



## MEMO

---

**DATE** May 19, 2026 **FILE NO.** 721-3464  
**RE** Home Farm Residential Development  
SPS Feasibility – Long Term Care & Rental Units

---

**TO** Evan Hancock, Development  
Engineering Reviewer **CC**  
**COMPANY** Town of The Blue Mountains

---

This memorandum has been prepared to summarize the feasibility of the constructed Sanitary Pumping Station (SPS) on the Home Farm Development to accommodate additional flows from the proposed Long-Term Care Facility and Rental units.

A Sanitary Pumping Station Design Brief had previously been completed in May of 2024, with drawings being approved for construction in August 2025. The SPS has since been fully constructed; however, no sewers or servicing has been constructed within the subdivision to date. The SPS is currently in a “mothball” state with preliminary commissioning completed.

For further information on the existing facility design and servicing strategy for the additional lands, please refer to the following reports:

- Sanitary Pumping Station Design Brief (Crozier, May 2024)
- Functional Servicing and Stormwater Management Report (Crozier, May 2026)

Please note that this memorandum only demonstrates the feasibility of utilizing the existing pumping station and a detailed design of the system will be completed at a later date.

### 1.0 SANITARY FLOWS

The design of the SPS includes flows from the Home Farm Development and a Town Block. The original Town Block design accounted for 130 units from affordable housing units and 14 equivalent units for the fire station. The design flows for the Town Block have been revised based on a concept plan including a 192-bed Long-Term Care Facility and 112 Rental units, with the SPS no longer accepting flows from the fire station.

The total daily peak flow into the SPS has increased from 18.15 L/s to 20.01 L/s.

### 2.0 PUMP STATION WET WELL AND OPERATING ELEVATIONS

The SPS wet well has been constructed as precast concrete with a 3048 mm inner diameter. The system design and station levels are as described in **Table 1**. Please refer to **Appendix A** for the relevant Approved for Construction drawings.

## 2.1 Wet Well Working Volume and Pump Cycle Times

The previous design set the working volume (normal volume between duty pump start and all pumps stop) at 2.92 m<sup>3</sup>, or 0.4 m of depth. This volume ensured that the pumps do not cycle more than six times an hour, but also at least every thirty minutes at average day flows to prevent accumulation of odours.

However, based on the increased peak flows, the working volume needs to increase to **3.28 m<sup>3</sup>**, or **0.45 m** of depth. This revision of the working volume does not affect the efficacy of the pumping station and only requires slightly raising the proposed pump start elevations for both the primary PLC and backup float controls. Please refer to **Table 1** below for a comparison in the operating elevations between the original design and the revised design.

**Table 1: Comparison of Pump Station Operating Elevations**

Description	Original Elevation Layout	Revised Elevation Layout
Invert of F/M discharge at Grey Rd 19 MH 12.	220.96	220.96
High Point of Forcemain	224.70	224.70
Top of Pump Station Conc.	216.00	216.00
Centreline of F/M at Pump Station	213.90	213.90
Minimum Basement Flooding Elevation	214.60	214.60
Top of the First Intermediate Platform	213.25	213.25
Top of the Second Intermediate Platform	210.90	210.90
Influent Sewer Invert at Pump Station	210.50	210.50
High Alarm Level/Start Standby Pump (Float)	210.20	210.25
High Alarm Level (PLC)	210.10	210.15
Start Duty Pump (Float)	209.90	209.95
Start Standby Pump (PLC)	209.80	209.85
Start Duty Pump (PLC)	209.60	209.65
Stop All Pumps (PLC)	209.20	209.20
Stop All Pumps (Float)	208.90	208.90
Low Alarm Level (PLC)	208.80	208.80
Invert of Station	208.40	208.40
U/S of Concrete Foundation/Ballast	207.40	207.40

Based on the revised operating levels, the SPS continues to have fewer than 6 starts per hour, as outlined in MECP guidelines. The revised pump cycles times are summarized below in **Table 2**, with additional details provided in **Appendix B**.

**Table 2: Summary of Pump Cycle Times**

Flow Scenario	Inflow (L/s)	Fill Time (min)	Pump Discharge (L/s)	Pump Time (min)	Cycle Time (min)	Starts Per Hour
<b>Average (dry weather)</b>	3.90	14.0	20.01	3.4	17.4	3.4
<b>Average (wet weather)</b>	9.05	6.0		5.0	11.0	5.4

### 3.0 PRESSURE PIPE SIZE SELECTION

All pressure pipes within the pumping station have been sized to convey the sanitary discharge to the proposed outlet while providing suitable flow velocities per MECP Guidelines (0.6 - 3.0 m/s) to minimize headlosses within the system.

The existing piping is sufficiently sized for the increased design flows.

### 4.0 SYSTEM CURVE

The system curve of the pumping station was previously calculated based on calculated friction losses through equivalent length of pipes at the proposed nominal pipe diameters of 100 and 150 mm. A more detailed approach to calculate the system curve was conducted to determine if the chosen pumps and their associated pump curves can support the increased design flows.

The actual internal diameters of the selected pressure pipes are now used to determine the major losses in the system. Refer to **Table 3** for the comparison between diameters used in the original design and the revised design.

**Table 3: Comparison of Pressure Pipe Diameters**

Pipe	Nominal Diameter (Original Design)	Actual Internal Diameter (Revised Design)
Individual Pump Discharge	100 mm	108.2 mm
Common Header	150 mm	161.5 mm
Forcemain	150 mm	154.7 mm

The increased diameters of the pipes significantly reduce the major friction losses in the system.

A more refined approach has been completed to determine the minor losses through the system by calculating the minor losses associated with piping appurtenances directly rather than converting them to an equivalent length of pipe and applying the Hazen-Williams equation. Please refer to **Appendix B** for a breakdown of the major and minor losses through the system.

Based on the revised approach to calculating the system curve, the Flygt model NP 3127 SH3 pumps installed within the SPS are capable of servicing the increased flow rate without needing to be replaced. Refer to **Appendix B** for the System Curve and Pump Curve Graph.

### 5.0 EMERGENCY STORAGE

With the increased flow into the SPS, the required emergency storage to provide a 2-hour buffer time will increase from 130.68 m<sup>3</sup> to 144.07 m<sup>3</sup>. Some of the additional storage will be provided through the proposed sanitary sewers and maintenance holes within the rental unit area, but the majority of storage will come from an upsized 2400 mm diameter maintenance hole proposed between MH43 and MH1 just upstream of the SPS Block. See **Table 4** below for a summary of storage provided.

**Table 4: Emergency Storage Volumes Provided**

<b>Structure</b>	<b>Storage – Original Design (m<sup>3</sup>)</b>	<b>Storage – Revised Design (m<sup>3</sup>)</b>
Wet Well	32.10	31.74
Storage Tank	50.08	50.08
Sanitary Sewers	11.13	12.74
Sanitary Maintenance Holes	37.45	55.77
<b>TOTAL</b>	<b>130.76</b>	<b>150.32</b>

Detailed calculations for emergency storage are provided in **Appendix B**.

## **6.0 CONCLUSIONS**

Based on the foregoing, the existing sanitary pumping station as it is currently constructed can support the proposed long-term care and rental unit developments. Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Yours truly,

**C.F. CROZIER & ASSOCIATES INC.**



Brady Ellsworth, P.Eng.  
Project Engineer

/cb

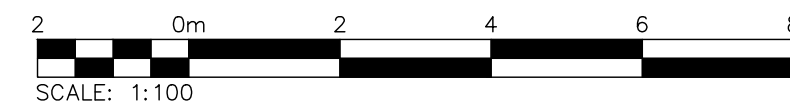
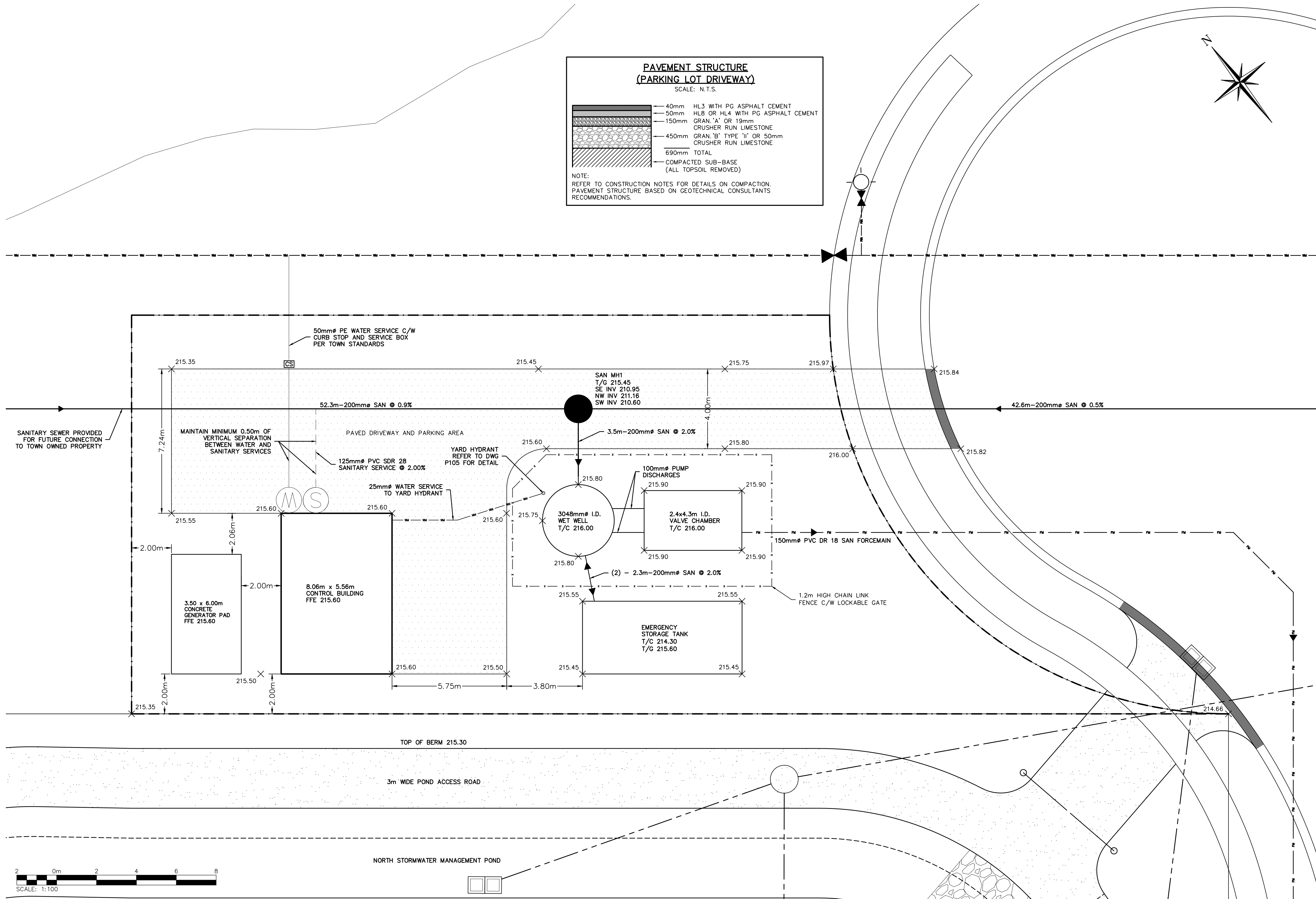
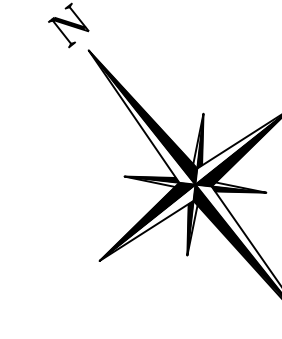
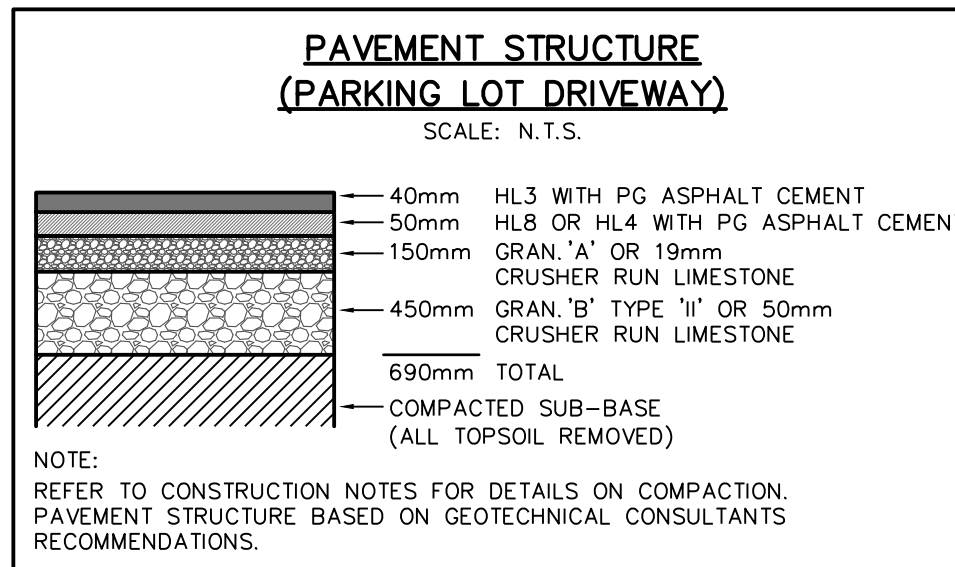
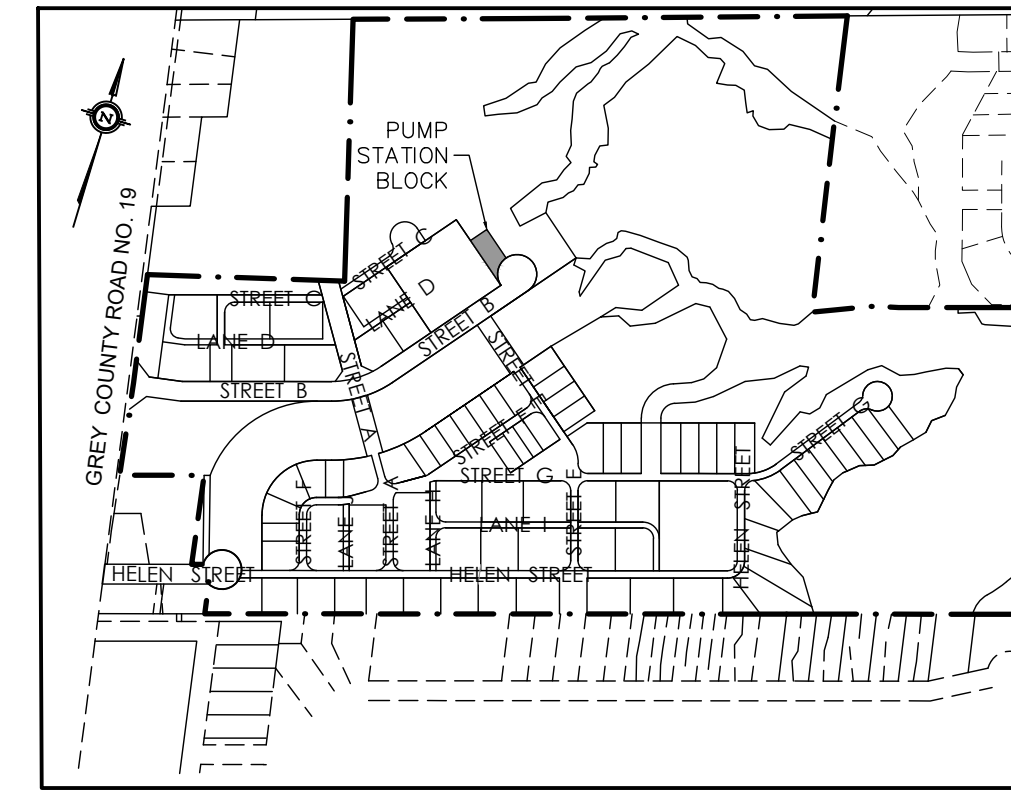
**C.F. CROZIER & ASSOCIATES INC.**



Charles Buscher  
Engineering Intern

# APPENDIX A

## Process AFC Drawings



NOTE: THE LIMITS OF CONSTRUCTION START AND END AT THE PROPERTY LINE.

- THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
- THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
- THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
- ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
- DO NOT SCALE DRAWINGS.

**TEMPORARY BENCHMARKS**  
TBM#1 -  
TBM#2 -  
TBM#3 -  
\*\*\*ADD REFERENCE TO SURVEY/SOURCE

**Town of Blue Mountains**  
Planning and Development Services  
**Accepted For Construction**  
**Pre-Service Only**

AFC Drawings are only valid as part and upon execution of a Pre-servicing Agreement

*Signature*      *26 Aug 2024*  
signature      date

No.	ISSUE	DATE: YYYY/MM/DD	Engineer
1	ISSUED FOR 1st SUBMISSION	2021/12/10	
2	ISSUED FOR 90% DETAILED DESIGN	2023/03/21	
3	ISSUED FOR CLIENT REVIEW - IFT	2023/12/15	
4	ISSUED FOR 90% DETAILED DESIGN REV 1	2024/01/02	
5	ISSUED FOR TENDER	2024/01/22	
6	ISSUED FOR APPROVAL	2024/03/08	
7	ISSUED FOR APPROVAL REV 1	2024/05/24	



Project: **HOME FARM SEWAGE PUMPING STATION TOWN OF THE BLUE MOUNTAINS**

Drawing: **SEWAGE PUMPING STATION SITE PLAN**

**CROZIER CONSULTING ENGINEERS**

Drawn By: B.E.	Design By: B.E.	Project: 721-3464
Check By: A.L.	Check By: M.H.	Drawing: P101

**STRUCTURAL NOTES:**

- FOUNDATION DESIGN TO BE CONFIRMED BASED ON RECOMMENDATION OF GEOTECHNICAL ENGINEER.
- SUBGRADE ELEVATIONS TO BE APPROVED BY THE GEOTECHNICAL ENGINEER.
- SUPPORT ALL FOOTINGS AND SLABS ON UNDISTURBED SUB-GRADE WHERE DEEMED SUITABLE BY GEOTECHNICAL ENGINEER, WHERE UNSUITABLE, REPLACE WITH ENGINEERED FILL TO ELEVATIONS RECOMMENDED BY GEOTECHNICAL ENGINEER.
- REVIEW GEOTECHNICAL REPORT FOR RECOMMENDATIONS CONCERNING DEWATERING AT ALL STRUCTURES.
- CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ALL STRUCTURAL AND MECHANICAL COMPONENTS.

**TANK BUOYANCY AND UPLIFT RESISTANCE**

- PROTECT ALL STRUCTURES FROM FLOTATION DURING CONSTRUCTION.
- DEWATER EXCAVATION UNTIL CONSTRUCTION IS COMPLETE.

**MATERIAL SPECIFICATIONS**

- CONCRETE STRENGTH IN ACCORDANCE WITH CSA STANDARD A23.1-14 AND A23.2-14.
- STRUCTURAL CONCRETE UNLESS OTHERWISE NOTED: 30 MPa AT 28 DAYS.
- EXPOSURE CLASSIFICATION A-1.
- MAXIMUM WATER CEMENT RATIO 0.50 U.N.O.
- USE WATER REDUCING AGENT AND SUPERPLASTICIZER.
- NORMAL MAXIMUM AGGREGATE SIZE 20mm.
- ENTRAINED AIR CONTENT RANGE 4% TO 7%.
- LEAN FILL AND MASS CONCRETE 28-DAYS COMPRESSIVE STRENGTH 15 MPa
- REINFORCING STEEL: CSA STANDARD G30.18-09(2014), GRADE 400, DEFORMED BARS.
- STRUCTURAL STEEL: CSA STANDARD G40.20-13/G40.21-13, GRADE 350 ROLLED SECTIONS, GRADE 300 PLATES.
- ALUMINUM HATCH:  
DESIGNED FOR 14.41KPA (300 PSF) LOAD C/W S.S. HOLD OPEN ARM AND RELEASE ASSEMBLY, S.S. AUTOMATIC LIFTING ASSEMBLY, LUG CONNECTION FOR PADLOCK, NEOPRENE GASKET FOR WEATHER AND ODOR TIGHTNESS, ALL HARDWARE TO BE STAINLESS STEEL, PADLOCK TO MATCH OWNERS STANDARD, SUBMIT SHOP DWGS. FOR APPROVAL.
- CEMENTITIOUS COATING FOR INTERIOR OF PUMPING STATION.  
REFER TO SPECIFICATION 07610 CEMENTITIOUS WATERPROOFING FOR COATING REQUIREMENTS.

**SUBMERSIBLE PUMPS**

- TWO ELECTRIC SUBMERSIBLE WASTEWATER PUMPS.
- FLYGT MODEL NP 3127 SH3 ADAPTIVE 248 12HP WITH 155mm IMPELLER.
- PUMP CAPACITY 18.9 L/s @ 28.1m TDH WITH ONE PUMP IN OPERATION.
- CAST IRON CASING AND IMPELLER WITH 80mm SOLIDS PASSING.
- 80mm (3") DISCHARGE ELBOW, ACCESSORIES AND S.S. GUIDE RAILS.
- 8.0m STAINLESS STEEL LIFTING CHAIN.

**SHOP DRAWING RESPONSIBILITIES**

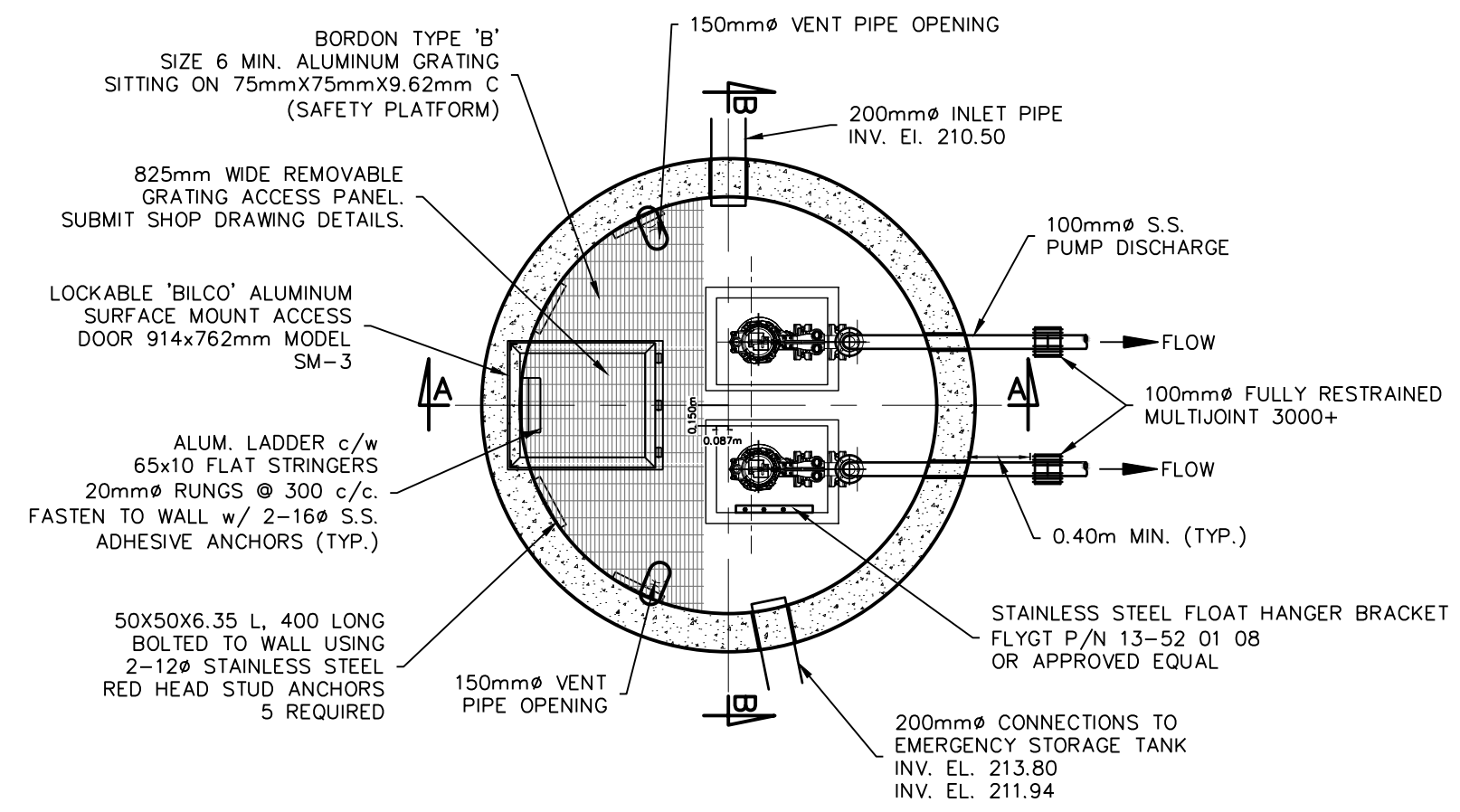
AS PART OF THEIR FIELD SERVICES, THE ENGINEER MAY REVIEW SHOP DRAWINGS PERTAINING TO WORK SHOWN ON THE ENGINEER'S DRAWINGS BY MEANS OF APPROPRIATE RATIONAL SAMPLING PROCEDURES AND COMMENT ON THE ACCURACY WITH WHICH THE CONTRACTOR PREPARED THE DRAWINGS. REVIEW OF SHOP DRAWINGS IS FOR THE SOLE PURPOSE OF ASCERTAINING CONFORMANCE WITH THE GENERAL DESIGN CONCEPT AND IS NOT AN APPROVAL OF THE DETAIL DESIGN INHERENT IN THE SHOP DRAWINGS. RESPONSIBILITY FOR WHICH SHALL REMAIN WITH THE CONTRACTOR SUBMITTING THEM. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS AND OMISSIONS IN THE SHOP DRAWINGS OR FOR MEETING ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR INFORMATION PERTAINING TO THE FABRICATION PROCESS TECHNIQUES OF CONSTRUCTION AND INSTALLATION, AND FOR CO-ORDINATION OF THE WORK OF ALL SUB-TRADES.

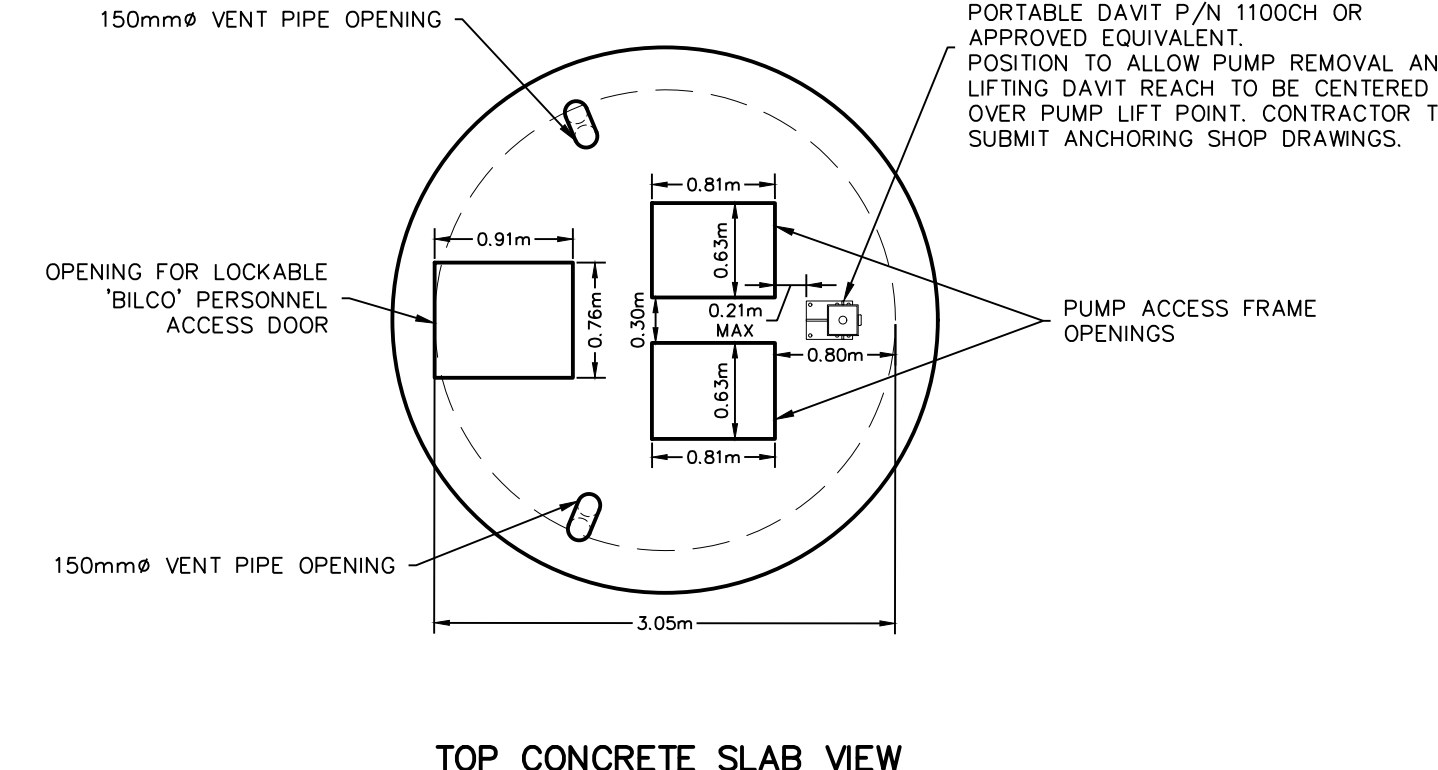
- MANUFACTURERS OF ALL STRUCTURAL ELEMENTS SHALL SUBMIT COMPLETE SHOP DRAWINGS, SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN ONTARIO TO THE CONSULTANT FOR REVIEW PRIOR TO THE FABRICATION (3 SETS OR PDF). SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH SPECIFICATIONS AND ALLOW A MINIMUM OF TWO(2) WEEKS FOR REVIEW. THE SUBMISSION NOR THE REVIEW SHALL RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY FOR PROVIDING PROPER ENGINEERING DESIGN, METHODS, EQUIPMENT, WORKMANSHIP AND SAFETY PROCEDURES.

- CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR THE FOLLOWING:

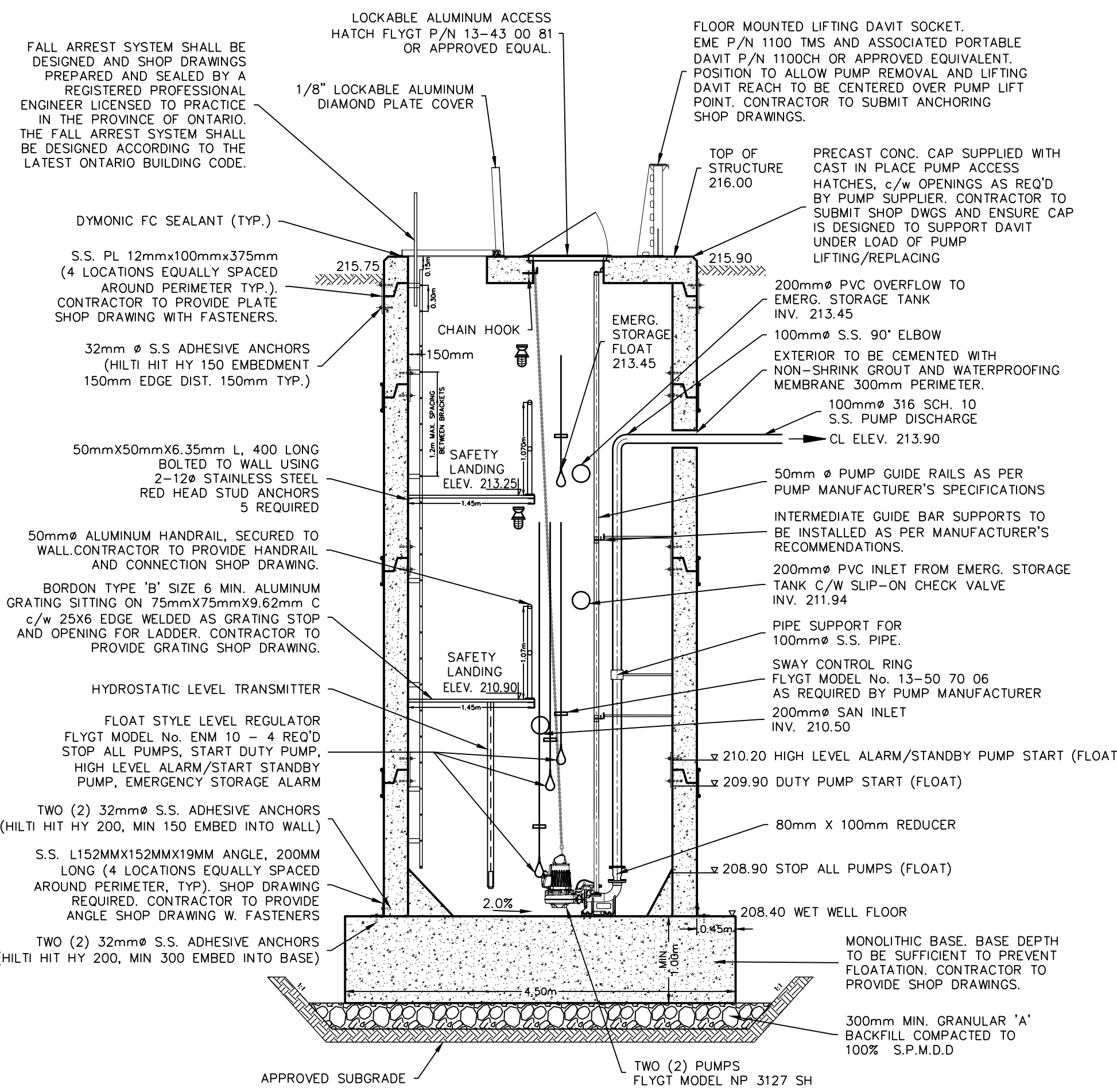
- PRECAST STRUCTURE (CAP, RISERS, BASE)
- PLATFORM, GUARD, AND SUPPORT
- LADDER, SUPPORT, AND FALL ARREST SYSTEM
- FROST STRAPS
- WATERPROOFING MEMBRANE
- VENT PIPE SUPPORT
- STEEL ANGLES, PLATES, AND FASTENERS



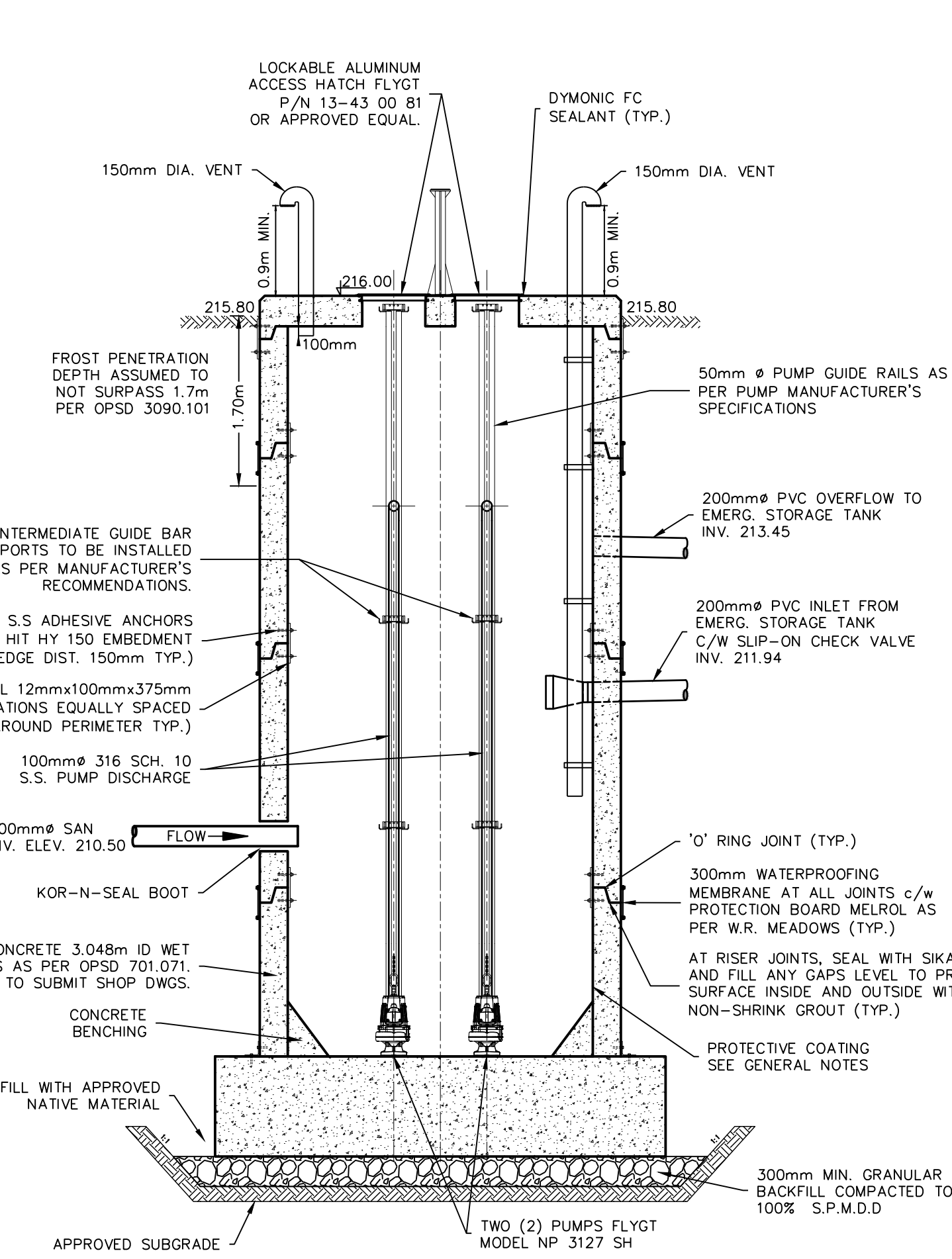
**PUMPING STATION-TOP VIEW**



**TOP CONCRETE SLAB VIEW**

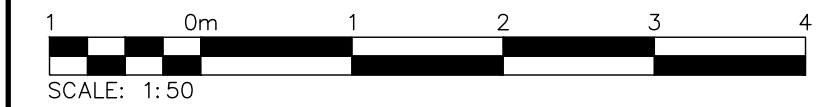


**WET WELL SECTION A-A 1:50**



**WET WELL SECTION B-B 1:50**

PUMP OPERATING ELEVATIONS (m)	
HIGH LEVEL ALARM AND START STANDBY PUMP (FLOAT INTERLOCK)	210.20
START DUTY PUMP ELEVATION (FLOAT INTERLOCK)	209.90
START STANDBY PUMP (PLC)	209.80
START DUTY PUMP (PLC)	209.60
STOP ALL PUMPS (PLC)	209.20
STOP ALL PUMPS (FLOAT INTERLOCK)	208.90
WET WELL FLOOR ELEVATION	208.40

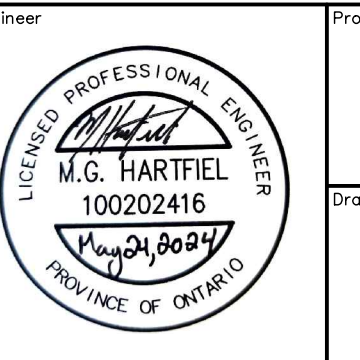


1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.  
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.  
3. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.  
4. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.  
5. DO NOT SCALE DRAWINGS.

**TEMPORARY BENCHMARKS**  
TBM#1 -  
TBM#2 -  
TBM#3 -  
\*\*\*ADD REFERENCE TO SURVEY/SOURCE

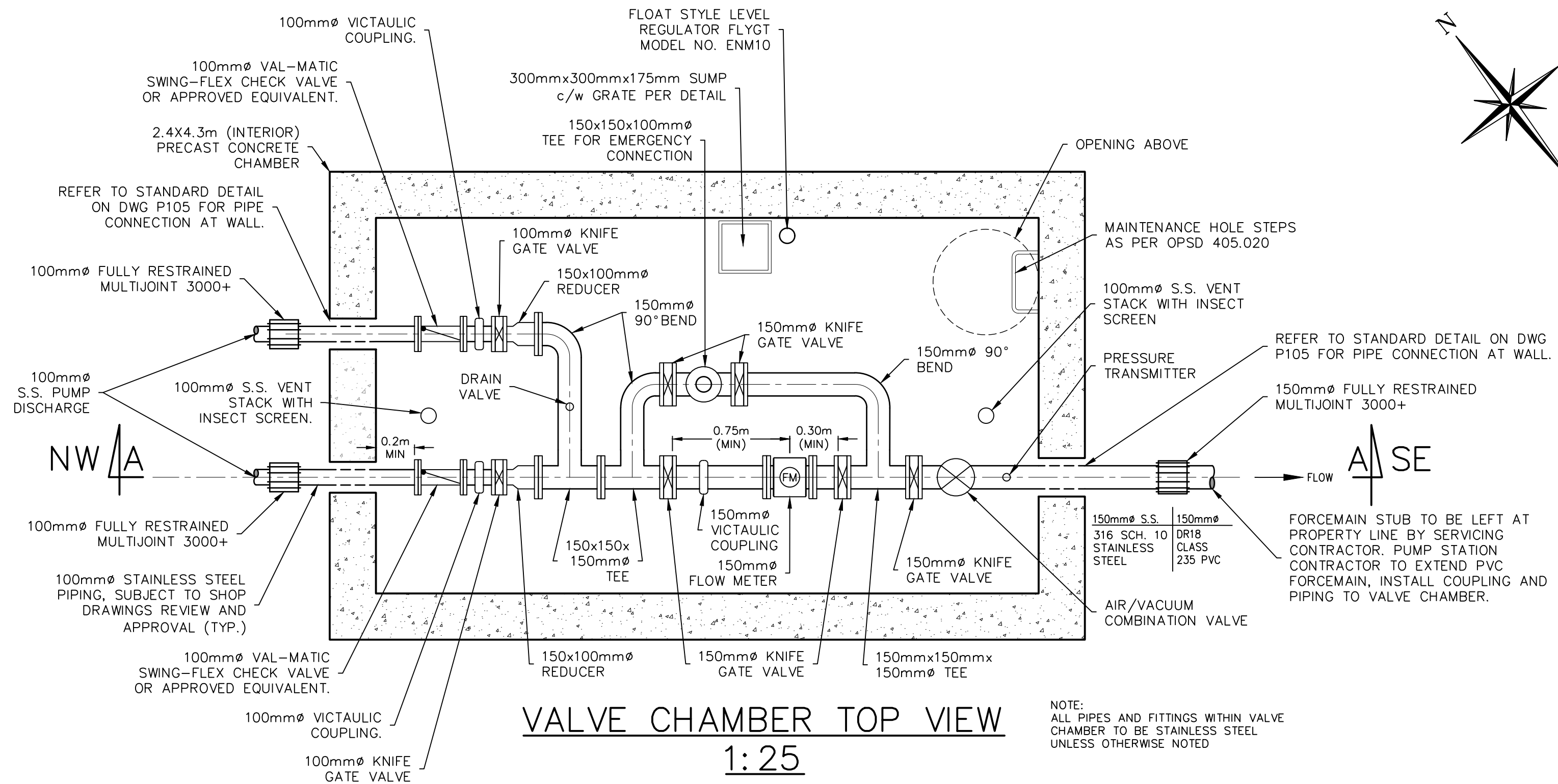
**Town of Blue Mountains**  
Planning and Development Services  
**Accepted For Construction**  
**Pre-Servicing Only**  
AFC Drawings are only valid as part and upon execution of a Pre-servicing Agreement  
signature: *Ronan W. [unclear]* date: 26-Apr-2024

No.	ISSUE	DATE: YYYY/MM/DD	Engineer
1	ISSUED FOR 1st SUBMISSION	2021/12/10	
2	ISSUED FOR 90% DETAILED DESIGN	2023/03/21	
3	ISSUED FOR CLIENT REVIEW - IFT	2023/12/15	
4	ISSUED FOR 90% DETAILED DESIGN REV 1	2024/01/02	
5	ISSUED FOR TENDER	2024/01/22	
6	ISSUED FOR APPROVAL	2024/03/08	
7	ISSUED FOR APPROVAL REV 1	2024/05/24	



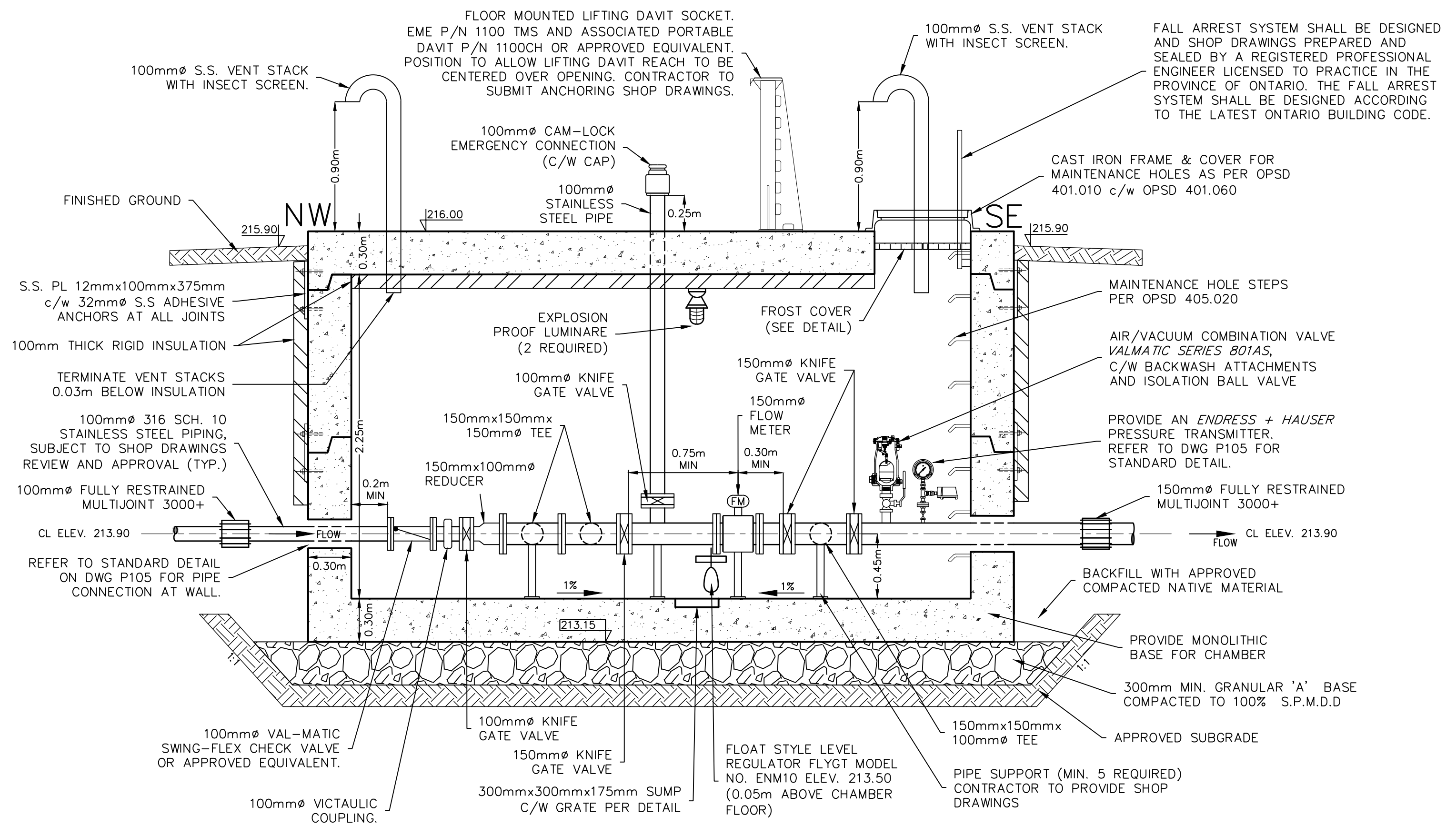
Project: HOME FARM SEWAGE PUMPING STATION TOWN OF THE BLUE MOUNTAINS  
Drawing: WET WELL CROSS SECTIONS & CONSTRUCTION NOTES  
Check By: B.E., A.L. Design By: B.E., M.H. Project: 721-3464 Drawing: P102

**CROZIER CONSULTING ENGINEERS**  
Project: 721-3464  
Drawing: P102



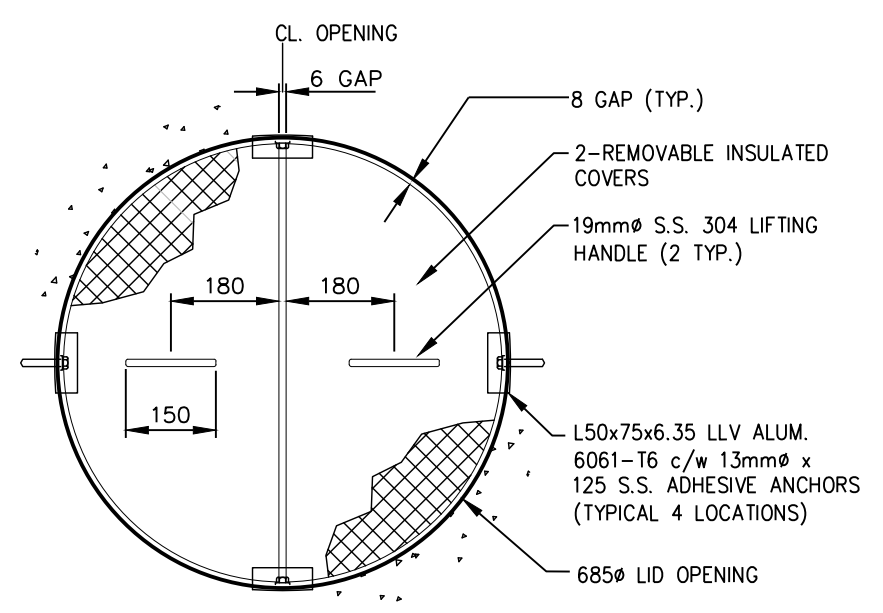
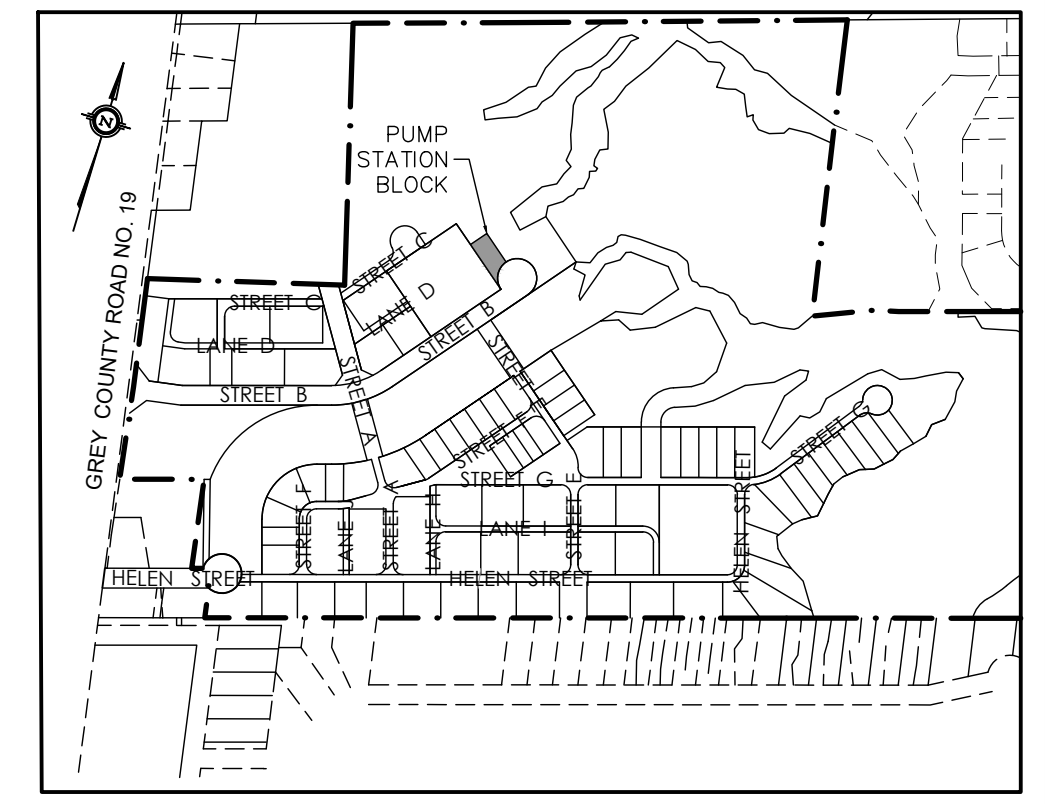
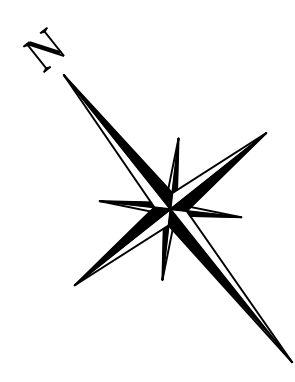
**VALVE CHAMBER TOP VIEW**  
1:25

NOTE:  
ALL PIPES AND FITTINGS WITHIN VALVE CHAMBER TO BE STAINLESS STEEL UNLESS OTHERWISE NOTED

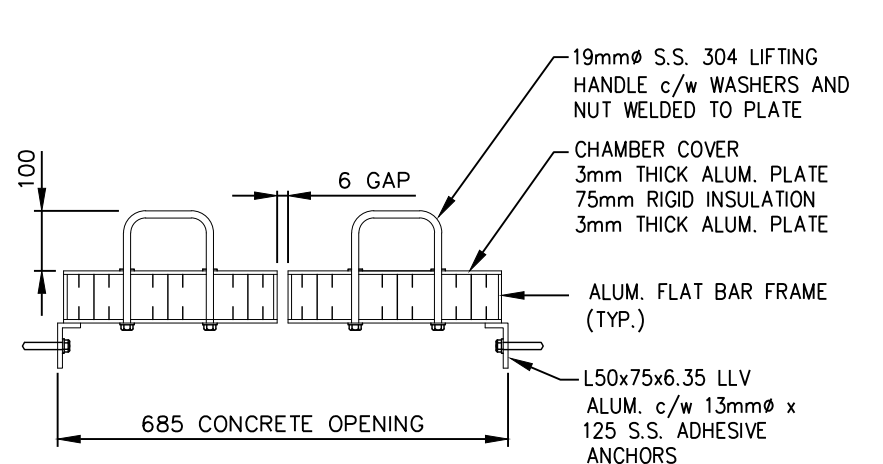


**VALVE CHAMBER SECTION A-A**  
1:25

NOTE:  
ALL PIPES AND FITTINGS WITHIN VALVE CHAMBER TO BE STAINLESS STEEL UNLESS OTHERWISE NOTED

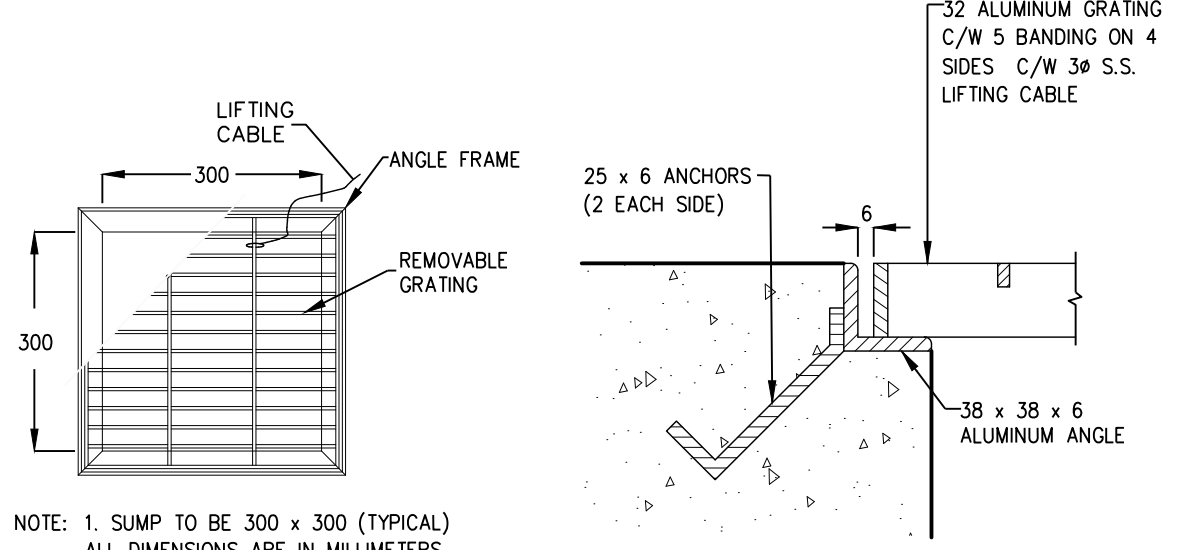


**PLAN**

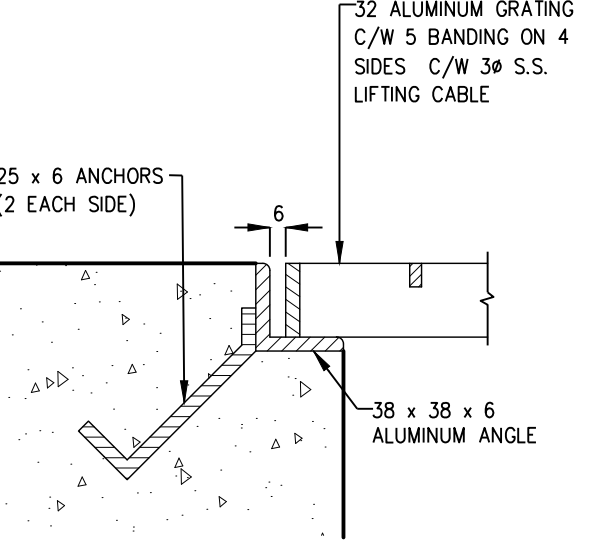


**SECTION**

**FROST COVER DETAIL**  
N.T.S.



**PLAN**



**SECTION**

**SUMP FRAME & GRATE DETAIL**  
N.T.S.

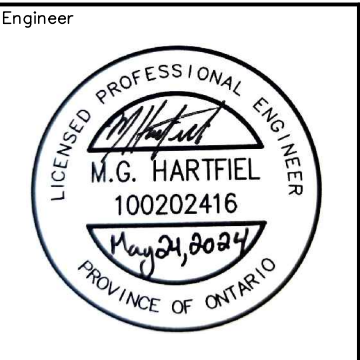


1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.  
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.  
3. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.  
4. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.  
5. DO NOT SCALE DRAWINGS.

**TEMPORARY BENCHMARKS**  
TBM#1 -  
TBM#2 -  
TBM#3 -  
\*\*\*ADD REFERENCE TO SURVEY/SOURCE

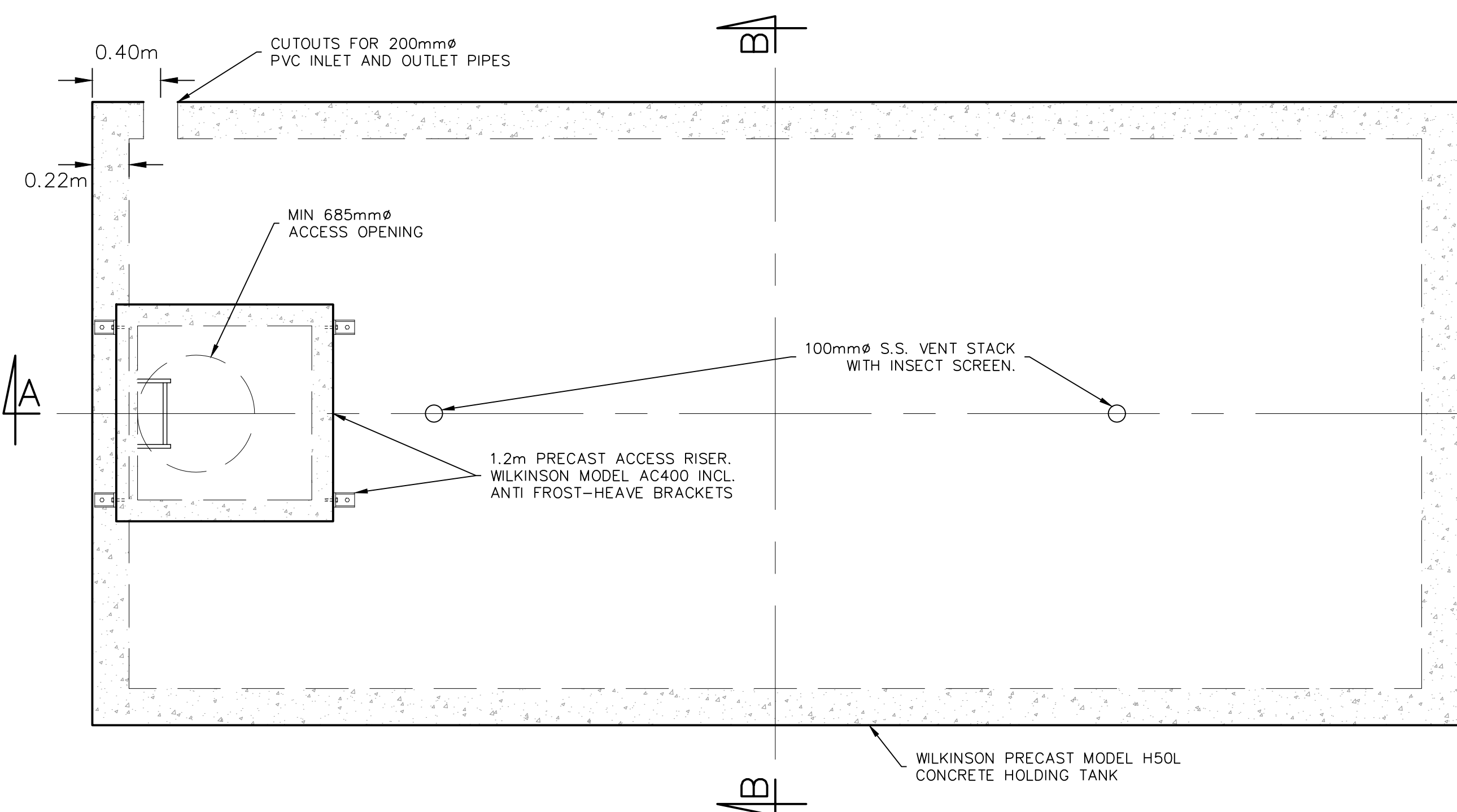
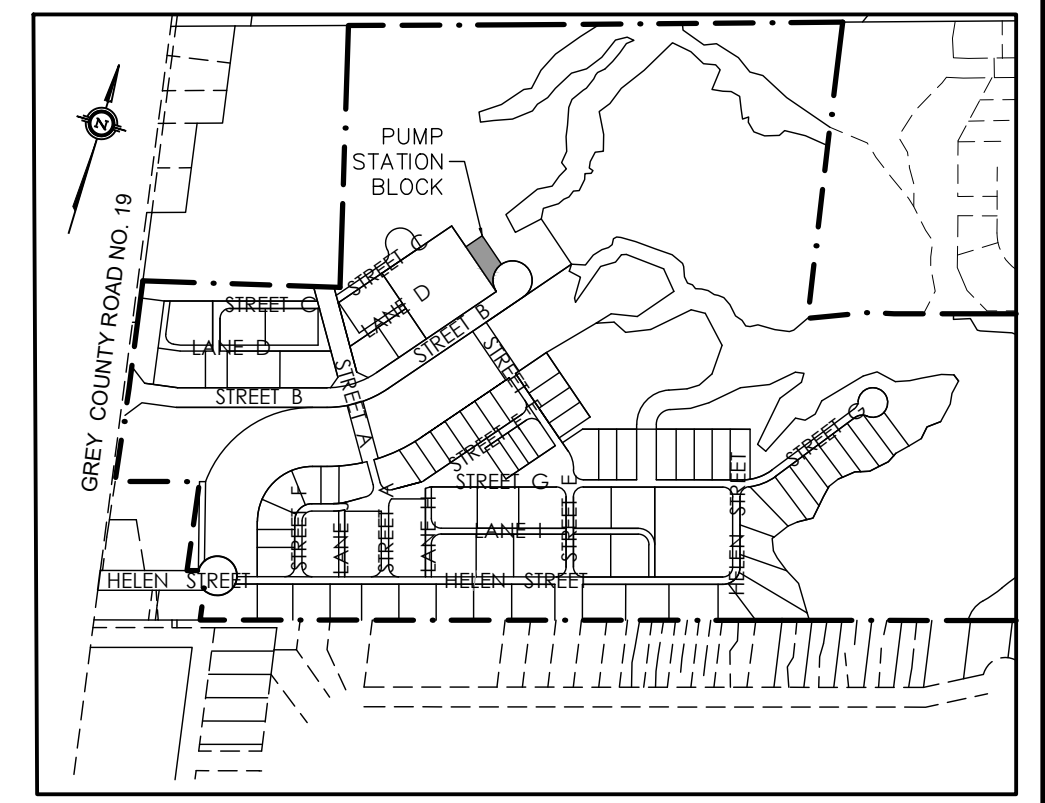
**Town of Blue Mountains**  
Planning and Development Services  
**Accepted For Construction**  
**Pre-Servicing Only**  
AFC Drawings are only valid as part and upon execution of a Pre-servicing Agreement  
signature: [Signature] date: 26-Apr-2024

No.	ISSUE	DATE: YYYY/MM/DD	Engineer
1	ISSUED FOR 1st SUBMISSION	2021/12/10	
2	ISSUED FOR 90% DETAILED DESIGN	2023/03/21	
3	ISSUED FOR CLIENT REVIEW - IFT	2023/12/15	
4	ISSUED FOR 90% DETAILED DESIGN REV 1	2024/01/02	
5	ISSUED FOR TENDER	2024/01/22	
6	ISSUED FOR APPROVAL	2024/03/08	
7	ISSUED FOR APPROVAL REV 1	2024/05/24	



Project: **HOME FARM SEWAGE PUMPING STATION TOWN OF THE BLUE MOUNTAINS**  
Drawing: **VALVE CHAMBER CROSS SECTIONS**

**CROZIER CONSULTING ENGINEERS**  
Drawn By: B.E. Design By: B.E. Project: **721-3464**  
Check By: A.L. Check By: M.H. Drawing: **P103**



**STRUCTURAL NOTES:**

- FOUNDATION DESIGN TO BE CONFIRMED BASED ON RECOMMENDATION OF GEOTECHNICAL ENGINEER.
- SUBGRADE ELEVATIONS TO BE APPROVED BY THE GEOTECHNICAL ENGINEER.
- SUPPORT ALL FOOTINGS AND SLABS ON UNDISTURBED SUB-GRADE WHERE DEEMED SUITABLE BY GEOTECHNICAL ENGINEER, WHERE UNSUITABLE, REPLACE WITH ENGINEERED FILL TO ELEVATIONS RECOMMENDED BY GEOTECHNICAL ENGINEER.
- REVIEW GEOTECHNICAL REPORT FOR RECOMMENDATIONS CONCERNING DEWATERING AT ALL STRUCTURES.
- CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ALL STRUCTURAL AND MECHANICAL COMPONENTS.

**TANK BUOYANCY AND UPLIFT RESISTANCE**

- PROTECT ALL STRUCTURES FROM FLOTATION DURING CONSTRUCTION.
- DEWATER EXCAVATION UNTIL CONSTRUCTION IS COMPLETE.
- ANTI-FLOTATION BALLAST SYSTEM TO BE PROVIDED AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

**MATERIAL SPECIFICATIONS**

- CONCRETE STRENGTH IN ACCORDANCE WITH CSA STANDARD A23.1-14 AND A23.2-14.
- STRUCTURAL CONCRETE UNLESS OTHERWISE NOTED: 30 MPa AT 28 DAYS.
- EXPOSURE CLASSIFICATION A-1.
- MAXIMUM WATER CEMENT RATIO 0.50 U.N.O.
- USE WATER REDUCING AGENT AND SUPERPLASTICIZER.
- NORMAL MAXIMUM AGGREGATE SIZE 20mm.
- ENTRAINED AIR CONTENT RANGE 4% TO 7%.
- LEAN FILL AND MASS CONCRETE 28-DAYS COMPRESSIVE STRENGTH 15 MPa
- REINFORCING STEEL: CSA STANDARD G30.18-09(2014), GRADE 400, DEFORMED BARS.
- STRUCTURAL STEEL: CSA STANDARD G40.20-13/G40.21-13, GRADE 350 ROLLED SECTIONS, GRADE 300 PLATES.

**SHOP DRAWING RESPONSIBILITIES**

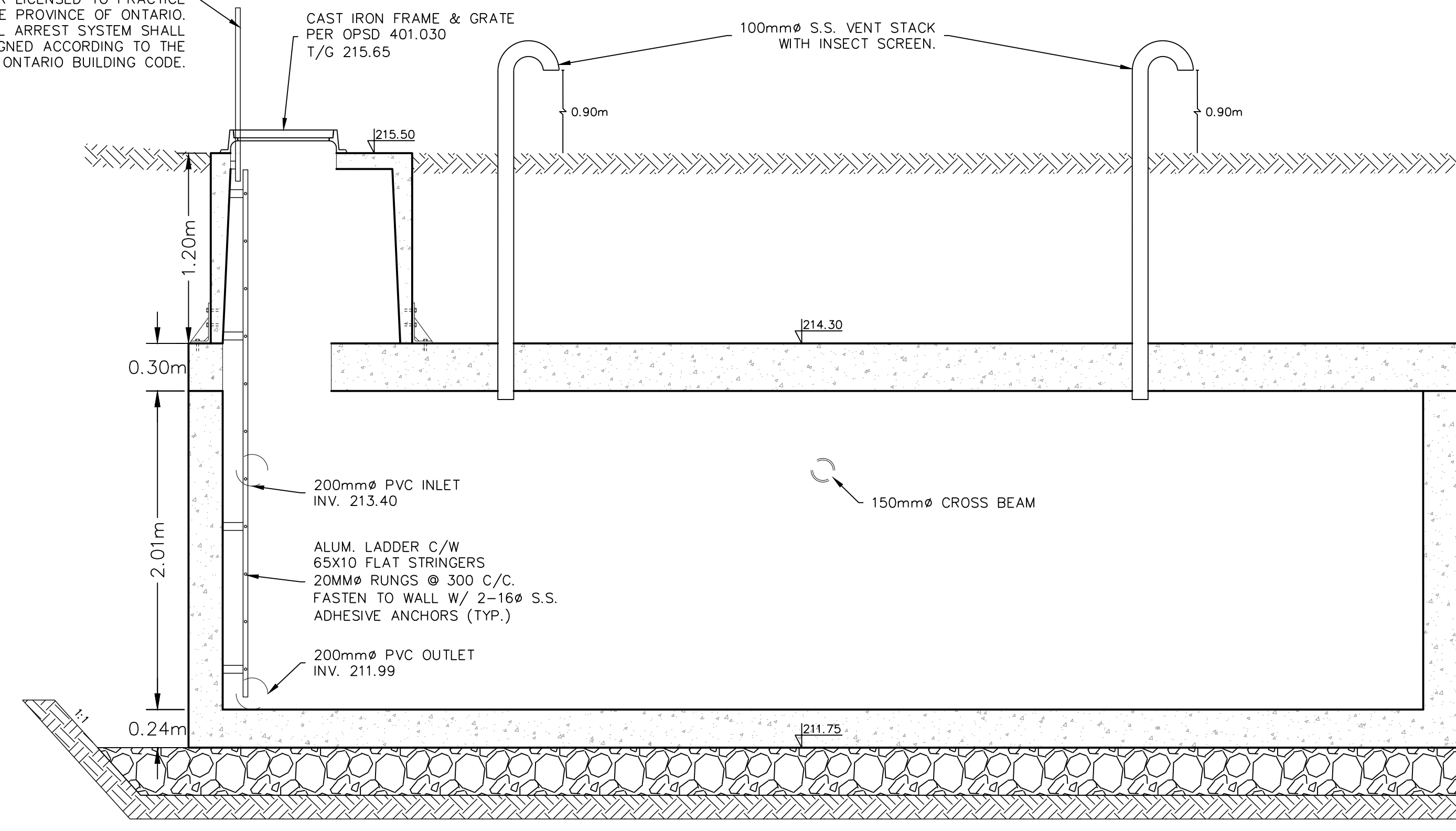
AS PART OF THEIR FIELD SERVICES, THE ENGINEER MAY REVIEW SHOP DRAWINGS PERTAINING TO WORK SHOWN ON THE ENGINEER'S DRAWINGS BY MEANS OF APPROPRIATE RATIONAL SAMPLING PROCEDURES AND COMMENT ON THE ACCURACY WITH WHICH THE CONTRACTOR PREPARED THE DRAWINGS. REVIEW OF SHOP DRAWINGS IS FOR THE SOLE PURPOSE OF ASCERTAINING CONFORMANCE WITH THE GENERAL DESIGN CONCEPT AND IS NOT AN APPROVAL OF THE DETAIL DESIGN INHERENT IN THE SHOP DRAWINGS. RESPONSIBILITY FOR WHICH SHALL REMAIN WITH THE CONTRACTOR SUBMITTING THEM. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS AND OMISSIONS IN THE SHOP DRAWINGS OR FOR MEETING ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR INFORMATION PERTAINING TO THE FABRICATION PROCESS TECHNIQUES OF CONSTRUCTION AND INSTALLATION, AND FOR CO-ORDINATION OF THE WORK OF ALL SUB-TRADES.

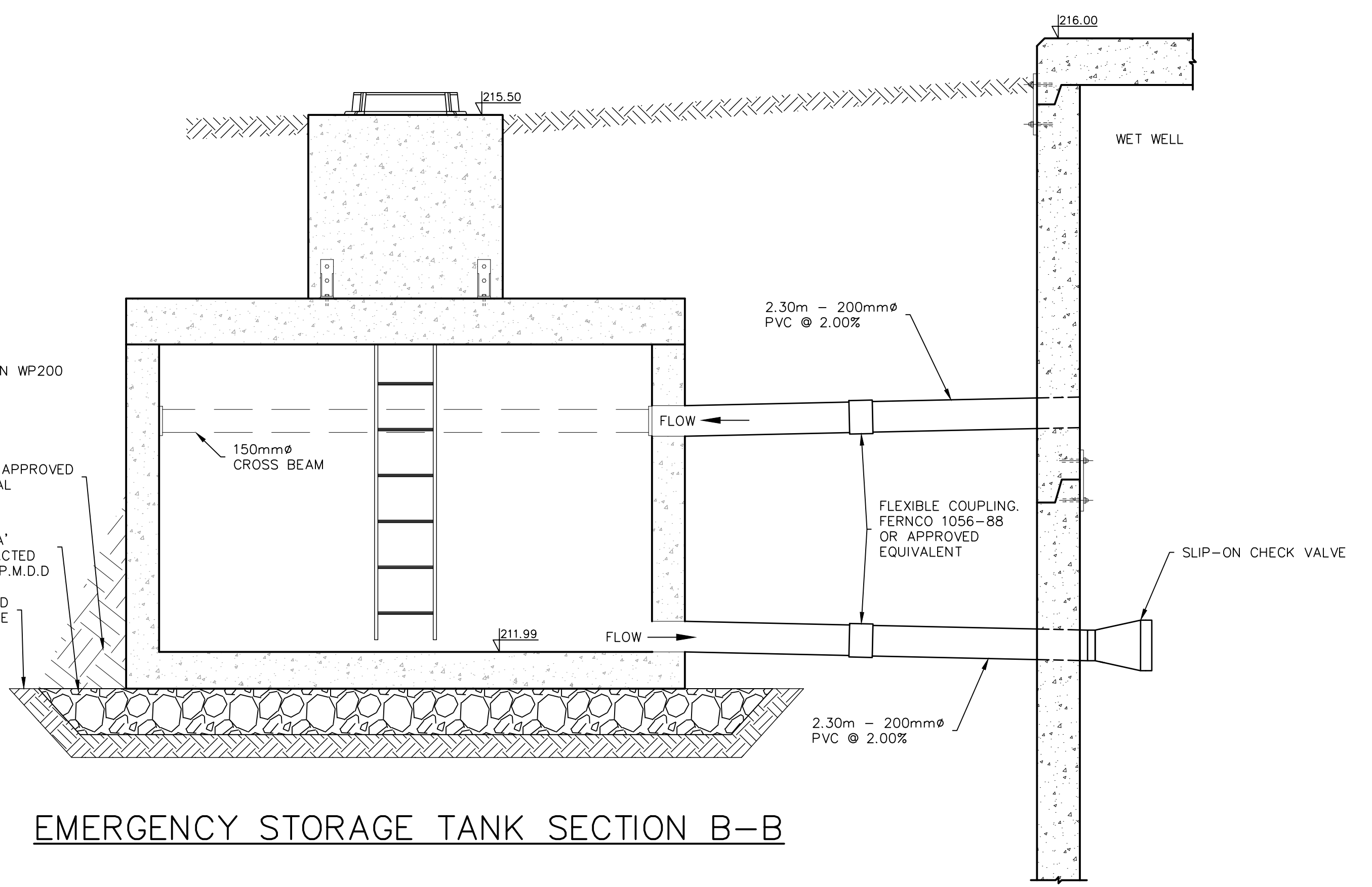
- MANUFACTURERS OF ALL STRUCTURAL ELEMENTS SHALL SUBMIT COMPLETE SHOP DRAWINGS, SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN ONTARIO TO THE CONSULTANT FOR REVIEW PRIOR TO THE FABRICATION (3 SETS OR PDF). SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH SPECIFICATIONS AND ALLOW A MINIMUM OF TWO(2) WEEKS FOR REVIEW. THE SUBMISSION NOR THE REVIEW SHALL RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY FOR PROVIDING PROPER ENGINEERING DESIGN, METHODS, EQUIPMENT, WORKMANSHIP AND SAFETY PROCEDURES.
- CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR THE FOLLOWING:
  - PRECAST STRUCTURE (CAP, RISERS, BASE)
  - PLATFORM, GUARD, AND SUPPORT
  - LADDER, SUPPORT, AND FALL ARREST SYSTEM
  - FROST STRAPS
  - WATERPROOFING MEMBRANE
  - VENT PIPE SUPPORT
  - STEEL ANGLES, PLATES, AND FASTENERS

FALL ARREST SYSTEM SHALL BE DESIGNED AND SHOP DRAWINGS PREPARED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE PROVINCE OF ONTARIO. THE FALL ARREST SYSTEM SHALL BE DESIGNED ACCORDING TO THE LATEST ONTARIO BUILDING CODE.

**EMERGENCY STORAGE TANK – TOP VIEW**



**EMERGENCY STORAGE TANK SECTION A-A**



**EMERGENCY STORAGE TANK SECTION B-B**



1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.  
 2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.  
 3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.  
 4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.  
 5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.  
 6. DO NOT SCALE DRAWINGS.

**TEMPORARY BENCHMARKS**

TBM#1-	
TBM#2-	
TBM#3-	

\*\*\*ADD REFERENCE TO SURVEY/SOURCE

**Town of Blue Mountains**  
 Planning and Development Services  
**Accepted For Construction**  
**Pre-Servicing Only**

AFC Drawings are only valid as part and upon execution of a Pre-servicing Agreement

*[Signature]* 26-Apr-2024  
 signature date

No.	ISSUE	DATE: YYYY/MM/DD	Engineer
1	ISSUED FOR 1st SUBMISSION	2021/12/10	
2	ISSUED FOR 90% DETAILED DESIGN	2023/03/21	
3	ISSUED FOR CLIENT REVIEW - IFT	2023/12/15	
4	ISSUED FOR 90% DETAILED DESIGN REV 1	2024/01/02	
5	ISSUED FOR TENDER	2024/01/22	
6	ISSUED FOR APPROVAL	2024/03/08	
7	ISSUED FOR APPROVAL REV 1	2024/05/24	

**PROFESSIONAL ENGINEER**  
 A.M.M.L.I.  
 100186317  
 2024-05-24  
 2121-3400  
 PROVINCE OF ONTARIO

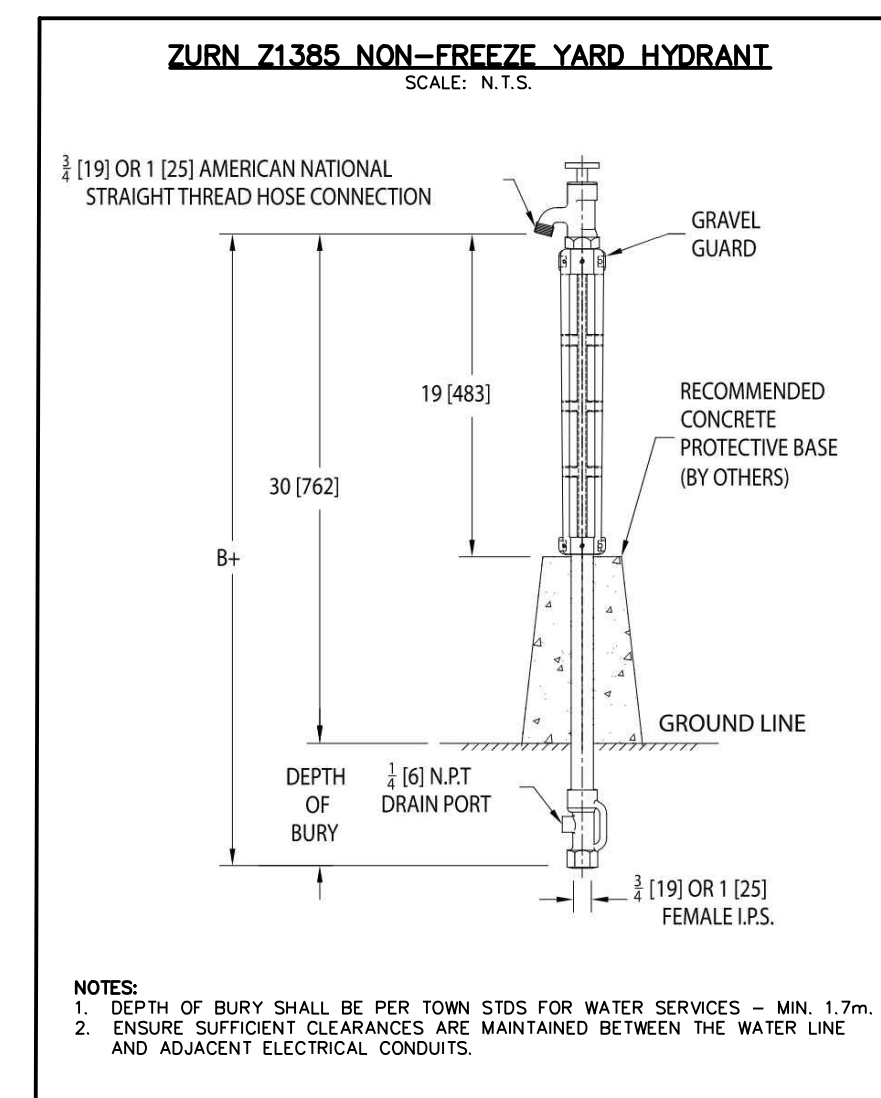
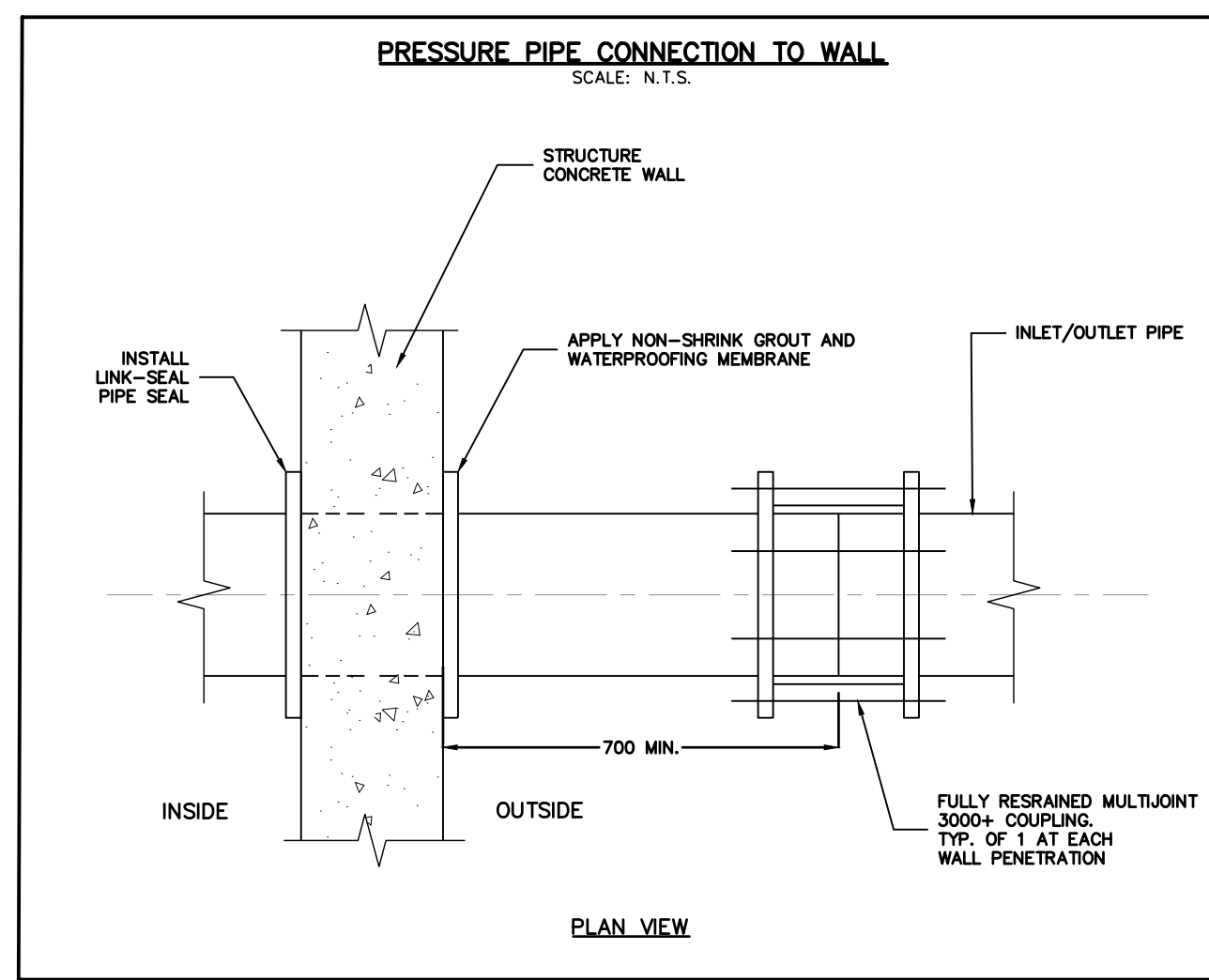
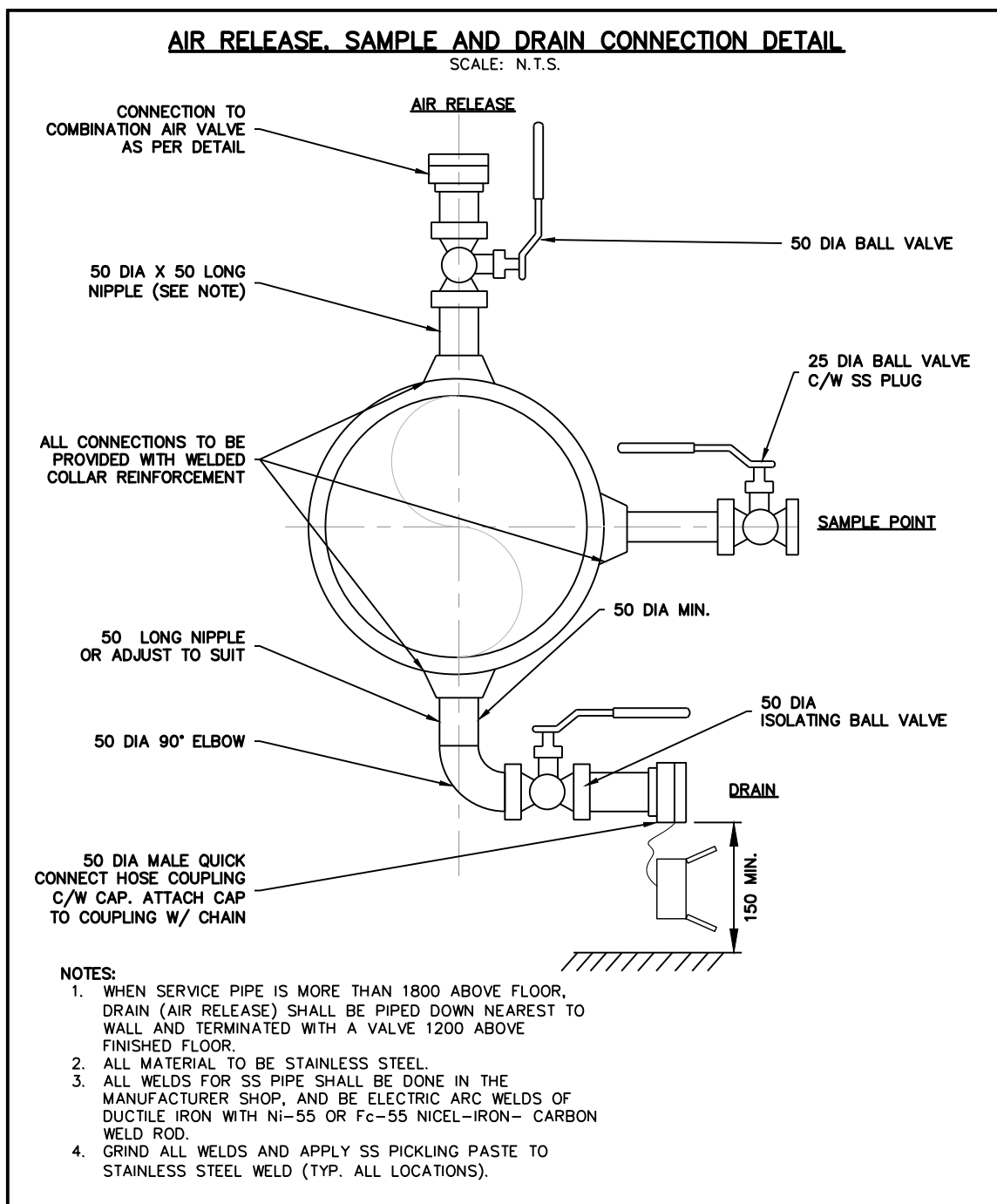
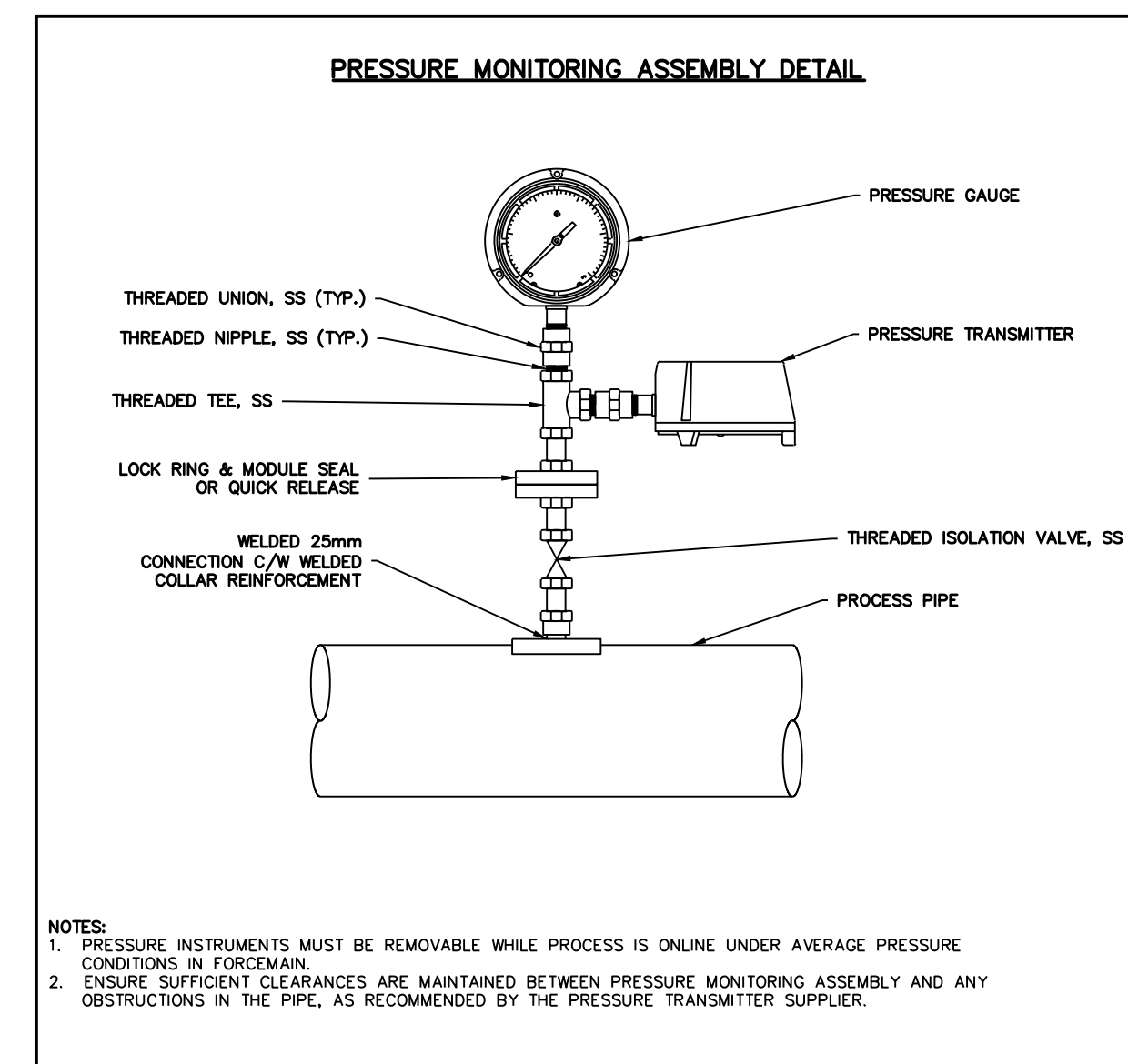
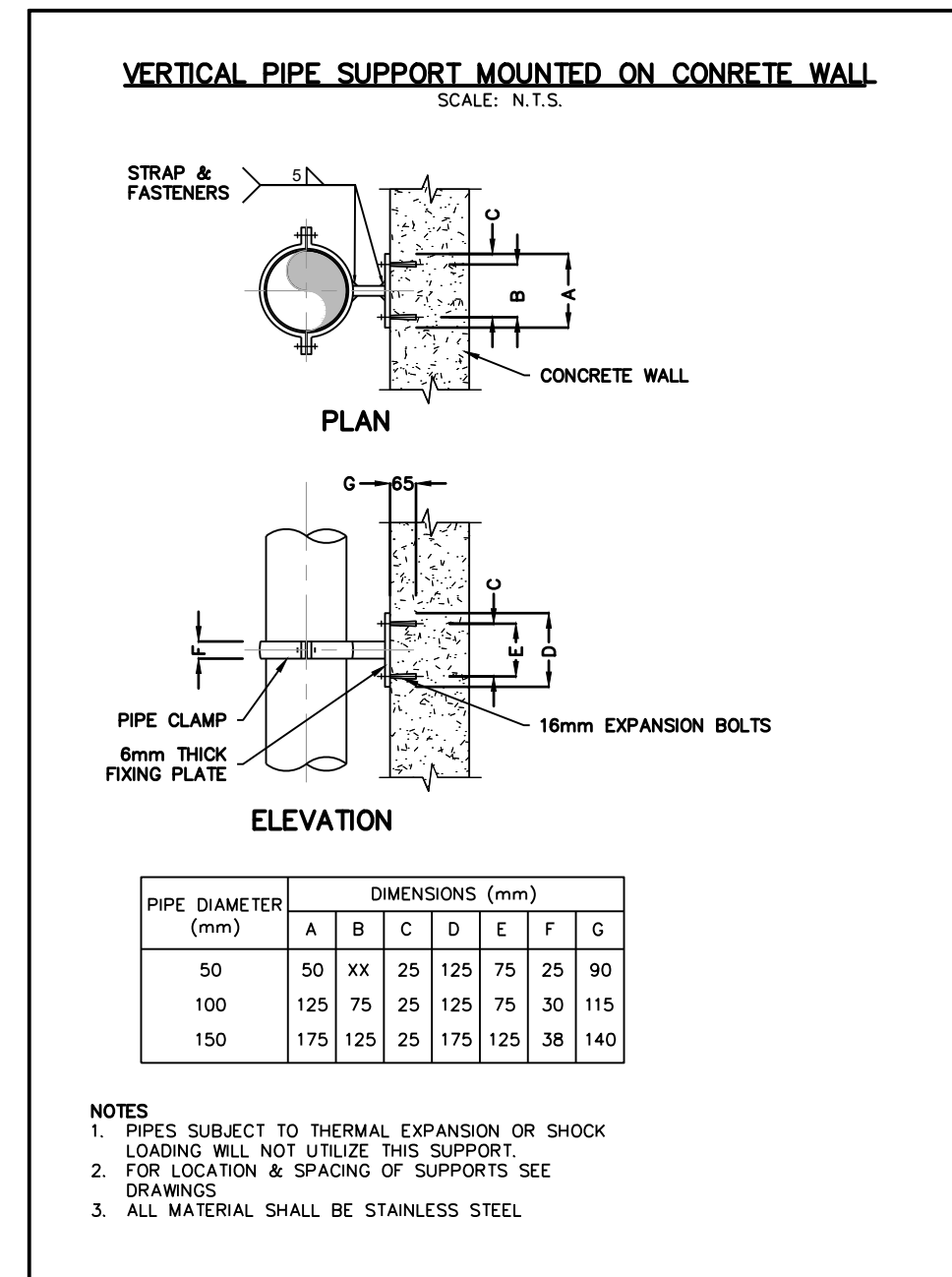
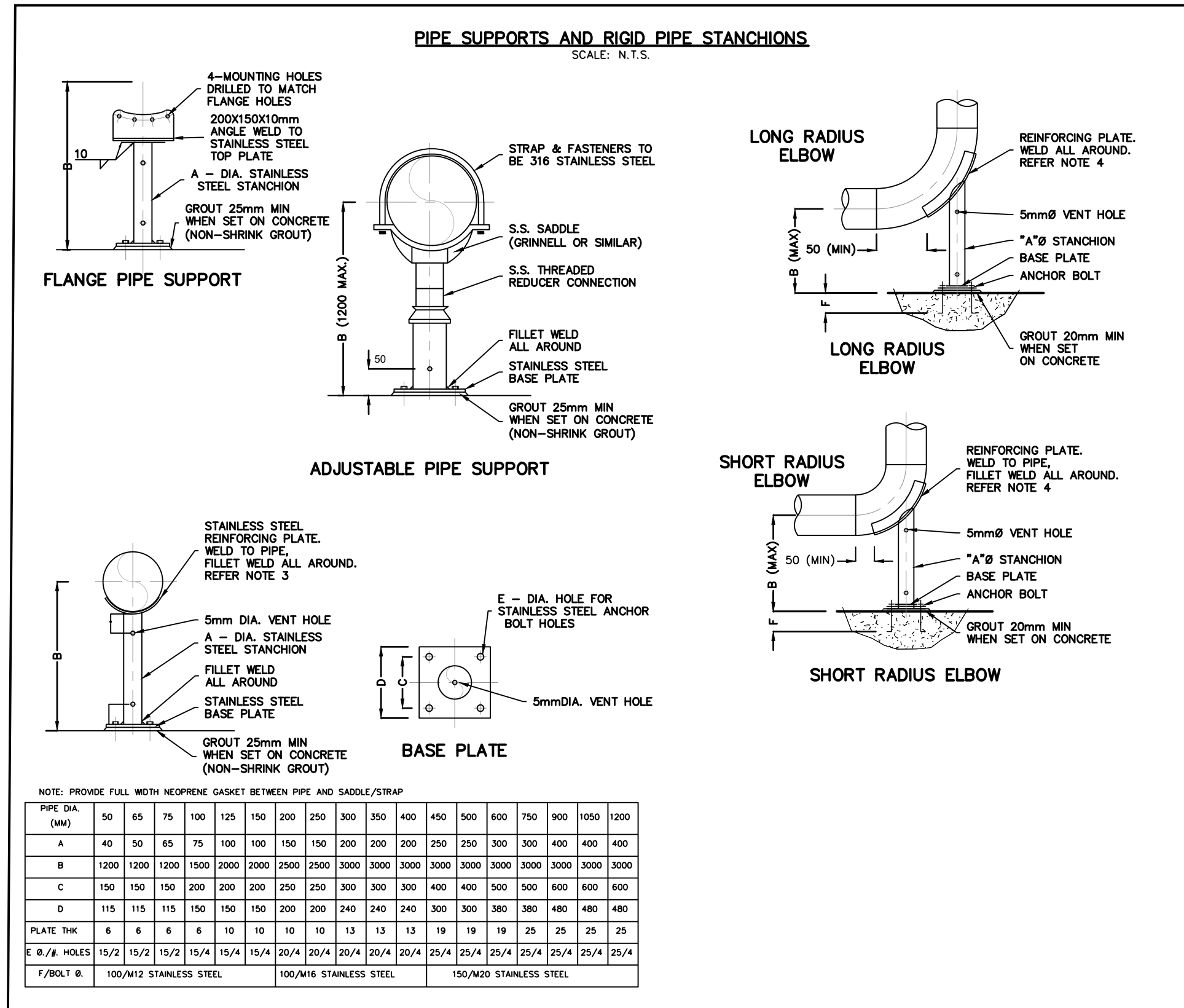
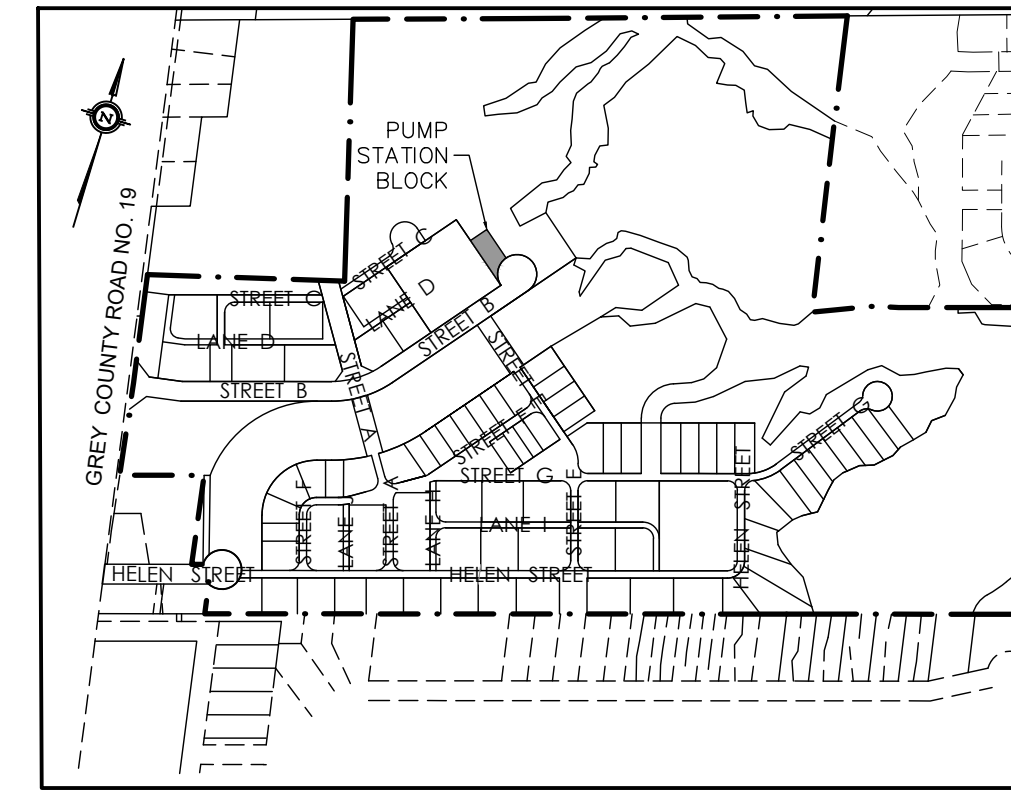
**PROFESSIONAL ENGINEER**  
 M.G. HARTFIEL  
 100202416  
 2024-05-24  
 2121-3400  
 PROVINCE OF ONTARIO

Project: HOME FARM SEWAGE PUMPING STATION TOWN OF THE BLUE MOUNTAINS

Drawing: EMERGENCY STORAGE TANK CROSS SECTIONS

**CROZIER CONSULTING ENGINEERS**

Drawn By: B.E.	Design By: B.E.	Project: 721-3464
Check By: A.L.	Check By: M.H.	Drawing: P104



1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.

2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.

3. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.

4. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

5. DO NOT SCALE DRAWINGS.

### TEMPORARY BENCHMARKS

TBM#1 -  
TBM#2 -  
TBM#3 -

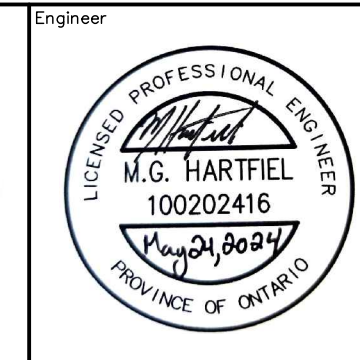
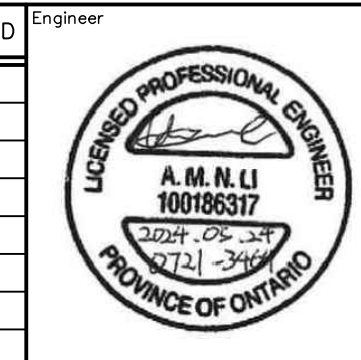
\*\*\*ADD REFERENCE TO SURVEY/SOURCE Pre-surveying Agreement

Town of Blue Mountains  
Planning and Development Services  
**Accepted For Construction**  
**Pre-Service Only**

AFC Drawings are only valid as part and upon execution of a Pre-surveying Agreement

signature: *[Signature]* date: 26-Aug-2024

No.	ISSUE	DATE: YYYY/MM/DD	Engineer
1	ISSUED FOR 1st SUBMISSION	2021/12/10	
2	ISSUED FOR 90% DETAILED DESIGN	2023/03/21	
3	ISSUED FOR CLIENT REVIEW - IFT	2023/12/15	
4	ISSUED FOR 90% DETAILED DESIGN REV 1	2024/01/02	
5	ISSUED FOR TENDER	2024/01/22	
6	ISSUED FOR APPROVAL	2024/03/08	
7	ISSUED FOR APPROVAL REV 1	2024/05/24	

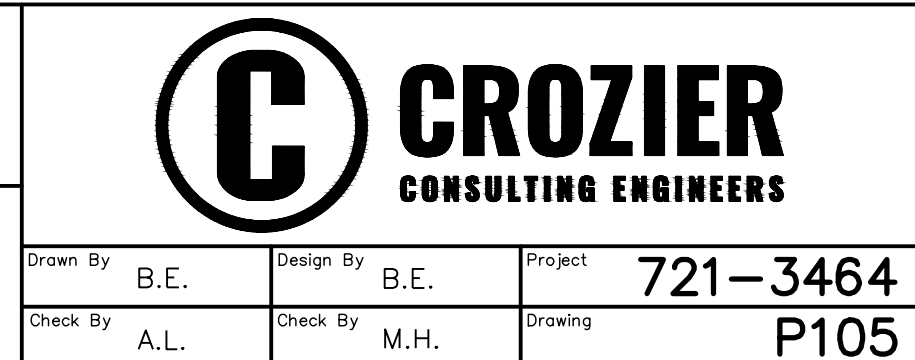


Project: HOME FARM SEWAGE PUMPING STATION TOWN OF THE BLUE MOUNTAINS

General Process Details

Drawn By: B.E. Design By: B.E. Project: 721-3464

Check By: A.L. Check By: M.H. Drawing: P105



# APPENDIX B

Wet Well Design  
System Curve Calculations  
Emergency Storage Calculations



Project: Home Farm  
Project No: 721-3464

Design by: CB  
Check By: BE  
Update By: -

Date: 2026-05-15  
Updated: -

**Home Farm SPS  
Wet Well Design and Emergency Storage Time**

Wet Well Design	
Ultimate Peak Design Flow	20.01 L/s
Ultimate Peak Pump Target Design Flow (per pump)	20.01 L/s
Target Min Operating Volume per MECP	3.00 m <sup>3</sup>
<b>Wet Well Size (Circular)</b>	
Wet Well Diameter	3048 mm
Wet Well Surface Area	7.30 m <sup>2</sup>
<b>Ultimate Depth of pump start to pump stop</b>	<b>0.45 m</b>
<b>Volume</b>	<b>3.28 m<sup>3</sup></b>

Wet Well Structure Elevations	
Top of Wet Well Elevation	216.10 m
Top of Ground Elevation	215.90 m
Forcemain C/L Elevation Exiting Wet Well	213.90 m
Basement Flood Elevation	214.90 m
Emergency Storage Elevation	214.60 m
Influent Sewer Elevation in Wet Well	210.50 m
Wet Well Floor Elevation	208.40 m

Emergency Storage Retention Time	
Hours of Peak Flow Required	2.00 hr
Volume Required	144.07 m <sup>3</sup>
Wet Well Storage Provided	31.74 m <sup>3</sup>
Emergency Storage Tank Volume	50.08 m <sup>3</sup>
Emergency Storage in Sewer System	68.51 m <sup>3</sup>
<b>Total Emergency Storage</b>	<b>150.33 m<sup>3</sup></b>
% of 2 hr Storage Onsite	54%
% of 2 hr Storage within Collection System	46%
<b>Sufficient Emergency Storage</b>	<b>YES (Total &gt; Req)</b>

Note: Emergency Storage Depth calculated from standby pump start to overflow.

Recommended Wet Well Pump Control & Alarm Elevations		
		Delta
Emergency Storage Alarm (Float)	214.60	- m
High Level Alarm (Float)	210.25	0.00 m
Start Standby Pump (Backup - Float)	210.25	0.10 m
High Level Alarm (PLC)	210.15	0.20 m
Start Duty Pump (Backup - Float)	209.95	0.10 m
Start Standby Pump (PLC)	209.85	0.20 m
Start Duty Pump - Ultimate (PLC)	209.65	0.45 m
Stop Pumps (PLC)	209.20	0.30 m
Stop Pumps (Backup - Float)	208.90	0.10 m
Low Level Alarm (PLC)	208.80	0.10 m
Pump Volute C/L	208.70	0.30 m
Wet Well Floor Elevation	208.40	0.00 m

\*Minimum depth per Flygt

0.28 m

\*PLC = Ultrasonic

**Criteria for Pump Controls**

Lag Pump Start 0.30m below incoming sewer

0.30m between float/backup controls

Minimum elevation to avoid intake vortexing 0.28m (per Xylem for proposed pump)

**Wet Well Working Volume and Pump Cycle Times**

**Working Well Volume Check**

Criteria:

Less than 30 min residence time (Time to Fill) at average dry weather flows.

Fewer than 6 starts per hour.

**Lead Pump ON - (Stop Duty Pump to Start Duty Pump)**

Inflow Scenario	Inflow (L/s)	Working Volume (m <sup>3</sup> )	Time to Fill (min)	Pump Discharge Rate (L/s)	Discharge minus Inflow (L/s)	Pump Time (min)	Cycle Time (min)	Starts Per Hour
Ultimate - Average Dry Weather	3.90		14.0		16.11	3.4	17.4	3.4
Ultimate - Average Wet Weather	9.05	3.28	6.0	20.01	10.96	5.0	11.0	5.4





Project: Home Farm  
Project No: 721-3464

Design by: CB  
Check By: BE  
Update By: -

Date: 2026-05-15  
Updated: -

**Home Farm SPS  
One Pump System Curve**

FLOW RATE QT (L/s)	Max Lift TDH (m)	Normal Lift TDH (m)	Overflow Conditions TDH (m)
	C = 100 Static Head (m) = 15.50	C = 110 Static Head (m) = 15.05	C = 120 Static Head (m) = 10.10
0.00	15.50	15.05	10.10
2.50	15.71	15.23	10.26
5.00	16.27	15.71	10.67
7.50	17.14	16.46	11.33
10.00	18.30	17.46	12.21
12.50	19.76	18.72	13.31
15.00	21.49	20.21	14.62
17.50	23.50	21.95	16.15
20.01	25.77	23.91	17.87
22.50	28.31	26.10	19.80
25.00	31.11	28.52	21.93
27.50	34.16	31.17	24.25
30.00	37.47	34.03	26.77
32.50	41.03	37.11	29.49
35.00	44.83	40.41	32.39
37.50	48.89	43.92	35.48
40.00	53.18	47.64	38.77
42.50	57.73	51.58	42.24
45.00	62.51	55.72	45.89
47.50	67.53	60.08	49.73
50.00	72.79	64.64	53.75
52.50	78.28	69.40	57.96
55.00	84.01	74.37	62.34
57.50	89.97	79.55	66.91
60.00	96.17	84.93	71.66
62.50	102.59	90.51	76.58
65.00	109.25	96.29	81.69
67.50	116.14	102.27	86.97
70.00	123.25	108.44	92.43
72.50	130.59	114.82	98.06
75.00	138.16	121.40	103.87
77.50	145.95	128.17	109.85
80.00	153.97	135.13	116.01
82.50	162.21	142.30	122.34
85.00	170.67	149.65	128.85
87.50	179.36	157.20	135.52
90.00	188.26	164.95	142.37
92.50	197.39	172.89	149.39
95.00	206.74	181.02	156.58
97.50	216.30	189.34	163.94
100.00	226.09	197.85	171.47

**System Curve Calculation**

- Hazen Williams C-factor is applied in Bulk to the entire system
- Head loss calculated according to:

$$\text{Major losses} = (10.675 * L * Q^{1.852}) \div (C^{1.852} * D^{4.8704})$$

$$\text{Minor losses} = (k * v^2) \div (2 * g)$$

- Units, unless otherwise noted are:

<b>Q</b>	L/s	<b>Head</b>	m	<b>D</b>	m
<b>v</b>	m/s	<b>L</b>	m		



Project: Home Farm  
Project No.: 721-3464  
Created By: CB  
Checked By: BE  
Date: 2026-05-15  
Updated: -

### Home Farm SPS PUMP CURVE AND SYSTEM CURVE

