

Engineering Design File

PROJECT NO. 23052

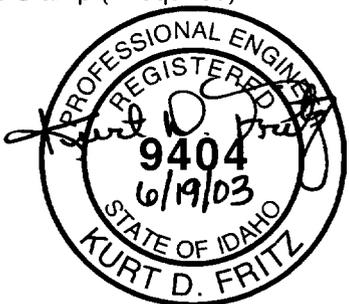
VES-SFE-20 Hot Waste Tank System Remedial Design Excavation Estimates

Prepared for:
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho



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04/03/2003
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VES-SFE-20 Hot Waste System Tank Remedial Design Excavation				
1. Title: Estimates		Page 1 of 1		
2. Index Codes:				
Building/Type <u>CPP-642</u>		SSC ID <u>SFE-20</u>		Site Area <u>INTEC</u>
3. NPH Performance Category: _____ or <input checked="" type="checkbox"/> N/A				
4. EDF Safety Category: <u>CG</u> or <input type="checkbox"/> N/A SCC Safety Category: _____ or <input checked="" type="checkbox"/> N/A				
5. Summary: This Engineering Design File is to document the estimated excavation quantities for the remedial design of the OU 3-13 Group 7 SFE-VES-20 Hot Waste Tank removal. The estimated excavation quantity for Phase I is 355 yd ³ . The Phase II estimated excavation volume is 1,621 yd ³ .				
6. Review (R) and Approval (A) and Acceptance (Ac) Signatures: (See instructions for definitions of terms and significance of signatures.)				
	R/A	Typed Name/Organization	Signature	Date
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Approver	A	N. K. Rogers/67A0	<i>N. K. Rogers</i>	6-20-03
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7. Distribution: (Name and Mail Stop)				
8. Does document contain sensitive unclassified information? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, what category:				
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Record Retention Period: <i>ENVI-h-1</i>		<i>06-23-03 gwr</i>		
11. For QA Records Classification Only: <input type="checkbox"/> Lifetime <input type="checkbox"/> Nonpermanent <input type="checkbox"/> Permanent Item and activity to which the QA Record apply: <i>n/a</i> <i>06-23-03 gwr</i>				
12. NRC related? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
13. Registered Professional Engineer's Stamp (if required)				
				

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VES-SFE-20 Hot Waste Tank System Remedial Design Excavation Estimates

1. INTRODUCTION

The Operable Unit (OU) 3-13 remedial investigation and feasibility study process evaluated the nature and extent of soil and groundwater contamination at the Idaho Nuclear Technology and Engineering Center (INTEC); this included the investigation and remediation approach for Group 7. As documented in the OU 3-13 Record of Decision (ROD) (DOE-ID 1999), the selected remedial approach for Group 7 is to remove the tank and its contents; the vault; the remainder of the Storage Facility Exterior (SFE)-20 structures, piping, and other components; and any potentially contaminated soils and transport them for either on-Site or off-Site disposal. The purpose of this Engineering Design File (EDF) is to document the estimated excavation volumes generated from the removal of the SFE-20 structures and potentially contaminated soils around and beneath the structures.

2. VES-SFE-20 TANK SYSTEM DESCRIPTION

The SFE-20 Hot Waste Tank System is also known as Site CPP-69, which consists of a concrete vault containing an abandoned radioactive liquid waste storage tank. The top of the tank vault is located about 3 m (10 ft) below grade. The tank system is located east of Building CPP-603 (Figure 1). The tank system includes the SFE-20 tank, tank vault, access tunnel, associated pump pit, and Building CPP-642 with related piping and instrumentation (Figure 2). Based on historical information, the lines that fed the SFE-20 tank and transferred the waste to the PEW were isolated from this tank and incorporated into other tank systems when the use of the SFE-20 tank was discontinued in 1976. What remains of the tank system will be removed as part of the remedial action described in the OU 3-13 ROD.

3. DISCUSSION OF THE REMOVAL ACTION

The remedial design for the SFE-20 Hot Waste Tank will reflect the ROD requirement that the tank system, including contaminated surrounding soils, be removed, treated as necessary, and disposed of in an approved disposal facility. The excavation and removal of the SFE-20 Tank System, plus any contaminated underlying soils, are complicated in that active structures and utilities exist near the excavation site. In addition, the tank is located 20 ft below grade with the vault floor extending deeper. An active concrete pipe corridor supporting operation of SFE-106 was constructed over a portion of the SFE-20 vault and doweled into the foundation of CPP-642, further complicating removal. As a result, the approach for the removal of the SFE-20 tank system will consist of two phases. During Phase I, the tank vault will be accessed and the tank and all piping within the vault and pump pit will be removed. Next, a temporary concrete roof will be placed on the vault opening and the area backfilled. Phase II will consist of removing the concrete structures including the vault, tunnel, and pump pit, as well as the remaining piping, Building CPP-642, and any contaminated adjacent and underlying soils. Phase II will occur following the closure of VES-106 and CPP-648 such that the pipe corridor overlying the SFE-20 tank vault can be removed.

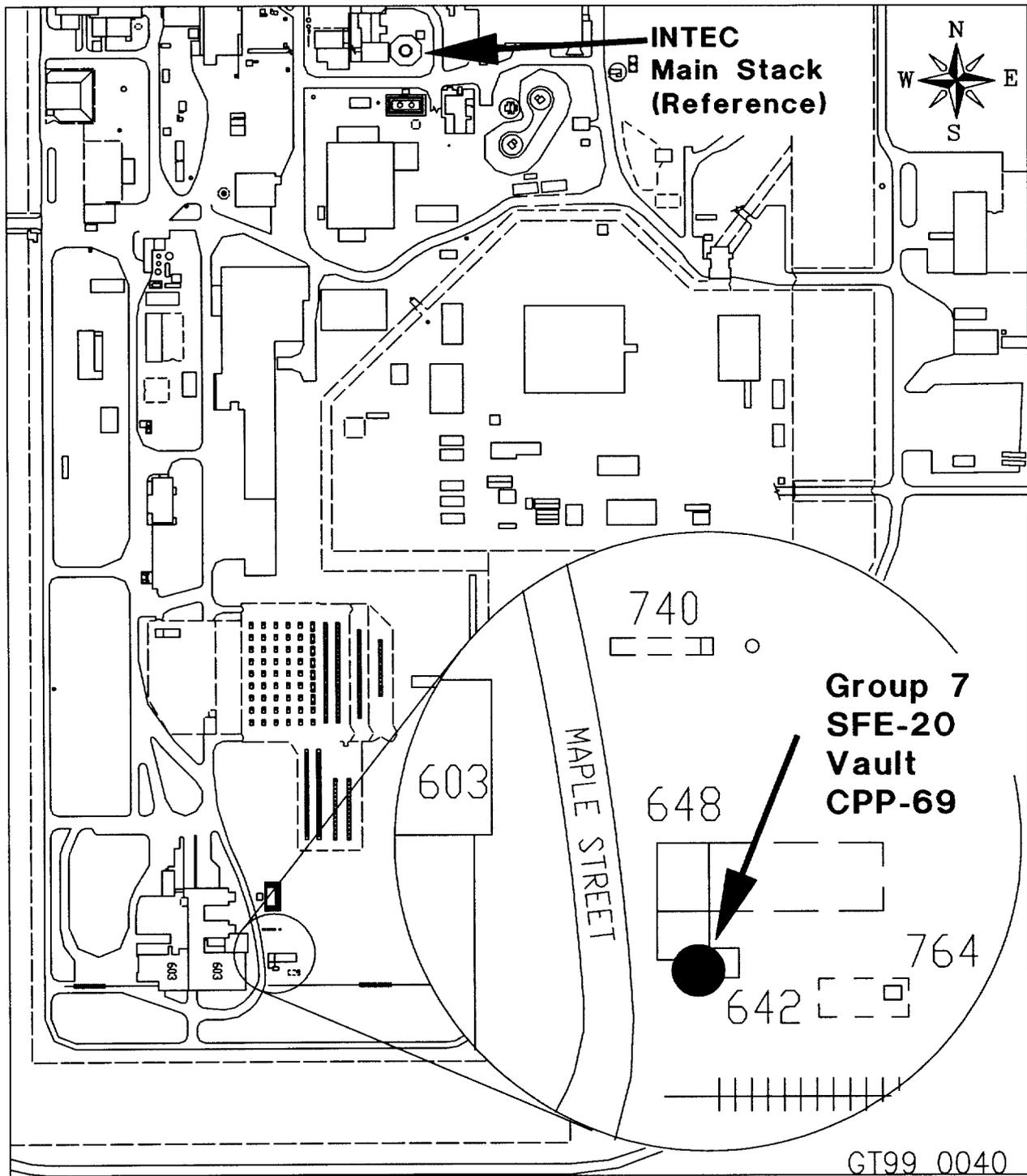
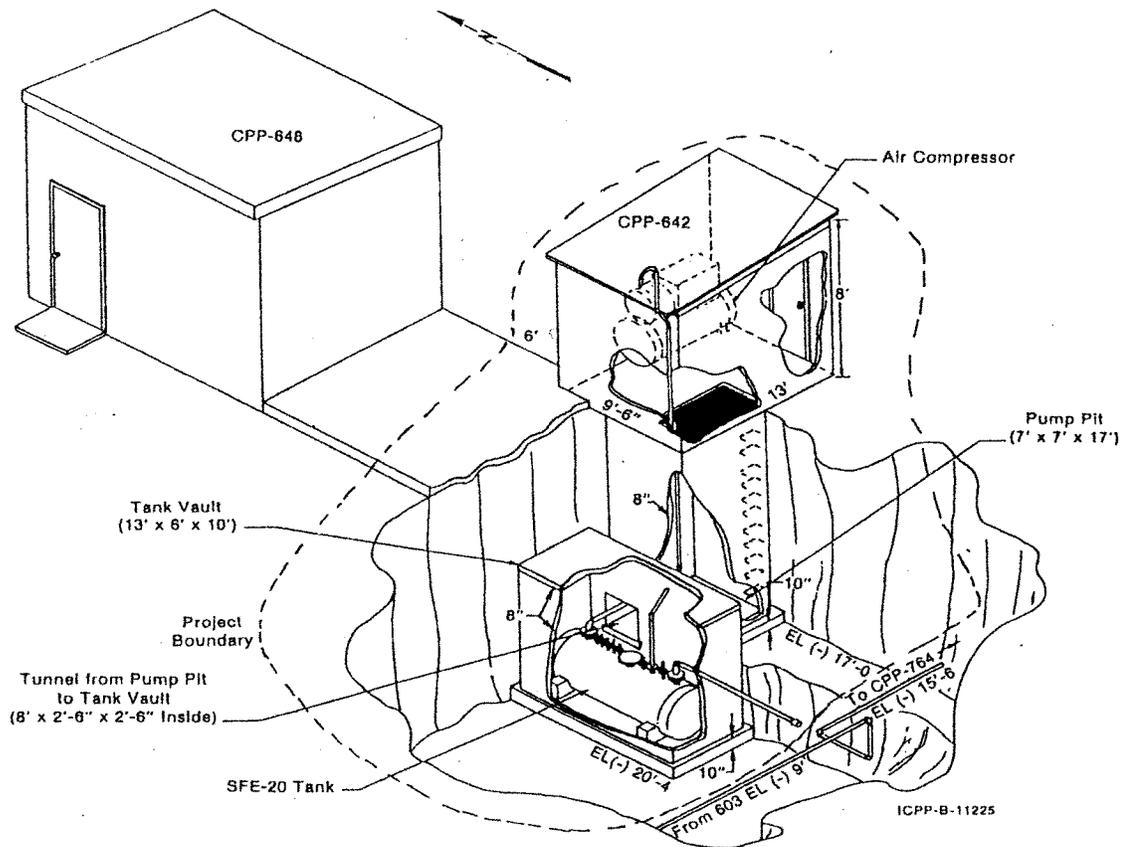


Figure 1. Location of the VES-SFE-20 tank in WAG 3.



Isometric view of tank vault and pump pit.

Figure 2. Isometric view of the tank vault and pump pit.

4. VOLUME ESTIMATES

The following assumptions were used for the excavation volume estimates:

- Volumes were calculated using a datum elevation of 4,918.2 ft (INTEC site-specific datum). This elevation was established from existing as-built drawings.
- The location and size of the existing concrete vault and structures were correctly identified in the as-built drawings.
- Cut slopes of 1.5:1 (H:V) are adequate for the soil conditions in the area.
- The excavation is assumed to extend to a basalt depth approximately 32 ft below ground surface (basalt depth estimated from monitor well 15 boring log).
- Compacted in-place quantities will be used (no correction for swell).
- Phase I and II will take place separately. The Phase I excavation will be backfilled with excavated soil (if acceptable) and pit run gravel.

- All soil excavated under Phase II will be assumed to require disposal at the ICDF.
- Flow of contamination, if present, started at the floor of the concrete vault and pump pit and extended down to bedrock at a theoretical 1H:1V path.

The Phase I excavation will consist of a sloped excavation to expose the roof of the vault. The final excavation will have a 2-ft wide horizontal surface adjacent to the concrete roof approximately 1 ft below the top surface of the vault. On the east side of the vault, the horizontal surface will extend approximately 6 ft, creating a working surface for access to the enclosure tent. From the outer perimeter of the working surface, the excavation will slope up to original grade at 1.5H:1V (see attached Sketch 1). Sloping is not required on the north side or a portion of the east side of the excavation. The existing concrete utility corridor on the north side and the concrete pump pit on the east side of the excavation will provide adequate protection during the excavation. TERRAMODEL was used to generate the volumetric quantities for Phase I (see Appendix A). The Phase I excavation will consist of approximately 355 yd³ of soil.

Phase II excavation will consist of a shored excavation that is assumed to extend to basalt. Shoring is required due to the numerous existing structures in the area and the overall depth of the excavation. The Phase II excavation will remove the concrete structures associated with the SFE-20 system and any underlying contaminated soils found beneath the concrete vault, tunnel, and pump pit. However, little to no data exist on the extent of contamination. Therefore, an excavation boundary was selected based on a theoretical contamination path starting at the floor of the concrete vault and pump pit and extending down to bedrock at a 1H:1V path. In plan view, this boundary was established where the theoretical path intersects the basalt surface (see attached Sketches 2 through 4). The boundary was adjusted slightly to miss active utilities and was then used to generate the volumetric quantities for Phase II (see Appendix B). The Phase II excavation will consist of approximately 1,621 yd³ of soil (does not include concrete structures).

5. REFERENCES

DOE-ID, 1999, *Final Record of Decision, Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13*, DOE/ID-10660, Rev. 0, U.S. Department of Energy Idaho Operations Office, October 1999.

Appendix A

Drawings and Software Data

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Appendix A

Drawings and Software Data

Output from Terramodel Land Modeling Software:

Bechtel BWXT Idaho, LLC
P.O. Box 1625, MS 3650
Idaho Falls, ID 83415
208-526-4915
Monday, November 18, 2002

PROJECT: D:\Job Files\INTEC\VES-20 Removal\VES-20
Excavation2a.pro

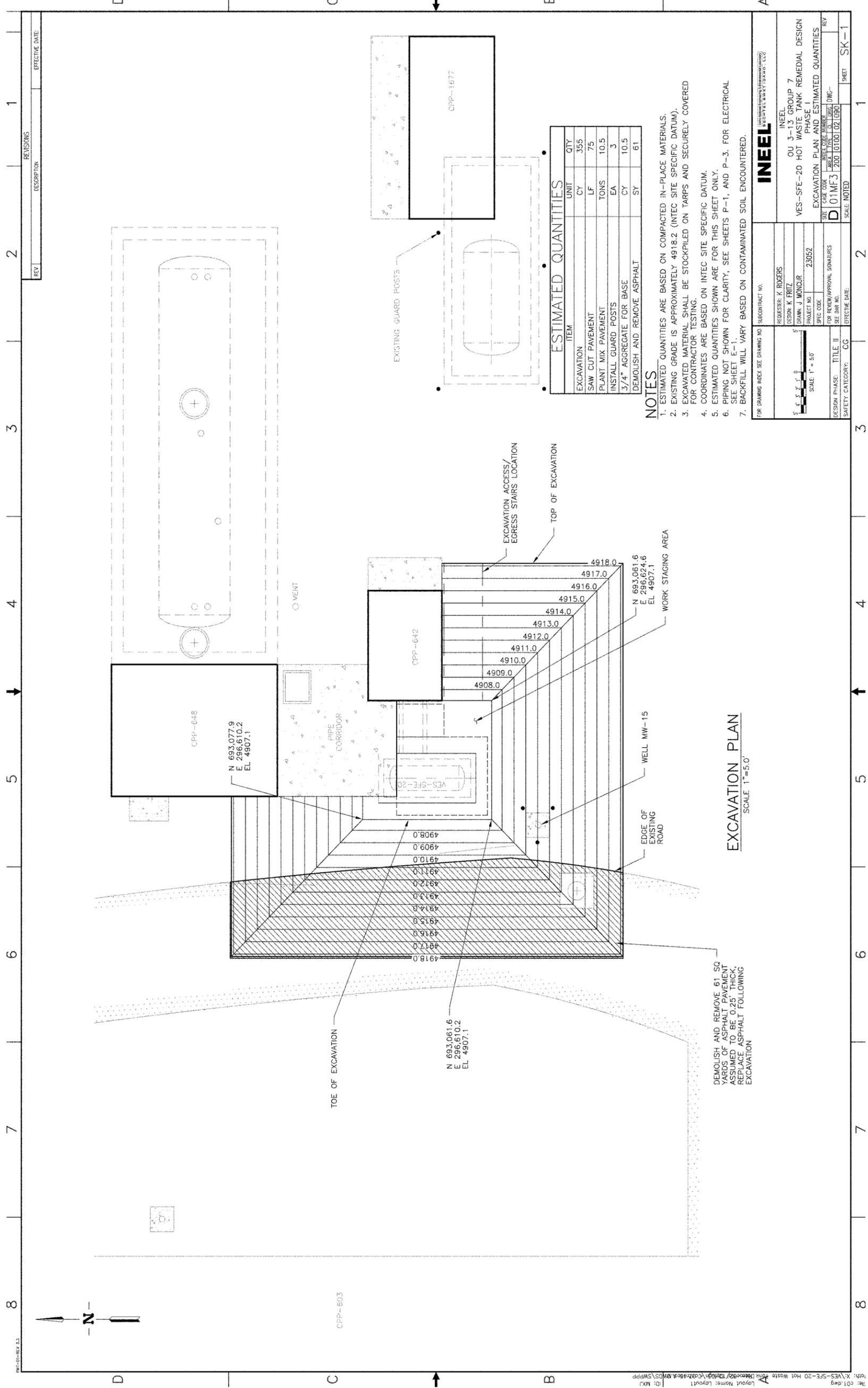
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DTM TO DTM VOLUME

Cut and Fill Volumes

Shrinkage/swell factors:	Cut	1.0000	Fill	1.0000
Original DTM Layer Name	# of Points	Final DTM Layer Name	# of Points	
-----	-----	-----	-----	
C-TOPO-ADTM	4	C-DSGN-BOTM-EXCV	25	
Cut Volume (Cu. Yd.)	Cumulative Cut Volume	Fill Volume (Cu. Yd.)	Cumulative Fill Volume	
-----	-----	-----	-----	
323.0	323.0	0.0	0.0	

Net Difference: 323.0 Cu. Yd. WASTE

Cut volume 323.0 cy * 1.1 (10% increase due to excavation variances) = 355 cy



ESTIMATED QUANTITIES

ITEM	UNIT	QTY
EXCAVATION	CY	355
SAW CUT PAVEMENT	LF	75
PLANT MIX PAVEMENT	TONS	10.5
INSTALL GUARD POSTS	EA	3
3/4" AGGREGATE FOR BASE	CY	10.5
DEMOLISH AND REMOVE ASPHALT	SY	61

- NOTES**
- ESTIMATED QUANTITIES ARE BASED ON COMPACTED IN-PLACE MATERIALS.
 - EXISTING GRADE IS APPROXIMATELY 4918.2 (INTEC SITE SPECIFIC DATUM).
 - EXCAVATED MATERIAL SHALL BE STOCKPILED ON TARPS AND SECURELY COVERED FOR CONTRACTOR TESTING.
 - COORDINATES ARE BASED ON INTEC SITE SPECIFIC DATUM.
 - ESTIMATED QUANTITIES SHOWN ARE FOR THIS SHEET ONLY.
 - PIPING NOT SHOWN FOR CLARITY, SEE SHEETS P-1, AND P-3. FOR ELECTRICAL SEE SHEET E-1.
 - BACKFILL WILL VARY BASED ON CONTAMINATED SOIL ENCOUNTERED.

EXCAVATION PLAN
SCALE 1"=5.0'

FOR DRAWING INFO SEE DRAWING NO. SUBCONTRACT NO.

REQUESTER: K. ROGERS
DESIGNER: K. FRITZ
DRAWN: J. MONCUR
PROJECT NO. 23052
SPEC CODE

FOR REVIEW/APPROVAL SIGNATURES
SEE DRAWING NO.

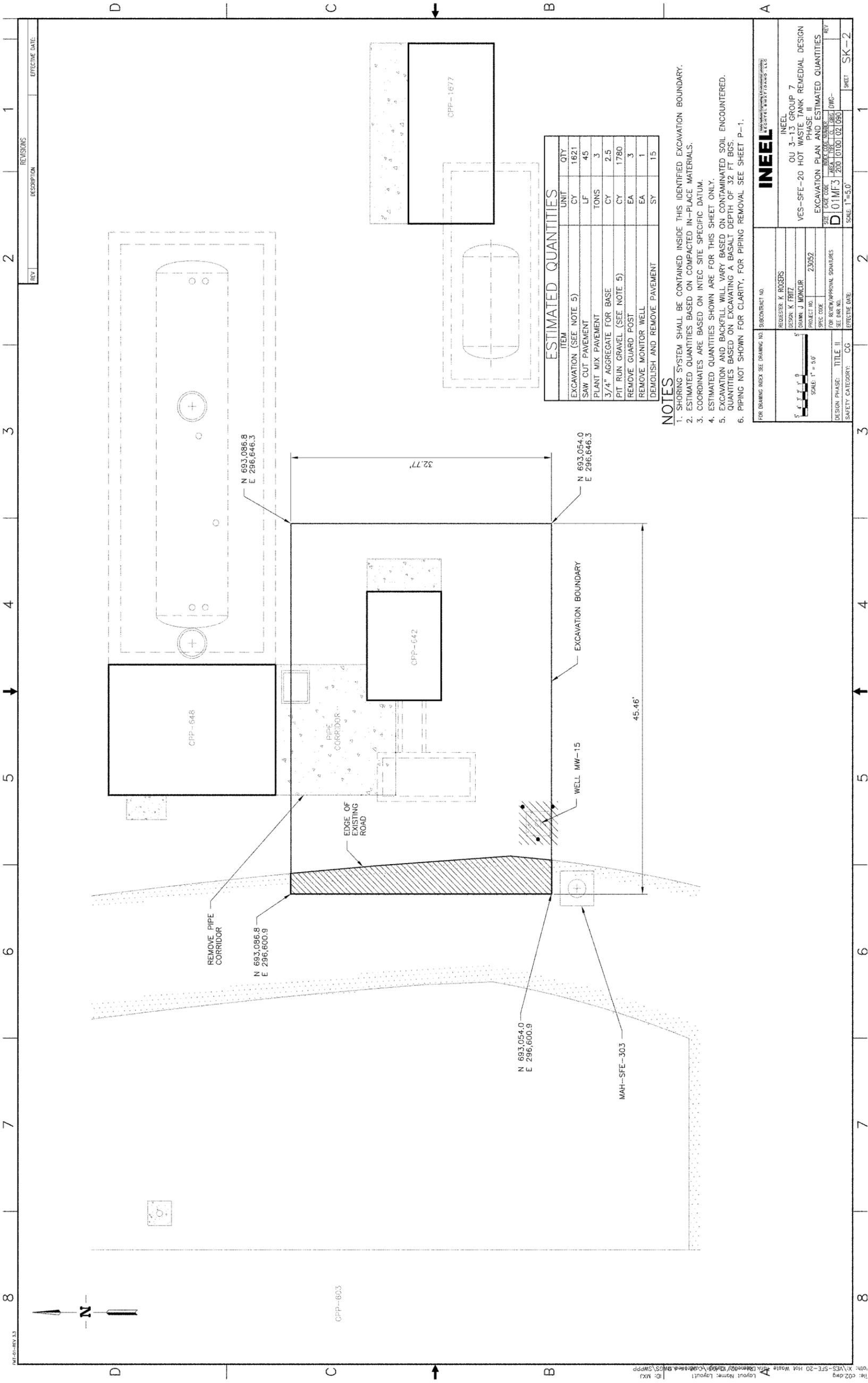
DESIGN PHASE: TITLE II
SAFETY CATEGORY: CC

INEEL
INTEC
OU 3-13 GROUP 7
VES-SFE-20 HOT WASTE TANK REMEDIAL DESIGN PHASE I
EXCAVATION PLAN AND ESTIMATED QUANTITIES

SCALE: 1"=5.0'

DATE: 2003 10/01 02/19/03

REV: SK-1



ITEM	UNIT	QTY
EXCAVATION (SEE NOTE 5)	CY	1621
SAW CUT PAVEMENT	LF	45
PLANT MIX PAVEMENT	TONS	3
3/4" AGGREGATE FOR BASE	CY	2.5
PIT RUN GRAVEL (SEE NOTE 5)	CY	1780
REMOVE GUARD POST	EA	3
REMOVE MONITOR WELL	EA	1
DEMOLISH AND REMOVE PAVEMENT	SY	15

- NOTES**
1. SHORING SYSTEM SHALL BE CONTAINED INSIDE THIS IDENTIFIED EXCAVATION BOUNDARY.
 2. ESTIMATED QUANTITIES BASED ON COMPACTED IN-PLACE MATERIALS.
 3. COORDINATES ARE BASED ON INTEC SITE SPECIFIC DATUM.
 4. ESTIMATED QUANTITIES SHOWN ARE FOR THIS SHEET ONLY.
 5. EXCAVATION AND BACKFILL WILL VARY BASED ON CONTAMINATED SOIL ENCOUNTERED.
 6. QUANTITIES BASED ON EXCAVATING A BASALT DEPTH OF 32 FT BGS.
 7. PIPING NOT SHOWN FOR CLARITY, FOR PIPING REMOVAL SEE SHEET P-1.

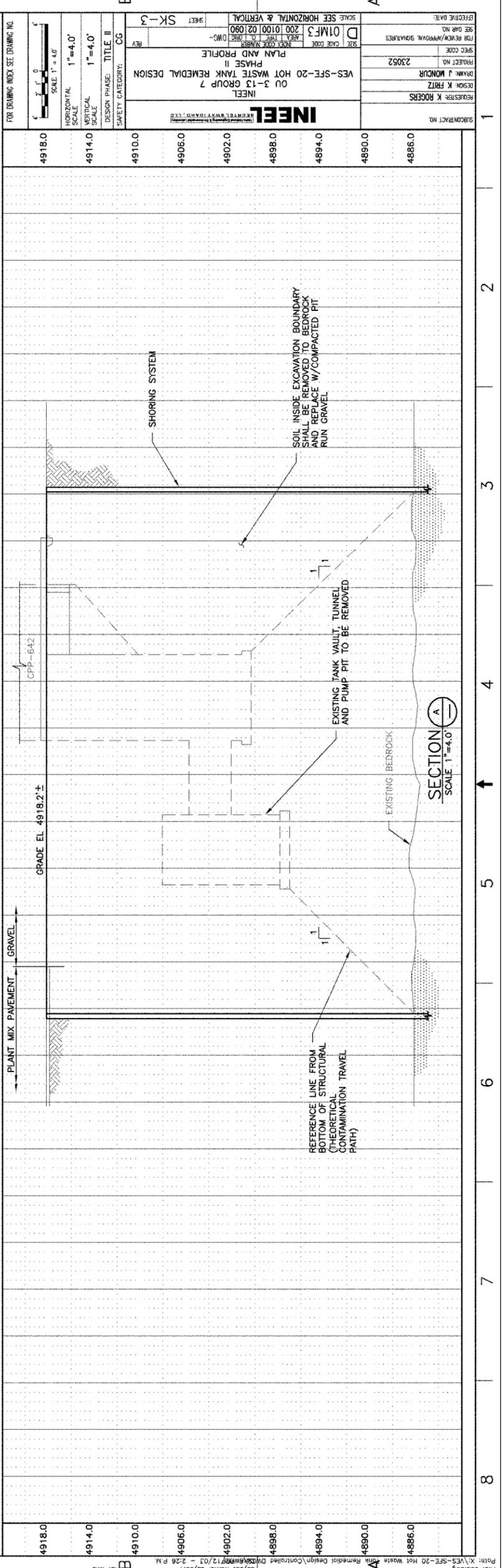
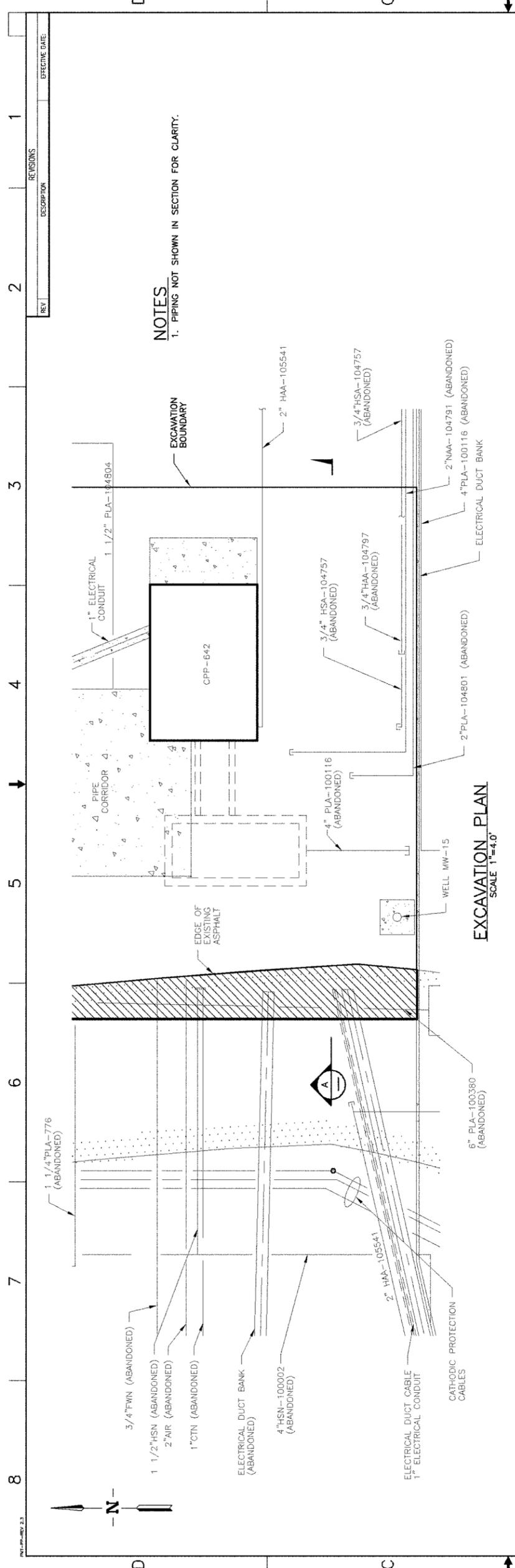
FOR DRAWING INDEX SEE DRAWING NO. SUBCONTRACT NO. **INEEL**

DESIGNER: K. ROEDERS
 DESIGN: K. FRITZ
 DRAWN: J. MONCUR
 PROJECT NO. 23052
 SPEC. CODE.
 FOR REVIEW/APPROVAL SIGNATURES
 SEE DAR NO. 01000102090
 EFFECTIVE DATE: 01/30/03

DESIGN PHASE: TITLE II
 SAFETY CATEGORY: CG

SCALE: 1"=50'

REVISIONS: SK-2



REV	DESCRIPTION	EFFECTIVE DATE

NOTES
1. PIPING NOT SHOWN IN SECTION FOR CLARITY.

EXCAVATION PLAN
SCALE 1"=4.0'

SECTION A
SCALE 1"=4.0'

FOR DRAWING INDEX SEE DRAWING NO. SK-3

INTEL
INTELLIGENCE & SECURITY GROUP
12000 W. WYOMING AVENUE
DENVER, CO 80202

DESIGNER: K. ROBERTS
CHECKER: J. MONDUR
PROJECT NO. 23052
SHEET NO. 01M13
SCALE: SEE HORIZONTAL & VERTICAL

REGISTRAR: K. ROBERTS
DESIGN: K. FRITZ
BY: J. MONDUR
PROJECT NO. 23052
SHEET NO. 01M13
SCALE: SEE HORIZONTAL & VERTICAL

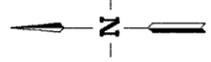
DESIGN PHASE: TITLE II
SAFETY CATEGORY: CG

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VERTICAL SCALE: 1"=4.0'

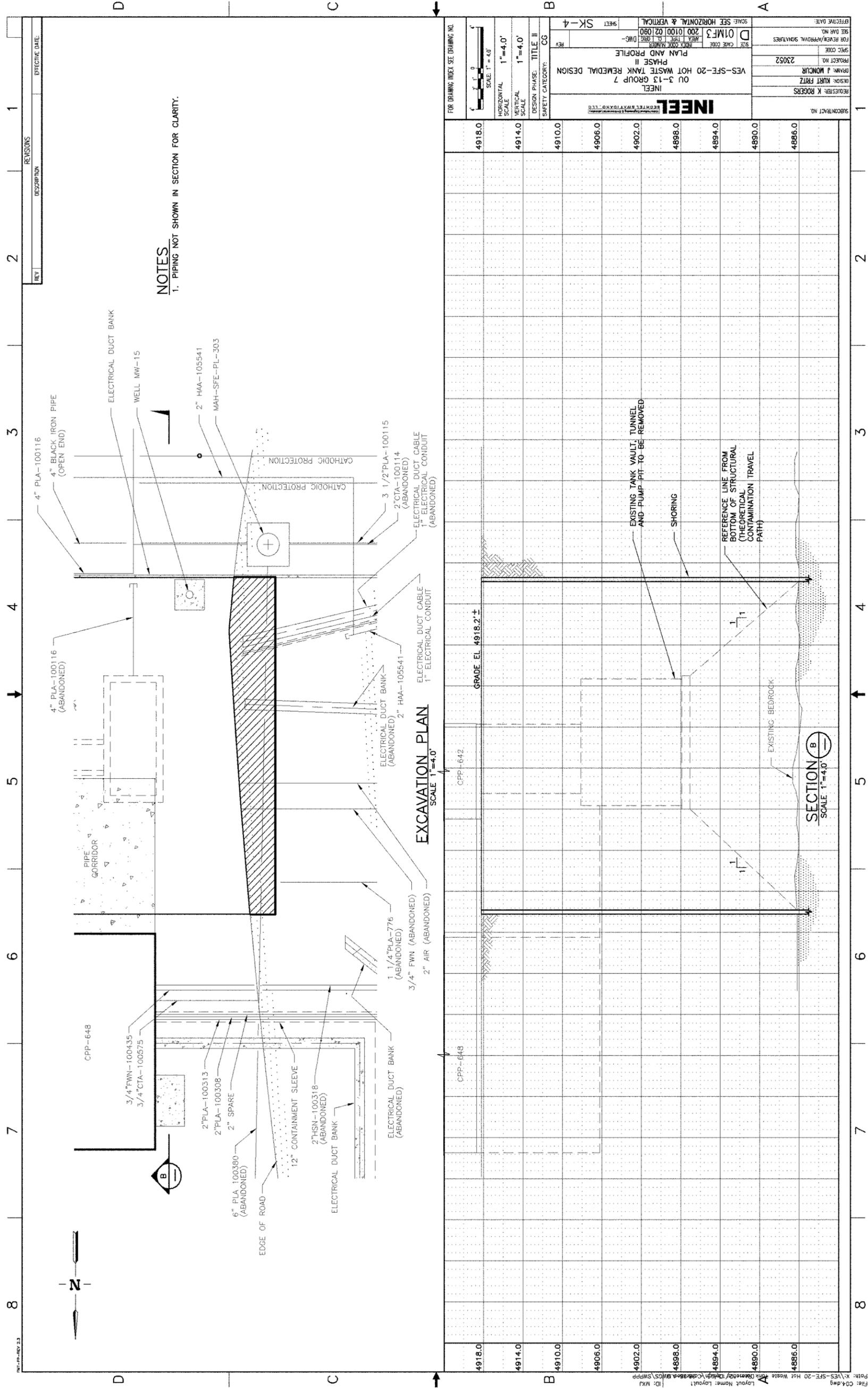
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4886.0

1 2 3 4 5 6 7 8

1 2 3 4 5 6 7 8



Plot: X:\VCS-SFE-20 Hot Waste Tank Remedial Design\Controlled Drawings\2712_03 - 2:26 P.M. [Layout Name: Layout1] D:\MK



NOTES
1. PIPING NOT SHOWN IN SECTION FOR CLARITY.

REV	DESCRIPTION	EFFECTIVE DATE

INTEL
INTEGRATED ENGINEERING & CONSULTING, LLC
11100 KENNEDY BLVD., SUITE 100, DALLAS, TEXAS 75244-3118
TEL: 972.346.1111 FAX: 972.346.1112

PROJECT NO. 23052
DRAWN: J. MONTEIR
CHECKED: K. ROGERS
DESIGNER: K. ROGERS
SUBCONTRACT NO.

DU 3-13 GROUP 7
VES-SFE-20 HOT WASTE TANK REMEDIAL DESIGN
PHASE II
PLAN AND PROFILE

SHEET 13 OF 17
DATE: 02/10/03
SCALE: SEE HORIZONTAL & VERTICAL

FOR DRAWING INDEX SEE DRAWING NO. SK-4

DESIGN PHASE: TITLE II
SAFETY CATEGORY: CG

HORIZONTAL SCALE: 1"=4.0'
VERTICAL SCALE: 1"=4.0'

SCALE: 1"=4.0'

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Appendix B
VES-SFE-20 Phase 2 Excavation Estimate

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