CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
South Dakota State University
Brookings, South Dakota
OSE# R0323--03X/ARPA
2024

CONTRACTOR'S BID DATE: Thursday, November 14, 2024, at 3:30 PM CT

PLACE TO FILE ELECTRONIC BIDS: South Dakota Board of Regents at https://www.sd.gov/cs?id=sc_cat_item&sys_id=af77b4b51bd15a107e05ea85624bcb36

ADDENDUM NO. 1
November 6, 2024

TO ALL PLANHOLDERS:

The following changes, clarifications, additions, and/or deletions are hereby made a part of the contract documents for the above-referenced project, as fully and completely as if the same were fully set forth therein. This addendum takes precedence over any items that may conflict.

GENERAL

A reminder that Contractors that prime the project shall be registered with SAM.gov prior to bidding.

MANUAL

1. BID FORM

   Replace in its entirety with attached.

   Updated plan quantities, removed bid items that are only in bid alternates and added bid items UP125 through UP127.

   The dollar amount for the ALLOWANCES have been modified.

2. SECTION 9, TECHNICAL INDEX AND TECHNICAL SPECIFICATIONS – TABLE OF CONTENTS:

   Replace in its entirety with attached.

   Added appendix for existing geotechnical reports.

   Added geotechnical reports.

PLANS

3. Sheet A001 – COVER SHEET

   Replace in its entirety with attached.

   Updated the location map.

4. Sheet A002 – SHEET INDEX

   Replace in its entirety with attached.

   Removed Sheet F007 from index.

5. Sheet B001 – ESTIMATE OF QUANITITES

   Replace in its entirety with attached.

   Updated plan quantities, removed bid items that are only in bid alternates and added bid items UP125 through UP127.

6. Sheet B002 – BID ALTERNATES ESTIMATE OF QUANITITES

   Replace in its entirety with attached.

   Updated plan quantities and added bid items. Also removed General Note #1. Refer to the bid form for the breakout unit pricing.

7. Sheet D001 – GENERAL NOTES

   Replace in its entirety with attached.

   Modified the Time Provisions and Coordination Meetings verbiage.

8. Sheet D004 – GENERAL NOTES

   Added the following to the **SANITARY SEWER – GENERAL** section:

   "All proposed PVC sanitary sewer main 6" to 12", shall be ASTM D-3034, Type PSM, SDR 35. All proposed PVC sanitary sewer main 15" to 18", shall be ASTM F-679 PS 115. All proposed PVC sanitary sewer service 6" to 8", shall be ASTM D-3034, Type PSM, SDR 35. All proposed PVC sanitary sewer service 4", shall be Schedule 40 solid pipe, IPS conforming to ASTM D-1725 and ASTM D-2665."

9. Sheet F001 – TRAFFIC CONTROL NOTES

   Replace in its entirety with attached.

   Added traffic control notes.

10. Sheet F002 – TRAFFIC CONTROL NOTES

    Replace in its entirety with attached.

    Added traffic control notes.

11. Sheet F003 – TRAFFIC CONTROL PLANS

    Replace in its entirety with attached.

    Added traffic control plan detail.

12. Sheet F004 – TRAFFIC CONTROL PLANS

    Replace in its entirety with attached.

        Added traffic control plan detail.

13. Sheet F005 – TRAFFIC CONTROL PLANS

    Replace in its entirety with attached.

        Added traffic control plan detail.

14. Sheet F006 – TRAFFIC CONTROL PLANS

    Replace in its entirety with attached.

        Changed the Sheet name to PEDESTRIAN TRAFFIC CONTROL PLANS. Added pedestrian traffic control plan detail.

15. Sheet F007 – TRAFFIC CONTROL PLANS

    Remove in its entirety.

16. Sheet G101 – EROSION CONTROL PLAN

    Replace in its entirety with attached.

        Modified Detail #3, TREE PROTECTION DETAIL.

17. Sheet G103 – EROSION CONTROL PLAN

    Replace in its entirety with attached.

        Added tree protection limits.

18. Sheet G104 – EROSION CONTROL PLAN

    Replace in its entirety with attached.

        Added tree protection limits.

19. Sheet G106 – EROSION CONTROL PLAN

    Replace in its entirety with attached.

        Added tree protection limits.

20. Sheet G109 – EROSION CONTROL PLAN

    Replace in its entirety with attached.

        Added tree protection limits.

21. Sheet G110 – EROSION CONTROL PLAN

    Replace in its entirety with attached.

        Modified tree protection limits and added landscape restoration.

22. Sheet G111 – EROSION CONTROL PLAN

    Replace in its entirety with attached.

        Added tree protection limits.

23. Sheet G112 – EROSION CONTROL PLAN

    Replace in its entirety with attached.

        Added tree protection limits.

24. Sheet G113 – EROSION CONTROL PLAN

    Replace in its entirety with attached.

        Added tree protection limits and Detail #3, MH-R-1.

25. Sheet G116 – EROSION CONTROL DETAILS

    Replace in its entirety with attached.

        Modified Detail, ORGANIC MULCH PLANT BEDS.

26. Sheet H001 – BYPASS PUMPING PLANS

    Replace in its entirety with attached.

        Removed temporary bypass sanitary sewer pumping on the northwest area, around Design Studio and modified pumping around Animal Science Arena. Added approximant sanitary sewer flows.

27. Sheet H002 – BYPASS PUMPING PLANS

    Replace in its entirety with attached.

        Added approximant sanitary sewer flows.

28. Sheet H003 – BYPASS PUMPING PLANS

    Replace in its entirety with attached.

        Added approximant sanitary sewer flows.

29. Sheet H004 – BYPASS PUMPING PLANS

    Replace in its entirety with attached.

        Added approximant sanitary sewer flows.

30. Sheet H104 – EXISTING CONDITIONS & REMOVALS

    Replace in its entirety with attached.

        Added tree removal.

31. Sheet H105 – EXISTING CONDITIONS & REMOVALS

    Replace in its entirety with attached.

        Modified keynotes and added CLSM of piping abandonment.

32. Sheet H109 – EXISTING CONDITIONS & REMOVALS

    Replace in its entirety with attached.

        Added tree removal.

33. Sheet H110 – EXISTING CONDITIONS & REMOVALS

    Replace in its entirety with attached.

        Adjusted viewport of Detail #2.

34. Sheet H111 – EXISTING CONDITIONS & REMOVALS

    Replace in its entirety with attached.

        Modified removal call outs and keynotes.

35. Sheet H112 – EXISTING CONDITIONS & REMOVALS

    Replace in its entirety with attached.

        Modified removal call outs and keynotes. Added Detail #3, EXISTING STRUCTURE LID SECTION VIEW and Detail #4, EXISTING STRUCTURE LID PLAN VIEW.

36. Sheet H113 – EXISTING CONDITIONS & REMOVALS

    Replace in its entirety with attached.

        Modified removal call outs and keynotes.

37. Sheet H118 – EXISTING CONDITIONS & REMOVALS

    Replace in its entirety with attached.

        Add Detail #5, MH-R-1.

38. Sheet I100 – UTILITY SHEET REFERENCE PLAN

    Replace in its entirety with attached.

        Modified location box for Sheet I106.

39. Sheet I101 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

40. Sheet I102 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Updated rehabilitation table quantity.

41. Sheet I103 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs, keynotes, and rehabilitation table.

42. Sheet I104 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

43. Sheet I105 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

44. Sheet I106 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs, keynotes, and rehabilitation table.

45. Sheet I107 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

46. Sheet I108 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

47. Sheet I109 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

48. Sheet I110 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

49. Sheet I111 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

50. Sheet I112 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

51. Sheet I113 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

52. Sheet I114 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs, keynotes, and general notes.

53. Sheet I115 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

54. Sheet I116 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

55. Sheet I117 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

56. Sheet I118 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

57. Sheet I119 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes. Added rehabilitation table.

58. Sheet I120 – SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes. Modified rehabilitation table and added Detail #2, PLAN.

59. Sheet I121 – BID ALTERNATE C: ANIMAL SCIENCE COMPLEX SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

60. Sheet I122 – BID ALTERNATE C: ABBOT HALL SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

61. Sheet I123 – BID ALTERNATE B: ANIMAL SCIENCE COMPLEX SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

62. Sheet I124 – BID ALTERNATE A: TESTING CENTER SANITARY SEWER MAIN PLAN AND PROFILE

    Replace in its entirety with attached.

        Modified call outs and keynotes.

63. Sheet I400 – MANHOLE LOCATION PLAN

    Replace in its entirety with attached.

        Added manhole MH-R-1 location.

64. Sheet I403 – MANHOLE STRUCTURE DETAILS

    Replace in its entirety with attached.

        Removed Detail #5, EXISTING MH-BMU-1770.

65. Sheet I404 – MANHOLE STRUCTURE DETAILS

Replace in its entirety with attached.

Added Detail #5, EXISTING MH-R-1.

66. Sheet I405 – MANHOLE STRUCTURE DETAILS

Replace in its entirety with attached.

Added the detail reference to the concrete sidewalk call outs.

67. Sheet I406 – MANHOLE STRUCTURE DETAILS

Replace in its entirety with attached.

Added the detail reference to the concrete sidewalk call outs. Added Detail #3, EXISTING MH-A-8-I-2 and moved prior Detail #8, EXISTING MH-A-8-D-2 to Plan Sheet I407.

68. Sheet I407 – MANHOLE STRUCTURE DETAILS

Replace in its entirety with attached.

Moved Detail #5, EXISTING MH-A-8-D-2 from Plan Sheet I406.

69. Sheet J105 – PAVING PLAN

Added the following Keynote #1 to the replaced colored concrete sidewalk:

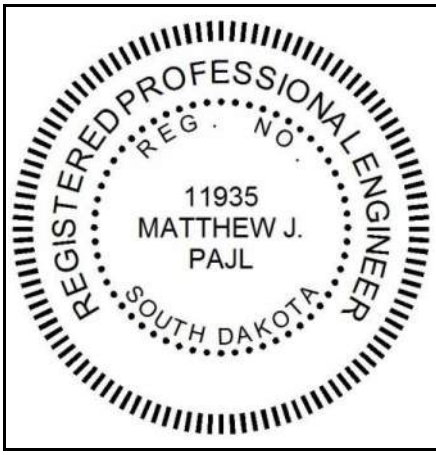
"1. COLORED CONCRETE SHALL BE "SOLOMON SALMON" COLOR TO BEST MATCH THE EXISTING. THIS COLOR DIFFERS FROM THE REST OF THE PROJECT."

70. Sheet U101 – STANDARD DETAILS

Replace in its entirety with attached.

Added Standard Detail 26-010, LARGE LIGHT BASE.

All bidders shall acknowledge receipt and acceptance of ADDENDUM NO. 1 by signing the space provided on the Bid Form.



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly registered Professional Engineer under the laws of the State of South Dakota.

Date: 11/06/2024

MATTHEW JAMES PAJL, P.E.

License No. **11935**

My renewal date is **December 31**, **2025**

Pages or sheets covered by this seal:

Entire document

BID FORM

All bids shall be submitted via the OSE Electronic Bidding Platform, details below:

OSE Electronic Bidding

Submit Bid

Overview

The undersigned, being familiar with the local conditions affecting the work, and with the Contract Documents, including the Invitation to Bid, Instructions to Bidders, Bid Form, Explanation of Alternates, Modification to Bid Form, Bid Bond Form, Performance and Payment Bond, Acknowledgment of Surety, Sample Certification of Surety, Non-Resident Bidder Affidavit, Form of Agreement for Construction, General Conditions, Special Conditions, Technical Specifications, Plans and Addenda which govern the purchase of material and labor and the awarding of contracts hereby proposes to do all the work and provide all the material and equipment for the project.

Bid Opening Date:	**3:30 PM CT**		
Bid Opening Time:	**November 14, 2024**		
Date of Project Manual:	**October 24, 2024**		
Date of Plans:	**October 24, 2024**		
Phase 1 Substantial Completion Date:	**August 6, 2025**	w/Liquidated Damages:	**$1,600.00** per calendar day
Phase 1 Final Completion Date:	**August 20, 2025**	w/Liquidated Damages:	**$800.00** per calendar day
Phase 2 Substantial Completion Date:	**August 7, 2026**	w/ Liquidated Damages:	**$1,600.00** per calendar day
Phase 2 Final Completion Date:	**August 21, 2026**	w/ Liquidated Damages:	**$800.00** per calendar day

Total value of material subject to tax: **0.00**

Any material furnished by the State for use in this project is subject to Use Tax and Excise Tax.

Link to Bidding: https://www.sd.gov/cs?id=sc_cat_item&sys_id=af77b4b51bd15a107e05ea85624bcb36

ALLOWANCES

- Insert a value of **$30,000.00** under the unit price for Item – "UP001 – ALLOWANCE - Irrigation System & Landscaping Repairs."
- Insert a value of **$30,000.00** under the unit price for Item – "UP002 – ALLOWANCE - Tree Canopy Replacement – Furnish and Plant."
- Insert a value of **$100,000.00** under the unit price for Item – "UP003 – ALLOWANCE - Unforeseen Conditions."

ATTENTION BIDDERS!

- ***TECHNICAL DIFFICULTIES:*** *OSE is not responsible for technical difficulties resulting from the electronic bidding platform.*
- ***MODIFY BIDS:*** *It is highly recommended that contractors submit their bid early and modify as needed prior to the bid closing. Please note, bids may be modified as many times as desired prior to the bid opening date/time as well as withdrawn at any point prior to the bid opening.*
- ***SESSION TIMEOUT:*** *The online bidding platform session will timeout if left open for too long, therefore bids need to be submitted in a timely manner as to ensure the information is not lost and other errors do not occur.*

EXPLANATION OF UNIT PRICES & ALTERNATES

Item	Quantity	Unit
UP001 - Allowance - Irrigation System & Landscaping Repairs	1	LS
UP002 - Allowance - Tree Canopy Replacement - Furnish & Plant	1	LS
UP003 - Allowance - Unforeseen Conditions	1	LS
UP004 - MOBILIZATION	1	LS
UP005 - Traffic Control	1	LS
UP006 - High Voltage Power, Remove And Replace	1	LS
UP007 - Fiber Optic, Remove And Replace	1	LS
UP008 - Verify Utility	50	Each
UP009 - Remove Walkway Light Assembly	14	Each
UP010 - Remove Existing Manhole	23	Each
UP011 - Abandon Existing Manhole	7	Each
UP012 - Abandon Existing Sanitary Structure	2	Each
UP013 - Remove Existing Manhole Frame And Cover	43	Each
UP014 - Remove Water Main	175	FT
UP015 - Remove Existing Sanitary Sewer Main	1,944	FT
UP016 - Abandon Sanitary Sewer, Fill And Plug (CLSM)	598	FT
UP017 - Remove Concrete Curb And Gutter	634	FT
UP018 - Remove Concrete Sidewalk	4,267	SqYd
UP019 - Remove Asphalt Concrete Composite	2,826	SqYd
UP020 - Remove Concrete Pavement	548	SqYd
UP021 - Cold Milling Asphalt Concrete	28	SqYd
UP022 - Landscaping Removals	3,168	SqFt
UP023 - Clear And Grub Tree	30	Each
UP024 - 8" PVC Water Main	100	FT
UP025 - 8" MJ 11.25, 22.5, 45 Degree Bend	4	Each
UP026 - 8" MJ Sleeve	2	Each
UP027 - 8" Gate Valve With Box	1	Each
UP028 - Cut And Tie To Existing Water Main	1	Each
UP029 - Sanitary Sewer Temporary Bypass Pumping	1	LS
UP030 - 2" Dia. HDPE Force Main	126	FT
UP031 - 6" Dia. PVC Gravity Sewer Pipe	312	FT
UP032 - 8" Dia. PVC Gravity Sewer Pipe	1,415	FT
UP033 - 10" Dia. PVC Gravity Sewer Pipe	123	FT
UP034 - 12" Dia. PVC Gravity Sewer Pipe	847	FT
UP035 - 15" Dia. PVCGravity Sewer Pipe	15	FT
UP036 - 18" Dia. PVC Gravity Sewer Pipe	135	FT
UP037 - 6" Sanitary Sewer Cap/ Plug	6	Each
UP038 - 8" Sanitary Sewer Cap/ Plug	1	Each
UP039 - 10" Sanitary Sewer Cap/ Plug	4	Each
UP040 - 12" Sanitary Sewer Cap/ Plug	8	Each
UP041 - 15" Sanitary Sewer Cap/ Plug	2	Each
UP042 - 12" No-Dig Vcp Micro Pilot Tunneling	873	FT
UP043 - Micro Pilot Tunneling, Launch Pit	3	Each
UP044 - Micro Pilot Tunneling, Receiving Pit	3	Each
UP045 - 16" Steel Casing Pipe, Trenchless	44	FT
UP046 - 18" Steel Casing Pipe, Trenchless	17	FT
UP047 - 20" Steel Casing Pipe, Trenchless	14	FT
UP048 - Pre-Installation Video Inspection	2,774	FT
UP049 - Pre-Installation Cleaning, 6" Sanitary Sewer	572	FT
UP050 - Pre-Installation Cleaning, 8" Sanitary Sewer	1,336	FT
UP051 - Pre-Installation Cleaning, 10" Sanitary Sewer	679	FT

UP052 - Pre-Installation Cleaning, 12" Sanitary Sewer	187	FT
UP053 - Pipe Lining, Cured-In-Place Pipe, 6"	572	FT
UP054 - Pipe Lining, Cured-In-Place Pipe, 8"	1,336	FT
UP055 - Pipe Lining, Cured-In-Place Pipe, 10"	679	FT
UP056 - Pipe Lining, Cured-In-Place Pipe, 12"	187	FT
UP057 - Post-Installation Video Inspection	2,774	FT
UP058 - Manhole Cementitious Liner, Depth Of 0-5 Feet	30	FT
UP059 - Manhole Cementitious Liner, Depth Of 5.1-15 Feet	40	FT
UP060 - Manhole Epoxy Liner, 125 Mil Applied Thickness	215	FT
UP061 - Polyurethane Chemical Grout	50	Gal
UP062 - Manhole Bench & Invert Reconstruction	15	Each
UP063 - Manhole Frame & Cover	43	Each
UP064 - Manhole Cover	2	Each
UP065 - Remove & Reinstall: Manhole Frame & Cover	3	Each
UP066 - Remove, Furnish & Install: Pipe Seals	4	Each
UP067 - External Frame Seal	45	Each
UP068 - 48" Dia Sanitary Sewer Manhole	26	Each
UP069 - 60" Dia Sanitary Sewer Lined Manhole	2	Each
UP070 - 48" Dia Barrel Section	8	FT
UP071 - Remove/ Reinstall Cone Section	5	Each
UP072 - Grind Protruding Sanitary Sewer Service	1	Each
UP073 - Trim Sanitary Sewer Pipe In Manhole	7	Each
UP074 - Remove Manhole Steps	209	Each
UP075 - Adjusting Ring For Manhole, Per One Inch Ring	174	Each
UP076 - Sanitary Sewer Manhole Drop Assembly	24	Each
UP077 - 8" X 6" Sewer Wye/Tap	7	Each
UP078 - 8" X 8" Sewer Wye/Tap	1	Each
UP079 - 12" X 6" Sewer Wye/Tap	2	Each
UP080 - 6" Sanitary Sewer Cleanout Assembly	2	Each
UP081 - 8" Sanitary Sewer Cleanout Assembly	5	Each
UP082 - Sanitary Sewer Service Connection	34	Each
UP083 - Connect To Existing Sanitary Sewer Pipe	28	Each
UP084 - Connect Into Existing Sanitary Sewer Manhole	5	Each
UP085 - Mathews Hall Lift Station	1	Each
UP086 - Contractor Furnished Fill	500	Ton
UP087 - Scarify & Recompact Subgrade	3,289	SqYd
UP088 - Geotextile Fabric For Subgrade Stabilization	3,289	SqYd
UP089 - Aggregate Base Course	2,880	Ton
UP090 - Asphalt Concrete Composite	675	Ton
UP091 - 8" PCC Pavement	405	SqYd
UP092 - Concrete Fillet	92	SqYd
UP093 - Concrete Curb & Gutter	587	FT
UP094 - Concrete Valley Gutter 6" Thick	365	SqFt
UP095 - 5" Concrete Sidewalk	35,243	SqFt
UP096 - 5" Colored Concrete Sidewalk	3,515	SqFt
UP097 - 6' Wide Concrete Stairs And Railing	5	Each
UP098 - Salvage And Reset Concrete Bench Segment, Spencer Hall	1	Ton
UP099 - Salvage And Reset Trash Bin Rails	2	Ton
UP100 - Epoxy Pavement Marking Paint, 4" Yellow	1,911	FT
UP101 - Epoxy Pavement Marking Paint, 4" White	158	FT
UP102 - Epoxy Pavement Marking Paint, 12" White	128	FT
UP103 - Epoxy Pavement Marking Paint, 24" White	148	FT
UP104 - Epoxy Pavement Marking Paint, Arrow	4	Each
UP105 - Type 1 Detectable Warning Panel	80	SqFt
UP106 - Salvage And Reset Sign	10	Each
UP107 - Install Salvaged Light Pole With New Concrete Base	13	Each

UP108 - Install Salvaged Light Pole On Existing Concrete Base	1	Each
UP109 - Sweeping	80	Hour
UP110 - Orange Plastic Safety Fence	5,641	FT
UP111 - Inlet Protection	20	Each
UP112 - Concrete Washout Area	7	Each
UP113 - Sediment Control Wattle	2,850	FT
UP114 - Silt Fence	50	FT
UP115 - Minor Impact Vehicle Tracking Control	6	Each
UP116 - Contractor Furnished Topsoil	1,070	Ton
UP117 - Salvage And Place Topsoil	2,139	CuYd
UP118 - Permanent Seed Mixture 1	393	Lb
UP119 - Permanent Seed Mixture 2	127	Lb
UP120 - Weed Control	9,650	SqYd
UP121 - Erosion Control Blanket	50	SqYd
UP122 - Bonded Fiber Matrix	4	Ton
UP123 - Plant Bed Preparation	540	SqYd
UP124 - 4" Depth Shredded Bark Mulch	540	SqYd
UP125 - 6" Restrained Cap	2	Each
UP126 - 10" Restrained Cap	2	Each
UP127 - 8" Sanitary Sewer Bend	2	Each

ALTERNATE A – UNIT PRICING

UPA001 - Mobilization	1	LS
UPA002 - Abandon Existing Manhole	3	Each
UPA003 - Remove Existing Sanitary Sewer Main	7	FT
UPA004 - Remove Concrete Sidewalk	75	SqYd
UPA005 - Remove Asphalt Concrete Composite	105	SqYd
UPA006 - 4" Dia PVC Force Main	150	FT
UPA007 - 4" Dia. PVC Force Main, Via HDD	240	FT
UPA008 - Horizontal Directional Drilling Pit	2	Each
UPA009 - 6" Sanitary Sewer Cap/ Plug	1	Each
UPA010 - 8" Sanitary Sewer Cap/ Plug	7	Each
UPA011 - 4" Sewer Bends	3	Each
UPA012 - Sanitary Sewer Service Connection	1	Each
UPA013 - Connect Into Existing Sanitary Sewer Manhole	1	Each
UPA014 - Scarify & Recompact Subgrade	105	SqYd
UPA015 - Geotextile Fabric for Subgrade Stabilization	105	SqYd
UPA016 - Aggregate Base Course	71	Ton
UPA017 - Asphalt Concrete Composite	23	Ton
UPA018 - 5" Concrete Sidewalk	675	SqFt
UPA019 - ORANGE PLASTIC SAFETY FENCE	92	FT
UPA020 - PLANT BED PREPARATION	15	SqYd
UPA021 - 4" DEPTH SHREDDED BARK MULCH	33	SqYd

ALTERNATE B – UNIT PRICING

UPB001 - Mobilization	1	LS
UPB002 - Remove Walkway Light Assembly	1	Each
UPB003 - Remove Existing Manhole	1	Each
UPB004 - Abandon Existing Manhole	0	Each
UPB005 - Abandon Existing Sanitary Structure	1	Each
UPB006 - Remove Existing Sanitary Sewer Main	52	FT
UPB007 - Remove Concrete Sidewalk	378	SqYd
UPB008 - Landscaping Removals	1,053	SqFt
UPB009 - Clear and Grub Tree	3	Each
UPB010 - Temporary Bypass Pumping	1	LS

UPB011 - 8" Dia. PVC Gravity Sewer Pipe	27	FT
UPB012 - 10" Dia. PVC Gravity Sewer Pipe	15	FT
UPB013 - 12" Dia. PVC Gravity Sewer Pipe	20	FT
UPB014 - 10" Sanitary Sewer Cap/ Plug	3	Each
UPB015 - 12" No-Dig VCP Micro Pilot Tunneling	226	FT
UPB016 - Micro Pilot Tunneling, Launch Pit	1	Each
UPB017 - Micro Pilot Tunneling, Receiving Pit	2	Each
UPB018 - Pre-Installation Video Inspection	126	FT
UPB019 - Pre-Installation Cleaning, 8" Sanitary Sewer	126	FT
UPB020 - Pipe Lining, Cured-In-Place Pipe, 8"	126	FT
UPB021 - Post-Installation Video Inspection	414	FT
UPB022 - 48" Dia Sanitary Sewer Manhole	4	Each
UPB023 - Sanitary Sewer Service Connection	4	Each
UPB024 - Connect To Existing Sanitary Sewer Pipe	1	Each
UPB025 - Aggregate Base Course	108	Ton
UPB026 - 5" Concrete Sidewalk	3,350	SqFt
UPB027 - Install Salvaged Light Pole With New Concrete Base	1	Each
UPB028 - ORANGE PLASTIC SAFETY FENCE	244	FT
UPB029 - 4" DEPTH SHREDDED BARK MULCH	33	SqYd

ALTERNATE C – UNIT PRICING

UPC001 - MOBILIZATION	1	LS
UPC002 - REMOVE EXISTING MANHOLE	3	Each
UPC003 - REMOVE EXISTING SANITARY STRUCTURE	2	Each
UPC004 - ABANDON SANITARY SEWER, FILL AND PLUG (CLSM)	108	FT
UPC005 - REMOVE CONCRETE CURB AND GUTTER	45	FT
UPC006 - REMOVE CONCRETE SIDEWALK	81	SqYd
UPC007 - REMOVE ASPHALT CONCRETE COMPOSITE	1,739	SqYd
UPC008 - REMOVE CONCRETE PAVEMENT	253	SqYd
UPC009 - CLEAR AND GRUB TREE	5	Each
UPC010 - SANITARY SEWER TEMPORARY BYPASS PUMPING	1	LS
UPC011 - 6" DIA PVC FORCE MAIN	77	FT
UPC012 - 6" DIA. PVC GRAVITY SEWER PIPE	137	FT
UPC013 - 8" DIA. PVC GRAVITY SEWER PIPE	235	FT
UPC014 - 10" DIA. PVC GRAVITY SEWER PIPE	111	FT
UPC015 - 15" DIA. PVC GRAVITY SEWER PIPE	333	FT
UPC016 - 15" SANITARY SEWER CAP/ PLUG	1	Each
UPC017 - POST-INSTALLATION VIDEO INSPECTION	885	FT
UPC018 - 48" DIA SANITARY SEWER MANHOLE	4	Each
UPC019 - 48" DIA SANITARY SEWER LINED MANHOLE	5	Each
UPC020 - LINED CONCRETE SEPARATION TANK	1	Each
UPC021 - SANITARY SEWER MANHOLE DROP ASSEMBLY	3	Each
UPC022 - 6" SANITARY SEWER BEND	4	Each
UPC023 - 8" SANITARY SEWER BEND	1	Each
UPC024 - 10" SANITARY SEWER BEND	1	Each
UPC025 - 6" SANITARY SEWER CLEANOUT ASSEMBLY	1	Each
UPC026 - 8" SANITARY SEWER CLEANOUT ASSEMBLY	5	Each
UPC027 - 10" SANITARY SEWER CLEANOUT ASSEMBLY	2	Each
UPC028 - SANITARY SEWER SERVICE CONNECTION	9	Each
UPC029 - CONNECT TO EXISTING SANITARY SEWER PIPE	1	Each
UPC030 - SCARIFY & RECOMPACT SUBGRADE	1,992	SqYd
UPC031 - GEOTEXTILE FABRIC FOR SUBGRADE STABILIZATION	1,992	SqYd
UPC032 - AGGREGATE BASE COURSE	945	Ton
UPC033 - ASPHALT CONCRETE COMPOSITE	357	Ton

UPC034 - 8" PCC PAVEMENT	346	SqYd
UPC035 - CONCRETE CURB & GUTTER	45	FT
UPC036 - 5" CONCRETE SIDEWALK	575	SqFt
UPC037 - TYPE 1 DETECTABLE WARNING PANEL	8	SqFt
UPC038 - REMOVE EXISTING SANITARY SEWER MAIN	440	FT
UPC039 - ABANDON EXISTING MANHOLE	1	Each
UPC040 - REMOVE WATER MAIN	71	FT
UPC041 - 6" RESTRAINED CAP	2	Each

ALTERNATES

BID ALTERNATE A – TESTING CENTER FORCE MAIN INSTALLATION

BID ALTERNATE B – ABBOT HALL SANITARY SEWER INSTALLATION

BID ALTERNATE C – ANIMAL COMPLEX SANITARY SEWER INSTALLATION

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TECHNICAL SPECIFICATIONS

Abbot Hall
Geotechnical Report

Date: January 20, 2009

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
605-335-5512 Fax 605-335-0773

January 20, 2009

Office of State Engineer
Joe Foss Building
523 E. Capitol Avenue
Pierre, SD 57501

Attn: Kyle Elenkiwich

Subj: Geotechnical Exploration
Proposed Residence Hall Buildings
South Dakota State University
Brookings, South Dakota
OSE #R309—03X/ RES HALL
GeoTek #08-F27

This correspondence presents our written report of the geotechnical exploration program for the referenced project. Our work was performed in accordance with our contractual agreement dated December 11, 2008. We are transmitting two copies of our report for your use. Additional copies are being sent as noted below.

We thank you for the opportunity of providing our services on this project and look forward to continued participation during the design and construction phases. If you have any questions regarding this report, please contact our office at (605) 335-5512.

Respectfully Submitted,
GeoTek Engineering & Testing Services, Inc.

Jared Haskins

Jared Haskins, EIT
Project Manager

Jeff Christensen

Jeff Christensen, PE
Geotechnical Manager

Cc: South Dakota State University (Facilities and Services), Attn: Colin Gaalskyk
Koch Hazard Architects, Attn: Todd Stone
SEA, Attn: Greg Hannestad

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APPENDIX A

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GEOTECHNICAL EXPLORATION
PROPOSED RESIDENCE HALL BUILDINGS
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA
OSE #R309—03X/ RES HALL
GEOTEK #08-F27

INTRODUCTION

Project Information

This report presents the results of the recent geotechnical exploration program for the proposed residence hall buildings at South Dakota State University in Brookings, South Dakota.

Scope of Services

Our work was performed in accordance with our contractual agreement with the Office of State Engineer. The authorized scope of services included the following:

1. To perform fifteen (15) standard penetration test (SPT) borings and install one (1) temporary groundwater monitoring well to gather data on the subsurface conditions at the project site.

2. To perform laboratory tests including moisture content, dry density, Atterberg limits (liquid and plastic limits), and unconfined compressive strength.

3. To prepare an engineering report including the results of the field and laboratory tests as well as our geotechnical engineering opinions and recommendations regarding the following:

    - Site preparation and excavation/filling procedures;
    - Foundation types and depths, allowable bearing capacity and estimated potential settlements of foundations;
    - Floor slab support;
    - Foundation backfill and lateral pressure;
    - Comments regarding factors that may impact the constructability and final performance of the project;
    - Quality control observations and testing.

The scope of our work was intended for geotechnical purposes only. This scope of work did not include determining the presence or extent of environmental contamination at the site or to characterize the site relative to wetlands status.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The project site is located on the campus of South Dakota State University in Brookings, South Dakota. The three proposed residence buildings will be constructed west of existing Brown Hall, Matthews Hall, and Grove Commons. The current site features include trees, lawn/landscaping, sidewalks, and pavement. The topography of the area slopes downward slightly to the northeast. Former structures have been demolished at the project site. Ground surface elevations at the boring locations were determined by using the top of the fire hydrant located approximately 110 feet west of the northwest corner of Grove Commons. An elevation of 1641.93 feet was furnished for the benchmark. The surface elevations at the boring locations varied from 1647.2 feet at boring #2 to 1639.3 feet at boring #9.

Subsurface Conditions

Fifteen (15) test borings were performed at the site on December 29 through December 31, 2008. The subsurface conditions encountered at the test boring locations are illustrated by means of the boring logs included in Appendix A. Field logs of the borings were prepared by the drill crew during the drilling operation. These boring logs included visual classifications of the soil materials during drilling and included the driller's interpretation of the subsurface conditions between the sampling intervals. The final boring logs included in this report represent the interpretation of the field boring logs and include revisions based on laboratory observations and test results.

We wish to point out that the subsurface conditions at other times and locations at the site may differ from those found at our test boring locations. If different conditions are encountered during construction, it is necessary that you contact us so that our recommendations can be reviewed.

A review of the boring logs indicates a general soil profile consisting of 3 ½ to 7 feet of existing fill materials at the surface, with the exception of borings #1, #3, #4, and #5 which had approximately 2 feet of topsoil at the surface. Lean clay with sand (glacial till) and sandy lean clay (glacial till) soils were encountered beneath the topsoil and existing fill materials and extended through the depth of the borings. Clayey sand (outwash) soils were encountered from 4 ½ feet to 9 ½ feet at boring #3. The existing fill materials consisted of mostly black/organic clay soils. Pieces of wood debris were encountered in the existing fill materials at some of the boring locations.

The consistency of the lean clay soils varied from firm to very stiff. The relative density of the clayey sand was medium dense to dense. The consistency and density of the soils are indicated by the standard penetration resistance ("N") values as shown on the boring logs.

Water Levels

Groundwater measurements were made at the boring locations both at the time of completion and just prior to backfilling. The data is recorded on the boring logs. Groundwater was measured at a depth of 18 ½ feet at boring #13 at the completion of the drilling. No measurable groundwater was encountered during or upon immediate completion of the remaining borings. We installed one (1) 2-inch diameter PVC temporary groundwater monitoring well at boring #13 on December 31, 2008. We measured the groundwater depths at the well on January 7, January 9, and January 12, 2009. The results of the groundwater measurements are shown on the monitoring well log included in Appendix A. Groundwater was measured in the monitoring well at a depth of 10.8 feet below existing ground surface (elevation 1628.67 feet) at borings #13 on January 12, 2009. Additional groundwater measurements can be taken to gather additional water level data that can be used in the design and bidding process.

The water levels indicated on the boring logs may or may not be an accurate indication of the depth or lack of subsurface groundwater. A long period of time is generally required for subsurface water to stabilize in the impervious soils encountered at the boring locations. Long term groundwater monitoring was not included in our work scope.

Subsurface groundwater levels should be expected to fluctuate seasonally and yearly from the groundwater readings recorded at the borings. Fluctuations occur due to varying seasonal and yearly rainfall amounts and snowmelt, as well as other factors. It is possible that the subsurface groundwater levels during or after construction could be significantly different than the time the borings were performed.

ENGINEERING REVIEW AND RECOMMENDATIONS

Project Design Data

We understand that the project will consist of constructing three new residence hall buildings on the campus of the South Dakota State University in Brookings, South Dakota. The proposed residence buildings will be constructed west of existing Brown Hall, Matthews Hall, and Grove Commons. The proposed buildings will be three and four stories with a basement level beneath portions of the buildings. We anticipate the main floor elevations of the three proposed buildings will be 1640.0 feet, 1642.0 feet, and 1644.0 feet, respectively. We understand the basement and tunnel floor elevations will be approximately 10 feet below the main floor elevations of the buildings. The tunnel system will be used for pedestrians and utilities. The exterior of the proposed buildings will consist of precast concrete wall panels. Wall loads for the building will be on the order of 22 to 25 kips per lineal foot.

The above information/assumptions are important factors in our review and recommendations. If there are any corrections or additions to the above-mentioned data, it is necessary that you contact us so that we can review our recommendations with regards to the revised plans.

Discussion

The test borings indicate 2 to 7 feet of existing fill and topsoil materials were encountered at the test borings. It is our opinion that the existing fill and topsoil materials are not considered suitable for support of the foundations and floor slabs and additional site preparation is required.

Typically, spread footings are the most cost effective type of foundation system. It is our opinion a spread footing foundation system can be used for support of the proposed buildings after the recommended site preparation has been performed.

Site Preparation

Excavation

We recommend site preparation for the foundations and floor slabs consists of removing the existing fill and topsoil materials in order to expose the lean clay with sand (glacial till) and sandy lean clay (glacial till) soils. Please refer to Table 1 shown below that summarizes the anticipated minimum excavation depths to remove unsuitable soils encountered at the boring locations. The depths of the excavation will likely vary between the boring locations.

Table 1. Estimated Footing and Floor Slab Excavation Depths

Boring Number	Surface Elevation, ft	Anticipated Excavation Depth, ft	Approximate Excavation Elevation, ft
1	1645.2	2	1643.2
2	1647.2	7	1640.2
3	1642.3	2	1640.3
4	1640.7	2	1638.7
5	1641.5	2	1639.5
6	1640.7	3 ½	1637.2
7	1640.1	3 ½	1636.6
8	1640.4	3 ½	1636.9
9	1639.8	4 ½	1635.3
10	1639.8	3 ½	1636.3
11	1641.6	3 ½	1638.1
12	1640.2	4 ½	1635.7
13	1639.4	3 ½	1635.9
14	1642.2	6	1636.2
15	1638.8	3 ½	1635.3

If the excavation required to expose the lean clay with sand (glacial till) and sandy lean clay (glacial till) soils extends below the design footing elevation, we recommend placing a controlled structural fill from the bottom of the excavation to design footing elevation. Where structural fill will be required below foundations, the bottom of the excavation should be laterally oversized one foot beyond the edges of the footings for each vertical foot of structural fill required below the footing (1 horizontal : 1 vertical).

The predominant clayey soils encountered at the boring locations are susceptible to disturbance and can experience strength loss caused by construction traffic and/or additional moisture. Precautions will be required during earthwork activities in order to reduce the risk of soil disturbance. The excavation should be performed with a track-driven excavator (backhoe) having a smooth cutting edge on the bucket to minimize soil disturbance.

Filling

Due to the magnitude of the foundation loads, we recommend structural fill placed in dry excavations for support of the footings consists of a granular material. The granular material should consist of pit-run or processed sand or gravel having a maximum particle size of 3 inch with less than 15 percent by weight passing the #200 sieve.

Structural fill placed in dry excavations for support of the floor slabs should be similar to that discussed for support of the footings or the lean clay with sand (glacial till) and sandy lean clay (glacial till) soils excavated from the basement and tunnel excavations. If the lean clay material is selected, scrutiny on the moisture content of the clay structural fill should be made prior to the acceptance and use. The clay structural fill should be placed at a water content between 3 percent below to 2 percent above of the optimum water content as determined by standard Proctor. We wish to point out that granular materials are preferred due to the ease of placement and compaction, as well as they are more resistant to construction disturbance. The on-site black/organic soils should not be re-used for structural fill in the building area, but could be placed in exterior landscape areas.

Any structural fill placed in excavations with water or having saturated soils in the bottoms should consist of a washed rock (minus ¾ inch) or medium to coarse grained, free-draining sand with less than 5 percent by weight passing the #200 sieve. The initial lift of this material should be placed to a height of approximately 2 feet above the water surface or saturated soils prior to compaction to lessen the risk of disturbing the natural soils.

Groundwater may be encountered in the basement and tunnel excavations for the new structures. We recommend that excess groundwater be removed from the bottom of the excavation prior to placement of the footings. Where groundwater is encountered at the footing elevation, we

recommend overexcavating the foundation excavations 6 to 12 inches and backfilling with crushed rock (minus ¾ inch) with less than 5 percent by weight passing the #200 sieve. This replacement with crushed rock will provide a more stable and uniform working surface during foundation construction.

The fill and backfill materials should be placed and uniformly compacted in thin lifts, using vibratory compactors sized for the individual tasks. For heavy, self-propelled compactors, the fill should be placed in lifts of 12 inches or less for the granular materials and 6 to 8 inches for the clay materials. For hand-operated compactors, the fill should be placed in lifts of 6 inches or less for the granular materials and 4 inches or less for the clay materials. Table 2 below presents a summary of the recommended compaction criteria for the various areas that will likely require fill or backfill. The percentages shown are expressed as minimums of standard Proctor density (ASTM:D698).

Table 2. Recommended Compaction Requirements

Location	Minimum Compaction, Percent
Below Footings	100
Below Floor Slabs	98
Interior Foundation Backfill	98
Exterior Foundation Backfill	95
Exterior Sidewalks	95
Non-Structural Areas	90

Foundations

Once the site has been prepared as previously recommended in the section entitled Site Preparation, the proposed structures can be supported by a spread footing foundation system. It is our opinion the footings can be designed using a net allowable soil bearing pressure of 4,000 pounds per square foot (psf) if the site has been prepared according to our recommendations in the Site Preparation section. The net allowable soil bearing pressure is based on the soil conditions encountered at the test borings, the results of the field and laboratory tests, recommended compaction levels and past experience with similar soil conditions.

We recommend all footings be placed at a sufficient depth for frost protection. The perimeter footings for heated buildings should be placed such that the bottom of the footing is a minimum of 4 feet below finished exterior grade. Interior footings in heated buildings can be placed beneath the floor slab. Footings for unheated areas and canopies, or footings that are not protected from frost during freezing temperatures, should be placed at a minimum depth of 5 feet below the lowest adjacent grade.

As previously mentioned, the foundation soils may become wet and as a result will be susceptible to disturbance during construction. Where wet soils are encountered at the bottom of the footing elevation, we recommend over excavating the foundation excavations 6 to 12 inches and backfilling with crushed rock (minus ¾ inch) with less than 5 percent by weight passing the #200 sieve.

Total settlement of the buildings should be on the order of ¾ to 1 inch and differential settlements should be ¼ to ½ inch. Unknown soil conditions at the site that are different from those depicted at the boring locations could increase the amount of expected settlement. It is our opinion the recommended bearing pressure should provide a minimum safety factor of 3.0 against shear or base failure.

Floor Slabs

As previously described, we recommend site preparation for the floor slab areas consist of excavating the topsoil and existing fill materials to expose the lean clay with sand (glacial till) and sandy lean clay (glacial till) soils. The overexcavated areas should be backfilled using structural fill as previously recommended for fill in the Site Preparation – Filling section. The structural fill should be placed and compacted according to our previous recommendations in the section entitled Site Preparation - Filling.

We recommend placing a layer of free-draining sand fill beneath the floor slabs in order to provide a working surface for the placement of concrete and to serve as a capillary barrier. This free-draining granular fill should have less than 40 percent by weight passing the #40 sieve and less than 5 percent by weight passing the #200 sieve. We recommend placing a minimum of 6

inches of free-draining sand fill beneath on-grade floor slabs. We recommend below-grade floor slabs be placed on a minimum of 12 inches of the free-draining sand fill.

Below-Grade/Retaining/Tunnel Wall Backfill – Water Control

Drainage

We recommend a perimeter backfill drainage system be provided for the exterior side of below-grade walls, retaining walls, and tunnel walls to collect and remove water and to prevent hydrostatic pressure on the walls. The drainage system should consist of slotted or perforated drainage pipes located at the bottom of the backfill trench, at an elevation lower than the below-grade floor elevation. In addition, drainage pipes should be placed beneath the below-grade floor slabs with a maximum spacing of 25 feet between pipes. The drainage pipes should be surrounded by a properly graded rock filter that is wrapped in a geotextile filter fabric to minimize clogging. The drainage pipes should be connected to a suitable means of discharge capable of pumping groundwater on a year-round basis.

Backfilling

We recommend a damp/water proofing material be applied to the below-grade walls prior to backfilling. The backfill materials placed against below-grade walls, retaining walls, and tunnel walls exert lateral forces on the walls. In order to minimize these lateral forces and to optimize drainage, we recommend using free-draining sand for backfill. We recommend the free-draining sand contain no more than 5 percent by weight passing the #200 sieve, which would consist of (SP) soils. The zone of sand backfill should extend a minimum of 2 feet outside the bottom of the wall and then extend upward and outward at a slope no steeper than 1:1 (horizontal to vertical). We recommend capping the sand backfill section with 1 to 2 feet of clayey soil in areas that will not have asphalt or concrete surfacing to minimize infiltration of surface waters. The sand backfill soils should be placed and compacted according to our previous recommendations in the section entitled Site Preparation – Filling. The foundation walls should be braced prior to backfilling in order to reduce the risk of damaging the walls.

Lateral Pressures

We recommend the below-grade walls, retaining walls, and tunnel walls be designed to resist at-rest lateral earth pressures. An ultimate lateral earth pressure equivalent to that generated by a fluid having a total unit weight of 50 pounds per cubic foot (pcf) could be used for the sand backfill recommended in the section entitled Backfilling. Retaining walls that are allowed to rotate or deflect can be designed to resist active lateral earth pressures. An ultimate fluid pressure of 35 pcf can be used for the active case. Lateral pressures will be significantly higher if the walls are backfilled with soils other than the free-draining sand or if they are not drained and become saturated.

Exterior Foundation Backfill

We recommend either granular soils or the lean clay with sand (glacial till) and sandy lean clay (glacial till) soils be used as exterior foundation backfill for slab-on-grade structures. If granular soils are used for backfill in areas that will not have asphalt or concrete surfacing, we recommend capping the sand with 1 to 2 feet of clayey soil to minimize infiltration of surface waters. The exterior foundation backfill soils should be placed and compacted according to our previous recommendations in the section entitled Site Preparation - Filling. The foundation walls should be braced prior to backfilling or they should be backfilled evenly on both sides to reduce the risk of damaging the walls.

Site Drainage

Proper site drainage should be provided during and after construction. General site grading should direct all surface waters away from the excavations. Any water that accumulates in the excavations should be removed as soon as possible.

It is important that a positive slope be provided away from the structures for proper drainage. Finished grades should be sloped away from the structure with a minimum slope of 1 inch per foot starting at the foundation and extending to at least 10 feet beyond the excavation line. If pavement will be placed immediately next to the structure, a slope of at least ¼ inch per foot away from the foundation should be used for the pavement, if possible. The joint between the

pavement and the foundation should be properly sealed and maintained. Roof run off water should be controlled with a well-maintained system of gutters and downspouts with extensions to remove the run off water away from the structure.

CONSTRUCTION CONSIDERATIONS

Groundwater and Surface Water

Water may enter the excavations due to subsurface water, precipitation or surface run off. Where clay soils are encountered, it will likely be possible to remove and control water entering the excavation using normal sump pumping techniques. However, where sand soils are encountered, more extensive dewatering techniques may be required depending upon the subsurface water levels present during construction and the required excavation depths. Any water that accumulates in the bottom of the excavation should be immediately removed and surface drainage away from the excavation should be provided during construction.

Disturbance of Soils

The soils encountered at the boring locations are susceptible to disturbance and can experience strength loss caused by construction traffic and/or additional moisture. Precautions will be required during earthwork activities in order to reduce the risk of soil disturbance. The excavation should be performed with a track-driven excavator (backhoe) having a smooth cutting edge on the bucket to minimize soil disturbance. If the soils become disturbed, additional excavation and filling will be required.

Cold Weather Precautions

If site preparation and construction is anticipated during cold weather, we recommend all foundations, slabs and other improvements that may be affected by frost movements be insulated from frost penetration during freezing temperatures. If filling is performed during freezing temperatures, all frozen soils, snow and ice should be removed from the areas to be filled prior to placing the new fill. The new fill should not be allowed to freeze during transit, placement and compaction. Concrete should not be placed on frozen subgrades. Frost should not be allowed to penetrate below the footings. If floor slab subgrades freeze, we recommend the frozen soils be

removed and replaced, or completely thawed, prior to placement of the floor slab. The subgrade soils will likely require reworking and recompacting due to the loss of density caused by the freeze/thaw process.

Excavation Sideslopes

All excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, "Excavations and Trenches". This document states that the excavation safety is the responsibility of the contractor. Reference to this OSHA requirement should be included in the project specifications.

Observations and Testing

This report was prepared using a limited amount of information for the project and a number of assumptions were necessary to help us develop our conclusions and recommendations. It is recommended that our firm be retained to review the geotechnical aspects of the final design plans and specifications to check that our recommendations have been properly incorporated into the design documents.

The recommendations submitted in this report have been made based on the subsurface conditions encountered at the test boring locations. It is possible that there are subsurface conditions at the site that are different from those represented by the borings. As a result, on-site observation during construction is considered integral to the successful implementation of the recommendations. We believe that qualified field personnel need to be on-site at the following times to observe the site conditions and effectiveness of the construction.

Excavation Observation

We recommend that a geotechnical engineer or geotechnical engineering technician working under the direct supervision of a geotechnical engineer observe all excavations for foundations, slabs and pavements. These observations are recommended to determine if the exposed soils are similar to those encountered at the boring locations, if unsuitable soils have been adequately removed and if the exposed soils are suitable for support of the proposed construction. These observations should be performed prior to placement of fill or foundations.

Testing

After the subgrade is observed by a geotechnical engineer/technician and approved, we recommend a representative number of compaction tests be taken during the placement of the structural fill and backfill placed below foundations, slabs and pavements, beside foundation walls and behind retaining walls. The tests should be performed to determine if the required compaction has been achieved. As a general guideline, we recommend at least one test be taken for every 2,000 square feet of structural fill placed in building and paved areas, at least one test for every 75 to 100 feet in trench fill, and for every 2-foot thickness of fill or backfill placed. The actual number of tests should be left to the discretion of the geotechnical engineer. Samples of proposed fill and backfill materials should be submitted to our laboratory for testing to determine their compliance with our recommendations and project specifications.

SUBSURFACE EXPLORATION PROCEDURES

Test Borings

Fifteen (15) standard penetration test (SPT) borings were drilled on December 29 through December 31, 2008, with a truck rig equipped with hollow-stem auger. Soil sampling was performed in accordance with the procedures described in ASTM:D1586. Using this procedure, a 2-inch O.D. split barrel sampler is driven into the soil by a 140-pound weight falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler an additional 12 inches is known as the penetration resistance, or “N” value. The “N” value is an index of the relative density of cohesionless soils and the consistency of cohesive soils.

The borings were backfilled with on-site materials and some settlement of these materials can be expected to occur. Final closure of the holes is the responsibility of the client or property owner.

The soil samples collected from the boring locations will be retained in our office for a period of one month after the date of this report and will then be discarded unless we are notified otherwise.

Soil Classification

As the samples were obtained in the field, they were visually and manually classified by the crew chief according to ASTM:D2488. Representative portions of all samples were then sealed and returned to the laboratory for further examination and for verification of the field classification. In addition, selected samples were then submitted to a program of laboratory tests. Where laboratory classification tests (sieve analysis and Atterberg limits) have been performed, classifications according to ASTM:D2487 are possible. Logs of the borings indicating the depth and identification of the various strata, the "N" value, the laboratory test data, water level information and pertinent information regarding the method of maintaining and advancing the drill holes are also attached in Appendix A. Charts illustrating the soil classification procedures, the descriptive terminology and the symbols used on the boring logs are also attached in Appendix A.

Water Level Measurements

Measurements for groundwater levels were made at the boring locations both at the time they were completed and just before being backfilled. The groundwater level measurements are shown on the bottom of the boring logs. We installed one (1) 2-inch diameter PVC temporary groundwater monitoring well at boring #13 on December 30, 2008. We measured the groundwater depths at the well on January 7, January 9, and January 12, 2009. The results of the groundwater measurements are shown on the monitoring well log included in Appendix A.

The water levels indicated on the boring logs may not be an accurate indication of the depth or lack of subsurface groundwater. A long period of time is generally required for subsurface water to stabilize in the impervious soils encountered at the boring locations. Long term water level monitoring was not included in our scope of work.

Subsurface groundwater levels should be expected to fluctuate seasonally and yearly from the groundwater readings recorded at the borings. Fluctuations occur due to varying seasonal and yearly rainfall amounts and snowmelt, as well as other factors. It is possible that the subsurface groundwater levels during or after construction could be significantly different than the time the borings were performed.

Laboratory Tests

Laboratory tests were performed on selected samples to aid in determining the index and strength properties of the soils. The index tests consisted of moisture content, dry density and Atterberg limits (liquid limit and plastic limit). The strength tests consisted of unconfined compressive strength. The laboratory tests were performed in accordance with the appropriate ASTM procedures. The results of the laboratory tests are shown on the boring logs opposite the samples upon which the tests were performed.

LIMITATIONS

The recommendations and professional opinions submitted in this report were based upon the data obtained through the sampling and testing program at the boring locations. We wish to point out that because no exploration program can totally reveal the exact subsurface conditions for the entire site, conditions between borings and between samples and at other times may differ from those described in our report. Our exploration program identified subsurface conditions only at those points where samples were retrieved or where water was observed. It is not standard engineering practice to continuously retrieve samples for the full depth of the borings. Therefore, strata boundaries and thicknesses must be inferred to some extent. Additionally, some soils layers present in the ground may not be observed between sampling intervals. If the subsurface conditions encountered at the time of construction differ from those represented by our borings, it is necessary to contact us so that our recommendations can be reviewed. The variations may result in altering our conclusions or recommendations regarding site preparation or construction procedures, thus, potentially affecting construction costs.

This report is for the exclusive use of the addressee and its representatives for the use in design of the proposed project described herein and preparation of construction documents. Without written approval, we assume no responsibility to other parties regarding this report. Our conclusions, opinions and recommendations may not be appropriate for other parties or projects.

STANDARD OF CARE

The recommendations submitted in this report represent our professional opinions. Our services for your project were performed in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering profession currently practicing at this time and area.

This report was prepared by:
GeoTek Engineering & Testing Services, Inc.

Jared Haskins, EIT
Project Manager

Jeff Christensen, PE
Geotechnical Manager

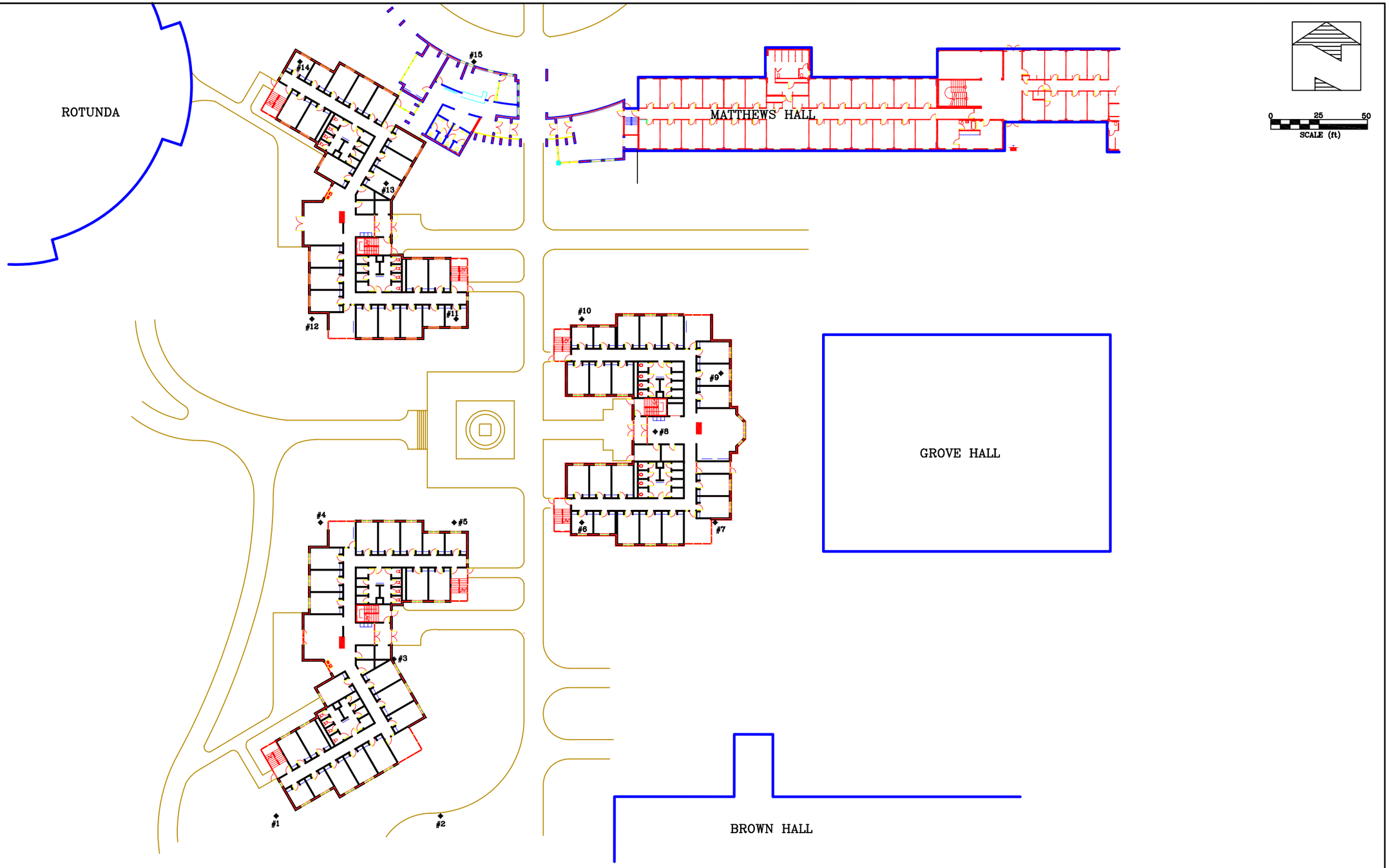

FIGURE 1
PROPOSED RESIDENCE HALL BUILDINGS
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SD

ACAD\GEOTEK\JARED\08-F27

PROJECT#: 08-F27

DRAWN BY: ELM CHECKED BY:

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **1 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1645.2 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LAB WC	LAB D	LAB LL	LAB PL	LAB QU
2	**LEAN CLAY**: black, frozen to moist, (CL)	TOPSOIL			1	HSA					
	LEAN CLAY WITH SAND: a little gravel, brown, moist, firm to very stiff, (CL)	GLACIAL TILL	6		2	SPT	15				
			10		3	SPT					
			17		4	SPT	17	115			8800
			13		5	SPT					
			16		6	SPT					
16			15		7	SPT					
	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-29-08	11:28 am	16	--	14.5	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 12-29-08 COMPLETE 12-29-08 11:27 am

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **2 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1647.2 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY CLAY: a little gravel, black and brown, frozen to moist	FILL			1	HSA					
			8		2	SPT					
			7		3	SPT	10	102			
7	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff to very stiff, (CL)	GLACIAL TILL	16		4	SPT	12				
			14		5	SPT	16	118			11700
			16		6	SPT					
			14		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

START 12-29-08 COMPLETE 12-29-08 3:00 pm

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-29-08	3:01 pm	16	--	14.5	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **3 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1642.3 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: black, frozen to moist, (CL)	TOPSOIL			1	HSA					
2	**SANDY LEAN CLAY**: a trace of gravel, brown, moist, stiff, (CL)	GLACIAL TILL	9		2	SPT					
4½	**CLAYEY SAND**: fine to medium grained, brown, moist, medium dense to dense, (SC)	OUTWASH	9		3	SPT					
			21		4	SPT	16				
9½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff to very stiff, (CL)	GLACIAL TILL	16		5	SPT	20	112			7600
			15		6	SPT					
			16		7	SPT					
			14		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-29-08	1:18 pm	21	--	19.5	none
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--	--	--	--	--	--
--	--	--	--	--	--

START 12-29-08 COMPLETE 12-29-08 1:18 pm

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **4 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1640.7 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: black, frozen to moist, (CL)	TOPSOIL			1	HSA					
2	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff, (CL)	GLACIAL TILL	9		2	SPT	16	115	39	14	10100
			11		3	SPT					
			15		4	SPT					
9½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff to very stiff, (CL)	GLACIAL TILL	13		5	SPT					
			16		6	SPT					
			13		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-29-08	2:06 pm	16	--	14.5	none
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--	--	--	--	--	--
--	--	--	--	--	--

START 12-29-08 COMPLETE 12-29-08 2:06 pm

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **5 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1641.5 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LAB WC	LAB D	LAB LL	LAB PL	LAB QU
	LEAN CLAY: black, frozen to moist, (CL)	TOPSOIL			1	HSA					
2	**SANDY LEAN CLAY**: a trace of gravel, brown, moist, stiff, (CL)	GLACIAL TILL	10		2	SPT	11	108			
4½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL	14		3	SPT	12	118			12500
7	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff, (CL)	GLACIAL TILL	14		4	SPT					
			14		5	SPT					
			15		6	SPT					
			13		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

START 12-29-08 COMPLETE 12-29-08 3:50 pm

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-29-08	3:50 pm	16	--	14.5	none
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METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **6 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1640.7 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LAB WC	LAB D	LAB LL	LAB PL	LAB QU
	FILL, MOSTLY CLAY: black, frozen to moist	FILL			1	HSA					
			9		2	SPT	23				
3½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL									
			11		3	SPT	14	117			
7	**SANDY LEAN CLAY**: brown, moist, very stiff, (CL)	GLACIAL TILL									
			17		4	SPT	16				
9½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff to very stiff, (CL)	GLACIAL TILL									
			14		5	SPT					
			16		6	SPT					
			14		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

START 12-30-08 COMPLETE 12-30-08 1:55 pm

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-30-08	1:55 pm	16	--	14.5	none
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--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **7 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1640.1 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LAB WC	LAB D	LAB LL	LAB PL	LAB QU
	FILL, MOSTLY CLAY: a trace of gravel, black, frozen to moist	FILL			1	HSA					
			6		2	SPT					
3½	**SANDY LEAN CLAY**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL									
			11		3	SPT	14	116			
7	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, very stiff, (CL)	GLACIAL TILL	15		4	SPT	16	113			8700
9½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, very stiff, (CL)	GLACIAL TILL	16		5	SPT					
			17		6	SPT					
			16		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

START 12-30-08 COMPLETE 12-30-08 2:57 pm

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-30-08	2:57 pm	16	--	14.5	none
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METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **8 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1640.4 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY CLAY: a little wood, black, frozen to moist	FILL			1	HSA					
			2		2	SPT					
3½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff, (CL)	GLACIAL TILL	13		3	SPT					
			15		4	SPT	15	118	39	14	
			14		5	SPT	16				
12	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, very stiff to stiff, (CL)	GLACIAL TILL	16		6	SPT					
			14		7	SPT					
19½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, very stiff, (CL)	GLACIAL TILL	27		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

START 12-30-08 COMPLETE 12-30-08 11:17 am

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-30-08	11:17 am	21	--	19.5	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **9 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1639.8 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY CLAY: a trace of gravel, black, frozen to moist	FILL			1	HSA					
			6		2	SPT	17				
4½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff to very stiff, (CL)	GLACIAL TILL	15		3	SPT	14				
			14		4	SPT					
			13		5	SPT					
			16		6	SPT					
14½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL	14		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

START 12-30-08 COMPLETE 12-30-08 1:17 pm

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-30-08	1:17 pm	16	--	14.5	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **10 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1639.8 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY CLAY: a little wood, black, frozen to moist	FILL			1	HSA					
			8		2	SPT	19				
3½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL									
			15		3	SPT	13	120			12500
			15		4	SPT					
			12		5	SPT					
12	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff, (CL)	GLACIAL TILL									
			14		6	SPT					
			14		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

START 12-30-08 COMPLETE 12-30-08 10:26 am

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-30-08	10:26 am	16	--	14.5	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **11 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1641.6 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY CLAY: black, frozen to moist	FILL			1	HSA					
			6		2	SPT					
3½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL									
			14		3	SPT	14				
			15		4	SPT	16	117			8800
			13		5	SPT					
			15		6	SPT					
			15		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

START 12-30-08 COMPLETE 12-30-08 9:48 am

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-30-08	9:48 am	16	--	14.5	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **12 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1640.2 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LAB WC	LAB D	LAB LL	LAB PL	LAB QU
	FILL, MOSTLY CLAY: a little gravel, black, frozen to moist	FILL			1	HSA					
			12		2	SPT					
4½	**LEAN CLAY**: a trace of gravel, brown, moist, stiff, (CL)	GLACIAL TILL	14		3	SPT	9				
7	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, very stiff, (CL)	GLACIAL TILL	18		4	SPT	12				
9½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL	12		5	SPT					
			15		6	SPT					
			15		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

START 12-30-08 COMPLETE 12-30-08 9:09 am

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-30-08	9:10 am	16	--	14.5	none
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--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **13 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1639.4 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY CLAY: black, frozen to moist	FILL			1	HSA					
			7		2	SPT					
3½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL									
			15		3	SPT					
7	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, very stiff to stiff, (CL)	GLACIAL TILL									
			19		4	SPT	14				
			14	▼	5	SPT	18	111			7200
			14		6	SPT					
			14		7	SPT					
19½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, very stiff, (CL)	GLACIAL TILL									
			18		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

START 12-31-08 COMPLETE 12-31-08 9:51 am

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-31-08	9:52 am	21	--	20	18.50
1-7-09	11:27 am	21	--	--	10.76
1-9-09	9:36 am	21	--	--	10.75
1-12-09	8:30 am	21	--	--	▼ 10.74

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **14 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1642.2 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY CLAY: a trace of gravel, black and brown, frozen to moist	FILL			1	HSA					
			11		2	SPT	15	117			
			11		3	SPT	11	113			
6	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, very stiff to stiff, (CL)	GLACIAL TILL	17		4	SPT	15	117			15200
			14		5	SPT					
			13		6	SPT					
			11		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

START 12-31-08 COMPLETE 12-31-08 10:39 am

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-31-08	10:39 am	16	--	14.5	none
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--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **08-F27** BORING NO. **15 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1638.8 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY CLAY: a trace of gravel, black, frozen to moist	FILL			1	HSA					
			8		2	SPT					
3½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL									
			9		3	SPT					
7	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff, (CL)	GLACIAL TILL									
			12		4	SPT	16	114			7100
			14		5	SPT					
			12		6	SPT					
			15		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
12-30-08	4:25 pm	16	--	14.5	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 12-30-08 COMPLETE 12-30-08 4:25 pm

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Gordy Hawkey

GEOTECHNICAL TEST BORING 08-F27.GPJ GEOTEKENG.GDT 1/12/09

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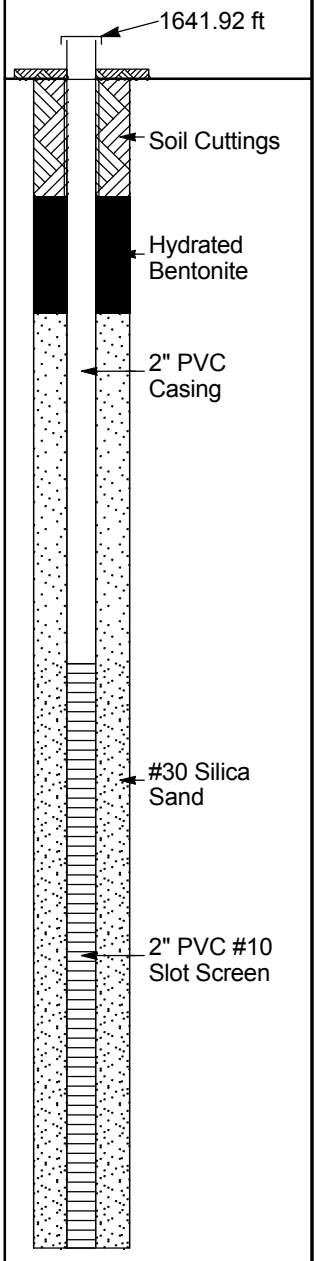
ENVIRONMENTAL SOIL BORING LOG / WELL CONSTRUCTION INFORMATION

GEOTEK # **08-F27** BORING / WELL NO. **13 (1 of 1)**

PROJECT **Proposed Residence Hall Buildings, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1639.4 ft)	GEOLOGIC ORIGIN	PID / FID	WL	SAMPLE NO.	SAMPLE TYPE
	FILL, MOSTLY CLAY: black, frozen to moist	FILL			1	HSA
					2	SPT
3½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL				
					3	SPT
7	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, very stiff to stiff, (CL)	GLACIAL TILL				
				▼	4	SPT
					5	SPT
					6	SPT
					7	SPT
19½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, very stiff, (CL)	GLACIAL TILL			8	SPT
21	Bottom of borehole at 21 feet.					

Well Construction Details



WATER LEVEL MEASUREMENTS

START 12-31-08 COMPLETE 12-31-08 9:51 am

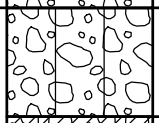
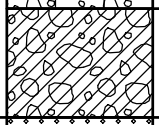
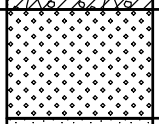
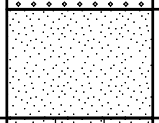
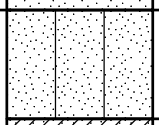
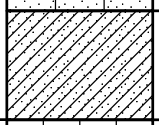
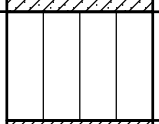
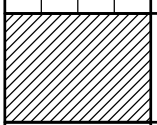
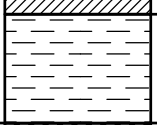
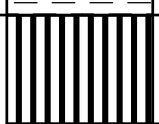
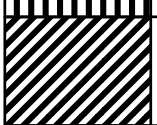
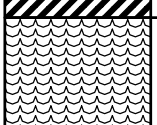
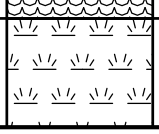
METHOD 3.25" ID Hollow Stem Auger

DATE	TIME	DEPTH BELOW SURFACE	DEPTH BELOW TOR / TOC	WATER ELEVATION
12-31-08	9:52 am	16.0	18.50	1623.42
1-7-09	11:27 am	10.7	13.24	1628.68
1-9-09	9:36 am	10.8	13.26	1628.66
1-12-09	8:30 am	10.8	13.25	▼ 1628.67

CREW CHIEF Gordy Hawkey

ENVIRONMENTAL WELL LOG 08-F27.GPJ GEOTEKENG.GDT 1/12/09

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

BORING LOG SYMBOLS AND DESCRIPTIVE TERMINOLOGY

SYMBOLS FOR DRILLING AND SAMPLING

Symbol	Definition
Bag	Bag sample
CS	Continuous split-spoon sampling
DM	Drilling mud
FA	Flight auger; number indicates outside diameter in inches
HA	Hand auger; number indicates outside diameter in inches
HSA	Hollow stem auger; number indicates inside diameter in inches
LS	Liner sample; number indicates outside diameter of liner sample
N	Standard penetration resistance (N-value) in blows per foot
NMR	No water level measurement recorded, primarily due to presence of drilling fluid
NSR	No sample retrieved; classification is based on action of drilling equipment and/or material noted in drilling fluid or on sampling bit
SH	Shelby tube sample; 3-inch outside diameter
SPT	Standard penetration test (N-value) using standard split-spoon sampler
SS	Split-spoon sample; 2-inch outside diameter unless otherwise noted
WL	Water level directly measured in boring
▼	Water level symbol

SYMBOLS FOR LABORATORY TESTS

Symbol	Definition
WC	Water content, percent of dry weight; ASTM:D2216
D	Dry density, pounds per cubic foot
LL	Liquid limit; ASTM:D4318
PL	Plastic limit; ASTM:D4318
QU	Unconfined compressive strength, pounds per square foot; ASTM:D2166

DENSITY/CONSISTENCY TERMINOLOGY

Density		Consistency
Term	N-Value	Term
Very Loose	0-4	Soft
Loose	5-8	Firm
Medium Dense	9-15	Stiff
Dense	16-30	Very Stiff
Very Dense	Over 30	Hard

PARTICLE SIZES

Term	Particle Size
Boulder	Over 12”
Cobble	3” – 12”
Gravel	#4 – 3”
Coarse Sand	#10 – #4
Medium Sand	#40 – #10
Fine Sand	#200 – #40
Silt and Clay	passes #200 sieve

DESCRIPTIVE TERMINOLOGY

Term	Definition
Dry	Absence of moisture, powdery
Frozen	Frozen soil
Moist	Damp, below saturation
Waterbearing	Pervious soil below water
Wet	Saturated, above liquid limit
Lamination	Up to ½” thick stratum
Layer	½” to 6” thick stratum
Lens	½” to 6” discontinuous stratum

GRAVEL PERCENTAGES

Term	Range
A trace of gravel	2-4%
A little gravel	5-15%
With gravel	16-50%

Raven Precision Ag Center Geotechnical Report

Date: August 7, 2018

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
Phone 605-335-5512 Fax 605-335-0773

August 7, 2018

Office of the State Engineer
Joe Foss Building
523 E. Capitol Avenue
Pierre, South Dakota 57501

Attn: Brandon Carda, EIT

Subj: Geotechnical Exploration
Proposed Precision Ag Classroom & Laboratory Building
South Dakota State University
Brookings, South Dakota
OSE #R0316--02X
GeoTek #18-977

This correspondence presents our written report of the geotechnical exploration program for the referenced project. We performed our work in accordance with our contractual agreement with the Office of the State Engineer. Additional copies of our report are also being sent as noted below.

We thank you for the opportunity of providing our services on this project and look forward to continued participation during the design and construction phases. If you have any questions regarding this report, please contact our office at (605) 335-5512.

Respectfully Submitted,
GeoTek Engineering & Testing Services, Inc.

Jared Haskins

Jared Haskins, PE
Geotechnical Manager

Cc: SDSU – Facilities & Services, Attn: Zack Rykhus, PE
EAPC Architects Engineers, Attn: Shawn Crowley, AIA

TABLE OF CONTENTS

GEOTECHNICAL EXPLORATION
PROPOSED PRECISION AG CLASSROOM & LABORATORY BUILDING
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA
OSE #R0316--02X
GEOTEK #18-977

INTRODUCTION

Project Information

This report presents the results of the recent geotechnical exploration program for the proposed Precision Ag Classroom & Laboratory Building on the campus of South Dakota State University in Brookings, South Dakota.

Scope of Services

We performed our work in accordance with our contractual agreement with the Office of the State Engineer. The scope of work as presented in this report is limited to the following:

1. To perform twelve (12) standard penetration test (SPT) borings to gather data on the subsurface conditions at the site.

2. To perform laboratory tests that include moisture content, dry density, Atterberg limits (liquid and plastic limits), sieve analysis (#200 sieve wash) and unconfined compressive strength.

3. To prepare an engineering report that includes the results of the field and laboratory tests as well as our earthwork and foundation recommendations for design and construction.

The scope of our work was intended for geotechnical purposes only. This scope of work did not include determining the presence or extent of environmental contamination at the site or to characterize the site relative to wetlands status.

SITE & SUBSURFACE CONDITIONS

Site Location & Description

The site is located southeast of the intersection of Medary Avenue and North Campus Drive on the campus of South Dakota State University in Brookings, South Dakota. The Edgar S. McFadden Biostress Lab is located east of the site. The current site features include the following: the Seedhouse, a small building located east of the Seedhouse, pavement areas, sidewalks, vegetated areas and trees. Several greenhouses were previously removed from the site. The Seedhouse and small building will eventually be removed from the site. The topography of the site generally slopes downward from the south edge of the site to the north edge of the site.

Ground Surface Elevations

The ground surface elevations at the test boring locations were determined by using the top of the fire hydrant located along the north side of North Campus Drive (just north of the site) as a benchmark. An elevation of 1,631.9 feet was used for the benchmark. Based on the benchmark datum, the ground surface elevations at the test boring locations varied from 1,630.4 feet at test boring 3 to 1,637.7 feet at test boring 12.

Test Boring Locations

A site map is attached showing the relative location of the test borings. We would like to point out that test boring 7 was performed approximately 15 feet north of the location shown on the site map.

Subsurface Conditions

Twelve (12) test borings were performed at the site on July 31 and August 1, 2018. Of the twelve (12) test borings, nine (9) test borings (test borings 1 through 9) were performed for the building and three (3) test borings (test borings 10 through 12) were performed in the new pavement areas. The subsurface conditions encountered at the test boring locations are illustrated by means of the boring logs included in Appendix A.

The subsurface profile at the test boring locations consisted of the following layers: existing fill materials, topsoil materials, fine alluvium soils, mixed alluvium soils and glacial till soils. The existing fill materials extended to depths varying from 2 feet to 8 feet. The topsoil materials were only encountered at test borings 2 and 3. The fine alluvium soils were only encountered at test boring 8. The mixed alluvium soils were only encountered at test borings 3, 5, 6 and 11. The glacial till soils extended to the termination depth of the test borings.

The existing fill materials consisted of lean clay soils, lean clay with sand soils and sandy lean clay soils. The upper portions of the existing fill materials at test borings 10 and 11 were black in color and slightly organic. The fine alluvium soils consisted of lean clay soils. The mixed alluvium soils consisted of sandy lean clay soils. The glacial till soils consisted of lean clay with sand soils.

The consistency or relative density of the soils is indicated by the standard penetration resistance ("N") values as shown on the boring log. A description of the soil consistency or relative density based on the "N" values can be found on the attached Soil Boring Symbols and Descriptive Terminology data sheet.

We wish to point out that the subsurface conditions at other times and locations at the site may differ from those found at our test boring locations. If different conditions are encountered during construction, then it is important that you contact us so that our recommendations can be reviewed.

Water Levels

Measurements to record the groundwater levels were made at the test boring locations. The time and level of the groundwater readings are recorded on the boring logs. Also, a summary of the groundwater levels is shown in Table 1.

The water levels may or may not be an accurate indication of the depth or lack of subsurface groundwater. The limited length of observation restricts the accuracy of the measurements. Long term groundwater monitoring was not included in our scope of work.

Table 1. Groundwater Levels

Test Boring	Ground Surface Elevation, ft	Groundwater Level, ft	Elevation of Groundwater, ft
1	1,632.0	9	1,623.0
2	1,631.6	---	---
3	1,630.4	---	---
4	1,633.6	6	1,627.6
5	1,632.6	---	---
6	1,632.2	---	---
7	1,634.6	7	1,627.6
8	1,634.2	---	---
9	1,633.4	---	---
10	1,636.0	---	---
11	1,635.9	---	---
12	1,637.7	---	---

Notes – The groundwater measurements at test borings 1, 4 and 7 were taken at the time the test borings were completed and one (1) day after the test borings were completed. The groundwater measurements at the other test borings were taken at the time the test borings were completed.

ENGINEERING REVIEW & RECOMMENDATIONS

Project Design Data

We understand that the project will consist of constructing the Precision Ag Classroom & Laboratory Building on the campus of South Dakota State University in Brookings, South Dakota. The building will be a two-story structure with an approximate footprint area of 70,000 square feet. The building may have a lower level. The top-of-slab elevation of the main floor will be at 1,635.0 feet. If the building has a lower level, then we assume that the top-of-slab elevation of the lower level will be near 1,623.0 feet. The building will have two (2) elevators. We anticipate that foundation support for the building will be provided by perimeter footings resting below frost depth and interior footings resting at or slightly below the floor slab. Maximum wall loads will be on the order of 15 kips per lineal foot (klf) and maximum column loads will be on the order of 350 kips. The project will also consist of constructing new pavement areas. The new pavement areas will mostly be used for parking. Grade changes for new pavement areas will

likely be minimal. A utility tunnel will also be constructed south of the building. The utility tunnel will have a height of 7 feet.

The information/assumptions detailed in the project design data section are important factors in our review and recommendations. If there are any corrections or additions to the information detailed in this section, then it is important that you contact us so that we can review our recommendations with regards to the revised plans.

Building

Discussion

It is our opinion that a spread footing foundation system can be used for support of the proposed building after the recommended site preparation has been performed. In our opinion, the footings for the building should be supported by the glacial till soils. Regarding the floor slabs, it is our opinion that the fine alluvium soils, mixed alluvium soils and glacial till soils are consider suitable for support of the floor slabs.

If the building has a lower level, then a dewatering system will likely be needed during construction. Also, a dewatering system will likely be needed for the construction of the utility tunnel.

Site Preparation – Footings – Slab-on-Grade Portions of the Building

The site preparation for the footings for the slab-on-grade portions of the building should consist of removing the existing fill materials, topsoil materials, fine alluvium soils and mixed alluvium soils in order to expose the glacial till soils. Any debris from previous structures and any pavement should also be removed. If the excavation required to expose the glacial till soils extends below the bottom-of-footing elevation, then we recommend placing and compacting granular structural fill up to the bottom-of-footing elevation. Please refer to Table 2 for a summary of the anticipated minimum excavation depths to remove the unsuitable soils encountered at the test borings performed for the building.

Table 2. Estimated Excavation Depths – Footings – Slab-on-Grade Portions of the Building

Test Boring Number	Ground Surface Elevation, ft	Anticipated Excavation Depth, ft	Approximate Excavation Elevation, ft
1	1,632.0	2 ½	1,629.5
2	1,631.6	4 ½	1,627.1
3	1,630.4	6	1,624.4
4	1,633.6	2 ½	1,631.1
5	1,632.6	5	1,627.6
6	1,632.2	7	1,625.2
7	1,634.6	2	1,632.6
8	1,634.2	7	1,627.2
9	1,633.4	4 ½	1,628.9

Site Preparation – Footings – Lower Level Portions of the Building

The initial site preparation for the footings for the lower level portions of the building should consist of removing the existing fill materials, topsoil materials, fine alluvium soils and mixed alluvium soils in order to expose the glacial till soils. Any debris from previous structures and any pavement should also be removed. Following the removals, we recommend that an overexcavation be performed to a minimum depth of 12 inches below the bottom-of-footing elevation. The overexcavated areas should be backfilled with a minimum of 12 inches of drainage rock. If the level of the drainage rock is below the bottom-of-footing elevation, then the remainder of the excavation could be backfilled with drainage rock or granular structural fill. The thickness of the granular material (drainage rock or granular structural fill) will exceed 12 inches in areas where the existing fill materials, topsoil materials, fine alluvium soils and mixed alluvium soils extend more than 12 inches below the bottom-of-footing elevation.

Site Preparation – Slab-on-Grade Floor Slab

The site preparation for the slab-on-grade floor slab should consist of removing the existing fill materials and topsoil materials in order to expose the fine alluvium soils, mixed alluvium soils or glacial till soils, or excavating to a minimum depth of 6 inches below the bottom-of-floor elevation, whichever is greater. Any debris from previous structures and any pavement should also be removed. Following the removals, we recommend placing and compacting granular

structural fill up to the bottom-of-floor elevation. The final 6 inches of granular structural fill beneath the floor slab should consist of select granular fill. The thickness of the granular structural fill will likely exceed 6 inches in areas where the fine alluvium soils, mixed alluvium soils or glacial till soils are exposed more than 6 inches below the bottom-of-floor elevation.

Site Preparation – Lower Level Floor Slab

The site preparation for the lower level floor slab should consist of removing the existing fill materials and topsoil materials in order to expose the fine alluvium soils, mixed alluvium soils or glacial till soils, or excavating to a minimum depth of 12 inches below the bottom-of-floor elevation, whichever is greater. Any debris from previous structures and any pavement should also be removed. We recommend backfilling the overexcavated area with drainage rock.

Site Preparation – Elevator Pit Foundations

The site preparation for the elevator pit foundations should be similar to that discussed in the section entitled *Site Preparation – Footings – Lower Level Portions of the Building*.

Site Preparation – Utility Tunnel

The site preparation for the utility tunnel should be similar to that discussed in the section entitled *Site Preparation – Footings – Lower Level Portions of the Building.*

Excavation – Building & Utility Tunnel

All excavations within the footprint of the building and utility tunnel should be performed with a track backhoe with a smooth edge bucket. The soils are susceptible to disturbance and can experience strength loss caused by construction traffic and/or additional moisture.

Groundwater or Saturated Soils

If groundwater or saturated soils are encountered at the bottom of an excavation, then we recommend placing a layer of drainage rock at the bottom of the excavation prior to the placement of the granular structural fill, select granular fill or footings. Based on the

groundwater levels, drainage rock may be needed in some footing excavations. Also, drainage rock is recommended below the lower level footings, elevator pit foundations and utility tunnel.

Laterally Oversized Footing Excavations

Where granular structural fill or drainage rock is needed below the footings, the bottom of the excavation should be laterally oversized 1 foot beyond the edges of the footings for each vertical foot of granular structural fill or drainage rock required below the footings (1 horizontal : 1 vertical).

Foundation Loads & Settlement

If our recommendations are followed during site preparations, then it is our opinion that the footings of the building can be sized for a net allowable soil bearing pressure of up to 4,000 pounds per square foot (psf). With the expected loads, net allowable soil bearing pressure and our site preparation recommendations, total settlement of the footings should be on the order of 1 inch and differential settlement should be on the order of ½ inch over 50 feet. The foundation for the utility tunnel could also be sized for a net allowable soil bearing pressure of up to 4,000 psf. Unknown soil conditions at the site that are different from those depicted at the test boring locations could increase the amount of expected settlement.

Floor Slabs & Soil Modulus of Subgrade Reactions

If our recommendations are followed during site preparations, then it is our opinion that the slab-on-grade floor slab can be designed using a soil modulus of subgrade reaction (k value) of 75 psi/inch. Also, if our recommendations are followed during site preparations, then it is our opinion that the lower level floor slab can be designed using a k value of 150 psi/inch. If needed, a k value of 150 psi/inch could be used for the design of the elevator pit foundation and utility tunnel floor slab.

Dewatering

Some dewatering will likely be needed during construction, especially within the excavations for the lower level and utility tunnel. It will likely be possible to remove and control water entering

the excavations using normal sump pumping techniques due to the low permeable characteristics of the predominant clayey soils encountered at the test boring locations. More extensive dewatering techniques will be needed if waterbearing sand soils are encountered.

Drainage System for the Lower Level & Elevator Pit

If the building has a lower level, then long-term groundwater control should be expected. We recommend placing drainage pipes beneath the lower level floor slab and elevator pit. The drainage pipes should have a maximum spacing of 25 feet between pipes and should also be placed along the exterior of the lower level floor slab and elevator pit. We recommend placing the drainage pipes approximately 12 inches below the lower level floor slab and the elevator pit. The drainage pipes should be surrounded by a properly graded filter that is wrapped in a geotextile filter fabric to minimize clogging. The drainage pipes should be connected to a suitable means of discharge. We also recommend sump pumps be installed.

Water Control – Utility Tunnel

We assume that water stops and water barriers will be incorporated into the design of the utility tunnel. If water stops and water barriers are not incorporated into the design, then a drainage system should be provided. The drainage system should be connected to a suitable means of discharge. The utility tunnel should also be designed to resist buoyancy forces.

Retaining Walls

We recommend backfilling any retaining walls with free-draining sand. The active lateral earth pressures may be employed only if movement of the walls can be tolerated to reach the active state. A horizontal movement of approximately 1/500 of the height of the wall would be required to develop the active state for granular soils. If the above movement cannot be tolerated, then we recommend using the at-rest lateral earth pressures to design the walls. The zone of the sand backfill should extend a minimum of 2 feet outside the bottom of the foundation and then extend upward and outward at a slope no steeper than 1:1 (horizontal to vertical). Also, we recommend capping the sand backfill section with 1 foot to 2 feet of clayey soil in areas that will not have

asphalt or concrete surfacing to minimize infiltration of surface waters. Table 3 shows the equivalent fluid unit weight values for the various soil types anticipated for this project.

Table 3. Equivalent Fluid Unit Weight Values

Soil Type	At-Rest, pcf		Active, pcf		Passive, pcf	
	Drained	Submerged	Drained	Submerged	Drained	Submerged
Clay	-	-	-	-	220*	115*
Free-Draining Sand (SP)	50	90	35	80	460*	230*

*Value below frost depth – 0 pcf above frost depth.

The passive resistance in front of a retaining wall should not be used in an analysis unless the wall extends well below the depth of frost penetration due to loss of strength upon thawing. In addition, development of passive lateral earth pressure in the soil in front of a wall requires a relatively large rotation or outward displacement of the wall. Therefore, we do not recommend using passive resistance in front of the wall for the analysis.

During backfill operations, bracing and/or shoring of the walls may be needed. Only hand-operated compaction equipment should be used directly adjacent to the walls.

Coefficient of Friction

It is our opinion that a friction factor of 0.35 can be used between the clay soils and the bottom of the concrete. A friction factor of 0.45 can be used between the granular structural fill or drainage rock and the bottom of the concrete. The friction values are considered ultimate values. We recommend applying a theoretical safety factor of at least 2.0.

Seismic Site Classification

Based on the 2012 International Building Code (IBC), it is our opinion that the site, as a whole, corresponds to a Site Class D (stiff soil). Also, the ground acceleration values are as follows: S_S = 0.084 g, S_1 = 0.028 g, S_{MS} = 0.135 g, S_{M1} = 0.068 g, S_{DS} = 0.090 g, S_{D1} = 0.045 g. Therefore, the seismic design category is “A”. The ground acceleration values are also based on the 2012 IBC with Risk Category I/II/III. If needed, we can provide ground acceleration values for a different design code. Regarding liquefaction, it is our opinion that the potential is very low.

Pavement Areas

Discussion

In general, fair to favorable subgrade conditions were encountered at test boring 12, while poor subgrade conditions were encountered at test borings 10 and 11 (test borings where the upper portions of the existing fill materials were black in color and slightly organic). With that said, normal subgrade preparation could be expected at and around test boring 12. Conversely, additional removals will likely be needed at and around test borings 10 and 11.

Subgrade Preparation

We recommend that the subgrade preparation in the new pavement areas consist of removing any vegetation, highly organic materials and existing pavement. At and around test borings 10 and 11, we recommend removing the existing pavement section (if applicable) and the upper 2 feet of the subgrade soils (soils that are black in color and slightly organic). At and around test boring 12, we recommend removing the existing pavement section. Following the removals, the subgrade should be prepared by cutting or placing subgrade fill to the design elevations. Once the design elevations have been achieved, we recommend that the exposed subgrade be scarified (with a disc harrow) to a minimum depth of 8 inches and adjusted to a moisture level that is 1 percent to 4 percent below the optimum moisture content as determined by standard Proctor (ASTM:D698). The moisture-conditioned soils should then be compacted.

Prior to the placement of the aggregate base course, we recommend that a proof roll be performed on the exposed subgrade with a truck weighing 20 tons to 30 tons. During the proof roll, unstable areas in the subgrade should be delineated from stable areas. An unstable area would be considered a location with at least 1 inch of rutting or deflection. Unstable areas will need additional corrections to provide a uniform and stable subgrade condition. Additional corrections may include the following: moisture conditioning the soils (e.g. drying the soils by scarification), mixing cement with the subgrade soils, an overexcavation to remove and replace the unstable subgrade soils, the placement of a woven geotextile fabric at the subgrade surface, and/or the placement of granular subbase at the subgrade surface. The type of correction performed should be determined after observing the performance of the subgrade during the

proof roll test. We expect that stable conditions will be encountered during drier periods of the year, while some unstable conditions could be encountered during wetter periods of the year.

Pavement Section Thicknesses

Table 4 shows the recommended pavement section thicknesses based on the subsurface conditions and anticipated traffic loads. We expect that the vehicle traffic will likely vary from automobiles to large trucks.

Table 4. Recommended Pavement Section Thicknesses

Pavement Description	Pavement Surfacing, in	Aggregate Base Course, in
Car Only Areas		
Asphalt:	4	6
PC Concrete:	5	6
Heavy Duty Areas		
Asphalt:	5	9
PC Concrete:	7	6

Notes: The pavement sections are based on the assumption that a stable subgrade condition is achieved during construction. A geotextile fabric could be installed beneath the aggregate base course material to extend the life of the pavement.

The asphalt pavement should meet the requirements of sections 320 and 321 for Class G. We recommend the concrete pavement meet the requirements of Section 380 of the SDDOT Standard Specifications.

It should be noted that routine maintenance such as crack filling, localized patching, and seal coating should be expected with all pavements in our recommendations. The design sections could be reduced if the owner is willing to assume additional maintenance costs or potentially shorter pavement life.

Excavation – Pavement Areas

If soils with high moisture content levels are encountered, then low-ground pressure construction equipment should be used.

Frost Protection

Footings

We recommend that all footings be placed at a sufficient depth for frost protection. The perimeter footings for heated buildings should be placed such that the bottom of the footing is a minimum of 4 feet below the finished exterior grade. Interior footings in heated buildings can be placed beneath the floor slab. Footings for unheated structures should be placed such that the bottom of the footing is a minimum of 5 feet below the finished exterior grade.

Surface Improvements

It is our opinion that the on-site clay soils have a moderate frost susceptibility. Surface improvements, such as pavements and sidewalks, constructed on these clay soils are potentially subject to both cosmetic and structural damage caused by frost heaving. We anticipate the heave for the on-site clay soils to potentially be on the order of 0.1 inch to 0.2 inch for each foot of frost penetration within the soil, which would translate to ½ inch to 1 inch of total movement. The heave could be even greater if free water is available, resulting in a buildup of ice lenses. The surface improvements should be designed to accommodate the potential frost movements, or non-frost susceptible drainage fill should be placed beneath the surface improvements. If movement cannot be tolerated, then we recommend placing non-frost susceptible drainage fill beneath the surface improvements. The non-frost susceptible drainage fill should extend to a depth of 5 feet below the finished exterior grade. If it is desired to reduce (but not eliminate) the amount of potential frost heave, we recommend consideration be given to placing 1 foot to 2 feet of non-frost susceptible drainage fill beneath the surface improvements.

Material Types & Compaction Levels

Granular Structural Fill – The granular structural fill should consist of a pit-run or processed sand or gravel having a maximum particle size of 3 inches with less than 10 percent by weight passing the #200 sieve. The granular structural fill should be placed in lifts of up to 1 foot in thickness.

Select Granular Fill – The select granular fill should consist of a medium to coarse grained, free-draining sand or rock having a maximum particle size of 1 inch with less than 5 percent by weight passing the #200 sieve. The select granular fill should be placed in lifts of up to 1 foot in thickness.

Drainage Rock – The drainage rock should be crushed, washed and meet the gradation specifications shown in Table 5.

Table 5. Drainage Rock Gradation Specifications

Sieve Size	Percent Passing
1 ½-inch	100
1-inch	70 – 90
¾-inch	25 – 50
3/8-inch	0 – 5

Free-Draining Sand – The free-draining sand should have a maximum particle size of 1 inch with less than 5 percent by weight passing the #200 sieve. The free-draining sand should be placed in lifts of up to 1 foot in thickness.

Non-Frost Susceptible Drainage Fill – The non-frost susceptible drainage fill should have a maximum particle size of 1 inch, less than 40 percent by weight passing the #40 sieve and less than 5 percent by weight passing the #200 sieve. The non-frost susceptible drainage fill should be placed in lifts of up to 1 foot in thickness.

Subgrade Fill – The subgrade fill should consist of either a granular or clay material. Debris, organic material, or over-sized material should not be used as subgrade fill. If a granular material is used, then it should consist of a pit-run or processed sand or gravel having a maximum particle size of 3 inches. The granular material can be placed in lifts of up to 1 foot in thickness. If a clay material is selected, then it should consist of a non-organic clay having a liquid limit less than 45. Scrutiny on the clay material's moisture content should be made prior to the acceptance and use. The clay fill should be placed in lifts of up to 6 inches in thickness. The majority of the on-site soils can be used as subgrade fill. Organic materials should not be used as subgrade fill.

Aggregate Base Course Material – We recommend that the aggregate base course materials meet the requirements of Sections 260 and 882 of the SDDOT Standard Specifications.

Granular Subbase – The granular subbase should consist of crushed quartzite, recycled concrete or a crushed pit-run material meeting the gradation specifications shown in Table 6.

Table 6. Granular Subbase Gradation Specifications

Sieve Size	Percent Passing
4-inch	100
1-inch	40 – 80
#4	10 – 50
#40	5 – 20
#200	0 – 8

Exterior Foundation Wall Backfill for Slab-on-Grade Structures – The exterior foundation wall backfill for slab-on-grade structures should consist of a similar material as described for the subgrade fill. If granular soils are used in areas that will not have asphalt or concrete surfacing, then we recommend capping the granular soils with at least 1 foot to 2 feet of clay soils to minimize infiltration of surface water. The exterior backfill should be placed in lifts of up to 1 foot in thickness.

Recommended Compaction Levels – The recommended compaction levels listed in Table 7 are based on a material's maximum dry density value, as determined by a standard Proctor (ASTM: D698) test.

Table 7. Recommended Compaction Levels

Placement Location	Compaction Specifications
Below Footings/Foundations	98%
Below Floor Slabs	95%
Exterior Foundation Wall Backfill for Slab-on-Grade Structures	95%
Behind Retaining Walls	95% - 98%
Subgrade in Pavement Areas	95%

Table 7 (Continued). Recommended Compaction Levels

Placement Location	Compaction Specifications
Base Course in Pavement Areas	97%
Granular Subbase in Pavement Areas	97%
Non-Structural Areas	90%

Notes: Compaction specifications are not applicable with the drainage rock. Compaction testing may not be practical for the granular subbase due to the large aggregate.

Recommended Moisture Levels – The moisture content of the clay backfill materials, when used as backfill around the exterior of a foundation should be maintained within a range of plus 1 percent to minus 4 percent of the materials' optimum moisture content. When the clay backfill materials are used below a vehicle area, or as site grading, the materials' moisture content should be maintained within a range of minus 1 percent to minus 4 percent of the materials' optimum moisture content. The optimum moisture content should be determined using a standard Proctor (ASTM: D698) test.

The moisture content of the granular backfill materials should be maintained at a level that will be conducive for vibratory compaction.

Drainage

Proper drainage should be maintained during and after construction. The general site grading should direct surface run-off waters away from the excavation. Water which accumulates in the excavation should be removed in a timely manner.

Finished grades around the perimeter of the structure should be sloped such that positive drainage away from the structure is provided. Also, a system to collect and channel roof run-off waters away from the structure is suggested.

CONSTRUCTION CONSIDERATIONS

Groundwater & Surface Water

Water may enter the excavations due to subsurface water, precipitation or surface run off. Any water that accumulates in the bottom of the excavations should be immediately removed and surface drainage away from the excavations should be provided during construction.

Disturbance of Soils

The soils encountered at the test boring locations are susceptible to disturbance and can experience strength loss caused by construction traffic and/or additional moisture. Precautions will be required during earthwork activities in order to reduce the risk of soil disturbance.

Cold Weather Precautions

If site preparation and construction is anticipated during cold weather, we recommend all foundations, slabs and other improvements that may be affected by frost movements be insulated from frost penetration during freezing temperatures. If filling is performed during freezing temperatures, all frozen soils, snow and ice should be removed from the areas to be filled prior to placing the new fill. The new fill should not be allowed to freeze during transit, placement and compaction. Concrete should not be placed on frozen subgrades. Frost should not be allowed to penetrate below the footings. If floor slab subgrades freeze, we recommend the frozen soils be removed and replaced, or completely thawed, prior to placement of the floor slab. The subgrade soils will likely require reworking and recompacting due to the loss of density caused by the freeze/thaw process.

Excavation Sideslopes

The excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, “Excavations and Trenches”. This document states that the excavation safety is the responsibility of the contractor. Reference to this OSHA requirement should be included in the project specifications.

Observations & Testing

This report was prepared using a limited amount of information for the project and a number of assumptions were necessary to help us develop our conclusions and recommendations. It is recommended that our firm be retained to review the geotechnical aspects of the final design plans and specifications to check that our recommendations have been properly incorporated into the design documents.

The recommendations submitted in this report have been made based on the subsurface conditions encountered at the test boring locations. It is possible that there are subsurface conditions at the site that are different from those represented by the test borings. As a result, on-site observation during construction is considered integral to the successful implementation of the recommendations. We believe that qualified field personnel need to be on-site at the following times to observe the site conditions and effectiveness of the construction.

Excavation

We recommend that a geotechnical engineer or geotechnical engineering technician working under the direct supervision of a geotechnical engineer observe all excavations for foundations, slabs and pavements. These observations are recommended to determine if the exposed soils are similar to those encountered at the test boring locations, if unsuitable soils have been adequately removed and if the exposed soils are suitable for support of the proposed construction. These observations should be performed prior to placement of fill or foundations.

Testing

After the subgrade is observed by a geotechnical engineer/technician and approved, we recommend a representative number of compaction tests be taken during the placement of the structural fill and backfill placed below foundations, slabs and pavements, beside foundation walls and behind retaining walls. The tests should be performed to determine if the required compaction has been achieved. As a general guideline, we recommend at least one (1) test be taken for every 2,000 square feet of structural fill placed in building and pavement areas, at least one (1) test for every 75 feet to 100 feet in trench fill, and for every 2-foot thickness of fill or

backfill placed. The actual number of tests should be left to the discretion of the geotechnical engineer. Samples of proposed fill and backfill materials should be submitted to our laboratory for testing to determine their compliance with our recommendations and project specifications.

SUBSURFACE EXPLORATION PROCEDURES

Test Borings

We performed twelve (12) SPT borings on July 31 and August 1, 2018 with a truck rig equipped with hollow-stem auger. Soil sampling was performed in accordance with the procedures described in ASTM:D1586. Using this procedure, a 2-inch O.D. split barrel sampler is driven into the soil by a 140-pound weight falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler an additional 12 inches is known as the penetration resistance, or "N" value. The "N" value is an index of the relative density of cohesionless soils and the consistency of cohesive soils. In addition, thin walled tube samples were obtained according to ASTM:D1587, where indicated by the appropriate symbol on the boring logs.

The test borings were backfilled with on-site materials and some settlement of these materials can be expected to occur. Final closure of the holes is the responsibility of the client or property owner.

The soil samples collected from the test boring locations will be retained in our office for a period of one (1) month after the date of this report and will then be discarded unless we are notified otherwise.

Soil Classification

As the samples were obtained in the field, they were visually and manually classified by the crew chief according to ASTM:D2488. Representative portions of all samples were then sealed and returned to the laboratory for further examination and for verification of the field classification. In addition, select samples were then submitted to a program of laboratory tests. Where laboratory classification tests (sieve analysis and Atterberg limits) have been performed, classifications according to ASTM:D2487 are possible. Logs of the test borings indicating the

depth and identification of the various strata, the "N" value, the laboratory test data, water level information and pertinent information regarding the method of maintaining and advancing the drill holes are also attached in Appendix A. Charts illustrating the soil classification procedures, the descriptive terminology and the symbols used on the boring logs are also attached in Appendix A.

Water Level Measurements

Subsurface groundwater levels should be expected to fluctuate seasonally and yearly from the groundwater readings recorded at the test boring locations. Fluctuations occur due to varying seasonal and yearly rainfall amounts and snowmelt, as well as other factors. It is possible that the subsurface groundwater levels during or after construction could be significantly different than the time the test borings were performed.

The water levels indicated on the boring logs may or may not be an accurate indication of the depth or lack of subsurface groundwater. The limited length of observation restricts the accuracy of the measurements. Long term groundwater monitoring was not included in our scope of work.

Laboratory Tests

Laboratory tests were performed on select samples to aid in determining the index and strength properties of the soils. The index tests consisted of moisture content, dry density, Atterberg limits (liquid and plastic limits) and sieve analysis (#200 sieve wash). The strength tests consisted of unconfined compressive strength. The laboratory tests were performed in accordance with the appropriate ASTM procedures. The results of the laboratory tests are shown on the boring logs opposite the samples upon which the tests were performed or on the attached data sheets.

LIMITATIONS

The recommendations and professional opinions submitted in this report were based upon the data obtained through the sampling and testing program at the test boring locations. We wish to point out that because no exploration program can totally reveal the exact subsurface conditions

for the entire site, conditions between test borings and between samples and at other times may differ from those described in our report. Our exploration program identified subsurface conditions only at those points where samples were retrieved or where water was observed. It is not standard engineering practice to continuously retrieve samples for the full depth of the borings. Therefore, strata boundaries and thicknesses must be inferred to some extent. Additionally, some soils layers present in the ground may not be observed between sampling intervals. If the subsurface conditions encountered at the time of construction differ from those represented by our test borings, it is necessary to contaet us so that our recommendations can be reviewed. The variations may result in altering our conclusions or recommendations regarding site preparation or construction procedures, thus, potentially affecting construction costs.

This report is for the exclusive use of the addressee and its representatives for use in design of the proposed project described herein and preparation of construction documents. Without written approval, we assume no responsibility to other parties regarding this report. Our conclusions, opinions and recommendations may not be appropriate for other parties or projects.

STANDARD OF CARE

The recommendations submitted in this report represent our professional opinions. Our services for your project were performed in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering profession currently practicing at this time and area.

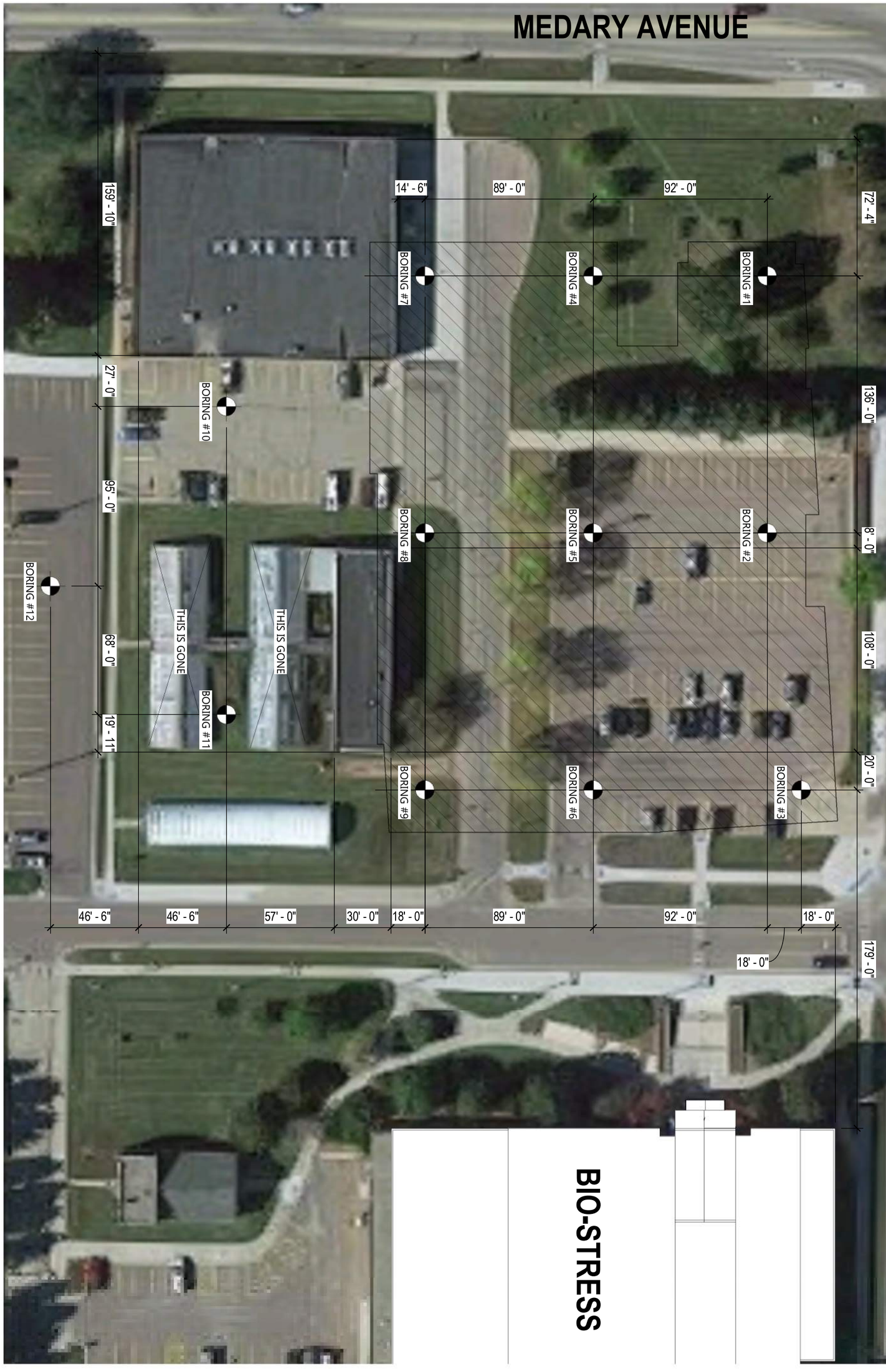
This report was prepared by:
GeoTek Engineering & Testing Services, Inc.

Jared Haskins, PE
Geotechnical Manager

1
001

SOIL BORING LOCATIONS

1" = 50'-0"



NO	Revision Description	Date

EAPC

PROJECT: PRECISION AG

PROJECT NO: 20183140

DRAWING
001

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **1 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1632.0 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY LEAN CLAY: a trace of gravel, dark brown, moist	FILL			1	HSA					
2½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, firm to very stiff, (CL)	GLACIAL TILL	8		2	SPT	15	118			
			12		3	SPT	15	117	35	16	7400
			16	▼	4	SPT					
			15		5	SPT					
12	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff to very stiff, (CL)	GLACIAL TILL	16		6	SPT					
			15		7	SPT					
			15		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

START 7-31-18 COMPLETE 7-31-18

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-31-18	--	21	--	19	none
8-1-18	--	21	--	14	▼ 9
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **2 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1631.6 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY LEAN CLAY WITH SAND: a little gravel, grayish brown, moist, 4" of asphalt and 4" of gravel at the surface	FILL			1	HSA					
2	**LEAN CLAY**: black, moist, firm, (CL)	TOPSOIL	5		2	SPT	22				
4½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, firm, (CL)	GLACIAL TILL	7		3	SPT	15	118			6400
7	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff to very stiff, (CL)	GLACIAL TILL	12		4	SPT					
			12		5	SPT					
			12		6	SPT					
			18		7	SPT					
			20		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

START 7-31-18 COMPLETE 7-31-18

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-31-18	--	21	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **3 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1630.4 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY LEAN CLAY WITH SAND: a little gravel, brown, moist, 4" of asphalt and 4" of gravel at the surface	FILL			1	HSA					
2	**LEAN CLAY**: black, moist, firm, (CL)	TOPSOIL									
3	**SANDY LEAN CLAY**: a trace of gravel, brown, moist to wet, firm, (CL)	MIXED ALLUVIUM	6		2	SPT					
			5		3	SPT	20	108	40	17	
6	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff, (CL)	GLACIAL TILL									
			12		4	SPT	17	116			
9½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL	14		5	SPT					
			11		6	SPT					
			12		7	SPT					
			14		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-31-18	--	21	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-31-18 COMPLETE 7-31-18

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **4 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1633.6 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LAB WC	LAB D	LAB LL	LAB PL	LAB QU
	FILL, MOSTLY LEAN CLAY: a little gravel, brown and dark brown, moist	FILL			1	HSA					
2½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, firm to stiff, percent passing the #200 sieve = 71% (at 5') (CL)	GLACIAL TILL	7		2	SPT	16	114			4700
			10	▼	3	SPT	15	116			
7	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff to very stiff, (CL)	GLACIAL TILL	14		4	SPT	17				
			15		5	SPT					
			13		6	SPT					
			12		7	SPT					
			19		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

START 7-31-18 COMPLETE 7-31-18

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-31-18	--	21	--	19	none
8-1-18	--	21	--	12	▼ 6
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **5 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1632.6 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY LEAN CLAY: a little gravel, brown and dark brown, moist, 4" of asphalt and 4" of gravel at the surface	FILL			1	HSA					
2	**SANDY LEAN CLAY**: mottled brown and gray, moist, firm, (CL)	MIXED ALLUVIUM	5		2	SPT	14				
5	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff to very stiff, (CL)	GLACIAL TILL	9		3	SPT					
			9		4	SPT	17	117			5600
			12		5	SPT					
			16		6	SPT					
			17		7	SPT					
19½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, very stiff, (CL)	GLACIAL TILL	18		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-31-18	--	21	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-31-18 COMPLETE 7-31-18

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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& TESTING SERVICES, INC.
909 E. 50th Street N.
Sioux Falls, SD 57105
605-335-5512 Fax 605-335-0773
www.geotekeng.com

GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **6 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1632.2 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY SANDY LEAN CLAY: a little gravel, brown, moist, 4" of asphalt and 4" of gravel at the surface	FILL			1	HSA					
			6		2	SPT					
4½	**SANDY LEAN CLAY**: brown, moist to wet, soft, (CL)	MIXED ALLUVIUM	4		3	SPT	16	114			
7	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, firm to very stiff, (CL)	GLACIAL TILL	8		4	SPT	17	118			
			8		5	SPT	17	116			3700
			13		6	SPT					
			13		7	SPT					
			17		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-31-18	--	21	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-31-18 COMPLETE 7-31-18

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **7 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1634.6 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY LEAN CLAY: a little gravel, brown, moist, 4" of asphalt and 4" of gravel at the surface	FILL			1	HSA					
2	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, firm to stiff, (CL)	GLACIAL TILL	7		2	SPT	15	115	36	17	
			11		3	SPT					
7	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL	13		4	SPT					
			14		5	SPT					
			14		6	SPT					
			12		7	SPT					
			15		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-31-18	--	21	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-31-18 COMPLETE 7-31-18

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **8 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1634.2 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY LEAN CLAY WITH SAND: a little gravel, brown, moist	FILL			1	HSA					
2	**FILL, MOSTLY SANDY LEAN CLAY**: a little gravel, dark brown, moist	FILL	9		2	SPT	19				
4½	**LEAN CLAY**: mottled brown and gray, moist to wet, firm, (CL)	FINE ALLUVIUM	7		3	SPT	17				
7	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff, (CL)	GLACIAL TILL	9	▼	4	SPT	17	115			3500
			13		5	SPT					
12	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff to very stiff, (CL)	GLACIAL TILL	13		6	SPT					
			16		7	SPT					
			16		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-31-18	--	21	--	19	none
8-1-18	--	21	--	13	▼ 7
--	--	--	--	--	--
--	--	--	--	--	--

START 7-31-18 COMPLETE 7-31-18

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **9 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1633.4 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY LEAN CLAY WITH SAND: a little gravel, dark brown, moist	FILL			1	HSA					
			8		2	SPT	12				
4½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, firm to stiff, (CL)	GLACIAL TILL	7		3	SPT	16	114			3900
			9		4	SPT					
			11		5	SPT					
12	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff to very stiff, (CL)	GLACIAL TILL	14		6	SPT					
			14		7	SPT					
			16		8	SPT					
21	Bottom of borehole at 21 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
8-1-18	--	21	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 8-1-18 COMPLETE 8-1-18

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **10 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1636.0 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY LEAN CLAY: a trace of gravel, black, moist, 4" of asphalt and 4" of gravel at the surface	FILL			1	HSA	17				
2	**FILL, MOSTLY LEAN CLAY**: a trace of gravel, brown, moist	FILL	7		2	SPT	17	108			
4½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff, (CL)	GLACIAL TILL	10		3	SPT					
7	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL	12		4	SPT					
			12		5	SPT					
11	Bottom of borehole at 11 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
8-1-18	--	11	--	9	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 8-1-18 COMPLETE 8-1-18

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **11 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1635.9 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LAB WC	LAB D	LAB LL	LAB PL	LAB QU
	FILL, MOSTLY LEAN CLAY: a trace of gravel, black, moist	FILL			1	HSA	17				
2	**FILL, MOSTLY LEAN CLAY WITH SAND**: a trace of gravel, brown and dark brown, moist	FILL	5		2	SPT	18	109			
			4		3	SPT					
8			10		4	SPT					
	SANDY LEAN CLAY: brown, wet, stiff, (CL)	MIXED ALLUVIUM									
9½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, firm, (CL)	GLACIAL TILL	8		5	SPT					
11	Bottom of borehole at 11 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
8-1-18	--	11	--	9	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 8-1-18 COMPLETE 8-1-18

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **18-977** BORING NO. **12 (1 of 1)**

PROJECT **Proposed Precision Ag Classroom & Laboratory Building, South Dakota State University, OSE #R0316--02X, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 1637.7 ft)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	FILL, MOSTLY LEAN CLAY: a little gravel, dark brown, moist, 4" of asphalt and 4" of gravel at the surface	FILL			1	HSA	13				
			8		2	SPT	17	118			
4½	**LEAN CLAY WITH SAND**: a little gravel, mottled brown and gray, moist, stiff, (CL)	GLACIAL TILL	9		3	SPT					
			9		4	SPT					
			11		5	SPT					
11	Bottom of borehole at 11 feet.										

WATER LEVEL MEASUREMENTS

START 8-1-18 COMPLETE 8-1-18

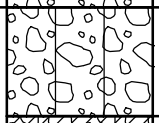
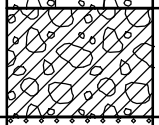
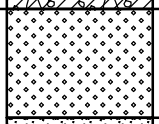
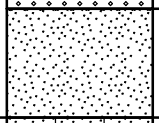
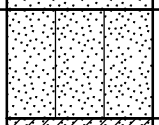
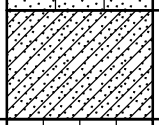
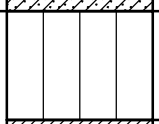
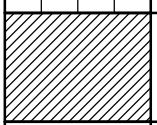
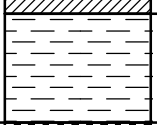
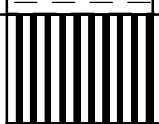
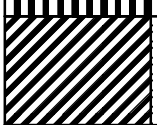
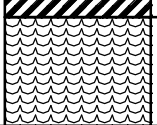
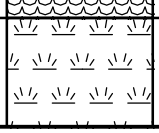
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
8-1-18	--	11	--	9	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 18-977.GPJ GEOTEKENG.GDT 8/7/18

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

BORING LOG SYMBOLS AND DESCRIPTIVE TERMINOLOGY

SYMBOLS FOR DRILLING AND SAMPLING

Symbol	Definition
Bag	Bag sample
CS	Continuous split-spoon sampling
DM	Drilling mud
FA	Flight auger; number indicates outside diameter in inches
HA	Hand auger; number indicates outside diameter in inches
HSA	Hollow stem auger; number indicates inside diameter in inches
LS	Liner sample; number indicates outside diameter of liner sample
N	Standard penetration resistance (N-value) in blows per foot
NMR	No water level measurement recorded, primarily due to presence of drilling fluid
NSR	No sample retrieved; classification is based on action of drilling equipment and/or material noted in drilling fluid or on sampling bit
SH	Shelby tube sample; 3-inch outside diameter
SPT	Standard penetration test (N-value) using standard split-spoon sampler
SS	Split-spoon sample; 2-inch outside diameter unless otherwise noted
WL	Water level directly measured in boring
▼	Water level symbol

SYMBOLS FOR LABORATORY TESTS

Symbol	Definition
WC	Water content, percent of dry weight; ASTM:D2216
D	Dry density, pounds per cubic foot
LL	Liquid limit; ASTM:D4318
PL	Plastic limit; ASTM:D4318
QU	Unconfined compressive strength, pounds per square foot; ASTM:D2166

DENSITY/CONSISTENCY TERMINOLOGY

Density		Consistency
Term	N-Value	Term
Very Loose	0-4	Soft
Loose	5-8	Firm
Medium Dense	9-15	Stiff
Dense	16-30	Very Stiff
Very Dense	Over 30	Hard

PARTICLE SIZES

Term	Particle Size
Boulder	Over 12”
Cobble	3” – 12”
Gravel	#4 – 3”
Coarse Sand	#10 – #4
Medium Sand	#40 – #10
Fine Sand	#200 – #40
Silt and Clay	passes #200 sieve

DESCRIPTIVE TERMINOLOGY

Term	Definition
Dry	Absence of moisture, powdery
Frozen	Frozen soil
Moist	Damp, below saturation
Waterbearing	Pervious soil below water
Wet	Saturated, above liquid limit
Lamination	Up to ½” thick stratum
Layer	½” to 6” thick stratum
Lens	½” to 6” discontinuous stratum

GRAVEL PERCENTAGES

Term	Range
A trace of gravel	2-4%
A little gravel	5-15%
With gravel	16-50%

Campanile Avenue Geotechnical Report

Date: April 10, 2019

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
Phone 605-335-5512 Fax 605-335-0773

April 10, 2019

HR Green
431 N. Phillips Avenue, Suite 400
Sioux Falls, South Dakota 57104

Attn: Jedidiah Reimnitz, EIT

Subj: Geotechnical Exploration
Proposed Street & Utility Improvements
Campanile Avenue
South Dakota State University
Brookings, South Dakota
GeoTek #19-254

This correspondence presents our written report of the geotechnical exploration program for the referenced project. Our work was performed in accordance with the authorization of Dawn Zahn with HR Green. We are transmitting an electronic copy of our report for your use.

We thank you for the opportunity of providing our services on this project and look forward to continued participation during the design and construction phases. If you have any questions regarding this report, please contact our office at (605) 335-5512.

Respectfully Submitted,
GeoTek Engineering & Testing Services, Inc.

Jared Haskins

Jared Haskins, PE
Geotechnical Manager

TABLE OF CONTENTS

GEOTECHNICAL EXPLORATION
PROPOSED STREET & UTILITY IMPROVEMENTS
CAMPANILE AVENUE
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA
GEOTEK #19-254

INTRODUCTION

Project Information

This report presents the results of the recent geotechnical exploration program for the proposed street and utility improvements on Campanile Avenue on the campus of South Dakota State University in Brookings, South Dakota.

Scope of Services

Our work was performed in accordance with the authorization of Dawn Zahn with HR Green. The scope of work as presented in this report is limited to the following:

1. To perform 2 standard penetration test (SPT) borings to gather data on the subsurface conditions at the site.

2. To perform laboratory tests that include moisture content, dry density, Atterberg limits (liquid and plastic limits) and standard Proctor.

3. To prepare an engineering report that includes the results of the field and laboratory tests as well as our geotechnical engineering opinions and recommendations regarding the following:

    - Existing pavement section;
    - Underground utility excavation and backfilling;
    - Subgrade strength and potential corrective measures;
    - Earthwork and grading for the pavement subgrade;
    - Pavement section thicknesses;
    - Corrosive potential of the soils;
    - Comments regarding factors that may impact the constructability and final performance of the project;
    - Quality control observations and testing.

The scope of our work was intended for geotechnical purposes only. This scope of work did not include determining the presence or extent of environmental contamination at the site or to characterize the site relative to wetlands status.

SITE & SUBSURFACE CONDITIONS

Site Location & Description

The site is located on Campanile Avenue on the campus of South Dakota State University in Brookings, South Dakota. The existing pavement surfacing consists of asphalt.

Ground Surface Elevations & Test Boring Locations

We did not determine the ground surface elevations at the test boring locations. A site map is attached showing the relative location of the test borings.

Existing Pavement Conditions

Table 1 summarizes the thickness of the existing pavement and gravel base encountered at the respective test boring locations.

Table 1. Thickness of the Existing Pavement & Gravel Base

Test Boring	Street	Asphalt Thickness, in	Gravel Base, in
1	Campanile Avenue	6	6
2	Campanile Avenue	6	6

Subsurface Conditions

Two (2) test borings were performed on March 22, 2019. The subsurface conditions encountered at the test boring locations are illustrated by means of the boring logs included in Appendix A.

At the test boring locations, the subgrade soils consisted of the following soil types: existing fill materials, topsoil materials and glacial till soils. The existing fill materials extended to depths of 2 feet (test boring 2) and 7 feet (test boring 1). The topsoil materials were only encountered at test boring 2. The existing fill materials at test boring 2 may be topsoil materials. The glacial till soils

were encountered beneath the existing fill materials and topsoil materials. At the time of our test borings, frozen soils extended to a depth of approximately 3 feet. The existing fill materials consisted of lean clay soils and lean clay with sand soils. The topsoil materials consisted of lean clay soils. The glacial till soils consisted of lean clay with sand soils and sandy lean clay soils.

The consistency or relative density of the soils is indicated by the standard penetration resistance ("N") values as shown on the boring logs. A description of the soil consistency or relative density based on the "N" values can be found on the attached Soil Boring Symbols and Descriptive Terminology data sheet.

We wish to point out that the subsurface conditions at other times and locations at the site may differ from those found at our test boring locations. If different conditions are encountered during construction, then it is important that you contact us so that our recommendations can be reviewed.

Water Levels

Measurements to record the groundwater levels were made at the test boring locations. The time and level of the groundwater readings are recorded on the boring logs. Groundwater did not enter the boreholes at the test boring locations at the time of our measurements.

The water levels indicated on the boring logs may or may not be an accurate indication of the depth or lack of subsurface groundwater. A long period of time is generally required for subsurface water to stabilize in the impervious soils encountered at the test boring locations. Long term groundwater monitoring was not included in our work scope.

ENGINEERING REVIEW & RECOMMENDATIONS

Project Design Data

We understand that the project will consist of street and utility improvements. The street improvements will consist of reconstructing the pavement section on Campanile Avenue. For the reconstruction, the north portion of Campanile Avenue will be closed to traffic and replaced with a sidewalk. The new pavement surfacing will be asphalt. The utility improvements will consist of installing new water main, sanitary sewer and storm sewer. A maximum installation depth of 15

feet may occur near the north end of the project. The project will also include reconstructing a small parking lot along the west side of Campanile Avenue (north of the heating plant).

The information/assumptions detailed in the project design data section are important factors in our review and recommendations. If there are any corrections or additions to the information detailed in this section, then it is important that you contact us so that we can review our recommendations with regards to the revised plans.

Utility Improvements

Subgrade Soils

The subgrade soils anticipated at the invert depths for the underground utilities will likely consist of clay soils. Where soils having moderate moisture and density values are encountered at the bottom of the trench excavations, it is our opinion that the soils are considered suitable for support of the proposed utilities, provided they are adequately dewatered, and are not disturbed by construction traffic. Localized areas of wet or soft soils may be encountered at the bottom of the trench excavations. These areas will require subexcavation and trench stabilization methods and materials. Appropriate bedding materials should be used for the utility pipes.

Dewatering

Water may enter the utility trench excavations as a result of subsurface water, precipitation or surface run off. Dewatering procedures may be required in order to control and remove water entering the utility trench excavations. Where clay soils are encountered, it may be possible to remove and control water entering the excavations using normal sump pumping techniques. However, if waterbearing sand soils are encountered, then extensive dewatering techniques will likely be required due to the potentially large volumes of water. The contractor should provide appropriate dewatering methods and equipment. Any water that accumulates at the bottom of the excavations should be immediately removed and surface drainage away from the excavations should be provided during construction.

OSHA Requirements

All excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, "Excavations and Trenches". This document states that the excavation safety is the responsibility of the contractor. Reference to this OSHA requirement should be included in the project specifications.

Trench Backfill

It is our opinion that the on-site existing fill materials (at test boring 1) and glacial till soils can likely be reused as trench backfill. We recommend that the trench backfill soils be placed and compacted in uniform thin lifts (6-inch maximum lifts). The trench backfill should be compacted to a minimum of 95 percent of standard Proctor density (ASTM:D698). The moisture content of the trench backfill soils should be adjusted to a moisture level that is within plus or minus 2 percent of the optimum moisture content as determined by standard Proctor (ASTM:D698). Based on the results of the moisture content tests and standard Proctor test, it is our opinion that the majority of the on-site existing fill materials (at test boring 1) and glacial till soils have in-situ moisture content levels that are within plus or minus 2 percent of the materials' optimum moisture content. With that said, minimal moisture adjustment (wetting or drying) should be expected with the majority of the on-site existing fill materials (at test boring 1) and glacial till soils.

Portions of the on-site soils encountered in the utility trench excavations may not be suitable or ideal for use as trench backfill. These materials would consist of organic soils as well as soils having high moisture content levels (wet soils) such that the specified compaction level cannot be reasonably achieved. The on-site topsoil materials are considered slightly organic soils. In addition, the on-site existing fill materials (at test boring 2) may be topsoil materials. The organic soils should be replaced with suitable material available at the site or with suitable off-site borrow soils. The wet soils will require significant drying in order to adjust the moisture content of the soils to a level that will facilitate the specified compaction requirement. It should be known that the drying process could be time consuming and may not be feasible during certain periods of the year (late fall). Alternatively, the wet soils could be replaced with suitable material available at the site or with suitable off-site borrow soils.

Street Improvements

Discussion

The upper portions (upper 5 feet) of the subgrade soils encountered at the test boring locations consisted of existing fill materials, topsoil materials and glacial till soils. These subgrade soils have a Unified Soils Classification System symbol of CL and AASHTO classifications of A-6 and A-7.

In general, favorable subgrade conditions were encountered at test boring 1, while poor subgrade conditions were encountered at test boring 2 (test boring with buried topsoil materials). At test boring 1, we estimate California Bearing Ratio (CBR) values of 3.5 to 4.5 for the upper portions of the subgrade soils. At test boring 2, we estimate CBR values of 1.0 to 2.0 for the upper portions of the subgrade soils. CBR values of 1.0 to 2.0 are considered low CBR values. The CBR value is a measure of the supporting value of the subgrade soils. The value can be determined from a soaked test or an unsoaked test. The value from a soaked test is used to simulate the worst conditions (wet periods of the year and the spring thaw), while the value from an unsoaked test is used to simulate normal field conditions (summer and fall). Values from a soaked test are much lower than values from an unsoaked test. The values discussed above would represent values from soaked tests.

In our opinion, normal subgrade preparation (scarification and recompaction) could be used at and around test boring 1. Conversely, subgrade reinforcement will likely be needed at and around test boring 2. The subgrade reinforcement should consist of a geotextile fabric. However, scarification and recompaction could be used at and around test boring 2 if additional removals are performed.

Stripping & Removals

We recommend removing the existing pavement section in order to achieve the design elevations. Low-ground-pressure construction equipment or excavators with smooth-edged buckets should be used for the stripping and removals in areas where soft/wet soils are present. We expect the low-ground-pressure equipment will be needed at and around test boring 2.

As stated on the previous page, additional removals would be needed if the scarification and recompaction is performed at and around test boring 2. The additional removals would consist of

subcutting to a minimum depth of 2 feet below the bottom of the aggregate base course elevation and replacing the removed soils with suitable subgrade soils. The suitable subgrade soils should consist of the material discussed in the section entitled *Filling*. We recommend that observations and hand auger borings be performed during construction to determine which areas require the additional removals.

Filling

If subgrade fill is needed to achieve the design subgrade elevations, then the subgrade fill should consist of non-organic lean clay or sandy lean clay soils having a liquid limit less than 45 and a plasticity index between 15 and 35. The moisture content of the subgrade fill should be 1 percent to 4 percent below the optimum moisture content. The subgrade fill should be placed in compacted lifts having a maximum thickness of 6 inches. We recommend a minimum compaction specification of 95 percent of standard Proctor (ASTM:D698) for the subgrade fill.

Subgrade Preparation Option 1 – Scarification & Recompaction

For the scarification and recompaction option, the upper 8 inches of the subgrade should be scarified, moisture conditioned and recompacted. A proof roll should be performed on the exposed subgrade with a truck weighing 20 tons to 30 tons. During the proof roll, unstable areas in the subgrade should be delineated from stable areas. An unstable area would be considered a location with at least 1 inch of rutting or deflection. Unstable areas will need additional subgrade preparation in order to provide a uniform and stable subgrade condition. The additional subgrade preparation may include the following: moisture conditioning the soils (e.g. drying the soils by scarification), an overexcavation to remove and replace the unstable subgrade soils or subgrade preparation option 2 (subgrade reinforcement). The type of additional subgrade preparation performed should be determined after observing the performance of the subgrade during the proof roll test. Some unstable areas should be expected, especially during the spring thaw and wetter periods of the year. With this option, a geotextile fabric could be installed beneath the aggregate base course material to extend the life of the pavement. Again, additional removals would be needed if the scarification and recompaction is performed at and around test boring 2.

Subgrade Preparation Option 2 – Subgrade Reinforcement

For the subgrade reinforcement option, a geotextile fabric should be placed beneath the aggregate base course material. Regarding the geotextile fabric, we recommend using Mirafi HP 370, Propex Geotex 3x3 HF, Huesker Comtrac P 45/45, or an approved alternative. Prior to the installation of the geotextile fabric, we recommend that observations, testing and hand auger borings be performed on the exposed subgrade in order to determine if unstable subgrade conditions are present. A proof roll test could also be performed to determine if the subgrade soils are unstable. The proof roll test should be performed with a truck weighing 20 tons to 30 tons. During the proof roll, unstable areas in the subgrade should be delineated from stable areas. The soils within the unstable area should be removed, and either moisture-conditioned and recompacted, or replaced with suitable subgrade soils. If the unstable area will not stabilize using this method, then an alternative section will likely be needed. One (1) alternative section would consist of increasing the thickness of the aggregate base course material (thickness would be based on field conditions). Another alternative section would consist of incorporating granular subbase into the design. The granular subbase would likely only be needed for very poor subgrade conditions. The granular subbase should consist of crushed quartzite, recycled concrete or a crushed pit-run material meeting the gradation specifications shown in Table 2.

Table 2. Granular Subbase Gradation Specifications

Sieve Size	Percent Passing
4-inch	100
3-inch	70 – 90
2-inch	60 – 80
1-inch	40 – 70
#4	10 – 50
#40	5 – 20
#200	0 – 8

The granular subbase should be compacted to a minimum of 97 percent of standard Proctor density (ASTM:D698). It should be noted that compaction testing may not be practical for the granular subbase due to the large aggregate.

Pavement Section Thicknesses

We were not provided a traffic volume for the street. We assume that the vehicle traffic will consist of automobiles and occasional trucks. Table 3 summarizes the recommended pavement section thicknesses for the project.

Table 3. Recommended Asphalt Pavement Section Thicknesses

Option	Asphalt Pavement Thickness, in	Aggregate Base Course Thickness, in	Granular Subbase Thickness, in	Subgrade Reinforcement
1*	5	9	-	**
2	5	12***	****	Geotextile Fabric

Notes: The options are (1) scarification and recompaction and (2) subgrade reinforcement. *Subgrade reinforcement may be needed in areas where scarification and recompaction is performed. **With this option, a geotextile fabric could be installed beneath the aggregate base course material to extend the life of the pavement. ***The thickness of the aggregate base course may need to be increased if unstable areas are encountered during construction. ****Granular subbase may be needed if very poor subgrade conditions are encountered.

Asphalt & Aggregate Base Course Materials

The asphalt pavement should meet the requirements of sections 320 and 321 for Class G. We recommend that the aggregate base course materials meet the requirements of Sections 260 and 882 of the SDDOT Standard Specifications. The aggregate base course materials should be compacted to a minimum of 97 percent of standard Proctor (ASTM:D698).

Existing Gravel Base

As shown in Table 1, the thickness of the existing gravel base was 6 inches. In our opinion, some reclaiming of the existing gravel base for use as aggregate base course material may be possible. Samples of the reclaimed material should be collected for analysis during construction in order to approve the material for use as aggregate base course material.

Corrosive Potential

Our scope of work did not include performing resistivity tests to determine the corrosive potential of the soils. Based on previous resistivity tests on similar soils, the soils would be considered extremely corrosive to highly corrosive.

CONSTRUCTION CONSIDERATIONS

Groundwater & Surface Water

Water may enter the excavations due to subsurface water, precipitation or surface run off. Any water that accumulates in the bottom of the excavations should be immediately removed and surface drainage away from the excavations should be provided during construction.

Disturbance of Soils

The soils encountered at the test boring locations are susceptible to disturbance and can experience strength loss caused by construction traffic and/or additional moisture. Precautions will be required during earthwork activities in order to reduce the risk of soil disturbance. Where soft/wet soils are encountered, the excavations should be performed with low-ground-pressure construction equipment or an excavator (backhoe) having a smooth cutting edge on the bucket.

Cold Weather Precautions

If site preparation and construction is anticipated during cold weather, then we recommend all subgrades, slabs and other improvements that may be affected by frost movements be insulated from frost penetration during freezing temperatures. If filling is performed during freezing temperatures, then all frozen soils, snow and ice should be removed from the areas to be filled prior to placing the new fill. The new fill should not be allowed to freeze during transit, placement and compaction. Asphalt and concrete should not be placed on frozen subgrades. If subgrades freeze, then we recommend that the frozen soils be removed and replaced, or completely thawed. The subgrade soils will likely require reworking and recompacting due to the loss of density caused by the freeze/thaw process.

Excavation Sideslopes

All excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, “Excavations and Trenches”. This document states that the excavation safety is the responsibility of the contractor. Reference to this OSHA requirement should be included in the project specifications.

Observations & Testing

This report was prepared using a limited amount of information for the project and a number of assumptions were necessary to help us develop our conclusions and recommendations. It is recommended that our firm be retained to review the geotechnical aspects of the final design plans and specifications to check that our recommendations have been properly incorporated into the design documents.

The recommendations submitted in this report have been made based on the subsurface conditions encountered at the test boring locations. It is possible that there are subsurface conditions at the site that are different from those represented by the test borings. As a result, on-site observation during construction is considered integral to the successful implementation of the recommendations. We believe that qualified field personnel need to be on-site at the following times to observe the site conditions and effectiveness of the construction.

Excavation

We recommend that a geotechnical engineer or geotechnical engineering technician working under the direct supervision of a geotechnical engineer observe all excavations for utilities, slabs and pavements. These observations are recommended to determine if the exposed soils are similar to those encountered at the test boring locations, if unsuitable soils have been adequately removed and if the exposed soils are suitable for support of the proposed construction.

Testing

After the subgrade is observed by a geotechnical engineer/technician and approved, we recommend a representative number of compaction tests be taken during the placement of the backfill placed below slabs and pavements. The tests should be performed to determine if the required compaction has been achieved. As a general guideline, we recommend at least 1 test be taken for every 10,000 square feet of embankment fill placed, at least 1 test for every 500 feet in trench fill, and for every 2-foot thickness of fill or backfill placed. The actual number of tests should be left to the discretion of the geotechnical engineer. Samples of proposed fill and backfill

materials should be submitted to our laboratory for testing to determine their compliance with our recommendations and project specifications.

SUBSURFACE EXPLORATION PROCEDURES

Test Borings

We drilled 2 SPT borings on March 22, 2019 with a truck rig equipped with hollow-stem auger. Soil sampling was performed in accordance with the procedures described in ASTM:D1586. Using this procedure, a 2-inch O.D. split barrel sampler is driven into the soil by a 140-pound weight falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler an additional 12 inches is known as the penetration resistance, or "N" value. The "N" value is an index of the relative density of cohesionless soils and the consistency of cohesive soils. In addition, thin walled tube samples were obtained according to ASTM:D1587, where indicated by the appropriate symbol on the boring logs.

The test borings were backfilled with on-site materials and some settlement of these materials can be expected to occur. Final closure of the holes is the responsibility of the client or property owner.

The soil samples collected from the test boring locations will be retained in our office for a period of 1 month after the date of this report and will then be discarded unless we are notified otherwise.

Soil Classification

As the samples were obtained in the field, they were visually and manually classified by the crew chief according to ASTM:D2488. Representative portions of all samples were then sealed and returned to the laboratory for further examination and for verification of the field classification. In addition, select samples were then submitted to a program of laboratory tests. Where laboratory classification tests (sieve analysis and Atterberg limits) have been performed, classifications according to ASTM:D2487 are possible. Logs of the test borings indicating the depth and identification of the various strata, the "N" value, the laboratory test data, water level information and pertinent information regarding the method of maintaining and advancing the drill holes are

also attached in Appendix A. Charts illustrating the soil classification procedures, the descriptive terminology and the symbols used on the boring logs are also attached in Appendix A.

Water Level Measurements

Subsurface groundwater levels should be expected to fluctuate seasonally and yearly from the groundwater readings recorded at the test boring locations. Fluctuations occur due to varying seasonal and yearly rainfall amounts and snowmelt, as well as other factors. It is possible that the subsurface groundwater levels during or after construction could be significantly different than the time the test borings were performed.

Laboratory Tests

We performed laboratory tests on select samples to aid in determining the index properties of the soils. The tests consisted of moisture content, dry density, Atterberg limits (liquid and plastic limits) and standard Proctor. The laboratory tests were performed in accordance with the appropriate ASTM procedures. The results of the laboratory tests are shown on the boring logs opposite the samples upon which the tests were performed or on the attached data sheet.

LIMITATIONS

The recommendations and professional opinions submitted in this report were based upon the data obtained through the sampling and testing program at the test boring locations. We wish to point out that because no exploration program can totally reveal the exact subsurface conditions for the entire site, conditions between test borings and between samples and at other times may differ from those described in our report. Our exploration program identified subsurface conditions only at those points where samples were retrieved or where water was observed. It is not standard engineering practice to continuously retrieve samples for the full depth of the test borings. Therefore, strata boundaries and thicknesses must be inferred to some extent. Additionally, some soils layers present in the ground may not be observed between sampling intervals. If the subsurface conditions encountered at the time of construction differ from those represented by our test borings, it is necessary to contact us so that our recommendations can be reviewed. The

variations may result in altering our conclusions or recommendations regarding site preparation or construction procedures, thus, potentially affecting construction costs.

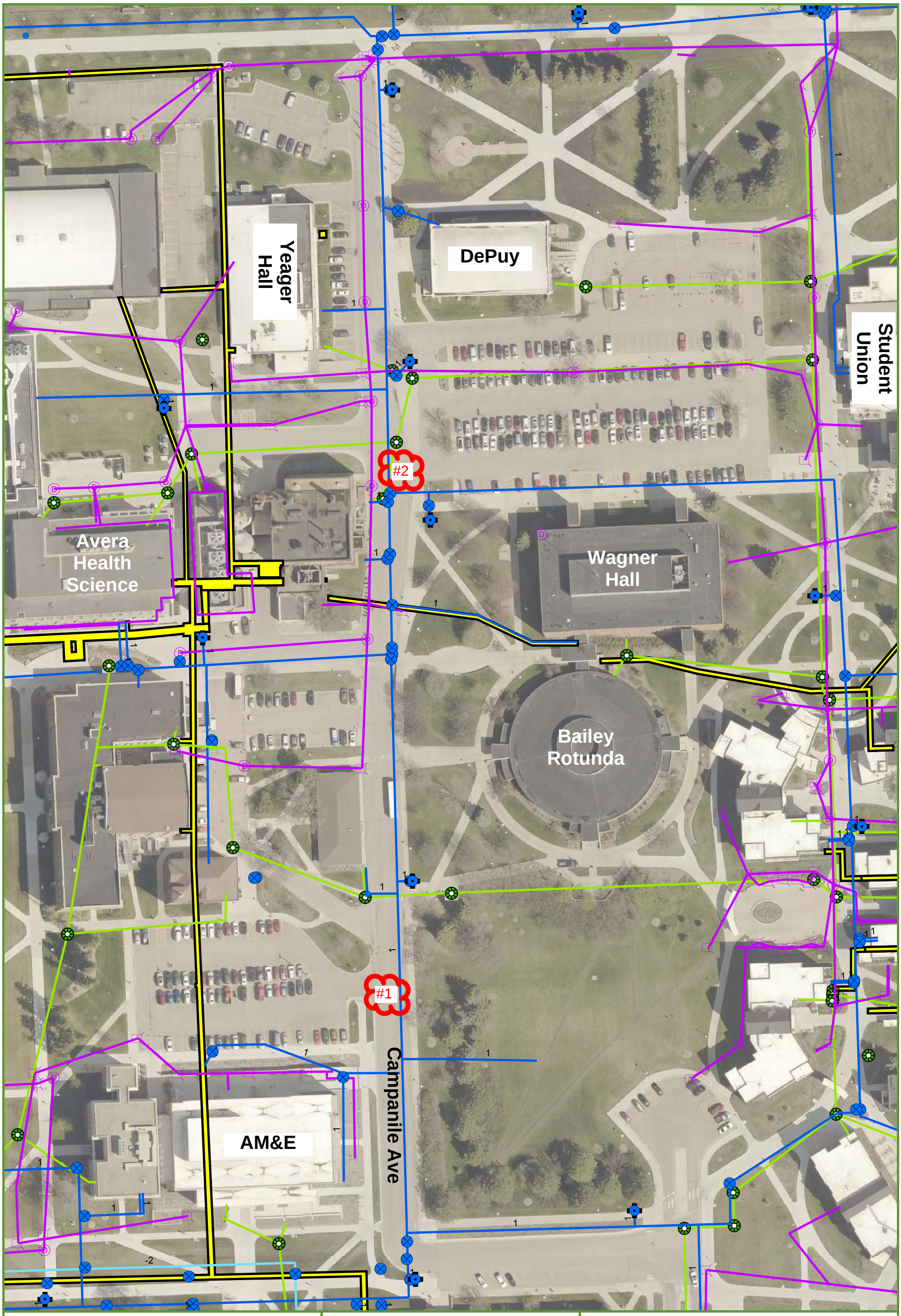
This report is for the exclusive use of the addressee and its representatives for use in design of the proposed project described herein and preparation of construction documents. Without written approval, we assume no responsibility to other parties regarding this report. Our conclusions, opinions and recommendations may not be appropriate for other parties or projects.

STANDARD OF CARE

The recommendations submitted in this report represent our professional opinions. Our services for your project were performed in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering profession currently practicing at this time and area.

This report was prepared by:
GeoTek Engineering & Testing Services, Inc.

Jared Haskins, PE
Geotechnical Manager



HRGreen

Soil Boring Locations

SDSU
Brookings, SD

N
W
E
S

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 E 50th St N
Sioux Falls, South Dakota, 57104
605-335-5512 Fax
jhaskins@geotekeng.com

GEOTECHNICAL TEST BORING LOG

GEOTEK # **19-254** BORING NO. **1 (1 of 1)**

PROJECT **Proposed Improvements, Campanile Avenue, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
0½	**ASPHALT**: 6" thick										
1	**FILL, MOSTLY CLAYEY SAND**: a little gravel, brown, frozen, 6" thick	EXISTING GRAVEL BASE			1	HSA					
	FILL, MOSTLY LEAN CLAY WITH SAND: a trace of gravel, brown, frozen to 3' then moist	FILL	26		2	SPT	15	116			
			6		3	SPT	17	111			
7	**SANDY LEAN CLAY**: a little gravel, mottled brown and gray, moist, stiff to very stiff, (CL)	GLACIAL TILL	15		4	SPT	17				
			17		5	SPT	16				
			18		6	SPT	18				
14½	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL	10		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
3-22-19	3:57 pm	16	--	14	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 3-22-19 COMPLETE 3-22-19 3:57 pm

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 19-254.GPJ GEOTEKENG.GDT 3/27/19

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 E 50th St N
Sioux Falls, South Dakota, 57104
605-335-5512 Fax
jhaskins@geotekeng.com

GEOTECHNICAL TEST BORING LOG

GEOTEK # **19-254** BORING NO. **2 (1 of 1)**

PROJECT **Proposed Improvements, Campanile Avenue, South Dakota State University, Brookings, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
0½	**ASPHALT**: 6" thick										
1	**FILL, MOSTLY CLAYEY SAND**: a little gravel, brown, frozen, 6" thick	EXISTING GRAVEL BASE			1	HSA					
2	**FILL, MOSTLY LEAN CLAY**: very dark brown, frozen	FILL									
	LEAN CLAY: black, frozen to 3' then moist, (CL)	TOPSOIL	19		2	SPT	27				
4½	**SANDY LEAN CLAY**: a little gravel, brown, moist, stiff, (CL)	GLACIAL TILL	11		3	SPT	15	114			
					8	BAG					
			13		4	SPT	18		38	16	
			15		5	SPT	18				
			13		6	SPT	17				
			13		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
3-22-19	5:10 pm	16	--	14	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

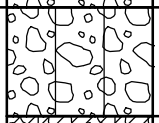
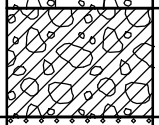
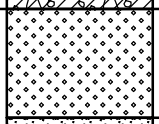
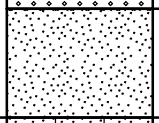
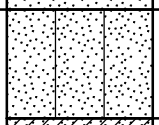
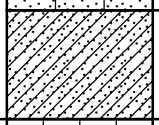
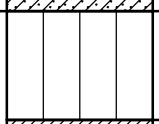
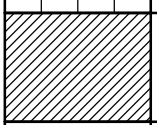
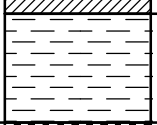
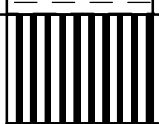
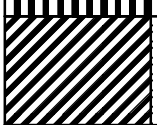
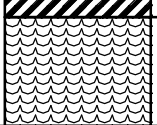
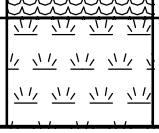
START 3-22-19 COMPLETE 3-22-19 5:09 pm

METHOD
3.25" ID Hollow Stem Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 19-254.GPJ GEOTEKENG.GDT 3/27/19

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

BORING LOG SYMBOLS AND DESCRIPTIVE TERMINOLOGY

SYMBOLS FOR DRILLING AND SAMPLING

Symbol	Definition
Bag	Bag sample
CS	Continuous split-spoon sampling
DM	Drilling mud
FA	Flight auger; number indicates outside diameter in inches
HA	Hand auger; number indicates outside diameter in inches
HSA	Hollow stem auger; number indicates inside diameter in inches
LS	Liner sample; number indicates outside diameter of liner sample
N	Standard penetration resistance (N-value) in blows per foot
NMR	No water level measurement recorded, primarily due to presence of drilling fluid
NSR	No sample retrieved; classification is based on action of drilling equipment and/or material noted in drilling fluid or on sampling bit
SH	Shelby tube sample; 3-inch outside diameter
SPT	Standard penetration test (N-value) using standard split-spoon sampler
SS	Split-spoon sample; 2-inch outside diameter unless otherwise noted
WL	Water level directly measured in boring
▼	Water level symbol

SYMBOLS FOR LABORATORY TESTS

Symbol	Definition
WC	Water content, percent of dry weight; ASTM:D2216
D	Dry density, pounds per cubic foot
LL	Liquid limit; ASTM:D4318
PL	Plastic limit; ASTM:D4318
QU	Unconfined compressive strength, pounds per square foot; ASTM:D2166

DENSITY/CONSISTENCY TERMINOLOGY

Density		Consistency
Term	N-Value	Term
Very Loose	0-4	Soft
Loose	5-8	Firm
Medium Dense	9-15	Stiff
Dense	16-30	Very Stiff
Very Dense	Over 30	Hard

PARTICLE SIZES

Term	Particle Size
Boulder	Over 12”
Cobble	3” – 12”
Gravel	#4 – 3”
Coarse Sand	#10 – #4
Medium Sand	#40 – #10
Fine Sand	#200 – #40
Silt and Clay	passes #200 sieve

DESCRIPTIVE TERMINOLOGY

Term	Definition
Dry	Absence of moisture, powdery
Frozen	Frozen soil
Moist	Damp, below saturation
Waterbearing	Pervious soil below water
Wet	Saturated, above liquid limit
Lamination	Up to ½” thick stratum
Layer	½” to 6” thick stratum
Lens	½” to 6” discontinuous stratum

GRAVEL PERCENTAGES

Term	Range
A trace of gravel	2-4%
A little gravel	5-15%
With gravel	16-50%

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, SD 57104
605-335-5512 Fax 605-335-0773
www.geotekeng.com

MOISTURE - DENSITY TEST REPORT

REPORTED TO:

HR Green
Jedidiah Reimnitz
431 N Phillips Ave, Ste 400
Sioux Falls, SD 57104

PROJECT: 19-254

Proposed Improvements
Campanile Avenue
South Dakota State University
Brookings, SD

COPIES TO:

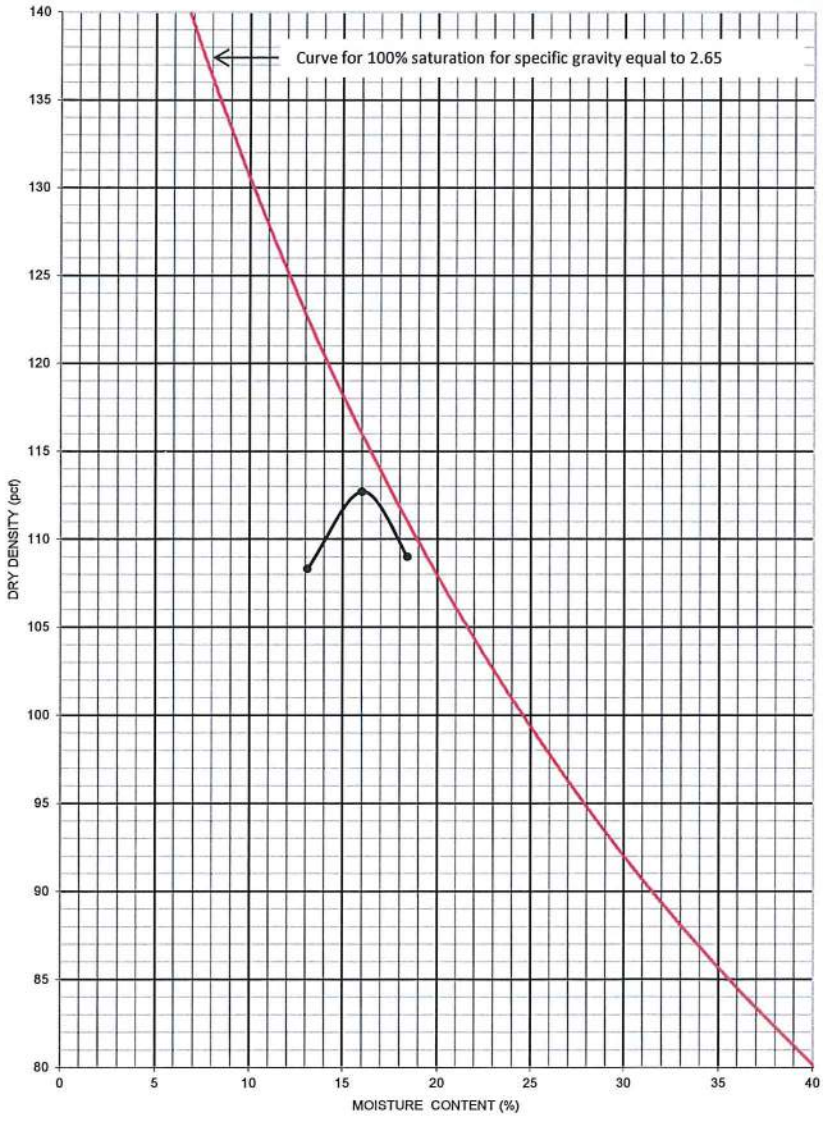
DATE REPORTED: 3/27/2019

SAMPLE DATA

Sample No.: 1
ASTM Test Method: D698B Manual
Soil Classification: Sandy Lean Clay with a little Gravel, Brown (CL) -1
Remarks: SB 2 (5' -10')

Date Received: 3/22/2019
Date Tested: 3/25/2019

TEST DATA



Maximum Density, pcf: 112.7
Optimum Moisture, %: 16.0

Percent Passing, %:
3/4": 100
3/8": 100
#4: 95
#200: 65

Atterberg Limits (ASTM: D4318):
Liquid Limit:
Plastic Limit:
Plasticity Index:

Nick Bierle, Staff Engineer

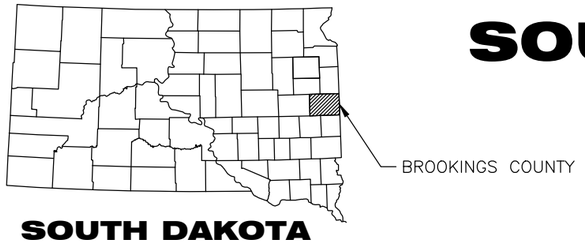
SDSU CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5

SOUTH DAKOTA STATE UNIVERSITY

BROOKINGS, SOUTH DAKOTA

OSE# R0323--03X/ARPA

2024



SOUTH DAKOTA

CERTIFICATION

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

I, Matthew James Pajl, hereby certify that these plans were prepared by me, or under my direct supervision and that I am a duly Registered Engineer under the laws of the State of South Dakota.

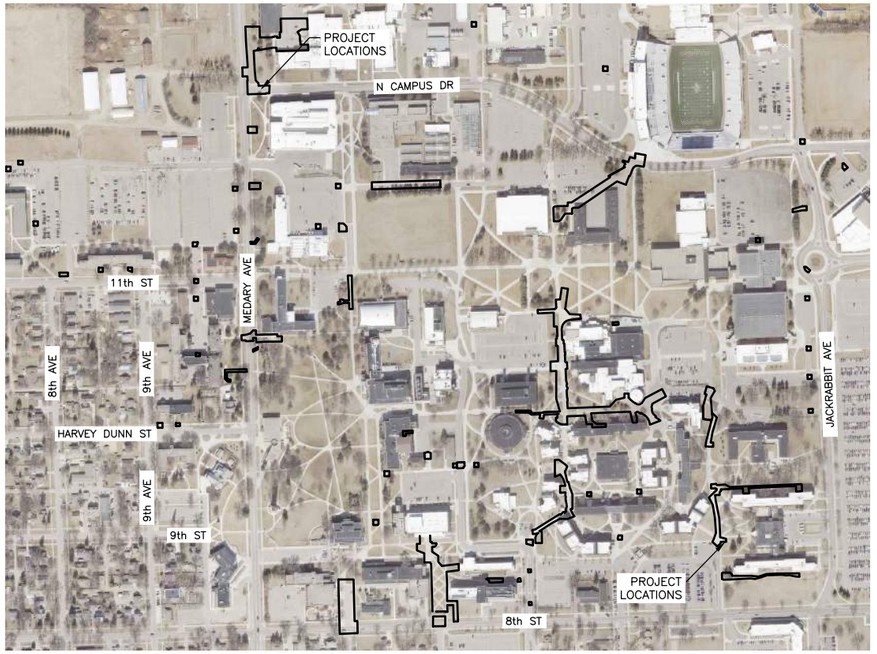
MATTHEW JAMES PAJL S.D. No. 11935 Date

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
17091
GRAHAM W.
HUCKINS
SOUTH DAKOTA

I, Graham W. Huckins, hereby certify that these plans were prepared by me, or under my direct supervision and that I am a duly Registered Engineer & Land Surveyor under the laws of the State of South Dakota.

GRAHAM W. HUCKINS S.D. No. 17091 Date

LOCATION MAP



This project may be partially funded using American Rescue Plan Act (ARPA) funds. As a condition of the ARPA funding guidelines, the Contractor shall meet the following minimum requirements:

- Based on the "Build America, Buy America" provisions of the Infrastructure Investment and Jobs Act (IIJA) and E.O. 14005 which provide that, as appropriate and to the extent consistent with law, a preference will be provided to Contractors for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products.) The Contractor shall provide documentation of their efforts to meet the provisions of "Build America, Buy America" upon request.
- The Contractor shall make a good faith effort to utilize Disadvantaged Business Enterprises (DBE) and/or Minority Business Enterprises (MBE) and shall provide documentation of the effort to solicit bids from qualified entities upon request.
- A copy of the ARPA funding guidance that outlines the requirements associated with projects that utilize this funding can be found at the following link: https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/state-and-local-fiscal-recovery-funds/

HRGreen

431 N. PHILLIPS AVENUE, SUITE 400 | SIOUX FALLS, SOUTH DAKOTA 57104
Phone: 605.334.4499 | Toll Free: 800.728.7805 | Fax: 713.965.0044 | HRGreen.com

Xrefs: xgt-1-dh01; XVX-IMAGE; XC-1-SAN; XV-SURVEY; XC-1-CONST-LIMITS

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APPROVED:	MJP	JOB NUMBER:	221795
CAD DATE:	10/31/2024 3:35:40 PM		
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BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

NO.	DATE	BY	REVISION DESCRIPTION

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CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

A – GENERAL
COVER SHEET

SHEET NO.
A001

SHEET INDEX

SHEET INDEX

SHT NO.	SHT NAME
A – GENERAL	
A001	COVER SHEET
A002	SHEET INDEX
A003	LEGEND
A004	HORIZONTAL ALIGNMENT DATA
A005	HORIZONTAL ALIGNMENT DATA
A006	HORIZONTAL ALIGNMENT DATA
A007	HORIZONTAL ALIGNMENT DATA
A008	HORIZONTAL ALIGNMENT DATA
A009	HORIZONTAL ALIGNMENT DATA
A010	HORIZONTAL ALIGNMENT DATA
A011	HORIZONTAL ALIGNMENT DATA
B – ESTIMATE OF QUANTITIES	
B001	ESTIMATE OF QUANTITIES
B002	BID ALTERNATES ESTIMATE OF QUANTITIES
C – TYPICAL SECTIONS	
C001	TYPICAL SECTIONS
C002	TYPICAL SECTIONS
D – GENERAL NOTES	
D001	GENERAL NOTES
D002	GENERAL NOTES
D003	GENERAL NOTES
D004	GENERAL NOTES
D005	GENERAL NOTES
D006	GENERAL NOTES
D007	GENERAL NOTES
D008	GENERAL NOTES
F – TRAFFIC CONTROL	
F001	TRAFFIC CONTROL NOTES
F002	TRAFFIC CONTROL NOTES
F003	TRAFFIC CONTROL PLANS
F004	TRAFFIC CONTROL PLANS
F005	TRAFFIC CONTROL PLANS
F006	PEDESTRIAN TRAFFIC CONTROL PLANS
G – EROSION CONTROL	
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G002	EROSION CONTROL NOTES
G003	EROSION CONTROL NOTES
G004	EROSION CONTROL NOTES
G005	EROSION CONTROL NOTES
G006	EROSION CONTROL NOTES
G007	EROSION CONTROL NOTES
G008	EROSION CONTROL NOTES
G101	EROSION CONTROL PLAN
G102	EROSION CONTROL PLAN
G103	EROSION CONTROL PLAN
G104	EROSION CONTROL PLAN
G105	EROSION CONTROL PLAN
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G107	EROSION CONTROL PLAN
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G109	EROSION CONTROL PLAN
G110	EROSION CONTROL PLAN
G111	EROSION CONTROL PLAN
G112	EROSION CONTROL PLAN
G113	EROSION CONTROL PLAN
G114	EROSION CONTROL DETAILS
G115	EROSION CONTROL DETAILS
G116	EROSION CONTROL DETAILS
H – EXISTING CONDITIONS AND REMOVALS	
H001	BYPASS PUMPING PLANS
H002	BYPASS PUMPING PLANS
H003	BYPASS PUMPING PLANS
H004	BYPASS PUMPING PLANS
H101	EXISTING CONDITIONS & REMOVALS
H102	EXISTING CONDITIONS & REMOVALS
H103	EXISTING CONDITIONS & REMOVALS
H104	EXISTING CONDITIONS & REMOVALS
H105	EXISTING CONDITIONS & REMOVALS
H106	EXISTING CONDITIONS & REMOVALS
H107	EXISTING CONDITIONS & REMOVALS
H108	MATHEWS HALL EXISTING CONDITIONS & REMOVALS
H109	EXISTING CONDITIONS & REMOVALS
H110	EXISTING CONDITIONS & REMOVALS
H111	EXISTING CONDITIONS & REMOVALS
H112	EXISTING CONDITIONS & REMOVALS
H113	EXISTING CONDITIONS & REMOVALS
H114	EXISTING CONDITIONS & REMOVALS
H115	EXISTING CONDITIONS & REMOVALS
H116	EXISTING CONDITIONS & REMOVALS
H117	EXISTING CONDITIONS & REMOVALS
H118	EXISTING CONDITIONS & REMOVALS
H119	EXISTING CONDITIONS & REMOVALS
H120	EXISTING CONDITIONS & REMOVALS
I – UTILITY PLAN AND PROFILE	
I100	UTIILITY SHEET REFERENCE PLAN
I101	SANITARY SEWER MAIN PLAN AND PROFILE
I102	SANITARY SEWER MAIN PLAN AND PROFILE
I103	SANITARY SEWER MAIN PLAN AND PROFILE
I104	SANITARY SEWER MAIN PLAN AND PROFILE
I105	SANITARY SEWER MAIN PLAN AND PROFILE
I106	SANITARY SEWER MAIN PLAN AND PROFILE
I107	SANITARY SEWER MAIN PLAN AND PROFILE
I108	SANITARY SEWER MAIN PLAN AND PROFILE
I109	SANITARY SEWER MAIN PLAN AND PROFILE
I110	SANITARY SEWER MAIN PLAN AND PROFILE
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I114	SANITARY SEWER MAIN PLAN AND PROFILE
I115	SANITARY SEWER MAIN PLAN AND PROFILE
I116	SANITARY SEWER MAIN PLAN AND PROFILE
I117	SANITARY SEWER MAIN PLAN AND PROFILE
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I122	SANITARY SEWER MAIN PLAN AND PROFILE
I123	SANITARY SEWER MAIN PLAN AND PROFILE
I124	SANITARY SEWER MAIN PLAN AND PROFILE
I400	MANHOLE LOCATION PLAN
I401	MANHOLE STRUCTURE DETAILS
I402	MANHOLE STRUCTURE DETAILS
I403	MANHOLE STRUCTURE DETAILS
I404	MANHOLE STRUCTURE DETAILS
I405	MANHOLE STRUCTURE DETAILS
I406	MANHOLE STRUCTURE DETAILS
I407	MANHOLE STRUCTURE DETAILS
J – PAVING PLANS	
J101	PAVING PLAN
J102	PAVING PLAN
J103	PAVING PLAN
J104	PAVING PLAN
J105	PAVING PLAN
J106	PAVING PLAN
J107	PAVING PLAN
J108	PAVING PLAN
J109	PAVING PLAN
J110	PAVING PLAN
J111	PAVING PLAN
J112	PAVING PLAN
J113	PAVING PLAN
J114	PAVING PLAN
J115	PAVING PLAN
K – STRIPING PLANS	
K101	STRIPING PLANS
K102	STRIPING PLANS
K103	STRIPING PLANS
K104	STRIPING PLANS
U – DETAILS AND STANDARD PLATES	
U001	SPECIAL DETAILS
U002	SPECIAL DETAILS
U101	STANDARD DETAILS
U102	STANDARD DETAILS
U103	STANDARD DETAILS
U104	STANDARD DETAILS
U105	STANDARD DETAILS
U106	STANDARD DETAILS
U107	STANDARD DETAILS
U108	STANDARD DETAILS
U109	STANDARD DETAILS
U110	STANDARD DETAILS
U111	STANDARD DETAILS
U112	STANDARD DETAILS
U113	STANDARD DETAILS
U114	STANDARD DETAILS
U115	STANDARD DETAILS
U116	STANDARD DETAILS
U117	STANDARD DETAILS

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

DRAWN BY: ELC JOB DATE: 2024
APPROVED: MJP JOB NUMBER: 221795
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CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

A – GENERAL
SHEET INDEX

SHEET NO.
A002

ITEM NO.	ITEM DESCRIPTION	UNIT	QTY
	Base Bid		
ALLOWANCES			
UP-001	IRRIGATION SYSTEM & LANDSCAPING REPAIRS	LS	1
UP-002	TREE CANOPY REPLACEMENT - FURNISH AND PLANT	LS	1
UP-003	UNFORESEEN CONDITIONS	LS	1
GENERAL			
UP-004	MOBILIZATION	LS	1
UP-005	TRAFFIC CONTROL	LS	1
UP-006	HIGH VOLTAGE POWER, REMOVE AND REPLACE	LS	1
UP-007	FIBER OPTIC, REMOVE AND REPLACE	LS	1
UP-008	VERIFY UTILITY	EA	50
REMOVALS			
UP-009	REMOVE WALKWAY LIGHT ASSEMBLY	EA	14
UP-010	REMOVE EXISTING MANHOLE	EA	23
UP-011	ABANDON EXISTING MANHOLE	EA	7
UP-012	ABANDON EXISTING SANITARY STRUCTURE	EA	2
UP-013	REMOVE EXISTING MANHOLE FRAME AND COVER	EA	43
UP-014	REMOVE WATER MAIN	FT	175
UP-015	REMOVE EXISTING SANITARY SEWER MAIN	LF	1,944
UP-016	ABANDON SANITARY SEWER, FILL AND PLUG (CLSM)	LF	598
UP-017	REMOVE CONCRETE CURB AND GUTTER	FT	634
UP-018	REMOVE CONCRETE SIDEWALK	SY	4,267
UP-019	REMOVE ASPHALT CONCRETE COMPOSITE	SY	2,826
UP-020	REMOVE CONCRETE PAVEMENT	SY	548
UP-021	COLD MILLING ASPHALT CONCRETE	SY	28
UP-022	LANDSCAPING REMOVALS	SF	3,168
UP-023	CLEAR AND GRUB TREE	EA	30
WATER			
UP-024	8" PVC WATER MAIN	LF	100
UP-025	8" MJ 11.25, 22.5, 45 DEGREE BEND	EA	4
UP-026	8" MJ SLEEVE	EA	2
UP-027	8" GATE VALVE WITH BOX	EA	1
UP-028	CUT AND TIE TO EXISTING WATER MAIN	EA	1
SANITARY SEWER			
UP-029	SANITARY SEWER TEMPORARY BYPASS PUMPING	LS	1
UP-030	2" DIA. HDPE FORCE MAIN	LF	126
UP-031	6" DIA. PVC GRAVITY SEWER PIPE	LF	312
UP-032	8" DIA. PVC GRAVITY SEWER PIPE	LF	1,415
UP-033	10" DIA. PVC GRAVITY SEWER PIPE	LF	123
UP-034	12" DIA. PVC GRAVITY SEWER PIPE	LF	847
UP-035	15" DIA. PVC GRAVITY SEWER PIPE	LF	15
UP-036	18" DIA. PVC GRAVITY SEWER PIPE	LF	135
UP-037	6" SANITARY SEWER CAP/ PLUG	EA	6
UP-038	8" SANITARY SEWER CAP/ PLUG	EA	1
UP-039	10" SANITARY SEWER CAP/ PLUG	EA	4
UP-040	12" SANITARY SEWER CAP/ PLUG	EA	8
UP-041	15" SANITARY SEWER CAP/ PLUG	EA	2
UP-042	12" NO-DIG VCP MICRO PILOT TUNNELING	LF	873
UP-043	MICRO PILOT TUNNELING, LAUNCH PIT	EA	3
UP-044	MICRO PILOT TUNNELING, RECEIVING PIT	EA	3
UP-045	16" STEEL CASING PIPE, TRENCHLESS	LF	44
UP-046	18" STEEL CASING PIPE, TRENCHLESS	LF	17
UP-047	20" STEEL CASING PIPE, TRENCHLESS	LF	14
UP-048	PRE-INSTALLATION VIDEO INSPECTION	LF	2,774
UP-049	PRE-INSTALLATION CLEANING, 6" SANITARY SEWER	LF	572
UP-050	PRE-INSTALLATION CLEANING, 8" SANITARY SEWER	LF	1,336
UP-051	PRE-INSTALLATION CLEANING, 10" SANITARY SEWER	LF	679
UP-052	PRE-INSTALLATION CLEANING, 12" SANITARY SEWER	LF	187
UP-053	PIPE LINING, CURED-IN-PLACE PIPE, 6"	LF	572
UP-054	PIPE LINING, CURED-IN-PLACE PIPE, 8"	LF	1,336
UP-055	PIPE LINING, CURED-IN-PLACE PIPE, 10"	LF	679
UP-056	PIPE LINING, CURED-IN-PLACE PIPE, 12"	LF	187
UP-057	POST-INSTALLATION VIDEO INSPECTION	LF	2,774
UP-058	MANHOLE CEMENTITIOUS LINER, DEPTH OF 0-5 FEET	VLF	30
UP-059	MANHOLE CEMENTITIOUS LINER, DEPTH OF 5.1-15 FEET	VLF	40
UP-060	MANHOLE EPOXY LINER, 125 MIL APPLIED THICKNESS	VLF	215
UP-061	POLYURETHANE CHEMICAL GROUT	GAL	50
UP-062	MANHOLE BENCH & INVERT RECONSTRUCTION	EA	15
UP-063	MANHOLE FRAME & COVER	EA	43
UP-064	MANHOLE COVER	EA	2
UP-065	REMOVE & REINSTALL: MANHOLE FRAME & COVER	EA	3
UP-066	REMOVE, FURNISH & INSTALL: PIPE SEALS	EA	4
UP-067	EXTERNAL FRAME SEAL	EA	45
UP-068	48" DIA SANITARY SEWER MANHOLE	EA	26
UP-069	60" DIA SANITARY SEWER LINED MANHOLE	EA	2
UP-070	48" DIA BARREL SECTION	VLF	8
UP-071	REMOVE/ REINSTALL CONE SECTION	EA	5
UP-072	GRIND PROTRUDING SANITARY SEWER SERVICE	EA	1
UP-073	TRIM SANITARY SEWER PIPE IN MANHOLE	EA	7
UP-074	REMOVE MANHOLE STEPS	EA	209
UP-075	ADJUSTING RING FOR MANHOLE, PER ONE INCH RING	EA	174
UP-076	SANITARY SEWER MANHOLE DROP ASSEMBLY	EA	24
UP-077	8" x 6" SEWER WYE/TAP	EA	7
UP-078	8" X 8" SEWER WYE/TAP	EA	1
UP-079	12" X 6" SEWER WYE/TAP	EA	2
UP-080	6" SANITARY SEWER CLEANOUT ASSEMBLY	EA	2
UP-081	8" SANITARY SEWER CLEANOUT ASSEMBLY	EA	5
UP-082	SANITARY SEWER SERVICE CONNECTION	EA	34
UP-083	CONNECT TO EXISTING SANITARY SEWER PIPE	EA	28
UP-084	CONNECT INTO EXISTING SANITARY SEWER MANHOLE	EA	5
UP-085	MATHEWS HALL LIFT STATION	EA	1
SURFACING			
UP-086	CONTRACTOR FURNISHED FILL	TON	500
UP-087	SCARIFY & RECOMPACT SUBGRADE	SY	3,289
UP-088	GEOTEXTILE FABRIC FOR SUBGRADE STABILIZATION	SY	3,289
UP-089	AGGREGATE BASE COURSE	TON	2,880
UP-090	ASPHALT CONCRETE COMPOSITE	TON	675
UP-091	8" PCC PAVEMENT	SY	405
UP-092	CONCRETE FILLET	SY	92
UP-093	CONCRETE CURB & GUTTER	ET	587
UP-094	CONCRETE VALLEY GUTTER 6" THICK	SF	365
UP-095	5" CONCRETE SIDEWALK	SF	35,243
UP-096	5" COLORED CONCRETE SIDEWALK	SF	3,515
UP-097	6' WIDE CONCRETE STAIRS AND RAILING	STEP	5
UP-098	SALVAGE AND RESET CONCRETE BENCH SEGMENT, SPENCER HALL	EA	1
UP-099	SALVAGE AND RESET TRASH BIN RAILS	EA	2
UP-100	EPOXY PAVEMENT MARKING PAINT, 4" YELLOW	LF	1,911
UP-101	EPOXY PAVEMENT MARKING PAINT, 4" WHITE	LF	158
UP-102	EPOXY PAVEMENT MARKING PAINT, 12" WHITE	LF	128
UP-103	EPOXY PAVEMENT MARKING PAINT, 24" WHITE	LF	148
UP-104	EPOXY PAVEMENT MARKING PAINT, ARROW	EA	4
UP-105	TYPE 1 DETECTABLE WARNING PANEL	SF	80
UP-106	SALVAGE AND RESET SIGN	EA	10
UP-107	INSTALL SALVAGED LIGHT POLE WITH NEW CONCRETE BASE	EA	13
UP-108	INSTALL SALVAGED LIGHT POLE ON EXISTING CONCRETE BASE	EA	1
EROSION CONTROL			
UP-109	SWEEPING	HR	80
UP-110	ORANGE PLASTIC SAFETY FENCE	FT	5,641
UP-111	INLET PROTECTION	EA	20
UP-112	CONCRETE WASHOUT AREA	EA	7
UP-113	SEDIMENT CONTROL WATTLE	ET	2,850
UP-114	SILT FENCE	FT	50
UP-115	MINOR IMPACT VEHICLE TRACKING CONTROL	EA	6
UP-116	CONTRACTOR FURNISHED TOPSOIL	TON	1,070
UP-117	SALVAGE AND PLACE TOPSOIL	CY	2,139
UP-118	PERMANENT SEED MIXTURE 1	LB	393
UP-119	PERMANENT SEED MIXTURE 2	LB	127
UP-120	WEED CONTROL	SY	9,650
UP-121	EROSION CONTROL BLANKET	SY	50
UP-122	BONDED FIBER MATRIX	TON	4.0
UP-123	PLANT BED PREPARATION	SY	540
UP-124	4" DEPTH SHREDDED BARK MULCH	SY	540
UP-125	6" RESTRAINED CAP	EA	2
UP-126	10" RESTRAINED CAP	EA	2
UP-127	8" SANITARY SEWER BEND	EA	2

REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

Xrefs: xgl-1-dh01; PE & LS-White_Benjamin-SD

DRAWN BY: ELC JOB DATE: 2024
APPROVED: MJP JOB NUMBER: 221795
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NO.	DATE	BY	REVISION DESCRIPTION

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CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

B – ESTIMATE OF QUANTITIES
ESTIMATE OF QUANTITIES

SHEET NO.
B001

TESTING CENTER FORCE MAIN INSTALLATION, BID ALTERNATE A			
ITEM NO.	ITEM DESCRIPTION	UNIT	QTY
UP-A-001	MOBILIZATION	LS	1
UP-A-002	ABANDON EXISTING MANHOLE	EA	3
UP-A-003	REMOVE EXISTING SANITARY SEWER MAIN	FT	7
UP-A-004	REMOVE CONCRETE SIDEWALK	SY	75
UP-A-005	REMOVE ASPHALT CONCRETE COMPOSITE	SY	105
UP-A-006	4" DIA PVC FORCE MAIN	LF	150
UP-A-007	4" DIIA. PVC FORCE MAIN, VIA HDD	LF	240
UP-A-008	HORIZONTAL DIRECTIONAL DRILLING PIT	EA	2
UP-A-009	6" SANITARY SEWER CAP/ PLUG	EA	1
UP-A-010	8" SANITARY SEWER CAP/ PLUG	EA	7
UP-A-011	4" SEWER BENDS	EA	3
UP-A-012	SANITARY SEWER SERVICE CONNECTION	EA	1
UP-A-013	CONNECT INTO EXISTING SANITARY SEWER MANHOLE	EA	1
UP-A-014	SCARIFY & RECOMPACT SUBGRADE	SY	105
UP-A-015	GEOTEXTILE FABRIC FOR SUBGRADE STABILIZATION	SY	105
UP-A-016	AGGREGATE BASE COURSE	TON	71
UP-A-017	ASPHALT CONCRETE COMPOSITE	TON	23
UP-A-018	5" CONCRETE SIDEWALK	SF	675
UP-A-019	ORANGE PLASTIC SAFETY FENCE	FT	92
UP-A-020	PLANT BED PREPARATION	SY	15
UP-A-021	4" DEPTH SHREDDED BARK MULCH	SY	33

ABBOT HALL SANITARY SEWER INSTALLATION, BID ALTERNATE B			
ITEM NO.	ITEM DESCRIPTION	UNIT	QTY
UP-B-001	MOBILIZATION	LS	1
UP-B-002	REMOVE WALKWAY LIGHT ASSEMBLY	EA	1
UP-B-003	REMOVE EXISTING MANHOLE	EA	1
UP-B-004	ABANDON EXISTING MANHOLE	EA	0
UP-B-005	ABANDON EXISTING SANITARY STRUCTURE	EA	1
UP-B-006	REMOVE EXISTING SANITARY SEWER MAIN	FT	52
UP-B-007	REMOVE CONCRETE SIDEWALK	SY	378
UP-B-008	LANDSCAPING REMOVALS	SF	1,053
UP-B-009	CLEAR AND GRUB TREE	EA	3
UP-B-010	TEMPORARY BYPASS PUMPING	LS	1
UP-B-011	8" DIA. PVC GRAVITY SEWER PIPE	LF	27
UP-B-012	10" DIA. PVC GRAVITY SEWER PIPE	LF	15
UP-B-013	12" DIA. PVC GRAVITY SEWER PIPE	LF	20
UP-B-014	10" SANITARY SEWER CAP/ PLUG	EA	3
UP-B-015	12" NO-DIG VCP MICRO PILOT TUNNELING	LF	226
UP-B-016	MICRO PILOT TUNNELING, LAUNCH PIT	EA	1
UP-B-017	MICRO PILOT TUNNELING, RECEIVING PIT	EA	2
UP-B-018	PRE-INSTALLATION VIDEO INSPECTION	LF	126
UP-B-019	PRE-INSTALLATION CLEANING, 8" SANITARY SEWER	LF	126
UP-B-020	PIPE LINING, CURED-IN-PLACE PIPE, 8"	LF	126
UP-B-021	POST-INSTALLATION VIDEO INSPECTION	LF	414
UP-B-022	48" DIA SANITARY SEWER MANHOLE	EA	4
UP-B-023	SANITARY SEWER SERVICE CONNECTION	EA	4
UP-B-024	CONNECT TO EXISTING SANITARY SEWER PIPE	EA	1
UP-B-025	AGGREGATE BASE COURSE	TON	108
UP-B-026	5" CONCRETE SIDEWALK	SF	3,350
UP-B-027	INSTALL SALVAGED LIGHT POLE WITH NEW CONCRETE BASE	EA	1
UP-B-028	ORANGE PLASTIC SAFETY FENCE	FT	244
UP-B-029	4" DEPTH SHREDDED BARK MULCH	SY	33

ANIMAL COMPLEX SANITARY SEWER INSTALLATION, BID ALTERNATE C			
ITEM NO.	ITEM DESCRIPTION	UNIT	QTY
UP-C-001	MOBILIZATION	LS	1
UP-C-002	REMOVE EXISTING MANHOLE	EA	3
UP-C-003	REMOVE EXISTING SANITARY STRUCTURE	EA	2
UP-C-004	ABANDON SANITARY SEWER, FILL AND PLUG (CLSM)	LF	108
UP-C-005	REMOVE CONCRETE CURB AND GUTTER	FT	45
UP-C-006	REMOVE CONCRETE SIDEWALK	SY	81
UP-C-007	REMOVE ASPHALT CONCRETE COMPOSITE	SY	1,739
UP-C-008	REMOVE CONCRETE PAVEMENT	SY	253
UP-C-009	CLEAR AND GRUB TREE	EA	5
UP-C-010	SANITARY SEWER TEMPORARY BYPASS PUMPING	LS	1
UP-C-011	6" DIA PVC FORCE MAIN	LF	77
UP-C-012	6" DIA. PVC GRAVITY SEWER PIPE	LF	137
UP-C-013	8" DIA. PVC GRAVITY SEWER PIPE	LF	235
UP-C-014	10" DIA. PVC GRAVITY SEWER PIPE	LF	111
UP-C-015	15" DIA. PVC GRAVITY SEWER PIPE	LF	333
UP-C-016	15" SANITARY SEWER CAP/ PLUG	EA	1
UP-C-017	POST-INSTALLATION VIDEO INSPECTION	LF	885
UP-C-018	48" DIA SANITARY SEWER MANHOLE	EA	4
UP-C-019	48" DIA SANITARY SEWER LINED MANHOLE	EA	5
UP-C-020	LINED CONCRETE SEPARATION TANK	EA	1
UP-C-021	SANITARY SEWER MANHOLE DROP ASSEMBLY	EA	3
UP-C-022	6" SANITARY SEWER BEND	EA	4
UP-C-023	8" SANITARY SEWER BEND	EA	1
UP-C-024	10" SANITARY SEWER BEND	EA	1
UP-C-025	6" SANITARY SEWER CLEANOUT ASSEMBLY	EA	1
UP-C-026	8" SANITARY SEWER CLEANOUT ASSEMBLY	EA	5
UP-C-027	10" SANITARY SEWER CLEANOUT ASSEMBLY	EA	2
UP-C-028	SANITARY SEWER SERVICE CONNECTION	EA	9
UP-C-029	CONNECT TO EXISTING SANITARY SEWER PIPE	EA	1
UP-C-030	SCARIFY & RECOMPACT SUBGRADE	SY	1,992
UP-C-031	GEOTEXTILE FABRIC FOR SUBGRADE STABILIZATION	SY	1,992
UP-C-032	AGGREGATE BASE COURSE	TON	945
UP-C-033	ASPHALT CONCRETE COMPOSITE	TON	357
UP-C-034	8" PCC PAVEMENT	SY	346
UP-C-035	CONCRETE CURB & GUTTER	FT	45
UP-C-036	5" CONCRETE SIDEWALK	SF	575
UP-C-037	TYPE 1 DETECTABLE WARNING PANEL	SF	8
UP-C-038	REMOVE EXISTING SANITARY SEWER MAIN	LF	440
UP-C-039	ABANDON EXISTING MANHOLE	EA	1
UP-C-040	REMOVE EXISTING WATER MAIN	LF	71
UP-C-041	6" RESTRAINED CAP	EA	2

GENERAL NOTES:

1. ANY, ALL OR NONE, OF THESE BID ALTERNATES MAY BE REMOVED FROM THE CONTRACT BY THE OWNER BASED ON BUDGET AND BIDS.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

DRAWN BY: ELC JOB DATE: 2024
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NO.	DATE	BY	REVISION DESCRIPTION

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CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

B – ESTIMATE OF QUANTITIES
BID ALTERNATES ESTIMATE OF QUANTITIES

SHEET NO.
B002

Xrefs: xgl-1-dh01; PE & LS-White_Benjamin-SD

GENERAL NOTES

PROJECT SCOPE

The project will replace, relocate, and rehabilitate aging sanitary sewer mains and manholes around campus. This will be done in multiple phases with the majority of work spread over two summers. Work will consist of removing and abandoning approximately 1,800 feet of 4-inch to 15-inch sanitary sewer main, rehabilitate 2,900 feet of 4-inch to 12-inch sanitary sewer main and services via CIPP lining, install 3,900 feet of 4-inch to 18-inch sanitary sewer main and services, and replace or rehabilitate 87 manholes, roadway and parking lot surfacing, ADA sidewalk ramps, sidewalks, and traffic control. Majority of the proposed sanitary sewer main will be installed via opencut with two segments being installed with a trenchless method of pilot tube micro tunneling.

SPECIFICATIONS TO BE USED

Division II and Division III of the most current edition of the South Dakota Department of Transportation Standard Specifications for Roads and Bridges with Supplemental Specifications and Errata, together with Brookings Municipal Utilities (BMU) Standard Specifications for Water Main and Sanitary Sewer Main Construction, South Dakota State University (SDSU), BMU and DOT Standard Plates and required provisions, supplemental specifications, and/or special provisions as included in the Project Manual are hereby made a part of these specifications in its entirety unless otherwise revised, deleted, or supplemented herein.

The South Dakota Department of Transportation Standard Specifications for Roads and Bridges with Supplemental Specifications and Errata can be downloaded from the SDDOT's website at https://dot.sd.gov/.

Brookings Municipal Utilities' Standard Specifications can be downloaded from their website at http://www.brookingsutilities.com/?page_id=16350. Note that not all requirements in these specifications apply.

ORDER OF PRECEDENCE

If conflicts arise, the order of precedence of the contract documents shall be as follows: Plans over Special Provisions over SDSU Standard Specifications over Brookings Municipal Utilities Standard Specifications over South Dakota Department of Transportation Supplemental Specifications and Errata over South Dakota Department of Transportation Standard Specifications for Roads and Bridges. SDSU Standard Plates have precedence over Brookings Municipal Utilities Standard Plates over South Dakota Department of Transportation Standard Plates.

ELECTRONIC DESIGN FILES

Electronic design files WILL be available to the Contractor prior to the bid letting if requested, subject to the following conditions:

a. A signed disclaimer agreement shall be required from each Contractor requesting the electronic design files prior to distribution.

b. Electronic design files will be distributed as DWG files. The Contractor will be responsible for obtaining the appropriate software to open, analyze, and/or convert these file formats for their own use, and understand the risks and limitations associated with that software.

c. The electronic design files for distribution may be limited to the following: existing survey line work, existing ground surface model, proposed design utility and surfacing line work, and finished ground surface model. Additional information may be distributed at the Engineer's discretion.

d. The electronic design files will not include any modifications due to addendum unless specifically noted in an addendum.

e. The electronic design files are provided for reference only. In the event of a discrepancy between the electronic design files and the contract documents, the contract documents shall prevail.

Requests for the electronic design files should be made by signing the disclaimer agreement and submitting it to the Engineer. Electronic design files will be furnished to the Contractor within two (2) business days from receipt of the signed disclaimer agreement.

CONSTRUCTION LIMITS

The construction limits are shown in the plans. Material storage and vehicle and equipment traffic shall be limited to the construction limits and designated staging area on the F Sheets. All paved areas adjacent to the project are to be cleaned at the end of each working day. The Contractor will not be allowed to store materials, equipment, etc. outside of the construction and staging area.

Long-term storage location is available upon request by Contractor. Providing a secure area at the storage location will be the Contractor's responsibility.

CONSTRUCTION STAKING

Staking required to complete the work shall be completed by the Contractor, unless otherwise noted. Civil Design Inc from Brookings, SD completed the design survey. All costs associated with this work shall be included in the "Construction Staking" bid item.

SUBMITTALS

The following documents shall be submitted by the Contractor. Documentation requirements elsewhere in the contract are not waived if not listed in the following table.

Submittals	Date Submitted
Shop drawings	
Construction schedule	
South Dakota State sewer and water plumbing contractor's license	
Documentation for licensed arborist	
Contractor furnished borrow location	
Dewatering plan for groundwater	
DANR Contractor Certification Form (SD Form – 2110LD)	
Temporary sanitary sewer bypass plan and phasing	
Pilot tube microtunneling pit layout plan and staging access to the location	
Horizontal directional drilling layout plan	
Horizontal directional drilling as-built profile	
Asphalt concrete certification of compliance	
Performance graded asphalt binder certification of compliance	
Asphalt concrete paving plan	
Geotextile fabric certificate of compliance	
Colored concrete product name, standard color, mix design and sealer	
Topsoil source	
Seed testing certified report/seed bag tags	
Weed control inoculation certification and application records	
Mycorrhizal inoculum certification of fungal species claimed and live propogule count	
Fertilizer specifications, label producer name and warranty	
Bonded fiber matrix specifications	
Landscaping plantings	

CONSTRUCTION SCHEDULE

The Contractor shall prepare a construction schedule for approval by the Engineer that will ensure the completion of the project within the time frame specified. This schedule must be provided to the Engineer for review a minimum of 3 days prior to the preconstruction meeting. The construction schedule shall be in bar or network diagram form and show the start and completion dates for significant items of work in their respective phases. Significant items of work includes but is not limited to: erosion control, removals, grading, temporary water, installation of water main, base course, curb and gutter, paving, sidewalk, and pavement markings. When applicable, the schedule shall include submission dates for shop drawings, manufacturing and installation of materials, supplies, equipment, and testing for various parts of the work.

The construction schedule shall be updated on a weekly basis. If it appears the rate of progress is such that the contract will not be completed within the time frame allowed the Contractor shall be required to provide written documentation as to what measures they will take to complete the project within the specified time frame or to prosecute work in a satisfactory manner.

TIME PROVISIONS

The Contractor will commence work under this contract after Notice to Proceed is given.

Phase 1 work can commence after the Notice to Proceed is given, with the exception of the work noted on Sheet F001 as having to be completed during summer break, which is anticipated to be **May 12th, 2025**. Phase 1 work should be completed to a point that sanitary sewer main and building services are operational, pavement, sidewalk, and striping is completed by **August 6th, 2025,** with Phase 1 final completion being **August 20th, 2025**.

The Phase 1 construction around the Student Union shall be staged so that the sidewalk placement is started within approximately 7 days after the sanitary sewer main and services are installed.

Phase 2 work can commence after the Notice to Proceed is given, with the exception of the work noted on Sheet F001 as having to be completed during summer break, which is anticipated to be **May 13th, 2026**. Phase 2 work should be completed to a point that sanitary sewer main and building services are operational, pavement, sidewalk, and striping is completed by **August 7th, 2026,** with Phase 2 final completion being **August 21st, 2026**.

Substantial Completion for each phase is listed above. The Contractor further agrees to pay as liquidated damages in the amount of **$1,200 per calendar day** thereafter that the work remains uncompleted. Substantial Completion for the project shall be defined as completion of the sanitary sewer main, building sewer services, passing pipe and manhole testing, roadway, parking lot, striping, and sidewalk work identified on the plans to permit utilization for the intended purpose. Exceptions shall be for final seeding, plantings, lighting, and related site work.

Final Completion for each phase is listed above. The Contractor further agrees to pay as liquidated damages in the amount of **$600 per calendar day** thereafter that the work remains uncompleted. Final Completion shall be defined as completion of all the work identified in the plans and specifications, including cleanup of the site and staging areas, full site restoration, and removal of all excess construction items from the site.

WARRANTY

All work and materials shall have a minimum one (1) year warranty after substantial completion.

COORDINATION MEETINGS

The contractor shall conduct coordination meetings with the subcontractors, SDSU Facilities and Services, OSE Project Manager, and Engineer. These meetings shall be held weekly at a location on or near the project. The Contractor shall determine the time and location and as approved by the Engineer. Due to the high level of coordination required with the project, it is imperative that the subcontractors be included in the coordination meetings.

All costs to conduct the coordination meetings shall be incidental to the project.

CONTRACTOR SAFETY REQUIREMENTS

The Contractor is responsible for following all local, state, and federal rules and regulations regarding confined space entry and trench and excavation safety. The Contractor is solely responsible for site safety from the issuance of the Notice to Proceed until Final Acceptance. South Dakota State University shall not be responsible for the Contractor's failure to follow all applicable rules and regulations.

The following requirements apply for all contractors and subcontractors working on the project. Failure to meet these requirements may result in a stop-work order and/or removal of the Contractor from the project at the discretion of the Engineer.

Confined Spaces

The Contractor shall have a written confined space entry program. Upon request, the Contractor shall provide a written certification to the Engineer that they are in compliance with their confined space entry program or provide a copy of their written confined space entry program to the Engineer.

The Contractor shall follow all OSHA confined space requirements. The Contractor's employees shall be trained in proper confined space entry operations. The Contractor shall supply any materials, equipment, tools, or other appurtenances needed for the confined space entry operations.

The Contractor is responsible for coordination when workers from more than one contractor or subcontractor, including SDSU personnel, are working in or near a confined space. The Engineer shall be included in the Contractor's coordination efforts.

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW J. PAJL
SOUTH DAKOTA

DRAWN BY:
APPROVED:
PLOT DATE: 11/6/2024 3:02 PM
CAD FILE:
BID DATE: 2024
JOB NUMBER: 221795

NO.	DATE	BY	DESCRIPTION
1	11/01/24	MJP	Addendum #1 modifications.

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CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE# R0323--03X/ARPA

GENERAL NOTES

SHEET NO.
D001

TRAFFIC CONTROL

SEQUENCE OF OPERATIONS

The following Sequence of Operation highlights critical timing items and shall be followed by the Contractor unless an alternate Sequence of Operations is submitted in writing and approved by the Engineer. Contractor shall refer to Plan Sheet F003 for the construction phasing outline in addition to the following notes. All Phase 1 work shall be substantially completed by August 6, 2025 and finally complete by August 20, 2025. All Phase 2 work shall be substantially completed by August 7, 2026 and finally complete by August 21, 2026.

Phase 1 construction work is as follows:

Construction Work That Can Be Commenced After Notice to Proceed

No Phase 1 work.

Construction Work That Can Be Commenced After May 12, 2025

The installation erosion control, temporary sanitary sewer bypass piping, removal and abandonment of existing sanitary sewer main and manholes and removal of sidewalk and pavement. The installation of the proposed sanitary sewer main, services, and manholes, along with sidewalk and pavement replacement, and seeding and tree planting. Refer to Sheet F003 for the proposed work that is included in Phase 1 and refer to Sheets I100 through I124 for proposed sanitary sewer work.

Phase 2 construction work is as follows:

Construction Work That Can Be Commenced After Notice to Proceed

The portions of the manhole rehabilitation that are not intrusive and do not require temporary sanitary sewer bypass piping can be conducted while school is in service. Rehabilitation work that requires temporary sanitary sewer bypass piping or requires excavators, skid loaders, and similar equipment, shall not be commenced until May 12th, 2025 through August 6th, 2025; than can recommence on May 13th, 2026. Refer to Sheets I400 through I407 for proposed manhole rehabilitation work.

The pre-cleaning, televising, and measurements for the CIPP sanitary sewer main and services work, as long as temporary sanitary sewer bypass piping isn't needed to complete the work.

The CIPP sanitary sewer main and services work that does require temporary sanitary sewer bypass piping can commence during the campus spring breaks in 2025 and 2026 and the Christmas break in 2025; however, sanitary sewer flow shall be returned to unimpeded status and temporary sanitary sewer bypass piping removed prior the end of the break period.

Construction Work That Can Be Commenced Between May 12, 2025 & August 20, 2025

The installation erosion control, temporary sanitary sewer bypass piping, removal and replacement of existing sanitary sewer main and manholes required to be completed to allow for CIPP sanitary sewer main and service lining. Removal of sidewalk and pavement as required to complete the sanitary sewer main and manhole replacements. Refer to Sheet F003 for the proposed work that is included in Phase 2 and which is scheduled for completion within this time period. Also, refer to Sheets I100 through I124 for proposed replacement work.

The portions of the manhole rehabilitation that requires temporary sanitary sewer bypass piping or requires excavators, skid loaders, similar equipment.

Construction Work That Can Be Commenced Between May 13, 2026 & August 21, 2026

The installation erosion control, temporary sanitary sewer bypass piping, removal and replacement of existing sanitary sewer main and manholes required to be completed to allow for CIPP sanitary sewer main and service lining. Removal of sidewalk and pavement as required to complete the sanitary sewer main and manhole replacements. Refer to Sheet F003 for the proposed work that is included in Phase 2 and which is scheduled for completion within this time period. Also, refer to Sheets I100 through I124 for proposed replacement work.

The portions of the manhole rehabilitation that requires temporary sanitary sewer bypass piping or requires excavators, skid loaders, similar equipment.

The installation erosion control, removal and abandonment of existing sanitary sewer main and manholes and removal of sidewalk and pavement. The installation of the proposed sanitary sewer main, services, and manholes, along with sidewalk and pavement replacement, and seeding and tree planting. Refer to Sheet F003 for the proposed work that is included in Phase 2 and which is scheduled for completion within this time period. Also, refer to Sheets I100 through I124 for proposed sanitary sewer work.

TRAFFIC CONTROL

Refer to F sheets for staging of traffic control. Method of measurement shall be lump sum for the entire project. Basis of payment shall include but is not limited to furnish and install of signs and other traffic control devices that are not signs, such as flashing lights barrels, barricades, cones, etc. and maintenance of all signs and devices utilized, labor, and all other items necessary to control traffic during construction.

Contractor shall coordinate garbage disposal and mail delivery when access is impacted by construction activities. Coordination shall be incidental to the bid item "TRAFFIC CONTROL".

GENERAL MAINTENANCE OF TRAFFIC

1. Installation of traffic control shall conform to the Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition unless otherwise modified in the plans.

2. The Contractor shall notify the Engineer 7 days prior to the start of construction, and before any substantial traffic control change. The Contractor shall notify the engineer 48 hours in advance of all other traffic control changes. Installation of traffic control shall not be made before 8:30 AM on the day of the closure.

3. Removing, relocating, salvaging, and resetting of existing traffic control devices, including delineation and resetting for phased construction, shall be the responsibility of the Contractor. Any delineators or signs damaged or lost shall be replaced by the Contractor at no cost to the Owner. Payment for removing, salvaging, installing, and/or resetting of signs, including resetting for phased construction shall be incidental to the unit price bid per "TRAFFIC CONTROL".

4. Storage of vehicles and equipment shall be outside all adjacent parking lots and shall not obstruct any roadway or sidewalk outside the construction limits. Contractor's employees should mobilize at a location and arrive at the work sites in a minimum number of vehicles necessary to perform the work.

5. Indiscriminate driving and parking of vehicles within the construction limits will not be permitted. Any damage to the vegetation, surfacing, embankment, delineators and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the Owner, and to the satisfaction of the Engineer.

6. All breakaway sign supports shall comply with FHWA NCHRP 350 crash-worthy requirements.

7. Installation, maintenance, relocation and removal of Type I and II barricades, cones, vertical panels, drums, barricade warning lights, watchmen, tubular markers and flags shall be incidental to the unit price bid per "TRAFFIC CONTROL".

8. The Contractor shall ensure conflicting signage near or within the work zone is covered (i.e. speed limit signs). This work shall be incidental to the unit price bid per "TRAFFIC CONTROL".

9. The Contractor or designated traffic control subcontractor shall ensure the adequacy, legibility, and reflectivity of each sign and device. Sign washing shall be considered incidental to Traffic Control and required as directed by the Engineer.

10. Flagger warning signs shall be installed when using flaggers to direct traffic. Flaggers shall wear appropriate safety clothing and shall use a Stop/Slow paddle. Payment for flagging shall be incidental to the unit price bid per "TRAFFIC CONTROL".

11. The Contractor is responsible for maintaining all traffic control devices throughout the project at all times in accordance with the plans and the latest edition of the MUTCD. The Contractor shall immediately take appropriate measures to remedy any traffic control devices that need to removed, replaced, etc. due to changes in phasing, sequencing, weather, or any other reason upon notification from the Engineer. Failure to correct any traffic control devices that are not in compliance with the plans or the latest edition of the MUTCD upon notification from the Engineer will result in a price adjustment to the contract. The minimum price adjustment to the contract will be $100 per day per occurrence. The Engineer may delay the issuance of the price adjustment(s) if the Engineer has determined all the following apply:

a. The Contractor has made a good faith effort to bring the items into compliance with the plans and latest edition of the MUTCD.
b. Compliance was not achieved due to weather conditions outside the Contractor's control and the conditions were severe enough to prevent the Contractor from bringing the item into compliance.
c. The Contractor brought the item into compliance as soon as possible after the weather and site conditions permit.

PEDESTRIAN TRAFFIC

Construction phasing shall follow the Traffic Control Sequence of Operations. Pedestrian access shall be maintained to all Campus Buildings during all phases of the project. Pedestrian traffic shall be maintained on new and/or existing sidewalk. This will require that sidewalk ramps be removed and reconstructed in phases so that access to the Student Union is continuously maintained.

TEMPORARY PEDESTRIAN ACCESS ROUTE

A Temporary Pedestrian Access Route (TPAR) will be provided when crosswalks, sidewalks, or other pedestrian facilities are blocked, closed, or relocated. A TPAR may consist of a combination of existing and/or temporary pedestrian facilities. The TPAR will be kept free of any obstructions and hazards, such as holes, debris, mud, snow, construction equipment, traffic control signing, stored materials, etc.

The Contractor will notify the Engineer at least 72 hours prior to the start of any construction operation that will necessitate a change in pedestrian access. Pedestrian traffic signal displays controlling a crosswalk that is closed shall be covered or removed by the Contractor.

All costs associated with installing, covering or removing conflicting signage or signal displays, maintaining, cleaning, and removing a temporary pedestrian access route will be incidental to the unit price bid per "TRAFFIC CONTROL".

TEMPORARY PEDESTRIAN SIDEWALK

Temporary pedestrian sidewalk will be a smooth, continuous, non-slip, hard surface. There should be no curbs or abrupt changes in grade or terrain that could cause tripping or be a barrier to wheelchair use.

Temporary pedestrian sidewalk will have a minimum width of 48 inches, with 60 inches recommended. The Contractor shall provide boulevard sidewalk whenever possible for temporary pedestrian sidewalk that is 48 inches wide. Temporary pedestrian sidewalk less than 60 inches wide will provide for a 60-inch x 60-inch passing space at intervals not to exceed 200 feet. Temporary pedestrian sidewalk will have a maximum cross slope of 2%. The maximum grade will be 5% where the temporary pedestrian sidewalk does not follow the grade of the road.

All costs associated with installing, maintaining, and removing temporary pedestrian sidewalk, including all materials, gravel, labor, and incidental work, will be incidental to the unit price bid per "TRAFFIC CONTROL".

LONGITUDINAL PEDESTRIAN BARRICADE

Longitudinal pedestrian barricades should not be used to provide positive protection for pedestrians.

To prevent any tripping hazard to pedestrians, ballast will be located behind or internal to the device, and at no time shall impede into the pedestrian access route.

When longitudinal pedestrian barricades are combined in a series, the maximum gap between devices that do not interlock shall be one inch. Joints between devices that do interlock will be closed and flush to prevent canes or small wheels from being trapped and to facilitate safe hand trailing. When used as a sidewalk closure mechanism, longitudinal pedestrian barricades must run the entire width of the sidewalk. Longitudinal pedestrian barricade should provide a color contrasting pattern. Black should not be used to color any base on a device. The devices should comply with the general color and stripe pattern requirements of Section 6F.68 of the MUTCD.

Longitudinal pedestrian barricade will have continuous bottom and top surfaces. The top surface will be smooth to allow safe hand trailing. Both upper and lower surfaces will share a common vertical plane.

All costs will be incidental to the unit price bid per "TRAFFIC CONTROL".

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW J. PAJL
SOUTH DAKOTA

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APPROVED:	MJP	JOB NUMBER:	221795
PLOT DATE:	11/6/2024 2:17 PM		
CAD FILE:	J:\2022\221795\CAD\Campus Wide San Sewer Cat 5.5\Dwgs\F\F.01 TRAFFIC CONTROL NOTES-ADM#1.docx		

NO.	DATE	BY	DESCRIPTION

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CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE# R0323--03X/ARPA

TRAFFIC CONTROL NOTES

SHEET NO.
F001

LONGITUDINAL PEDESTRIAN BARRIER

When exposed to vehicular traffic, longitudinal pedestrian barriers shall be crashworthy, and the bottom and top surfaces of the traffic side of devices shall have retroreflective sheeting or delineation for improved nighttime visibility.

When longitudinal pedestrian barriers are combined in a series, the maximum gap between devices that do not interlock shall be one inch. Joints between devices that do interlock should be closed and flush to prevent canes or small wheels from being trapped and to facilitate safe hand trailing. Channelizing devices should provide a color contrasting pattern. Black should not be used to color any base on a device. The devices should comply with the general color and stripe pattern requirements of Chapter 6F of the MUTCD.

Longitudinal pedestrian barriers shall have continuous bottom and top surfaces. The top surface will be smooth to allow safe hand trailing.

All costs will be incidental to the unit price bid per “TRAFFIC CONTROL”.

TEMPORARY CONSTRUCTION SIGNS

Installation of temporary traffic control shall conform to the Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition, Section 6F.03 Sign Placement, unless otherwise modified in the plans. Signs mounted on portable sign supports shall meet minimal requirements provided in Paragraphs 4 through 6 of Section 6F.03 Sign Placement if used for duration greater than 30 days.

The R9-8 through R9-11a series, R11 series, W1-6 through W1-8 series, M4-10, E5-1, or other similar type signs may be used on portable sign supports that do not meet the minimum mounting heights provided in Paragraphs 4 through 6 up to 30 days. All other signs must meet the minimum height requirements if used longer than 3 days.

Signs mounted on Type 3 Barricades should not cover more than 50 percent of the top two rails or 33 percent of the total area of the three rails.

PERMANENT PAVEMENT MARKINGS

Markings shall meet requirements of SDDOT specification section 633 and associated sections. Pavement markings shall be installed at location and lengths as shown on K Sheets and shall be as follows:

- Crosswalk – Epoxy Type 1 (fast cure), 24” wide, white
- Parking lot striping, including cross hatching and Accessible Parking Symbol, Street median striping – Epoxy Type 1 (fast cure), 4” wide, yellow
- Street median striping – Epoxy Type 1 (fast cure), 4” wide, white

Acceptable brands of traffic paint known to meet the quantitative and qualitative requirements outlined below are Sherwin Williams and Diamond Vogel. The paint supplied shall be manufactured during the same calendar year that the contract work is done.

REGISTERED PROFESSIONAL ENGINEER
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11935
MATTHEW J. PAJL
SOUTH DAKOTA

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PLOT DATE:	11/6/2024 2:17 PM		
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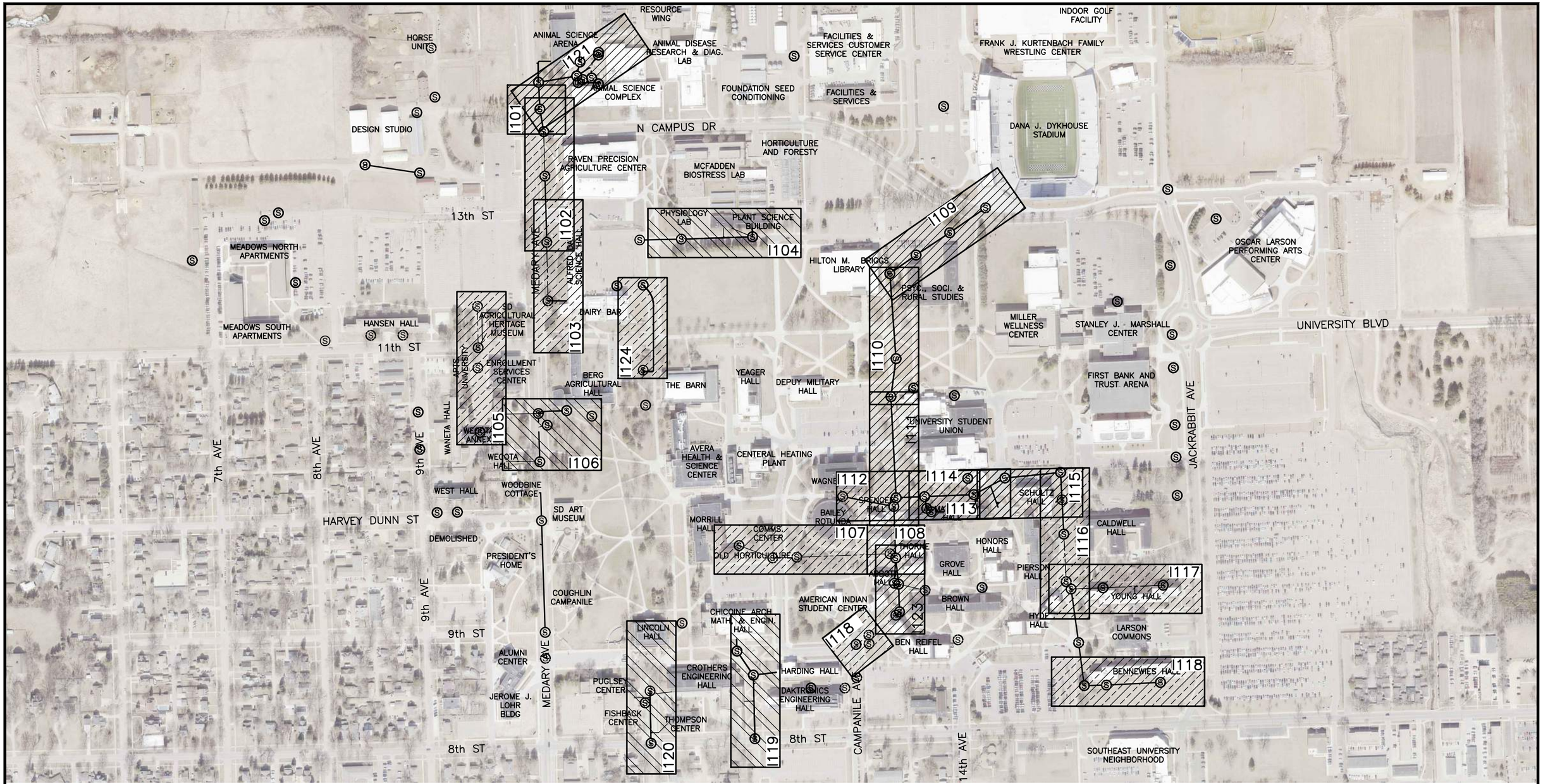
TRAFFIC CONTROL NOTES

SHEET NO.
F002



LEGEND

- (S) EXISTING SANITARY MANHOLE
- (S) PROPOSED SANITARY MANHOLE
- (S) REHABILITATED SANITARY MANHOLE
- PROPOSED SANITARY SEWER (SIZE VARIES)
- REHABILITATED SANITARY SEWER (SIZE VARIES)

- PHASE 1 PROJECT WORK BETWEEN MAY 12, 2025 TO AUGUST 6, 2025
- PHASE 2 PROJECT WORK BETWEEN MAY 13, 2026 TO AUGUST 7, 2026
- PHASE 2 PROJECT WORK BETWEEN MAY 12, 2025 TO AUGUST 6, 2025 & MAY 13, 2026 TO AUGUST 7, 2026

1 PROJECT PHASING PLAN
SCALE: NORTH 0 200' 1"=200'

REGISTERED PROFESSIONAL ENGINEER — REG. NO. 11935 — MATTHEW JAMES PAJL — SOUTH DAKOTA

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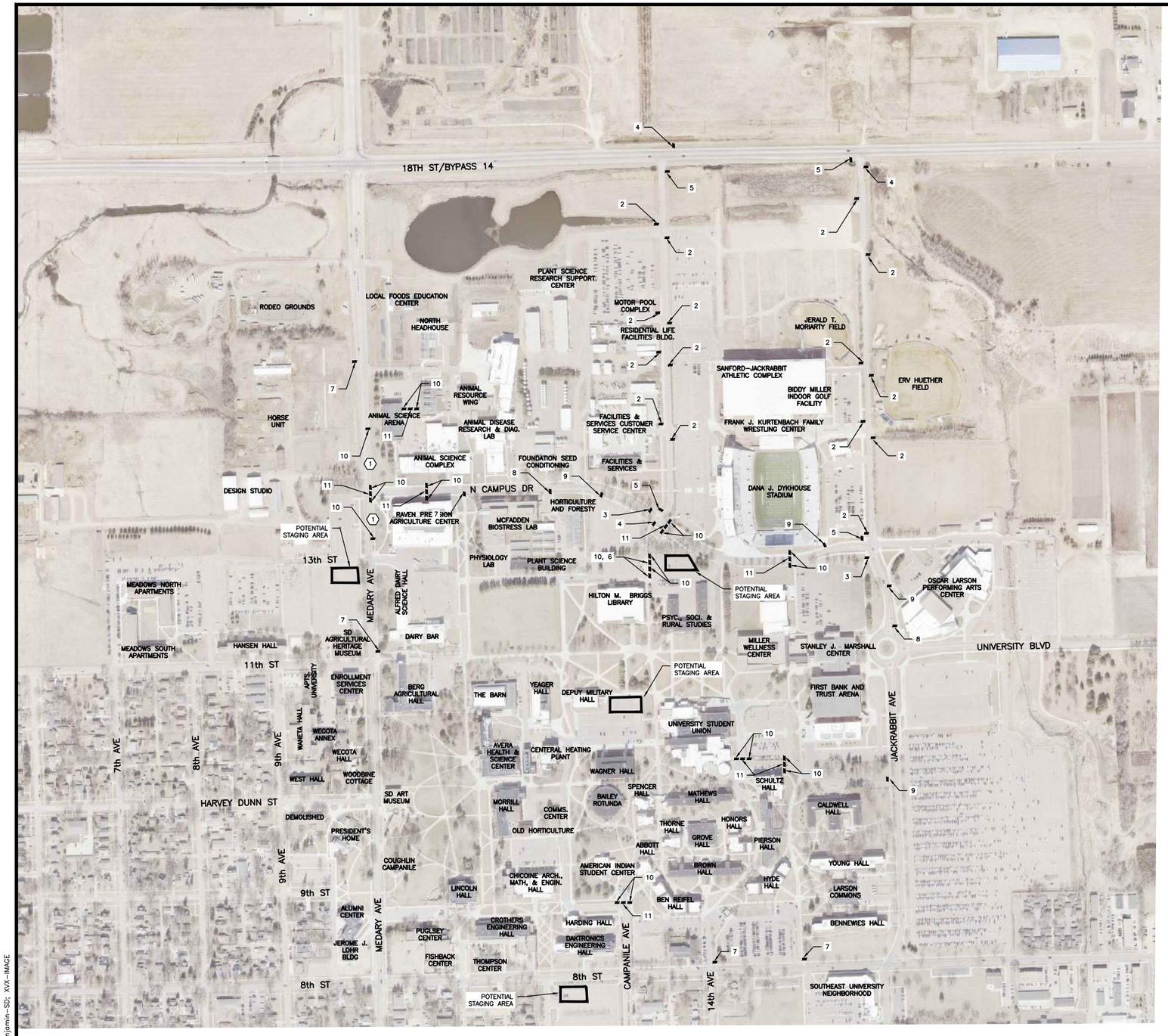
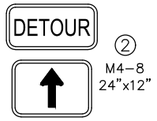
F – TRAFFIC CONTROL
TRAFFIC CONTROL PLANS

SHEET NO.
F003

Xrefs: xgf-1-dh01; PE & LS-White_Benjamin-SD; XVX-IMAGE; XC-1-SAN

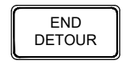


① W20-2A
36"x36"



② M4-8
24"x12"

② M6-3
21"x15"



③ G20-2
36"x18"

④ M4-9L
30"x24"

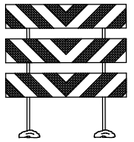
⑤ M4-9R
30"x24"

⑥ R11-4
60"x30"

⑦ W20-1
36"x36"

⑧ W20-2A
36"x36"

⑨ W20-3
36"x36"



⑩ TYPE III BARRICADE

R11-2
48"x30" ⑪

⑪ TYPE III BARRICADE

KEYNOTE: ⬡

1. CONTRACTOR SHALL PLAN TO CLOSE ONE LANE AND SHALL INCLUDE TRAFFIC DELINEATORS AS REQUIRED. THE DELINEATORS ARE INCIDENTAL.

REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

1 PHASING 1
TRAFFIC CONTROL PLAN
SCALE: 1"=300'

NORTH

0 300'

Xrefs: xg1-1-dh01; PE & LS-White_Benjamin-SD; XVX-IMAGE

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F – TRAFFIC CONTROL
TRAFFIC CONTROL PLANS

SHEET NO.
F004

1 PHASING 2
TRAFFIC CONTROL PLAN
SCALE:

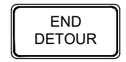
NORTH

0 300'
1"=300'

① W20-2A 36"x36"

② M4-8 24"x12"

② M6-3 21"x15"



③ G20-2 36"x18"

④ M4-9L 30"x24"

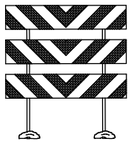
⑤ M4-9R 30"x24"

⑥ R11-4 60"x30"

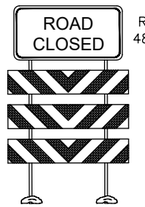
⑦ W20-1 36"x36"

⑧ W20-2A 36"x36"

⑨ W20-3 36"x36"



⑩ TYPE III BARRICADE



R11-2 48"x30" ⑪

⑪ TYPE III BARRICADE

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REG. NO.
11935
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SOUTH DAKOTA

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F – TRAFFIC CONTROL
TRAFFIC CONTROL PLANS

SHEET NO.
F005

Xrefs: xgl-1-dh01; PE & LS-White_Benjamin-SD; XVX-IMAGE

SIDEWALK CLOSED

1 R9–9

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND PLACING SIDEWALK CLOSED SIGNS. LOCATIONS AND TIMING OF PLACEMENT SHALL BE COORDINATED WITH SDSU. SDSU WILL FURNISH AND INSTALL SIDEWALK PEDESTRIAN DETOUR ROUTE LOCATION SIGNS.
2. CONTRACTOR SHALL STAGE CONSTRUCTION ACTIVITIES TO KEEP THE PEDESTRIAN RAMPS OPEN DURING CONSTRUCTION. IF RAMPS CAN NOT BE KEPT OPEN AND DETOUR ROUTE CAN NOT BE PROVIDED, CONTRACTOR SHALL INSTALL TEMPORARY PEDESTRIAN SIDEWALK. TEPORARY PEDESTRIAN SIDEWALKS ARE INCIDENTAL.
3. CONTRACTOR SHALL BE ALLOWED TO MOVE THE SIDEWALK CLOSED SIGNS AS NEEDED PER THE PHASING OF THE CONSTRUCTION WORK.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
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MATTHEW JAMES PAJL
SOUTH DAKOTA

1 PEDESTRAIN TRAFFIC CONTROL PLAN
SCALE: 1"=200'

NORTH

0 200'

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APPROVED: XXX	JOB NUMBER: 221795	IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.	
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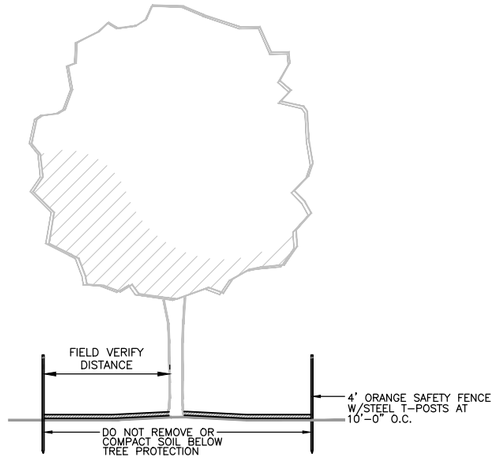
F – TRAFFIC CONTROL
PEDESTRIAN TRAFFIC CONTROL PLANS

SHEET NO.
F006

Xrefs: xgl-1-gh01; PE & LS-White_Benjamin-SD; XVX-IMAGE

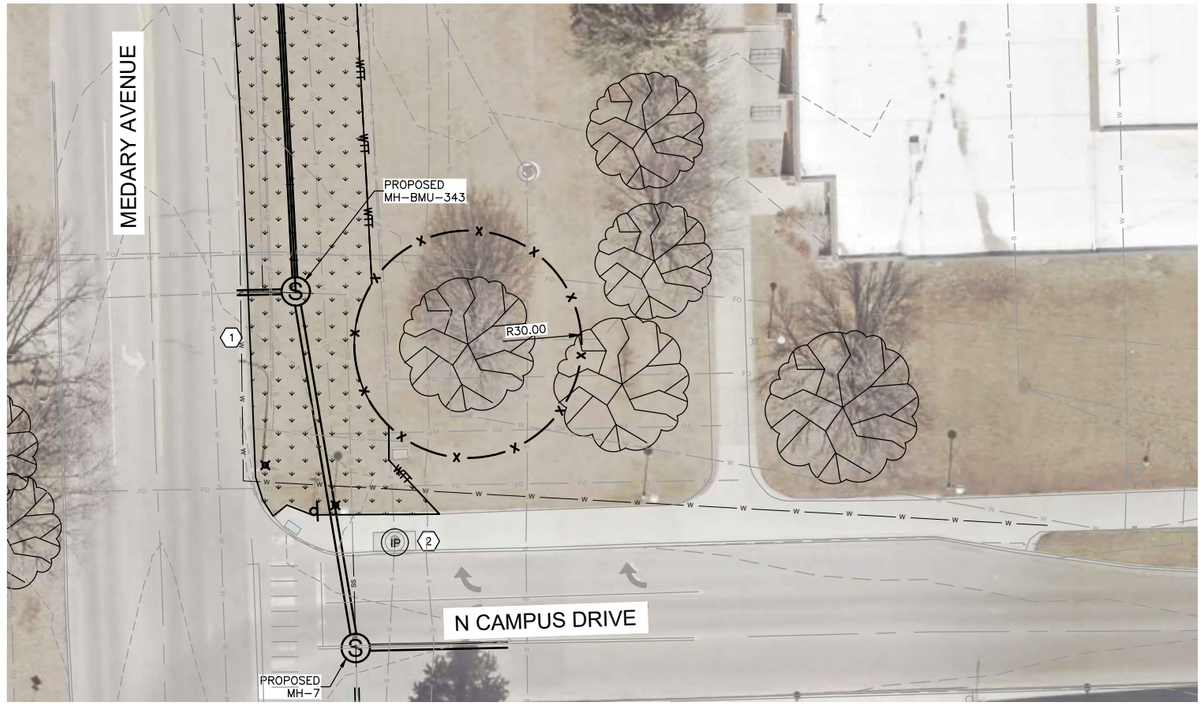
LEGEND

- PERMANENT SEED MIXTURE 1
- PERMANENT SEED MIXTURE 2
- EROSION CONTROL BLANKET
- LANDSCAPE RESTORATION
- IP — INLET PROTECTION
- CWF — CONC WASHOUT FACILITY
- MVTC — MINOR IMPACT CONSTRUCTION SITE TEMPORARY VEHICLE TRACKING CONTROL
- SF — SILT FENCE
- WTT — WATTLES
- TREE PROTECT ORANGE PLASTIC SAFETY FENCE SEE DETAIL 3/G101
- PROTECTION ZONE; NO CONSTRUCTION ACTIVITIES WITHIN ZONE UNLESS OTHERWISE NOTED



NOTES:
- FENCING IS TO BE INSTALLED PRIOR TO THE BEGINNING OF ANY CONSTRUCTION ACTIVITIES.
- NO PARKING OF VEHICLES, STORAGE OF MATERIALS, OR CONSTRUCTION TRAFFIC IS ALLOWED WITHIN OR BEYOND THE LIMITS OF TREE PROTECTION FENCING.

3 TREE PROTECTION DETAIL
SCALE: NTS



1 EROSION CONTROL PLAN
SCALE: 1"=20'

NORTH

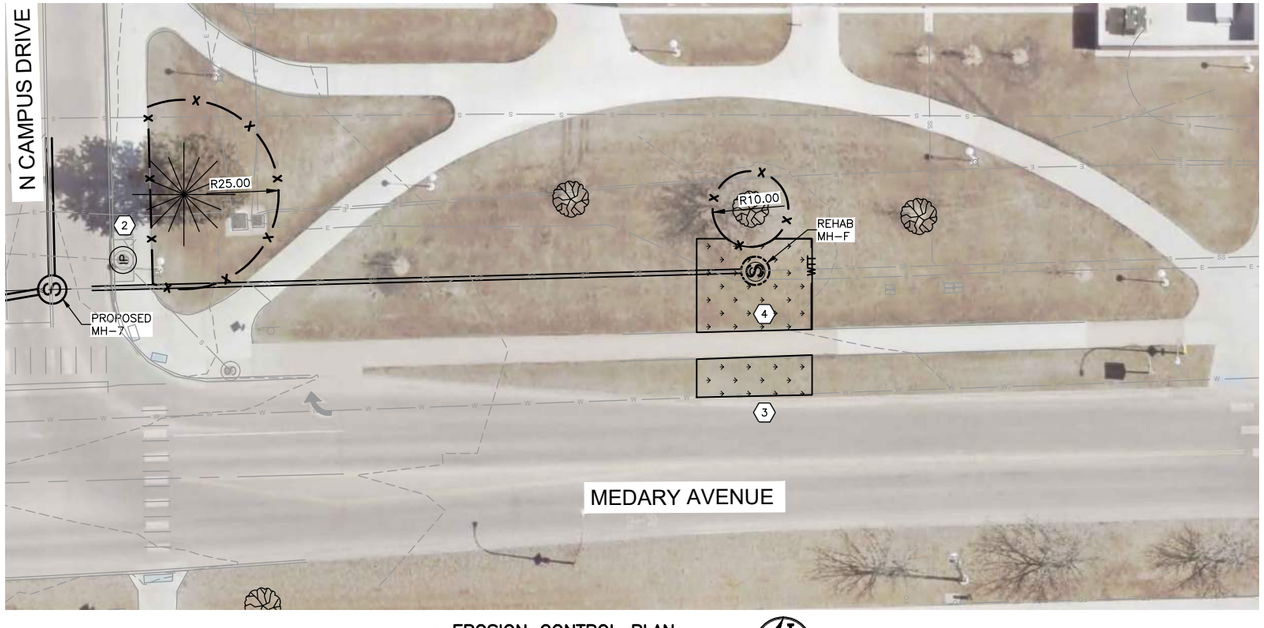
KEYNOTE:

1. CONTRACTOR MAY USE A PORTION OF THE NORTH BOUND LANE FOR CONSTRUCTION EQUIPMENT AS LONG AS THE ROADWAY SURFACE IS PROTECTED AND PROPER TRAFFIC CONTROL IS PLACED.
2. CONTRACTOR SHALL ADJUST INLET PROTECTION AS NEEDED DURING ADJACENT EXCAVATION TO PROVIDE FULL INLET PROTECTION. IMPROPER INLET PROTECTION THAT RESULTS IN SOIL ENTERING THE STORM SYSTEM SHALL BE REMOVED AT THE EXPENSE OF THE CONTRACTOR.
3. CONTRACTOR SHALL ACCESS MH-F FROM THE ROADWAY SURFACE.
4. CONTRACTOR SHALL UTILIZE PROTECTIVE MATS/BOARDS FOR MANHOLE AND SEWER MAIN REHABILITATION.

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SWEPT TO REMOVE TRACKING OF MATERIAL WHEN DIRECTED BY OWNER, ENGINEER, OR WHEN TRACKING IS PRESENT.
2. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
3. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REPAIRED AT NO COST TO OWNER.
4. PROJECT AREAS VARY FROM HAVING IRRIGATION TO NOT HAVING IRRIGATION. DAMAGED IRRIGATION SYSTEMS SHALL BE REPAIRED WITHIN 7 CALENDAR DAYS AFTER DAMAGED UNLESS OTHERWISE NOTED BY OWNER OR ENGINEER. MANY IRRIGATED AREAS WILL NEED TO MAINTAIN FUNCTIONING IRRIGATION SYSTEMS.
5. CONTRACTOR SHALL INSTALL TREE AND SHRUB PROTECTION FENCING PRIOR TO STARTING CONSTRUCTION ACTIVITIES, TO ENSURE THAT TREES AND SHRUBS ARE NOT DAMAGED WHEN NOT CALLED TO BE REMOVED.
6. WHERE NOTED, CONTRACTOR SHALL UTILIZE PROTECTIVE MATS/BOARDS OVER VEGETATION AND PAVEMENT. PROJECT INCLUDES A CONSERVATIVE AMOUNT OF SEEDING; HOWEVER, CONTRACTOR SHALL UTILIZE THE PROTECTIVE MEASURES TO LIMIT THE REQUIRED SEEDING.

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA



2 EROSION CONTROL PLAN
SCALE: 1"=20'

NORTH

DRAWN BY:	JMM
JOB DATE:	2024
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JOB NUMBER:	221795
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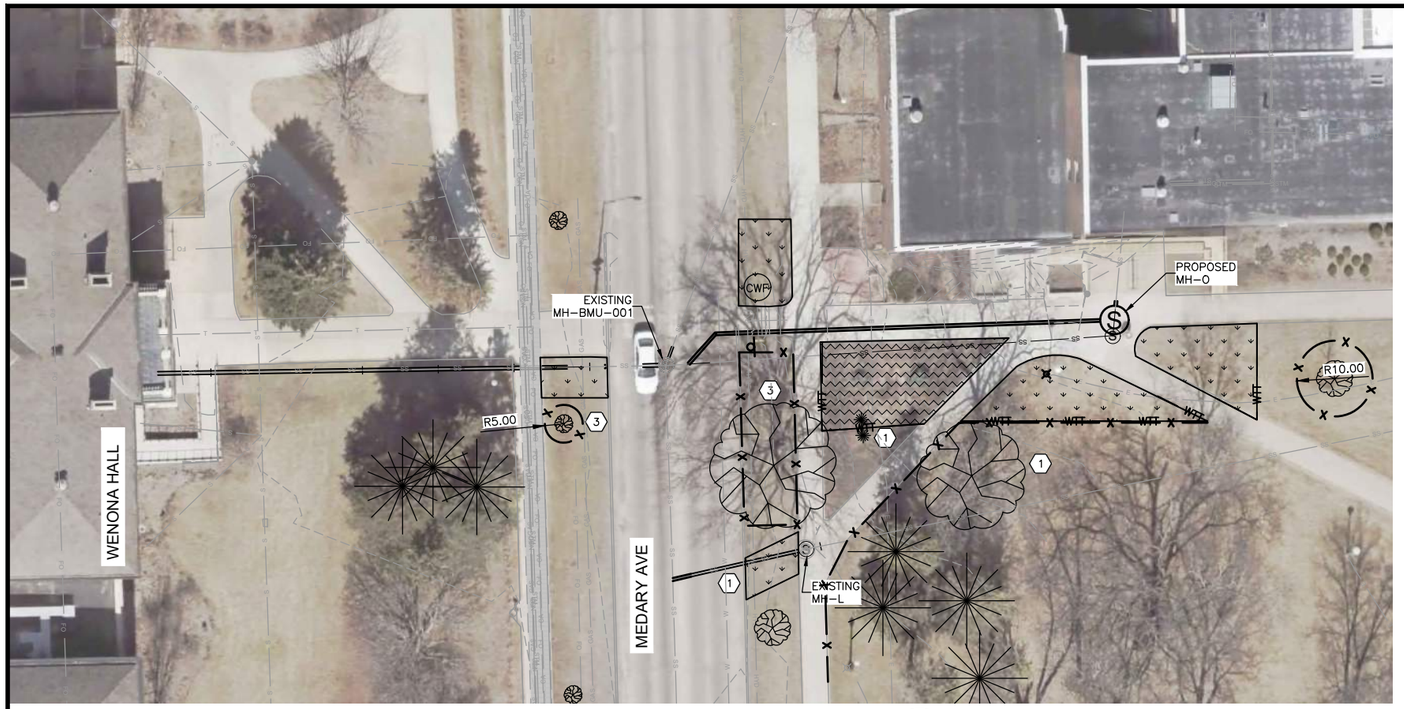
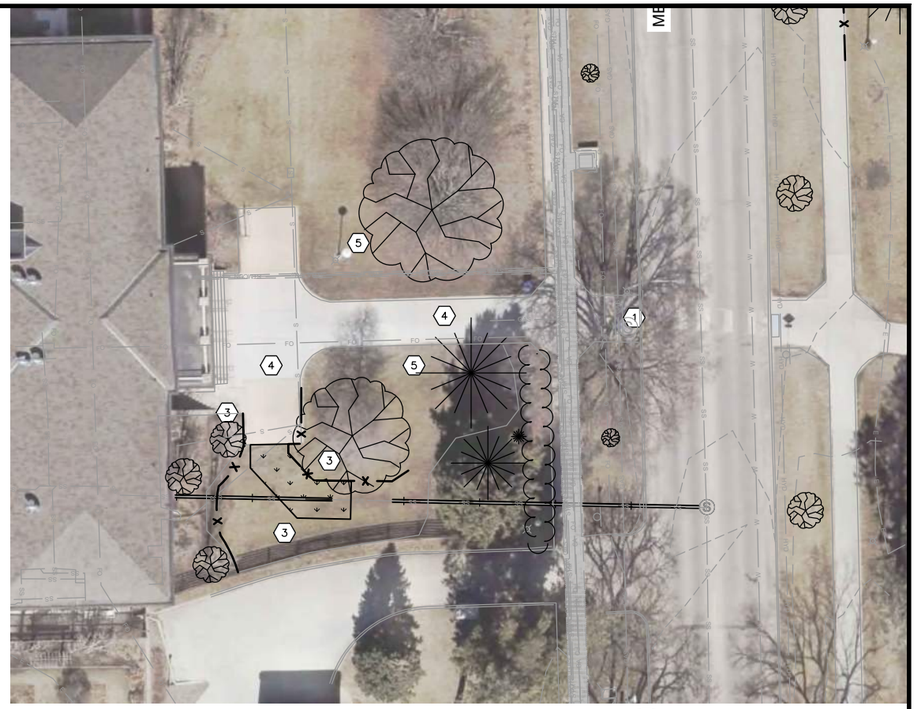
G – EROSION CONTROL
EROSION CONTROL PLAN

SHEET NO.
G101

Xrefs: xg1-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-Erosion



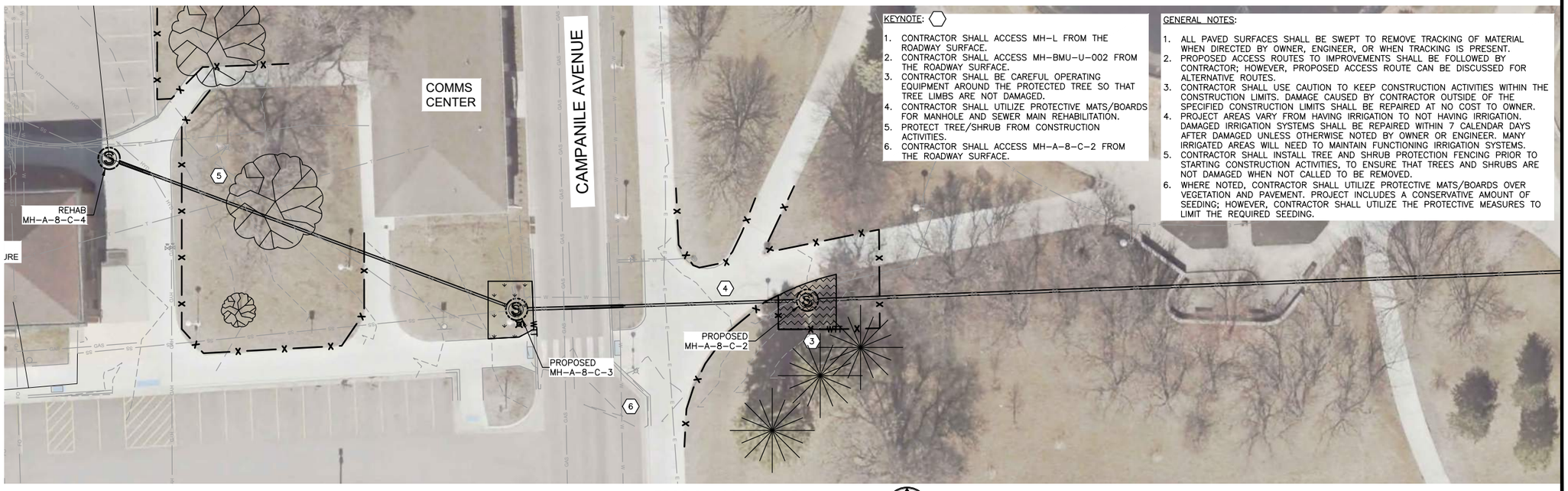
1 EROSION CONTROL PLAN
SCALE: 1"=20'



2 EROSION CONTROL PLAN
SCALE: 1"=20'

LEGEND

- PERMANENT SEED MIXTURE 1
- PERMANENT SEED MIXTURE 2
- EROSION CONTROL BLANKET
- LANDSCAPE RESTORATION
- IP — INLET PROTECTION
- CWF — CONC WASHOUT FACILITY
- MVTC — MINOR IMPACT CONSTRUCTION SITE TEMPORARY VEHICLE TRACKING CONTROL
- SF — SILT FENCE
- WTT — WATTLES
- TREE PROTECT ORANGE PLASTIC SAFETY FENCE SEE DETAIL 3/G101
- PROTECTION ZONE; NO CONSTRUCTION ACTIVITIES WITHIN ZONE UNLESS OTHERWISE NOTED



KEYNOTE:

1. CONTRACTOR SHALL ACCESS MH–L FROM THE ROADWAY SURFACE.
2. CONTRACTOR SHALL ACCESS MH–BMU–U–002 FROM THE ROADWAY SURFACE.
3. CONTRACTOR SHALL BE CAREFUL OPERATING EQUIPMENT AROUND THE PROTECTED TREE SO THAT TREE LIMBS ARE NOT DAMAGED.
4. CONTRACTOR SHALL UTILIZE PROTECTIVE MATS/BOARDS FOR MANHOLE AND SEWER MAIN REHABILITATION.
5. PROTECT TREE/SHRUB FROM CONSTRUCTION ACTIVITIES.
6. CONTRACTOR SHALL ACCESS MH–A–8–C–2 FROM THE ROADWAY SURFACE.

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SWEPT TO REMOVE TRACKING OF MATERIAL WHEN DIRECTED BY OWNER, ENGINEER, OR WHEN TRACKING IS PRESENT.
2. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
3. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REPAIRED AT NO COST TO OWNER.
4. PROJECT AREAS VARY FROM HAVING IRRIGATION TO NOT HAVING IRRIGATION. DAMAGED IRRIGATION SYSTEMS SHALL BE REPAIRED WITHIN 7 CALENDAR DAYS AFTER DAMAGED UNLESS OTHERWISE NOTED BY OWNER OR ENGINEER. MANY IRRIGATED AREAS WILL NEED TO MAINTAIN FUNCTIONING IRRIGATION SYSTEMS.
5. CONTRACTOR SHALL INSTALL TREE AND SHRUB PROTECTION FENCING PRIOR TO STARTING CONSTRUCTION ACTIVITIES, TO ENSURE THAT TREES AND SHRUBS ARE NOT DAMAGED WHEN NOT CALLED TO BE REMOVED.
6. WHERE NOTED, CONTRACTOR SHALL UTILIZE PROTECTIVE MATS/BOARDS OVER VEGETATION AND PAVEMENT. PROJECT INCLUDES A CONSERVATIVE AMOUNT OF SEEDING; HOWEVER, CONTRACTOR SHALL UTILIZE THE PROTECTIVE MEASURES TO LIMIT THE REQUIRED SEEDING.

3 EROSION CONTROL PLAN
SCALE: 1"=20'

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

DRAWN BY:	JMM	JOB DATE:	2024
APPROVED:	MJP	JOB NUMBER:	221795
CAD DATE:	11/5/2024 11:22:16 AM		
CAD FILE:	\\hrgreen.com\HRG\Data\2022\221795\CAD\Campus Wide San Sewer Cat 5.5\Dwgs\G\Main Campus Erosion 01.dwg		

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NO.	DATE	BY	REVISION DESCRIPTION

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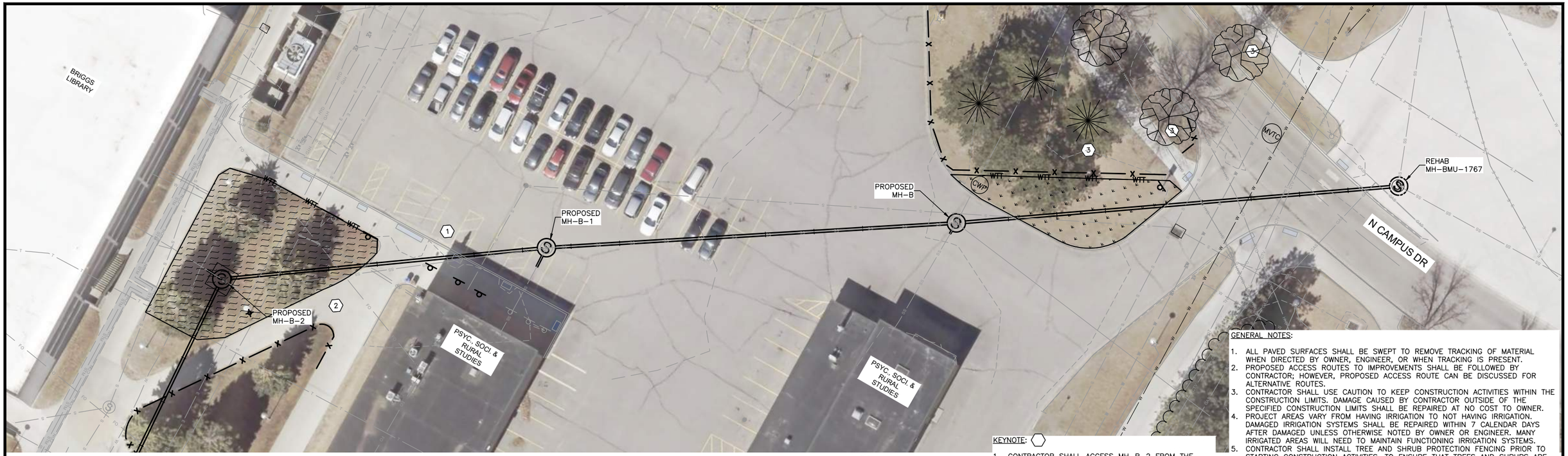
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

G – EROSION CONTROL
EROSION CONTROL PLAN

SHEET NO.
G103

Xrefs: xg1-1-dh01; XX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-Erosion



1 EROSION CONTROL PLAN

SCALE: 1"=20'

KEYNOTE:

1. CONTRACTOR SHALL ACCESS MH–B–2 FROM THE PARKING LOT SURFACE.
2. CONTRACTOR SHALL UTILIZE PROTECTIVE MATS/BOARDS FOR MANHOLE AND SEWER MAIN REHABILITATION.
3. PROTECT TREE/SHRUB FROM CONSTRUCTION ACTIVITIES.

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SWEPT TO REMOVE TRACKING OF MATERIAL WHEN DIRECTED BY OWNER, ENGINEER, OR WHEN TRACKING IS PRESENT.
2. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
3. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REPAIRED AT NO COST TO OWNER.
4. PROJECT AREAS VARY FROM HAVING IRRIGATION TO NOT HAVING IRRIGATION. DAMAGED IRRIGATION SYSTEMS SHALL BE REPAIRED WITHIN 7 CALENDAR DAYS AFTER DAMAGED UNLESS OTHERWISE NOTED BY OWNER OR ENGINEER. MANY IRRIGATED AREAS WILL NEED TO MAINTAIN FUNCTIONING IRRIGATION SYSTEMS.
5. CONTRACTOR SHALL INSTALL TREE AND SHRUB PROTECTION FENCING PRIOR TO STARTING CONSTRUCTION ACTIVITIES, TO ENSURE THAT TREES AND SHRUBS ARE NOT DAMAGED WHEN NOT CALLED TO BE REMOVED.
6. WHERE NOTED, CONTRACTOR SHALL UTILIZE PROTECTIVE MATS/BOARDS OVER VEGETATION AND PAVEMENT. PROJECT INCLUDES A CONSERVATIVE AMOUNT OF SEEDING; HOWEVER, CONTRACTOR SHALL UTILIZE THE PROTECTIVE MEASURES TO LIMIT THE REQUIRED SEEDING.

LEGEND

- PERMANENT SEED MIXTURE 1
- PERMANENT SEED MIXTURE 2
- EROSION CONTROL BLANKET
- LANDSCAPE RESTORATION
- IP — INLET PROTECTION
- CWF — CONC WASHOUT FACILITY
- MVTC — MINOR IMPACT CONSTRUCTION SITE TEMPORARY VEHICLE TRACKING CONTROL
- SF — SILT FENCE
- WTT — WATTLES
- TREE PROTECT ORANGE PLASTIC SAFETY FENCE SEE DETAIL 3/G101
- PROTECTION ZONE; NO CONSTRUCTION ACTIVITIES WITHIN ZONE UNLESS OTHERWISE NOTED

2 EROSION CONTROL PLAN

SCALE: 1"=20'

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

DRAWN BY:	JMM	JOB DATE:	2024
APPROVED:	MJP	JOB NUMBER:	221795
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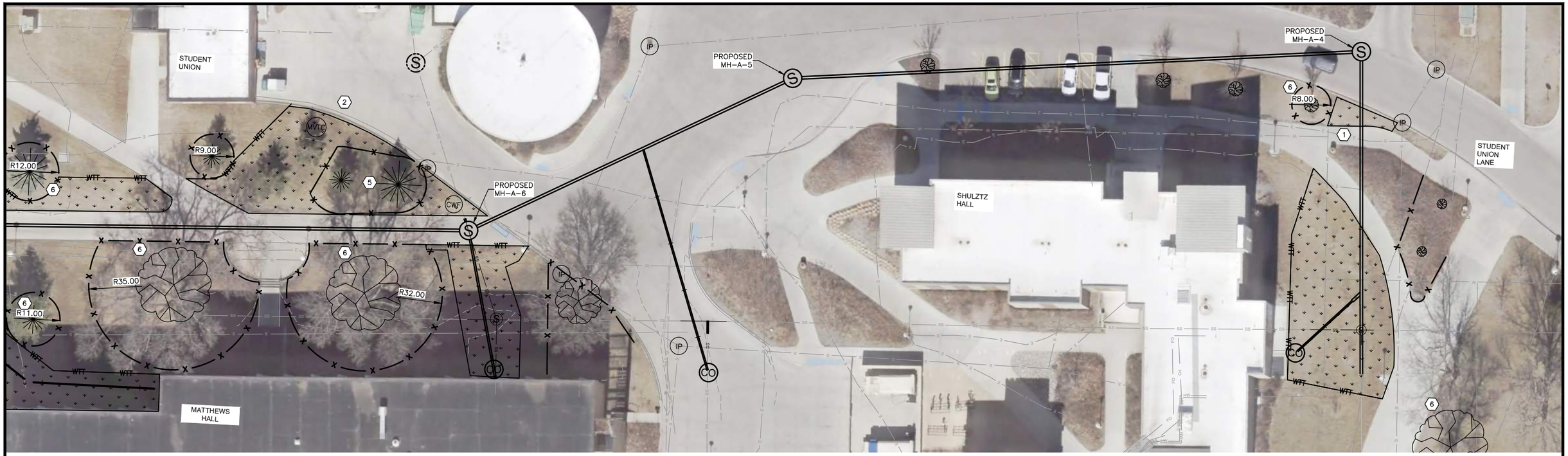
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

G – EROSION CONTROL

EROSION CONTROL PLAN

SHEET NO.
G104

Xrefs: xg1-1-dh01; XX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-Erosion



1 EROSION CONTROL PLAN

SCALE: 1"=20'

NORTH

LEGEND

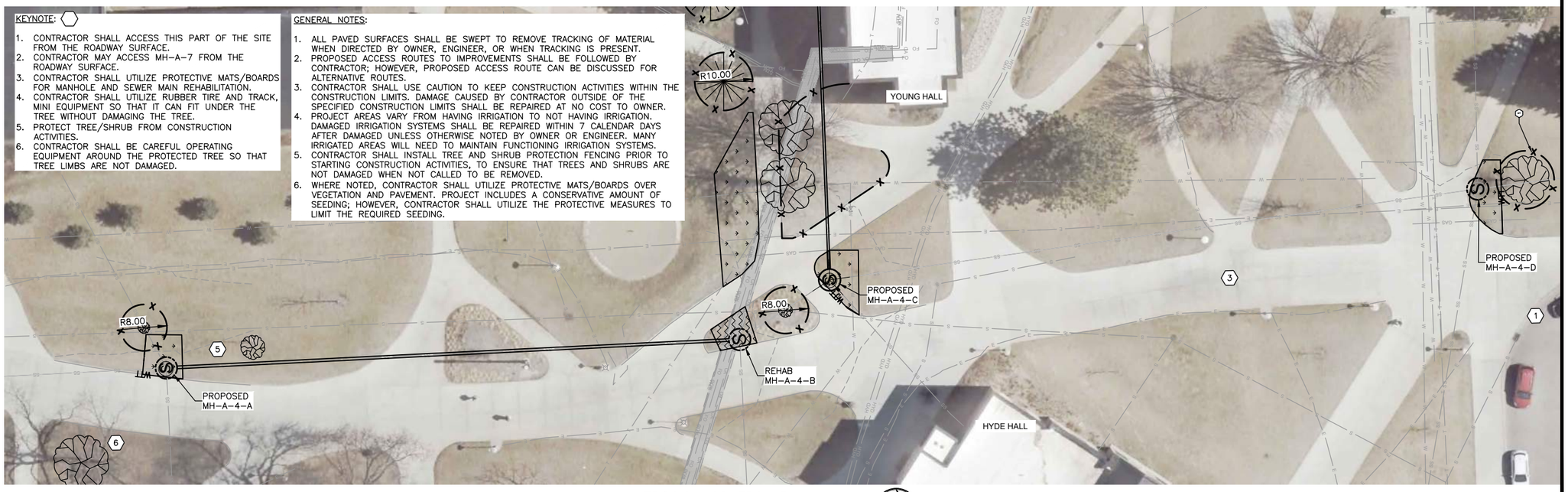
- PERMANENT SEED MIXTURE 1
- PERMANENT SEED MIXTURE 2
- EROSION CONTROL BLANKET
- LANDSCAPE RESTORATION
- IP — INLET PROTECTION
- CWF — CONC WASHOUT FACILITY
- MVTC — MINOR IMPACT CONSTRUCTION SITE TEMPORARY VEHICLE TRACKING CONTROL
- SF — SILT FENCE
- WTT — WATTLES
- TREE PROTECT ORANGE PLASTIC SAFETY FENCE SEE DETAIL 3/G101
- PROTECTION ZONE; NO CONSTRUCTION ACTIVITIES WITHIN ZONE UNLESS OTHERWISE NOTED

KEYNOTE: ⬡

1. CONTRACTOR SHALL ACCESS THIS PART OF THE SITE FROM THE ROADWAY SURFACE.
2. CONTRACTOR MAY ACCESS MH–A–7 FROM THE ROADWAY SURFACE.
3. CONTRACTOR SHALL UTILIZE PROTECTIVE MATS/BOARDS FOR MANHOLE AND SEWER MAIN REHABILITATION.
4. CONTRACTOR SHALL UTILIZE RUBBER TIRE AND TRACK, MINI EQUIPMENT SO THAT IT CAN FIT UNDER THE TREE WITHOUT DAMAGING THE TREE.
5. PROTECT TREE/SHRUB FROM CONSTRUCTION ACTIVITIES.
6. CONTRACTOR SHALL BE CAREFUL OPERATING EQUIPMENT AROUND THE PROTECTED TREE SO THAT TREE LIMBS ARE NOT DAMAGED.

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SWEPT TO REMOVE TRACKING OF MATERIAL WHEN DIRECTED BY OWNER, ENGINEER, OR WHEN TRACKING IS PRESENT.
2. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
3. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REPAIRED AT NO COST TO OWNER.
4. PROJECT AREAS VARY FROM HAVING IRRIGATION TO NOT HAVING IRRIGATION. DAMAGED IRRIGATION SYSTEMS SHALL BE REPAIRED WITHIN 7 CALENDAR DAYS AFTER DAMAGED UNLESS OTHERWISE NOTED BY OWNER OR ENGINEER. MANY IRRIGATED AREAS WILL NEED TO MAINTAIN FUNCTIONING IRRIGATION SYSTEMS.
5. CONTRACTOR SHALL INSTALL TREE AND SHRUB PROTECTION FENCING PRIOR TO STARTING CONSTRUCTION ACTIVITIES, TO ENSURE THAT TREES AND SHRUBS ARE NOT DAMAGED WHEN NOT CALLED TO BE REMOVED.
6. WHERE NOTED, CONTRACTOR SHALL UTILIZE PROTECTIVE MATS/BOARDS OVER VEGETATION AND PAVEMENT. PROJECT INCLUDES A CONSERVATIVE AMOUNT OF SEEDING; HOWEVER, CONTRACTOR SHALL UTILIZE THE PROTECTIVE MEASURES TO LIMIT THE REQUIRED SEEDING.



2 EROSION CONTROL PLAN

SCALE: 1"=20'

NORTH

REGISTERED PROFESSIONAL ENGINEER — REG. NO. 11935 — MATTHEW JAMES PAJL — SOUTH DAKOTA

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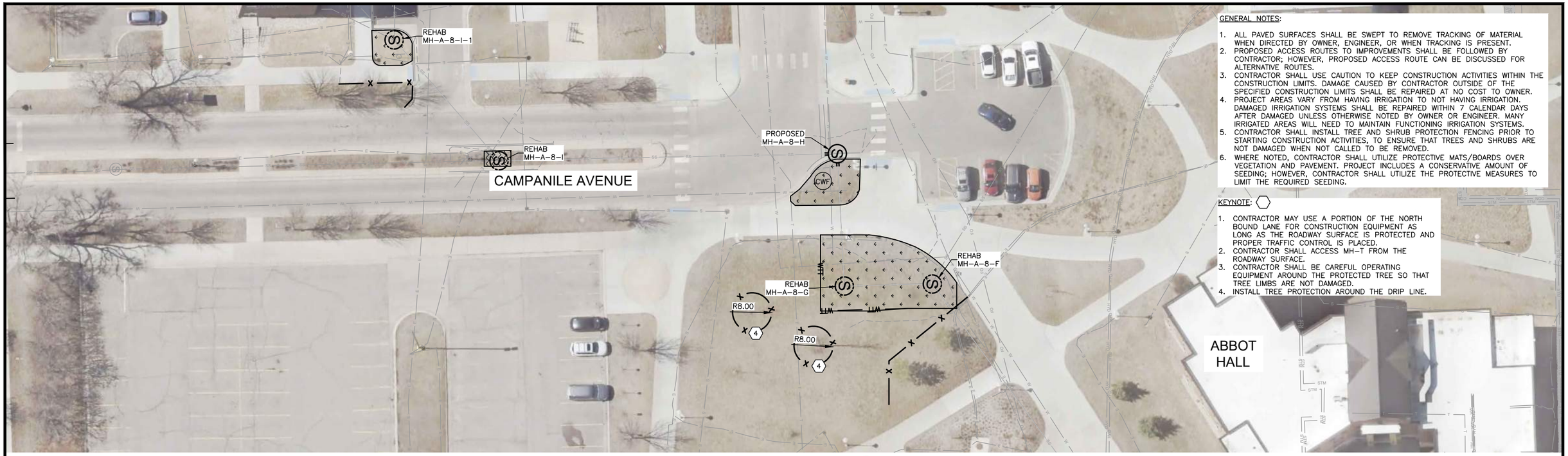
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

G – EROSION CONTROL

EROSION CONTROL PLAN

SHEET NO. G106

Xrefs: xg1–1–dh01; XX–IMAGE; Sheet Layout– Prelim–A; XV–SURVEY; XC–1–SAN; XC–1–Erosion



GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SWEPT TO REMOVE TRACKING OF MATERIAL WHEN DIRECTED BY OWNER, ENGINEER, OR WHEN TRACKING IS PRESENT.
2. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
3. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REPAIRED AT NO COST TO OWNER.
4. PROJECT AREAS VARY FROM HAVING IRRIGATION TO NOT HAVING IRRIGATION. DAMAGED IRRIGATION SYSTEMS SHALL BE REPAIRED WITHIN 7 CALENDAR DAYS AFTER DAMAGED UNLESS OTHERWISE NOTED BY OWNER OR ENGINEER. MANY IRRIGATED AREAS WILL NEED TO MAINTAIN FUNCTIONING IRRIGATION SYSTEMS.
5. CONTRACTOR SHALL INSTALL TREE AND SHRUB PROTECTION FENCING PRIOR TO STARTING CONSTRUCTION ACTIVITIES, TO ENSURE THAT TREES AND SHRUBS ARE NOT DAMAGED WHEN NOT CALLED TO BE REMOVED.
6. WHERE NOTED, CONTRACTOR SHALL UTILIZE PROTECTIVE MATS/BOARDS OVER VEGETATION AND PAVEMENT. PROJECT INCLUDES A CONSERVATIVE AMOUNT OF SEEDING; HOWEVER, CONTRACTOR SHALL UTILIZE THE PROTECTIVE MEASURES TO LIMIT THE REQUIRED SEEDING.

KEYNOTE: ⬡

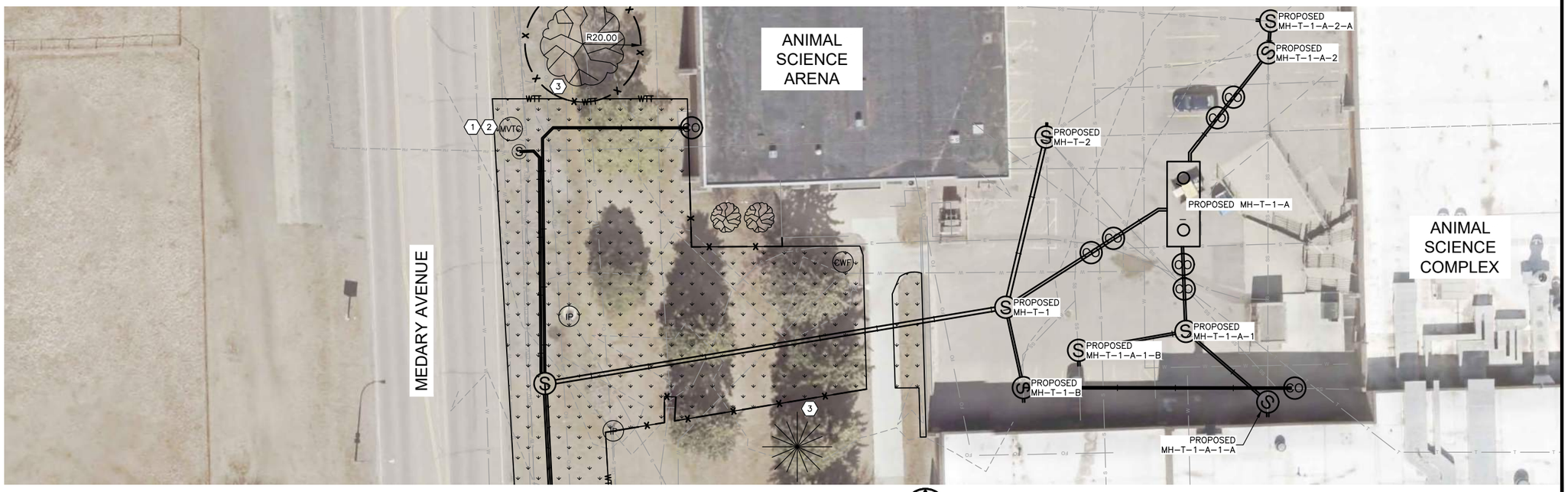
1. CONTRACTOR MAY USE A PORTION OF THE NORTH BOUND LANE FOR CONSTRUCTION EQUIPMENT AS LONG AS THE ROADWAY SURFACE IS PROTECTED AND PROPER TRAFFIC CONTROL IS PLACED.
2. CONTRACTOR SHALL ACCESS MH-T FROM THE ROADWAY SURFACE.
3. CONTRACTOR SHALL BE CAREFUL OPERATING EQUIPMENT AROUND THE PROTECTED TREE SO THAT TREE LIMBS ARE NOT DAMAGED.
4. INSTALL TREE PROTECTION AROUND THE DRIP LINE.

1 EROSION CONTROL PLAN
SCALE: 1"=20'

NORTH

LEGEND

- PERMANENT SEED MIXTURE 1
- PERMANENT SEED MIXTURE 2
- EROSION CONTROL BLANKET
- LANDSCAPE RESTORATION
- IP — INLET PROTECTION
- CWF — CONC WASHOUT FACILITY
- MVTC — MINOR IMPACT CONSTRUCTION SITE TEMPORARY VEHICLE TRACKING CONTROL
- SF — SILT FENCE
- WTT — WATTLES
- TREE PROTECT ORANGE PLASTIC SAFETY FENCE SEE DETAIL 3/G101
- PROTECTION ZONE; NO CONSTRUCTION ACTIVITIES WITHIN ZONE UNLESS OTHERWISE NOTED



2 BID ALTERNATE C: ANIMAL SCIENCE COMPLEX, EROSION CONTROL PLAN
SCALE: 1"=20'

NORTH

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

DRAWN BY:	JMM	JOB DATE:	2024
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SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

G – EROSION CONTROL
EROSION CONTROL PLAN

SHEET NO.
G109

Xrefs: xg1-1-dh01; XX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-Erosion

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SWEPT TO REMOVE TRACKING OF MATERIAL WHEN DIRECTED BY OWNER, ENGINEER, OR WHEN TRACKING IS PRESENT.
2. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
3. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REPAIRED AT NO COST TO OWNER.
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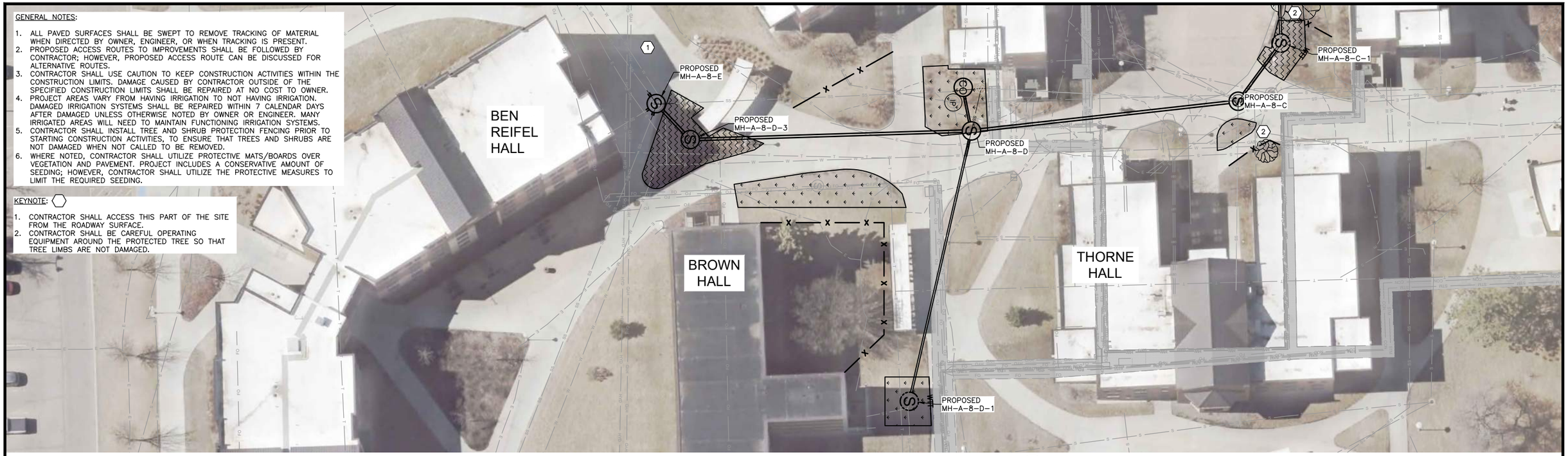
5. CONTRACTOR SHALL INSTALL TREE AND SHRUB PROTECTION FENCING PRIOR TO STARTING CONSTRUCTION ACTIVITIES, TO ENSURE THAT TREES AND SHRUBS ARE NOT DAMAGED WHEN NOT CALLED TO BE REMOVED.
6. WHERE NOTED, CONTRACTOR SHALL UTILIZE PROTECTIVE MATS/BOARDS OVER VEGETATION AND PAVEMENT. PROJECT INCLUDES A CONSERVATIVE AMOUNT OF SEEDING; HOWEVER, CONTRACTOR SHALL UTILIZE THE PROTECTIVE MEASURES TO LIMIT THE REQUIRED SEEDING.

KEYNOTE: ⬡

1. CONTRACTOR SHALL ACCESS THIS PART OF THE SITE FROM THE ROADWAY SURFACE.
2. CONTRACTOR SHALL BE CAREFUL OPERATING EQUIPMENT AROUND THE PROTECTED TREE SO THAT TREE LIMBS ARE NOT DAMAGED.

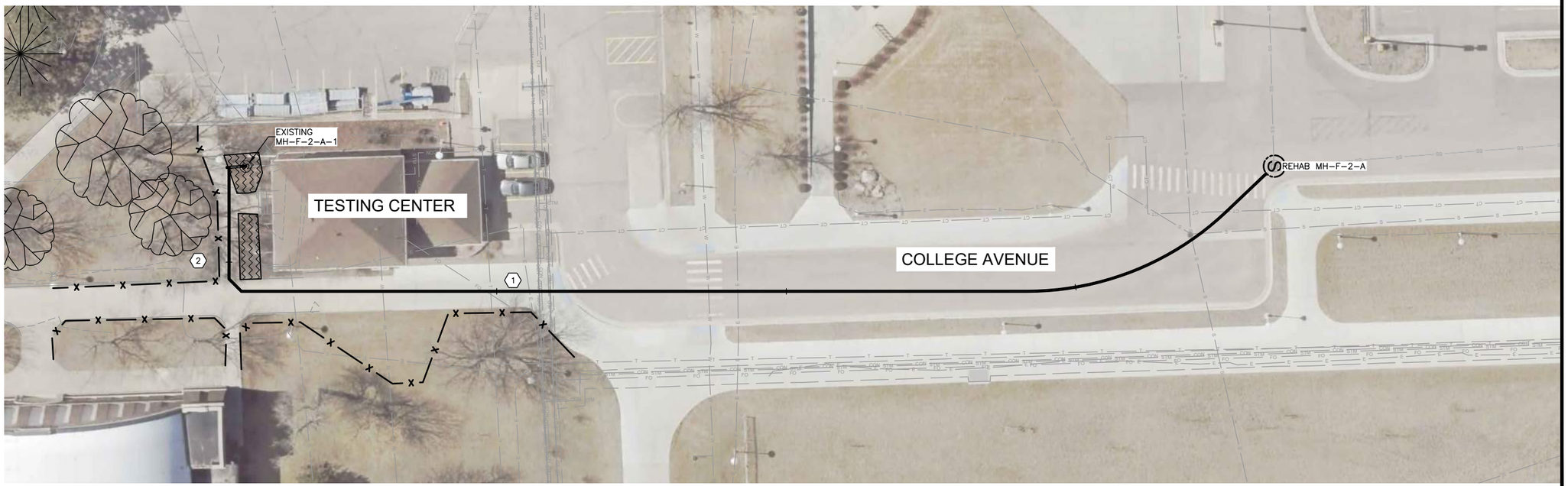


1 BID ALTERNATE B: ABBOT HALL, EROSION CONTROL PLAN
SCALE: 1"=20'

NORTH

LEGEND

- PERMANENT SEED MIXTURE 1
- PERMANENT SEED MIXTURE 2
- EROSION CONTROL BLANKET
- LANDSCAPE RESTORATION
- IP — INLET PROTECTION
- CWF — CONC WASHOUT FACILITY
- MVTC — MINOR IMPACT CONSTRUCTION SITE TEMPORARY VEHICLE TRACKING CONTROL
- SF — SILT FENCE
- WTT — WATTLES
- TREE PROTECT ORANGE PLASTIC SAFETY FENCE SEE DETAIL 3/G101
- PROTECTION ZONE; NO CONSTRUCTION ACTIVITIES WITHIN ZONE UNLESS OTHERWISE NOTED



2 BID ALTERNATE A: TESTING CENTER, EROSION CONTROL PLAN
SCALE: 1"=20'

NORTH

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

DRAWN BY:	JMM	JOB DATE:	2024
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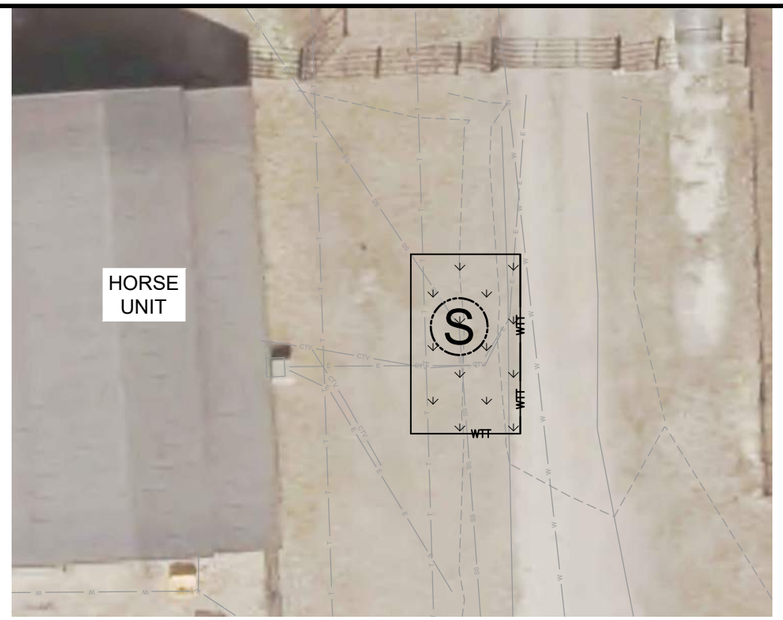
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

G – EROSION CONTROL
EROSION CONTROL PLAN

SHEET NO.
G110

Xrefs: xgl-1-dh01; XX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-Erosion

1 MH-BMU-348
SCALE: 1" = 10'



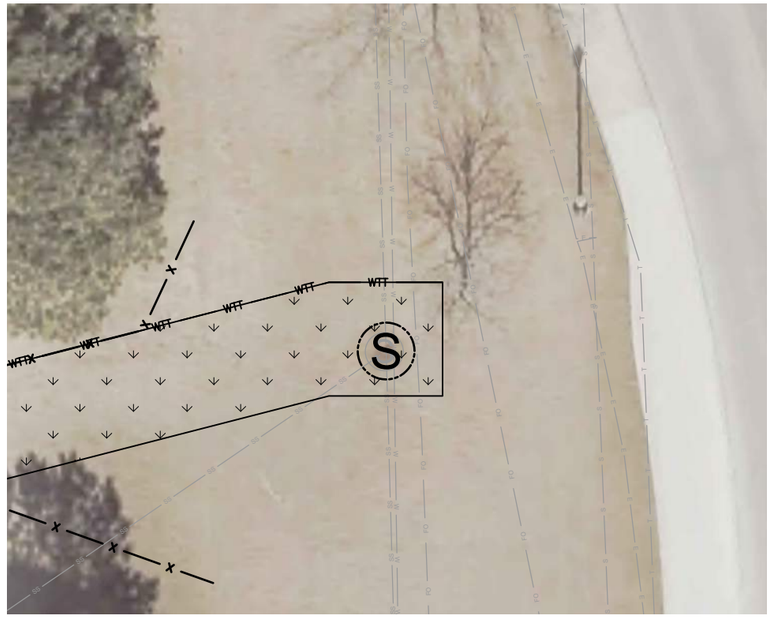
2 MH-K
SCALE: 1" = 10'

3 MH-C-1
SCALE: 1" = 10'

LEGEND

- PERMANENT SEED MIXTURE 1
- PERMANENT SEED MIXTURE 2
- EROSION CONTROL BLANKET
- LANDSCAPE RESTORATION
- IP — INLET PROTECTION
- CWF — CONC WASHOUT FACILITY
- MVTC — MINOR IMPACT CONSTRUCTION SITE TEMPORARY VEHICLE TRACKING CONTROL
- SF — SILT FENCE
- WTT — WATTLES
- TREE PROTECT ORANGE PLASTIC SAFETY FENCE SEE DETAIL 3/G101
- PROTECTION ZONE; NO CONSTRUCTION ACTIVITIES WITHIN ZONE UNLESS OTHERWISE NOTED

4 MH-C-2
SCALE: 1" = 10'



5 MH-BMU-564
SCALE: 1" = 10'

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

Xrefs: xg1-1-dh01; XX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-Erosion

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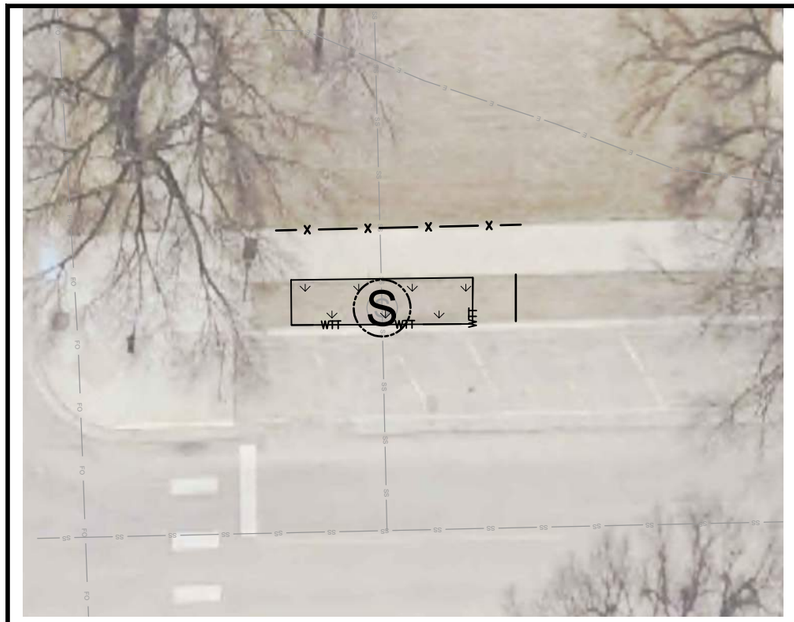
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

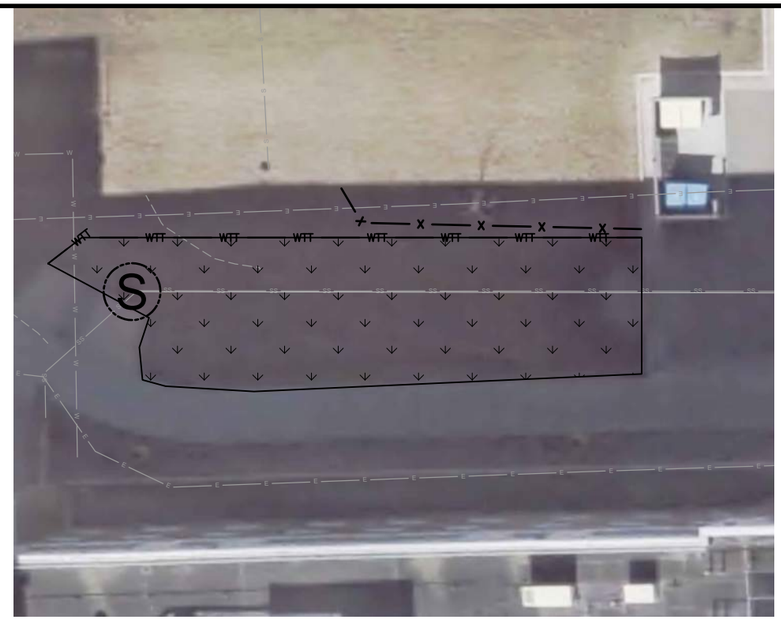
G – EROSION CONTROL
EROSION CONTROL PLAN

SHEET NO.
G111



1 MH–P
SCALE: 1" = 10'

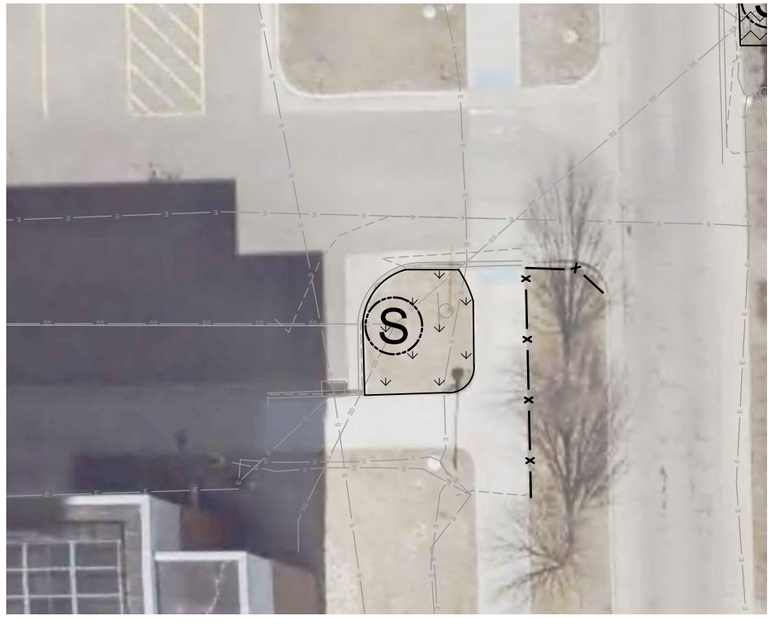
2 MH–Q
SCALE: 1" = 10'



3 MH–A–8–I–2
SCALE: 1" = 10'

LEGEND

- PERMANENT SEED MIXTURE 1
- PERMANENT SEED MIXTURE 2
- EROSION CONTROL BLANKET
- LANDSCAPE RESTORATION
- IP — INLET PROTECTION
- CWF — CONC WASHOUT FACILITY
- MVTC — MINOR IMPACT CONSTRUCTION SITE TEMPORARY VEHICLE TRACKING CONTROL
- SF — SILT FENCE
- WTT — WATTLES
- TREE PROTECT ORANGE PLASTIC SAFETY FENCE SEE DETAIL 3/G101
- PROTECTION ZONE; NO CONSTRUCTION ACTIVITIES WITHIN ZONE UNLESS OTHERWISE NOTED



4 MH–8–I–1
SCALE: 1" = 10'

5 MH–8–I
SCALE: 1" = 10'

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

Xrefs: xg1–1–dh01; XX–IMAGE; Sheet Layout– Prelim–A; XV–SURVEY; XC–1–SAN; XC–1–Erosion

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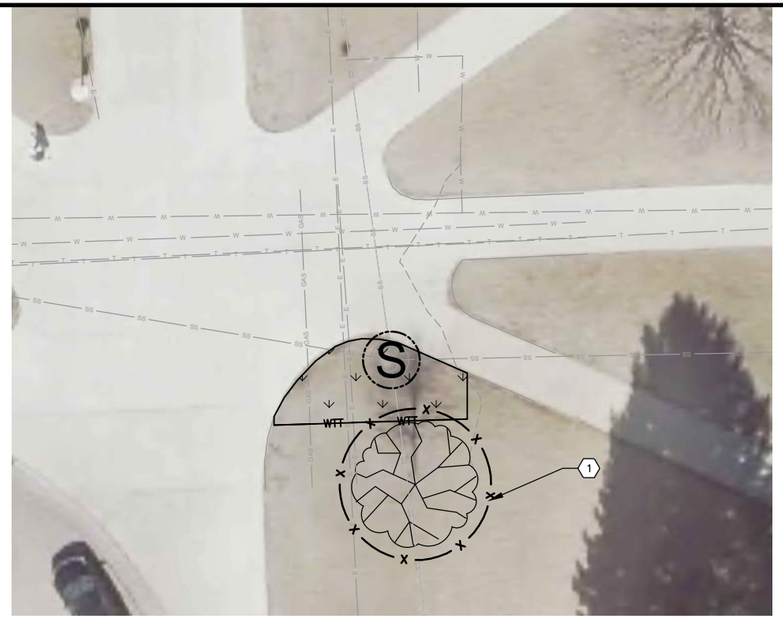
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

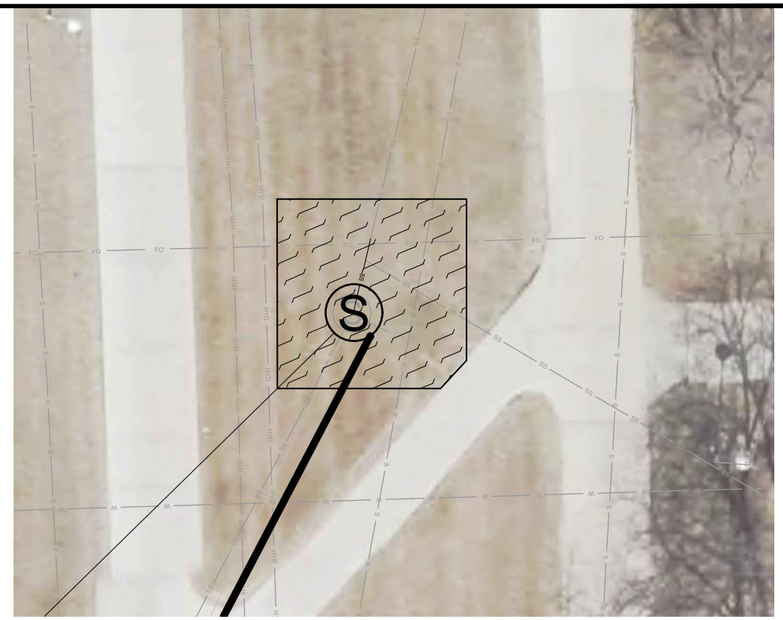
G – EROSION CONTROL
EROSION CONTROL PLAN

SHEET NO.
G112

1 MH-A-8-E-1
SCALE: 1" = 10'



2 MH-A-4-D
SCALE: 1" = 10'



3 MH-R-1
SCALE: 1" = 10'

LEGEND

- PERMANENT SEED MIXTURE 1
- PERMANENT SEED MIXTURE 2
- EROSION CONTROL BLANKET
- LANDSCAPE RESTORATION
- IP — INLET PROTECTION
- CWF — CONC WASHOUT FACILITY
- MVTC — MINOR IMPACT CONSTRUCTION SITE TEMPORARY VEHICLE TRACKING CONTROL
- SF — SILT FENCE
- WTT — WATTLES
- TREE PROTECT ORANGE PLASTIC SAFETY FENCE SEE DETAIL 3/G101
- PROTECTION ZONE; NO CONSTRUCTION ACTIVITIES WITHIN ZONE UNLESS OTHERWISE NOTED

KEYNOTE:

1. INSTALL TREE PROTECTION AROUND THE DRIP LINE.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

DRAWN BY:	JMM	JOB DATE:	2024
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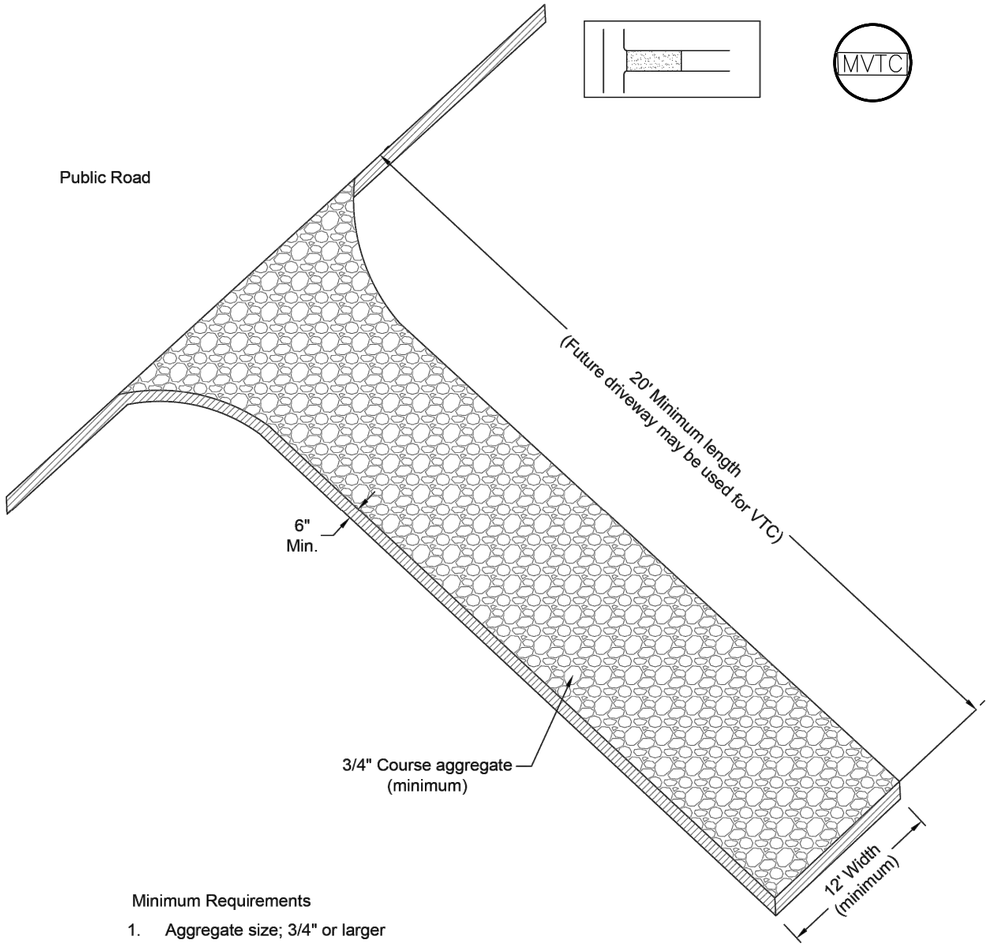
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

G – EROSION CONTROL
EROSION CONTROL PLAN

SHEET NO.
G113

Xrefs: xgl-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-Erosion

Minor Impact Construction Site, Vehicle Tracking Control



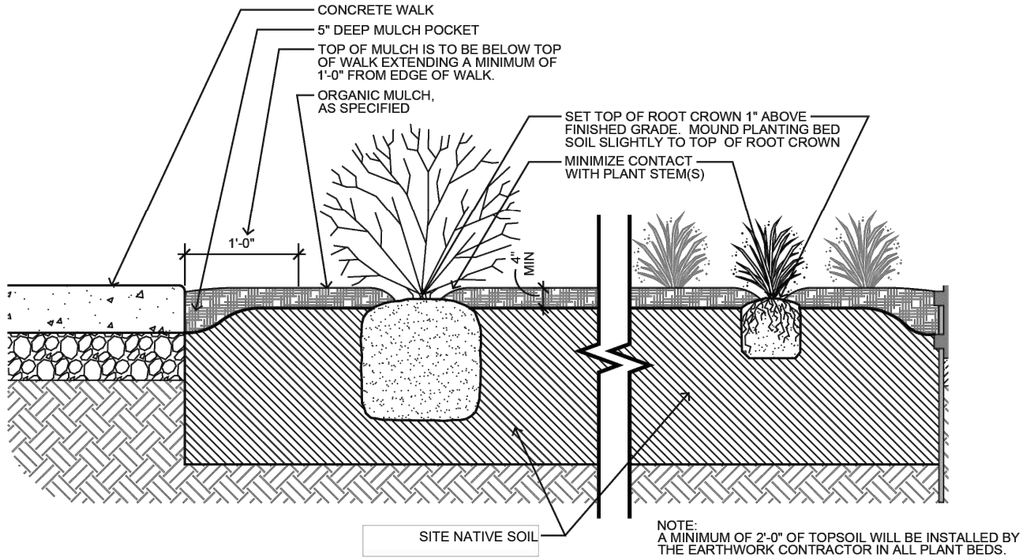
Minimum Requirements

1. Aggregate size; 3/4" or larger

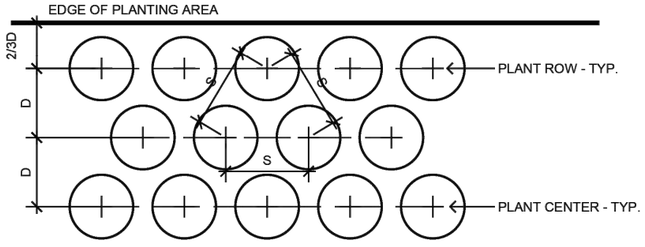
2. Pad design;
   A. Thickness: 6" Minimum
   B. Width: 12' Minimum
   C. Length: 20' Minimum

3. BMP must be in place and operational prior to any vehicles leaving a site that have been operated in an area of unstabilized soils.

This modified plate can only be used as a structural BMP for a minor impact construction site (erosion sediment control plan drawing) that is within an approved subdivision in compliance with Section 15A.11.020 of the ordinances of Sioux Falls and is classified as a Minor Impact Construction Site.



ORGANIC MULCH PLANT BEDS



TRIANGULAR SPACING - 'S'	DISTANCE BETWEEN ROWS - 'D'	TOTAL AREA PER PLANT (SF)
12" 15" 18" 21"	10-1/2" 13" 15-1/2" 18"	0.88 1.35 1.94 2.63
24" (2') 30" 36" (3') 42"	21" 26" 31" 36"	3.50 5.42 7.75 10.50

PLANT SPACING

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

Xrefs: xgt-1-dh01; PE & LS-White_Benjamin-SD

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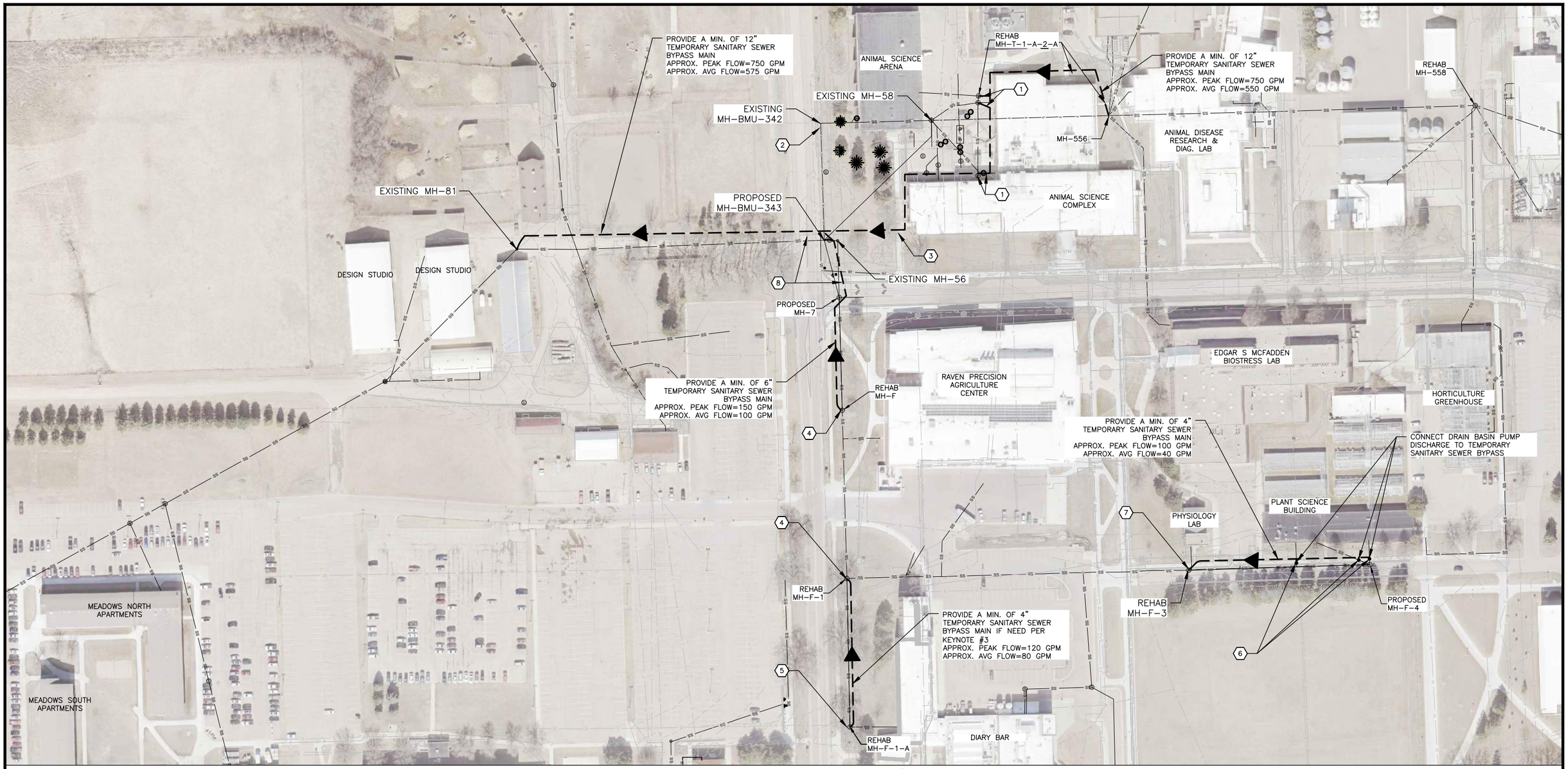
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

G – EROSION CONTROL
EROSION CONTROL DETAILS

SHEET NO.
G116



KEYNOTES:

1. PLUG DOWNSTREAM PIPE IN MANHOLE AND INSTALLED TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MANHOLE WHILE PROPOSED SANITARY SEWER MAINS AND MANHOLES ARE INSTALLED TO MH-BMU-343. COORDINATE WITH OWNER TO ALLOW FOR THE BUILDING SERVICE TO BE TAKEN OFFLINE FOR 1 DAY.
2. PLUG DOWNSTREAM PIPE IN MANHOLE MH-BMU-342 AND INSTALLED TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-BMU-342 WHILE PROPOSED SANITARY SEWER MAINS AND MANHOLES ARE INSTALLED TO MH-BMU-343.
3. PLUG DOWNSTREAM PIPE IN MANHOLE MH-556 AND INSTALLED TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-556 WHILE PROPOSED SANITARY SEWER MAINS AND MANHOLES ARE INSTALLED TO MH-BMU-343. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
4. PLUG DOWNSTREAM PIPE IN MANHOLE MH-F AND INSTALLED TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-F WHILE PROPOSED SANITARY SEWER MAINS AND MANHOLE MH-7 ARE INSTALLED. FOR REHABILITATION OF SANITARY SEWER MAIN BETWEEN MANHOLES MH-F AND MH-7, PLUG UPSTREAM PIPE IN MANHOLE MH-F AND EITHER BYPASS PUMP OUT OF THE MH-F-1 OR UTILIZE VACTRUCK TO SUCK OUT OF MANHOLE MH-F-1. IF BYPASS PIPING IS INSTALL IN MH-F-1, INSTALL TEMPORARY VEHICLE RAMP OVER THE PIPING AT PARKING LOT ENTRANCE.
5. IF THE BUILDING SERVICE IS ANTICIPATED TO BE OFFLINE FOR MORE THAN 1 DAY, INSTALL A TEMPORARY SANITARY SEWER FLOW-THROUGH PLUG INSIDE OF THE MANHOLE AT THE SERVICE CONNECTION. THE FLOW-THROUGH PLUG SHALL BE CONNECTED TO A TEMPORARY SANITARY SEWER BYPASS PUMP WHILE THE PROPOSED IMPROVEMENTS ARE COMPLETED.
6. CONTRACTOR SHALL INSTALL A TEMPORARY SANITARY SEWER DRAIN BASIN WITH A MINIMUM OF 100 GALLON CAPACITY, SUCH AS ADS NYLOPLAST 36" DRAIN BASIN. DIRECT THE BUILDING SANITARY SEWER SERVICE TO THE DRAIN BASIN (VIA BEND) SO THAT THE FLOW IS ACCUMULATED INTO THE BASIN. INSTALL A PUMP IN THE BASIN TO PUMP LIQUID DIRECTLY INTO THE TEMPORARY BYPASS PIPING OR SUCK OUT THE BASIN WITH A VACTRUCK.
7. IF THE BUILDING SERVICE IS ANTICIPATED TO BE OFFLINE FOR MORE THAN 1 DAY, INSTALL A TEMPORARY SANITARY SEWER DRAIN BASIN WITH A MINIMUM OF 100 GALLON CAPACITY.
8. CUT PAVEMENT AND PLACE TEMPORARY SANITARY SEWER BYPASS PIPING WITHIN TRENCH WITH GRAVEL OR DRIVABLE PLATE OVER TOP TO PROVIDE FLAT SURFACE WITH ADJACENT PAVEMENT.

1 NORTHWEST CAMPUS BYPASS PUMPING PLAN

NORTH

0 80'

1"=80'

LEGEND

- NEW OR REHABILITATED SANITARY SEWER PIPE
- POSSIBLE ROUTE FOR TEMPORARY SANITARY SEWER BYPASS PIPING
- DIRECTION OF TEMPORARY SANITARY SEWER BYPASS DISCHARGE

REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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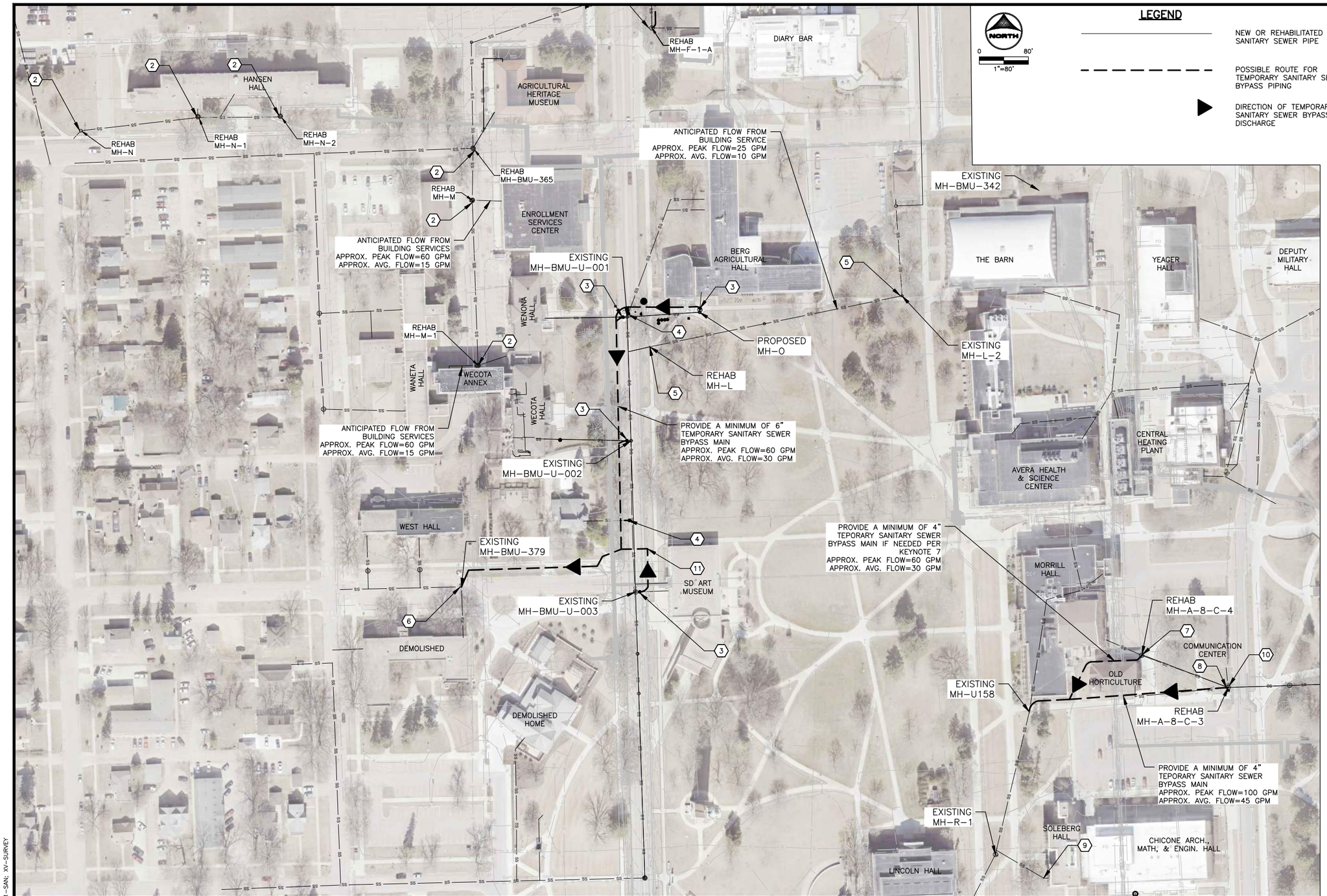
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS

BYPASS PUMPING PLANS

SHEET NO.
H001

Xrefs: xgl-1-dh01; XVX-IMAGE; XC-1-SAN; XV-SURVEY



LEGEND

- NEW OR REHABILITATED SANITARY SEWER PIPE
- POSSIBLE ROUTE FOR TEMPORARY SANITARY SEWER BYPASS PIPING
- DIRECTION OF TEMPORARY SANITARY SEWER BYPASS DISCHARGE

KEYNOTES:

1. IF THE BUILDING SERVICE IS ANTICIPATED TO BE OFFLINE FOR MORE THAN 1 DAY, INSTALL A TEMPORARY SANITARY SEWER FLOW-THROUGH PLUG INSIDE OF THE MANHOLE AT THE SERVICE CONNECTION. THE FLOW-THROUGH PLUG SHALL BE CONNECTED TO A TEMPORARY SANITARY SEWER BYPASS PUMP AND WILL BE DISCHARGE INTO THE NEXT DOWNSTREAM MANHOLE.
2. IF THE BUILDING SERVICE IS ANTICIPATED TO BE OFFLINE FOR MORE THAN 2 DAYS, INSTALL A TEMPORARY SANITARY SEWER FLOW-THROUGH PLUG INSIDE OF THE MANHOLE AT THE SERVICE CONNECTION. THE FLOW-THROUGH PLUG SHALL BE CONNECTED TO A TEMPORARY SANITARY SEWER BYPASS PUMP AND WILL BE DISCHARGE INTO THE NEXT DOWNSTREAM MANHOLE.
3. CONTRACTOR SHALL INSTALL A TEMPORARY SANITARY SEWER DRAIN BASIN WITH A MINIMUM OF 150 GALLON CAPACITY, SUCH AS ADS NYLOPLAST 36" DRAIN BASIN. DIRECT THE BUILDING SANITARY SEWER SERVICE TO THE DRAIN BASIN (VIA BEND) SO THAT THE FLOW IS ACCUMULATED INTO THE BASIN. INSTALL A PUMP IN THE BASIN TO PUMP LIQUID DIRECTLY INTO THE TEMPORARY BYPASS PIPING.
4. CONTRACTOR SHALL INSTALL A TEMPORARY SANITARY SEWER DRAIN BASIN WITH A MINIMUM OF 100 GALLON CAPACITY, SUCH AS ADS NYLOPLAST 36" DRAIN BASIN. DIRECT THE BUILDING SANITARY SEWER SERVICE TO THE DRAIN BASIN (VIA BEND) SO THAT THE FLOW IS ACCUMULATED INTO THE BASIN. INSTALL A PUMP IN THE BASIN TO PUMP LIQUID DIRECTLY INTO THE TEMPORARY BYPASS PIPING OR SUCK OUT THE BASIN WITH A VACTRUCK.
5. PLUG UPSTREAM PIPE IN MANHOLE MH-L AND ALLOW FLOW TO BACKUP IN THE UPSTREAM PIPE SEGMENTS. IF FLOW BACKS UP INTO MANHOLE MH-L-2 UTILIZE VACTRUCK TO SUCK OUT OF MANHOLE.
6. INSTALL TEMPORARY SANITARY SEWER BYPASS PIPING THAT PICKS UP FLOWS FROM TEMPORARY SANITARY SEWER DRAIN BASINS AND DISCHARGE INTO MANHOLE MH-BMU-379.
7. IF THE BUILDING SERVICE IS ANTICIPATED TO BE OFFLINE FOR MORE THAN 1 DAY, INSTALL A TEMPORARY SANITARY SEWER FLOW-THROUGH PLUG INSIDE OF THE MANHOLE AT THE SERVICE CONNECTION. THE FLOW-THROUGH PLUG SHALL BE CONNECTED TO A TEMPORARY SANITARY SEWER BYPASS PUMP AND PUT TO MANHOLE MH-U158 AND WHILE THE PROPOSED IMPROVEMENTS ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
8. PLUG BUILDING SERVICE IN MANHOLE MH-A-8-C-3 WHILE THE PROPOSED IMPROVEMENTS ARE COMPLETED. DISCHARGE FLOW BETWEEN PROPOSED IMPROVEMENTS.
9. OWNER WILL TAKE BUILDING SERVICE OFFLINE WHILE THE PROPOSED IMPROVEMENTS ARE COMPLETED ON THE SANITARY SEWER SERVICE. IT IS ANTICIPATED THAT THE SERVICE WILL BE OFFLINE FOR 1 DAY.
10. ONCE THE PROPOSED IMPROVEMENTS BETWEEN MANHOLES MH-A-8-C-4 TO MH-A-8-C-2, REMOVE THE TEMPORARY SANITARY SEWER BYPASS FROM KEYNOTES 7 AND 8. INSTEAD PLUG THE DOWNSTREAM PIPE IN MANHOLE MH-A-8-C-3 AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-A-8-C-3 WHILE THE PROPOSED IMPROVEMENTS THROUGH MANHOLE MH-A-8-C ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
11. ADJUST THE TEMPORARY SANITARY SEWER BYPASS PIPING TO ALLOW FOR INSTALLATION OF THE PROPOSED SANITARY SEWER TRENCH.

REGISTERED PROFESSIONAL ENGINEER
YES NO
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

1 SOUTH CAMPUS BYPASS PUMPING PLAN

Xrefs: xgl-1-dh01; XVX-IMAGE; XC-1-SAN; XV-SURVEY

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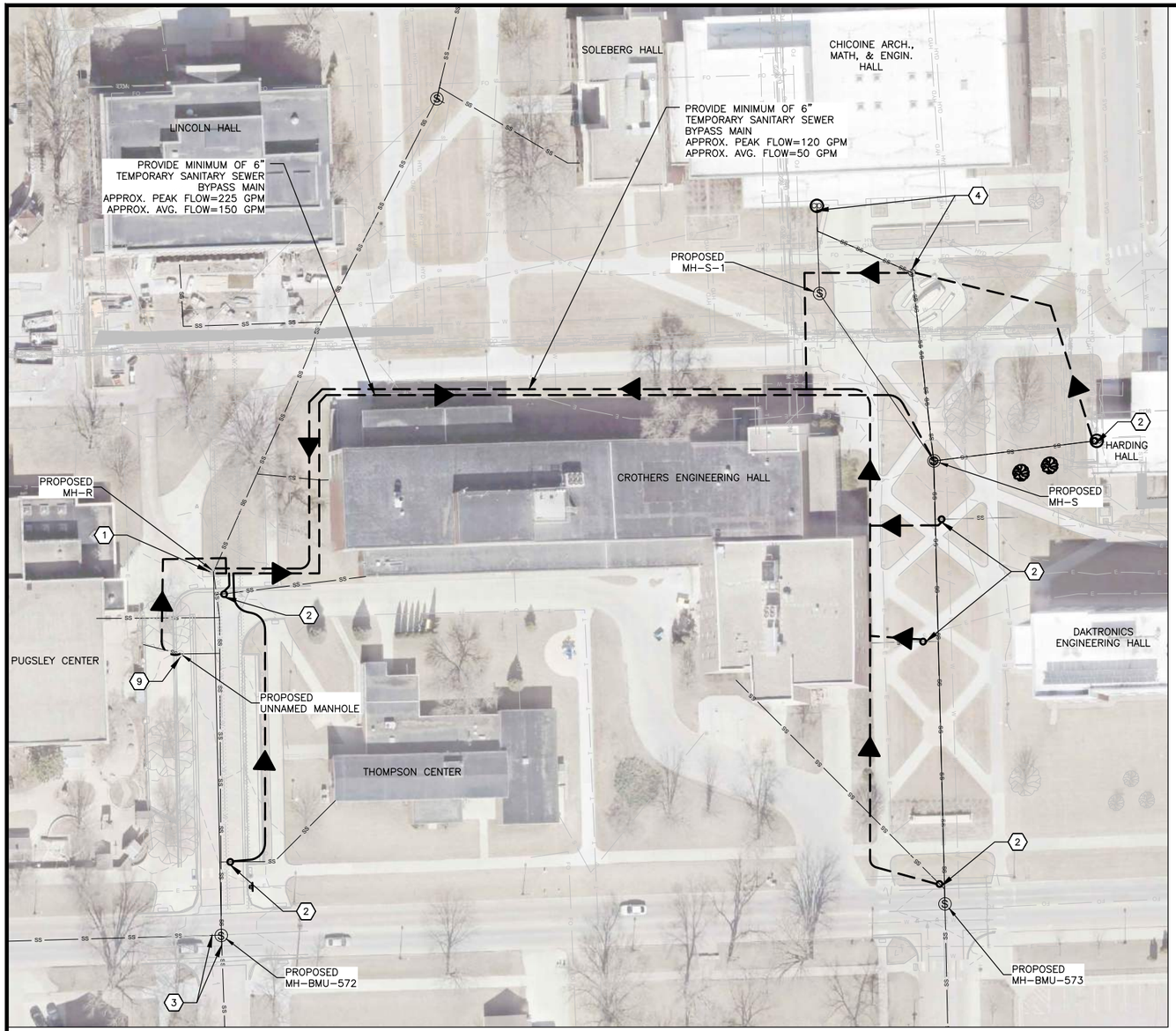
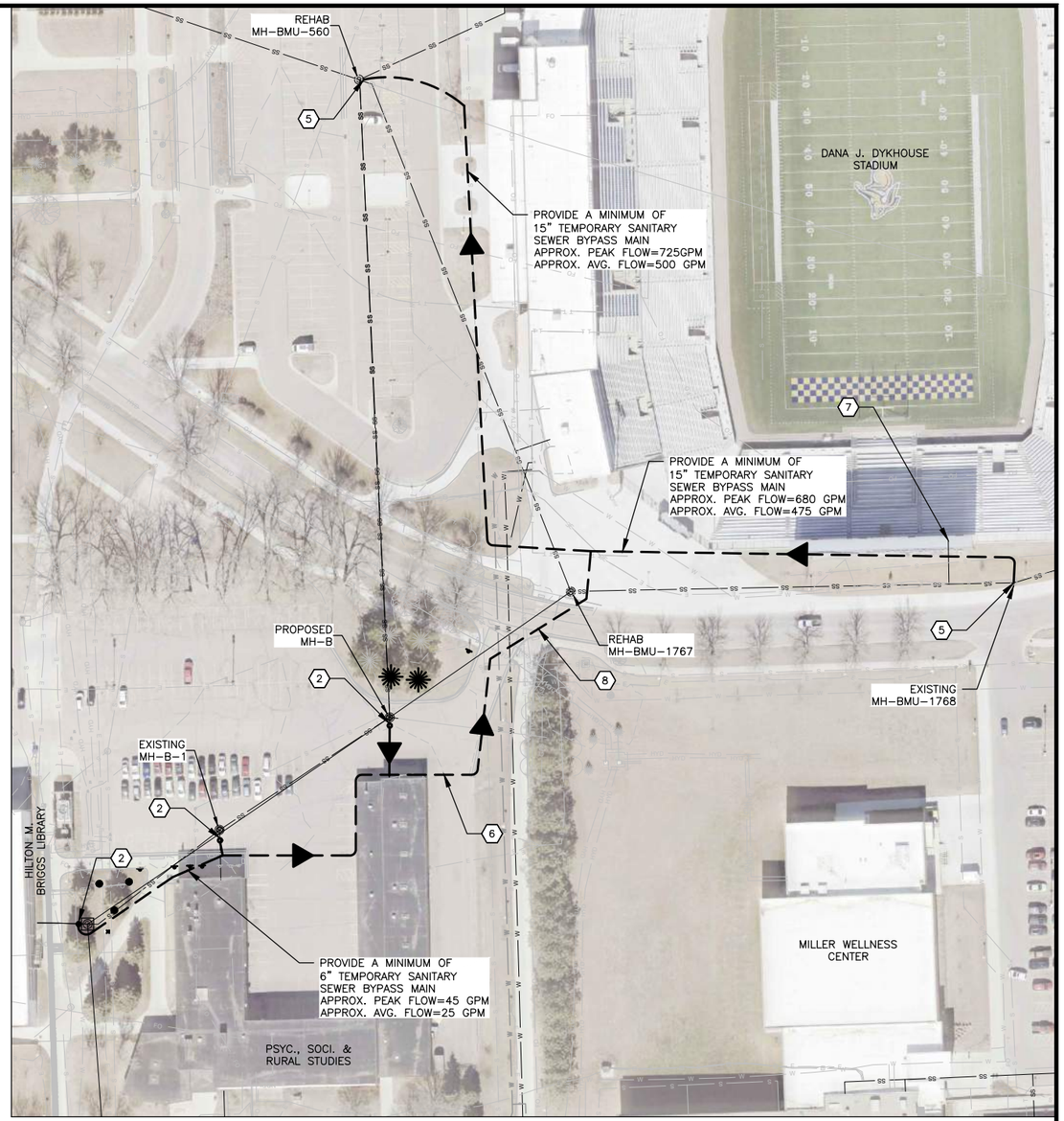
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS
BYPASS PUMPING PLANS

SHEET NO.
H002





1 SOUTH CAMPUS BYPASS PUMPING PLAN

NORTH 0 40' 1"=40'

1 NORTHEAST CAMPUS BYPASS PUMPING PLAN

NORTH 0 60' 1"=60'

KEYNOTES:

1. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-R AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-R TO MANHOLE MH-S WHILE THE PROPOSED IMPROVEMENTS THROUGH MANHOLE MH-BMU-572 ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
2. CONTRACTOR SHALL INSTALL A TEMPORARY SANITARY SEWER DRAIN BASIN WITH A MINIMUM OF 150 GALLON CAPACITY, SUCH AS ADS NYLOPLAST 36" DRAIN BASIN. DIRECT THE BUILDING SANITARY SEWER SERVICE TO THE DRAIN BASIN (VIA BEND) SO THAT THE FLOW IS ACCUMULATED INTO THE BASIN. INSTALL A PUMP IN THE BASIN TO PUMP LIQUID DIRECTLY INTO THE TEMPORARY BYPASS PIPING. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
3. INSTALL TEMPORARY PLUGS IN UPSTREAM PIPES OF MANHOLE MH-BMU-572 WHILE THE MANHOLE IS REPLACED. ONCE MANHOLE BASE SECTION IS SET, REMOVE THE TEMPORARY PLUGS TO ALLOW FLOW THROUGH THE MANHOLE. KEEP TEMPORARY PLUG INSTALLATION LIMITED TO 3 OR LESS HOURS AS FLOW WILL BACKUP INTO MAINS WHILE PLUGGED. CONTRACTOR SHALL ALSO NOTIFY PROPERTY OWNERS ON THE ADJACENT BLOCKS TO LIMIT SANITARY SEWER FLOW FOR THE PERIOD OF TIME THAT THE TEMPORARY PLUGS ARE INSTALLED.
4. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-U151 AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-U151 TO MANHOLE MH-R WHILE THE PROPOSED IMPROVEMENTS FROM MANHOLE MH-BMU-573 THROUGH MANHOLE MH-S-1 ARE COMPLETED. BUILDING SERVICE CAN BE OFFLINE FOR 1 DAY WHILE PIPING IS CONNECTED TO MANHOLE MH-S-1. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
5. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-BMU-1768 AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-BMU-1768 TO MANHOLE MH-560 WHILE THE PROPOSED IMPROVEMENTS FROM MANHOLE MH-B-1 THROUGH MANHOLE MH-BMU-1767 ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN RAMP OVER PIPING AT SIDEWALKS.
6. INSTALL TEMPORARY VEHICLE RAMP OVER THE TEMPORARY SANITARY SEWER BYPASS PIPING LOCATED IN PARKING LOT WHERE OWNER NEEDS CONTINUOUS ACCESS.
7. OWNER WILL TAKE BUILDING SERVICE OFFLINE WHILE THE PROPOSED IMPROVEMENTS ARE COMPLETED ON THE SANITARY SEWER SERVICE. IT IS ANTICIPATED THAT THE SERVICE WILL BE OFFLINE FOR 10 DAYS.
8. CUT PAVEMENT AND PLACE TEMPORARY SANITARY SEWER BYPASS PIPING WITHIN TRENCH WITH GRAVEL OR DRIVABLE PLATE OVER TOP TO PROVIDE FLAT SURFACE WITH ADJACENT PAVEMENT.
9. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF UNNAMED MANHOLE AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF UNNAMED MANHOLE DIRECTLY INTO THE TEMPORARY BYPASS PIPING.

LEGEND

- NEW OR REHABILITATED SANITARY SEWER PIPE
- POSSIBLE ROUTE FOR TEMPORARY SANITARY SEWER BYPASS PIPING
- DIRECTION OF TEMPORARY SANITARY SEWER BYPASS DISCHARGE

REGISTERED PROFESSIONAL ENGINEER — REG. NO. 11935 — MATTHEW JAMES PAJL — SOUTH DAKOTA

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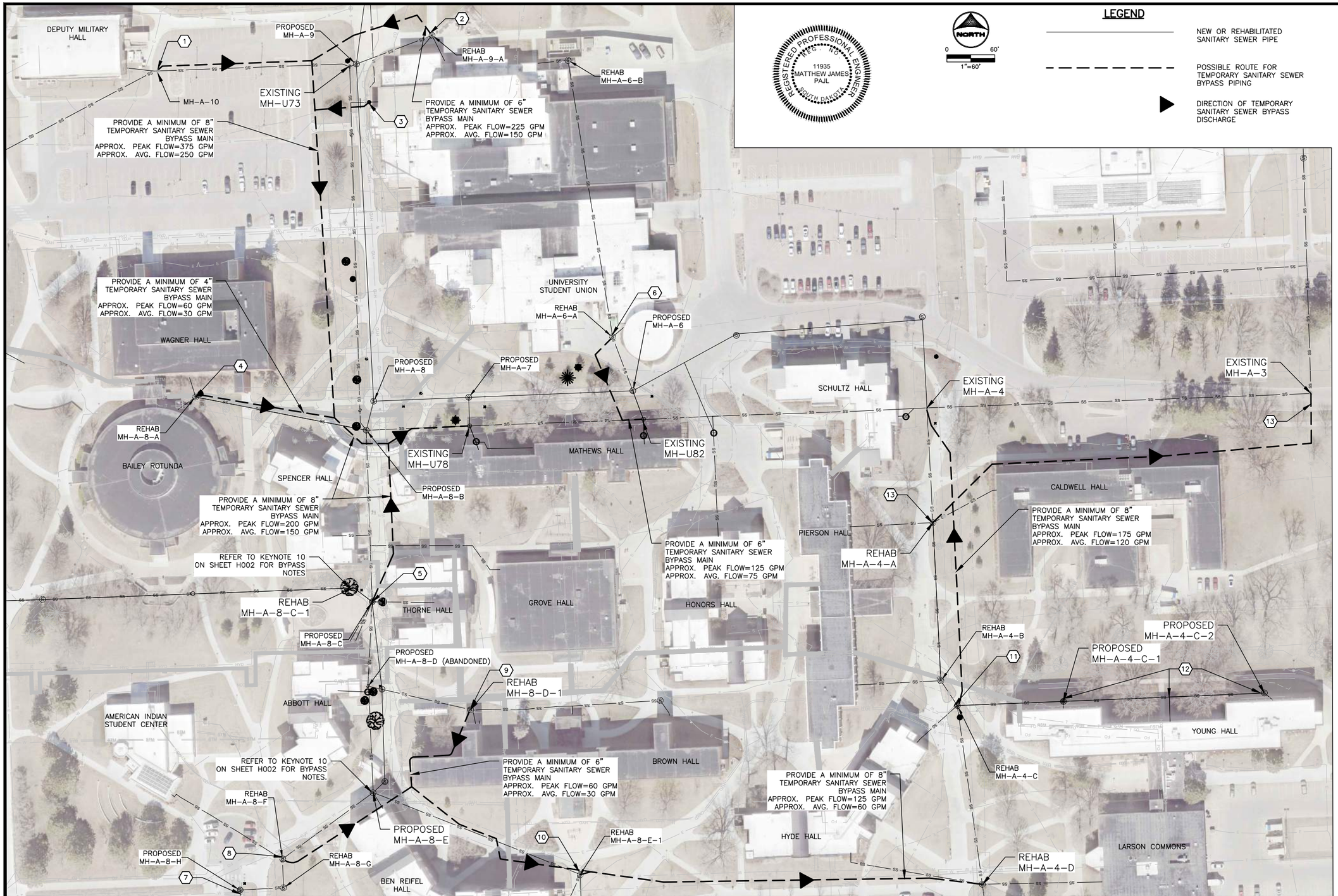
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS
BYPASS PUMPING PLANS

SHEET NO. H003

Xrefs: xg|-1-dh01; XVX-IMAGE; XC-1-SAN; XV-SURVEY



1 EAST CAMPUS BYPASS PUMPING PLAN

REGISTERED PROFESSIONAL ENGINEER
STATE OF
11935
MATTHEW JAMES
PAUL
SOUTH DAKOTA

NORTH
0 60'
1"=60'

LEGEND

- NEW OR REHABILITATED SANITARY SEWER PIPE
- POSSIBLE ROUTE FOR TEMPORARY SANITARY SEWER BYPASS PIPING
- DIRECTION OF TEMPORARY SANITARY SEWER BYPASS DISCHARGE

KEYNOTES:

1. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-A-10 AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-A-10 TO MANHOLE MH-U78 WHILE THE PROPOSED IMPROVEMENTS THROUGH MANHOLE MH-A-5 ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
2. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-A-9-A AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-A-9-A TO MANHOLE MH-U78 WHILE THE PROPOSED IMPROVEMENTS THROUGH MANHOLE MH-A-5 ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
3. CONTRACTOR SHALL INSTALL A TEMPORARY SANITARY SEWER DRAIN BASIN WITH A MINIMUM OF 150 GALLON CAPACITY, SUCH AS ADS NYLOPLAST 36" DRAIN BASIN. DIRECT THE BUILDING SANITARY SEWER SERVICE TO THE DRAIN BASIN (VIA BEND) SO THAT THE FLOW IS ACCUMULATED INTO THE BASIN. INSTALL A PUMP IN THE BASIN TO PUMP LIQUID DIRECTLY INTO THE TEMPORARY BYPASS PIPING. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
4. INSTALL A TEMPORARY SANITARY SEWER FLOW-THROUGH PLUG INSIDE OF THE MANHOLE AT THE SERVICE CONNECTIONS. THE FLOW-THROUGH PLUG SHALL BE CONNECTED TO A TEMPORARY SANITARY SEWER BYPASS PUMP AND WILL BE DISCHARGE DIRECTLY INTO THE TEMPORARY BYPASS PIPING. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
5. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-A-8-C AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-A-8-C TO MANHOLE MH-U78 WHILE THE PROPOSED IMPROVEMENTS THROUGH MANHOLE MH-A-5 ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN RAMP OVER THE PIPING AT SIDEWALKS.
6. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-A-6-A AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-A-6-A TO MANHOLE MH-U82 WHILE THE PROPOSED IMPROVEMENTS THROUGH MANHOLE MH-A-5 ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN RAMP OVER PIPING AT SIDEWALKS.
7. INSTALL TEMPORARY PLUG IN THE UPSTREAM PIPE OF MANHOLE MH-A-8-H WHILE THE MANHOLE IS BEING REPLACED. ONCE MANHOLE BASE SECTION IS SET, REMOVE THE TEMPORARY PLUGS TO ALLOW FLOW THROUGH THE MANHOLE. KEEP TEMPORARY PLUG INSTALLATION LIMITED TO 4 OR LESS HOURS AS FLOW WILL BACKUP INTO MAINS WHILE PLUGGED.
8. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-A-8-F AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-A-8-F TO MANHOLE MH-A-4-D WHILE THE PROPOSED IMPROVEMENTS THROUGH MANHOLE MH-A-8-C-1 ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN RAMP OVER PIPING AT SIDEWALKS.
9. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-A-8-D-1 AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-A-8-D-1 AND DISCHARGE DIRECTLY INTO THE TEMPORARY BYPASS PIPING. INSTALL TEMPORARY PEDESTRIAN RAMP OVER PIPING AT SIDEWALKS.
10. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-A-8-E-1 AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-A-8-E-1 AND DISCHARGE DIRECTLY INTO THE TEMPORARY BYPASS PIPING. INSTALL TEMPORARY PEDESTRIAN RAMP OVER PIPING AT SIDEWALKS.
11. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-A-4-C AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-A-4-C TO MANHOLE MH-A-4-A ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN RAMP OVER PIPING AT SIDEWALKS.
12. OWNER WILL TAKE BUILDING SERVICE OFFLINE WHILE THE PROPOSED IMPROVEMENTS ARE COMPLETED ON THE SANITARY SEWER SERVICE. IT IS ANTICIPATED THAT THE SERVICE WILL BE OFFLINE FOR 2 DAYS.
13. INSTALL TEMPORARY PLUG IN THE DOWNSTREAM PIPE OF MANHOLE MH-A-4-A AND INSTALL TEMPORARY SANITARY SEWER BYPASS PUMPING OUT OF MH-A-4-A TO MANHOLE MH-A-3 WHILE REMOVAL OF MANHOLE MH-A-4 AND CONNECTION OF THE PROPOSED IMPROVEMENTS ARE COMPLETED. INSTALL TEMPORARY PEDESTRIAN AND VEHICLE RAMPS OVER PIPING AT SIDEWALKS AND ROADWAY.

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SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS
BYPASS PUMPING PLANS

SHEET NO.
H004

Xrefs: xgf-1-dh01; XVX-IMAGE; XC-1-SAN; XV-SURVEY

1 EXISTING CONDITIONS & REMOVALS PLAN

SCALE: 1"=20'

NORTH

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SAW CUT WITH A NEAT LINE AT THE REMOVAL LIMITS.
2. REMOVAL OF SIDEWALKS, CONCRETE PAVEMENTS, VALLEY GUTTER, AND CURB AND GUTTER SHALL BE TAKEN TO NEAREST JOINT. THIS MAY EFFECT THE QUANTITY, ALL SURFACING QUANTITIES WILL BE FIELD MEASURED.
3. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
4. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
5. PROTECT PAVED SURFACES, SIDEWALKS, VEGETATION, LANDSCAPING, AND OTHER ITEMS NOT CALLED OUT FOR REMOVAL.
6. DAMAGE TO ANY ITEMS NOT DESIGNATED TO BE REMOVED OR DISTURBED SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
7. CONTRACTOR SHALL TAKE CARE WHEN PERFORMING REMOVALS NEXT TO EXISTING BUILDINGS AND OR STRUCTURES. DAMAGES INCURRED FROM CARELESSNESS SHALL BE REPAIRED TO OWNER'S ACCEPTANCE, FULLY AT CONTRACTOR'S EXPENSE.
8. WITHIN TREE PROTECTION AREA, NO CONSTRUCTION ACTIVITY, ESPECIALLY VEHICLE TRACKING. FAILURE TO KEEP CONSTRUCTION ACTIVITY OUT OF PROTECTION AREA MAY RESULT IN CONTRACTOR BEING ASSESSED COSTS ASSOCIATED WITH DAMAGE TO TREES.
9. CONTRACTOR SHALL PRESERVE AND PROTECT TUNNELS AND SHALLOW TRENCHES DURING CONSTRUCTION.

KEYNOTE: ⬡

1. MEDARY AVENUE EXISTING PAVEMENT IS EXPECTED TO BE 6" PCC WITH A 2" ASPHALT OVERLAY.
2. REFER TO DETAIL 4/U001, FOR INSTALLATION OF PLUGS.
3. REMOVALS ARE ADJACENT TO A BLOCK FLOWER BED, RETAINING WALL THAT LIKELY HAS A BURIED FOOTING. CONTRACTOR SHALL TAKE EXTRA PRECAUTION WHEN WORKING NEXT TO THE WALL SO THAT IT IS NOT UNDERMINED OR DAMAGED. THERE IS ALSO A STAIRWAY THAT IS NOT SPECIFIED TO BE REMOVED, THAT SHALL BE PROTECTED.
4. CONTRACTOR SHALL REMOVE THE CONCRETE STAIRS AND THE ASSOCIATED HANDRAIL.
5. REMOVE SECTION OF PIPE THAT HAS AN OFFSET JOINT AND IS BROKEN. REPLACED PIPE SECTION WILL BE CIPP LINED THROUGH.
6. CONTRACTOR SHALL TAKE EXTRA PRECAUTION WHEN WORKING NEXT TO A TUNNEL, SO THAT IT IS NOT UNDERMINED OR DAMAGED.
7. REMOVE AND SALVAGE STREET LIGHT POLE IF IN THE WAY OF CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL STORE LIGHT POLE AND REINSTALL. ANY DAMAGE TO THE LIGHT POLE DURING CONSTRUCTION OR STORAGE SHALL BE REPLACED OR REPAIRED AT NO COST TO OWNER.

REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

DRAWN BY:	JMM	JOB DATE:	2024
APPROVED:	MJP	JOB NUMBER:	221795
CAD DATE:	11/5/2024 3:26:34 PM		
CAD FILE:	\\hrgreen.com\HRG\Data\2022\221795\CAD\Campus Wide San Sewer Cat 5.5\Dwgs\H\Main Campus EC&R 01.dwg		

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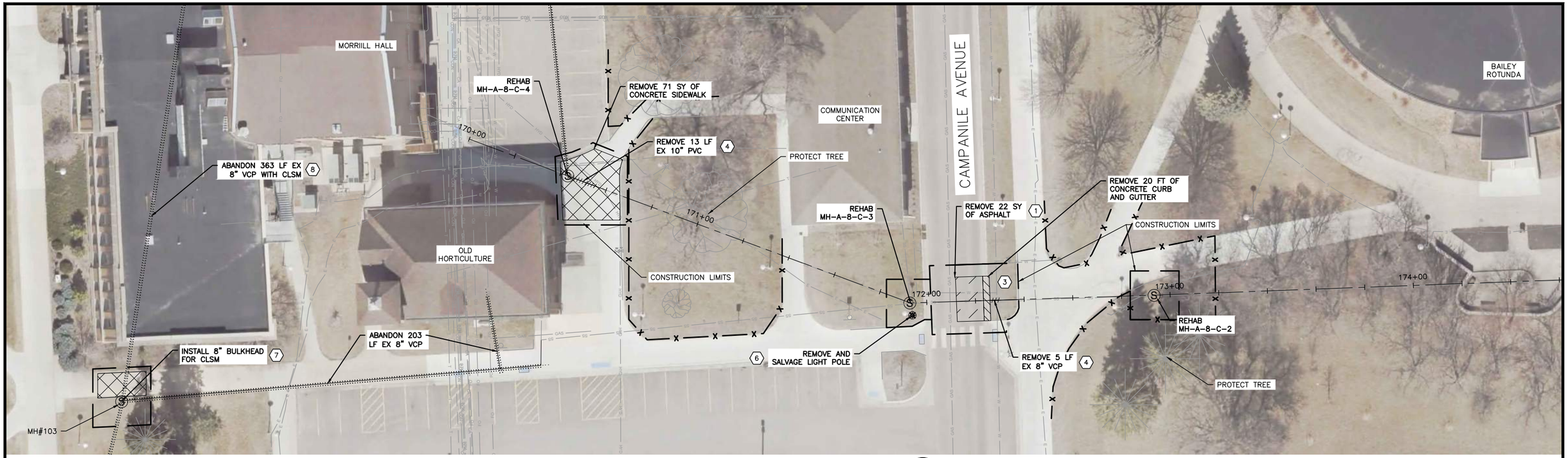
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS
EXISTING CONDITIONS & REMOVALS

SHEET NO.
H104

Xrefs: xgt-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-EC&R; XC-1-CONST-LIMITS; XC-1-Erosion



1 EXISTING CONDITIONS & REMOVALS PLAN

SCALE: 1"=20'

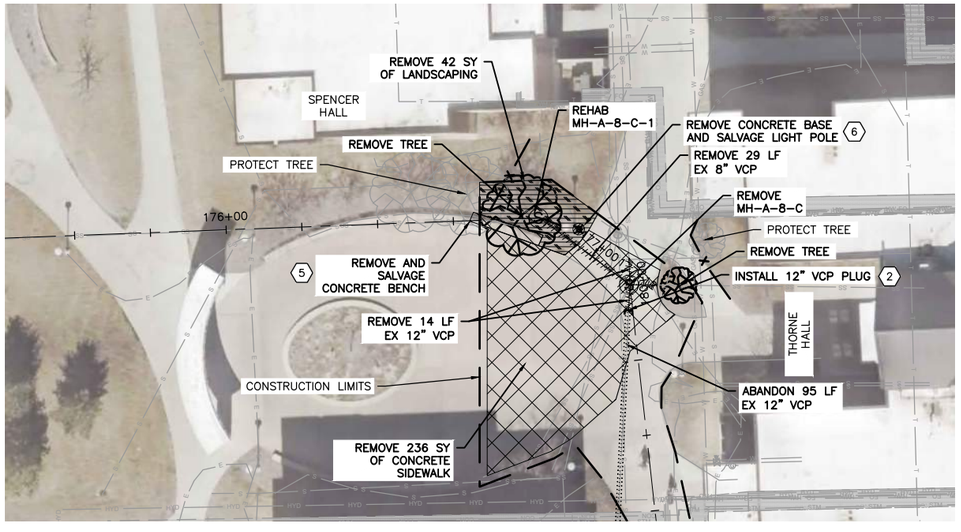
NORTH

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SAW CUT WITH A NEAT LINE AT THE REMOVAL LIMITS.
2. REMOVAL OF SIDEWALKS, CONCRETE PAVEMENTS, VALLEY GUTTER, AND CURB AND GUTTER SHALL BE TAKEN TO NEAREST JOINT. THIS MAY EFFECT THE QUANTITY, ALL SURFACING QUANTITIES WILL BE FIELD MEASURED.
3. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
4. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
5. PROTECT PAVED SURFACES, SIDEWALKS, VEGETATION, LANDSCAPING, AND OTHER ITEMS NOT CALLED OUT FOR REMOVAL.
6. DAMAGE TO ANY ITEMS NOT DESIGNATED TO BE REMOVED OR DISTURBED SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
7. CONTRACTOR SHALL TAKE CARE WHEN PERFORMING REMOVALS NEXT TO EXISTING BUILDINGS AND OR STRUCTURES. DAMAGES INCURRED FROM CARELESSNESS SHALL BE REPAIRED TO OWNER'S ACCEPTANCE, FULLY AT CONTRACTOR'S EXPENSE.
8. WITHIN TREE PROTECTION AREA, NO CONSTRUCTION ACTIVITY, ESPECIALLY VEHICLE TRACKING. FAILURE TO KEEP CONSTRUCTION ACTIVITY OUT OF PROTECTION AREA MAY RESULT IN CONTRACTOR BEING ASSESSED COSTS ASSOCIATED WITH DAMAGE TO TREES.
9. CONTRACTOR SHALL PRESERVE AND PROTECT TUNNELS AND SHALLOW TRENCHES DURING CONSTRUCTION.

KEYNOTE: ⬡

1. CAMPANILE AVENUE EXISTING PAVEMENT IS EXPECTED TO BE 6" ASPHALT.
2. REFER TO DETAIL 4/U001, FOR INSTALLATION OF PLUGS.
3. CONTRACTOR SHALL SUPPORT WATER MAIN DURING PIPE REPAIR.
4. REMOVE SECTION OF PIPE THAT HAS AN OFFSET JOINT AND IS BROKEN. REPLACED PIPE SECTION WILL BE CIPP LINED THROUGH.
5. CONTRACTOR SHALL TAKE EXTRA PRECAUTION WHEN WORKING NEXT TO CONCRETE SEATS. ONE SEGMENT OF THE CONCRETE SEAT IS SHOWN TO BE SALVAGED FOR RESET; HOWEVER, IF CONTRACTOR CAN COMPLETE THE SANITARY SEWER REPLACEMENT WITHOUT HAVING TO REMOVE THE SEAT, THE SEAT CAN BE LEFT BUT IT SHALL NOT GET DAMAGED.
6. REMOVE AND SALVAGE STREET LIGHT POLE IF IN THE WAY OF CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL STORE LIGHT POLE AND REINSTALL. ANY DAMAGE TO THE LIGHT POLE DURING CONSTRUCTION OR STORAGE SHALL BE REPLACED OR REPAIRED AT NO COST TO OWNER.
7. INSTALL BULKHEAD IN MANHOLE, THAT IS CAPABLE OF GROUT FILLING THE ABANDONED SANITARY SEWER MAIN WITH CLSM.
8. FILL ENTIRE SANITARY SEWER MAIN BETWEEN BULKHEADS WITH CLSM. CONTRACTOR SHALL INSTALL VENTING AS NEEDED.



2 EXISTING CONDITIONS & REMOVALS PLAN

SCALE: 1"=20'

NORTH

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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APPROVED:	MJP	JOB NUMBER:	221795
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SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS

EXISTING CONDITIONS & REMOVALS

SHEET NO. H105

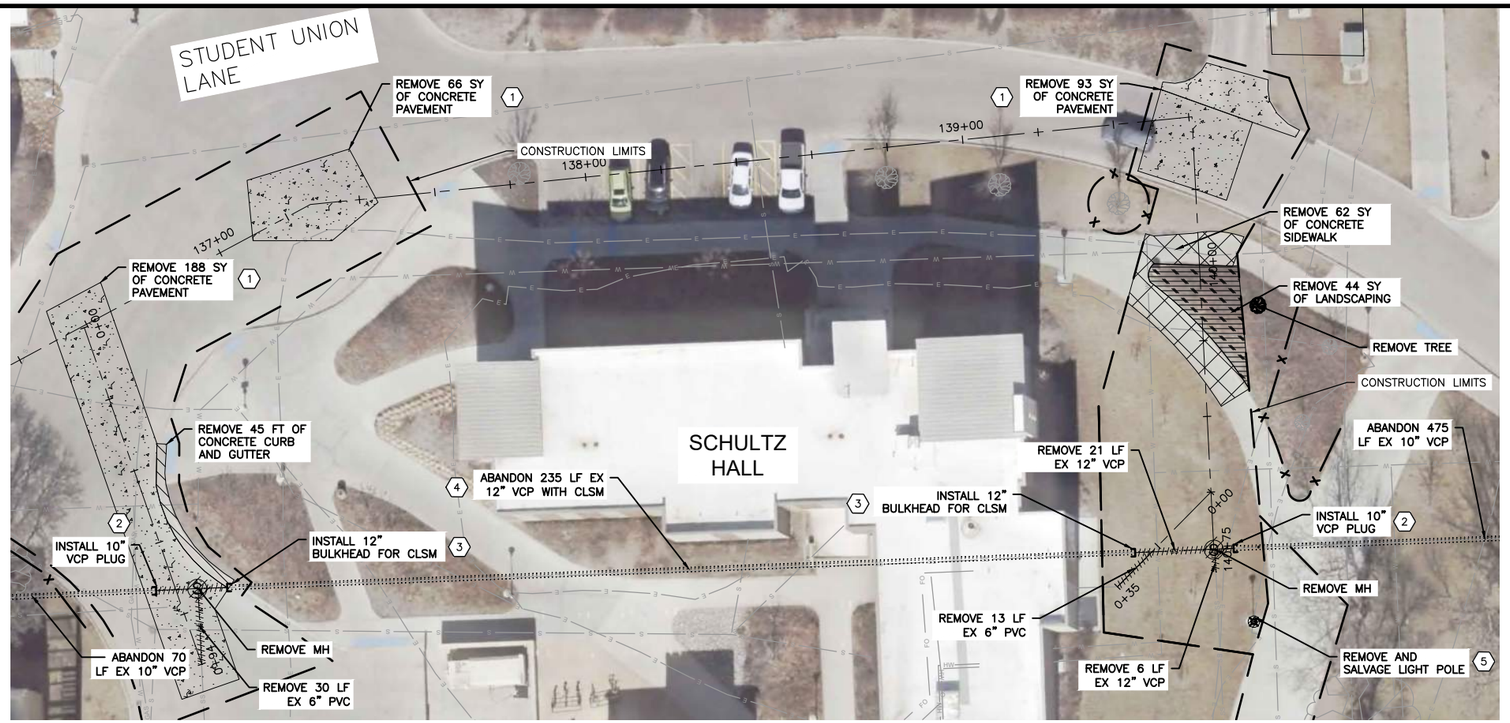
Xrefs: xg1-1-dh01; XX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-EC&R; XC-1-CONST-LIMITS; XC-1-Erosion

GENERAL NOTES:

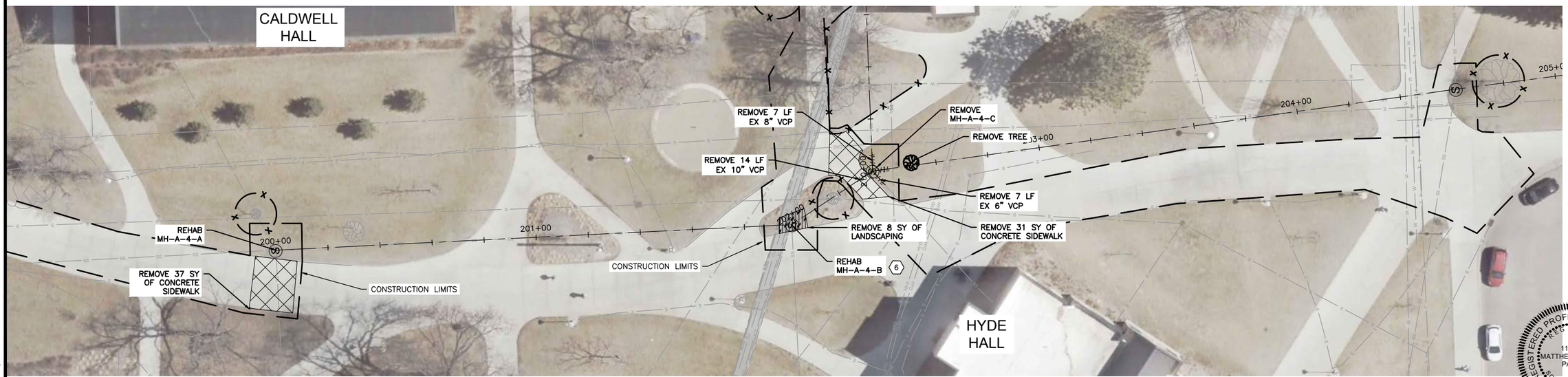
1. ALL PAVED SURFACES SHALL BE SAW CUT WITH A NEAT LINE AT THE REMOVAL LIMITS.
2. REMOVAL OF SIDEWALKS, CONCRETE PAVEMENTS, VALLEY GUTTER, AND CURB AND GUTTER SHALL BE TAKEN TO NEAREST JOINT. THIS MAY EFFECT THE QUANTITY, ALL SURFACING QUANTITIES WILL BE FIELD MEASURED.
3. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
4. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
5. PROTECT PAVED SURFACES, SIDEWALKS, VEGETATION, LANDSCAPING, AND OTHER ITEMS NOT CALLED OUT FOR REMOVAL.
6. DAMAGE TO ANY ITEMS NOT DESIGNATED TO BE REMOVED OR DISTURBED SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
7. CONTRACTOR SHALL TAKE CARE WHEN PERFORMING REMOVALS NEXT TO EXISTING BUILDINGS AND OR STRUCTURES. DAMAGES INCURRED FROM CARELESSNESS SHALL BE REPAIRED TO OWNER'S ACCEPTANCE, FULLY AT CONTRACTOR'S EXPENSE.
8. WITHIN TREE PROTECTION AREA, NO CONSTRUCTION ACTIVITY, ESPECIALLY VEHICLE TRACKING. FAILURE TO KEEP CONSTRUCTION ACTIVITY OUT OF PROTECTION AREA MAY RESULT IN CONTRACTOR BEING ASSESSED COSTS ASSOCIATED WITH DAMAGE TO TREES.
9. CONTRACTOR SHALL PRESERVE AND PROTECT TUNNELS AND SHALLOW TRENCHES DURING CONSTRUCTION.

KEYNOTE: ⬡

1. STUDENT UNION LANE EXISTING PAVEMENT IS EXPECTED TO BE 8" PCC.
2. REFER TO DETAIL 4/U001, FOR INSTALLATION OF PLUGS.
3. INSTALL BULKHEAD THAT IS CAPABLE OF GROUT FILLING THE ABANDONED SANITARY SEWER MAIN WITH CLSM.
4. FILL ENTIRE SANITARY SEWER MAIN BETWEEN BULKHEADS WITH CLSM. CONTRACTOR SHALL INSTALL VENTING AS NEEDED.
5. REMOVE AND SALVAGE STREET LIGHT POLE IF IN THE WAY OF CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL STORE LIGHT POLE AND REINSTALL. ANY DAMAGE TO THE LIGHT POLE DURING CONSTRUCTION OR STORAGE SHALL BE REPLACED OR REPAIRED AT NO COST TO OWNER.
6. CONTRACTOR SHALL TAKE EXTRA PRECAUTION WHEN WORKING NEXT TO A TUNNEL, SO THAT IT IS NOT UNDERMINED OR DAMAGED.



1 EXISTING CONDITIONS & REMOVALS PLAN
SCALE: 1"=20'



2 EXISTING CONDITIONS & REMOVALS PLAN
SCALE: 1"=20'

REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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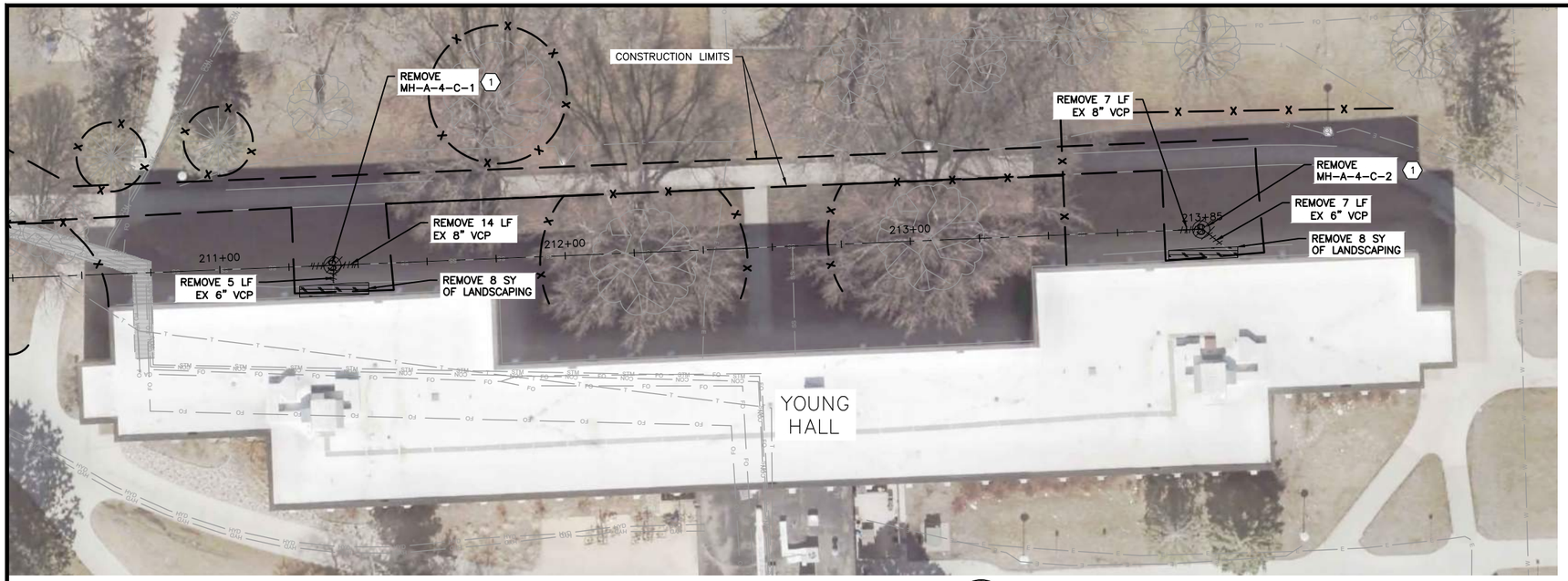
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

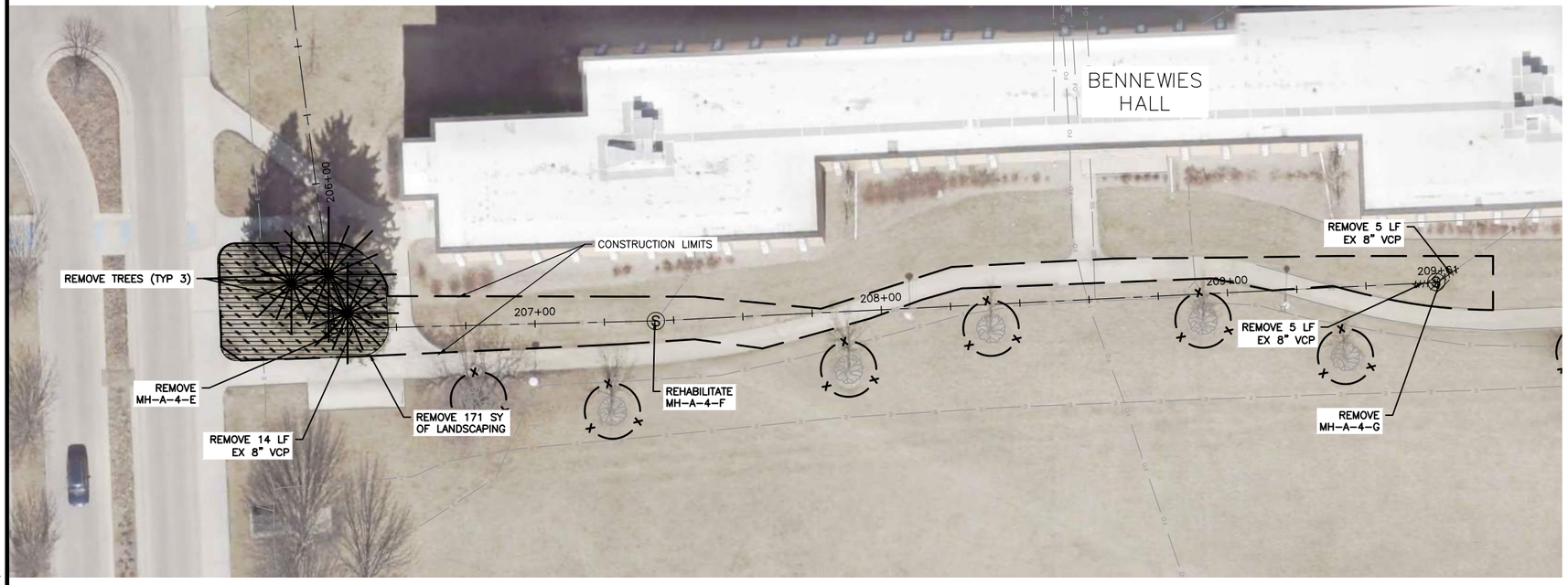
H – EXISTING CONDITIONS AND REMOVALS
EXISTING CONDITIONS & REMOVALS

SHEET NO.
H109

Xrefs: xgl-1-dh01; XV-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-EC&R; XC-1-CONST-LIMITS; XC-1-Erosion



1 EXISTING CONDITIONS & REMOVALS PLAN
SCALE: 1"=20'



2 EXISTING CONDITIONS & REMOVALS PLAN
SCALE: 1"=20'

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SAW CUT WITH A NEAT LINE AT THE REMOVAL LIMITS.
2. REMOVAL OF SIDEWALKS, CONCRETE PAVEMENTS, VALLEY GUTTER, AND CURB AND GUTTER SHALL BE TAKEN TO NEAREST JOINT. THIS MAY EFFECT THE QUANTITY, ALL SURFACING QUANTITIES WILL BE FIELD MEASURED.
3. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
4. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
5. PROTECT PAVED SURFACES, SIDEWALKS, VEGETATION, LANDSCAPING, AND OTHER ITEMS NOT CALLED OUT FOR REMOVAL.
6. DAMAGE TO ANY ITEMS NOT DESIGNATED TO BE REMOVED OR DISTURBED SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
7. CONTRACTOR SHALL TAKE CARE WHEN PERFORMING REMOVALS NEXT TO EXISTING BUILDINGS AND OR STRUCTURES. DAMAGES INCURRED FROM CARELESSNESS SHALL BE REPAIRED TO OWNER'S ACCEPTANCE, FULLY AT CONTRACTOR'S EXPENSE.
8. WITHIN TREE PROTECTION AREA, NO CONSTRUCTION ACTIVITY, ESPECIALLY VEHICLE TRACKING. FAILURE TO KEEP CONSTRUCTION ACTIVITY OUT OF PROTECTION AREA MAY RESULT IN CONTRACTOR BEING ASSESSED COSTS ASSOCIATED WITH DAMAGE TO TREES.
9. CONTRACTOR SHALL PRESERVE AND PROTECT TUNNELS AND SHALLOW TRENCHES DURING CONSTRUCTION.

KEYNOTE:

1. REPLACED PIPE SECTION WILL BE CIPP LINED THROUGH.

REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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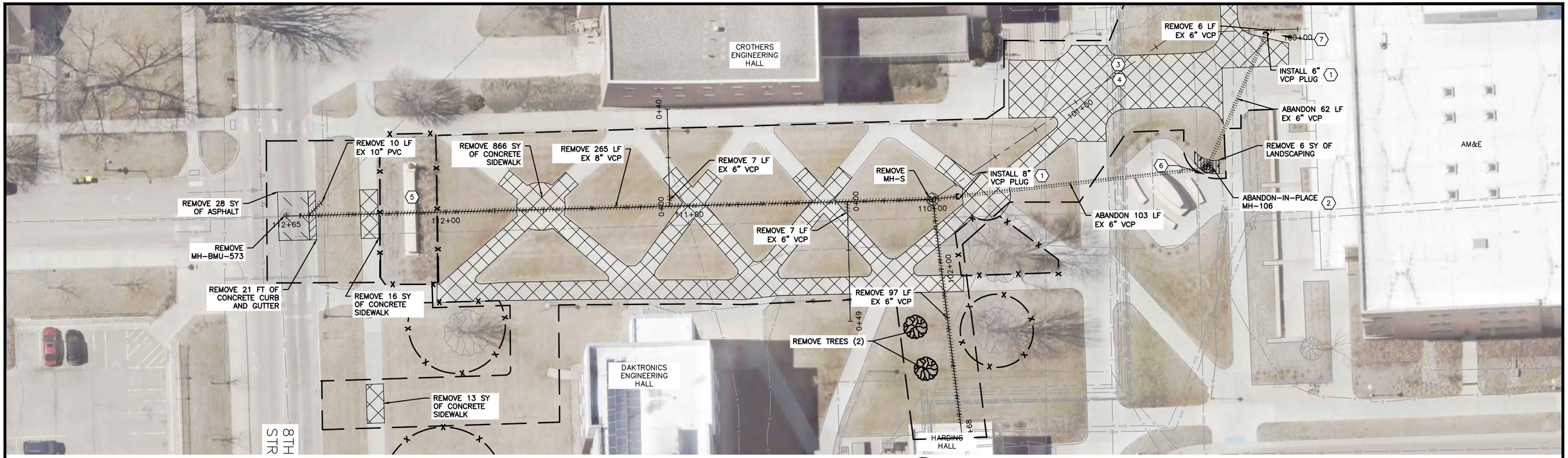
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS
EXISTING CONDITIONS & REMOVALS

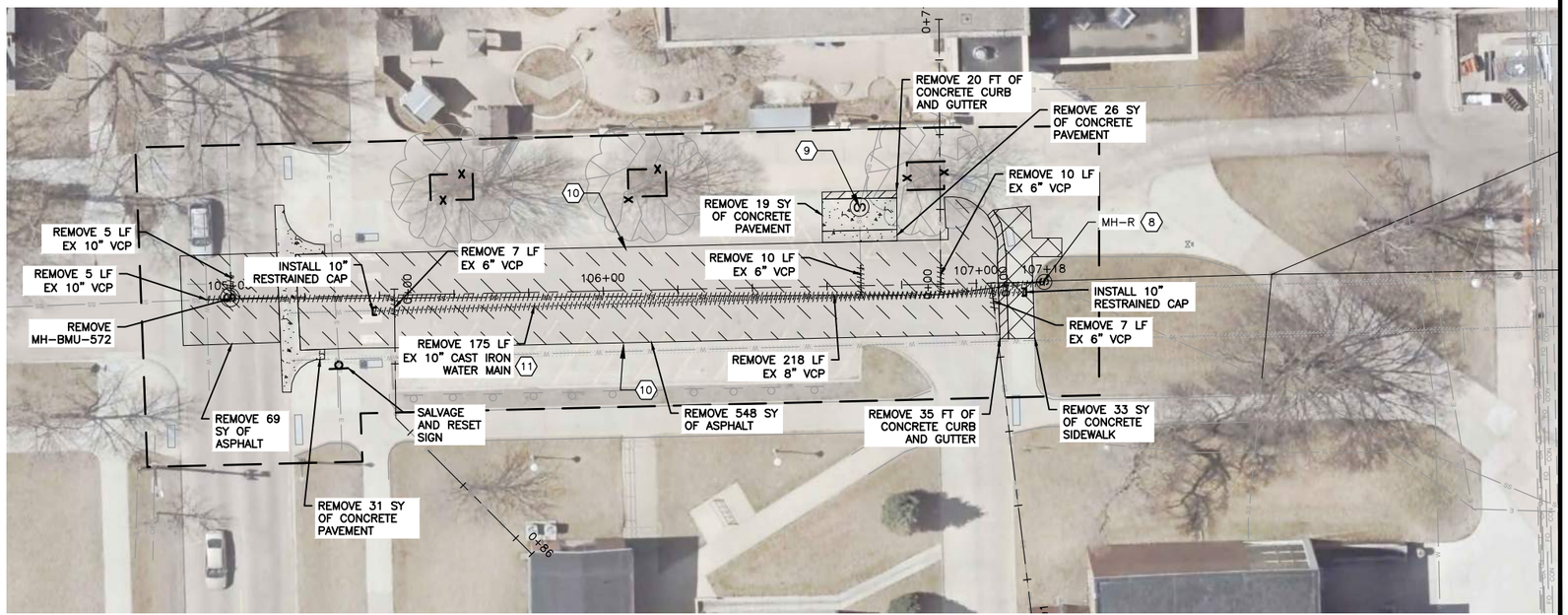
SHEET NO.
H110

Xrefs: xgt-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-EC&R; XC-1-CONST-LIMITS; XC-1-Erosion



1 EXISTING CONDITIONS & REMOVALS PLAN

SCALE: 1"=20'



2 EXISTING CONDITIONS & REMOVALS PLAN

SCALE: 1"=20'

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SAW CUT WITH A NEAT LINE AT THE REMOVAL LIMITS.
2. REMOVAL OF SIDEWALKS, CONCRETE PAVEMENTS, VALLEY GUTTER, AND CURB AND GUTTER SHALL BE TAKEN TO NEAREST JOINT. THIS MAY EFFECT THE QUANTITY, ALL SURFACING QUANTITIES WILL BE FIELD MEASURED.
3. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
4. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
5. PROTECT PAVED SURFACES, SIDEWALKS, VEGETATION, LANDSCAPING, AND OTHER ITEMS NOT CALLED OUT FOR REMOVAL.
6. DAMAGE TO ANY ITEMS NOT DESIGNATED TO BE REMOVED OR DISTURBED SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
7. CONTRACTOR SHALL TAKE CARE WHEN PERFORMING REMOVALS NEXT TO EXISTING BUILDINGS AND OR STRUCTURES. DAMAGES INCURRED FROM CARELESSNESS SHALL BE REPAIRED TO OWNER'S ACCEPTANCE, FULLY AT CONTRACTOR'S EXPENSE.
8. WITHIN TREE PROTECTION AREA, NO CONSTRUCTION ACTIVITY, ESPECIALLY VEHICLE TRACKING. FAILURE TO KEEP CONSTRUCTION ACTIVITY OUT OF PROTECTION AREA MAY RESULT IN CONTRACTOR BEING ASSESSED COSTS ASSOCIATED WITH DAMAGE TO TREES.
9. CONTRACTOR SHALL PRESERVE AND PROTECT TUNNELS AND SHALLOW TRENCHES DURING CONSTRUCTION.

KEYNOTE: ⬡

1. REFER TO DETAIL 4/U001, FOR INSTALLATION OF PLUGS.
2. REFER TO DETAIL 5/U001, FOR ABANDONMENT OF MANHOLE WITH THE EXCEPTION THAT ONLY THE MANHOLE CASTING AND RINGS WILL BE REMOVED, THE MANHOLE CONE SECTION SHALL BE LEFT IN PLACE.
3. PROTECT TUNNEL ENTRANCES AND HATCHES.
4. CONTRACTOR SHALL TAKE EXTRA PRECAUTION WHEN WORKING NEXT TO A TUNNEL, SO THAT IT IS NOT UNDERMINED OR DAMAGED.
5. PROTECT EXISTING SIGN, LANDSCAPING, AND SHRUBS.
6. PROTECT CONCRETE SIDEWALK FROM DAMAGE WHEN ABANDONING MANHOLE MH-106.
7. PROTECT CONCRETE SITTING WALL FROM DAMAGE DURING CONSTRUCTION.
8. PROTECT EXISTING MANHOLE MH-R FROM DAMAGE DURING CONSTRUCTION.
9. MANHOLE IS UNNAMED AND THE COVER IS LOCATED UNDER THE CONCRETE PAVEMENT. AFTER EXPOSING THE MANHOLE COVER AND GAINING ACCESS INTO THE MANHOLE, 6" PVC SHALL BE INSTALLED BETWEEN PIPE PENETRATION TO ALLOW FOR CIPP LINING THROUGH THE PIPE. AFTER THE CIPP LINING HAS BEEN COMPLETED, THE MANHOLE SHALL BE ABANDON-IN-PLACE, PER DETAIL 5/U001.
10. PROTECT CONCRETE PAVEMENT EDGE DURING CONSTRUCTION.
11. REMOVE EXISTING ABANDONED WATER MAIN WHEN IT CONFLICTS WITH THE TRENCH FOR INSTALLING THE PROPOSED SANITARY SEWER MAIN.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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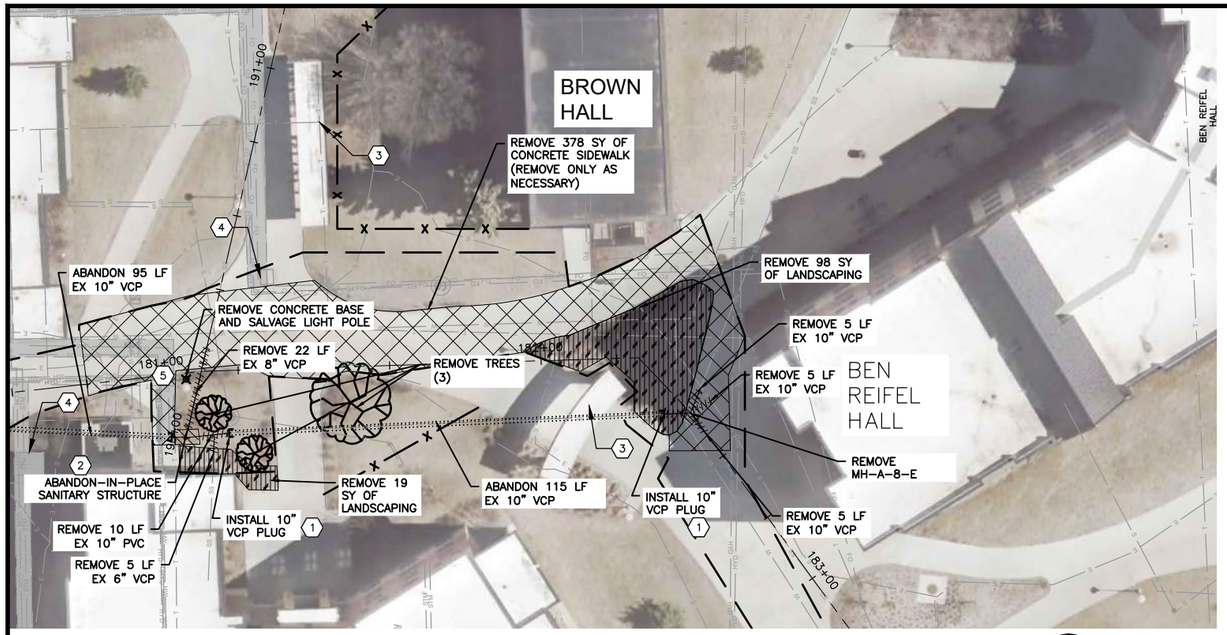
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS
EXISTING CONDITIONS & REMOVALS

SHEET NO.
H111

Xrefs: xgl-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-EC&R; XC-1-CONST-LIMITS; XC-1-Erosion



1 BID ALTERNATE B: ABBOT HALL, EXISTING CONDITIONS & REMOVALS PLAN

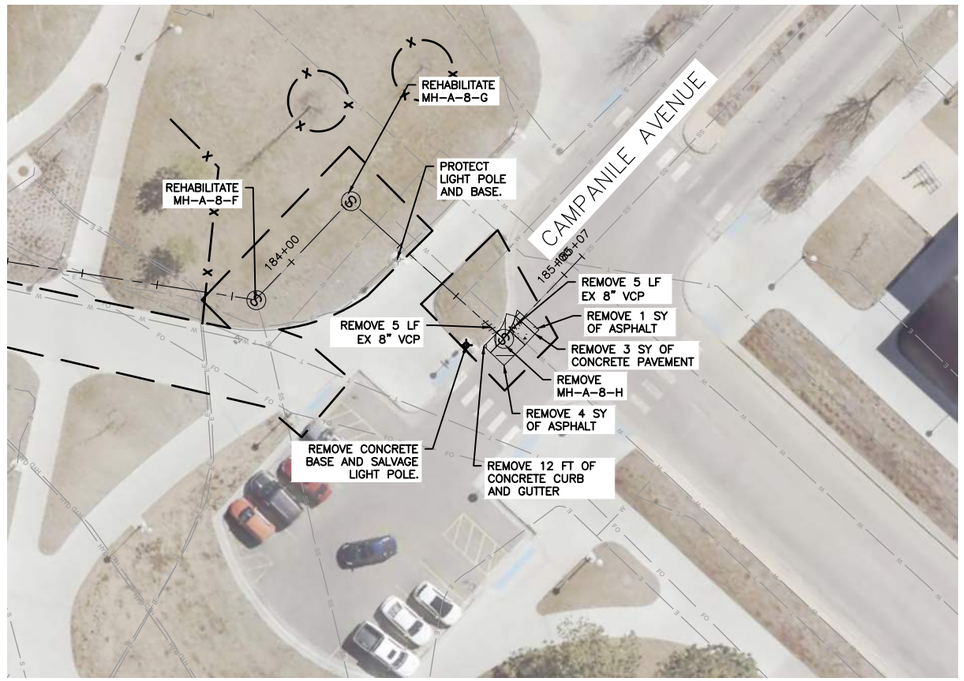
SCALE: 1"=20'

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SAW CUT WITH A NEAT LINE AT THE REMOVAL LIMITS.
2. REMOVAL OF SIDEWALKS, CONCRETE PAVEMENTS, VALLEY GUTTER, AND CURB AND GUTTER SHALL BE TAKEN TO NEAREST JOINT. THIS MAY EFFECT THE QUANTITY, ALL SURFACING QUANTITIES WILL BE FIELD MEASURED.
3. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
4. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
5. PROTECT PAVED SURFACES, SIDEWALKS, VEGETATION, LANDSCAPING, AND OTHER ITEMS NOT CALLED OUT FOR REMOVAL.
6. DAMAGE TO ANY ITEMS NOT DESIGNATED TO BE REMOVED OR DISTURBED SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
7. CONTRACTOR SHALL TAKE CARE WHEN PERFORMING REMOVALS NEXT TO EXISTING BUILDINGS AND OR STRUCTURES. DAMAGES INCURRED FROM CARELESSNESS SHALL BE REPAIRED TO OWNER'S ACCEPTANCE, FULLY AT CONTRACTOR'S EXPENSE.
8. WITHIN TREE PROTECTION AREA, NO CONSTRUCTION ACTIVITY, ESPECIALLY VEHICLE TRACKING. FAILURE TO KEEP CONSTRUCTION ACTIVITY OUT OF PROTECTION AREA MAY RESULT IN CONTRACTOR BEING ASSESSED COSTS ASSOCIATED WITH DAMAGE TO TREES.
9. CONTRACTOR SHALL PRESERVE AND PROTECT TUNNELS AND SHALLOW TRENCHES DURING CONSTRUCTION.

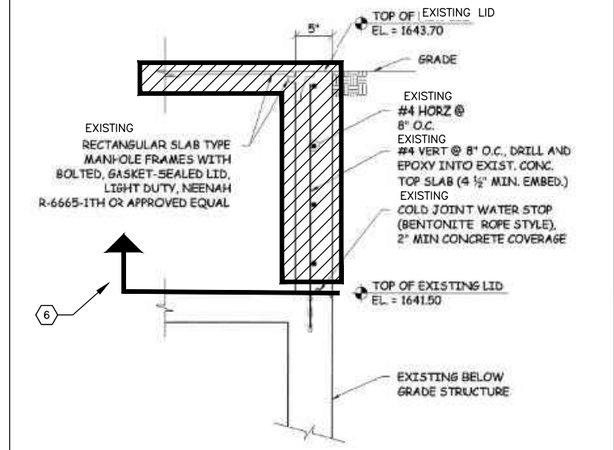
KEYNOTE:

1. REFER TO DETAIL 4/U001, FOR INSTALLATION OF PLUGS.
2. REFER TO DETAIL 3/H112, FOR ABANDONMENT OF THE SANITARY SEWER STRUCTURE, WHICH INCLUDES THE REMOVAL OF THE TOP 2' OF THE STRUCTURE.
3. PROTECT EXISTING STRUCTURE.
4. PROTECT TUNNEL ENTRANCES AND HATCHES.
5. CONTRACTOR SHALL TAKE EXTRA PRECAUTION WHEN WORKING NEXT TO A TUNNEL, SO THAT IT IS NOT UNDERMINED OR DAMAGED.
6. SAW CUT THIS JOINT AND REMOVE THE STRUCTURE FROM THIS JOINT TO THE SURFACE. REFER TO DETAIL 5/U001, FOR THE ABANDONMENT OF THE LOWER STRUCTURE.
7. REMOVE THE ENTIRE EXISTING STRUCTURE LID.



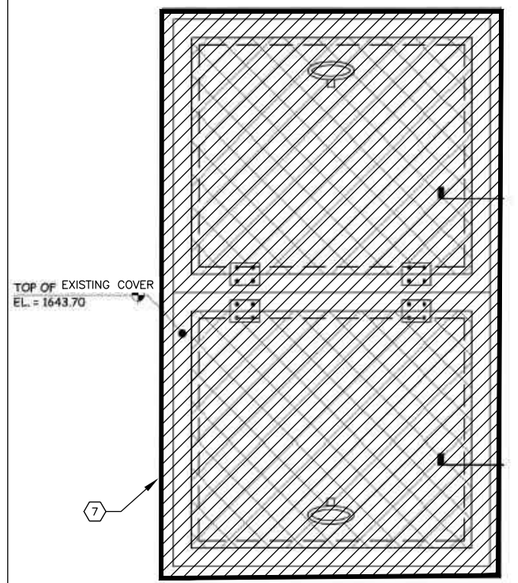
2 EXISTING CONDITIONS & REMOVALS PLAN

SCALE: 1"=20'



3 EXISTING STRUCTURE LID SECTION VIEW

SCALE: NTS



4 EXISTING STRUCTURE LID PLAN VIEW

SCALE: NTS

REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS
EXISTING CONDITIONS & REMOVALS

SHEET NO.
H112

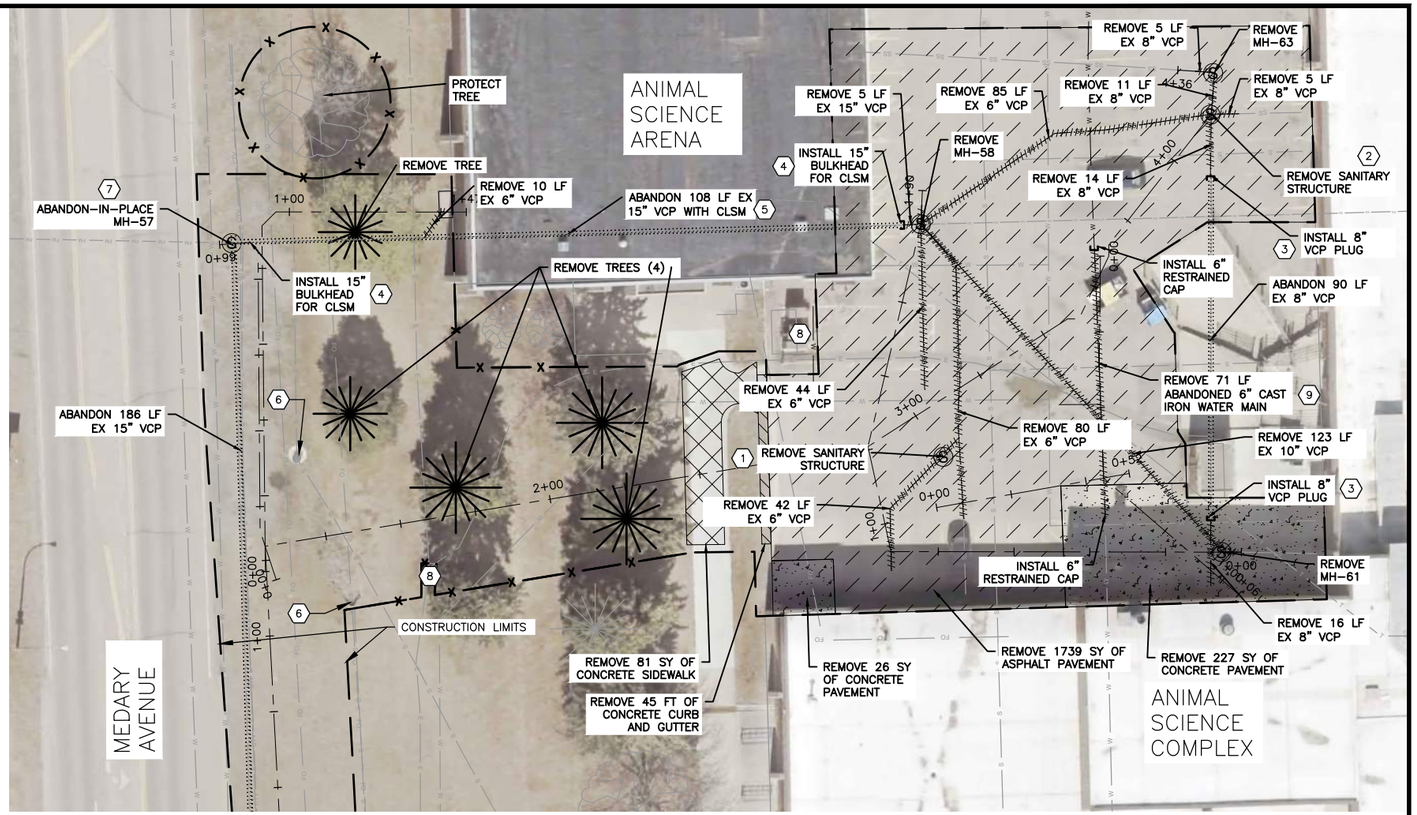
Xrefs: xgf-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-EC&R; XC-1-CONST-LIMITS; XC-1-Erosion

GENERAL NOTES:

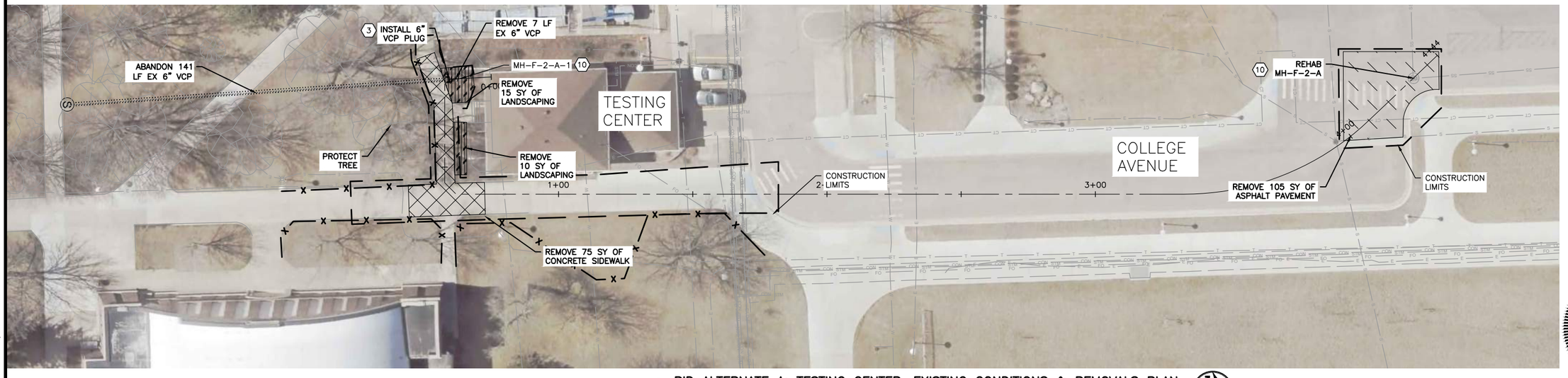
1. ALL PAVED SURFACES SHALL BE SAW CUT WITH A NEAT LINE AT THE REMOVAL LIMITS.
2. REMOVAL OF SIDEWALKS, CONCRETE PAVEMENTS, VALLEY GUTTER, AND CURB AND GUTTER SHALL BE TAKEN TO NEAREST JOINT. THIS MAY EFFECT THE QUANTITY, ALL SURFACING QUANTITIES WILL BE FIELD MEASURED.
3. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
4. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
5. PROTECT PAVED SURFACES, SIDEWALKS, VEGETATION, LANDSCAPING, AND OTHER ITEMS NOT CALLED OUT FOR REMOVAL.
6. DAMAGE TO ANY ITEMS NOT DESIGNATED TO BE REMOVED OR DISTURBED SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
7. CONTRACTOR SHALL TAKE CARE WHEN PERFORMING REMOVALS NEXT TO EXISTING BUILDINGS AND OR STRUCTURES. DAMAGES INCURRED FROM CARELESSNESS SHALL BE REPAIRED TO OWNER'S ACCEPTANCE, FULLY AT CONTRACTOR'S EXPENSE.
8. WITHIN TREE PROTECTION AREA, NO CONSTRUCTION ACTIVITY, ESPECIALLY VEHICLE TRACKING. FAILURE TO KEEP CONSTRUCTION ACTIVITY OUT OF PROTECTION AREA MAY RESULT IN CONTRACTOR BEING ASSESSED COSTS ASSOCIATED WITH DAMAGE TO TREES.
9. CONTRACTOR SHALL PRESERVE AND PROTECT TUNNELS AND SHALLOW TRENCHES DURING CONSTRUCTION.

KEY NOTES:

1. APPROXIMATELY 6,000 GALLON CONCRETE GREASE TRAP.
2. APPROXIMATELY 24,000 GALLON CONCRETE HOLDING TANK.
3. REFER TO DETAIL 4/U001, FOR INSTALLATION OF PLUGS.
4. INSTALL BULKHEAD THAT IS CAPABLE OF GROUT FILLING THE ABANDONED SANITARY SEWER MAIN WITH CLSM.
5. FILL ENTIRE SANITARY SEWER MAIN BETWEEN BULKHEADS WITH CLSM. CONTRACTOR SHALL INSTALL VENTING AS NEEDED.
6. PROTECT STORM SEWER STRUCTURE DURING CONSTRUCTION.
7. REFER TO DETAIL 5/U001, FOR ABANDONMENT OF MANHOLES. REMOVE THE BARREL SECTIONS DOWN TO AND INCLUDING THE BARREL SECTION THAT THE FORCE MAIN INVERT IS IN.
8. PROTECT ELECTRICAL TRANSFORMER DURING CONSTRUCTION.
9. REMOVE EXISTING ABANDONED WATER MAIN WHEN IT CONFLICTS WITH THE TRENCH FOR INSTALLING THE PROPOSED SANITARY SEWER MAIN.
10. PROTECT MANHOLE DURING CONSTRUCTION.



1 BID ALTERNATE C: ANIMAL COMPLEX, EXISTING CONDITIONS & REMOVALS PLAN
SCALE: 1"=20'



2 BID ALTERNATE A: TESTING CENTER, EXISTING CONDITIONS & REMOVALS PLAN
SCALE: 1"=20'

REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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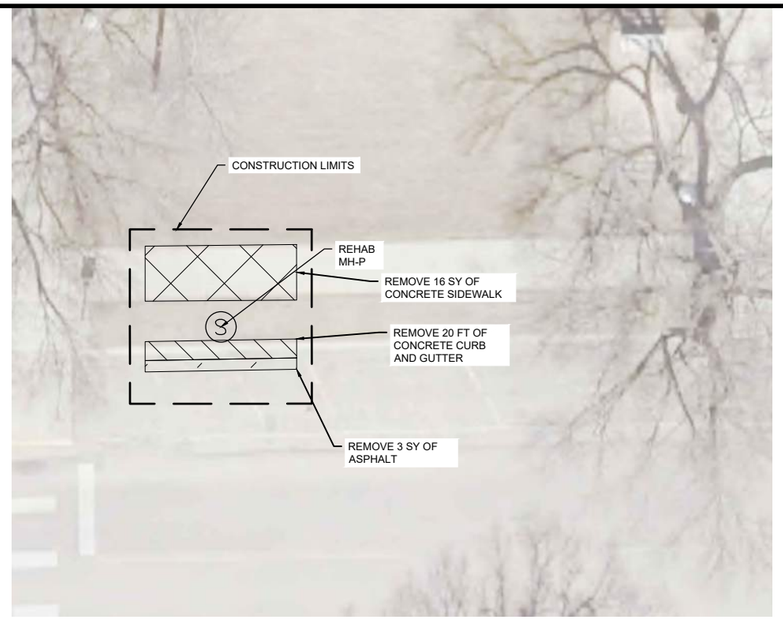
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS
EXISTING CONDITIONS & REMOVALS

SHEET NO.
H113

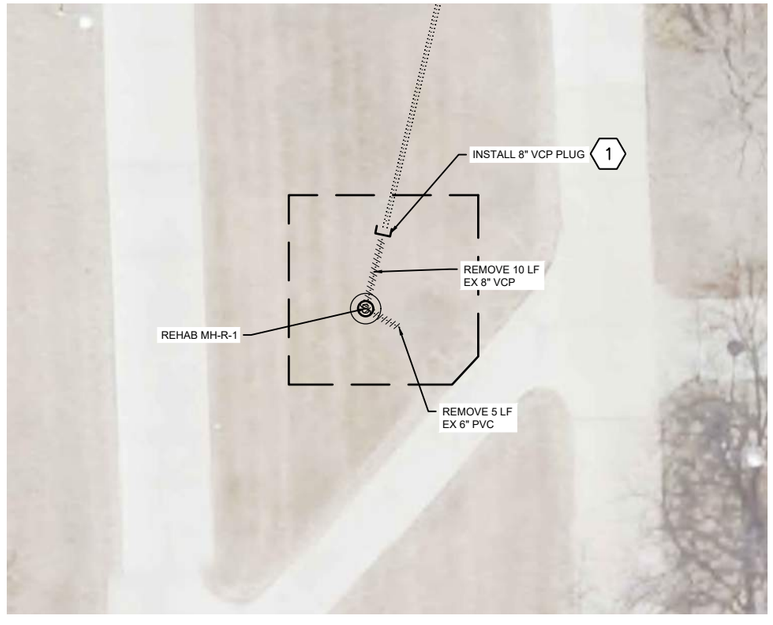
Xrefs: xgl-1-dh01; XX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-EC&R; XC-1-CONST-LIMITS; XC-1-Erosion

1 MH–M–1
SCALE: 1" = 10'

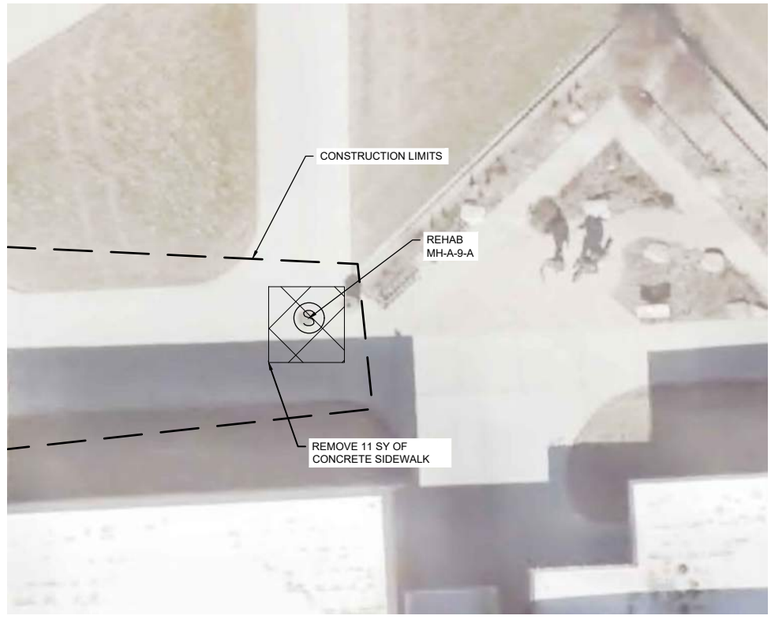


2 MH–P
SCALE: 1" = 10'

3 MH–Q
SCALE: 1" = 10'



4 MH–R–1
SCALE: 1" = 10'



5 MH–A–9–A
SCALE: 1" = 10'

GENERAL NOTES:

1. ALL PAVED SURFACES SHALL BE SAW CUT WITH A NEAT LINE AT THE REMOVAL LIMITS.
2. REMOVAL OF SIDEWALKS, CONCRETE PAVEMENTS, VALLEY GUTTER, AND CURB AND GUTTER SHALL BE TAKEN TO NEAREST JOINT. THIS MAY EFFECT THE QUANTITY, ALL SURFACING QUANTITIES WILL BE FIELD MEASURED.
3. PROPOSED ACCESS ROUTES TO IMPROVEMENTS SHALL BE FOLLOWED BY CONTRACTOR; HOWEVER, PROPOSED ACCESS ROUTE CAN BE DISCUSSED FOR ALTERNATIVE ROUTES.
4. CONTRACTOR SHALL USE CAUTION TO KEEP CONSTRUCTION ACTIVITIES WITHIN THE CONSTRUCTION LIMITS. DAMAGE CAUSED BY CONTRACTOR OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
5. PROTECT PAVED SURFACES, SIDEWALKS, VEGETATION, LANDSCAPING, AND OTHER ITEMS NOT CALLED OUT FOR REMOVAL.
6. DAMAGE TO ANY ITEMS NOT DESIGNATED TO BE REMOVED OR DISTURBED SHALL BE REMEDIED/REPLACE/REPAIRED AT NO COST TO OWNER.
7. CONTRACTOR SHALL TAKE CARE WHEN PERFORMING REMOVALS NEXT TO EXISTING BUILDINGS AND OR STRUCTURES. DAMAGES INCURRED FROM CARELESSNESS SHALL BE REPAIRED TO OWNER'S ACCEPTANCE, FULLY AT CONTRACTOR'S EXPENSE.
8. WITHIN TREE PROTECTION AREA, NO CONSTRUCTION ACTIVITY, ESPECIALLY VEHICLE TRACKING. FAILURE TO KEEP CONSTRUCTION ACTIVITY OUT OF PROTECTION AREA MAY RESULT IN CONTRACTOR BEING ASSESSED COSTS ASSOCIATED WITH DAMAGE TO TREES.
9. CONTRACTOR SHALL PRESERVE AND PROTECT TUNNELS AND SHALLOW TRENCHES DURING CONSTRUCTION.

KEY NOTES:

1. REFER TO DETAIL 4/U001, FOR INSTALLATION OF PLUGS.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

Xrefs: xgl-1-dh01; XVX-IMAGE; xv-sewer rehab-replace; XC-1-SAN; XC-BASE-GIS; XC-1-EC&R; XC-1-CONST-LIMITS

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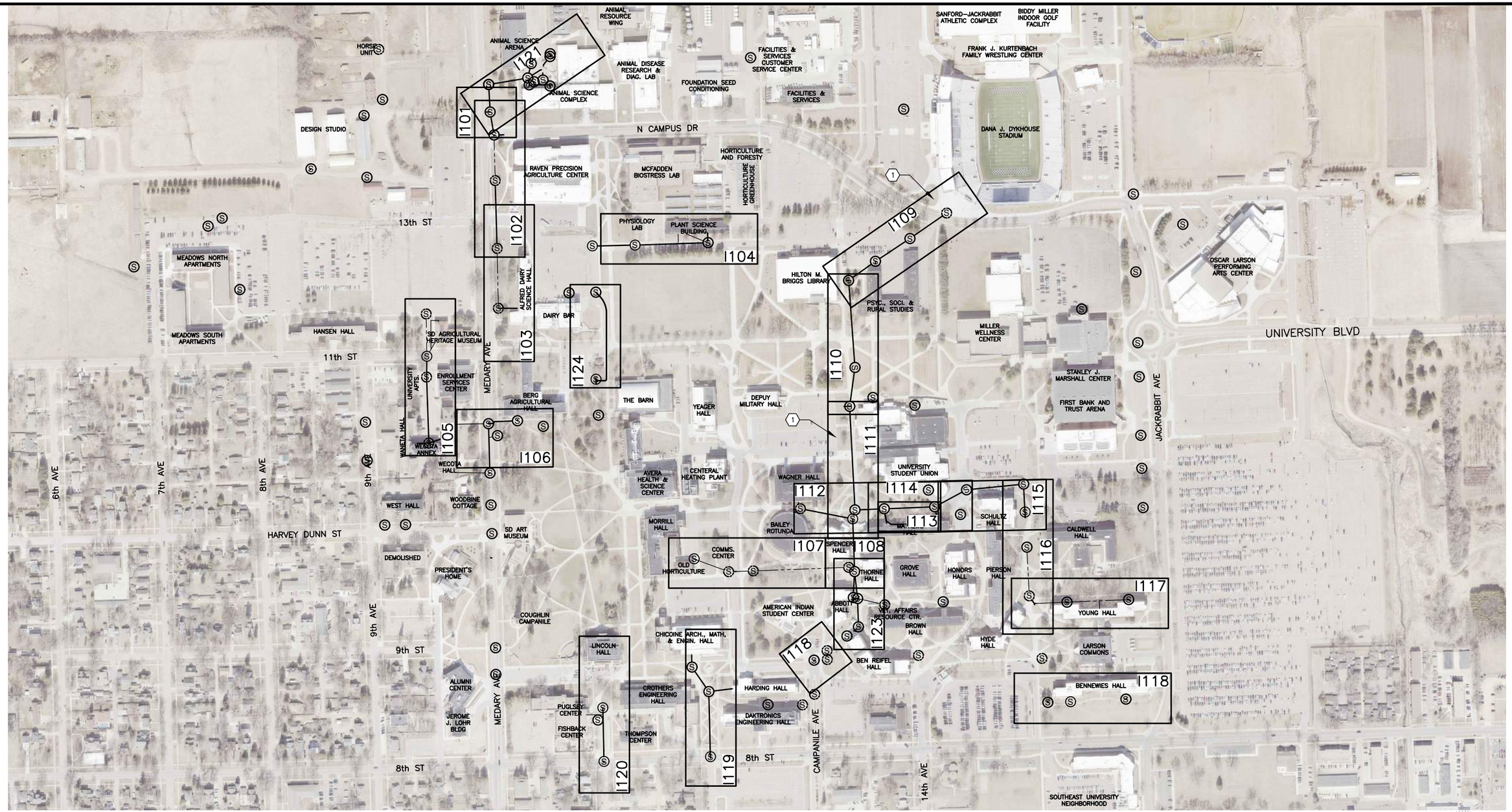
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

H – EXISTING CONDITIONS AND REMOVALS
EXISTING CONDITIONS & REMOVALS

SHEET NO.
H118



LEGEND

- EXISTING SANITARY MANHOLE
- PROPOSED SANITARY MANHOLE
- REHABILITATED SANITARY MANHOLE
- PROPOSED SANITARY SEWER (SIZE VARIES)
- REHABILITATED SANITARY SEWER (SIZE VARIES)

KEYNOTE: ⬡

1. WITHIN 1 WEEK AFTER LOW PRESSURE AND VACUUM TESTING, SURFACING AND PAVING EFFORT MUST BEGIN.

1 UTILITY SHEET REFERENCE PLAN

SCALE: 1" = 200'

NORTH

0 200'
1"=200'

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
UTIILITY SHEET REFERENCE PLAN

SHEET NO.
I100

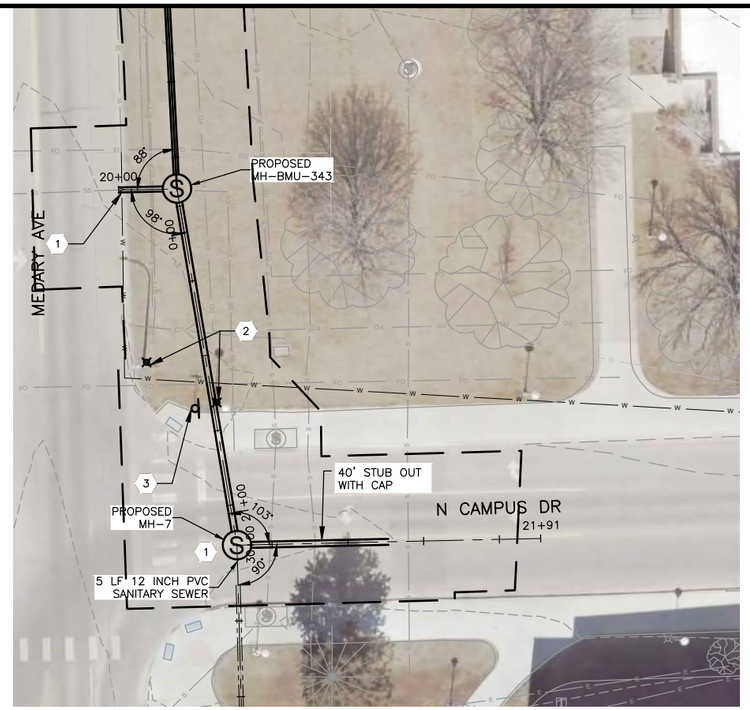
Xrefs: xg-1-dh01; XVX-IMAGE; xv-sewer rehab-replace; XC-1-SAN; XC-BASE-GIS

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

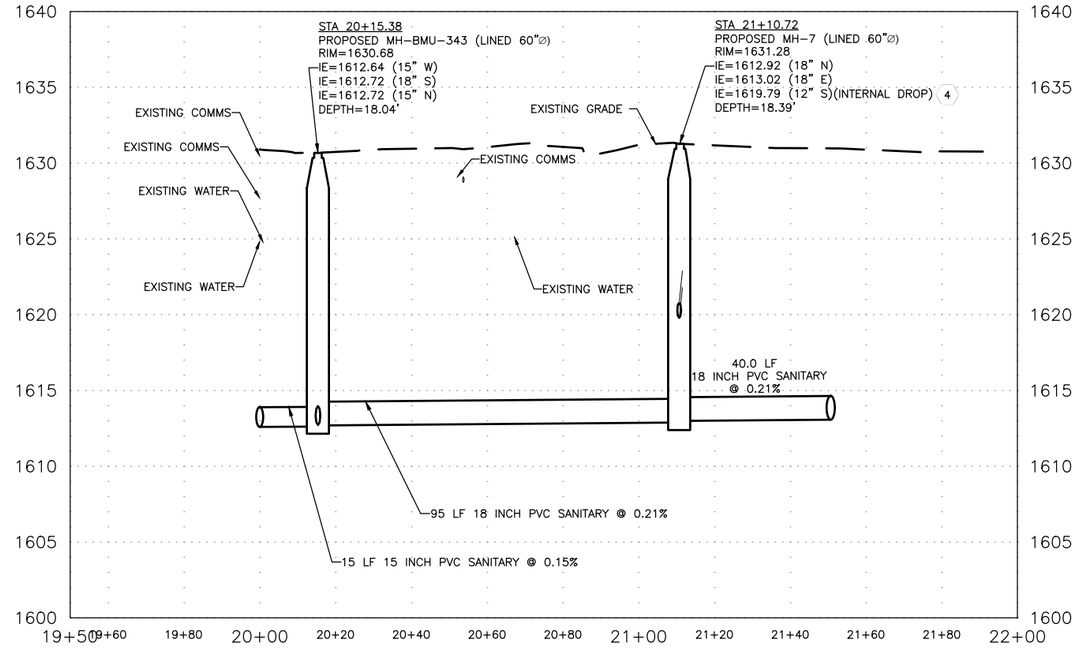
KEYNOTE:

1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
2. RESET SALVAGED LIGHT POLE AND RECONNECT ELECTRICAL CONNECTIONS. REFER TO DETAIL 26-010/U101, FOR INSTALLATION OF LIGHT POLE BASE.
3. RESET SALVAGED SIGN AND PROVIDE NEW CONNECTION HARDWARE AND BURIED SIGN POST.
4. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.



1 PLAN
SCALE: 1"=20'

NORTH



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REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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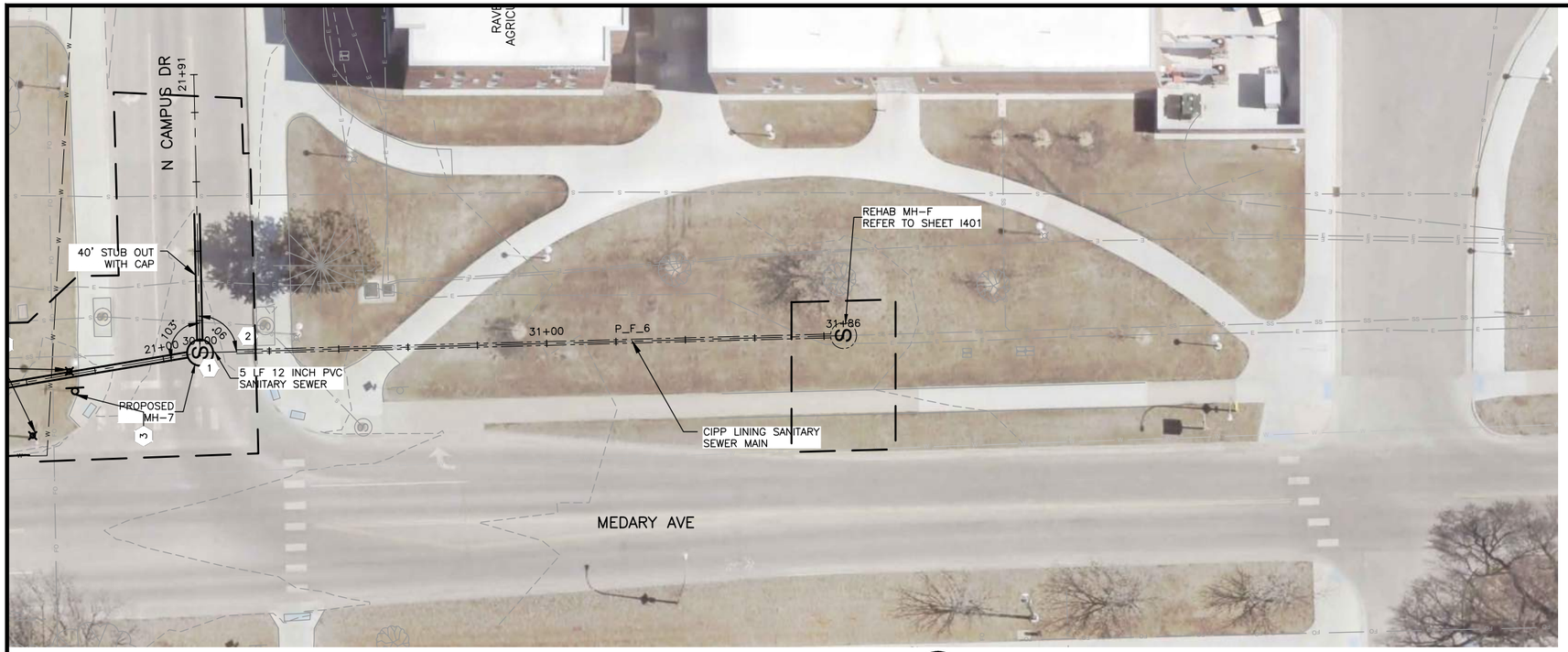
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

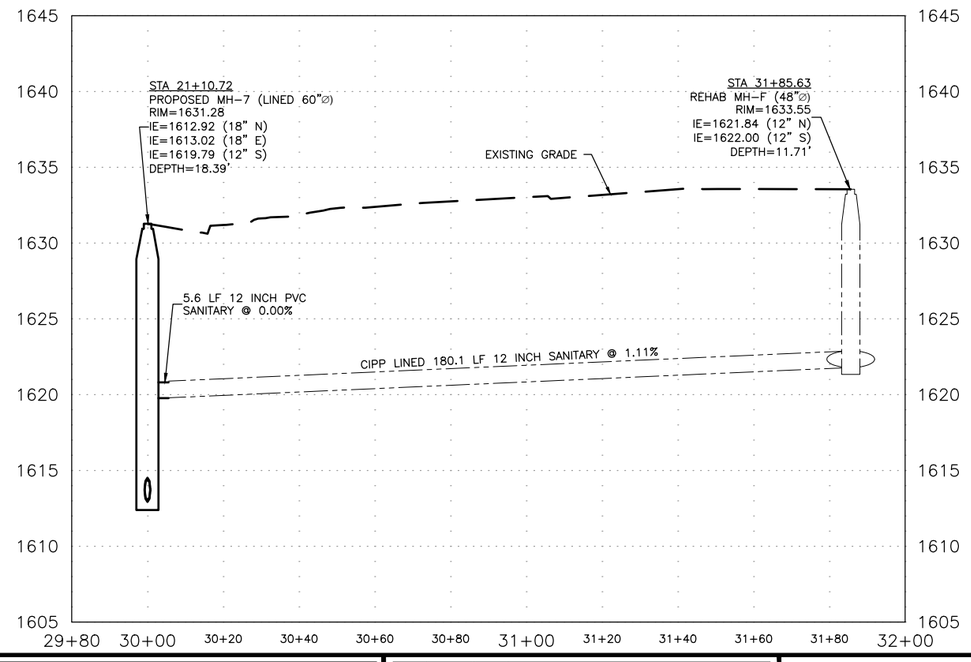
I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I101

Xrefs: xg|-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 **PLAN**
SCALE: 1"=40'



GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE:

1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
2. UPON INSTALLATION OF PROPOSED SANITARY SEWER PIPE SEGMENT CONNECTED TO EXISTING PIPE AND INSTALLED IN PROPOSED MANHOLE, CONTRACTOR SHALL CIPP LINE ENTIRE PIPE SEGMENT FROM MANHOLE MH-F TO MH-7.

SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_F_7	MH-F		MH-7	11.7	187	12	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0

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REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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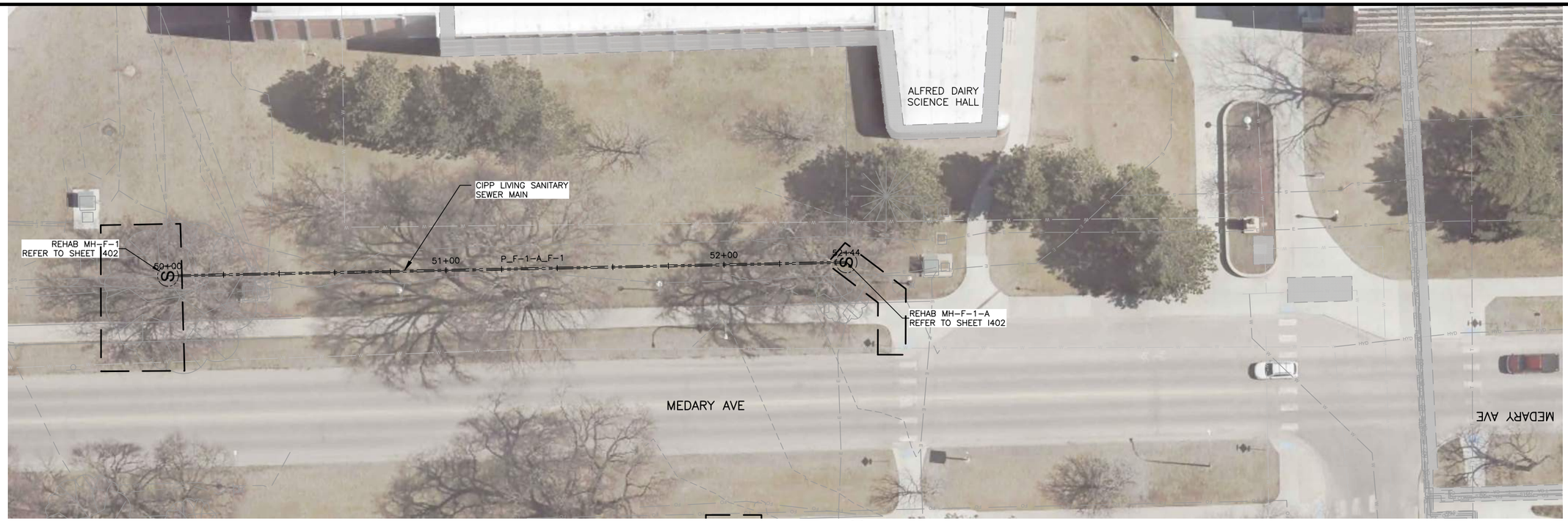
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I102

Xrefs: xg|-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 PLAN
SCALE: 1"=20'

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_F-1-A_F-1	MH-F-1-A		MH-F-1	11.4	235	8, 10	VCP	1	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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SOUTH DAKOTA STATE UNIVERSITY
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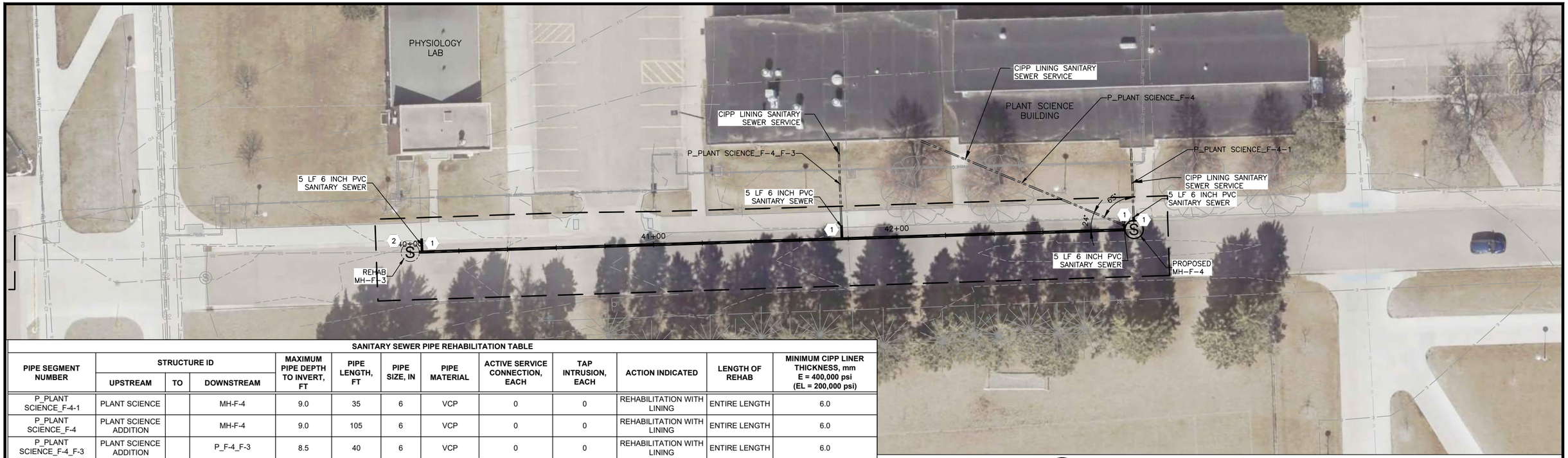
I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I103

Xrefs: xg1-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_PLANT SCIENCE_F-4-1	PLANT SCIENCE		MH-F-4	9.0	35	6	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
P_PLANT SCIENCE_F-4	PLANT SCIENCE ADDITION		MH-F-4	9.0	105	6	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
P_PLANT SCIENCE_F-4_F-3	PLANT SCIENCE ADDITION		P_F-4_F-3	8.5	40	6	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0

1 PLAN
SCALE: 1"=20'

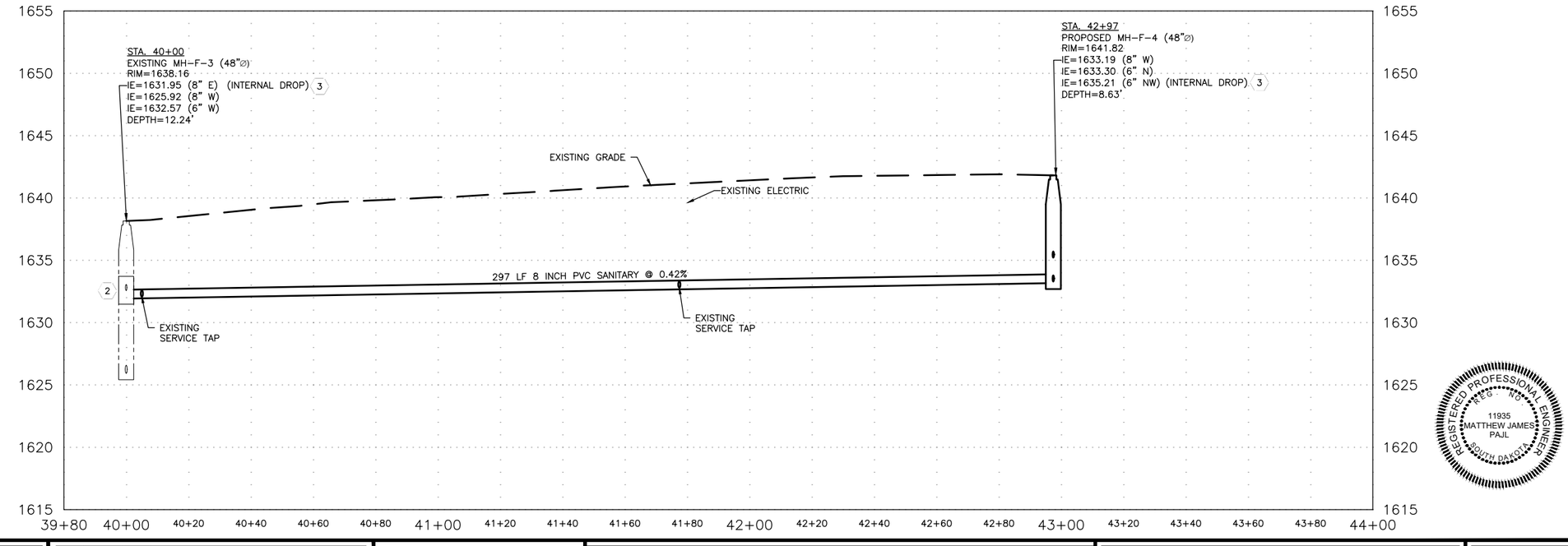
NORTH

KEYNOTES:

1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
2. INSTALL NEW BARREL SECTION WITH UPSTREAM PIPE PENETRATION FOR PROPOSED UPSTREAM MAIN DIAMETER AND ELEVATION. RESET CONE SECTION

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.
3. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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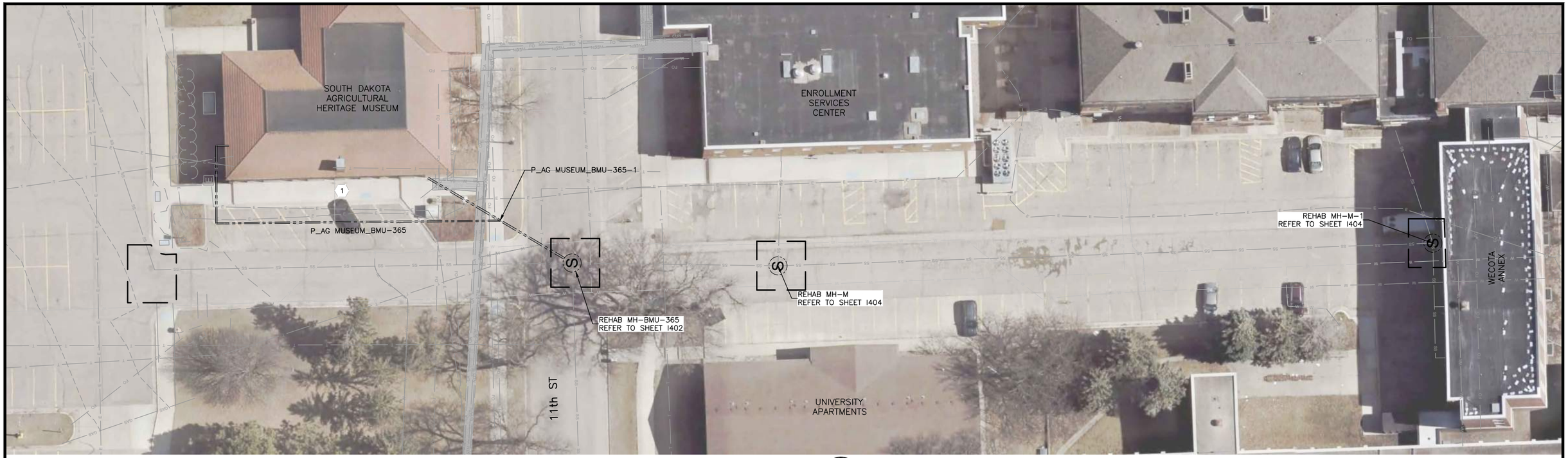
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I104

Xrefs: xg-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 PLAN
SCALE: 1"=20'

KEYNOTE:

1. FIELD VERIFY THAT THERE IS OR IS NOT A SUMP PUMP SERVICE LINE ENTERING THE PIPE HERE. IF THERE IS, RECONNECT.

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_AG MUSEUM_BMU-365-1	AG MUSEUM (SW)		MH-BMU 365	11.0	65	8	VCP	1	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
P_AG MUSEUM_BMU-365	AG MUSEUM (NW)		MH-BMU 365	11.0	150	6	VCP	1	0	REHABILITATION WITH LINING	ENTIRE LENGTH	7.0

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

DRAWN BY: JMM JOB DATE: 2024
APPROVED: MJP JOB NUMBER: 221795
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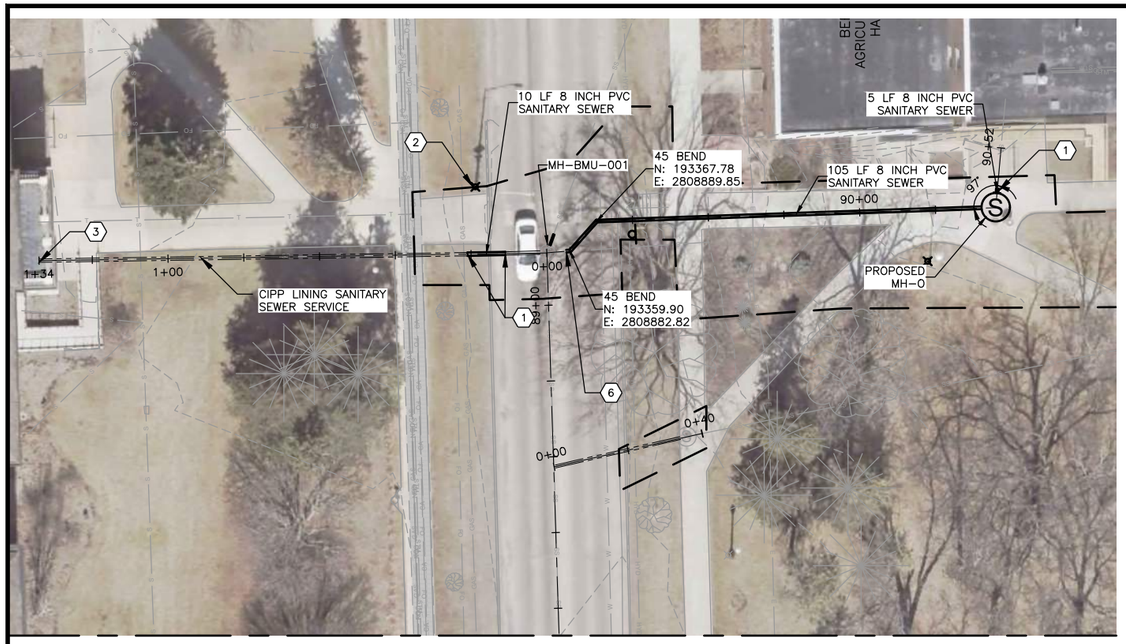
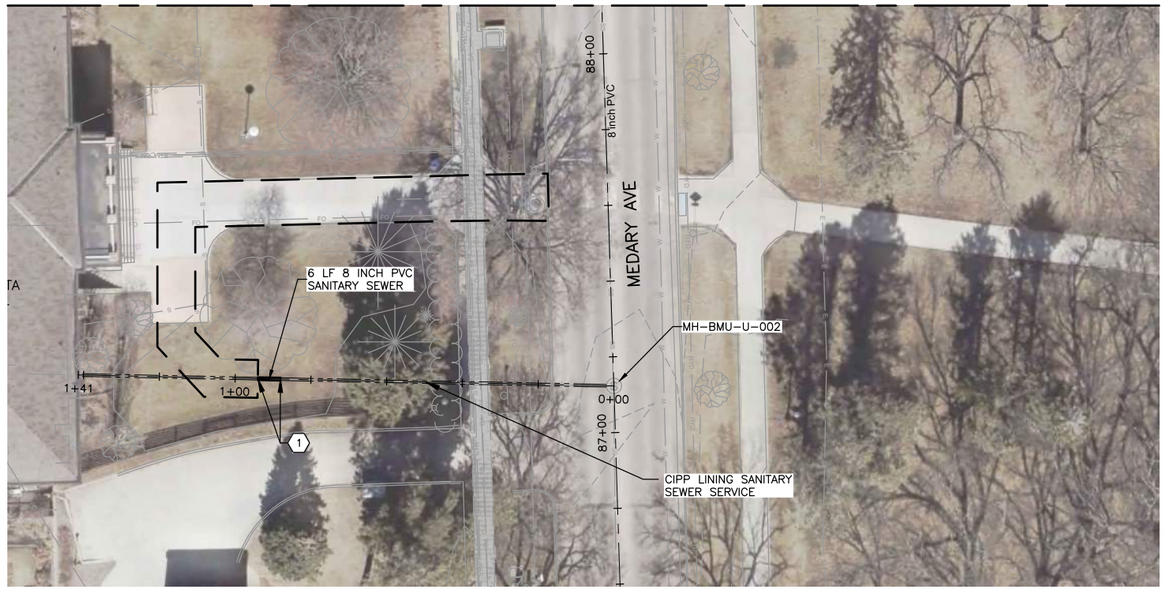
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I105

Xrefs: xg1-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS

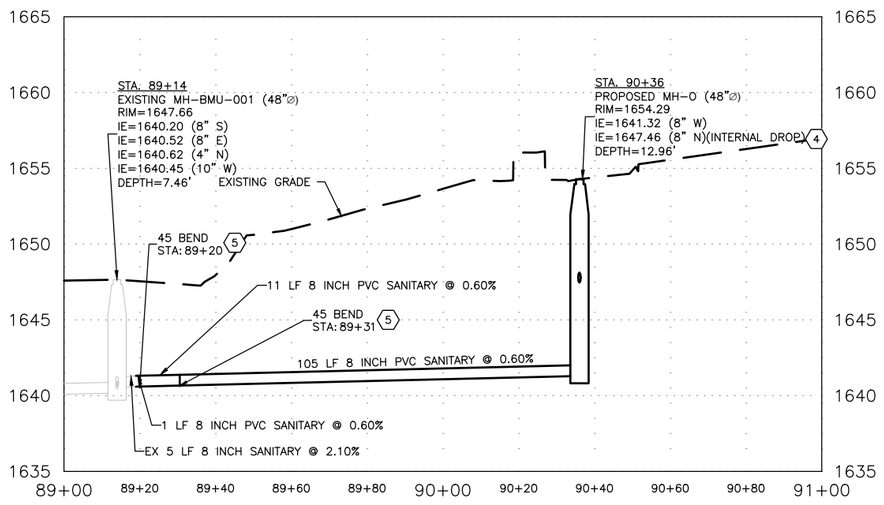




1 **PLAN**
SCALE: 1"=20'

SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_WENONA HALL_BMU-001	WENONA HALL		BMU-U-001	7.0	134	8	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
P_L_U-001_U-002	MH-L		P_U-001_U-002	8.0	36	8	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
P_WECOTA HALL_BMU-U-002	WECOTA HALL		BMU-U-002	10.0	120	8	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0



GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTES:

1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
2. RESET SALVAGED LIGHT POLE AND RECONNECT ELECTRICAL CONNECTIONS. REFER TO DETAIL 26-010/U101, FOR INSTALLATION OF LIGHT POLE BASE.
3. CONTRACTOR SHALL FABRICATE CIPP LINER WITH A REDUCER FROM 8" TO 4" AT THE END OF THE CIPP LINING, CONTRACTOR TO VERIFY THE DIAMETER OF THE REDUCER.
4. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP
5. INSTALL PROTECTO 401 EPOXY LINED MJ X MJ DUCTILE IRON BENDS. INSTALL EBAA IRON RESTRAINT ADAPTER BENDS. RESTRAINT ADAPTERS ARE INCIDENTAL TO THE BEND BID ITEM.
6. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING PVC SEWER MAIN WITH PIPE COUPLING.

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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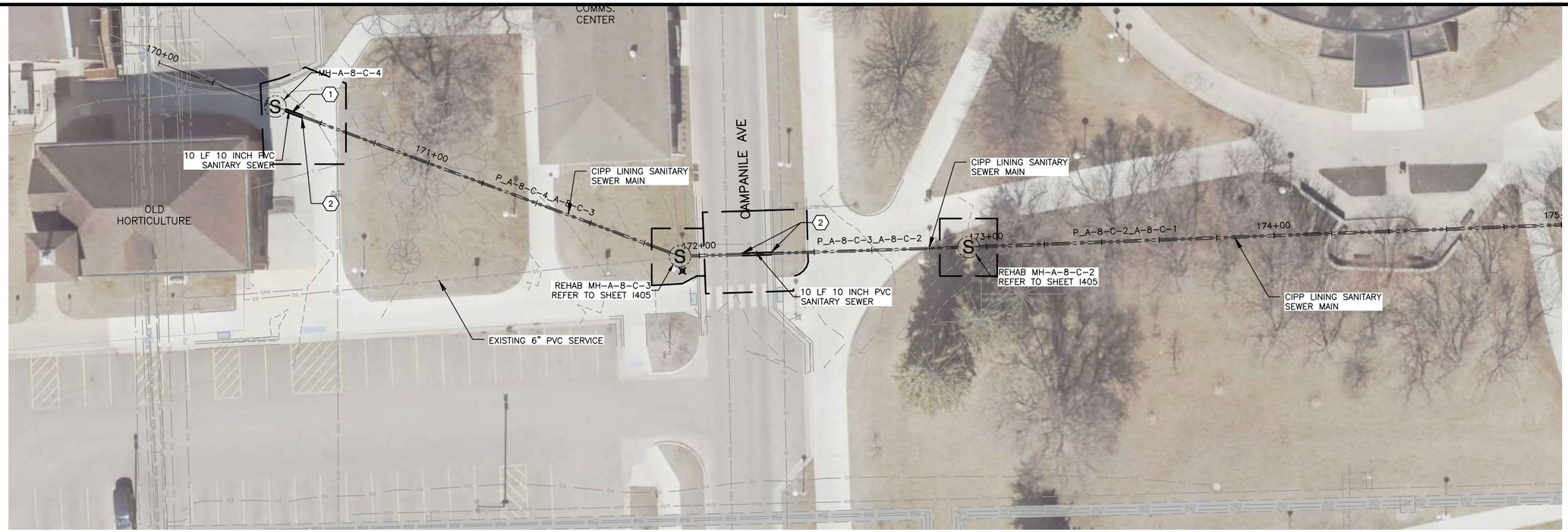
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I106

Xrefs: xg-I-dn01; XW-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 PLAN
SCALE: 1"=20'

NORTH

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE:

1. EXPOSE THE EXISTING 10' OF PVC PIPE FROM MANHOLE MH-A-8-C-4 TO THE CONNECTION TO THE EXISTING VCP PIPE. ADJUST THE PVC PIPE AND CONNECTION TO REMOVE THE OFFSET JOINT PRIOR TO CIPP LINING.
2. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.

SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_A-8-C-4_A-8-C-3	MH-A-8-C-4		MH-A-8-C-3	13.7	152	10	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
P_A-8-C-3_A-8-C-2	MH-A-8-C-3		MH-A-8-C-2	12.5	96	10	VCP	0	1	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

Xrefs: xg|-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS

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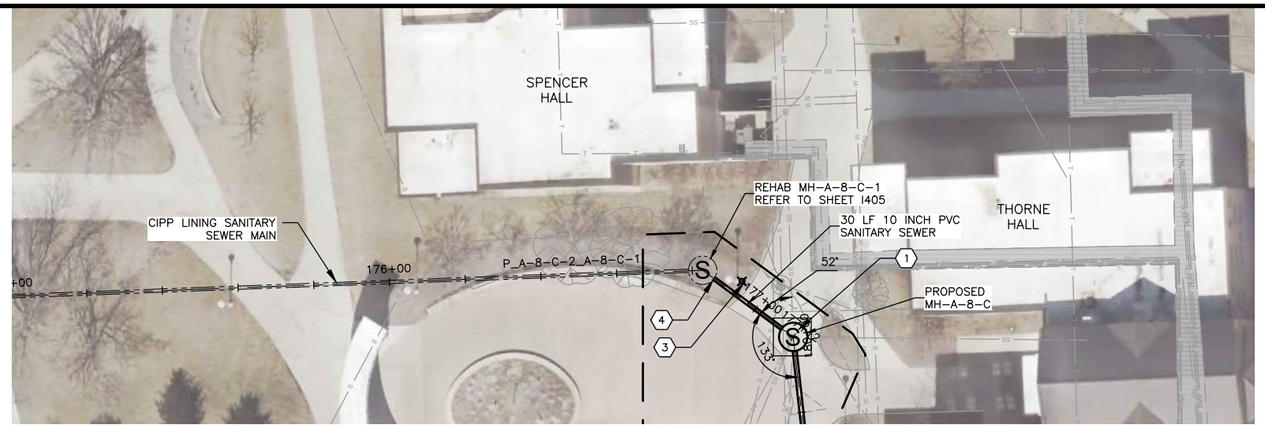
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I107



1 PLAN
SCALE: 1"=20'

NORTH

GENERAL NOTES:

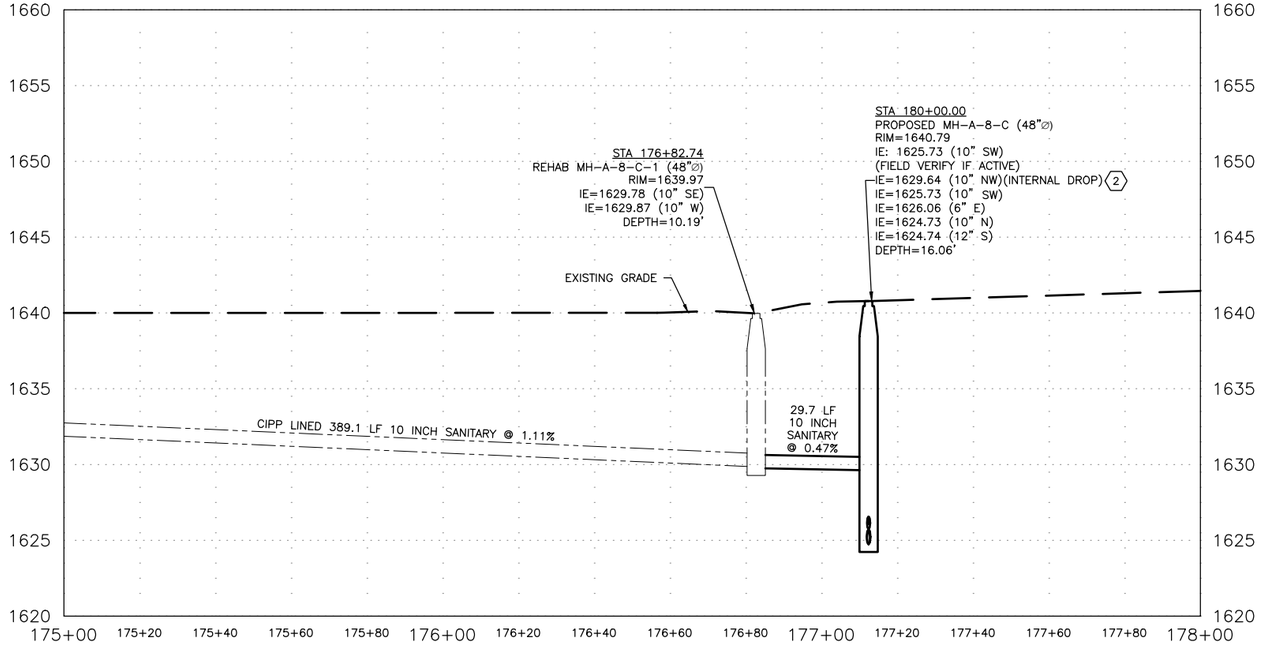
1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE:

1. CONTRACTOR TO FIELD VERIFY IF SERVICES ARE ACTIVE BEFORE ORDERED MANHOLE BASE.
2. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.
3. RESET SALVAGED LIGHT POLE AND RECONNECT ELECTRICAL CONNECTIONS. REFER TO DETAIL 26-030/U112, FOR INSTALLATION OF LIGHT POLE BASE.
4. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING PVC SANITARY SEWER MAIN WITH PIPE COUPLING.

SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_A-8-C-2_A-8-C-1	MH-A-8-C-2		MH-A-8-C-1	13.8	384	8	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

DRAWN BY:	JMM	JOB DATE:	2024
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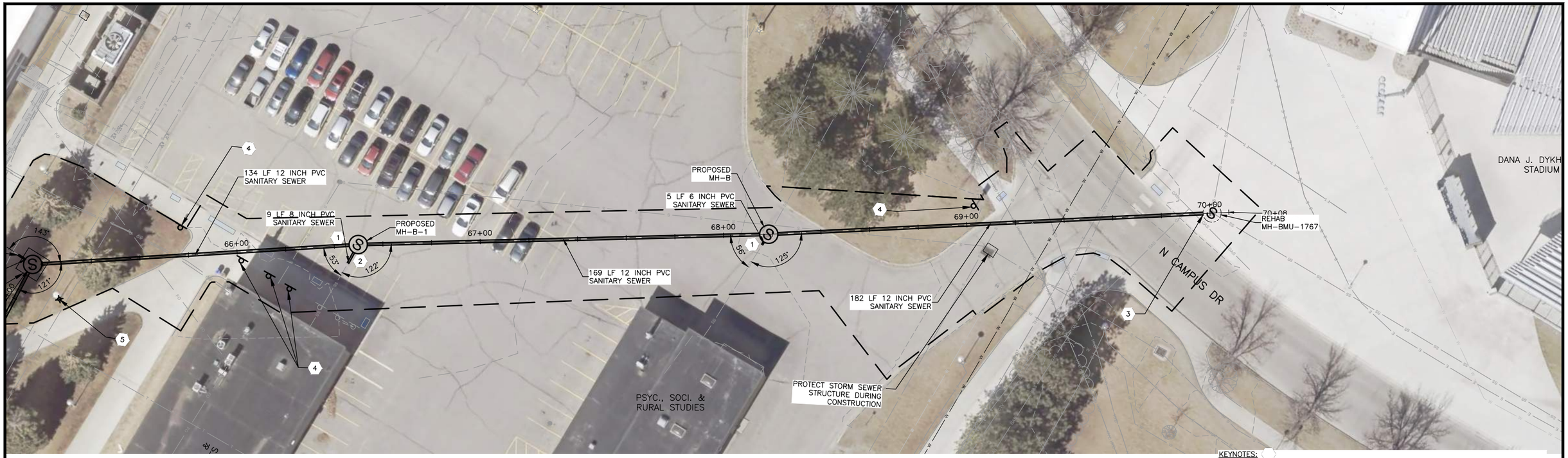
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I108

Xrefs: xgt-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



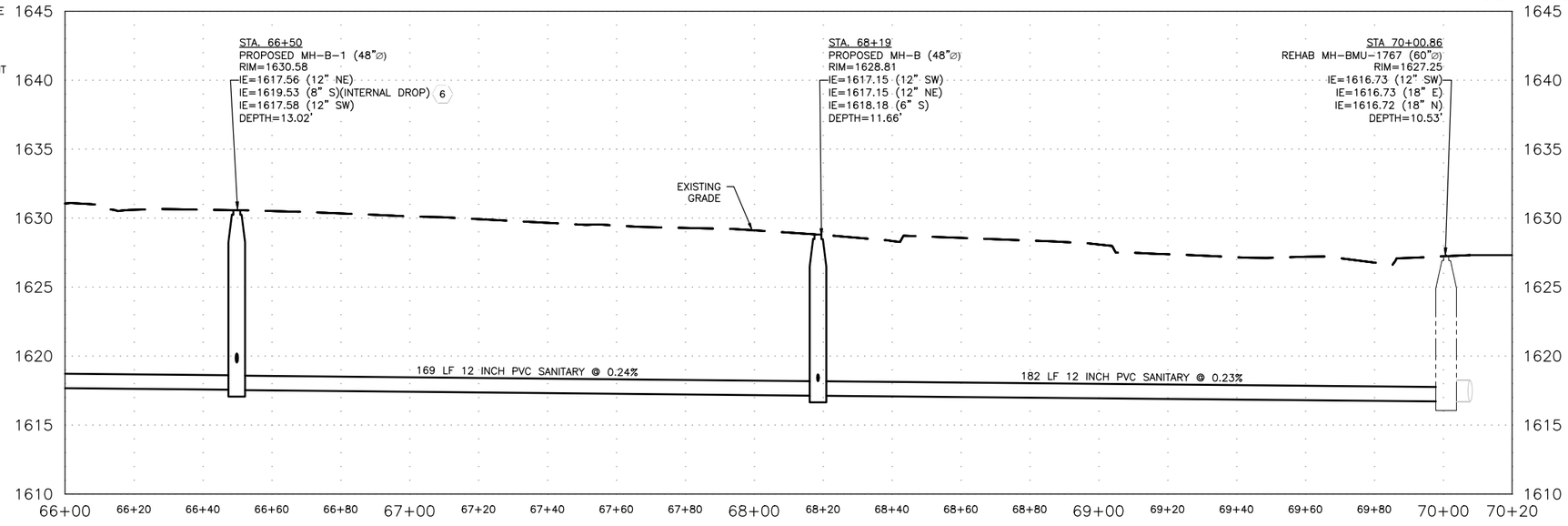
1 **PLAN**
SCALE: 1"=20'

KEYNOTES:

1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
2. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING PVC SANITARY SEWER MAIN WITH PIPE COUPLING.
3. CORE DRILL INTO EXISTING MANHOLE FOR PROPOSED SANITARY SEWER MAIN.
4. RESET SALVAGED SIGN AND PROVIDE NEW CONNECTION HARDWARE AND BURIED SIGN POST.
5. RESET SALVAGED LIGHT POLE AND RECONNECT ELECTRICAL CONNECTIONS. REFER TO DETAIL 26-030/U112, FOR INSTALLATION OF LIGHT POLE BASE.
6. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.



REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

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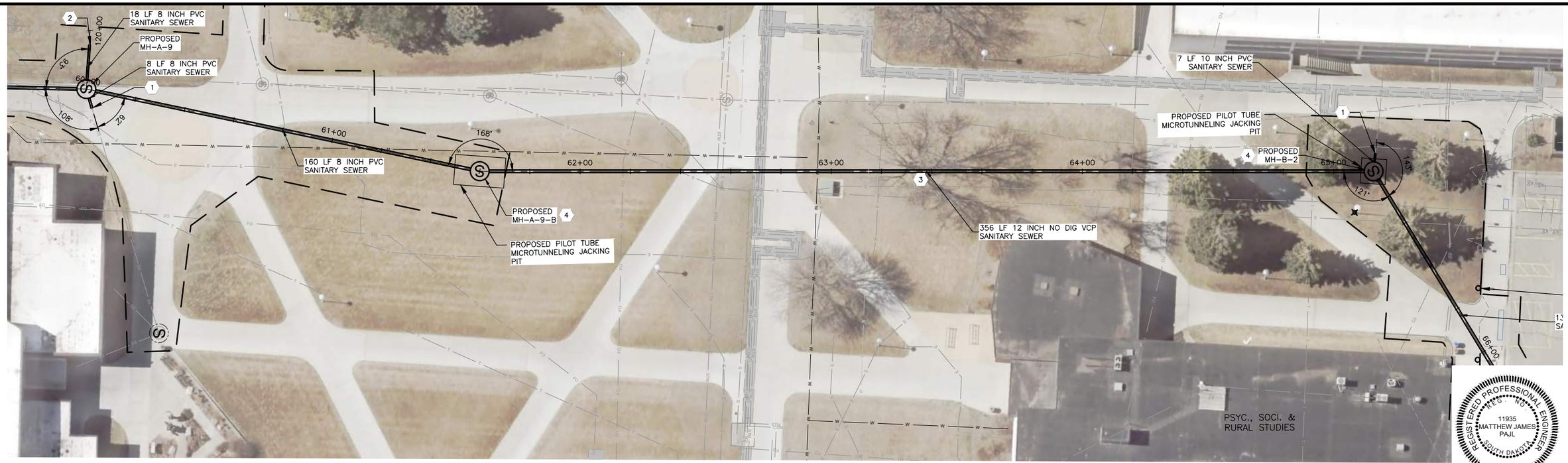
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I109

Xrefs: xgl-1-dh01; XW-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 PLAN
SCALE: 1"=20'

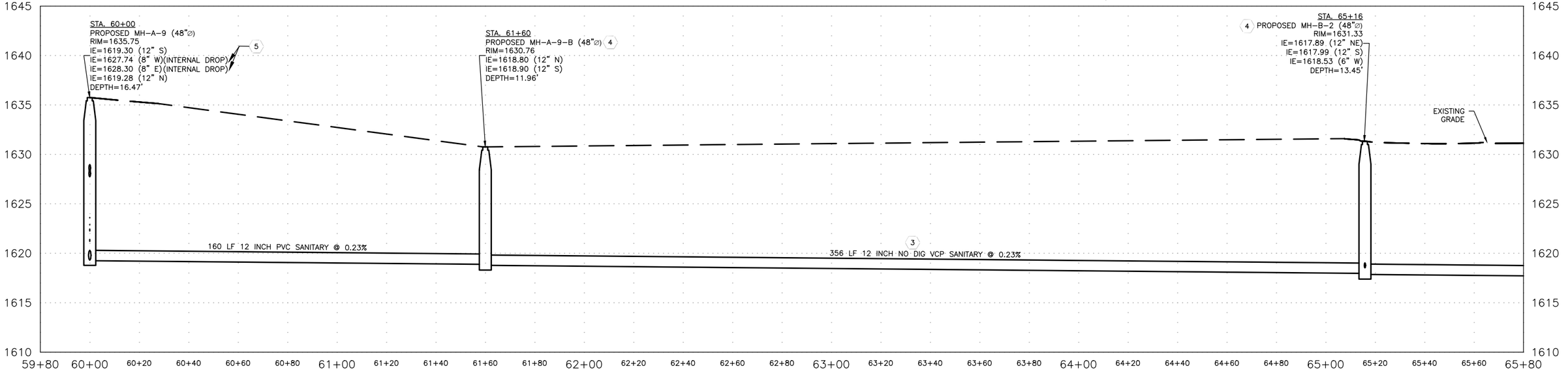
NORTH

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTES:

1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
2. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING PVC SANITARY SEWER MAIN WITH PIPE COUPLING.
3. INSTALL PROPOSED SANITARY SEWER MAIN TRENCHLESSLY VIA PILOT TUBING MICROTUNNELING.
4. INSTALL PROPOSED SANITARY SEWER MANHOLE INSIDE THE PILOT TUBE MICROTUNNELING JACKING OR RECEIVING PITS.
5. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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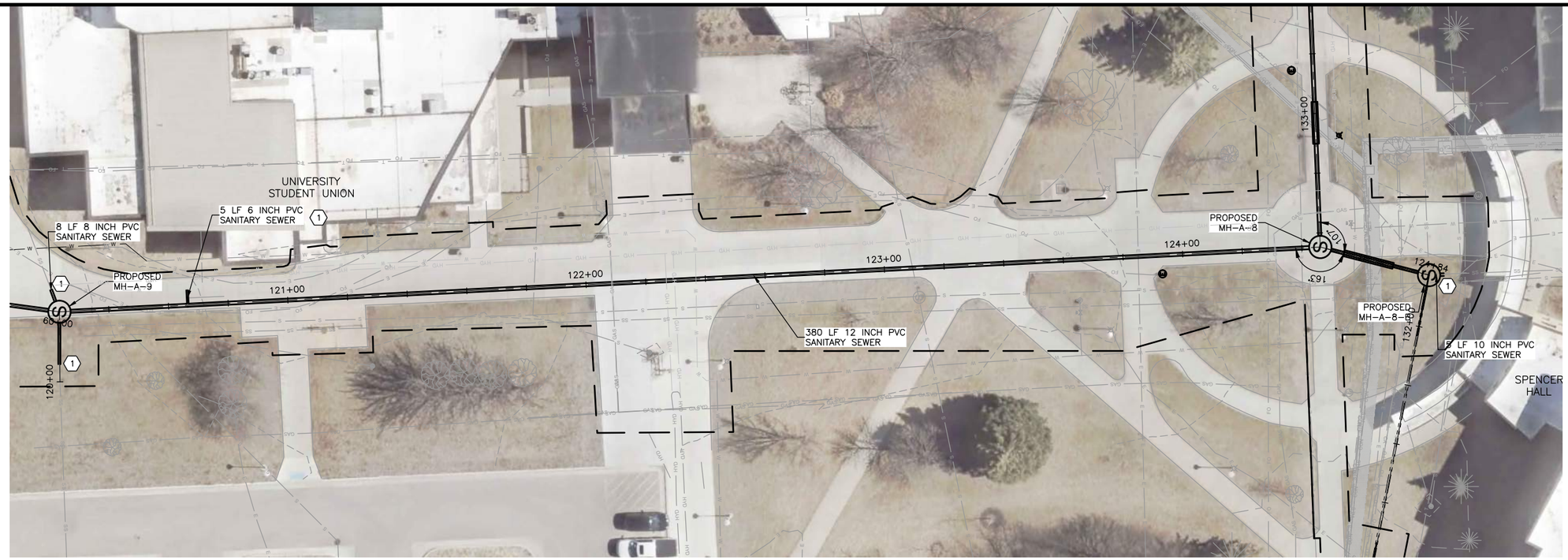
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

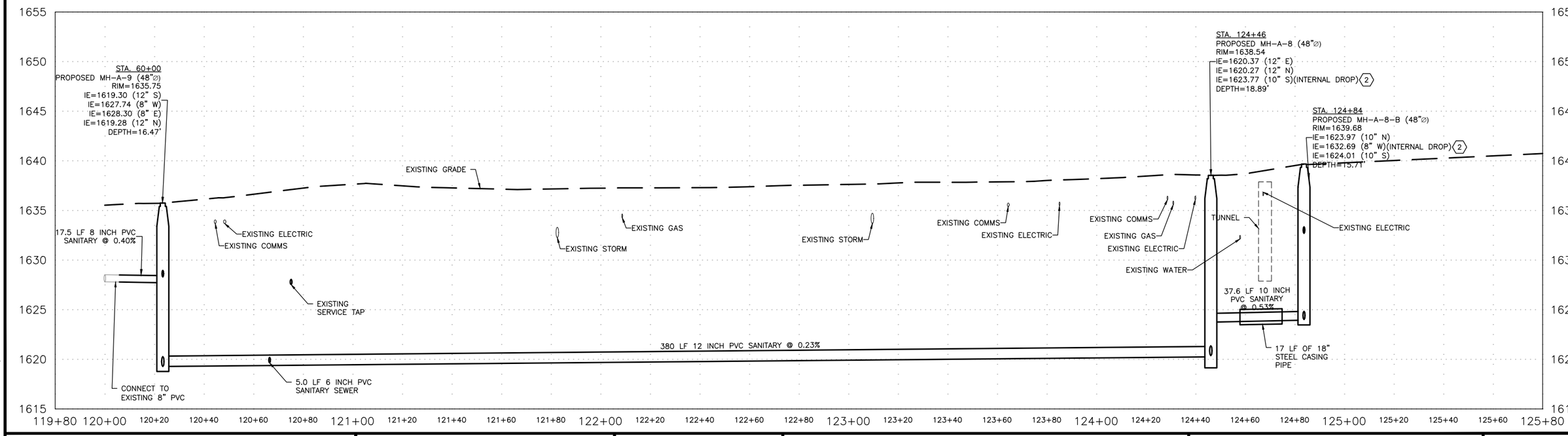
I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I110

Xrefs: xg-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 **PLAN**
SCALE: 1"=20'



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE:

1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
2. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.

Xrefs: xg1-1-dh01; XX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS

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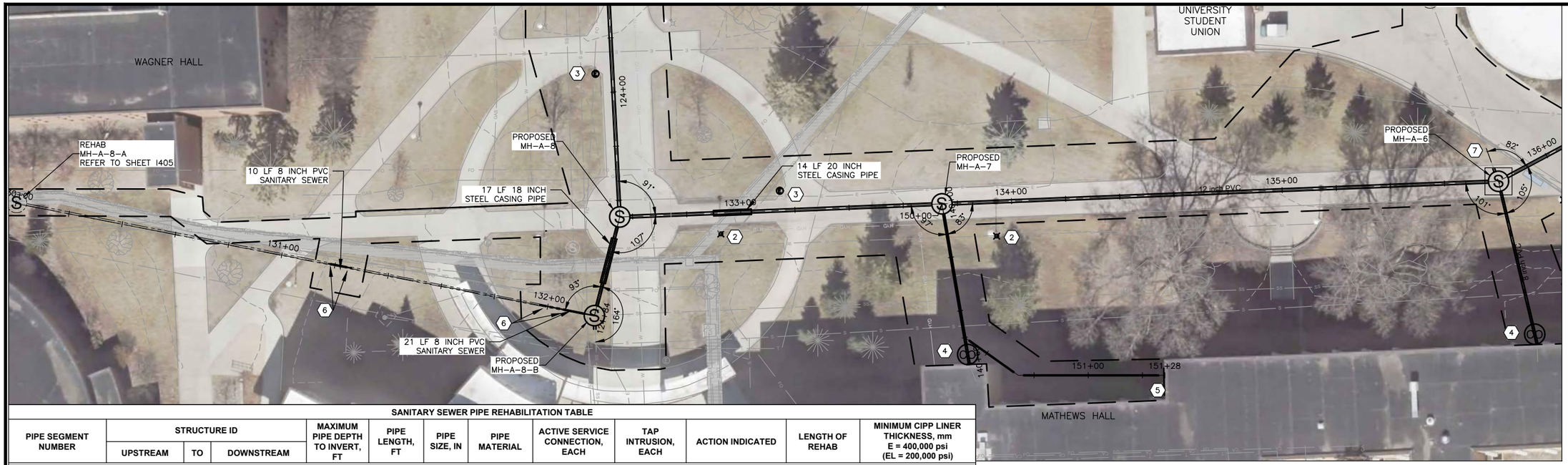
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

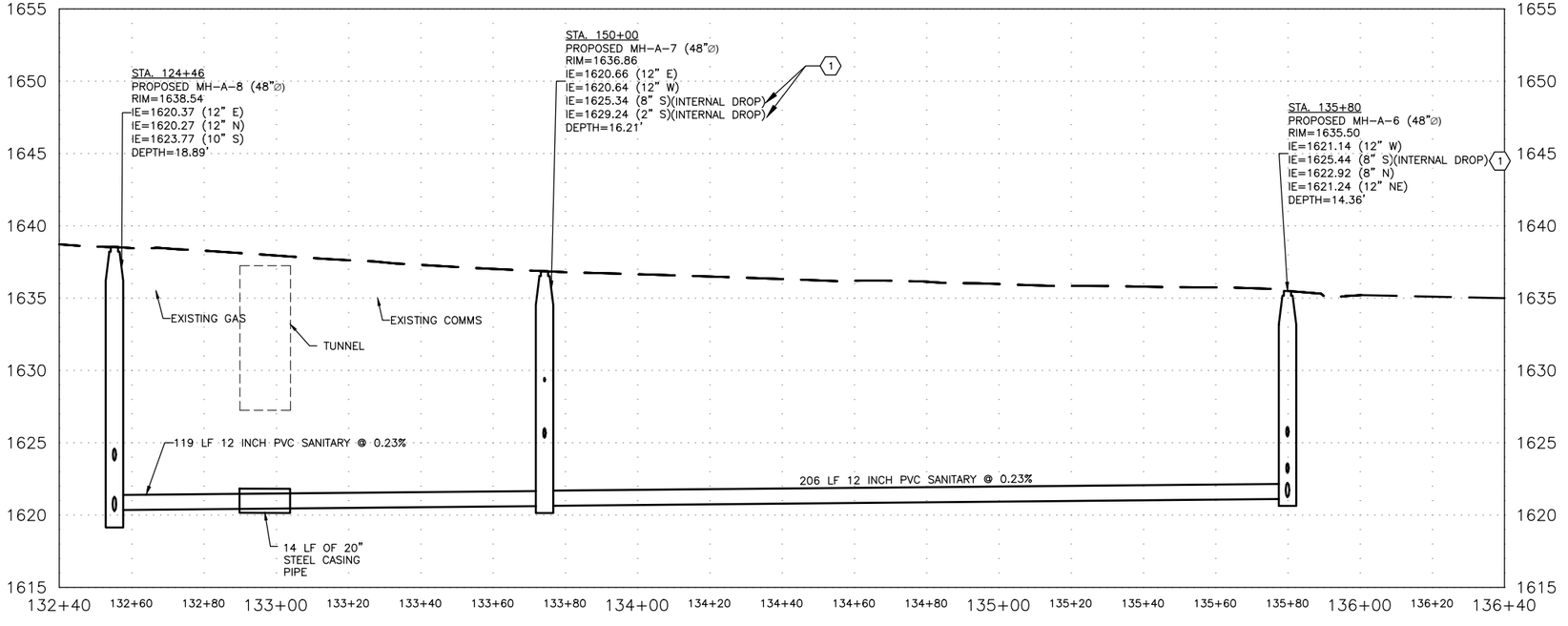
I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I111



SANITARY SEWER PIPE REHABILITATION TABLE											
PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_A-8-A_A-8-B	MH-A-8-A		MH-A-8-B	0.0	220	8	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0

1 PLAN
SCALE: 1"=20'



GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE: ⬡

1. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.
2. RESET SALVAGED LIGHT POLE AND RECONNECT ELECTRICAL CONNECTIONS. REFER TO DETAIL 26-030/U112, FOR INSTALLATION OF LIGHT POLE BASE.
3. RESET SALVAGED ELECTRICAL BOX AND RECONNECT ELECTRICAL CONNECTIONS.
4. REFER TO DETAILS ON SHEETS U108 AND U109 FOR INSTALLATION OF CLEAN OUT AND CLEAN OUT FRAME AND COVER.
5. CONNECT BURIED FORCE MAIN TO INTERIOR FORCE MAIN, SEE SHEET I114 FOR CONTINUATION.
6. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
7. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING PVC SANITARY SEWER MAIN WITH PIPE COUPLING.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

Xrefs: xgt-1-dh01; XV-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS

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APPROVED:	MJP	JOB NUMBER:	221795
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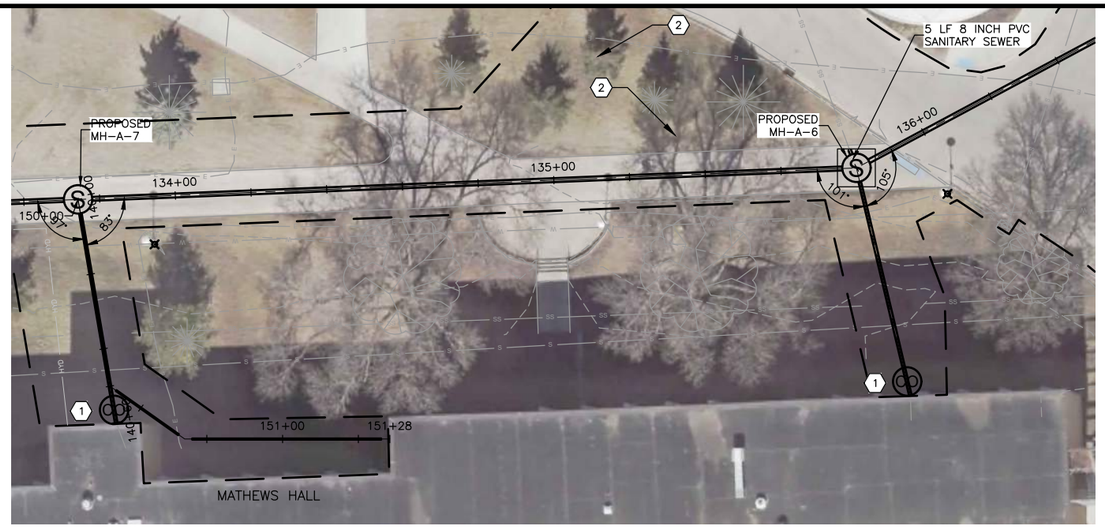
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I112



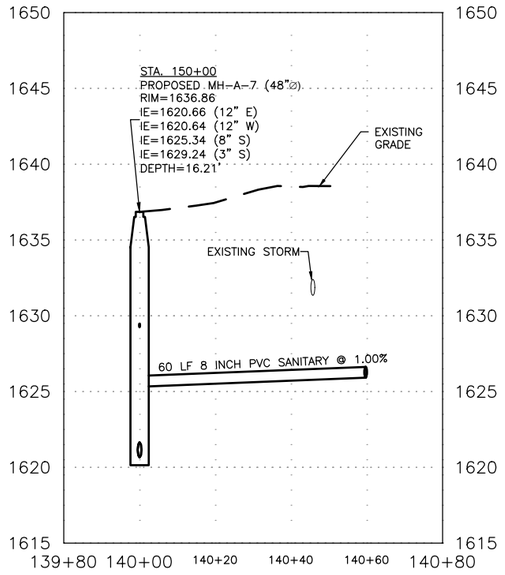
1 **PLAN**
SCALE: 1"=20'

KEYNOTE:

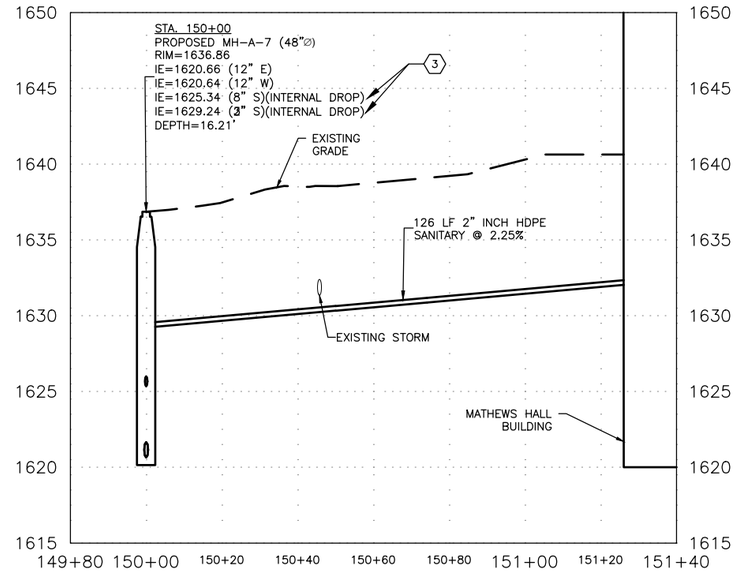
1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING
2. NO TRACKING THROUGH TO PROTECT TREES. NEED TO TRACK FROM NORTHWEST.
3. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.

GENERAL NOTES:

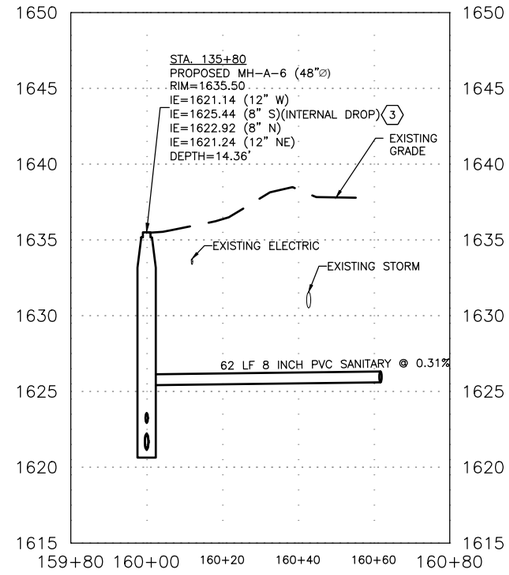
1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.



3 **SERVICE PROFILE AT STA 133+42.10**
SCALE: 1"=20'



4 **SERVICE PROFILE AT STA 133.42.10**
SCALE: 1"=20'



5 **SERVICE PROFILE AT STA 135+47.73**
SCALE: 1"=20'

REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

Xrefs: xg1-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS

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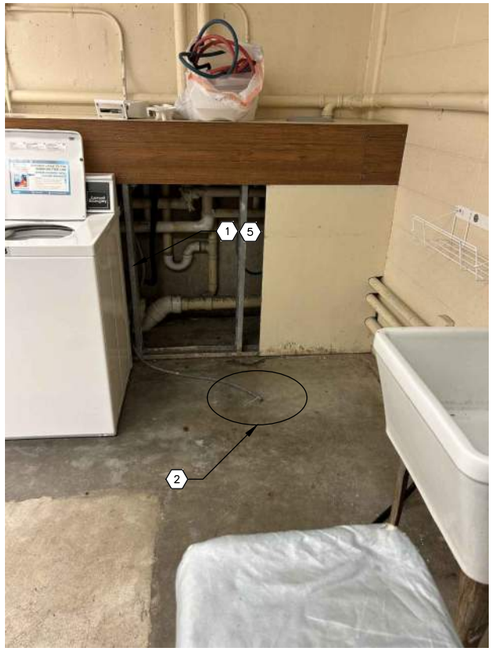
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

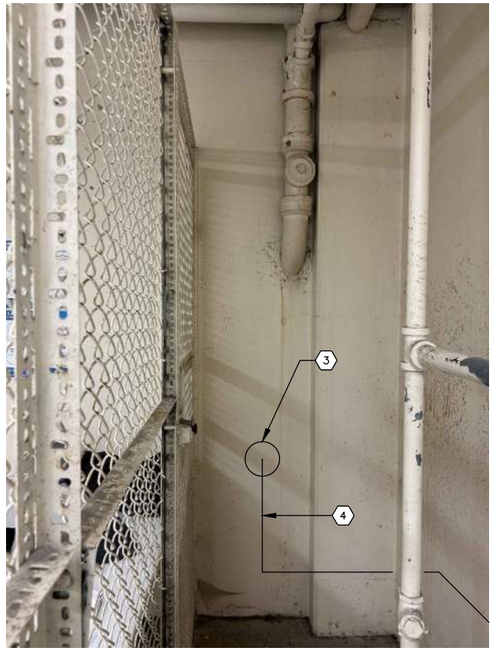
I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I113



1 GRINDER PUMP LIFT STATION PLAN

SCALE: NTS



2 EXTERIOR WALL DISCHARGE

SCALE: NTS

3 ELECTRICAL PANEL

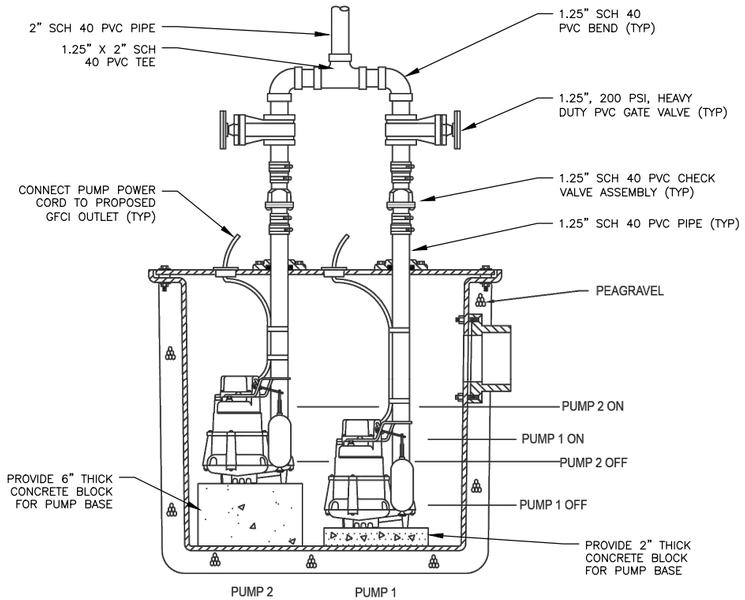
SCALE: NTS

GENERAL NOTES:

1. REFER TO SHEET H108 FOR OTHER PROPOSED WORK IN THIS ROOM.
2. ROUTE THE APPROXIMATELY 30–FEET OF FORCE MAIN PIPE BEHIND THE WASHING MACHINES ALONG THE FLOOR.
3. SUPPORT THE PIPE TO THE FLOOR OR THE WALL EVERY 10–FEET.
4. MAINTAIN A POSITIVE SLOPE FROM THE PUMP TO THE DISCHARGE IN THE EXTERIOR WALL.
5. ALL WORK SEEN ON THIS SHEET UP TO AND INCLUDING THE 2" DUCTILE IRON PIPE PENETRATING THE EXTERIOR WALL SHALL BE PAID UNDER BID ITEM "MATHEWS HALL LIFT STATION".
6. CONTRACTOR SHALL PROVIDE A PACKAGE 36"X36", INDOOR DUPLEX, POLY BASIN, WITH TWO (2) GRINDER PUMPS, MODEL WM818 MANUFACTURED BY ZOELLER OR ENGINEER APPROVED EQUAL.

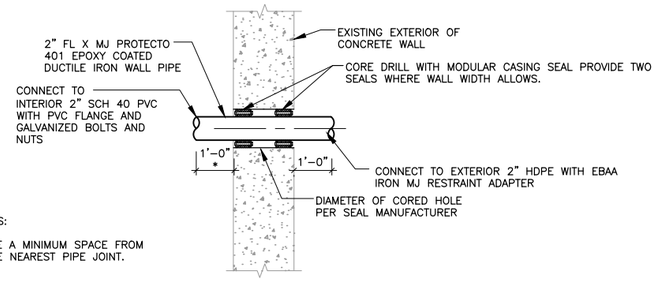
KEYNOTE: ⬡

1. PROPOSED LOCATION FOR PROPOSED 115 V OUTLET.
2. THE GRINDER PUMP BASIN SHALL BE 36" DIAMETER AND 36" HEIGHT. THE BASIN SHALL BE MADE OUT OF POLYETHYLENE.
3. CORE DRILL A HOLE IN THE EXTERIOR BASEMENT WALL, REFER TO DETAIL 5/I114. THE CENTERLINE OF THE CORE DRILL SHALL BE APPROXIMATELY 2–FEET FROM THE RIGHT WALL AND 3–FEET FROM THE FLOOR.
4. ALL INTERIOR FORCE MAIN PIPING SHALL BE SCH 40 PVC.
5. REMOVE THE EXISTING 15 AMP BREAKER IN SLOT PER OWNER. REPLACE WITH A 40 AMP BREAKER. REMOVE THE EXISTING WIRING FROM THE BREAKER BOX TO THE OUTLET AND REPLACE WITH GAUGE ROMEX WIRE ADDITIONALLY PROVIDE PROPOSED GFCI OUTLET.



4 GRINDER PUMP LIFT STATION DETAIL

SCALE: NTS



DETAIL NOTES:

* PROVIDE A MINIMUM SPACE FROM WALL TO THE NEAREST PIPE JOINT.

5 WALL PENETRATION – EXISTING WALL

SCALE: NTS

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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APPROVED: MJP	JOB NUMBER: 221795	0 1"	
CAD DATE: 11/6/2024 12:26:54 PM		IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.	
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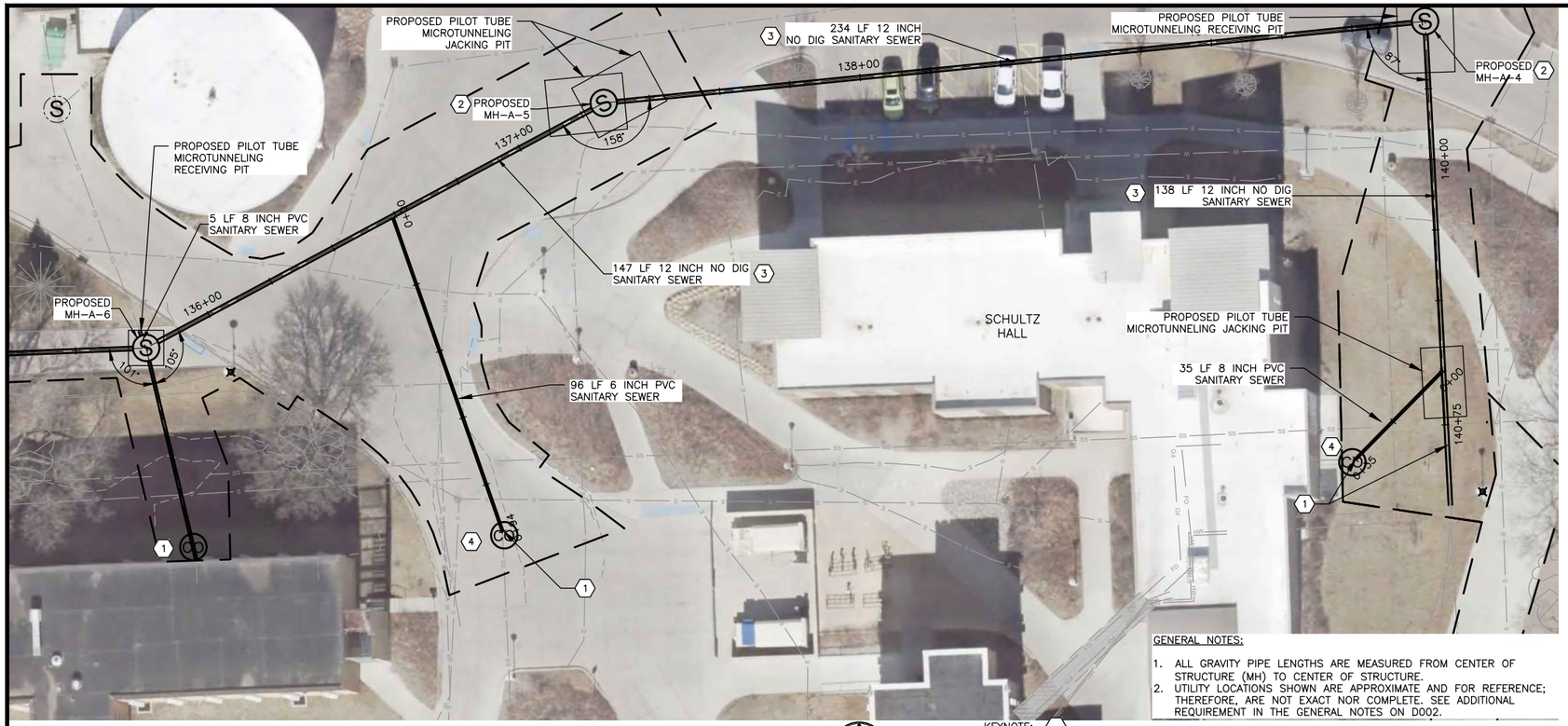
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE

SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO. I114

Xrefs: xpl-1-dh01; XX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



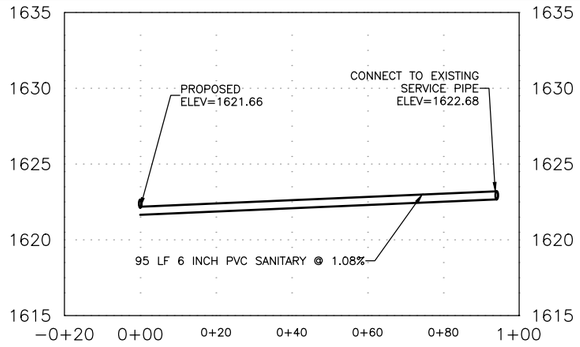
1 PLAN
SCALE: 1"=20'

GENERAL NOTES:

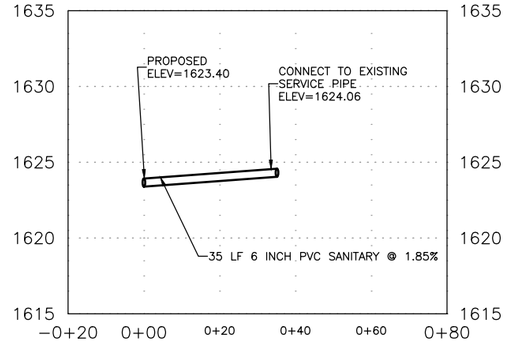
1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE:

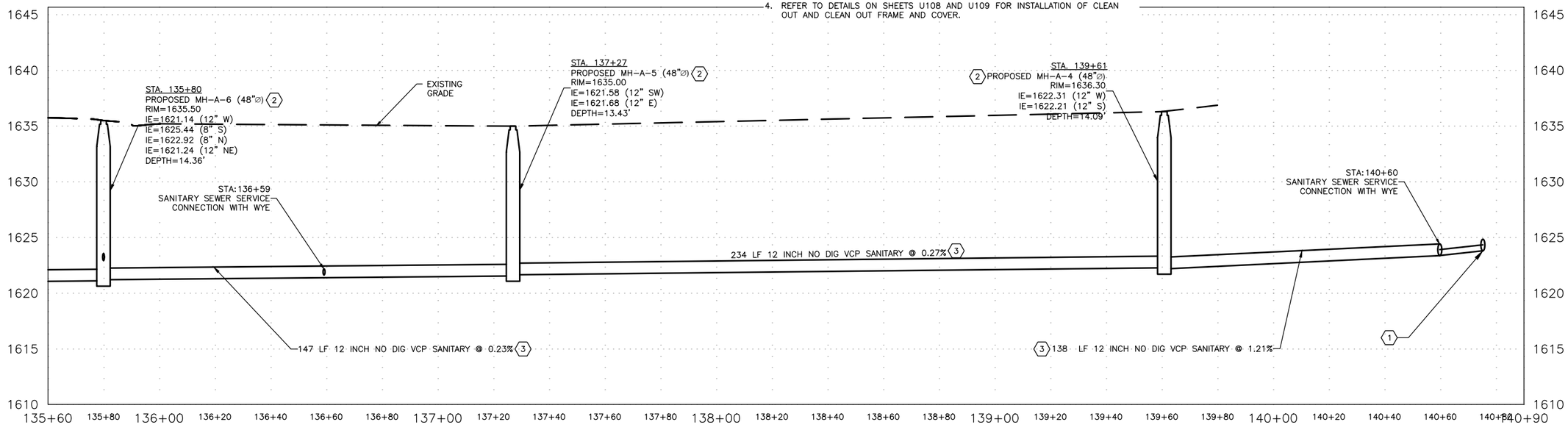
1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING PVC SANITARY SEWER MAIN WITH PIPE COUPLING.
2. INSTALL PROPOSED SANITARY SEWER MANHOLE INSIDE THE PILOT TUBE MICROTUNNELING JACKING OR RECEIVING PITS.
3. INSTALL PROPOSED SANITARY SEWER MAIN TRENCHLESSLY VIA PILOT TUBE MICROTUNNELING.
4. REFER TO DETAILS ON SHEETS U108 AND U109 FOR INSTALLATION OF CLEAN OUT AND CLEAN OUT FRAME AND COVER.



2 HONORS HALL SERVICE
SCALE: 1"=20'



3 SCHULTZ HALL SERVICE
SCALE: 1"=20'



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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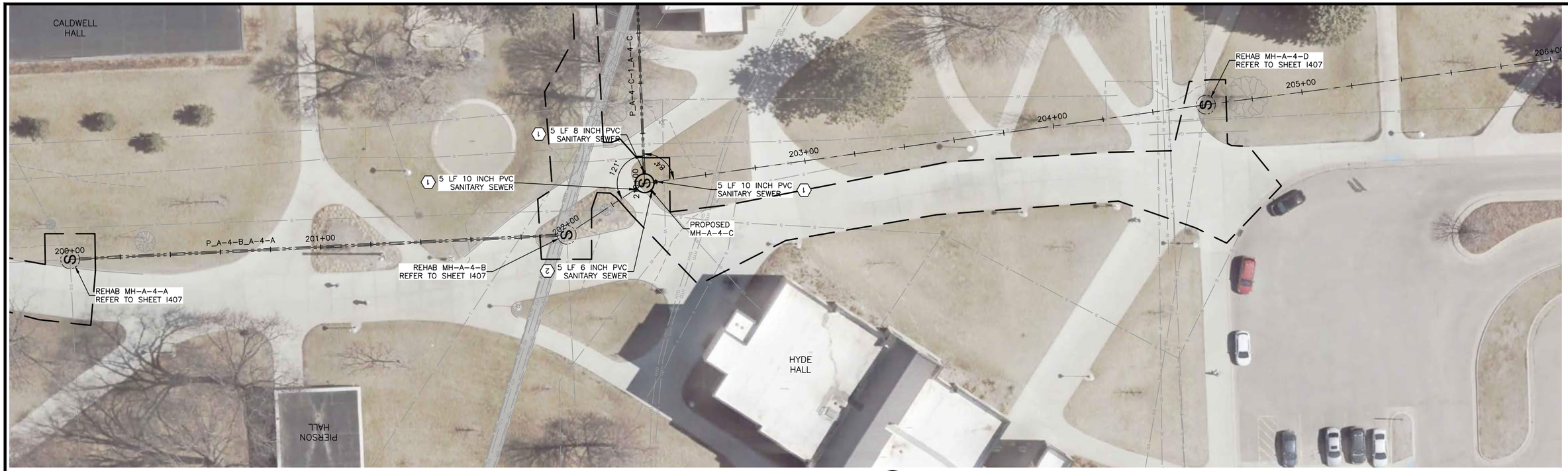
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I115

Xrefs: xg-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 **PLAN**
SCALE: 1"=20'

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_A-4-B_A-4-A	MH-A-4-B		MH-A-4-A	14.1	196	10	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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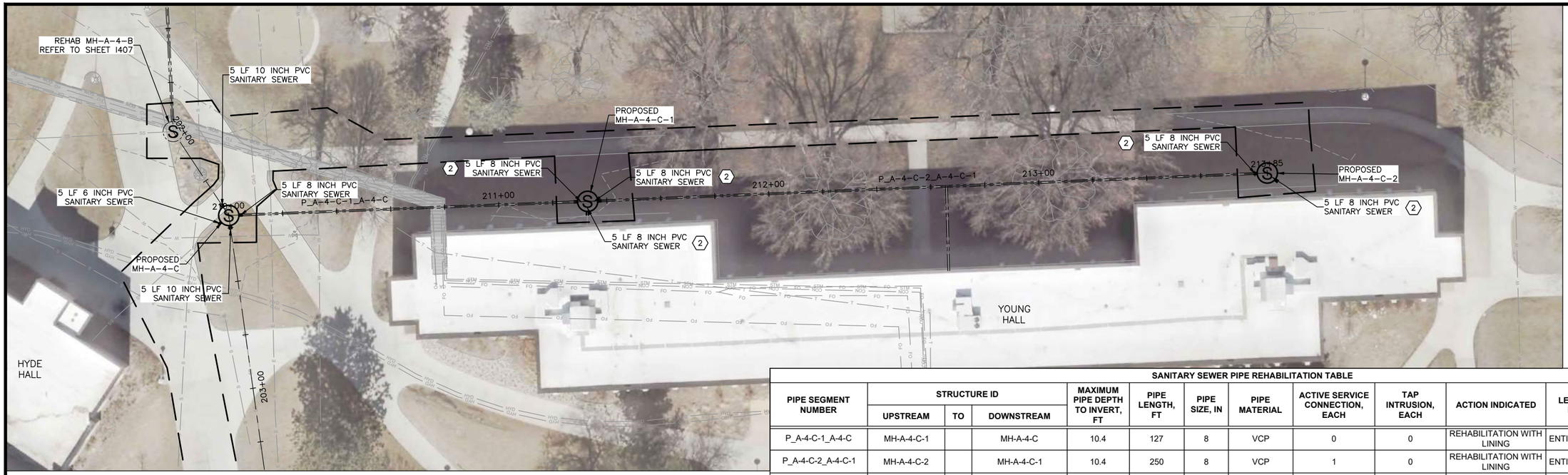
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I116

Xrefs: xg|-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS

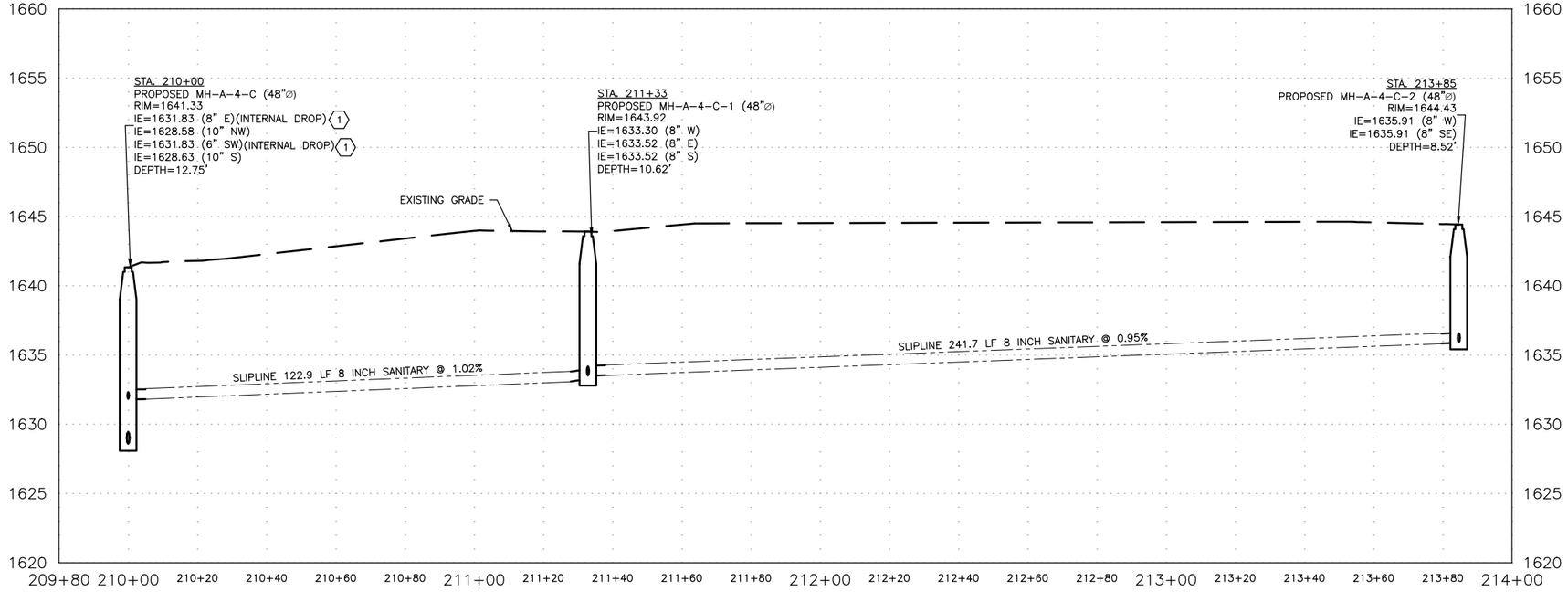


1 PLAN
SCALE: 1"=20'

NORTH

SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_A-4-C-1_A-4-C	MH-A-4-C-1		MH-A-4-C	10.4	127	8	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
P_A-4-C-2_A-4-C-1	MH-A-4-C-2		MH-A-4-C-1	10.4	250	8	VCP	1	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
	YOUNG HALL		P_A-4-C-2_A-4-C-1	10.4	30	6	VCP	LATERAL	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0



GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE: ⬡

1. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.
2. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

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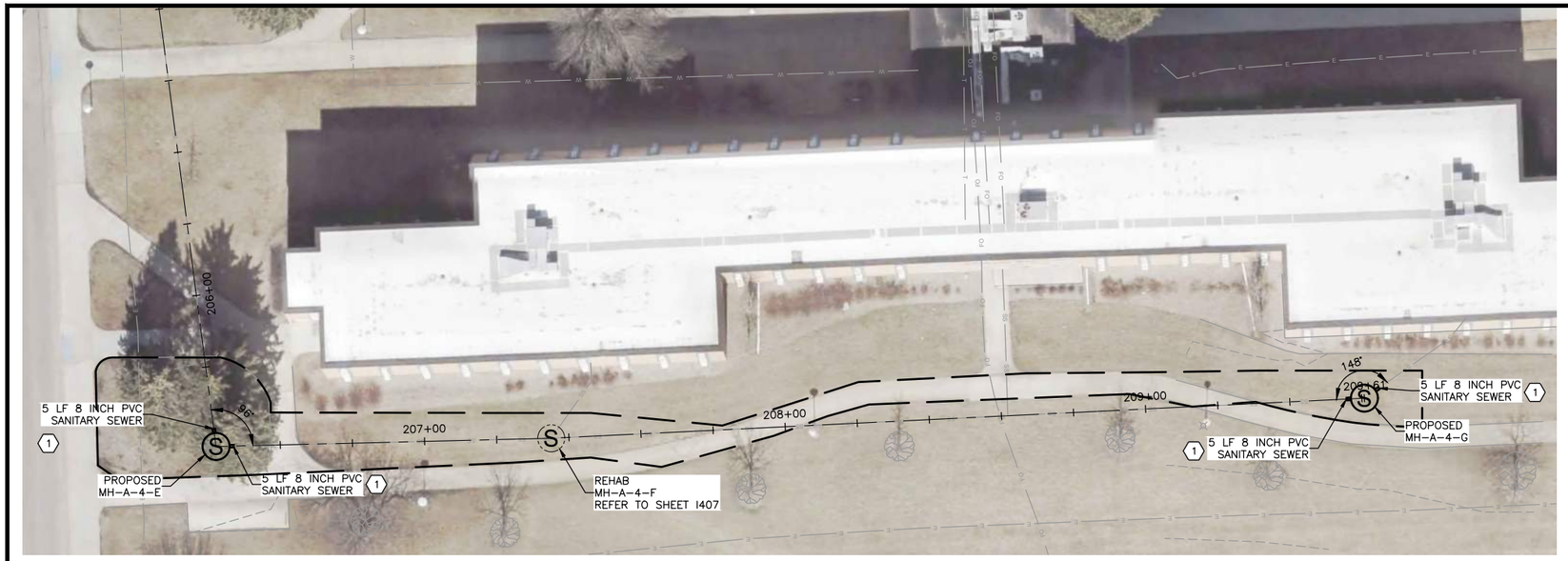
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I117

Xrefs: xg-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 PLAN
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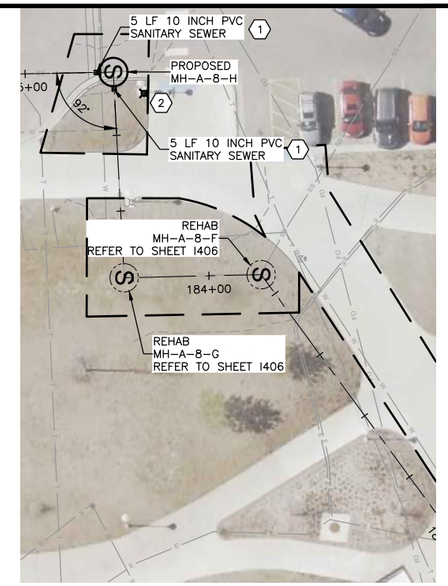

2 PLAN
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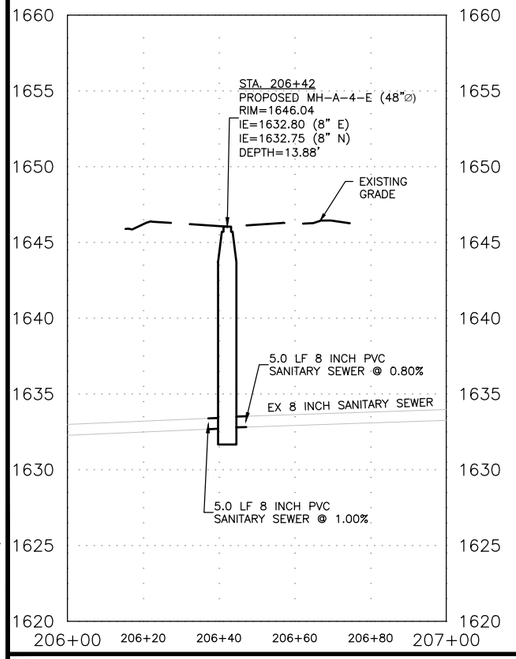
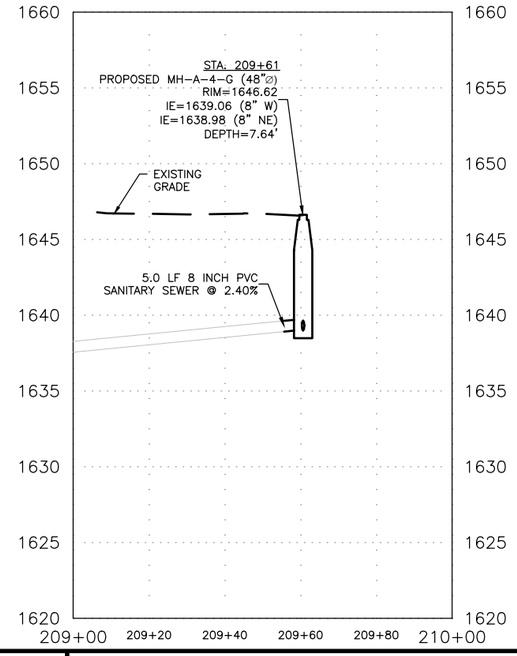


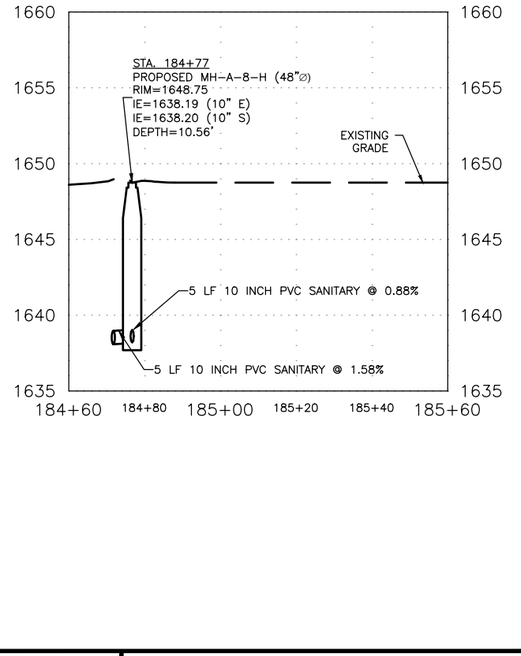
GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE: ⬡

1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
2. RESET SALVAGED LIGHT POLE AND RECONNECT ELECTRICAL CONNECTIONS. REFER TO DETAIL 26-030/U112, FOR INSTALLATION OF LIGHT POLE BASE.





REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

Xrefs: xg|-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS

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CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I118

SANITARY SEWER PIPE REHABILITATION TABLE												
PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_CROTHERS ENG HALL_R_108	CROTHERS ENG HALL		P_R_108	10.0	40	6	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0

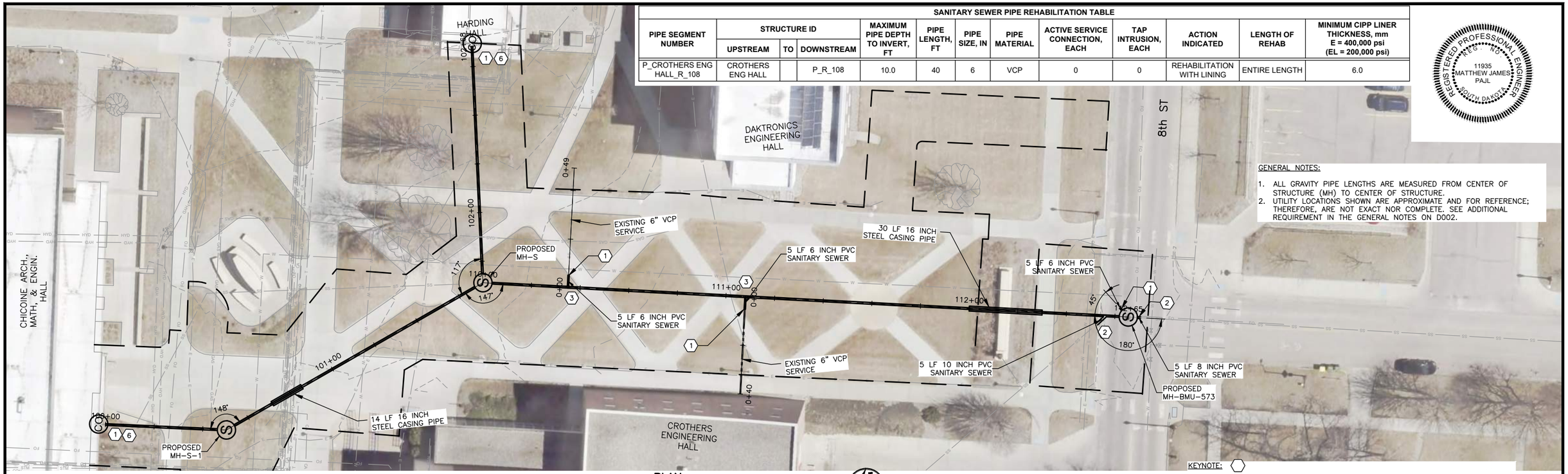
REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

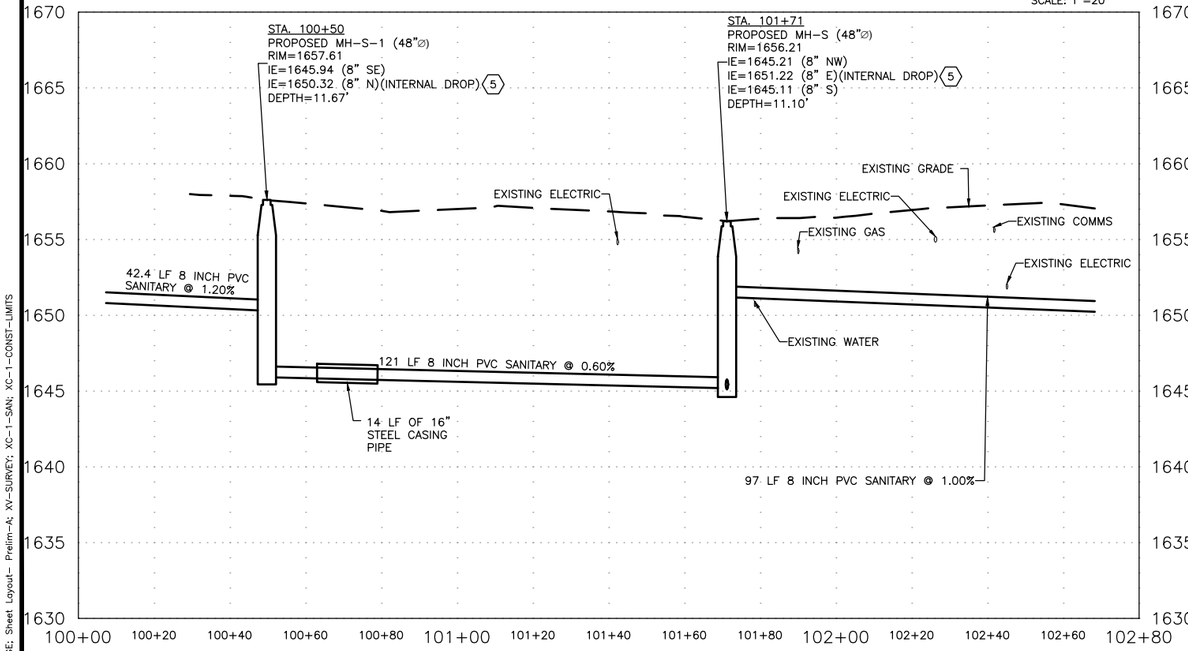
KEYNOTE:

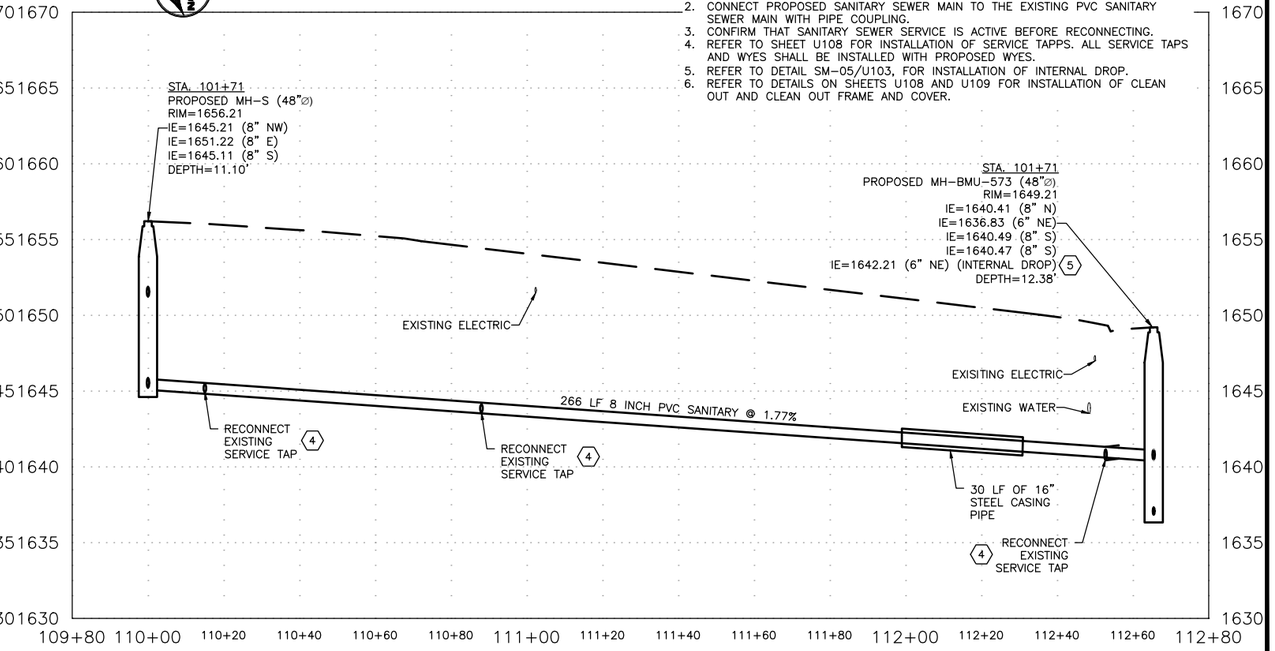
1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
2. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING PVC SANITARY SEWER MAIN WITH PIPE COUPLING.
3. CONFIRM THAT SANITARY SEWER SERVICE IS ACTIVE BEFORE RECONNECTING.
4. REFER TO SHEET U108 FOR INSTALLATION OF SERVICE TAPPS. ALL SERVICE TAPS AND WYES SHALL BE INSTALLED WITH PROPOSED WYES.
5. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.
6. REFER TO DETAILS ON SHEETS U108 AND U109 FOR INSTALLATION OF CLEAN OUT AND CLEAN OUT FRAME AND COVER.



1 PLAN

SCALE: 1"=20'





DRAWN BY:	JMM	JOB DATE:	2024
APPROVED:	MJP	JOB NUMBER:	221795
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CAD FILE:	\\hrgreen.com\HRG\Data\2022\221795\CAD\Campus Wide San Sewer Cat 5.5\Dwgs\I\Main Campus P&P 02.dwg		

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NO.	DATE	BY	REVISION DESCRIPTION

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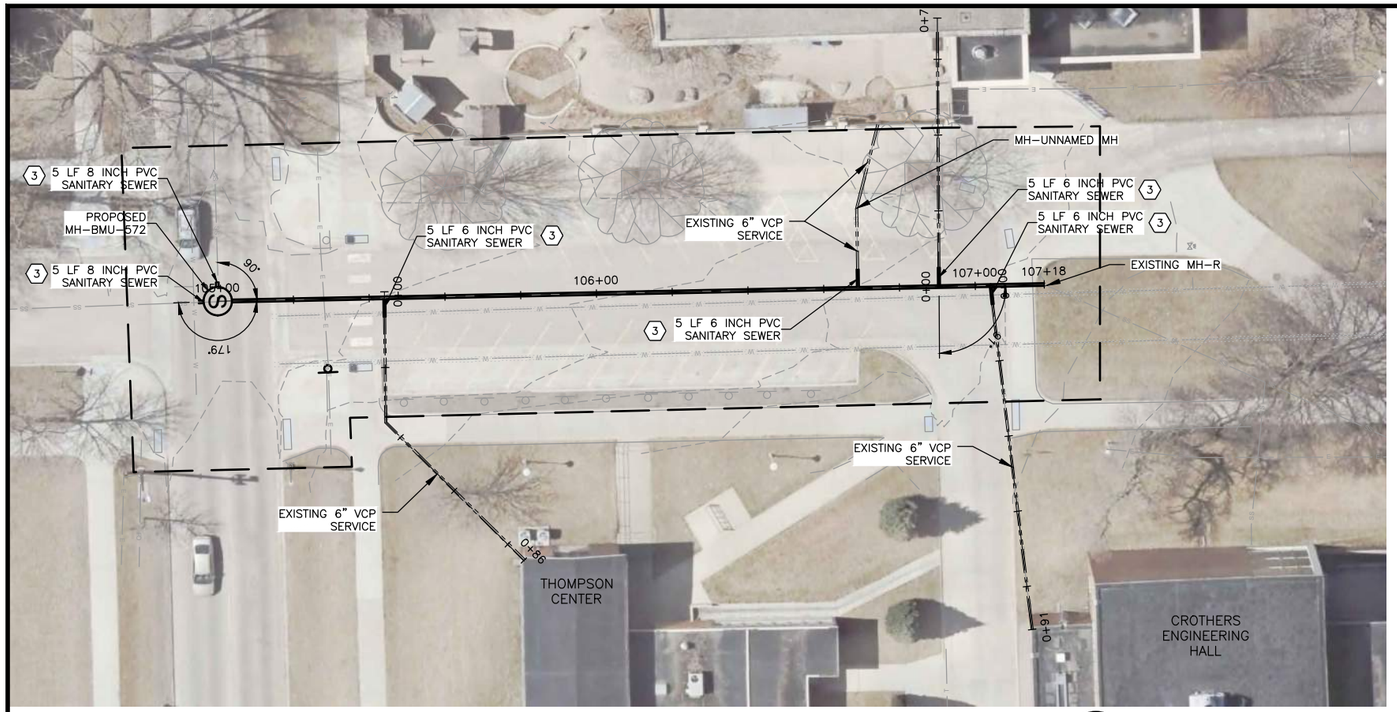
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE

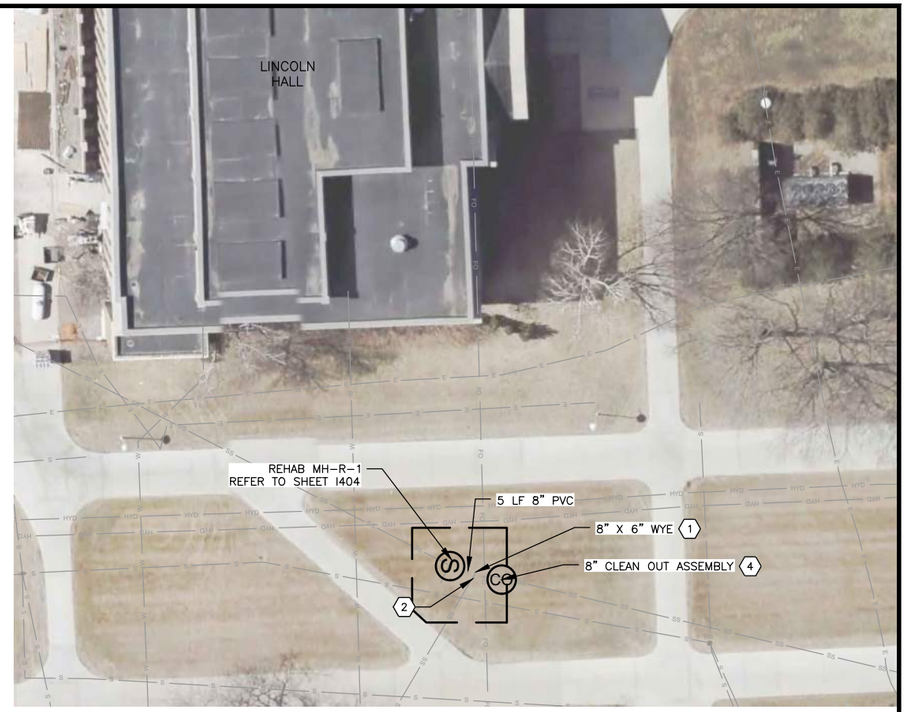
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I119

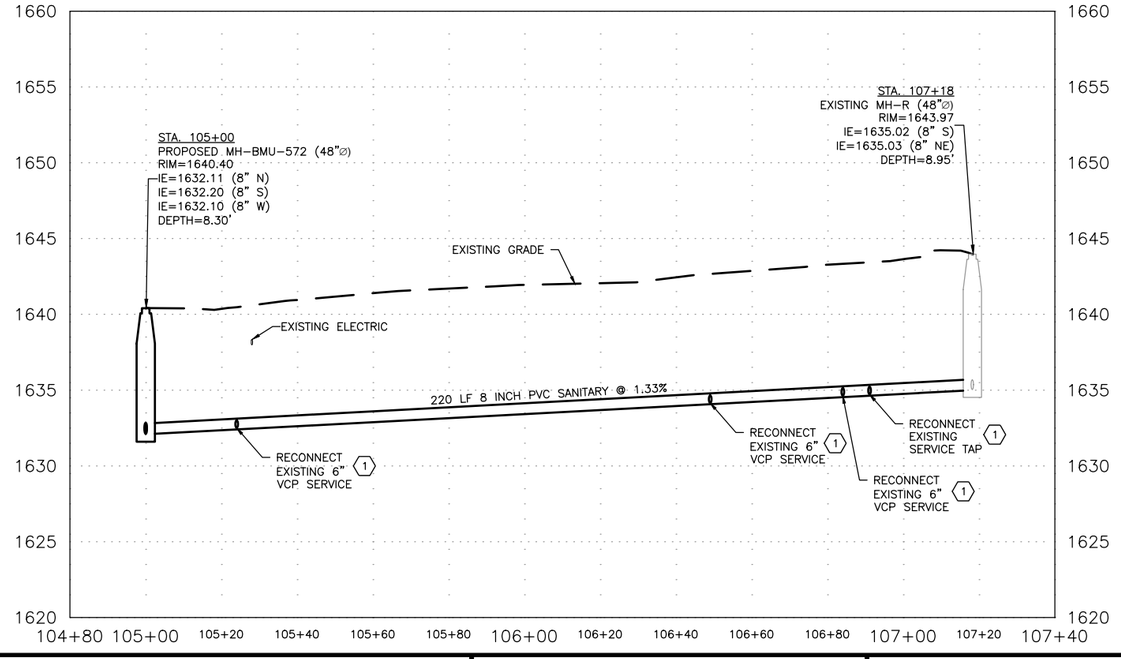
Xrefs: xg1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 **PLAN**
SCALE: 1"=20'



2 **PLAN**
SCALE: 1"=20'



SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_PUGSLEY HALL_R_572	PUGSLEY HALL		P_R_572	9.0	67	6	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
P_FISHBACK CENTER_R_572	FISHBACK CENTER		P_R_572	9.0	70	6	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
P_THOMPSON CENTER_R_572	THOMPSON CENTER		P_R_572	9.0	86	6	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0
P_CROTHERS ENG HALL_R_572	CROTHERS ENG HALL		P_R_572	9.0	91	6	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE

1. REFER TO SHEET U108 FOR INSTALLATION OF SERVICE TAPS. ALL SERVICE TAPS AND WYES SHALL BE INSTALLED WITH PROPOSED WYES.
2. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING PVC SANITARY SEWER MAIN WITH PIPE COUPLING.
3. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
4. REFER TO DETAILS ON SHEETS U108 AND U109 FOR INSTALLATION OF CLEAN OUT AND CLEAN OUT FRAME AND COVER.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

DRAWN BY:	JMM	JOB DATE:	2024
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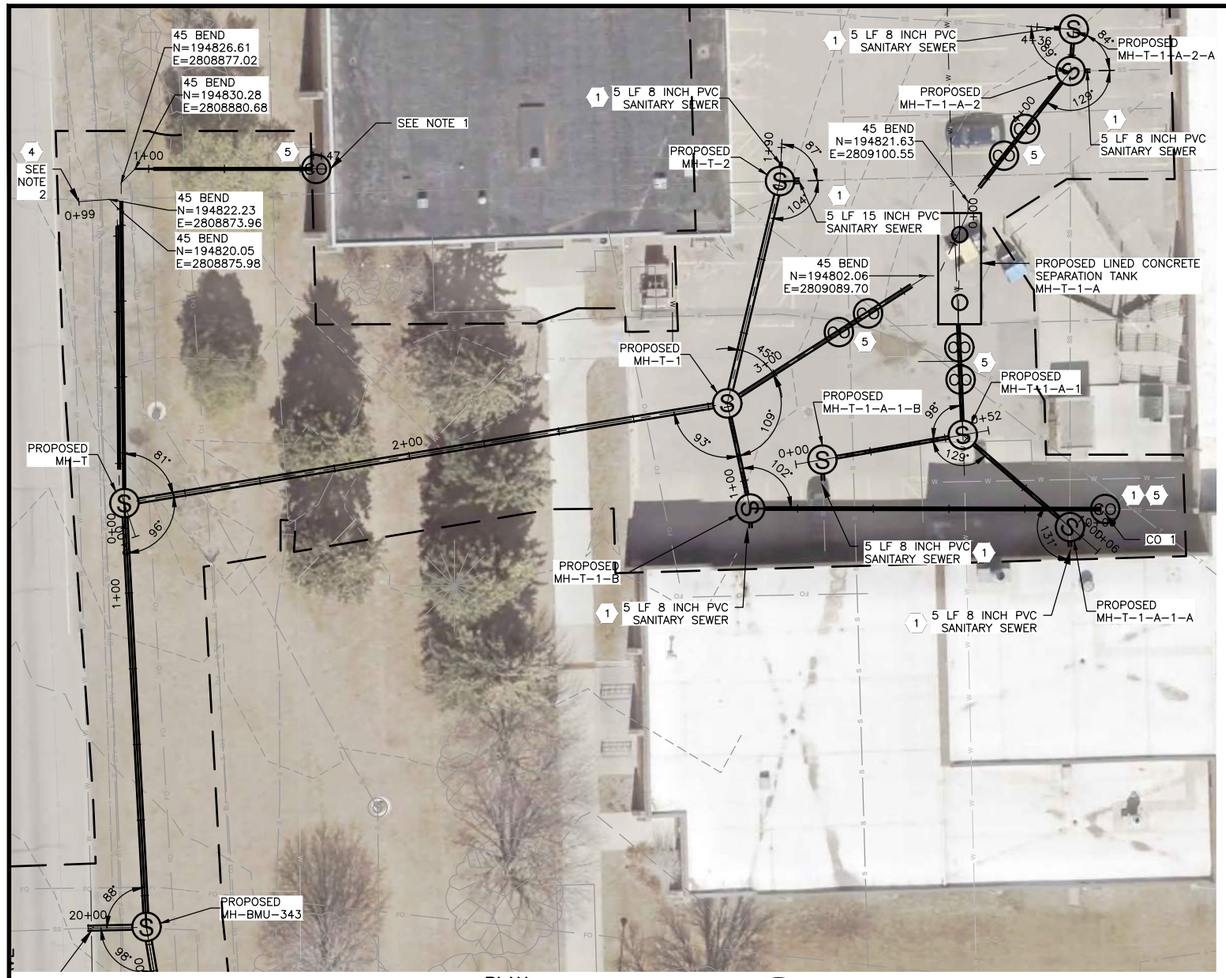
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I120

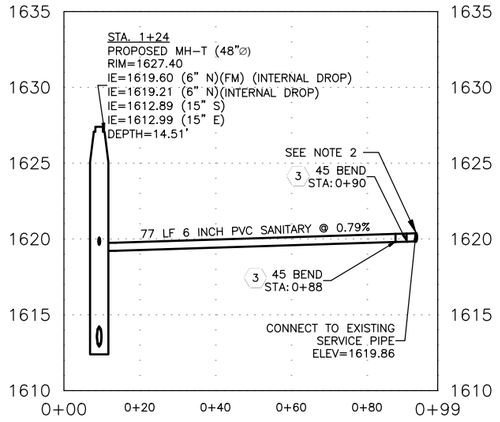
Xrefs: xg|-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 PLAN

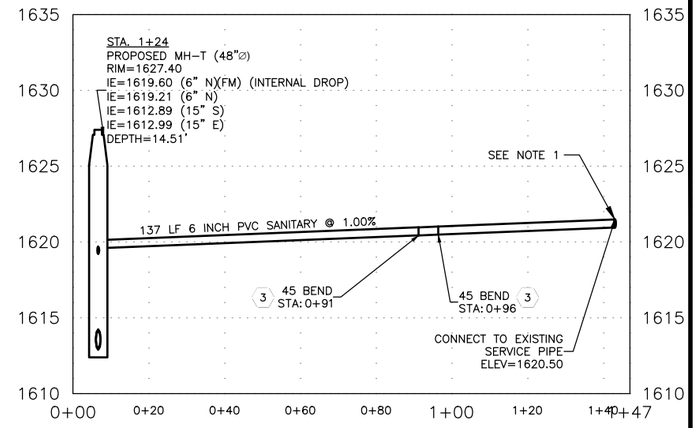
SCALE: 1"=20'

NORTH



2 FORCE MAIN PROFILE

SCALE: 1"=20'



3 BUILDING SERVICE PROFILE

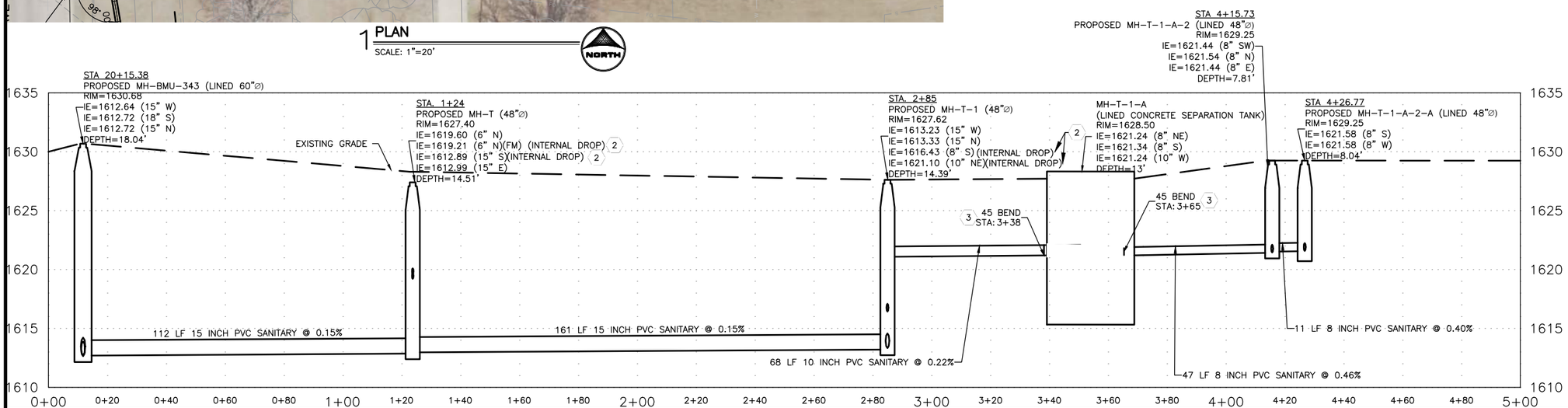
SCALE: 1"=20'

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE:

1. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
2. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.
3. INSTALL PROTECTO 401 EPOXY LINED MJ X MJ DUCTILE IRON BENDS. INSTALL EBAA IRON RESTRAINT ADAPTER TO BENDS. RESTRAINT ADAPTERS ARE INCIDENTAL TO THE BEND BID ITEM.
4. CONNECT PROPOSED SANITARY SEWER FORCE MAIN TO THE EXISTING DUCTILE IRON PIPE WITH EPOXY RESTRAINED JOINT SLEEVE.
5. REFER TO DETAILS ON SHEETS U108 AND U109 FOR INSTALLATION OF CLEAN OUT AND CLEAN OUT FRAME AND COVER.



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES
PAJL
SOUTH DAKOTA

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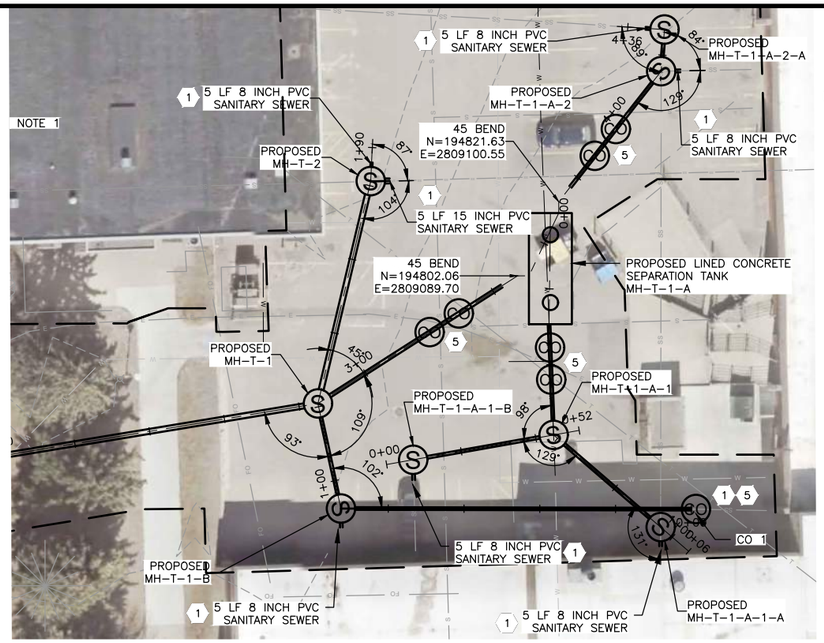
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

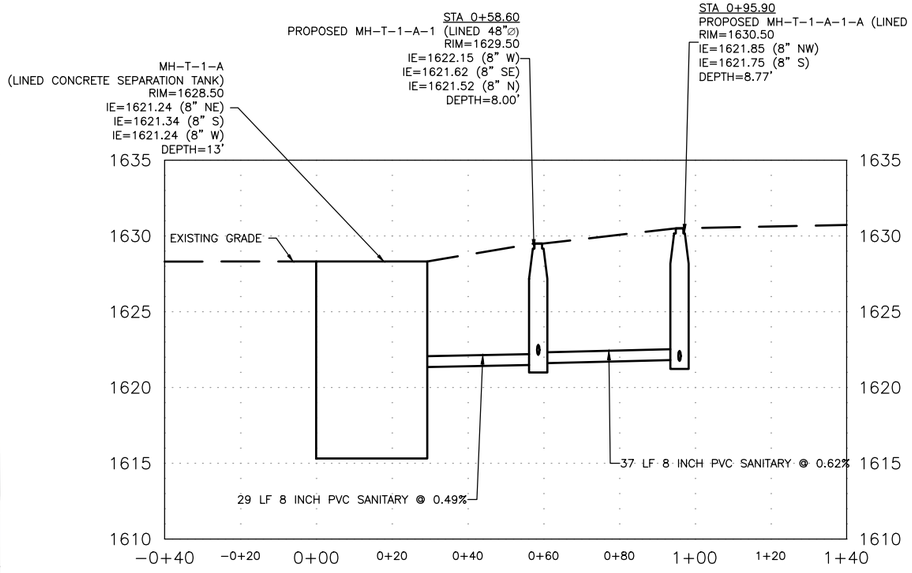
I – UTILITY PLAN AND PROFILE
BID ALTERNATE C: ANIMAL SCIENCE COMPLEX
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I121

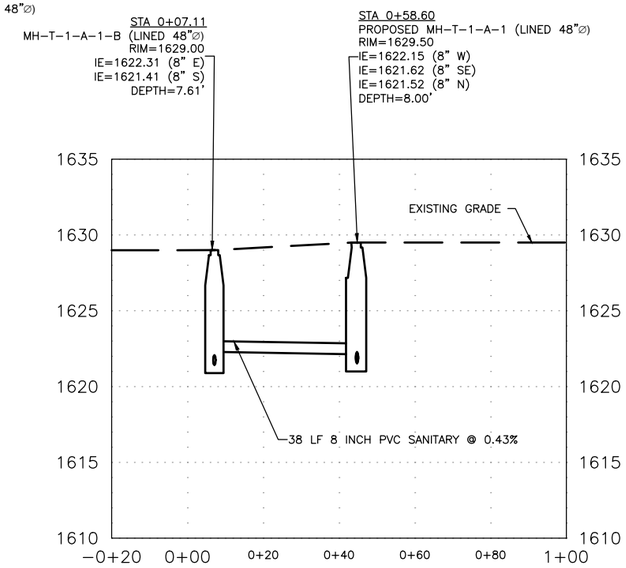
Xrefs: xgl-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 DETAIL
SCALE: 1"=20'



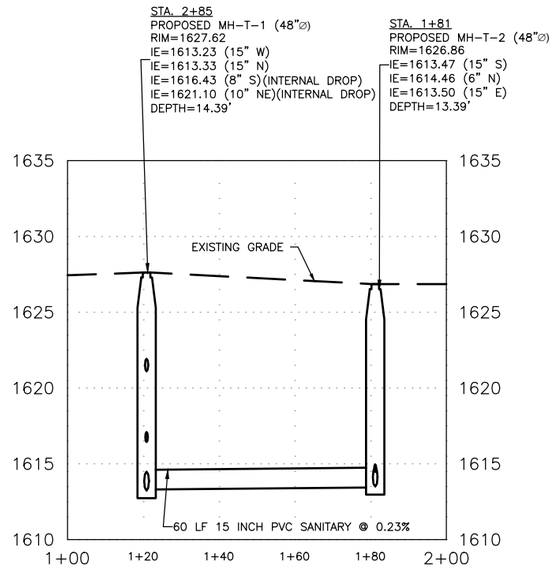
2 DETAIL
SCALE: 1"=20'



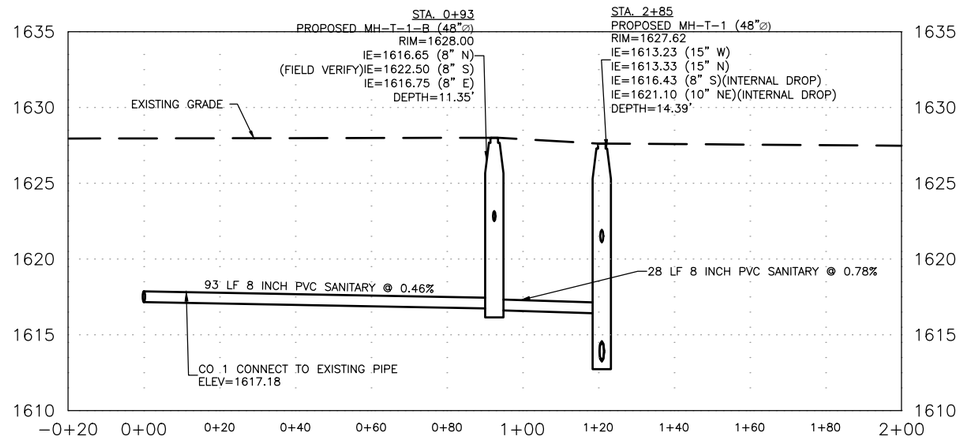
3 DETAIL
SCALE: 1"=20'

GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.



4 DETAIL
SCALE: 1"=20'



5 DETAIL
SCALE: 1"=20'

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

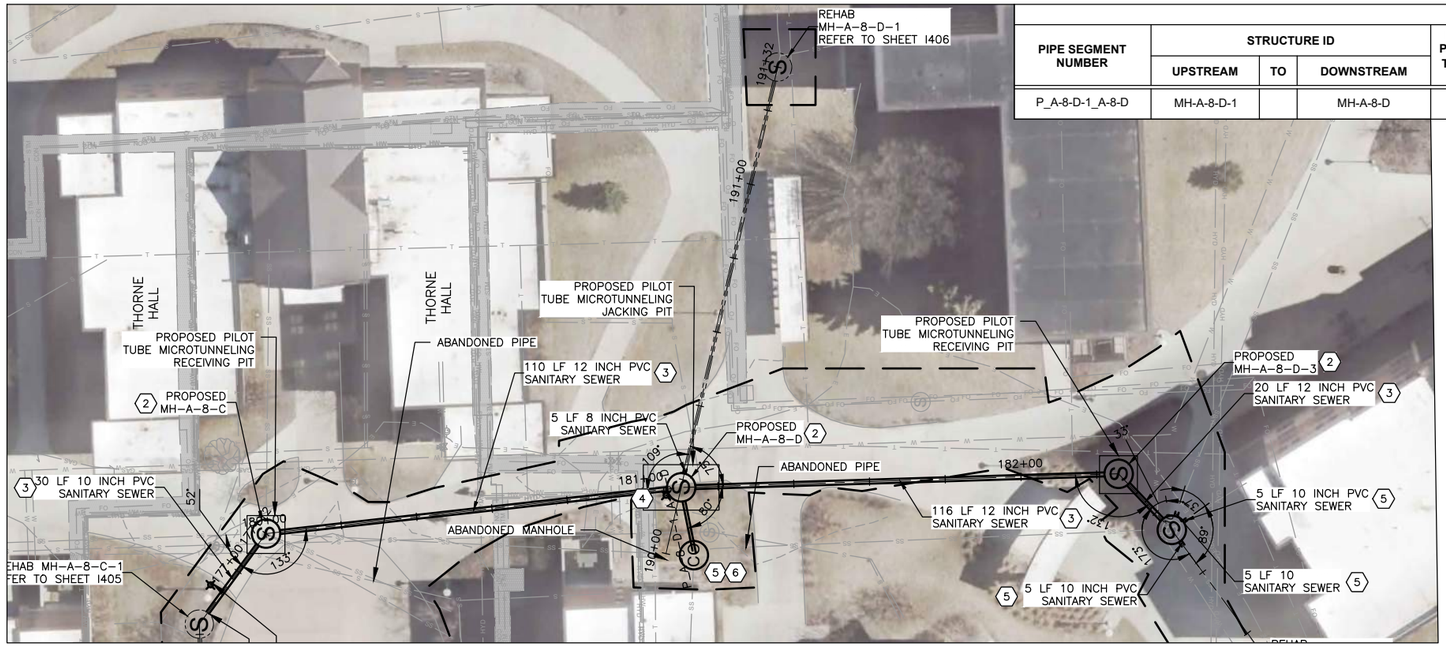
I – UTILITY PLAN AND PROFILE
BID ALTERNATE C: ANIMAL SCIENCE COMPLEX
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I122

Xrefs: xg-1-dh01; XVX-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS

SANITARY SEWER PIPE REHABILITATION TABLE

PIPE SEGMENT NUMBER	STRUCTURE ID			MAXIMUM PIPE DEPTH TO INVERT, FT	PIPE LENGTH, FT	PIPE SIZE, IN	PIPE MATERIAL	ACTIVE SERVICE CONNECTION, EACH	TAP INTRUSION, EACH	ACTION INDICATED	LENGTH OF REHAB	MINIMUM CIPP LINER THICKNESS, mm E = 400,000 psi (EL = 200,000 psi)
	UPSTREAM	TO	DOWNSTREAM									
P_A-8-D-1_A-8-D	MH-A-8-D-1		MH-A-8-D	13.6	126	8	VCP	0	0	REHABILITATION WITH LINING	ENTIRE LENGTH	6.0



1 PLAN
SCALE: 1"=20'

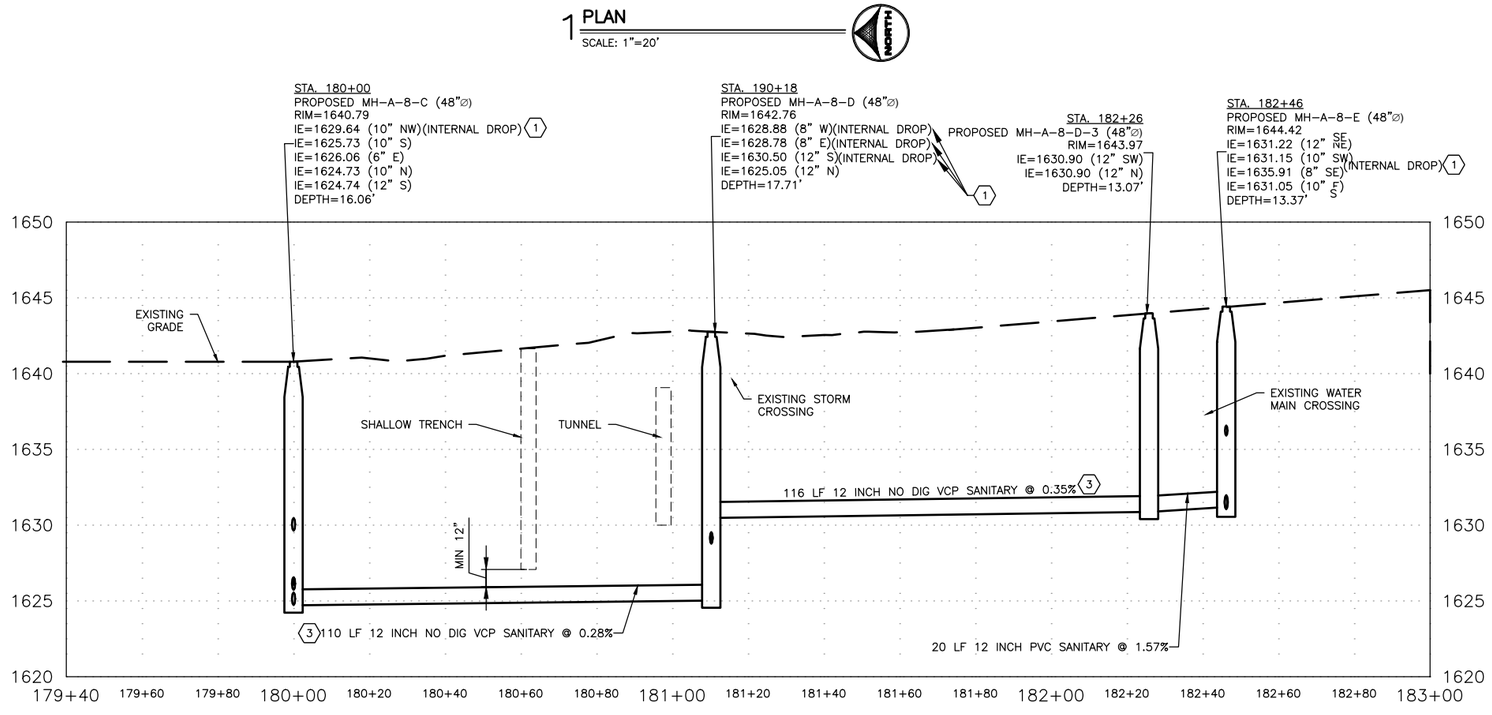
GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

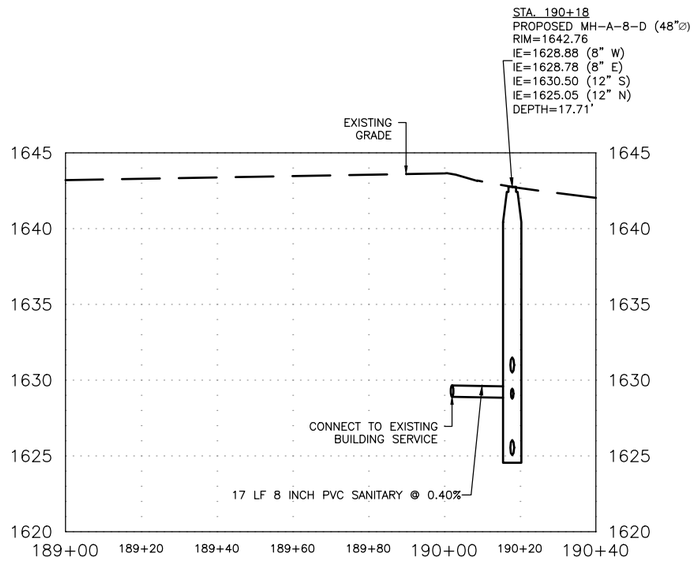
KEYNOTE: ⬡

1. REFER TO DETAIL SM-05/U103, FOR INSTALLATION OF INTERNAL DROP.
2. INSTALL PROPOSED SANITARY SEWER MANHOLE INSIDE THE PILOT TUBE MICROTUNNELING JACKING AND RECEIVING PITS.
3. INSTALL PROPOSED SANITARY SEWER MAIN TRENCHLESSLY VIA PILOT TUBE MICROTUNNELING.
4. RESET SALVAGED LIGHT POLE AND RECONNECT ELECTRICAL CONNECTIONS. REFER TO DETAIL 26-030/U112, FOR INSTALLATION OF LIGHT POLE BASE.
5. CONNECT PROPOSED SANITARY SEWER MAIN TO THE EXISTING VCP SANITARY SEWER MAIN WITH PIPE COUPLING.
6. REFER TO DETAILS ON SHEETS U108 AND U109 FOR INSTALLATION OF CLEAN OUT AND CLEAN OUT FRAME AND COVER.

REGISTERED PROFESSIONAL ENGINEER
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA



2 PROFILE
SCALE: 1"=20'



3 BUILDING SERVICE PROFILE
SCALE: 1"=20'

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APPROVED:	MJP	JOB NUMBER:	221795
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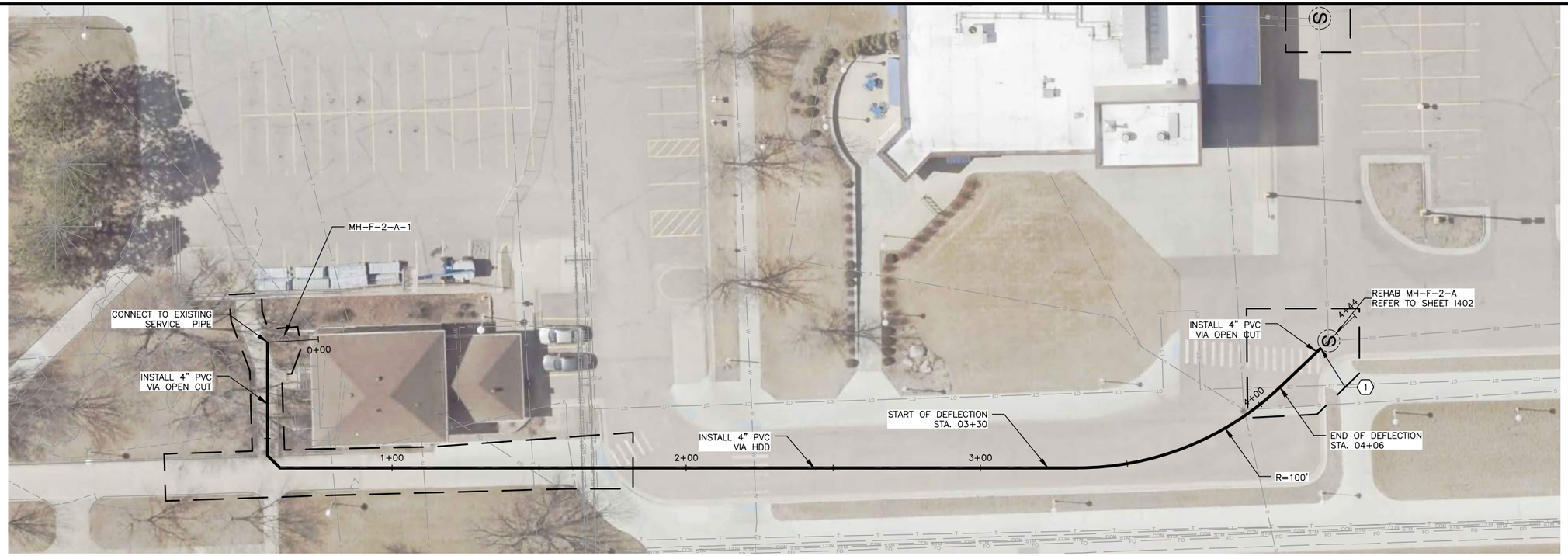
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

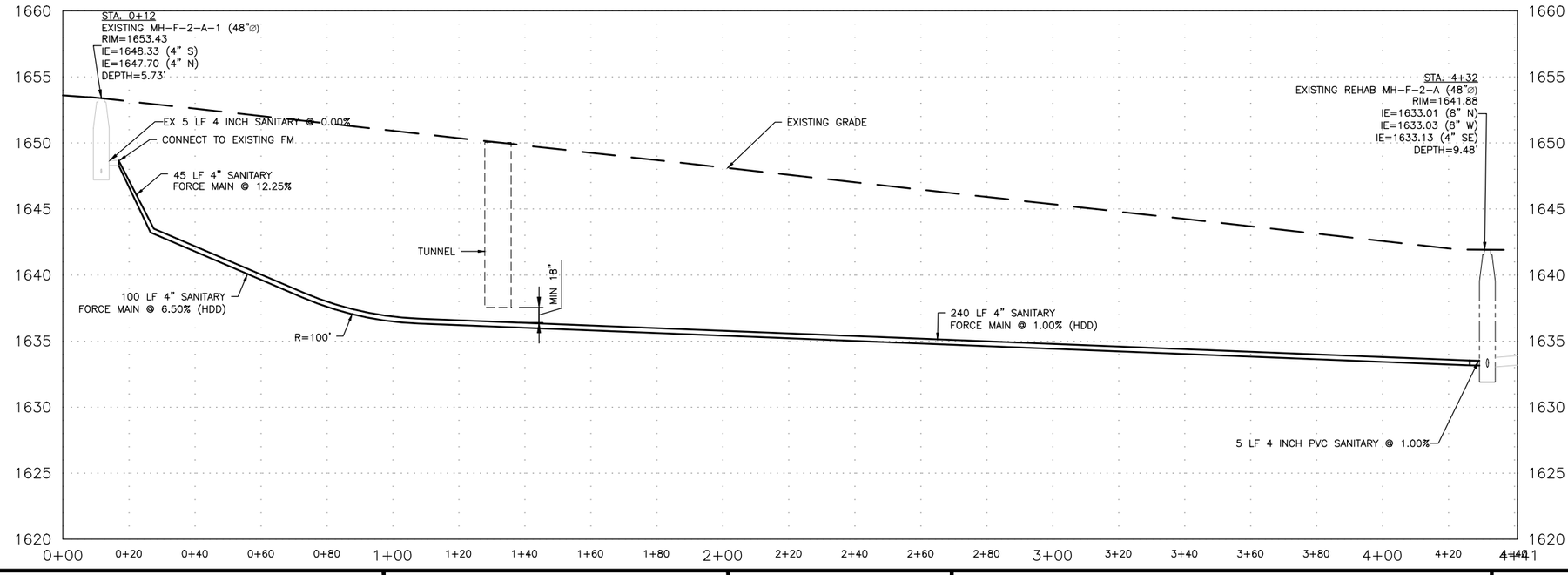
I – UTILITY PLAN AND PROFILE
BID ALTERNATE B: ABBOT HALL
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I123

Xrefs: xgl-1-dh01; XW-IMAGE; Sheet Layout- Prelim-A; XV-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS



1 PLAN
SCALE: 1"=20'



GENERAL NOTES:

1. ALL GRAVITY PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE (MH) TO CENTER OF STRUCTURE.
2. UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND FOR REFERENCE; THEREFORE, ARE NOT EXACT NOR COMPLETE. SEE ADDITIONAL REQUIREMENT IN THE GENERAL NOTES ON D002.

KEYNOTE: ⬡

1. CORE DRILL INTO MANHOLE FOR PROPOSED FORCE MAIN.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

Xrefs: xgl-1-dh01; XXX-IMAGE; Sheet Layout- Prelim-A; XX-SURVEY; XC-1-SAN; XC-1-CONST-LIMITS

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APPROVED:	MJP	JOB NUMBER:	221795
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SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
BID ALTERNATE A: TESTING CENTER
SANITARY SEWER MAIN PLAN AND PROFILE

SHEET NO.
I124

LEGEND

- (S) EXISTING SANITARY MANHOLE
- (S) PROPOSED SANITARY MANHOLE
- (S) REHABILITATED SANITARY MANHOLE

1 MANHOLE LOCATION PLAN
SCALE: 1" = 200'

NORTH 0 200' 1"=200'

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

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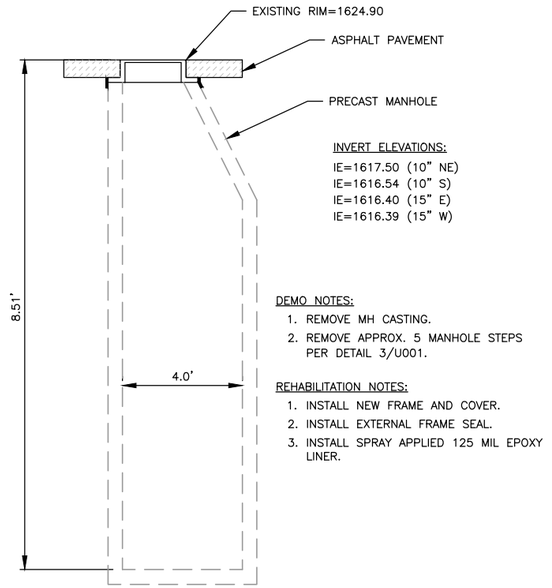
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

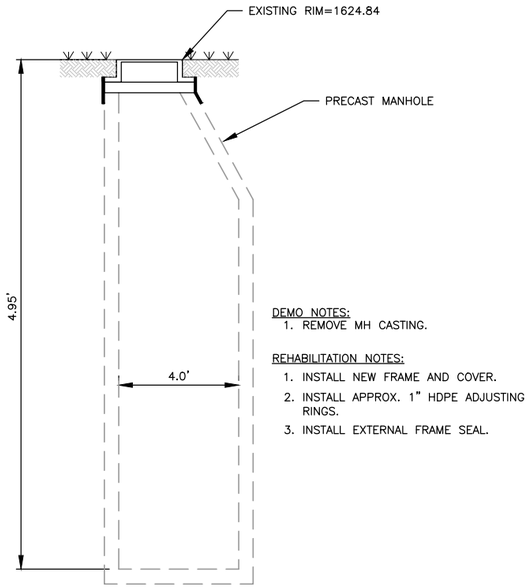
I – UTILITY PLAN AND PROFILE
MANHOLE LOCATION PLAN

SHEET NO.
I400

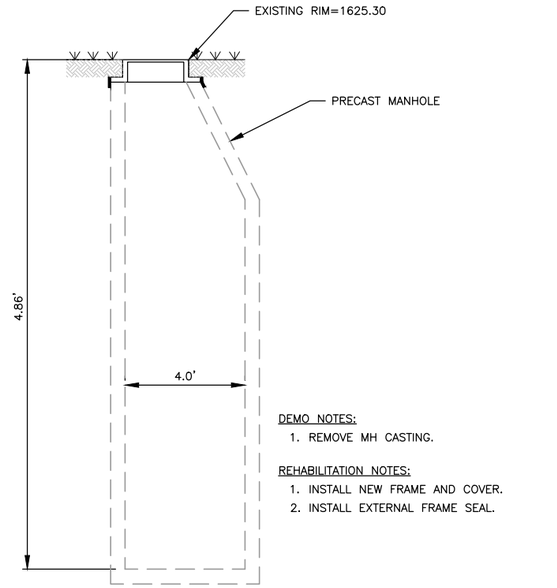
Xrefs: xg-1-dt01; XVX-IMAGE; xv-sewer rehab-replace; XC-1-SAN; XC-BASE-GIS



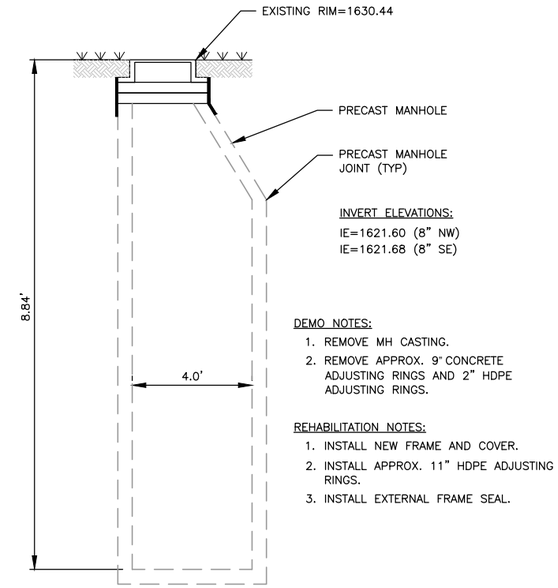
EXISTING MH–BMU–560
1 CLOSEST BUILDING: DYKHOUSE STADIUM



EXISTING MH–C–1
CLOSEST BUILDING: SANFORD–JACKRABBIT ATHLETIC COMPLEX
2



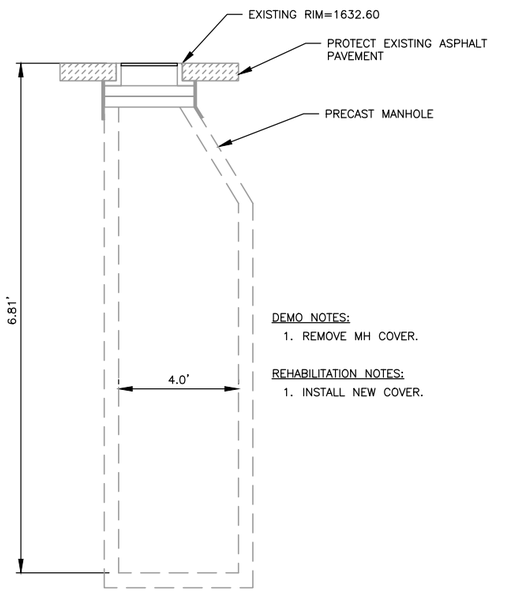
EXISTING MH–C–2
CLOSEST BUILDING: SANFORD–JACKRABBIT ATHLETIC COMPLEX
3



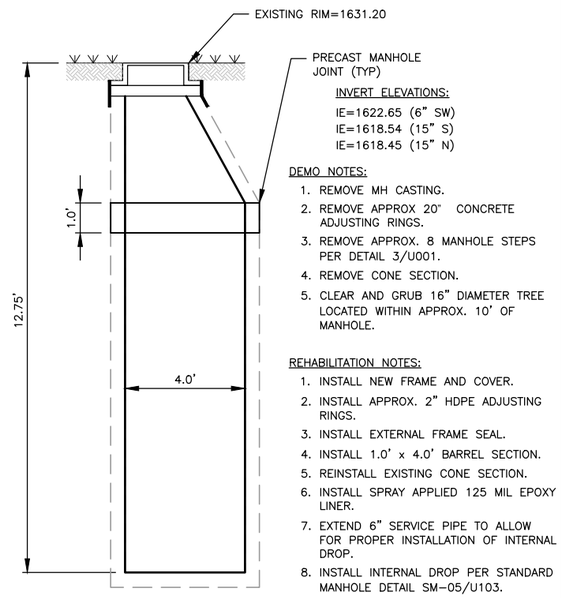
EXISTING MH–U
CLOSEST BUILDING: PERFORMING ARTS CENTER
4

THIS SPACE WAS INTENTIONALLY LEFT BLANK.

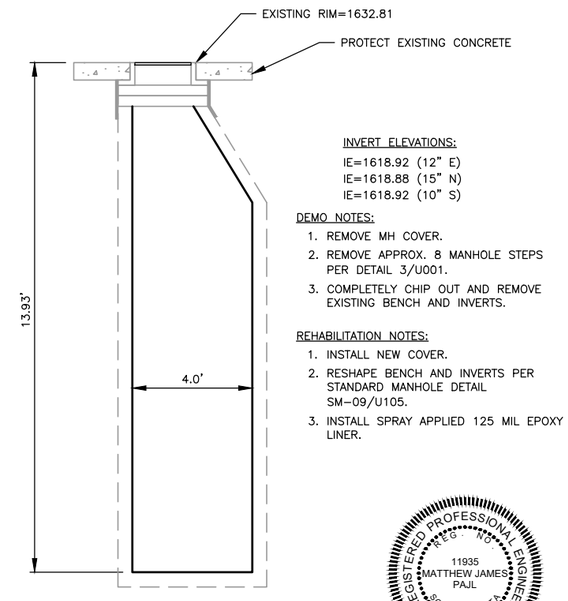
5



EXISTING MH–V
6 CLOSEST BUILDING: WELLNESS CENTER



EXISTING MH–BMU–564
CLOSEST BUILDING: PERFORMING ARTS CENTER
7



EXISTING MH–BMU–565
CLOSEST BUILDING: FIRST BANK AND TRUST ARENA
8

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

DRAWN BY:	XXX	JOB DATE:	2024
APPROVED:	XXX	JOB NUMBER:	221795
CAD DATE:	11/5/2024 2:44:26 PM		
CAD FILE:	\\hrgreen.com\HRG\Data\2022\221795\CAD\Campus Wide San Sewer Cat 5.5\Dwgs\I\I401.dwg		

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0 1"
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NO.	DATE	BY	REVISION DESCRIPTION

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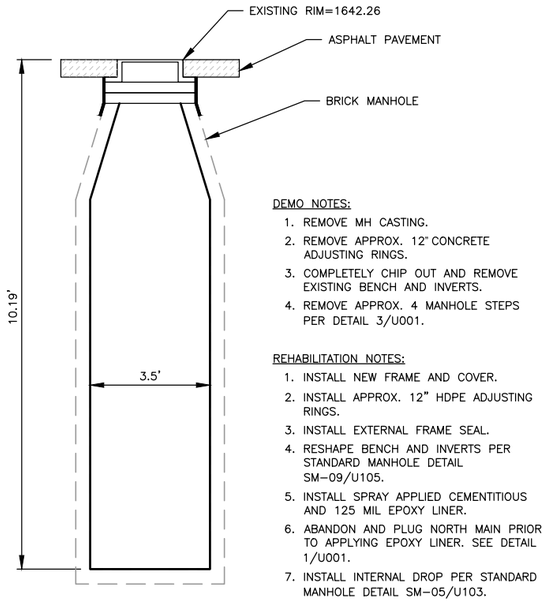
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
MANHOLE STRUCTURE DETAILS

SHEET NO.
I403

Xrefs: xgI-I-dh01



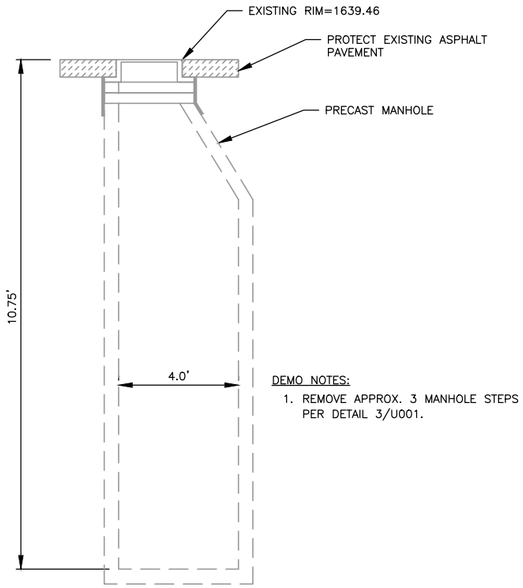
DEMO NOTES:

1. REMOVE MH CASTING.
2. REMOVE APPROX. 12" CONCRETE ADJUSTING RINGS.
3. COMPLETELY CHIP OUT AND REMOVE EXISTING BENCH AND INVERTS.
4. REMOVE APPROX. 4 MANHOLE STEPS PER DETAIL 3/U001.

REHABILITATION NOTES:

1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 12" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. RESHAPE BENCH AND INVERTS PER STANDARD MANHOLE DETAIL SM-09/U105.
5. INSTALL SPRAY APPLIED CEMENTITIOUS AND 125 MIL EPOXY LINER.
6. ABANDON AND PLUG NORTH MAIN PRIOR TO APPLYING EPOXY LINER. SEE DETAIL 1/U001.
7. INSTALL INTERNAL DROP PER STANDARD MANHOLE DETAIL SM-05/U103.

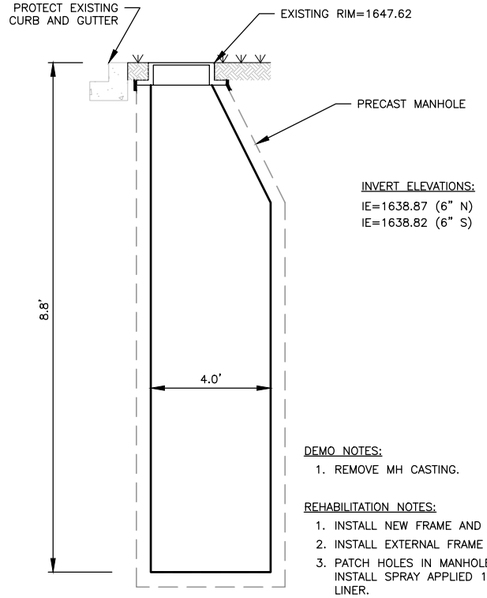
1 EXISTING MH-M-1
CLOSEST BUILDING: WECOTA ANNEX



DEMO NOTES:

1. REMOVE APPROX. 3 MANHOLE STEPS PER DETAIL 3/U001.

2 EXISTING MH-M
CLOSEST BUILDING: ENROLLMENT SERVICES CENTER



INVERT ELEVATIONS:
IE=1638.87 (6" N)
IE=1638.82 (6" S)

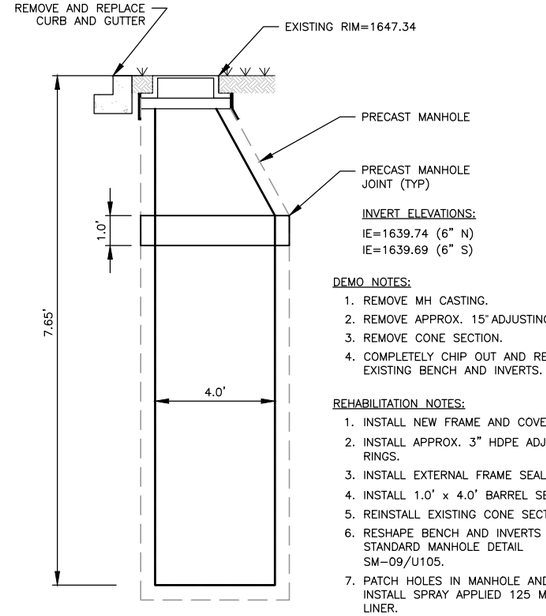
DEMO NOTES:

1. REMOVE MH CASTING.

REHABILITATION NOTES:

1. INSTALL NEW FRAME AND COVER.
2. INSTALL EXTERNAL FRAME SEAL.
3. PATCH HOLES IN MANHOLE AND INSTALL SPRAY APPLIED 125 MIL EPOXY LINER.

3 EXISTING MH-Q
CLOSEST BUILDING: WEST HALL



INVERT ELEVATIONS:
IE=1639.74 (6" N)
IE=1639.69 (6" S)

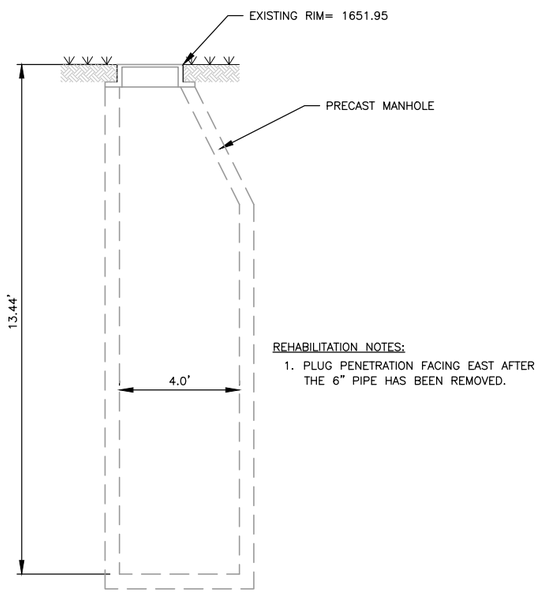
DEMO NOTES:

1. REMOVE MH CASTING.
2. REMOVE APPROX. 15" ADJUSTING RINGS.
3. REMOVE CONE SECTION.
4. COMPLETELY CHIP OUT AND REMOVE EXISTING BENCH AND INVERTS.

REHABILITATION NOTES:

1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 3" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. INSTALL 1.0' x 4.0' BARREL SECTION.
5. REINSTALL EXISTING CONE SECTION.
6. RESHAPE BENCH AND INVERTS PER STANDARD MANHOLE DETAIL SM-09/U105.
7. PATCH HOLES IN MANHOLE AND INSTALL SPRAY APPLIED 125 MIL EPOXY LINER.

4 EXISTING MH-P
CLOSEST BUILDING: WEST HALL



REHABILITATION NOTES:

1. PLUG PENETRATION FACING EAST AFTER THE 6" PIPE HAS BEEN REMOVED.

5 EXISTING MH-R-1
CLOSEST BUILDING: SOLEBERG HALL

THIS SPACE WAS INTENTIONALLY LEFT BLANK.

6

THIS SPACE WAS INTENTIONALLY LEFT BLANK.

7

THIS SPACE WAS INTENTIONALLY LEFT BLANK.

8

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

DRAWN BY: XXX JOB DATE: 2024
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0 1"
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NO.	DATE	BY	REVISION DESCRIPTION

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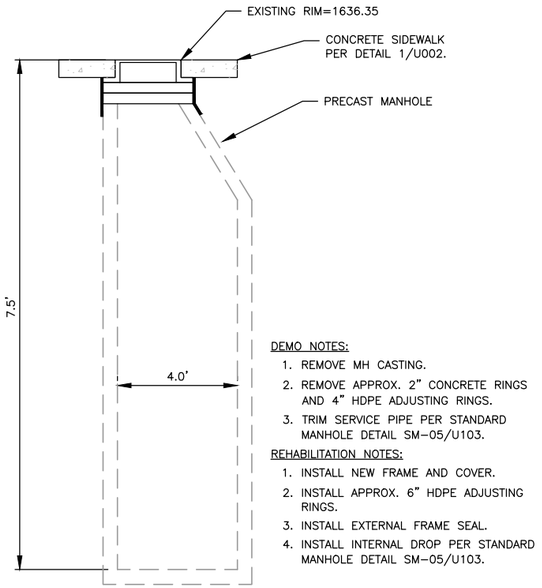
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
MANHOLE STRUCTURE DETAILS

SHEET NO.
I404

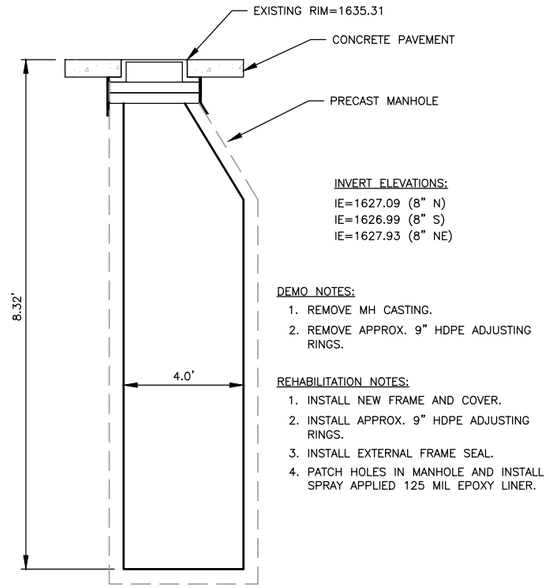
Xrefs: xg1-1-db01



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 2" CONCRETE RINGS AND 4" HDPE ADJUSTING RINGS.
3. TRIM SERVICE PIPE PER STANDARD MANHOLE DETAIL SM-05/U103.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 6" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. INSTALL INTERNAL DROP PER STANDARD MANHOLE DETAIL SM-05/U103.

EXISTING MH-A-9-A
1 CLOSEST BUILDING: STUDENT UNION

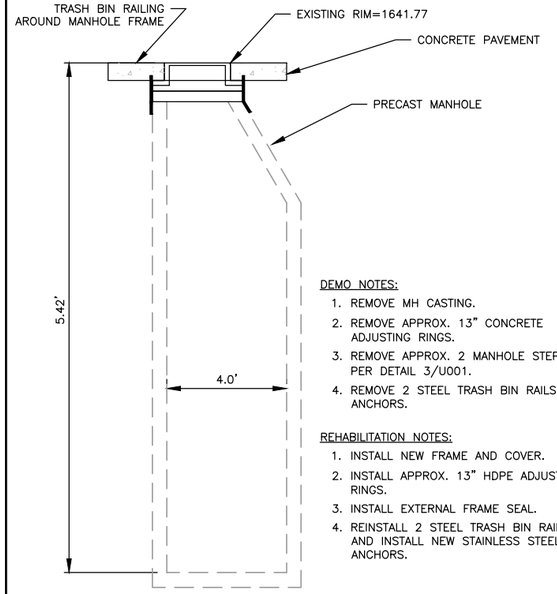


INVERT ELEVATIONS:
IE=1627.09 (8" N)
IE=1626.99 (8" S)
IE=1627.93 (8" NE)

DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 9" HDPE ADJUSTING RINGS.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 9" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. PATCH HOLES IN MANHOLE AND INSTALL SPRAY APPLIED 125 MIL EPOXY LINER.

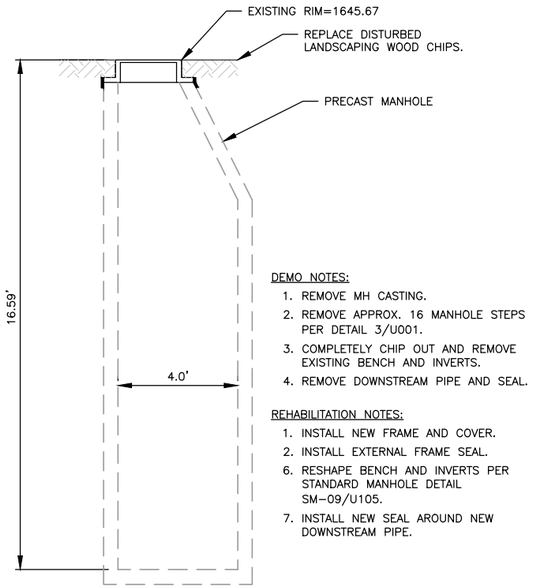
EXISTING MH-A-6-A
2 CLOSEST BUILDING: STUDENT UNION



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 13" CONCRETE ADJUSTING RINGS.
3. REMOVE APPROX. 2 MANHOLE STEPS PER DETAIL 3/U001.
4. REMOVE 2 STEEL TRASH BIN RAILS AND ANCHORS.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 13" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. REINSTALL 2 STEEL TRASH BIN RAILS AND INSTALL NEW STAINLESS STEEL ANCHORS.

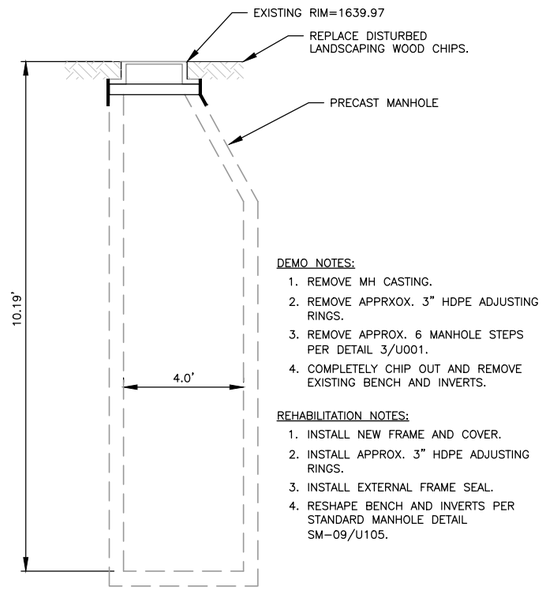
EXISTING MH-A-6-B
3 CLOSEST BUILDING: STUDENT UNION



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 16 MANHOLE STEPS PER DETAIL 3/U001.
3. COMPLETELY CHIP OUT AND REMOVE EXISTING BENCH AND INVERTS.
4. REMOVE DOWNSTREAM PIPE AND SEAL.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL EXTERNAL FRAME SEAL.
6. RESHAPE BENCH AND INVERTS PER STANDARD MANHOLE DETAIL SM-09/U105.
7. INSTALL NEW SEAL AROUND NEW DOWNSTREAM PIPE.

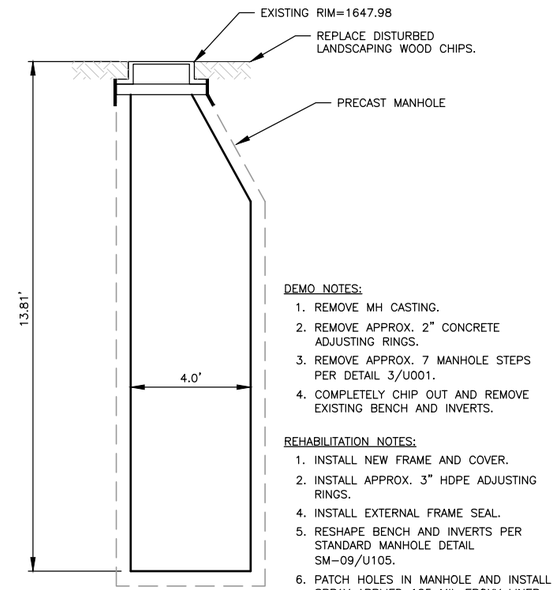
EXISTING MH-A-8-A
4 CLOSEST BUILDING: BAILEY ROTUNDA



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPRXOX. 3" HDPE ADJUSTING RINGS.
3. REMOVE APPROX. 6 MANHOLE STEPS PER DETAIL 3/U001.
4. COMPLETELY CHIP OUT AND REMOVE EXISTING BENCH AND INVERTS.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 3" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. RESHAPE BENCH AND INVERTS PER STANDARD MANHOLE DETAIL SM-09/U105.

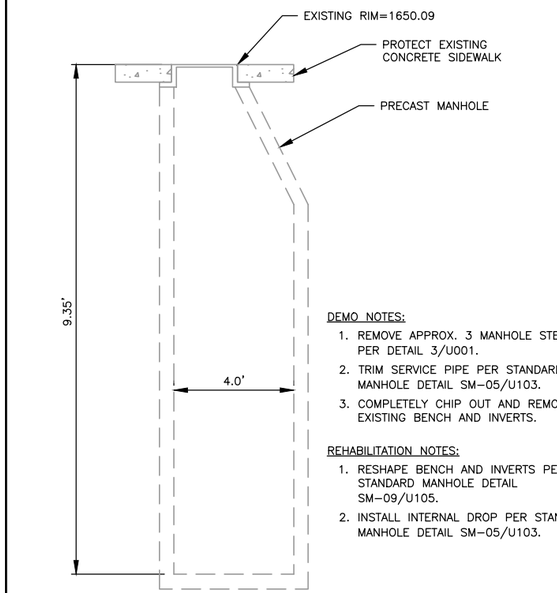
EXISTING MH-A-8-C-1
5 CLOSEST BUILDING: SPENCER HALL



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 2" CONCRETE ADJUSTING RINGS.
3. REMOVE APPROX. 7 MANHOLE STEPS PER DETAIL 3/U001.
4. COMPLETELY CHIP OUT AND REMOVE EXISTING BENCH AND INVERTS.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 3" HDPE ADJUSTING RINGS.
4. INSTALL EXTERNAL FRAME SEAL.
5. RESHAPE BENCH AND INVERTS PER STANDARD MANHOLE DETAIL SM-09/U105.
6. PATCH HOLES IN MANHOLE AND INSTALL SPRAY APPLIED 125 MIL EPOXY LINER.

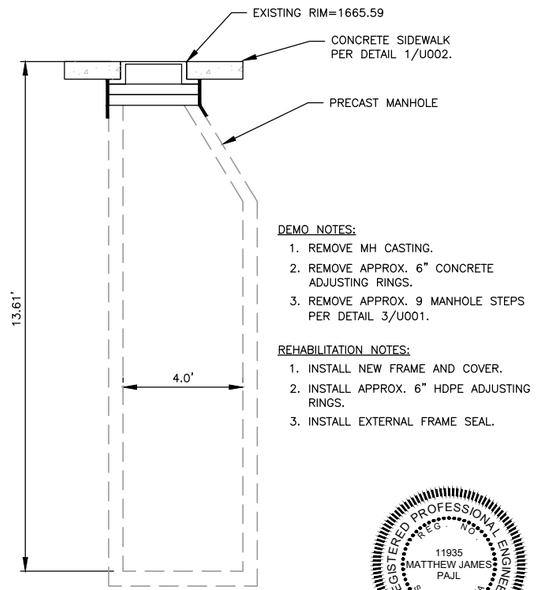
EXISTING MH-A-8-C-2
6 CLOSEST BUILDING: BAILEY ROTUNDA



DEMO NOTES:
1. REMOVE APPROX. 3 MANHOLE STEPS PER DETAIL 3/U001.
2. TRIM SERVICE PIPE PER STANDARD MANHOLE DETAIL SM-05/U103.
3. COMPLETELY CHIP OUT AND REMOVE EXISTING BENCH AND INVERTS.

REHABILITATION NOTES:
1. RESHAPE BENCH AND INVERTS PER STANDARD MANHOLE DETAIL SM-09/U105.
2. INSTALL INTERNAL DROP PER STANDARD MANHOLE DETAIL SM-05/U103.

EXISTING MH-A-8-C-3
7 CLOSEST BUILDING: COMMUNICATIONS CENTER



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 6" CONCRETE ADJUSTING RINGS.
3. REMOVE APPROX. 9 MANHOLE STEPS PER DETAIL 3/U001.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 6" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

EXISTING MH-A-8-C-4
8 CLOSEST BUILDING: OLD HORTICULTURE

Xrefs: xgl-1-dh01

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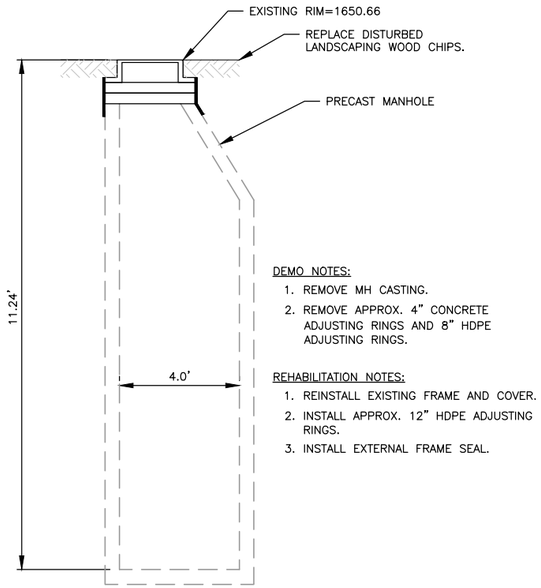
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
MANHOLE STRUCTURE DETAILS

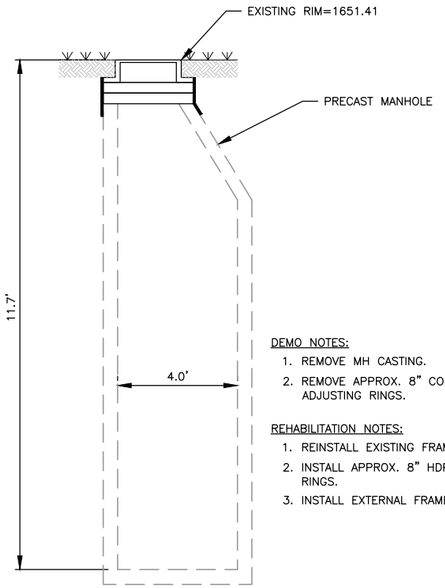
SHEET NO.
I405



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 4" CONCRETE ADJUSTING RINGS AND 8" HDPE ADJUSTING RINGS.

REHABILITATION NOTES:
1. REINSTALL EXISTING FRAME AND COVER.
2. INSTALL APPROX. 12" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.

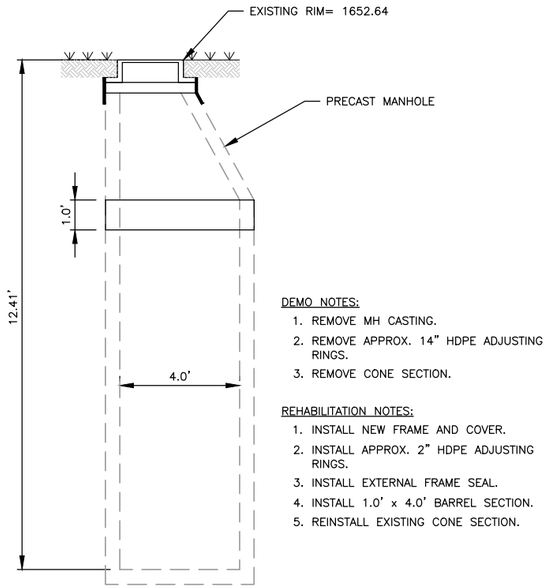
EXISTING MH-A-8-I
1 CLOSEST BUILDING: HARDING HALL



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 8" CONCRETE ADJUSTING RINGS.

REHABILITATION NOTES:
1. REINSTALL EXISTING FRAME AND COVER.
2. INSTALL APPROX. 8" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.

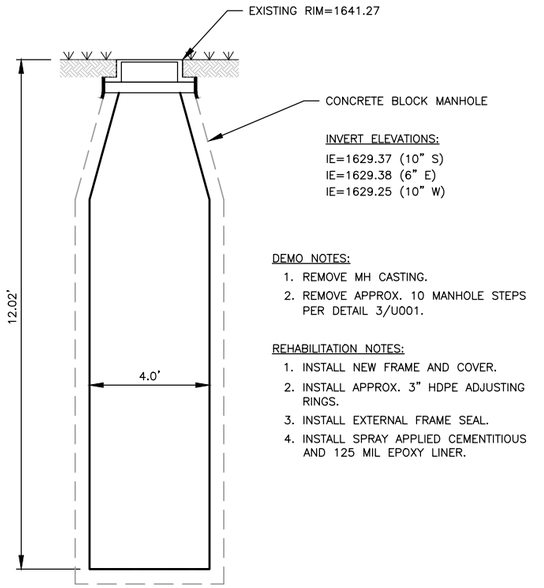
EXISTING MH-A-8-I-1
2 CLOSEST BUILDING: DAKTRONICS HALL



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 14" HDPE ADJUSTING RINGS.
3. REMOVE CONE SECTION.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 2" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. INSTALL 1.0' x 4.0' BARREL SECTION.
5. REINSTALL EXISTING CONE SECTION.

EXISTING MH-A-8-I-2
3 CLOSEST BUILDING: DAKTRONICS HALL

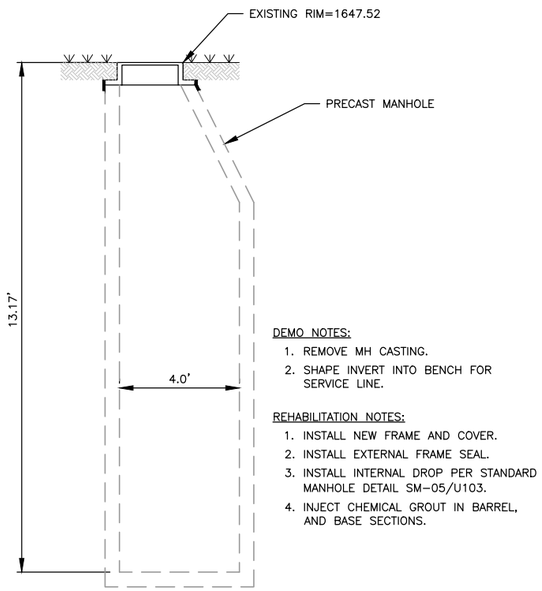


INVERT ELEVATIONS:
IE=1629.37 (10" S)
IE=1629.38 (6" E)
IE=1629.25 (10" W)

DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 10 MANHOLE STEPS PER DETAIL 3/U001.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 3" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. INSTALL SPRAY APPLIED CEMENTITIOUS AND 125 MIL EPOXY LINER.

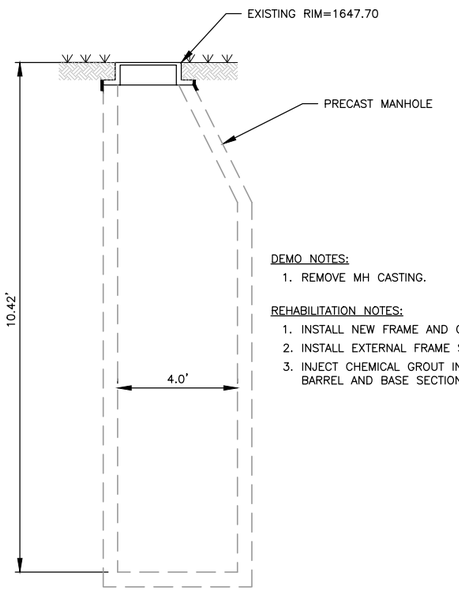
EXISTING MH-A-8-D-1
4 CLOSEST BUILDING: BROWN HALL



DEMO NOTES:
1. REMOVE MH CASTING.
2. SHAPE INVERT INTO BENCH FOR SERVICE LINE.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL EXTERNAL FRAME SEAL.
3. INSTALL INTERNAL DROP PER STANDARD MANHOLE DETAIL SM-05/U103.
4. INJECT CHEMICAL GROUT IN BARREL, AND BASE SECTIONS.

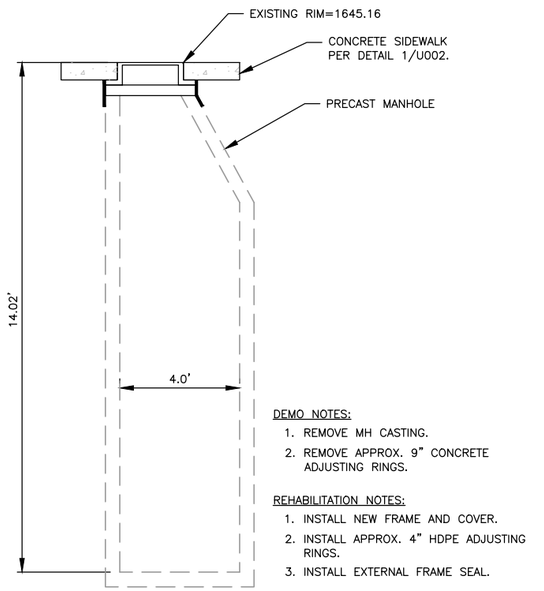
EXISTING MH-A-8-F
5 CLOSEST BUILDING: BEN REIFEL HALL



DEMO NOTES:
1. REMOVE MH CASTING.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL EXTERNAL FRAME SEAL.
3. INJECT CHEMICAL GROUT IN CONE, BARREL AND BASE SECTIONS.

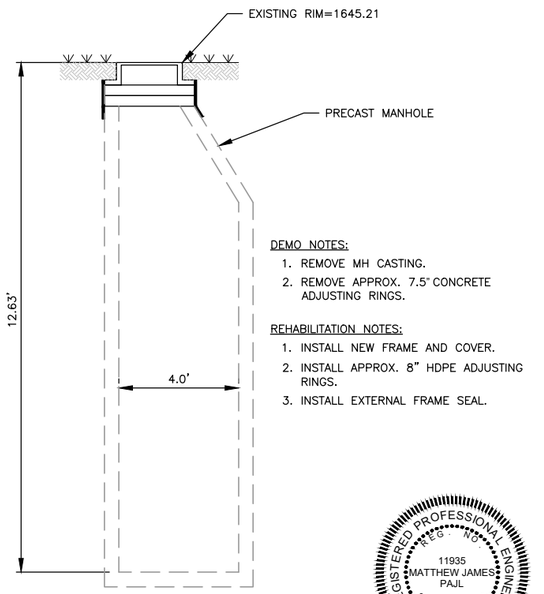
EXISTING MH-A-8-G
6 CLOSEST BUILDING: BEN REIFEL HALL



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 9" CONCRETE ADJUSTING RINGS.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 4" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.

EXISTING MH-A-8-E
7 CLOSEST BUILDING: BEN REIFEL HALL



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 7.5" CONCRETE ADJUSTING RINGS.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 8" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

EXISTING MH-A-8-E-1
8 CLOSEST BUILDING: BEN REIFEL HALL

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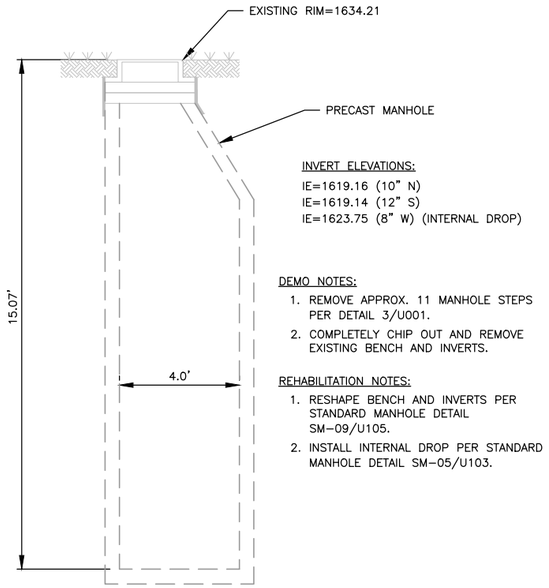
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
MANHOLE STRUCTURE DETAILS

SHEET NO.
I406

Xrefs: xg1-1-db01

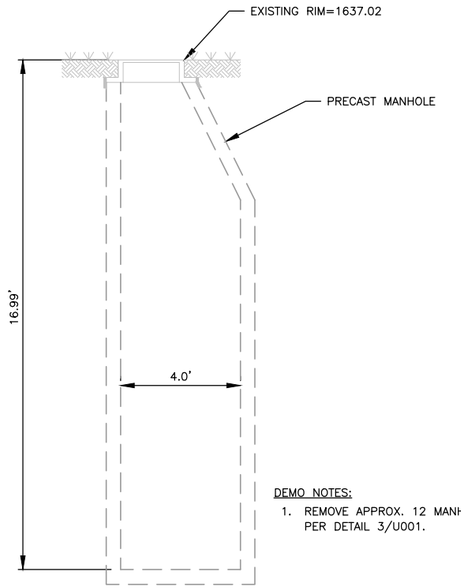


INVERT ELEVATIONS:
IE=1619.16 (10" N)
IE=1619.14 (12" S)
IE=1623.75 (8" W) (INTERNAL DROP)

DEMO NOTES:
1. REMOVE APPROX. 11 MANHOLE STEPS PER DETAIL 3/U001.
2. COMPLETELY CHIP OUT AND REMOVE EXISTING BENCH AND INVERTS.

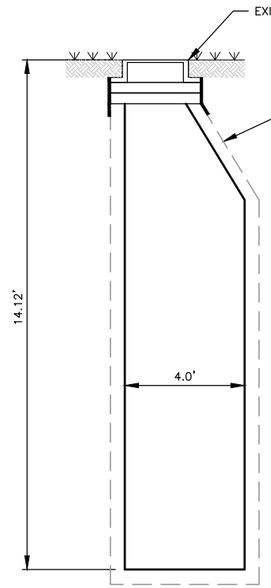
REHABILITATION NOTES:
1. RESHAPE BENCH AND INVERTS PER STANDARD MANHOLE DETAIL SM-09/U105.
2. INSTALL INTERNAL DROP PER STANDARD MANHOLE DETAIL SM-05/U103.

1 EXISTING MH-A
CLOSEST BUILDING: FIRST BANK AND TRUST ARENA



DEMO NOTES:
1. REMOVE APPROX. 12 MANHOLE STEPS PER DETAIL 3/U001.

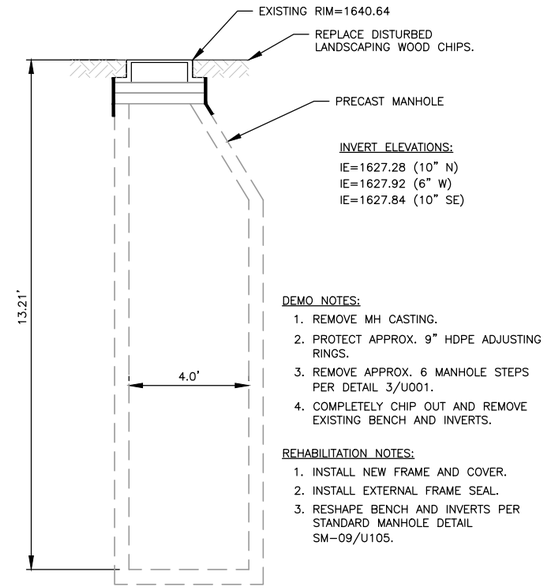
2 EXISTING MH-A-1
CLOSEST BUILDING: FIRST BANK AND TRUST ARENA



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 8" CONCRETE ADJUSTING RINGS.
3. COMPLETELY CHIP OUT AND REMOVE EXISTING BENCH AND INVERTS.
4. REMOVE INTERNAL DROP ASSEMBLY.
5. TRIM UPSTREAM AND DOWNSTREAM MAIN LINE PIPES BACK TOWARD MANHOLE WALL.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 8" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. RESHAPE BENCH AND INVERTS PER STANDARD MANHOLE DETAIL SM-09/U105.
5. INSTALL SPRAY APPLIED 125 MIL EPOXY LINER.
6. INSTALL INTERNAL DROP PER STANDARD MANHOLE DETAIL SM-05/U103.

3 EXISTING MH-A-4-A
CLOSEST BUILDING: CALDWELL HALL

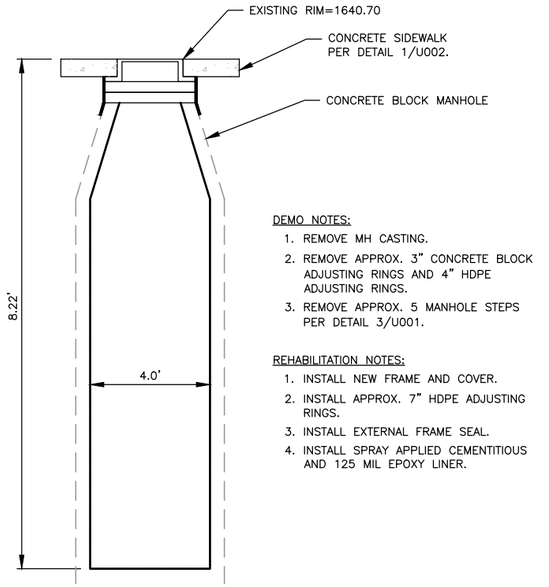


INVERT ELEVATIONS:
IE=1627.28 (10" N)
IE=1627.92 (6" W)
IE=1627.84 (10" SE)

DEMO NOTES:
1. REMOVE MH CASTING.
2. PROTECT APPROX. 9" HDPE ADJUSTING RINGS.
3. REMOVE APPROX. 6 MANHOLE STEPS PER DETAIL 3/U001.
4. COMPLETELY CHIP OUT AND REMOVE EXISTING BENCH AND INVERTS.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL EXTERNAL FRAME SEAL.
3. RESHAPE BENCH AND INVERTS PER STANDARD MANHOLE DETAIL SM-09/U105.

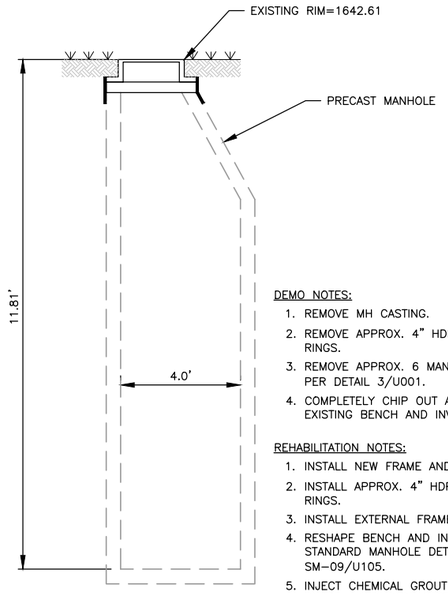
4 EXISTING MH-A-4-B
CLOSEST BUILDING: HYDE HALL



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 3" CONCRETE BLOCK ADJUSTING RINGS AND 4" HDPE ADJUSTING RINGS.
3. REMOVE APPROX. 5 MANHOLE STEPS PER DETAIL 3/U001.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 7" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. INSTALL SPRAY APPLIED CEMENTITIOUS AND 125 MIL EPOXY LINER.

5 EXISTING MH-A-8-D-2
CLOSEST BUILDING: BROWN HALL



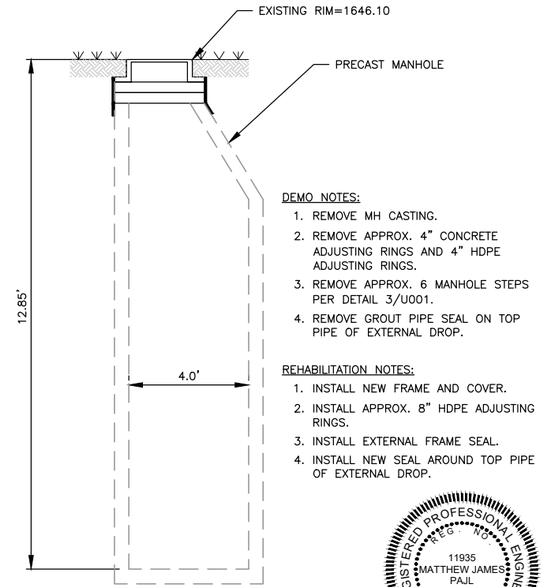
DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 4" HDPE ADJUSTING RINGS.
3. REMOVE APPROX. 6 MANHOLE STEPS PER DETAIL 3/U001.
4. COMPLETELY CHIP OUT AND REMOVE EXISTING BENCH AND INVERTS.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 4" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. RESHAPE BENCH AND INVERTS PER STANDARD MANHOLE DETAIL SM-09/U105.
5. INJECT CHEMICAL GROUT IN CONE, BARREL, AND BASE SECTIONS.

6 EXISTING MH-A-4-D
CLOSEST BUILDING: LARSON COMMONS

THIS SPACE WAS INTENTIONALLY LEFT BLANK.

7



DEMO NOTES:
1. REMOVE MH CASTING.
2. REMOVE APPROX. 4" CONCRETE ADJUSTING RINGS AND 4" HDPE ADJUSTING RINGS.
3. REMOVE APPROX. 6 MANHOLE STEPS PER DETAIL 3/U001.
4. REMOVE GROUT PIPE SEAL ON TOP PIPE OF EXTERNAL DROP.

REHABILITATION NOTES:
1. INSTALL NEW FRAME AND COVER.
2. INSTALL APPROX. 8" HDPE ADJUSTING RINGS.
3. INSTALL EXTERNAL FRAME SEAL.
4. INSTALL NEW SEAL AROUND TOP PIPE OF EXTERNAL DROP.

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 11935
MATTHEW JAMES PAJL
SOUTH DAKOTA

8 EXISTING MH-A-4-F
CLOSEST BUILDING: BINNEWIES HALL

Xrefs: xgl-1-dh01

DRAWN BY:	XXX	JOB DATE:	2024
APPROVED:	XXX	JOB NUMBER:	221795
CAD DATE:	11/5/2024 2:44:26 PM		
CAD FILE:	\\hrgreen.com\HRG\Data\2022\221795\CAD\Campus Wide San Sewer Cat 5.5\Dwgs\I\I401.dwg		

BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1"
IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

NO.	DATE	BY	REVISION DESCRIPTION

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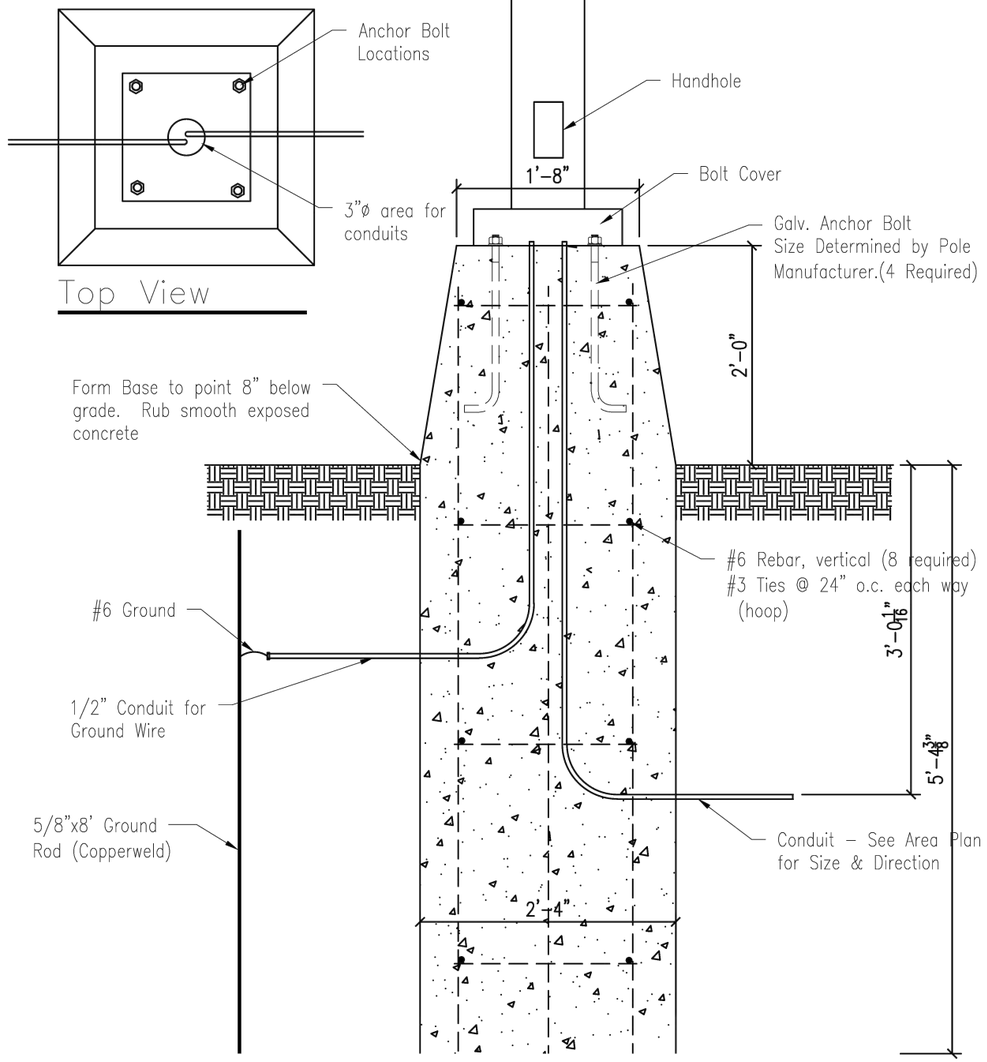
CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

I – UTILITY PLAN AND PROFILE
MANHOLE STRUCTURE DETAILS

SHEET NO.
I407



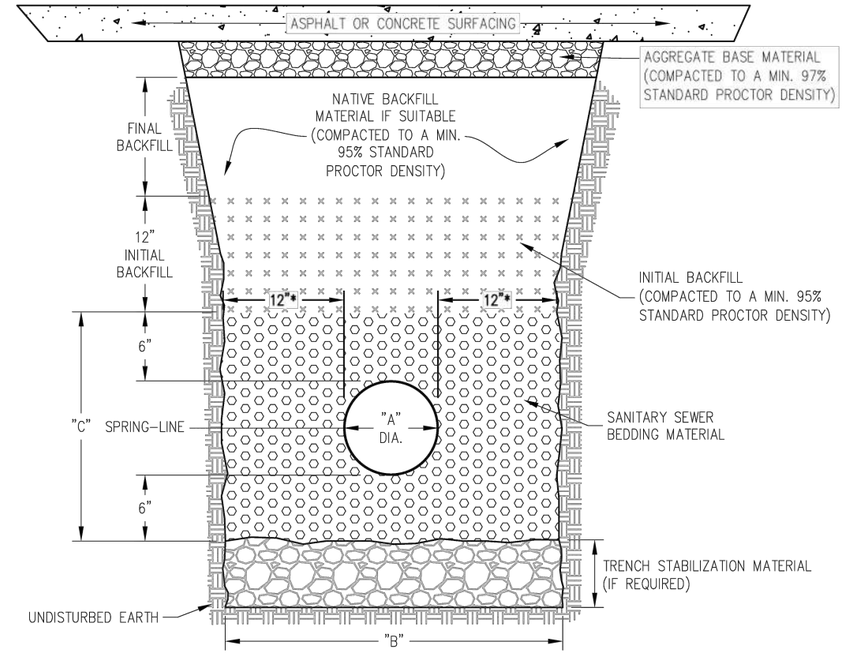
No.	Revision/Issue	Date

Large Light Base

3/4" = 1'-0"

CAD File	Sheet
Large Lite Base	
Date 12/9/2014	26-010
Scale As Noted	

SDSU



"A" PIPE SIZE DIAMETER	"B" TRENCH WIDTH	"C" TRENCH HEIGHT	TRENCH AREA	PIPE AREA	SANITARY SEWER BEDDING MAT. AREA	SANITARY SEWER BEDDING MAT. **TONS/LF
4"	28"	16"	3.11 Sq.Ft.	0.09 Sq.Ft.	3.02 Sq.Ft.	0.18
6"	30"	18"	3.75 Sq.Ft.	0.20 Sq.Ft.	3.55 Sq.Ft.	0.21
8"	32"	20"	4.44 Sq.Ft.	0.35 Sq.Ft.	4.10 Sq.Ft.	0.25
10"	34"	22"	5.19 Sq. Ft.	0.55 Sq.Ft.	4.65 Sq.Ft.	0.28
12"	36"	24"	6.00 Sq.Ft.	0.79 Sq.Ft.	5.22 Sq.Ft.	0.31
15"	39"	27"	7.31 Sq.Ft.	1.23 Sq.Ft.	6.09 Sq.Ft.	0.37
18"	42"	30"	8.75 Sq.Ft.	1.77 Sq.Ft.	6.98 Sq.Ft.	0.42
21"	45"	33"	10.31 Sq.Ft.	2.41 Sq.Ft.	7.91 Sq.Ft.	0.47
24"	48"	36"	12.00 Sq.Ft.	3.14 Sq.Ft.	8.86 Sq.Ft.	0.53
27"	51"	39"	13.81 Sq.Ft	3.98 Sq.Ft.	9.84 Sq.Ft.	0.59
30"	54"	42"	15.75 Sq.Ft.	4.91 Sq.Ft.	10.84 Sq.Ft.	0.65
36"	60"	48"	20.00 Sq.Ft.	7.07 Sq.Ft.	12.93 Sq.Ft.	0.78

* LENGTH BASED ON ONE (1) FOOT OF SANITARY SEWER PIPE.

** TONS PER LF IS BASED ON (120 LBS/FT³)

CITY OF BROOKINGS
BROOKINGS MUNICIPAL UTILITIES

SANITARY SEWER MAIN BEDDING

REVISION DATE: 11/21/2022

PLATE NUMBER: SM-01

Xrefs: xgl-1-dh01; PE & LS-White_Benjamin-SDc; c900 template

DRAWN BY: XXX JOB DATE: 2024
APPROVED: XXX JOB NUMBER: 221795
CAD DATE: 11/6/2024 12:18:44 PM
CAD FILE: \\hrgreen.com\HRG\Data\2022\221795\CAD\Campus Wide San Sewer Cat 5.5\Dwgs\U\STANDARD DETAILS.dwg

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IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

NO.	DATE	BY	REVISION DESCRIPTION

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CAMPUS WIDE, REPLACEMENT/REHAB SAN SEWER SYSTEM CAT 5.5
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA – OSE#R0323--03X/ARPA

U – DETAILS AND STANDARD PLATES
STANDARD DETAILS

SHEET NO. U101