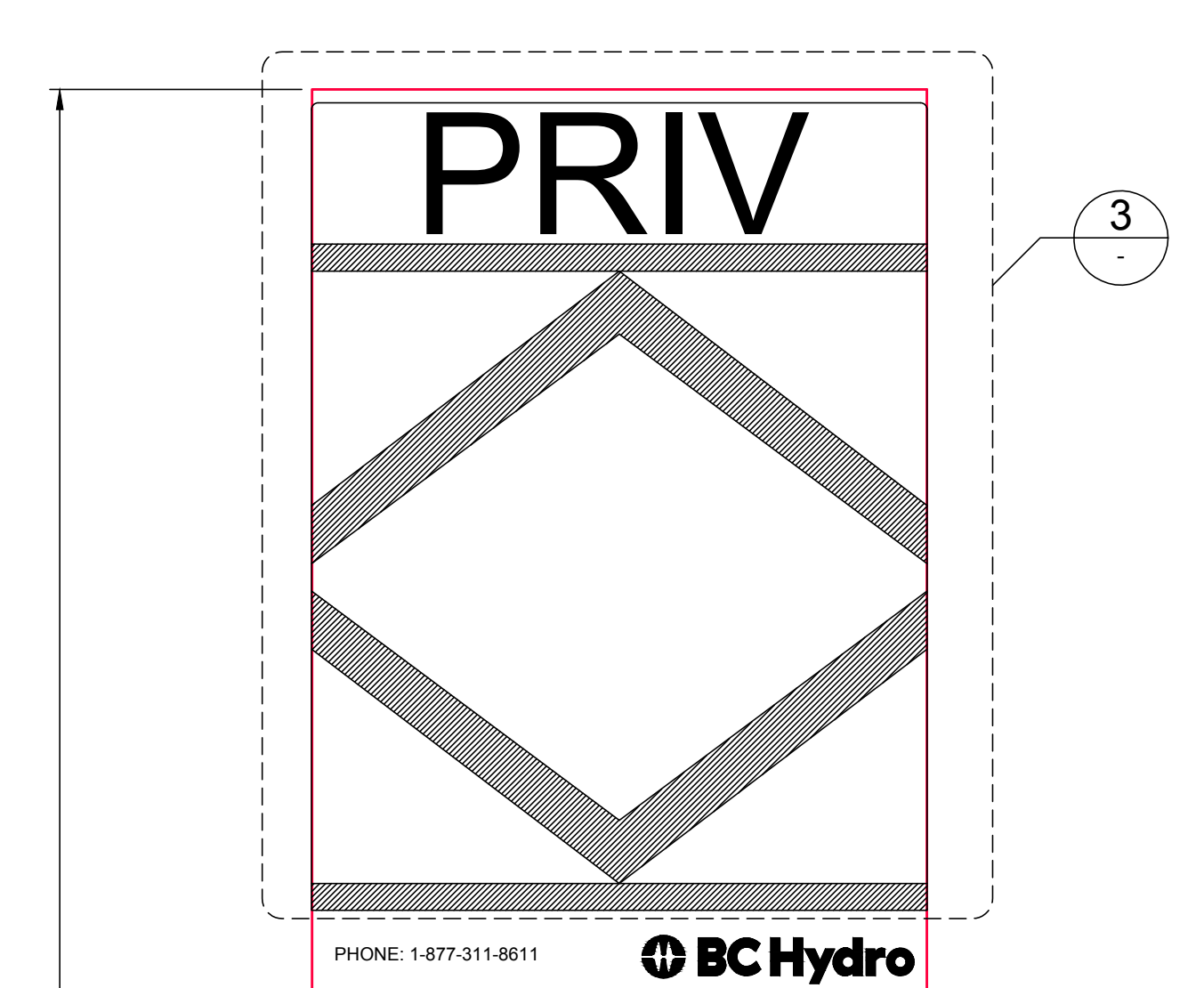
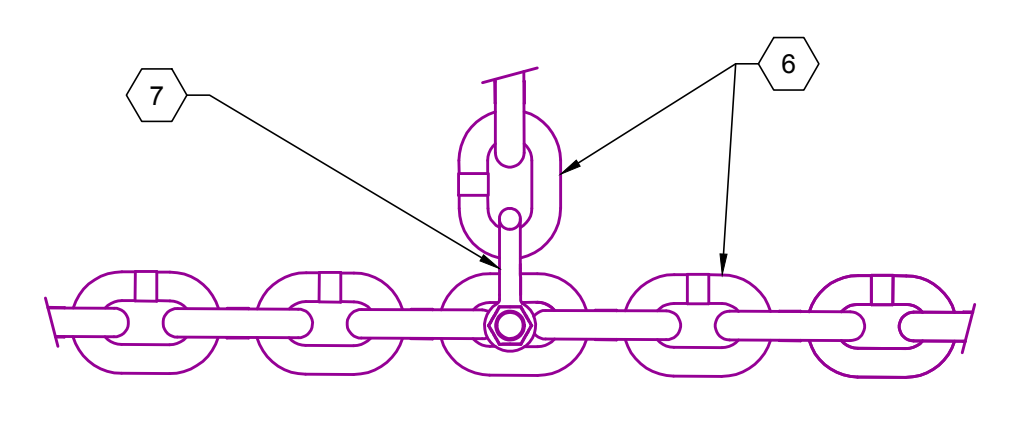
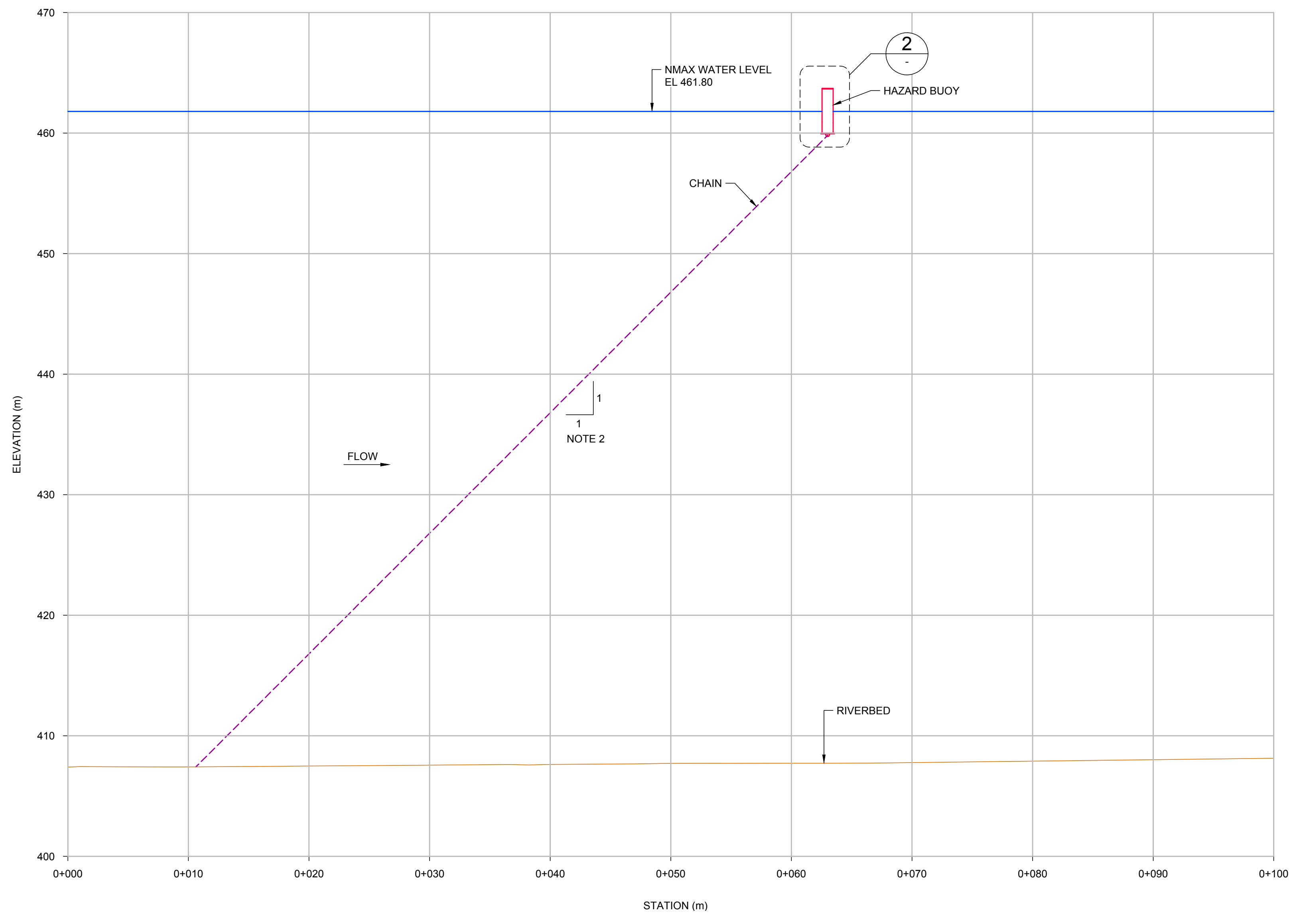
NOT TO BE REPRODUCED WITHOUT THE PERMISSION OF BC HYDRO

BILL OF MATERIALS		
ITEM	QTY.	DESCRIPTION
1	10	HAZARD BUOY - 914 mm DIA. X 4.0 m LONG
2		
3	495m	DOCK FENDER CHAIN - MAIN CHAIN - A1 TO A2 19 mm DIA. GRADE 80
4	365m	DOCK FENDER CHAIN - MAIN CHAIN - A2 TO A3 19 mm DIA. GRADE 80
5	205m	DOCK FENDER CHAIN - MAIN CHAIN - A3 TO A4 19 mm DIA. GRADE 80
6	881m	DOCK FENDER CHAIN - SECONDARY CHAIN 19 mm DIA. GRADE 80
7	20	GREEN PIN G-4143 SHACKLE 19 mm DIA.

HAZARD BUOY DATA	
BUOY	PERMANENT BALLAST (kg)
1	750
2	750
3	750
4	620
5	620
6	620
7	620
8	620
9	620
10	750

- NOTES:
- FOR GENERAL NOTES SEE 1020-C18-01015.
 - ANCHOR LINE SLOPE VARIES AT OTHER BUOY LOCATIONS.

- LEGEND:
- BUOY
 - STEEL
 - SUBMERGED ANCHOR CHAIN



ALL DIMENSIONS IN MILLIMETRES, UNLESS NOTED OTHERWISE.
ALL ELEVATIONS IN METRES, UNLESS NOTED OTHERWISE.

SITE C CLEAN ENERGY PROJECT		HATCH HATCH B.C. PERMIT TO PRACTICE NO. 1000695	
BC Hydro		CLEAN ENERGY PROJECT - SITE C	
PEACE RIVER UPSTREAM HAZARD BUOYS SECTION AND DETAILS		DESIGN: J. NEUFELD CHECKER: J. WALKER DESIGNER: G. MENDIOLA DFTG: G. BUCKLEY INSP: J. WALKER REV: J. WALKER ACP: E. NEUFELD	
DATE: 2024JUN04	DIST:	DRAWING NUMBER: 1020-C18-01016	REPORT NUMBER:
FIG NO:	REV:	E:	1

NO.	DRAWING NUMBER	REFERENCE DRAWINGS	DRAWING TITLE	NO.	REVISIONS
1	1020-C18-01017		PEACE RIVER UPSTREAM HAZARD BUOYS ANCHOR PLANS AND DETAILS	1	APPROVED FOR CONSTRUCTION. BILL OF MATERIALS REVISED.
0	1020-C18-01015		PEACE RIVER UPSTREAM HAZARD BUOYS PLAN, SECTION AND GENERAL NOTES	0	APPROVED FOR CONSTRUCTION

C:\projects\hatch-bc-permit-to-practice\1020-C18-01016.dwg
 BRUCE BUCKLEY (DRAWN)
 01/2024 4:58 PM

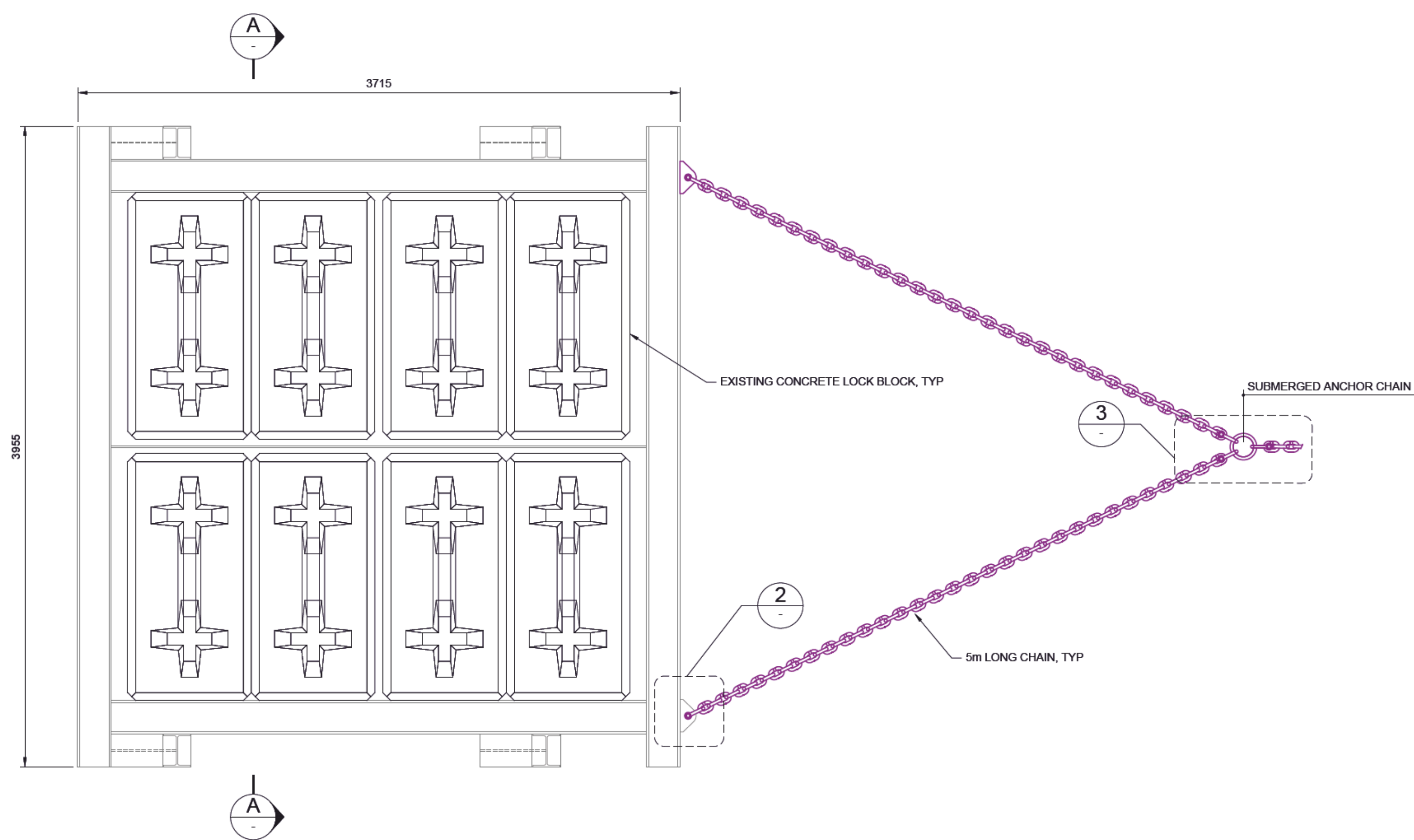
BILL OF MATERIALS

ITEM	QTY.	DESCRIPTION
1	20m	DOCK FENDER CHAIN - SLED ANCHOR CHAIN 19mm DIA. GRADE 80
2	16	GREEN PIN G-4143 SHACKLE 19mm DIA.
3	2	GREEN PIN G-4143 SHACKLE 25mm DIA.
4	4	PEERLESS ROUND ALLOY RING 26mm DIA.

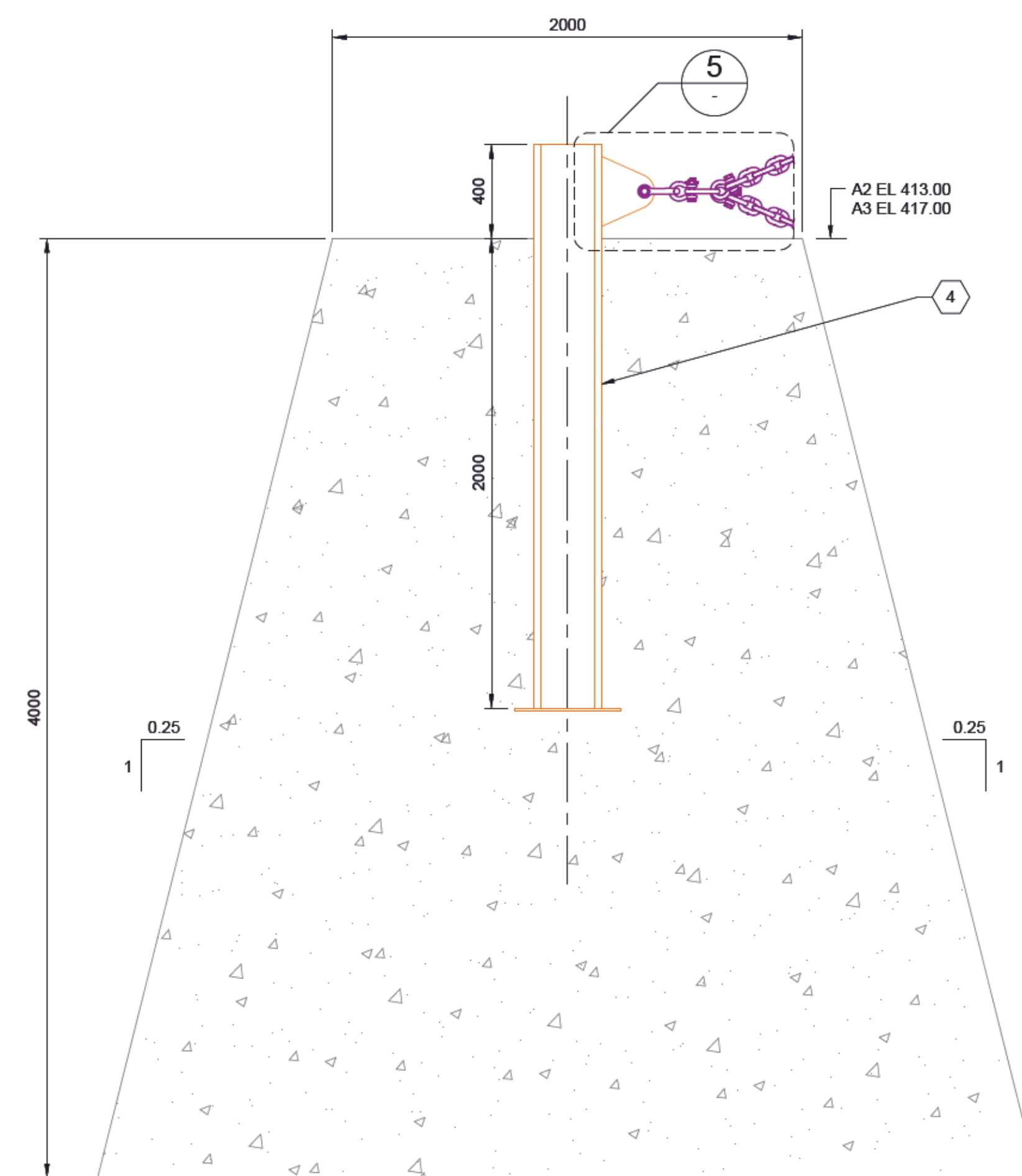
NOTES:
 1. FOR GENERAL NOTES SEE 1020-C18-01015.

LEGEND:

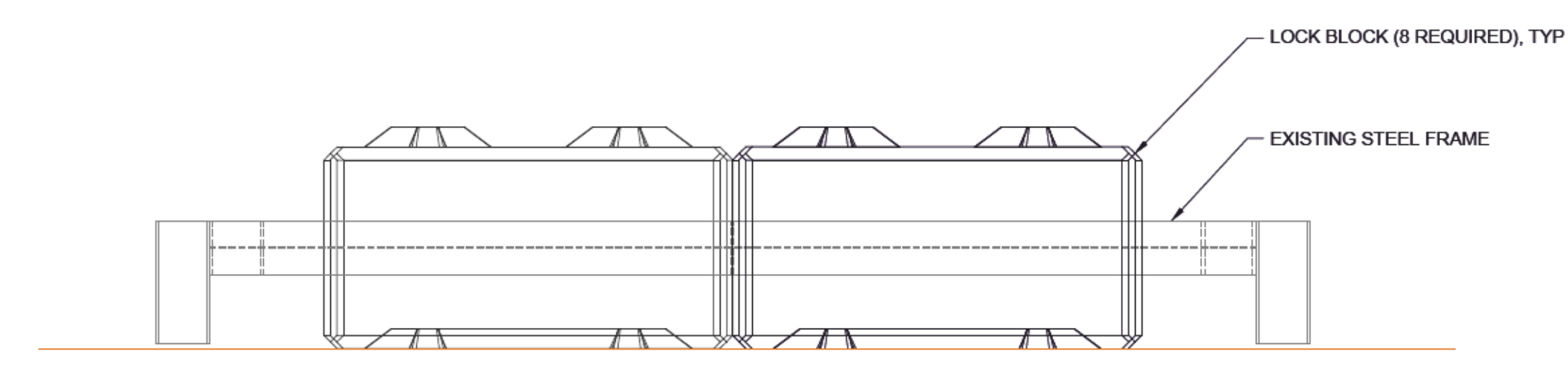
	EXISTING REINFORCED CONCRETE
	EXISTING STEEL
	STEEL



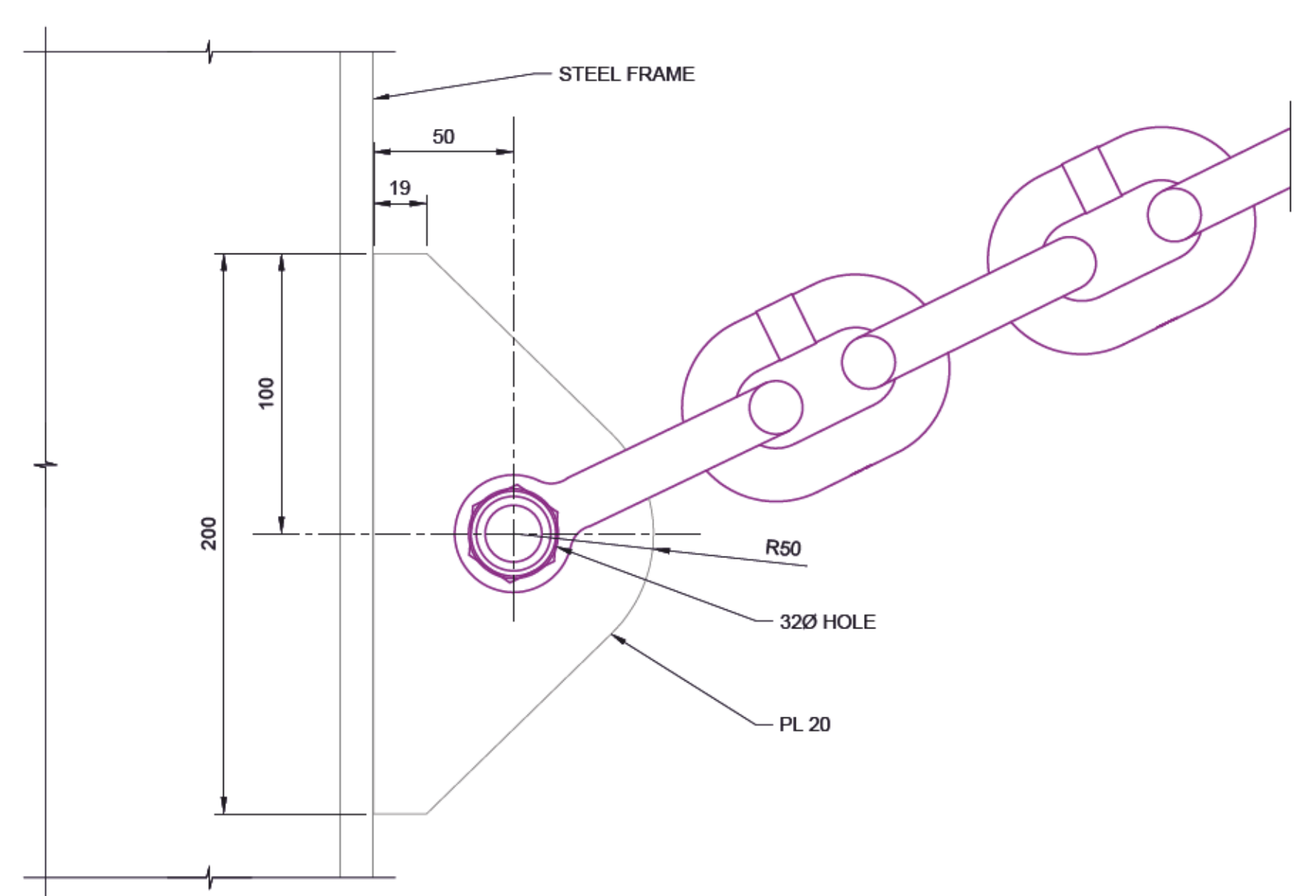
DETAIL 1 EXISTING SLED ANCHOR (A1 AND A4)
 SCALE: A



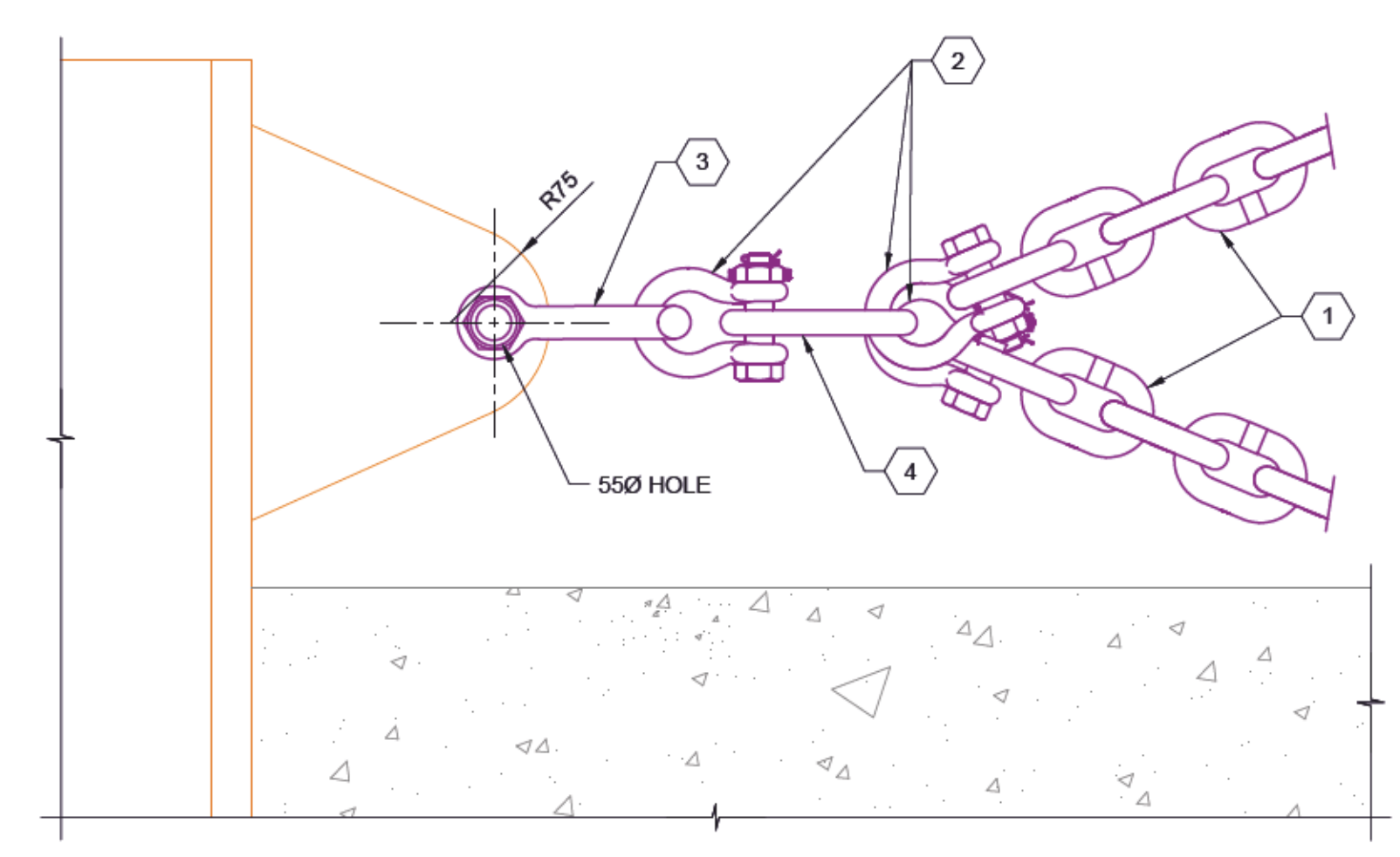
DETAIL 4 EXISTING BURIED CONCRETE ANCHOR BLOCK (A2 AND A3)
 SCALE: B



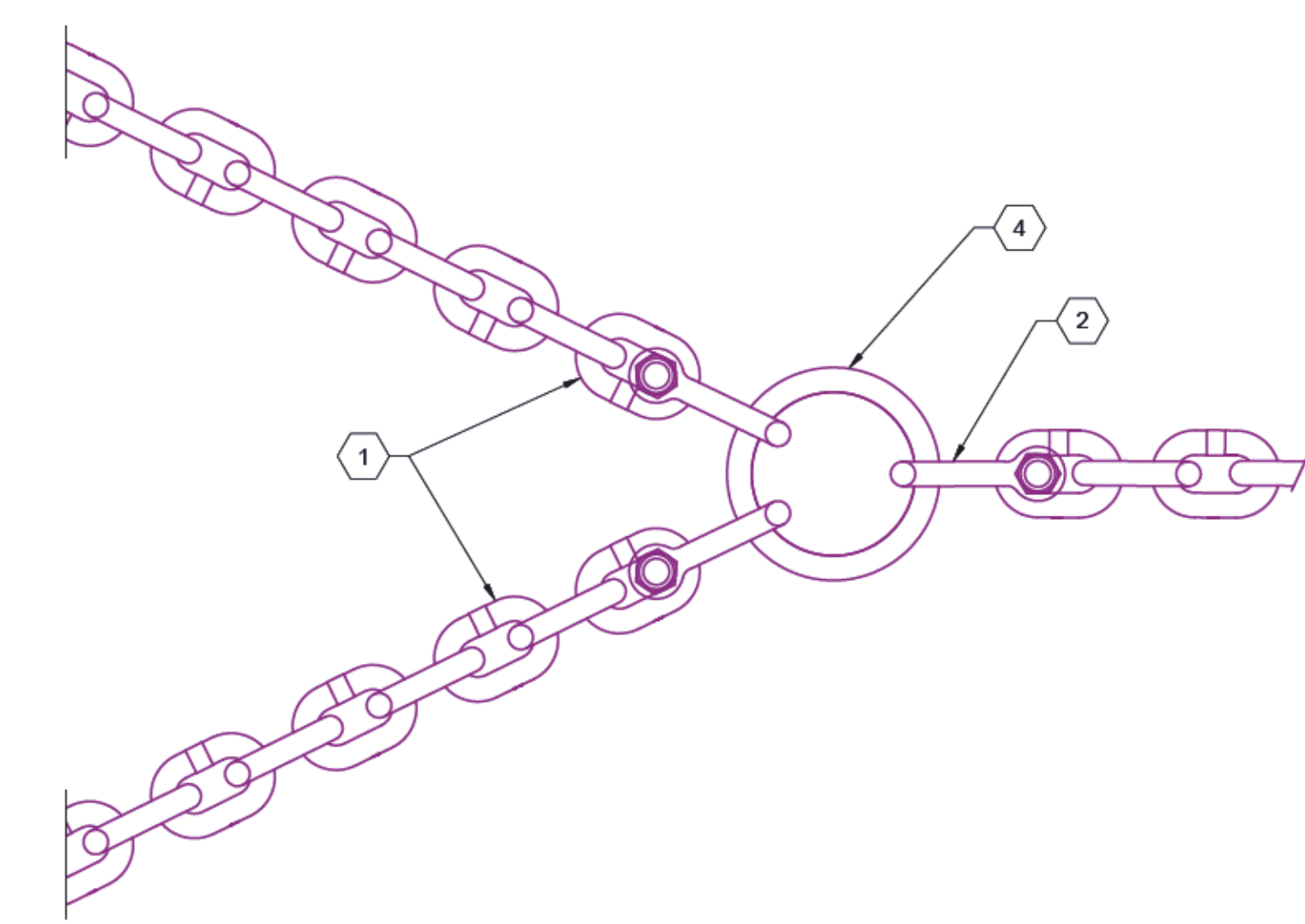
SECTION A
 SCALE: A



DETAIL 2
 SCALE: C

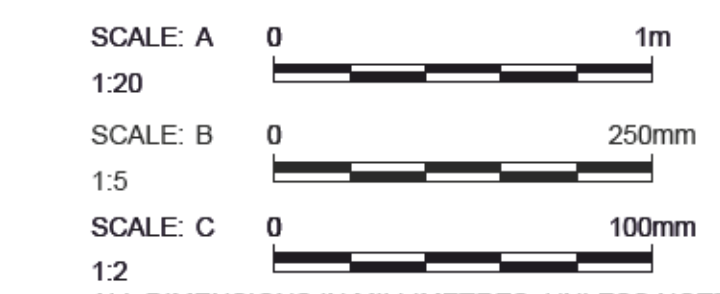


DETAIL 5
 SCALE: B



DETAIL 3
 SCALE: B

BC Hydro Contract No. MSA 19632
ISSUED FOR CONSTRUCTION
 By: _____ Date: _____
 Hydro's Representative



ALL DIMENSIONS IN MILLIMETRES, UNLESS NOTED OTHERWISE.
 ALL ELEVATIONS IN METRES, UNLESS NOTED OTHERWISE.

SITE C CLEAN ENERGY PROJECT	HATCH HATCH B.C. PERMIT TO PRACTICE NO. 1000695 BC Hydro	
	CLEAN ENERGY PROJECT - SITE C PEACE RIVER UPSTREAM HAZARD BUOYS ANCHOR PLANS AND DETAILS	
DESIGN NUMBER: J. NEUFELD WORK ORDER NUMBER: J. WALKER CSA S250 ACCURACY: G. MENDIOLA BASE ACCURACY LEVEL: G. BUCKLEY ASB ACCURACY LEVEL: J. WALKER ACPT: E. NEUFELD	DATE: 2024APR22 DIST:	REPORT NUMBER: 1020-C18-01017 FIG NO: E 0

1020-C18-01016	PEACE RIVER UPSTREAM HAZARD BUOYS SECTIONS AND DETAILS	0	APPROVED FOR CONSTRUCTION	
1020-C18-01015	PEACE RIVER UPSTREAM HAZARD BUOYS PLAN, SECTION AND GENERAL NOTES			
NO	DRAWING NUMBER	NO	REVISIONS	REMARKS
	REFERENCE DRAWINGS			

C:\work\1020-C18-01015-01016-01017-01018-01019-01020-C18-01015.dwg
 MENDIOLA, GABRIEL (R)
 4/18/2024 3:33 PM