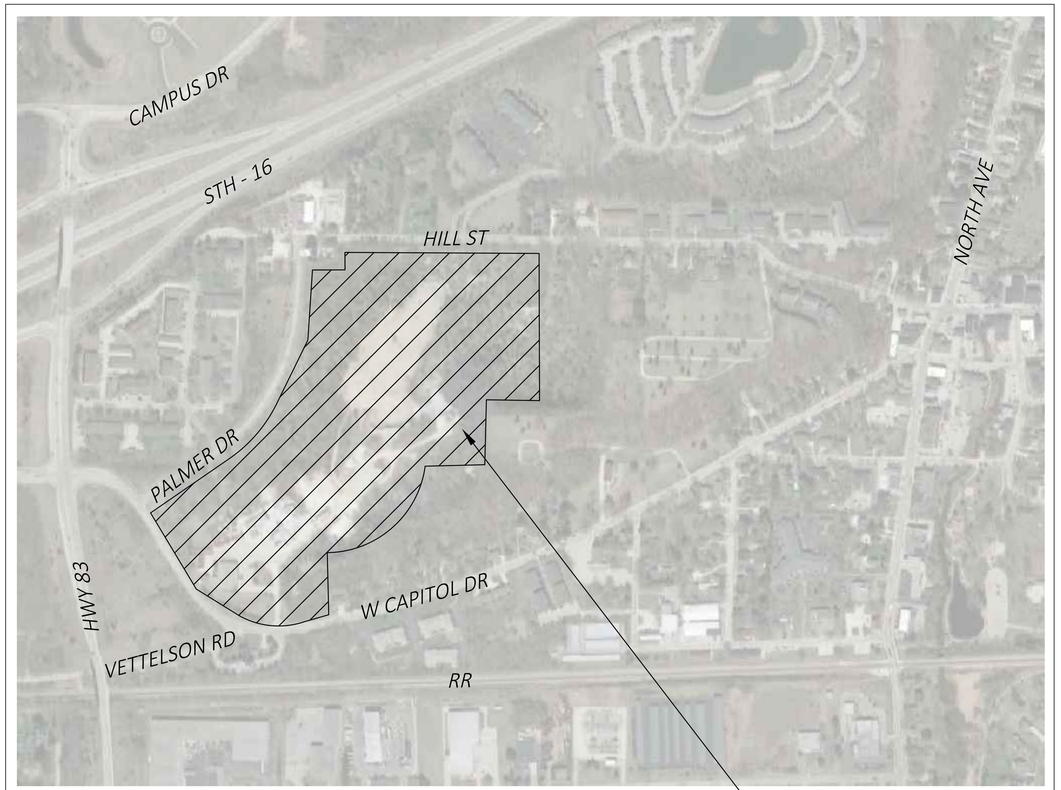
Exhibit D
Civil Design

Civil Design Plans	Pages 2-59
Storm Water Mgmt Plan	Pages 60-214

PLAN OF PROPOSED IMPROVEMENTS
FOR
THREE LEAF PARTNERS
HARTLAND APARTMENTS
VILLAGE OF HARTLAND, WI
WAUKESHA COUNTY

LOCATION MAP
NOT TO SCALE



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SHEET NO.	DESCRIPTION
C0.0	COVER
C1.0 - 1.1	TYPICAL SECTIONS
C2.0 - 2.1	PROJECT OVERVIEW
C3.0 - C3.12	GRADING & EROSION CONTROL PLANS
C4.0	OVERALL STORM SEWER PLAN
C5.0	OVERALL UTILITY PLAN
C6.0 - C6.2	CENTER STREET PLAN & PROFILE
C6.3 - C6.4	WEST DRIVE PLAN & PROFILE
C6.5 - C6.7	EAST DRIVE PLAN & PROFILE
C6.8 - C6.13	NORTH STACKED FLATS PLAN & PROFILE
C6.14 - C6.16	TOWNHOMES/CLUBHOUSE PLAN & PROFILE
C6.17 - C6.18	FIRE EXIT LANE PLAN & PROFILE
C7.0 - C7.4	WALL SECTIONS
C8.0 - C8.5	CONSTRUCTION DETAILS
C9.0 - C9.4	INTERSECTION DETAILS
C10.0 - C10.1	TURNING MOVEMENTS

EXISTING LEGEND

- BENCHMARK
- FOUND, IRON PIPE
- FIRE HYDRANT
- ENDWALL
- INLET
- MH MANHOLE
- GUY GUY WIRE
- SIGN
- GV GAS VALVE
- WV WATER VALVE
- POST POST
- UTILITY METER
- UTILITY PEDESTAL
- TREE
- POWER POLE
- DOWNSPOUT
- BOLLARD
- OH EXISTING OVERHEAD UTILITY
- E EXISTING UNDERGROUND ELECTRIC
- G EXISTING UNDERGROUND GAS
- FO EXISTING UNDERGROUND FIBER OPTIC
- W EXISTING WATER
- SS EXISTING STORM SEWER
- SAN EXISTING SANITARY SEWER
- T EXISTING UNDERGROUND TELEPHONE
- EXISTING FENCE
- EXISTING TREE LINE
- PROPERTY LINE
- EASEMENT LINE
- RIGHT OF WAY LINE

PROPOSED LEGEND

- SIGN
- HANDICAP PARKING
- ASPHALT PAVEMENT
- CONCRETE/ASPHALT COMPOSITE PAVEMENT
- CONCRETE SIDEWALK
- PAVEMENT REMOVAL
- SWALE
- STORM MH
- STORM CLEANOUT
- PIPE END SECTION
- EXTERIOR DOWNSPOUT
- SAN SANITARY LATERAL
- STO STORM SEWER PIPE
- XXXX XXXX XXXX XXXX SAWCUT PAVEMENT
- CHAIN LINK FENCE

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701 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

CLIENT
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

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SHEET TITLE
COVER

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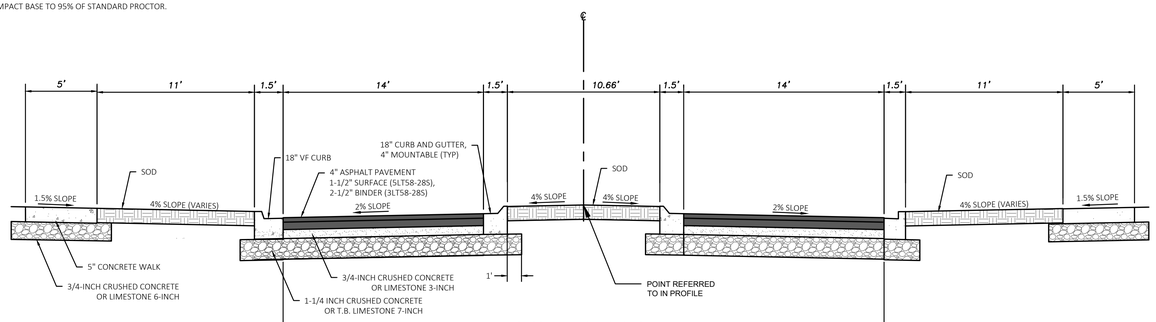
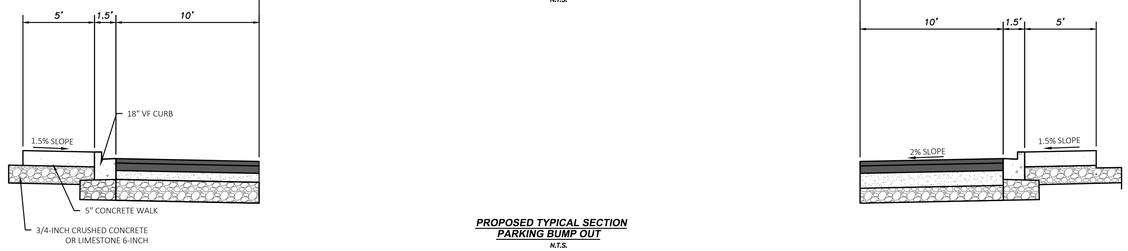
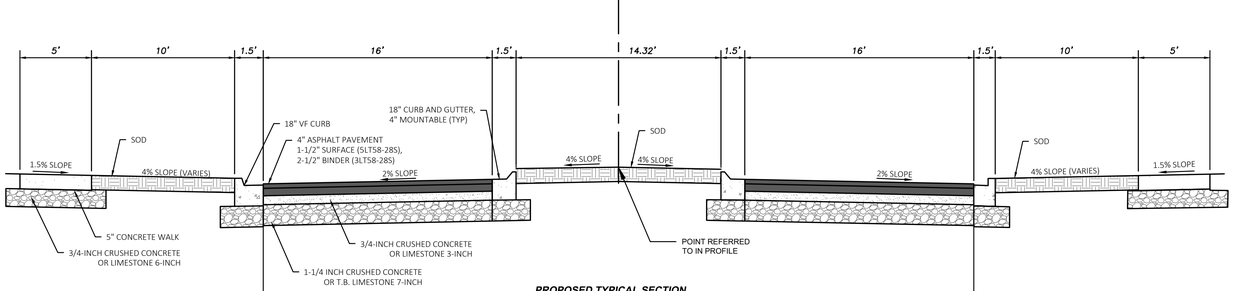
NOTES:
1. FINISHED ASPHALT 1/4" ABOVE CURB/GUTTER FLANGE
2. ADJUST MH FRAMES AND VALVE BOXES TO 1/4-INCH BELOW FINISHED GRADE.
3. 4" CONCRETE SIDEWALK EXCEPT 6" THICK THROUGH DRIVEWAY APPROACHES.
4. COMPACT BASE TO 95% OF STANDARD PROCTOR.



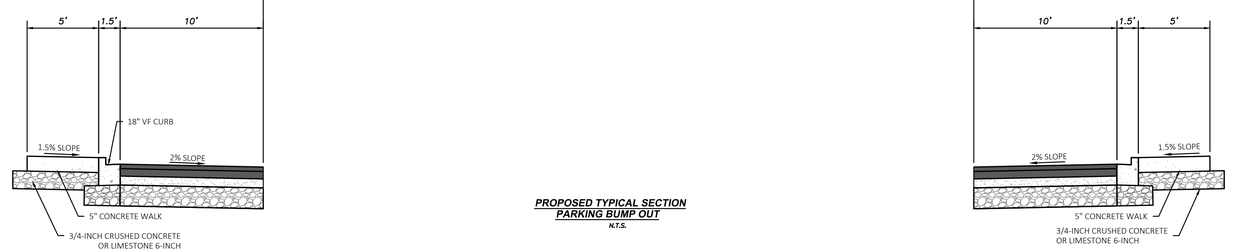
PROPOSED TYPICAL SECTION
ENTRANCE BOULEVARD
N.T.S.



PROPOSED TYPICAL SECTION
PARKING BUMP OUT
N.T.S.



PROPOSED TYPICAL SECTION
STACKED FLATS BOULEVARD
N.T.S.



PROPOSED TYPICAL SECTION
PARKING BUMP OUT
N.T.S.

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SHEET TITLE
TYPICAL SECTIONS 1 OF 2

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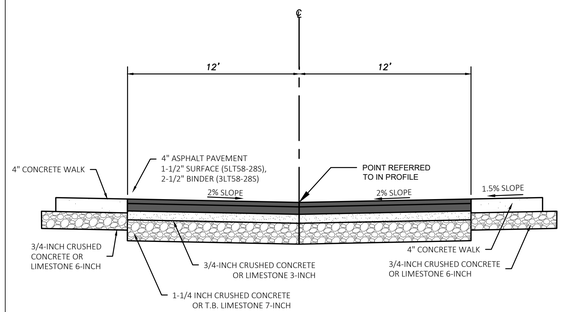
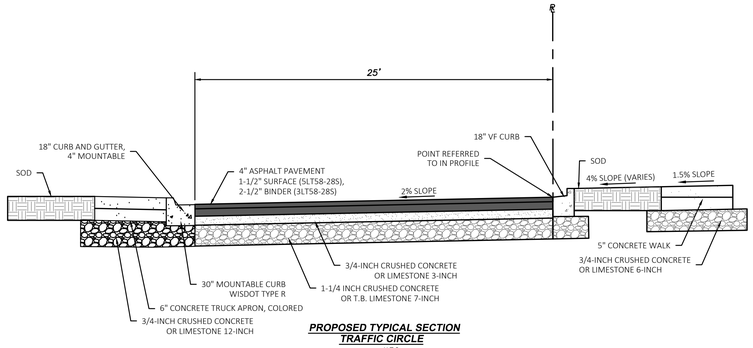
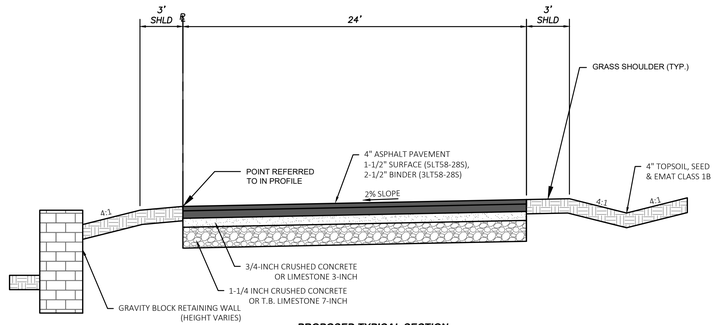


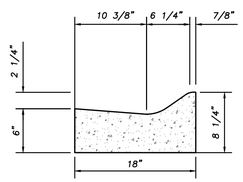
PROPOSED TYPICAL SECTION
RING ROADS
N.T.S.



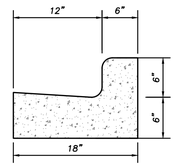
PROPOSED TYPICAL SECTION
TRAFFIC CIRCLE
N.T.S.



PROPOSED TYPICAL SECTION
FIRE LANE
N.T.S.



TYPICAL SECTION 18" CURB & GUTTER
4" MOUNTABLE
N.T.S.



TYPICAL SECTION 18" CURB & GUTTER
VERTICAL FACE
N.T.S.

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TYPICAL SECTIONS 2 OF 2

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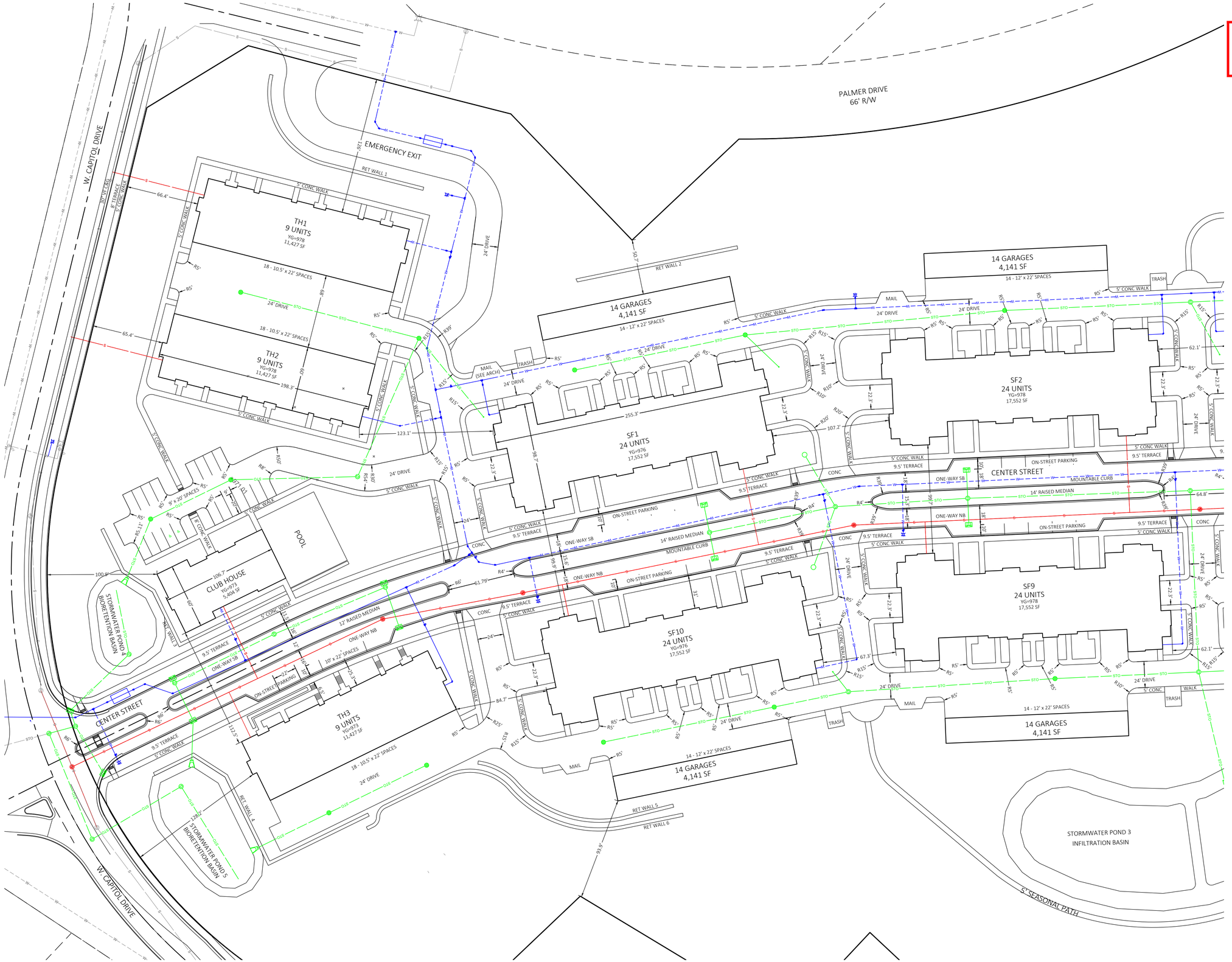

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1 OF 2

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0 40' 80'

SF 4
24 UNITS
YG=974
17,552 SF

SF 5
24 UNITS
YG=974
17,552 SF

SF 6
24 UNITS
YG=972
17,552 SF

SF 7
24 UNITS
YG=974
17,552 SF

SF8
24 UNITS
YG=976
17,552 SF

SF3
24 UNITS
YG=976
17,552 SF

SF2
24 UNITS
YG=976
17,552 SF

14 GARAGES
4,141 SF
14 - 12' x 22' SPACES

POND 1
FOREBAY
NWL=962

POND 1
INF SURFACE 962

POND 2
FOREBAY
NWL = 960

POND 2
INF SURFACE 960

OPEN SPACE

MAIL

TRASH

5' CONC WALK

24' DRIVE

28' ASPHALT

TRUCK APRON

ONE-WAY SB

ONE-WAY NB

14' RAISED MEDIAN

ON-STREET PARKING

MOUNTABLE CURB

9.5' TERRACE

5' SEASONAL PATH

CENTER STREET

DOG PARK

VILLAGE CEMETERY

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SHEET TITLE
PROJECT OVERVEW 2 OF 2

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SHEET TITLE
OVERALL GRADING PLAN 1 OF 4

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MATCH LINE - SHEET C3.0

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MATCH LINE - SHEET C3.3

0 40' 80'

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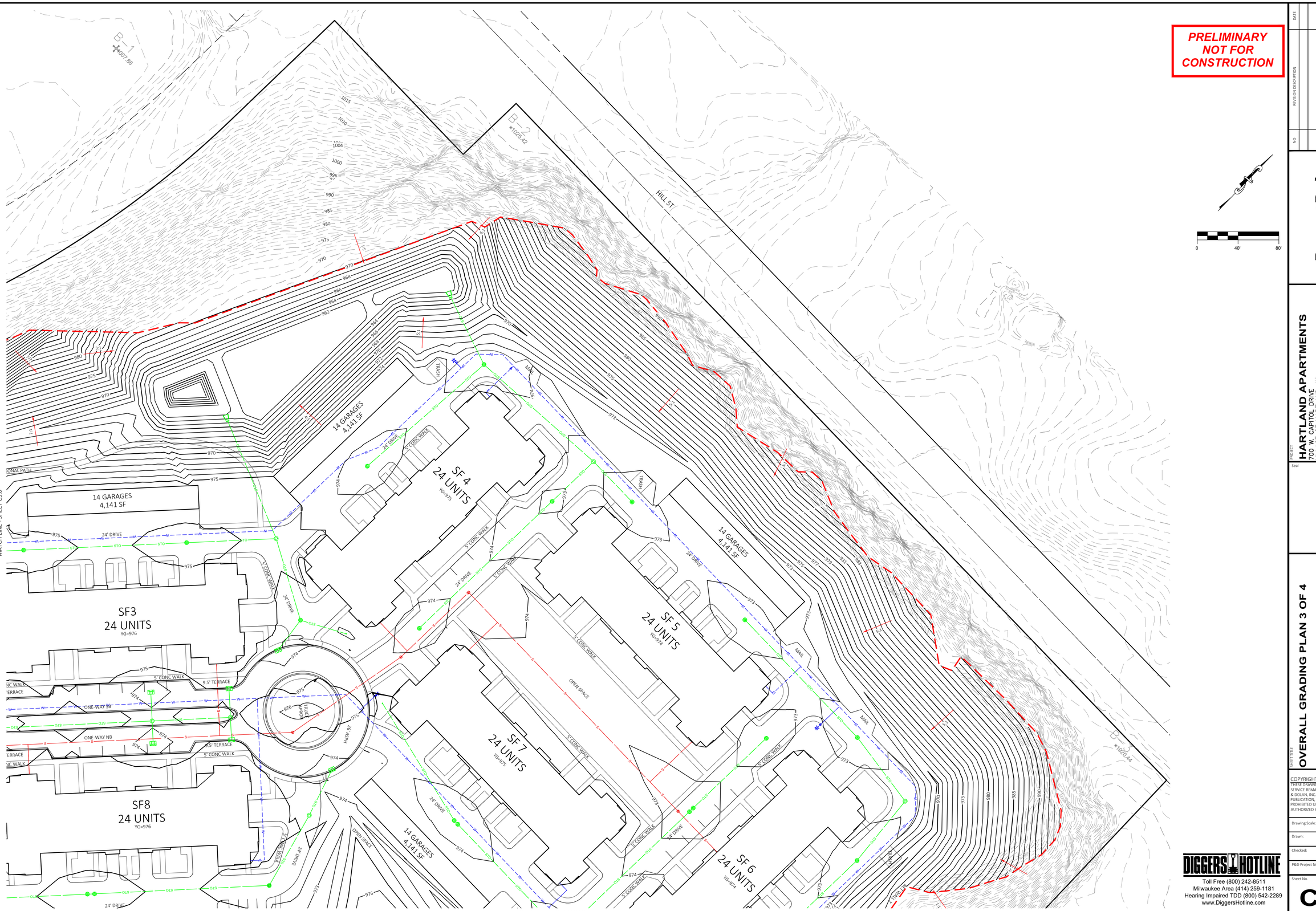

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SHEET TITLE
OVERALL GRADING PLAN 3 OF 4

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MATCH LINE - SHEET C3.1

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SF8
24 UNITS
YG=976

SF 7
24 UNITS
YG=973

SF 6
24 UNITS
YG=974

14 GARAGES
4,141 SF

14 GARAGES
4,141 SF

14 GARAGES
4,141 SF

DOG PARK

VILLAGE CEMETERY

ONE-WAY SB

ONE-WAY NB

5' CONC WALK

9.5' TERRACE

24' DRIVE

OPEN SPACE

MAIL

TRASH

0 40' 80'

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PRELIMINARY
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TH2
9 UNITS
YG=973

14 GARAGES
YG=976

22' SPACES

SF1
24 UNITS
YG=976

SF2
24 UNITS
YG=978

TH3
9 UNITS
YG=973

SF10
24 UNITS
YG=976

SF9
24 UNITS
YG=978

14 GARAGES
YG=976

24' DRIVE

5' CONC WALK

9.5' TERRACE

14' RAISED MEDIAN

MAIL

TRASH

CONC

0 20' 40'

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SHEET TITLE
DETAILED GRADING PLAN
1 OF 7

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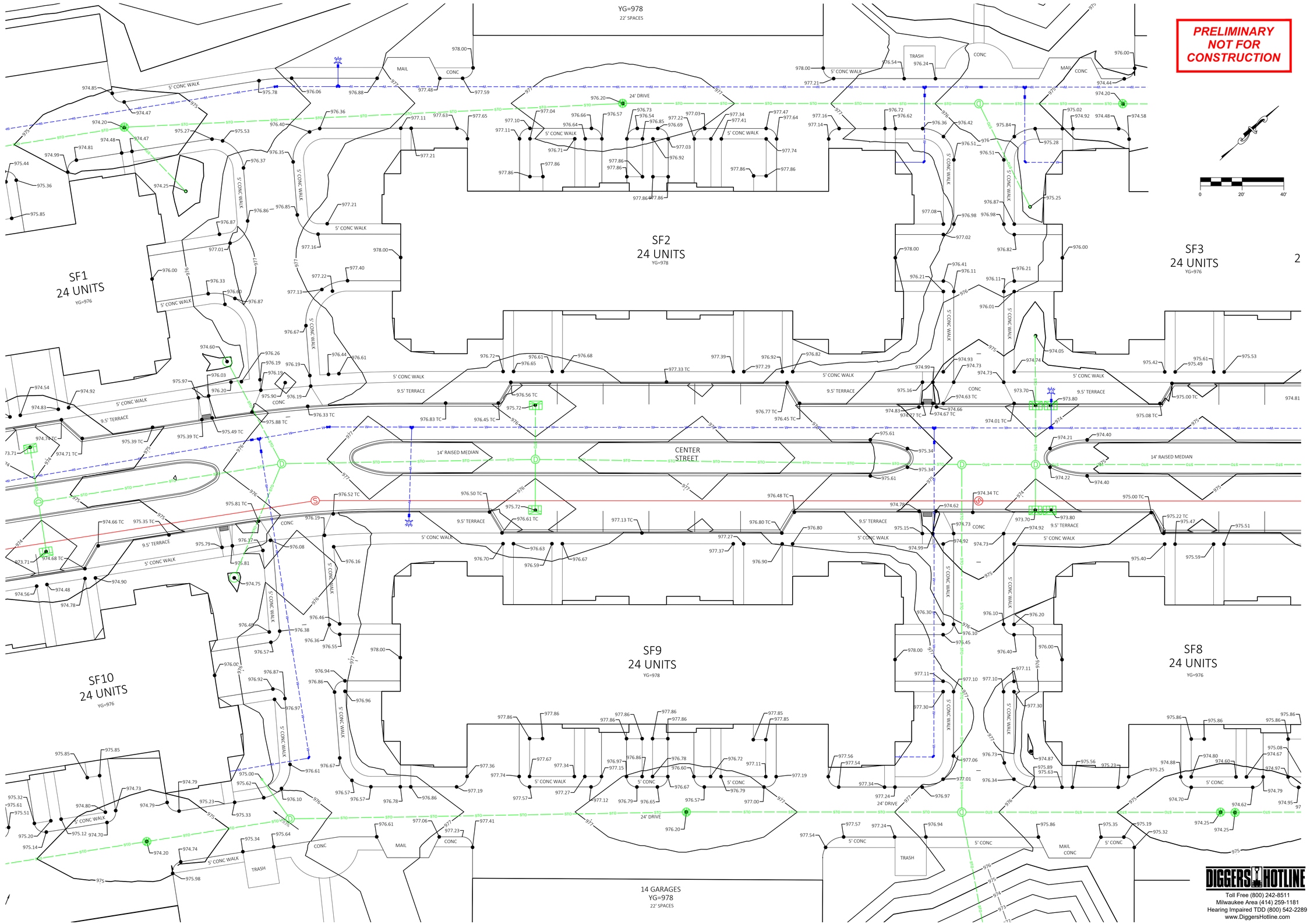

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DETAILED GRADING PLAN
2 OF 7

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14 GARAGES
YG=976
22' SPACES

SF2
24 UNITS
YG=978

SF3
24 UNITS
YG=976

SF4
24 UNITS
YG=974

SF7
24 UNITS
YG=975

SF9
24 UNITS
YG=978

SF8
24 UNITS
YG=976

14 GARAGES
YG=976
22' SPACES

14 GARAGES
YG=974
22' SPACES

OPEN SPACE

14' RAISED MEDIAN

24' DRIVE

TRASH

MAIL

CONC

5' CONC WALK

5' CONC

9.5' TERRACE

HATCH APRON

0 40' 80'

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Sheet No.
C3.6

PRELIMINARY NOT FOR CONSTRUCTION

14 GARAGES
YG=974
22' SPACES

SF 4
24 UNITS
YG=974

SF 5
24 UNITS
YG=974

SF 7
24 UNITS
YG=974

14 GARAGES
YG=974
22' SPACES

22' SPACES

24' DRIVE

5' CONC WALK

MAIL

TRASH

26" ASPH

0 40' 80'

DIGGERS HOTLINE
Toll Free (800) 242-8511
Milwaukee Area (414) 259-1181
Hearing Impaired TDD (800) 542-2289
www.DiggersHotline.com

DATE
NO REVISION DESCRIPTION

Payne+Dolan
www.waldercgroup.com
(920) 757-7559

PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

CLIENT
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

SHEET TITLE
DETAILED GRADING PLAN
4 OF 7

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Drawing Scale:	1: 40
Drawn:	NJO 09/08/2023
Checked:	CTD 09/08/2023
P&D Project No:	490686
Sheet No.	**C3.7**

PRELIMINARY NOT FOR CONSTRUCTION

SF 5
24 UNITS
YG=974

SF 6
24 UNITS
YG=972

SF 7
24 UNITS
YG=974

14 GARAGES
YG=974

14 GARAGES
YG=972

22' SPACES

24' DRIVE

5' CONC WALK

TRASH

MAIL

OPEN SPACE

0 40' 80'

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SHEET TITLE
DETAILED GRADING PLAN
5 OF 7

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P&D Project No:	490686
Sheet No.	**C3.8**

PRELIMINARY NOT FOR CONSTRUCTION

W. CAPITOL DRIVE

30" VF C&G

8' TERRACE

5' CONC WALK

EMERGENCY EXIT

RET WALL 1

RET WALL 2

TH1
9 UNITS
YG=978
11,427 SF

TH2
9 UNITS
YG=978
11,427 SF

14 GARAGES
YG=976

SF1
24 UNITS
YG=976

SF1
24 UNITS
YG=976

22' SPACES

24' DRIVE

5' CONC WALK

TRASH

CONC

MAIL

0 40' 80'

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700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

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SHEET TITLE
DETAILED GRADING PLAN
6 OF 7

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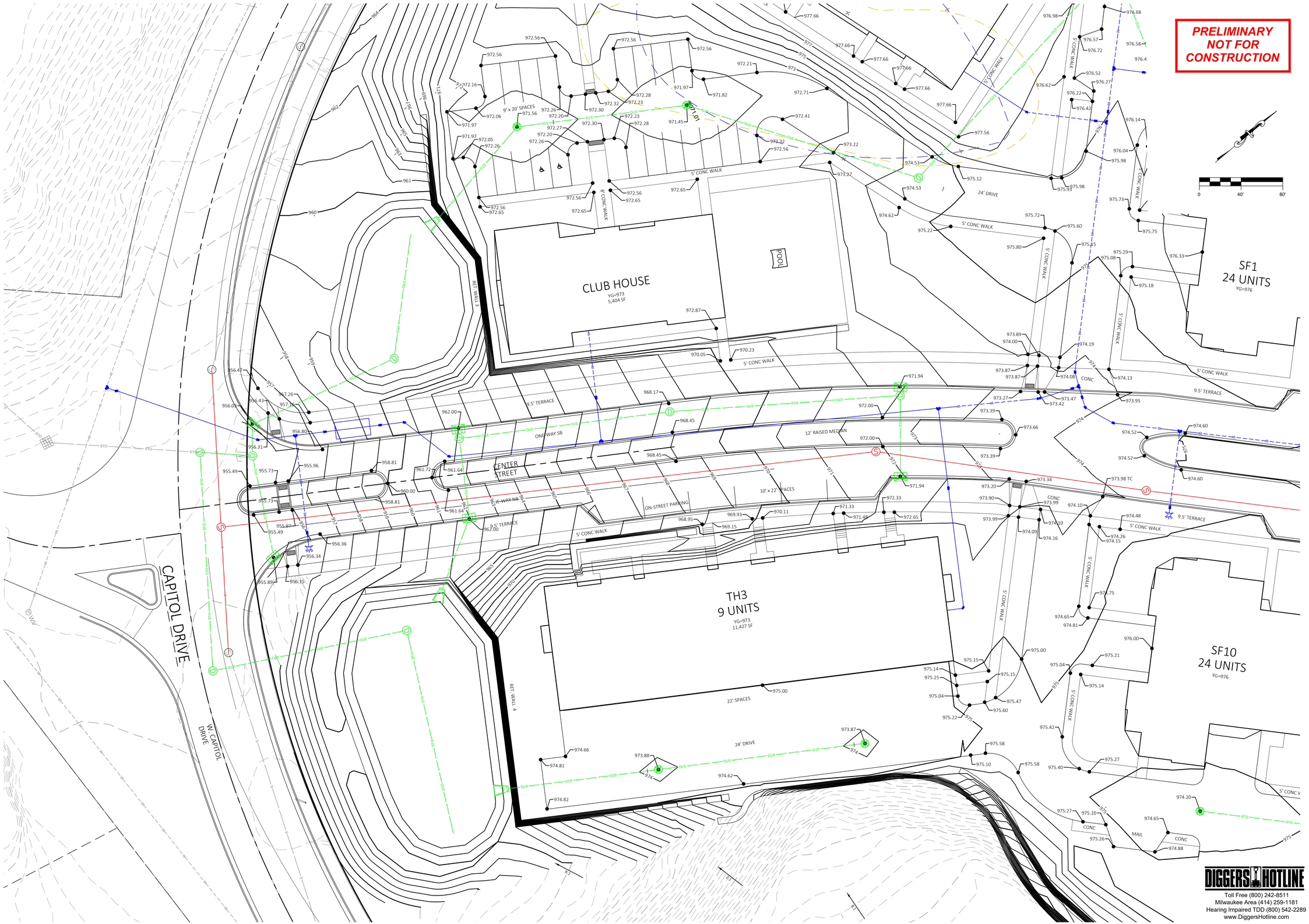
P&D Project No:	490686
Sheet No.	**C3.9**



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DETAILED GRADING PLAN
7 OF 7

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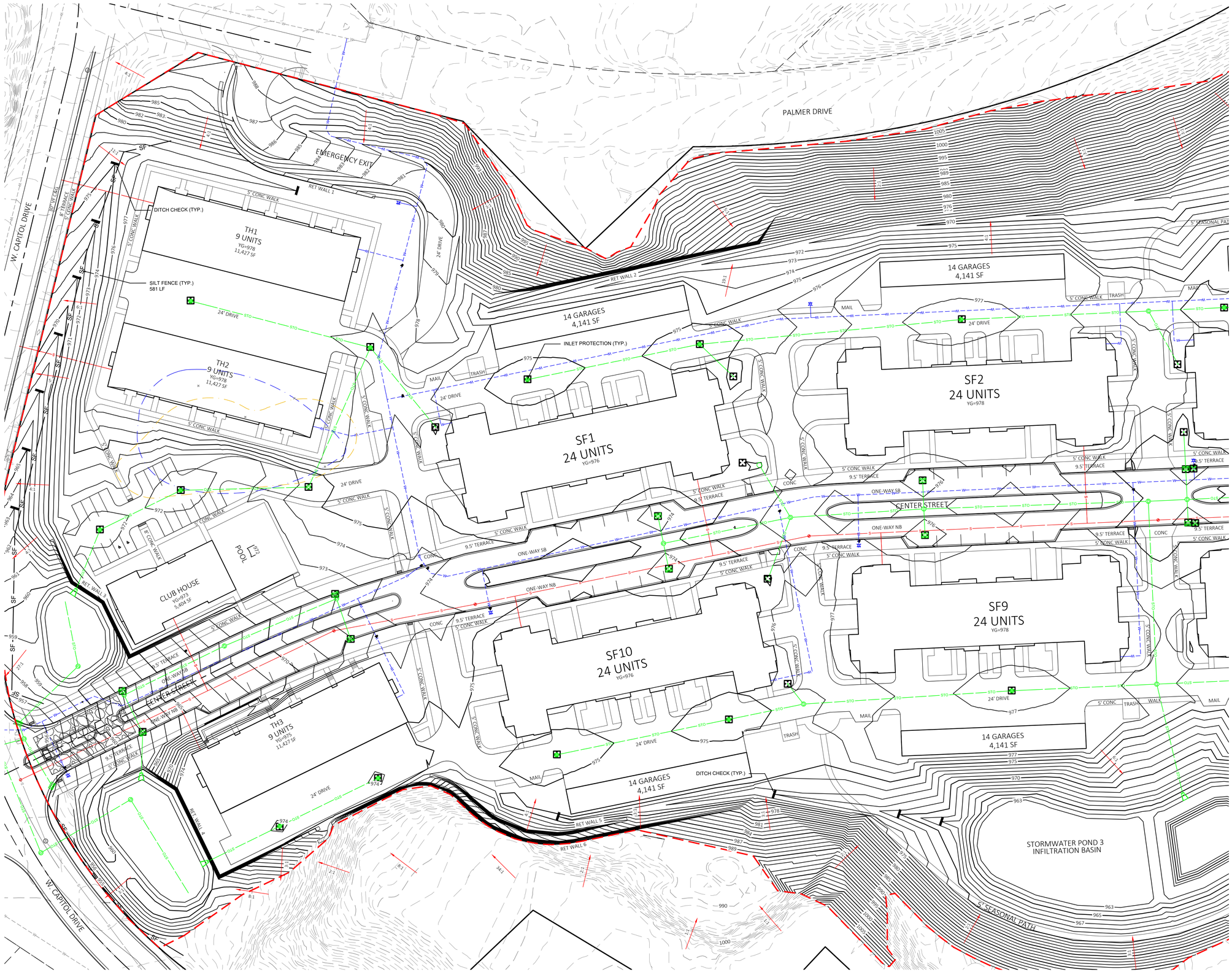
P&D Project No:	490686
Sheet No.	**C3.10**



PRELIMINARY NOT FOR CONSTRUCTION

0 40' 80'

TOPO LINEWORK

- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATER SERVICE
- EXISTING OVERHEAD WIRE
- EXISTING GAS LINE
- EXISTING TELEPHONE LINE

TOPO SYMBOLS

- EXISTING SQUARE INLET
- EXISTING CURB INLET
- EXISTING SIGN
- EXISTING WATER VALVE
- EXISTING HYDRANT
- EXISTING GUY WIRE
- EXISTING LIGHT POLE
- EXISTING STORM MANHOLE
- EXISTING UTILITY POLE
- EXISTING TREE
- EXISTING BUSH

LEGEND

- INLET PROTECTION
- DRAINAGE ARROW
- EROSION MAT
- TRACKING PAD
- PERIMETER EROSION CONTROL
- GRADING LIMITS (21.92 Ac)
- DITCH CHECK

CONSTRUCTION ACTIVITY AND SEQUENCE

ANTICIPATED DISTURBANCE: X.XXX Ac
SITE CONSTRUCTION: MONTH 202X TO MONTH 202X, DURATION: XX MONTHS

1. BEGIN CONSTRUCTION AFTER RECEIPT OF ALL CITY, COUNTY AND WDNR PERMITS
2. INSTALL DETENTION PONDS AND GRADE RIGHT-OF-WAY AND DRAINAGE SWALES XX/XX/202X
3. STABILIZE DRAINAGE SWALES WITHIN 7 DAYS OF FINAL GRADING
2. SERVICE LATERALS AND UTILITY EXTENSION WORK XX/XX/202X – XX/XX/202X
3. REPLACE CURBS, SIDEWALK AND COMPLETE MILL & OVERLAY
4. COMPLETE PERMANENT RESTORATION OF ALL REMAINING DISTURBED AREAS BY XX/XX/202X
5. ESTABLISHMENT PERIOD THRU XX/XX/202X

MAINTENANCE PLAN

1. ALL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE INSPECTED FOR FUNCTIONAL EFFECTIVENESS FOLLOWING EVERY 1/2-INCH RAIN EVENT AND IN NO CASE LESS THAN ONCE PER WEEK. ANY NEEDED REPAIRS WILL BE MADE IMMEDIATELY TO ENSURE THE DEVICE FUNCTIONS AS DESIGNED.
2. ALL SEEDED AREAS WILL BE WATERED, FERTILIZED, MULCHED AND RE-SEEDED AS NECESSARY TO MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER.
3. ANY SEDIMENT REACHING A PUBLIC OR PRIVATE STREET SHALL BE REMOVED BY STREET CLEANING BEFORE THE END OF EACH DAY OR AS NECESSARY TO PREVENT DEBRIS FROM ENTERING A STORM SEWER, DITCH, OR WATERWAY.
4. IN THE EVENT CONSTRUCTION ACTIVITIES RESULT IN SEVERE DUST CONDITIONS, SEE WDNR TECHNICAL STANDARD 1068.
5. IN THE EVENT OF DEWATERING ACTIVITIES, FOLLOW WDNR TECHNICAL STANDARD 1061. ALL WATER DISCHARGED FROM THE DEWATERING EQUIPMENT MUST BE FILTERED BY A TYPE II GEOTEXILE BAG SIZED FOR THE PUMP DISCHARGE FLOW RATE.
6. SEDIMENT TRAP DESIGN TO BE IN ACCORDANCE WITH WDNR TECHNICAL STANDARD 1063
7. DITCH CHECKS TO BE PLACED AT EVERY 2' OF VERTICAL DROP IN ELEVATION OR CLOSER. DITCH CHECK AND EMAT INSTALLATION SHOULD BE PER WDNR TECHNICAL STANDARD 1062.
8. ALL EXPOSED SOIL AREAS NOT DISTURBED FOR UP TO SEVEN DAYS MUST BE IMMEDIATELY STABILIZED OR PERMANENTLY RESTORED IN ACCORDANCE WITH THE WDNR BMP'S.
9. TEMPORARY STABILIZATION MATERIALS SHALL BE MULCHED AND SHALL BE APPLIED AND ANCHORED AS SPECIFIED IN WI DNR TECHNICAL STANDARD 1058. FOR AREAS NOT STABILIZED BY OCT. 15, APPLY TEMPORARY SEEDING WITH ANIONIC POLYACRYLAMIDE AS SPECIFIED IN WI DNR TECHNICAL STANDARD 1050 & 1059.
10. ALL SIGNIFICANT CHANGES TO THIS SCHEDULE SHALL BE PROVIDED TO THE WDNR AND LOCAL MUNICIPALITY PRIOR TO DEVIATION.
11. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN POSITIVE DRAINAGE TO THE SEDIMENT CONTROL DEVICES AT ALL TIMES DURING CONSTRUCTION.
12. ALL EROSION CONTROL BMP DEVICES CAN BE REMOVED ONCE 100% OF THE SITE HAS BEEN VEGETATED TO 70% COVERAGE PER WDNR TECHNICAL STANDARDS.

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Drawing Scale:	1: 40
Drawn:	GME 09/08/2023
Checked:	HAM 09/08/2023
P&D Project No:	490686
Sheet No.	C3.11

PRELIMINARY
NOT FOR
CONSTRUCTION

14 GARAGES
4,141 SF

SF 5
24 UNITS
YG=974

SF 4
24 UNITS
YG=975

SF 6
24 UNITS
YG=974

SF 7
24 UNITS
YG=975

SF3
24 UNITS
YG=976

SF8
24 UNITS
YG=976

OPEN SPACE

VILLAGE CEMETERY

DOG PARK

MAIL

TRASH

5' CONC WALK

24' DRIVE

26' ASPH

URUCE APRON

9.5' TERRACE

ONE WAY NB

ONE WAY SB

5' COPPERCLIFF

5' SEASONAL PATH

LEGEND

- INLET PROTECTION
- DRAINAGE ARROW
- EROSION MAT
- TRACKING PAD
- SF — PERIMETER EROSION CONTROL
- GRADING LIMITS (21.92 Ac)
- DITCH CHECK

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Drawing Scale:	1: 40
Drawn:	GME 09/08/2023
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P&D Project No:	490686
Sheet No.	C3.12

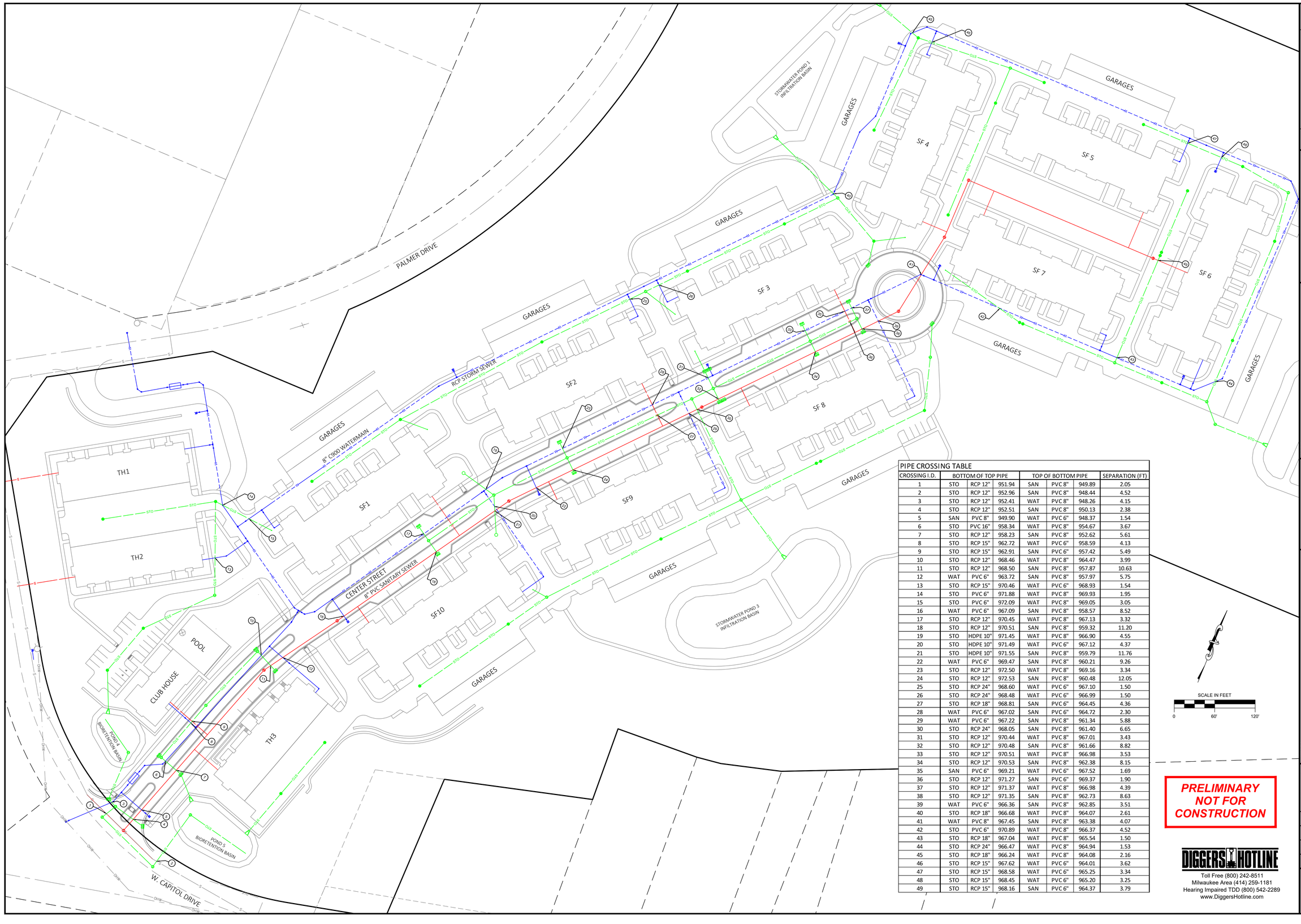
Station Line	To Line	Len (ft)	Drng Area Incr (ac)	Drng Area Total (ac)	Rnoff coeff (C)	Area x C Incr	Area x C Total	Tc Inlet (min)	Tc Syst (min)	Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe Size (in)	Pipe Slope (%)	Invert Elev Dn (ft)	Invert Elev Up (ft)	HGL Elev Dn (ft)	HGL Elev Up (ft)	Grnd / Rim Elev Dn (ft)	Grnd / Rim Elev Up (ft)	Line ID
21	18	49.748	0.09	0.09	0.76	0.07	0.07	6.0	6.0	6.8	0.47	4.13	1.71	12	1.35	952.24	952.91	952.89	953.19	955.24	955.91	CB4B-MH4
20	19	75.000	0.00	0.00	0.00	0.00	0.00	6.0	6.0	0.0	1.37	2.63	3.20	12	0.55	952.84	953.25	953.42	953.75	956.04	957.19	OS5-CB4A
19	18	15.121	0.10	0.10	0.77	0.08	0.08	6.0	6.7	6.5	1.87	7.15	3.69	12	4.03	952.23	952.84	952.89	953.42	955.24	956.04	CB4A-MH4
18	End	25.234	0.00	0.19	0.00	0.00	0.15	6.0	7.4	6.3	2.28	3.17	4.25	12	0.79	952.04	952.24	952.69	952.89	958.02	955.24	MH4-MH1
17	16	95.000	0.00	0.00	0.00	0.00	0.00	6.0	6.0	0.0	1.16	4.09	3.91	12	1.32	953.00	954.25	953.36	954.70	957.89	958.00	OS3-MH2
16	End	104.994	0.00	0.00	0.00	0.00	0.00	6.0	7.1	0.0	1.16	9.56	3.04	18	0.83	951.63	952.50	952.03	952.90	958.02	957.89	MH2-MH1
15	14	99.790	0.62	0.62	0.50	0.31	0.31	6.0	6.0	6.8	2.11	9.46	4.35	12	7.05	963.83	970.87	964.40	971.49	973.88	973.87	CB58-CB57
14	End	73.385	0.72	1.34	0.44	0.32	0.63	6.0	6.6	6.6	4.11	17.14	4.82	15	7.05	958.41	963.58	959.23	964.40	959.93	973.88	CB57-FES2
13	8	4.500	0.49	0.49	0.65	0.32	0.32	6.0	6.0	6.8	2.17	5.04	2.76	12	2.00	958.91	959.00	960.12	960.14	962.08	962.00	CB6A-MH6
12	10	4.035	0.73	0.73	0.64	0.47	0.47	6.0	6.0	6.8	3.18	9.09	3.78	15	1.98	968.61	968.69	969.56	969.41	972.03	971.94	CB8A-MH8
11	10	39.004	0.53	0.53	0.67	0.36	0.36	6.0	6.0	6.8	2.42	2.92	2.45	15	0.21	968.61	968.69	969.56	969.62	972.03	971.94	CB8B-MH8
10	9	110.868	0.00	1.26	0.00	0.00	0.82	6.0	6.3	6.7	5.49	11.65	5.53	15	3.26	965.00	968.61	965.94	969.56	968.25	972.03	MH8-MH7
9	8	101.709	0.00	1.26	0.00	0.00	0.82	6.0	6.7	6.5	5.35	15.94	4.89	15	6.10	958.80	965.00	960.12	965.94	962.08	968.25	MH7-MH6
8	7	38.500	0.00	1.75	0.00	0.00	1.14	6.0	7.1	6.4	7.25	7.57	4.61	18	0.52	958.35	958.55	959.62	959.78	962.00	962.08	MH6-CB6B
7	End	36.935	0.41	2.16	0.75	0.31	1.45	6.0	7.3	6.3	9.12	12.34	4.84	24	0.30	958.02	958.13	959.10	959.38	959.79	962.00	CB6B-FES1
6	4	93.652	0.02	0.02	0.30	0.01	0.01	6.0	6.0	6.8	0.04	0.40	0.40	6	0.50	971.83	972.30	972.47	972.49	976.67	974.80	CB53A-CB53
5	4	169.000	0.37	0.37	0.90	0.33	0.33	6.0	6.0	6.8	2.27	2.51	3.62	12	0.50	973.19	974.03	973.93	974.77	976.67	977.03	CB52-CB53
4	3	139.093	0.54	0.93	0.73	0.39	0.73	6.0	13.5	4.7	3.45	4.55	4.07	15	0.50	970.38	971.07	971.19	971.89	974.29	976.67	CB53-MH56
3	2	116.417	0.00	0.93	0.00	0.00	0.73	6.0	14.1	4.6	3.37	7.92	3.98	15	1.50	968.18	969.93	969.10	970.67	971.45	974.29	MH56-CB55
2	1	82.000	0.61	1.54	0.66	0.40	1.14	6.0	14.6	4.5	5.13	17.80	5.18	15	7.60	961.95	968.18	962.91	969.10	971.56	971.45	CB55-CB54
1	End	58.574	0.19	1.73	0.71	0.13	1.27	6.0	14.9	4.5	5.69	17.80	5.59	15	7.60	957.50	961.95	958.46	962.91	959.02	971.56	CB54-FES3

Station Line	To Line	Len (ft)	Drng Area Incr (ac)	Drng Area Total (ac)	Rnoff coeff (C)	Area x C Incr	Area x C Total	Tc Inlet (min)	Tc Syst (min)	Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe Size (in)	Pipe Slope (%)	Invert Elev Dn (ft)	Invert Elev Up (ft)	HGL Elev Dn (ft)	HGL Elev Up (ft)	Grnd / Rim Elev Dn (ft)	Grnd / Rim Elev Up (ft)	Line ID
18	15	54.549	0.32	0.32	0.85	0.27	0.27	6.0	6.0	6.8	1.85	2.51	3.43	12	0.50	968.93	969.20	969.60	969.84	973.29	972.20	CH37-MH36
17	16	160.140	0.28	0.28	0.79	0.22	0.22	6.0	6.0	6.8	1.51	2.25	2.98	12	0.40	969.65	970.37	970.32	970.94	972.73	973.37	CB50-CB51
16	15	56.227	0.35	0.63	0.78	0.27	0.49	6.0	7.6	6.2	3.06	4.04	3.62	15	0.39	969.18	969.40	969.99	970.21	973.29	972.73	CB51-MH36
15	13	143.519	0.00	0.95	0.00	0.00	0.77	6.0	7.9	6.1	4.65	7.44	4.45	18	0.50	967.71	968.43	968.57	969.29	973.20	973.29	MH36-CB35
14	13	151.635	0.50	0.50	0.84	0.42	0.42	6.0	6.0	6.8	2.86	3.23	2.97	15	0.25	969.57	969.95	970.48	970.86	973.20	973.20	CB34-MH35
13	End	73.766	0.21	1.66	0.85	0.18	1.36	6.0	8.8	5.8	7.91	26.76	5.76	18	6.49	962.40	967.19	963.49	968.28	963.79	973.20	CB35-FES6
12	7	160.000	0.48	0.48	0.78	0.37	0.37	6.0	6.0	6.8	2.55	3.23	2.32	15	0.25	970.55	970.95	971.70	971.93	974.20	974.20	CB16-CB17
11	9	36.745	0.11	0.11	0.74	0.08	0.08	6.0	6.0	6.8	0.55	1.95	0.90	12	0.30	970.56	970.67	971.35	971.36	974.24	973.67	CB24-CB23
10	9	46.744	0.03	0.03	0.30	0.01	0.01	6.0	6.0	6.8	0.06	0.39	0.82	6	0.49	971.02	971.25	971.35	971.40	974.24	973.75	CB23A-CB23
9	1	83.509	0.17	0.31	0.70	0.12	0.21	6.0	8.5	5.9	1.23	2.53	3.20	12	0.50	970.14	970.56	970.63	971.05	975.52	974.24	CB23-MH22
8	7	42.539	0.03	0.03	0.30	0.01	0.01	6.0	6.0	6.8	0.06	0.39	1.37	6	0.49	971.54	971.75	971.70	971.87	974.20	974.25	CB17A-CB17
7	6	239.396	0.54	1.05	0.79	0.43	0.61	6.0	8.3	6.0	4.83	5.21	3.35	18	0.25	969.71	970.30	970.85	971.44	976.20	974.20	CB17-CB18
6	4	170.860	0.42	1.47	0.85	0.36	1.17	6.0	9.6	5.6	6.49	11.21	2.94	24	0.25	968.79	969.21	970.25	970.43	975.58	976.20	CB18-MH19
5	4	55.219	0.02	0.02	0.30	0.01	0.01	6.0	6.0	6.8	0.04	0.39	1.29	6	0.49	972.48	972.75	972.59	972.86	975.58	975.25	CB19A-MH19
4	3	69.140	0.00	1.49	0.00	0.00	1.17	6.0	10.9	5.2	6.15	11.21	2.63	24	0.25	968.62	968.79	970.07	970.13	974.20	975.58	MH19-CB20
3	2	160.000	0.52	2.01	0.83	0.43	1.60	6.0	11.4	5.1	8.21	11.31	3.44	24	0.25	968.22	968.62	969.73	969.97	974.20	974.20	CB20-CB21
2	1	87.786	0.34	2.35	0.84	0.29	1.89	6.0	12.4	4.9	9.30	11.32	4.02	24	0.25	968.00	968.22	969.38	969.60	975.52	974.20	CB21-MH22
1	End	125.020	0.00	2.66	0.00	0.00	2.10	6.0	12.8	4.8	10.15	21.00	6.56	18	4.00	962.24	967.24	963.47	968.47	963.79	975.52	MH22-FES5

Station Line	To Line	Len (ft)	Drng Area Incr (ac)	Drng Area Total (ac)	Rnoff coeff (C)	Area x C Incr	Area x C Total	Tc Inlet (min)	Tc Syst (min)	Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe Size (in)	Pipe Slope (%)	Invert Elev Dn (ft)	Invert Elev Up (ft)	HGL Elev Dn (ft)	HGL Elev Up (ft)	Grnd / Rim Elev Dn (ft)	Grnd / Rim Elev Up (ft)	Line ID
33	28	6.880	0.29	0.29	0.80	0.23	0.23	6.0	6.0	6.8	1.58	4.29	3.09	12	1.45	970.70	970.80	971.46	971.33	973.70	973.80	CB13E-CB13B
32	17	7.121	0.29	0.29	0.80	0.23	0.23	6.0	6.0	6.8	1.58	4.22	3.18	12	1.40	970.70	970.80	971.41	971.33	973.70	973.80	CB13D-CB13A
31	29	24.306	0.54	0.54	0.75	0.41	0.41	6.0	6.0	6.8	2.76	2.98	3.94	12	0.70	970.54	970.71	971.41	971.52	974.67	973.71	CB9B-MH9
30	29	25.864	0.52	0.52	0.73	0.38	0.38	6.0	6.0	6.8	2.59	2.89	3.71	12	0.66	970.54	970.71	971.41	971.51	974.67	973.71	CB9A-MH9
29	14	118.084	0.00	1.06	0.00	0.00	0.78	6.0	6.1	6.8	5.30	5.72	3.55	18	0.30	969.69	970.04	970.89	971.20	976.55	974.67	MH9-MH10
28	9	21.976	0.29	0.58	0.80	0.23	0.46	6.0	6.1	6.8	3.15	3.72	5.12	12	1.09	970.46	970.70	971.17	971.46	974.14	973.70	CB13B-MH13
27	26	160.000	0.47	0.47	0.69	0.32	0.32	6.0	6.0	6.8	2.21	3.23	2.46	15	0.25	970.55	970.95	971.49	971.74	974.20	974.20	CB25-CB26
26	7	59.705	0.52	0.99	0.84	0.44	0.76	6.0	7.5	6.2	4.74	5.34	3.41	18	0.26	970.12	970.30	971.22	971.40	975.59	974.20	CB26-MH27
25	24	49.932	0.05	0.05	0.71	0.04	0.04	6.0	6.0	6.8	0.24	1.82	1.34	12	0.26	970.55	970.68	970.87	970.93	974.63	973.68	CB33-MH32
24	23	79.239	0.00	0.05	0.00	0.00	0.04	6.0	8.7	5.8	0.21	1.79	0.76	12	0.25	970.35	970.55	970.84	970.87	973.98	974.63	MH32-CB31
23	22	171.533	0.31	0.36	0.80	0.25	0.28	6.0	13.1	4.6	1.36	2.64	2.99	12	0.55	969.41	970.35	970.07	970.84	974.25	973.98	CB31-CB30A
22	21	6.875	0.29	0.65	0.83	0.24	0.52	6.0	14.3	4.6	2.40	3.59	4.06	12	1.02	969.34	969.41	970.09	970.07	974.25	974.25	CB30A-CB30
21	1	124.252	0.29	0.94	0.83	0.24	0.76	6.0	14.3	4.6	3.49	5.68	4.42	15	0.77	968.38	969.34	969.16	970.09	976.36	974.25	CB30-MH29
20	10	21.992	0.36	0.36	0.71	0.26	0.26	6.0	6.0	6.8	1.74	2.52	2.66	12	0.50	970.61	970.72	971.42	971.46	974.63	973.72	CB14B-MH14
19	10	28.320	0.36	0.36	0.71	0.26	0.26	6.0	6.0	6.8	1.74	2.22	2.62	12	0.39	970.61	970.72	971.42	971.48	974.63	973.72	CB14A-MH14
18	17	33.277	0.02	0.02	0.30	0.01	0.01	6.0	6.0	6.8	0.04	0.53	1.01	6	0.90	971.20	971.50	971.41	971.60	973.70	974.00	CB13C-CB13A
17	9	28.320	0.29	0.60	0.80	0.23	0.47	6.0	8.7	5.8	2.74	3.28	4.64	12	0.85	970.46	970.70	971.16	971.41	974.14	973.70	CB13A-MH13
16	14	59.133	0.02	0.02	0.30	0.01	0.01	6.0	6.0	6.8	0.04	1.99	1.42	10	0.83	971.43	971.92	971.51	972.01	976.55	974.75	CB10B-MH10
15	14	55.512	0.02	0.02	0.30	0.01	0.01	6.0	6.0	6.8	0.04	1.71	1.31	10	0.61	971.43	971.77	971.52	971.86	976.55	974.60	CB10A-MH10
14	3	121.786	0.00	1.10	0.00	0.00	0.80	6.0	19.1	3.9	3.11	5.21	2.02	18	0.25	969.39	969.69	970.73	970.82	976.67	976.55	MH10-MH11
13	11	28.274	0.14	0.14	0.70	0.10	0.10	6.0	6.0	6.8	0.67	2.26	1.01	12	0.40	971.47	971.58	972.31	972.32	975.01	974.58	CB15A-MH15
12	11	22.000	0.19	0.19	0.76	0.14	0.14	6.0	6.0	6.8	0.98	2.52	1.48	12	0.50	971.47	971.58	972.31	972.32	975.01	974.58	CB15B-MH15
11	10	76.841	0.00	0.33	0.00	0.00	0.24	6.0	6.6	6.6	1.59	1.77	2.55	12	0.25	971.28	971.47	972.02	972.21	974.63	975.01	MH15-MH14
10	9	159.995	0.00	1.05	0.00	0.00	0.75	6.0	7.2	6.3	4.78	5.25	3.24	18	0.25	969.71	970.11	970.90	971.26	974.14	974.63	MH14-MH13
9	2	35.400	0.00	2.23	0.00	0.00	1.69	6.0	8.8	5.8	9.79	11.41	4.08	24	0.25	969.12	969.21	970.55	970.64	974.85	974.14	MH13-MH12
8	7	23.339	0.02	0.02	0.30	0.01	0.01	6.0	6.0	6.8	0.04	0.40	0.54	6	0.51	970.45	970.57	970.73	970.74	975.59	973.07	CB27A-MH27
7	6	190.085	0.00	1.01	0.00	0.00	0.77	6.0	7.9	6.1	4.67	5.28	3.10	18	0.25	968.97	969.45	970.22	970.59	976.20	975.59	MH27-CB28
6	1	132.248	0.48	1.49	0.85	0.41	1.18	6.0	9.1	5.7	6.72	8.12	5.14	18	0.60	968.18	968.97	969.22	970.01	976.36	976.20	CB28-MH29
5	3	24.297	0.35	0.35	0.71	0.25	0.25	6.0	6.0	6.8	1.69	2.50	3.42	12	0.49	972.60	972.72	973.20	973.32	976.67	975.72	CB11B-MH11
4	3	25.970	0.34	0.34	0.71	0.24	0.24	6.0	6.0	6.8	1.65	2.42	3.32	12	0.46	972.60	972.72	973.20	973.32	976.67	975.72	CB11A-MH11
3	2	204.610	0.00	1.79	0.00	0.00	1.29	6.0	19.8	3.8	4.92	5.24	3.29	18	0.25	968.88	969.39	970.08	970.56	974.85	976.67	MH11-MH12
2	1	166.798	0.00	4.02	0.00	0.00	2.97	6.0	20.6	3.7	11.13	15.17	4.85	24	0.45	967.63	968.38	969.16	969.63	976.36	974.85	MH12-MH29
1	End	102.422	0.00	6.45	0.00	0.00	4.91	6.0	21.1	3.7	18.14	46.61	7.02	24	4.25	963.28	967.63	964.81	969.16	965.33	976.36	MH29-FES4

Station Line	To Line	Len (ft)	Drng Area Incr (ac)	Drng Area Total (ac)	Rnoff coeff (C)	Area x C Incr	Area x C Total	Tc Inlet (min)	Tc Syst (min)	Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe Size (in)	Pipe Slope (%)	Invert Elev Dn (ft)	Invert Elev Up (ft)	HGL Elev Dn (ft)	HGL Elev Up (ft)	Grnd / Rim Elev Dn (ft)	Grnd / Rim Elev Up (ft)	Line ID
15	14	159.730	0.37	0.37	0.85	0.31	0.31	6.0	6.0	6.8	2.14	3.23	2.48	15	0.25	968.55	968.95	969.46	969.72	972.20	972.20	CB38-CB39
14	13	78.064	0.15	0.52	0.75	0.11	0.43	6.0	7.5	6.2	2.65	3.80	2.94	15	0.35	968.30	968.57	969.22	969.38	973.21	972.20	CB39-MH40
13	12	74.839	0.00	0.52	0.00	0.00	0.43	6.0	8.1	6.0	2.57	3.81	3.27	15	0.35	968.04	968.30	968.81	969.05	972.20	973.21	MH40-CB41
12	11	159.770	0.27	0.79	0.82	0.22	0.65	6.0	8.7	5.8	3.78	5.25	3.23	18	0.25	967.39	967.79	968.33	968.73	972.20	972.20	CB41-CB42
11	2	98.583	0.36	1.15	0.85	0.31	0.95	6.0	9.9	5.5	5.25	11.39	3.56	24	0.25	966.64	966.89	967.59	967.84	973.38	972.20	CB42-MH43
10	9	99.284	0.23	0.23	0.77	0.18	0.18	6.0	6.0	6.8	1.21	1.79	2.44	12	0.25	968.95	969.20	969.55	969.80	972.25	972.20	CB49-CB48
9	8	5.000	0.80	1.03	0.61	0.49	0.67	6.0	7.1	6.4	4.24	6.46	5.00	15	1.00	968.65	968.70	969.45	969.53	972.25	972.25	CB48-CB48A
8	4	172.666	0.80	1.83	0.61	0.49	1.15	6.0	7.1	6.4	7.34	8.80	5.57	18	0.70	967.19	968.40	968.24	969.45	973.34	972.25	CB48A-MH45
7	6	134.612	0.02	0.02	0.30	0.01	0.01	6.0	6.0	6.8	0.04	0.43	1.39	6	0.60	970.69	971.50	970.79	971.60	973.24	974.00	CB47-CB46
6	5	5.106	0.28	0.30	0.84	0.24	0.24	6.0	16.8	4.2	1.01	3.52	3.54	12	0.98	970.14	970.19	970.51	970.61	973.24	973.24	CB46-CB46A
5	4	149.053	0.28	0.58	0.84	0.24	0.48	6.0	16.8	4.2	2.00	5.00	3.79	15	0.60	969.00	969.89	969.55	970.45	973.34	973.24	CB46A-MH45
4	3	75.737	0.00	2.41	0.00	0.00	1.63	6.0	17.8	4.1	6.62	8.79	5.39	18	0.70	968.66	967.19	967.63	968.18	972.20	973.34	MH45-CB44
3	2	72.533	0.38	2.79	0.79	0.30	1.93	6.0	18.0	4.0	7.78	12.47	3.99	24	0.30	965.94	966.16	967.16	967.33	973.38	972.20	CB44-MH43
2	1	35.843	0.00	3.94	0.00	0.00	2.88	6.0	18.3	4.0	11.52	17.31	5.76	24	0.59	965.73	965.94	966.94	967.16	970.11	973.38	MH43-MH60
1	End	77.185	0.00	3.94	0.00	0.00	2.88	6.0	18.5	4.0	11.48	59.16	5.75	24	6.84	960.45	965.73	961.67	966.94	962.33	970.11	MH60-FES7

PALMER DRIVE
GARAGES
SF 4
SF 5
SF 7
SF 6
SF 3
SF 2
SF 8
SF9
SF10
CB 18 RIM: 976.20 18" SW = 969.71 24" NE = 969.21
CB 17 RIM: 974.20 15" SW = 970.55 6" E = 971.54 18" NE = 970.30
CB 16 RIM: 974.20 15" NE = 970.95
CB 15A RIM: 974.58 12" SE = 971.58
CB 14A RIM: 973.72 NEENAH 3290-B OR EQUIV. 12" SE = 970.72
CB 19A RIM: 975.25 ADS NYLOPLAST 10" DOME OR EQUIV. 6" W = 972.75
CB 13C RIM: 974.00 ADS NYLOPLAST 10" DOME OR EQUIV. 6" SE = 971.50
CB 13A RIM: 973.70 6" NW = 971.20 12" NE = 970.70 12" SE = 970.70
CB 14B RIM: 973.72 NEENAH 3290-B OR EQUIV. 12" NW = 970.72
CB 11A RIM: 975.72 NEENAH 3290-B OR EQUIV. 12" SE = 972.72
CB 10A RIM: 974.60 ADS NYLOPLAST 10" DOME OR EQUIV. 10" E = 971.76
CB 17A RIM: 974.25 ADS NYLOPLAST 10" DOME OR EQUIV. 6" W = 971.75
CB 11B RIM: 975.72 NEENAH 3290-B OR EQUIV. 12" NW = 972.72
CB 13B RIM: 973.70 12" NE = 970.70 12" NW = 970.70
CB 9A RIM: 973.71 NEENAH 3290-B OR EQUIV. 12" SE = 970.71
CB 9B RIM: 973.71 NEENAH 3290-B OR EQUIV. 12" NW = 970.71
CB 8A RIM: 971.94 15" SE = 968.69
CB 8B RIM: 971.94 15" NW = 968.69
CB 25 RIM: 974.20 15" NE = 970.95
CB 26 RIM: 974.20 15" SW = 970.55 18" NE = 970.30
CB 27A RIM: 973.07 ADS NYLOPLAST 10" DOME OR EQUIV. 6" E = 970.57
CB 10B RIM: 974.75 ADS NYLOPLAST 10" DOME OR EQUIV. 10" NW = 971.92
CB 53 RIM: 976.67 12" SW = 973.19 6" E = 971.83 15" S = 971.07
CB 52 RIM: 977.03 12" NE = 974.03
CB 53A RIM: 974.80 ADS NYLOPLAST 10" DOME OR EQUIV. 6" W = 972.30
CB 55 RIM: 971.45 15" NE = 968.18 15" S = 968.18
CB 54 RIM: 971.56 15" N = 961.95 15" SE = 961.95
CB 4A RIM: 956.04 12" N = 952.84 12" SE = 952.84
CB 4B RIM: 955.91 12" W = 952.91
CB 6A RIM: 962.00 12" E = 959.00
CB 6B RIM: 962.00 15" W = 958.35 24" SE = 958.13
CB 58 RIM: 973.87 12" S = 970.87
CB 57 RIM: 973.88 12" N = 963.83 15" S = 963.58
CB 56 RIM: 974.25 12" NW = 969.25
CB 59 RIM: 974.25 12" NE = 969.34 15" SW = 969.34
CB 60 RIM: 974.63 12" N = 970.55 12" S = 970.55
CB 61 RIM: 973.68 12" S = 970.68
CB 62 RIM: 973.98 12" N = 970.35 15" SW = 970.35
CB 63 RIM: 974.29 12" NW = 970.46 12" SE = 970.46 18" NE = 969.71 24" SW = 969.21
CB 64 RIM: 976.36 15" NE = 968.38 24" NW = 967.63 18" SW = 968.18 24" SE = 967.63
CB 65 RIM: 976.20 18" SW = 968.97 18" NE = 968.97
CB 66 RIM: 975.59 18" SW = 970.12 6" W = 970.45 18" NE = 969.45
CB 67 RIM: 973.07 ADS NYLOPLAST 10" DOME OR EQUIV. 6" E = 970.57
CB 68 RIM: 974.20 15" SW = 970.55 18" NE = 970.30
CB 69 RIM: 974.20 24" SW = 968.22 24" NE = 968.22
CB 70 RIM: 974.20 24" SW = 968.62 24" NE = 968.62
CB 71 RIM: 975.58 24" SW = 968.79 6" E = 972.48 24" NE = 968.79
CB 72 RIM: 974.24 12" S = 970.56 6" NE = 971.02 12" NW = 970.56
CB 73 RIM: 973.75 ADS NYLOPLAST 10" DOME OR EQUIV. 6" SW = 971.25
CB 74 RIM: 974.00 ADS NYLOPLAST 10" DOME OR EQUIV. 6" E = 971.50
CB 75 RIM: 973.34 12" N = 968.95 18" S = 968.70
CB 76 RIM: 972.20 12" N = 969.95
CB 77 RIM: 972.20 12" S = 969.20
CB 78 RIM: 972.20 15" E = 968.95
CB 79 RIM: 972.20 12" W = 969.20
CB 80 RIM: 972.73 12" S = 969.65 15" N = 969.40
CB 81 RIM: 972.20 15" W = 968.30 15" S = 968.30
CB 82 RIM: 972.20 15" N = 968.04 18" S = 967.79
CB 83 RIM: 973.24 18" W = 967.39 24" S = 966.89
CB 84 RIM: 973.24 6" W = 970.69 12" E = 970.19
CB 85 RIM: 973.24 15" W = 969.00 18" N = 967.19 18" E = 967.19
CB 86 RIM: 973.24 12" W = 969.66 24" E = 966.16
CB 87 RIM: 973.38 24" W = 965.94 24" N = 966.64 24" SE = 965.94
CB 88 RIM: 973.24 15" W = 968.55 15" E = 968.57
CB 89 RIM: 973.24 15" W = 968.55 15" E = 968.57
CB 90 RIM: 973.24 15" W = 968.55 15" E = 968.57
MH 1 RIM: 958.02 18" SE = 951.63 12" NE = 952.04
MH 2 RIM: 957.89 12" N = 953.00 18" NW = 952.50
MH 3 RIM: 956.24 12" NW = 952.23 12" SW = 952.24
MH 4 RIM: 955.24 12" E = 952.24 12" NW = 952.23 12" SW = 952.24
MH 5 RIM: 957.19 (SEE DETAIL) 6" NW = 953.25 12" S = 953.25
MH 6 RIM: 962.08 12" W = 958.91 15" N = 958.80 15" E = 958.55
MH 7 RIM: 968.25 15" N = 965.00 15" S = 965.00
MH 8 RIM: 972.03 15" SE = 968.61 15" NW = 968.61 15" S = 968.61
MH 9 RIM: 974.67 12" SE = 970.54 12" NW = 970.54 18" NE = 970.04
MH 10 RIM: 976.55 18" SW = 969.69 10" W = 971.43 10" SE = 971.43 18" NE = 969.69
MH 11 RIM: 976.67 18" SW = 969.39 12" S



PIPE CROSSING TABLE

CROSSING I.D.	BOTTOM OF TOP PIPE			TOP OF BOTTOM PIPE			SEPARATION (FT)
1	STO	RCP 12"	951.94	SAN	PVC 8"	949.89	2.05
2	STO	RCP 12"	952.96	SAN	PVC 8"	948.44	4.52
3	STO	RCP 12"	952.41	WAT	PVC 8"	948.26	4.15
4	STO	RCP 12"	952.51	SAN	PVC 8"	950.13	2.38
5	SAN	PVC 8"	949.90	WAT	PVC 6"	948.37	1.54
6	STO	PVC 16"	958.34	WAT	PVC 8"	954.67	3.67
7	STO	RCP 12"	958.23	SAN	PVC 8"	952.62	5.61
8	STO	RCP 15"	962.72	WAT	PVC 6"	958.59	4.13
9	STO	RCP 15"	962.91	SAN	PVC 6"	957.42	5.49
10	STO	RCP 12"	968.46	WAT	PVC 8"	964.47	3.99
11	STO	RCP 12"	968.50	SAN	PVC 8"	957.87	10.63
12	WAT	PVC 6"	963.72	SAN	PVC 8"	957.97	5.75
13	STO	RCP 15"	970.46	WAT	PVC 6"	968.93	1.54
14	STO	PVC 6"	971.88	WAT	PVC 8"	969.93	1.95
15	STO	PVC 6"	972.09	WAT	PVC 8"	969.05	3.05
16	WAT	PVC 6"	967.09	SAN	PVC 8"	958.57	8.52
17	STO	RCP 12"	970.45	WAT	PVC 8"	967.13	3.32
18	STO	RCP 12"	970.51	SAN	PVC 8"	959.32	11.20
19	STO	HDPE 10"	971.45	WAT	PVC 8"	966.90	4.55
20	STO	HDPE 10"	971.49	WAT	PVC 6"	967.12	4.37
21	STO	HDPE 10"	971.55	SAN	PVC 8"	959.79	11.76
22	WAT	PVC 6"	969.47	SAN	PVC 8"	960.21	9.26
23	STO	RCP 12"	972.50	WAT	PVC 8"	969.16	3.34
24	STO	RCP 12"	972.53	SAN	PVC 8"	960.48	12.05
25	STO	RCP 24"	968.60	WAT	PVC 6"	967.10	1.50
26	STO	RCP 24"	968.48	WAT	PVC 6"	966.99	1.50
27	STO	RCP 18"	968.81	SAN	PVC 6"	964.45	4.36
28	WAT	PVC 6"	967.02	SAN	PVC 6"	964.72	2.30
29	WAT	PVC 6"	967.22	SAN	PVC 8"	961.34	5.88
30	STO	RCP 24"	968.05	SAN	PVC 8"	961.40	6.65
31	STO	RCP 12"	970.44	WAT	PVC 8"	967.01	3.43
32	STO	RCP 12"	970.48	SAN	PVC 8"	961.66	8.82
33	STO	RCP 12"	970.51	WAT	PVC 8"	966.98	3.53
34	STO	RCP 12"	970.53	SAN	PVC 8"	962.38	8.15
35	SAN	PVC 6"	969.21	WAT	PVC 6"	967.52	1.69
36	STO	RCP 12"	971.27	SAN	PVC 6"	969.37	1.90
37	STO	RCP 12"	971.37	WAT	PVC 8"	966.98	4.39
38	STO	RCP 12"	971.35	SAN	PVC 8"	962.73	8.63
39	WAT	PVC 6"	966.36	SAN	PVC 8"	962.85	3.51
40	STO	RCP 18"	966.68	WAT	PVC 8"	964.07	2.61
41	WAT	PVC 8"	967.45	SAN	PVC 8"	963.38	4.07
42	STO	PVC 6"	970.89	WAT	PVC 8"	966.37	4.52
43	STO	RCP 18"	967.04	WAT	PVC 8"	965.54	1.50
44	STO	RCP 24"	966.47	WAT	PVC 8"	964.94	1.53
45	STO	RCP 18"	966.24	WAT	PVC 8"	964.08	2.16
46	STO	RCP 15"	967.62	WAT	PVC 6"	964.01	3.62
47	STO	RCP 15"	968.58	WAT	PVC 6"	965.25	3.34
48	STO	RCP 15"	968.45	WAT	PVC 6"	965.20	3.25
49	STO	RCP 15"	968.16	SAN	PVC 6"	964.37	3.79

SCALE IN FEET

0 60' 120'

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NO	REVISION DESCRIPTION	DATE

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PROJECT
HARTLAND APARTMENTS
700W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

CLIENT
THREE LEAF PARTNERS
504 W. LINEAU AVE.
MILWAUKEE, WI 53203

Seal

SHEET TITLE
OVERALL UTILITY PLAN

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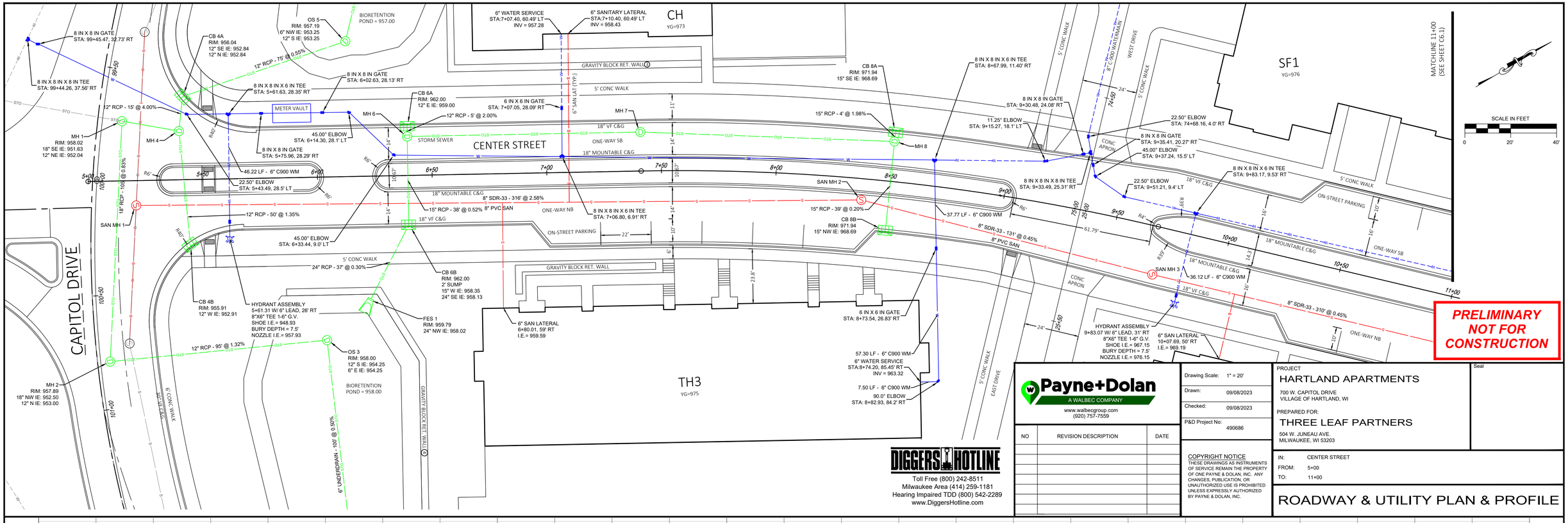
Drawing Scale:	1" = 60'
Drawn:	GME 09/08/2023
Checked:	HAM 09/08/2023
P&D Project No:	490686
Sheet No.	C5.0

Sep 13, 2023 – 10:56am
S:\Design & Construction Services\080-CSD\Mandel Group\Hartland Apartments\30 – SHEETSPLAN\SHT_UTL.dwg



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P&D Project No: 490686

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PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: CENTER STREET
FROM: 5+00
TO: 11+00

ROADWAY & UTILITY PLAN & PROFILE

C6.0

MATCHLINE 11+00 (SEE SHEET C6.0)

SF1
YG=976

SF2
YG=978

SF3
YG=976

MATCHLINE 17+00 (SEE SHEET C6.2)

6" SAN LATERAL
11+91.91, 50' LT
I.E.= 965.00

CB 10A
RIM: 974.60
10" E IE: 971.76

10" RCP - 56' @ 0.60%

5' CONC WALK

11.25° ELBOW
STA: 12+91.48, 15.5' LT

CB 9A
RIM: 973.71
12" SE IE: 970.71

8 IN X 8 IN X 6 IN TEE
STA: 12+58.77, 12.76' RT

5.37 LF - 6" C900 WM

12" RCP - 26' @ 0.66%

ONE-WAY SB

18" MOUNTABLE C&G

MH 10

8 IN X 8 IN X 6 IN TEE
STA: 13+30.64, 14.64' RT

18" VF C&G

CB 11A
RIM: 975.72
12" SE IE: 972.72

12" RCP - 26' @ 0.46%

ON-STREET PARKING

CONC APRON

CENTER STREET

6" SAN LATERAL
15+38.07, 50' LT
I.E.= 970.86

8 IN X 8 IN X 6 IN TEE
STA: 15+81.36, 14.48' RT

6" SAN LAT (TYP.)

CB 13C
RIM: 974.00
6" SE IE: 971.50

CB 13A
RIM: 973.70
12" SE IE: 970.70
6" NW IE: 971.20
12" NE IE: 970.70

6" RCP - 33' @ 0.90%

HYDRANT ASSEMBLY
16+37.49 W/ 6" LEAD, 32' LT
8"X6" TEE 1.6° G.V.
SHOE I.E.= 967.10
BURY DEPTH = 7.5'
NOZZLE I.E.= 976.10

12.32 LF - 6" C900 WM

12" RCP - 28' @ 0.85%

8 IN X 8 IN X 6 IN TEE
STA: 16+37.50, 14.37' RT

6.20 LF - 6" C900 WM

MH 11

MH 12

MH 13

SAN MH 4

SAN MH 5

41.60 LF - 6" C900 WM

12" RCP - 24' @ 0.50%

12" RCP - 22' @ 1.10%

12" RCP - 24' @ 0.70%

CB 9B
RIM: 973.71
12" NW IE: 970.71
8" PVC - 310' @ 0.45%

10" RCP - 59' @ 0.83%

6" SAN LATERAL
13+49.84, 50' RT
I.E.= 970.75

CB 11B
RIM: 975.72
12" NW IE: 972.72

HYDRANT ASSEMBLY
13+29.29 W/ 6" LEAD, 31' RT
8"X6" TEE 1.6° G.V.
SHOE I.E.= 969.58
BURY DEPTH = 7.5'
NOZZLE I.E.= 978.58

CB 10B
RIM: 974.75
10" NW IE: 971.92

CB 13B
RIM: 973.70
12" NW IE: 970.70
12" NE IE: 970.70

6" SAN LATERAL
16+67.32, 50' RT
I.E.= 968.70

SF10
YG=976

SF9
YG=978

SCALE IN FEET
0 20' 40'

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PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI

Seal

IN: CENTER STREET
FROM: 11+00
TO: 17+00

ROADWAY & UTILITY PLAN & PROFILE

EXISTING GRADE AT ℄ OF ROAD
PROPOSED GRADE AT ℄ OF ROAD

GRADE BREAK STA = 11+50.00
ELEV = 974.200
-1.50%
2.00%

MH 9
STA:11+96, 11' RT
RIM:974.67
INV(NE):970.04
INV(NW):970.54
INV(SW):970.54

GRADE BREAK STA = 13+10.36
ELEV = 977.406
-1.60%

MH 10
STA:12+68, 0.4' RT
RIM:975.5
INV(SW):969.36
INV(NE):969.69
INV(NW):969.91
INV(SE):97 .43

GRADE BREAK STA = 13+90.00
ELEV = 973.300
1.50%

MH 11
STA:13+92, 0.9' RT
RIM:976.81
INV((SW):969.39
INV(SE):969.90
INV((NW):972.60
INV((NE):969.39

GRADE BREAK STA = 14+70.00
ELEV = 977.400
1.50%

MH 12
STA:15+95, 3.2' RT
RIM:974.86
INV(SW):969.38
INV(NE):969.12
INV(SE):968.38

-2.00%

GRADE BREAK STA = 16+30.00
ELEV = 974.200
1.50%

MH 13
STA:16+33, 3.2' RT
RIM:974.14
INV(SW):969.21
INV(NW):969.48
INV(SE):969.46
INV(NE):969.71

18" RCP - 118' @ 0.30%
38.82 LF - 8" C900 WM @ -4.00%
18" RCP - 122' @ 0.25%
18" RCP - 205' @ 0.25%
18" RCP - 160' @ 0.25%
32.57 LF - 8" C900 WM @ -4.00%
2.65 LF - 8" C900 WM @ 2.96%
249.50 LF - 8" C900 WM @ 1.00%
54.97 LF - 8" C900 WM @ 0.50%
24" RCP - 35' @ 0.25%
8" SDR-33 - 310' @ 0.45%
8" SDR-33 - 318' @ 0.45%

6" SAN RISER
STA:11+72.00
ELEV:963.53

8 IN X 8 IN G4 TEE
STA: 12+65.94, 12.58' RT
INV ELEV = 956.14

8 IN X 8 IN X 6 IN TEE
STA: 12+67.27, 12.76' RT
INV ELEV = 968.22

SAN MH 4
STA:12+83, 19.5' RT
RIM:977.40
INV(SW):959.22
INV(NE):959.32

11.25° ELBOW
STA: 12+91.43, 15.5' LT
INV ELEV = 959.32

8 IN X 8 IN X 6 IN TEE
STA: 13+30.64, 14.64' RT
INV ELEV = 969.08

0° SAN RISER
STA:13+50.00
ELEV:970.15

6" SAN RISER
STA:15+38.00
ELEV:969.30

6 IN X 8 IN X 6 IN TEE
STA: 15+81.36, 14.48' RT
INV ELEV = 966.37

SAN MH 5
STA:16+50, 20.6' RT
RIM:974.96
INV(NW):960.75
INV(NE):960.85

8 IN X 8 IN X 6 IN TEE
STA: 16+37.50, 14.37' RT
INV ELEV = 966.30

6" SAN RISER
STA:16+67.00
ELEV:968.09

118' 122' 205' 35' 160'
312' 318' 324'
STORM BACKFILL GRANULAR
SANITARY BACKFILL GRANULAR
WATERMAIN BACKFILL GRANULAR

| | | |

MATCHLINE 17+00
(SEE SHEET C6.1)

SF3
YG=976

SF4
YG=974

SF5
YG=974

SF7
YG=974

SF8
YG=976

MATCHLINE 20+03
(SEE SHEET C6.13/C6.14)

WEST DRIVE

EAST DRIVE

CENTER STREET

5' CONC WALK

ON-STREET PARKING

18" MOUNTABLE C&G

18" VF C&G

8" PVC SAN

STORM SEWER

6" SAN LATERAL
18+55.55, 50' LT
I.E.= 969.96

6" SAN LAT (TYP.)

CB 15A
RIM: 974.58
12" SE IE: 971.58

CB 14A
RIM: 973.72
12" SE IE: 970.72

CB 14B
RIM: 973.72
12" NW IE: 970.72

CB 15B
RIM: 974.58
12" NW IE: 971.58

MH 14

MH 15

MH 32
RIM: 974.63
12" N IE: 970.55
12" S IE: 970.55

CB 33
RIM: 973.68
12" S IE: 970.68

SAN MH 6

81.55 LF - 8" C900 WM @ 1.37%

2.29 LF - 6" C900 WM

12" RCP - 28' @ 0.40%

12" RCP - 28' @ 0.39%

12" RCP - 22' @ 0.50%

12" RCP - 22' @ 0.50%

12" RCP - 50' @ 0.25%

8 IN X 8 IN X 6 IN TEE
STA: 16+40.88, 18.46' RT

45.00° ELBOW
STA: 19+60.56, 14.2' LT

8 IN X 8 IN GATE
STA: 19+83.88, 10.45' RT

8 IN X 8 IN X 6 IN TEE
STA: 18+93.81, 14.26' RT

HYDRANT ASSEMBLY
16+32.45 W/ 6" LEAD, 39' RT
8"X6" TEE 1-6" G.V.
SHOE I.E.= 967.76
BURY DEPTH = 7.5'
NOZZLE I.E.= 976.76

SCALE IN FEET
0 20' 40'

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NO	REVISION DESCRIPTION	DATE

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P&D Project No: 490686

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PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: CENTER STREET
FROM: 17+00
TO: 21+50

ROADWAY & UTILITY PLAN & PROFILE

GRADE BREAK STA = 17+10.00
ELEV = 975.400

GRADE BREAK STA = 17+90.00
ELEV = 974.200

PROPOSED GRADE AT ℄ OF ROAD

GRADE BREAK STA = 19+00.97
ELEV = 975.482

GRADE BREAK STA = 19+72.97
ELEV = 975.520

GRADE BREAK STA = 20+03.49
ELEV = 975.460

-1.50%
1.50%
-2.45%
2.00%
-2.00%

MH 14
STA:17+90, 3.2' RT
RIM:974.63
INV(SW):970.11
INV(NW):970.61
INV(NE):971.29

MH 15
STA: 18+97, 3.2' RT
RIM:975.25
INV(SE):971.47
INV(NW):971.47
INV(NE):971.47

C9 24
STA:19+90, 0.6' RT
RIM:973.67
INV(S):970.37

CB 33
STA: 20+79, 0.7' RT
RIM:973.68
INV(S):970.68

GRADE BREAK STA = 17+59.80
ELEV = 975.245

GRADE BREAK STA = 18+72.97
ELEV = 974.902

GRADE BREAK STA = 20+01.37
ELEV = 974.940

18" RCP - 160' @ 0.25%

12" RCP - 77' @ 0.25%

6" SAN RISER
STA:18+56.00
ELEV:968.50

3.74 LF - 8" C900 WM @ 1.37%

255.15 LF - 8" C900 WM @ -0.00%

18.11 LF - 8" C900 WM @ -1.90%

4.43 LF - 8" C900 WM @ 1.44%

81.55 LF - 8" C900 WM @ 1.37%

8" SDR-33 - 324' @ 0.45%

EXISTING GRADE AT ℄ OF ROAD

8 IN X 8 IN X 6 IN TEE
STA: 18+93.81, 14.26' RT
INV ELEV = 966.29

8 IN X 8 IN GATE
STA: 18+98.43, 14.39' RT
INV ELEV = 965.35

SAN MH 6
STA:19+27, 20.5' RT
RIM:974.72
INV(SW):962.31
INV(N):962.41

45.00° ELBOW
STA: 19+60.56, 14.2' LT

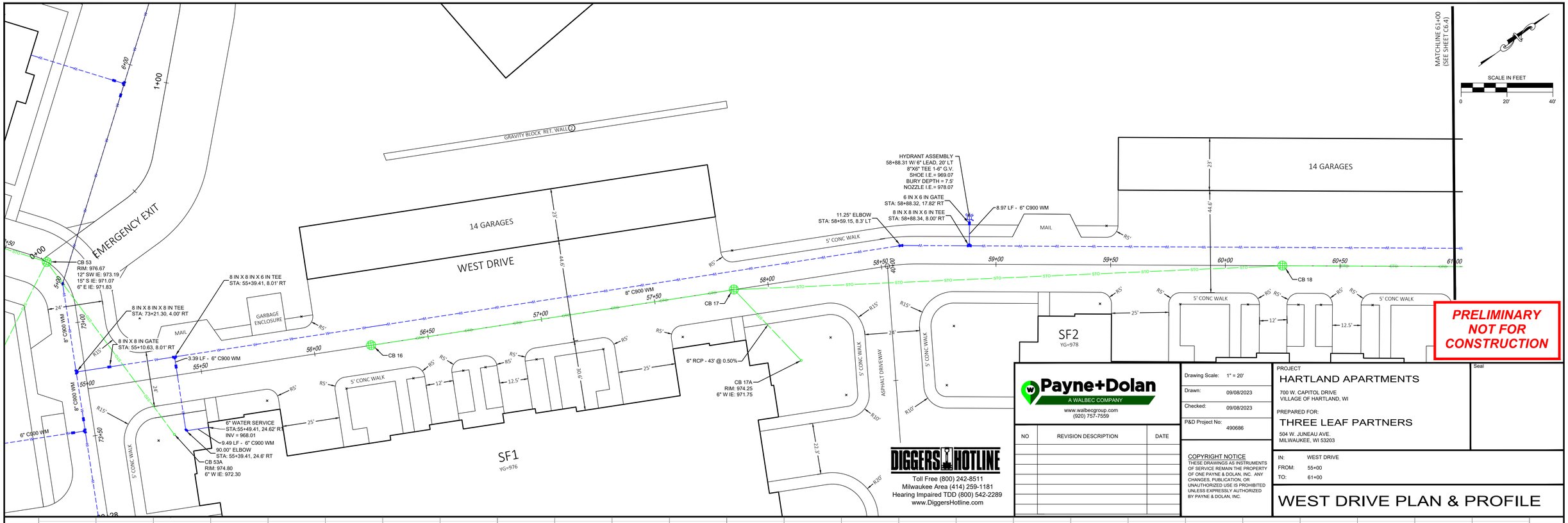
8 IN X 8 IN GATE
STA: 19+83.88, 10.45' RT
INV ELEV = 967.53

8 IN X 8 IN X 6 IN TEE
STA: 19+94.38, 1.61' RT
INV ELEV = 967.52

160'
77'
STORM BACKFILL GRANULAR

324'
SANITARY BACKFILL GRANULAR
WATERMAIN BACKFILL GRANULAR

| | | |



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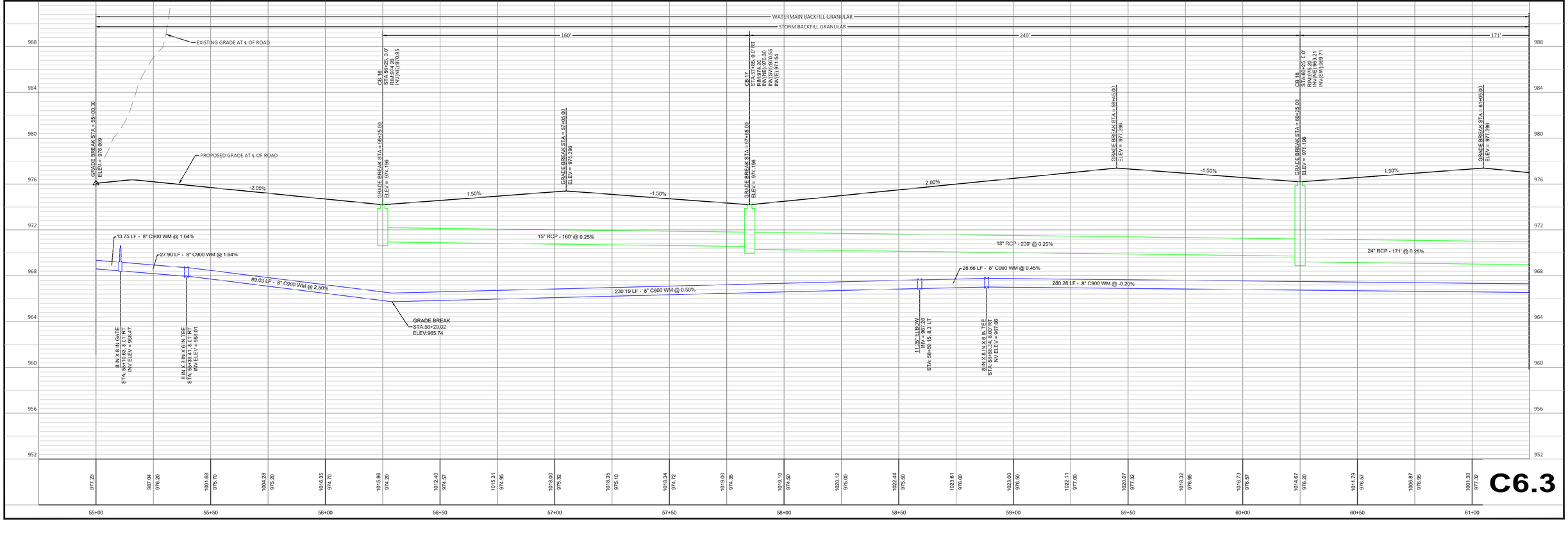
PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: WEST DRIVE
FROM: 55+00
TO: 61+00

WEST DRIVE PLAN & PROFILE



C6.3

Sep 13, 2023 — 10:59am
S:\Design & Construction Services\080-C30\Mandel Group\Hartland Apartments\30 — SHEETSPLAN\SHT_West Dr_PP.dwg

MATCHLINE 61+00
(SEE SHEET C6.3)

5' TRAIL

14 GARAGES

WEST DRIVE

5' CONC WALK

GARBAGE ENCLOSURE

MAIL

8 IN X 8 IN X 6 IN TEE
STA: 61+69.79, 7.99' RT

3.17 LF - 6" C900 WM

MH 19

8 IN X 8 IN X 6 IN TEE
STA: 62+17.86, 8.00' RT

CB 20

CB 21

18" RCP - 125' @ 4.00%

45.00° ELBOW
STA: 0+16.66, 18.5' LT

MATCHLINE 65+00

3.94 LF - 6" C900 WM

44.61'

23'

24'

25'

12'

12.5'

30.16'

SF2
YG=978

13.50 LF - 6" C900 WM

6" WATER SERVICE
STA:61+55.79, 28.12' RT
INV = 966.58

90.00° ELBOW
STA: 61+69.80, 28.1' RT

6" RCP - 55' @ 0.50%

CB 19A
RIM: 975.25
6" W IE: 972.75

17.57 LF - 6" C900 WM

6" WATER SERVICE
STA:62+35.94, 28.11' RT
INV = 966.47

90.00° ELBOW
STA: 62+17.87, 28.1' RT

ASPHALT DRIVEWAY

22.33'

SF3
YG=976

SF4
YG=974

CB 23A
RIM: 973.75
6" SW IE: 971.25

6" RCP - 47' @ 0.50%

CB 23

CB 24

MH 22

MATCHLINE 65+00

SCALE IN FEET
0 20' 40'

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700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: WEST DRIVE
FROM: 61+00
TO: 65+00

WEST DRIVE PLAN & PROFILE

WATERMAIN BACKFILL GRANULAR
STORM BACKFILL GRANULAR

171' | 69' | 160' | 81'

MH 19
STA:63+96.10'
RIM:975.56
INV(SW):968.79
INV(E):972.43

CB 20
STA:62+65.70'
RIM:974.38
INV(NW):968.62
INV(SW):936.62

CB 21
STA:64+25.10'
RIM:974.20
INV(NE):968.22
INV(SW):968.22

GRADE BREAK STA = 61+05.00
ELEV = 977.386

GRADE BREAK STA = 62+65.00
ELEV = 971.196

GRADE BREAK STA = 63+45.00
ELEV = 975.596

GRADE BREAK STA = 64+25.00
ELEV = 971.196

-2.00%
1.50%
-1.50%
1.50%

PROPOSED GRADE AT ℄ OF ROAD

24" RCP - 171' @ 0.25%
24" RCP - 69' @ 0.25%
24" RCP - 160' @ 0.25%
24" RCP - 88' @ 0.25%

20.22 LF - 6" C900 WM @ 0.50%
20.11 LF - 8" C900 WM @ -0.22%
280.28 LF - 8" C900 WM @ -0.20%
290.66 LF - 8" C900 WM @ -0.77%

8 IN X 8 IN X 6 IN TEE
STA: 61+69.79, 7.99' RT
INV(SW) = 968.79

8 IN X 8 IN X 6 IN TEE
STA: 62+17.86, 8.00' RT
INV ELEV = 966.39

8 IN X 8 IN X 6 IN TEE
STA: 62+17.86, 8.00' RT
INV ELEV = 966.39

45.00° ELBOW
INV = 955.48
STA: 0+19.66, 18.5' LT

EXISTING GRADE AT ℄ OF ROAD

988 / 984 / 980 / 976 / 972 / 968 / 964 / 960 / 956 / 952

1001.39 977.32 | 996.84 977.00 | 990.22 976.50 | 982.90 976.00 | 975.64 975.90 | 968.67 975.00 | 964.74 974.90 | 966.00 974.35 | 961.47 974.72 | 959.00 975.10 | 958.59 975.32 | 958.00 974.95 | 957.13 974.57 | 956.69 974.20 | 956.36 974.57 | 956.40 974.95 | 956.59 975.32

61+00 | 61+50 | 62+00 | 62+50 | 63+00 | 63+50 | 64+00 | 64+50 | 65+00

STORM BACKFILL GRANULAR

77.05' | 51'

GRADE BREAK STA = 65+05.00
ELEV = 975.386

CB 23
STA:65+53, 0.6' LT
RIM:974.24
INV(S):970.96
INV(NW):971.63
INV(NE):971.02

CB 24
STA:65+90, 0.6' RT
RIM:973.67
INV(N):970.67

GRADE BREAK STA = 66+38
ELEV = 973.975

2.00%
-1.50%

PROPOSED GRADE AT ℄ OF ROAD

12" RCP - 84' @ 0.50%
12" RCP - 37' @ 0.30%

MH 22
STA:65+06, -14.3' LT
RIM:974.32
2' SUMP
INV(SE):970.14
INV(NW):969.24
INV(SW):969.00

GRADE BREAK STA = 66+40.32
ELEV = 974.755

GRADE BREAK STA = 66+34.68
ELEV = 974.416

EXISTING GRADE AT ℄ OF ROAD

988 / 984 / 980 / 976 / 972 / 968 / 964 / 960 / 956 / 952

956.59 975.32 | 957.39 975.10 | 958.00 974.72 | 958.18 974.35 | 958.20 973.97 | 958.00 974.22

65+00 | 65+50 | 66+00

C6.4

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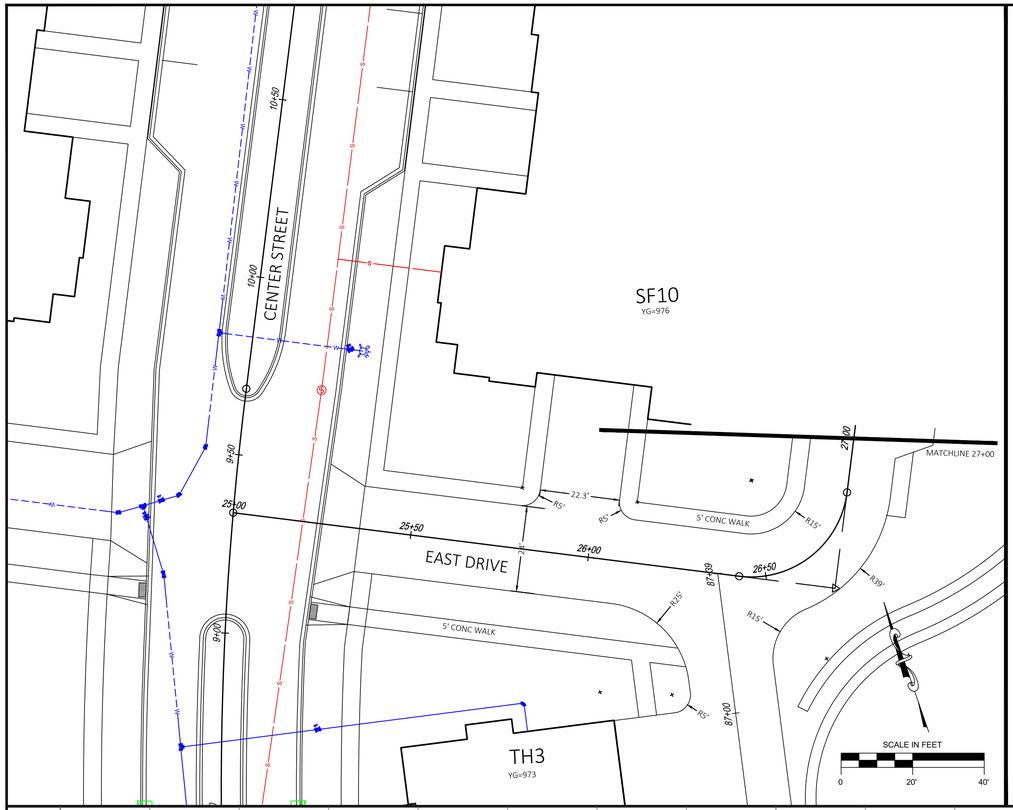

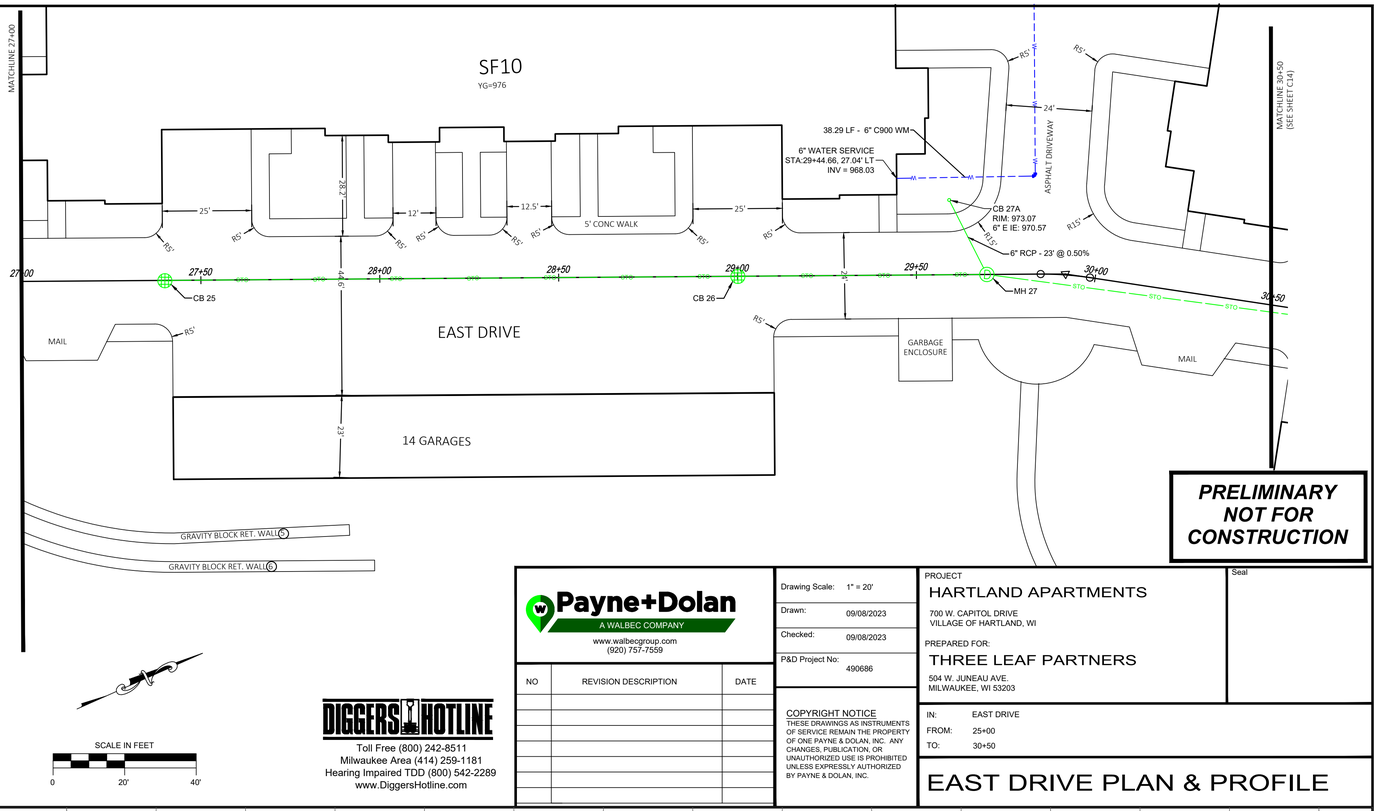

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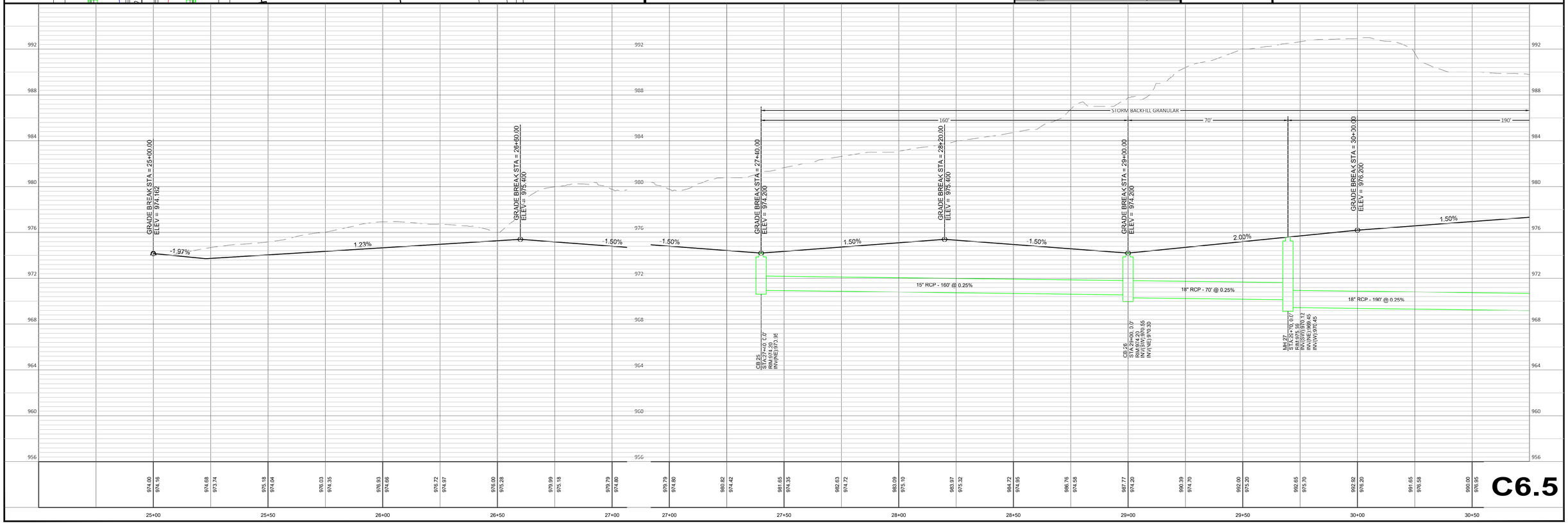
PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: EAST DRIVE
FROM: 25+00
TO: 30+50

EAST DRIVE PLAN & PROFILE



C6.5

Sep 13, 2023 - 11:00am
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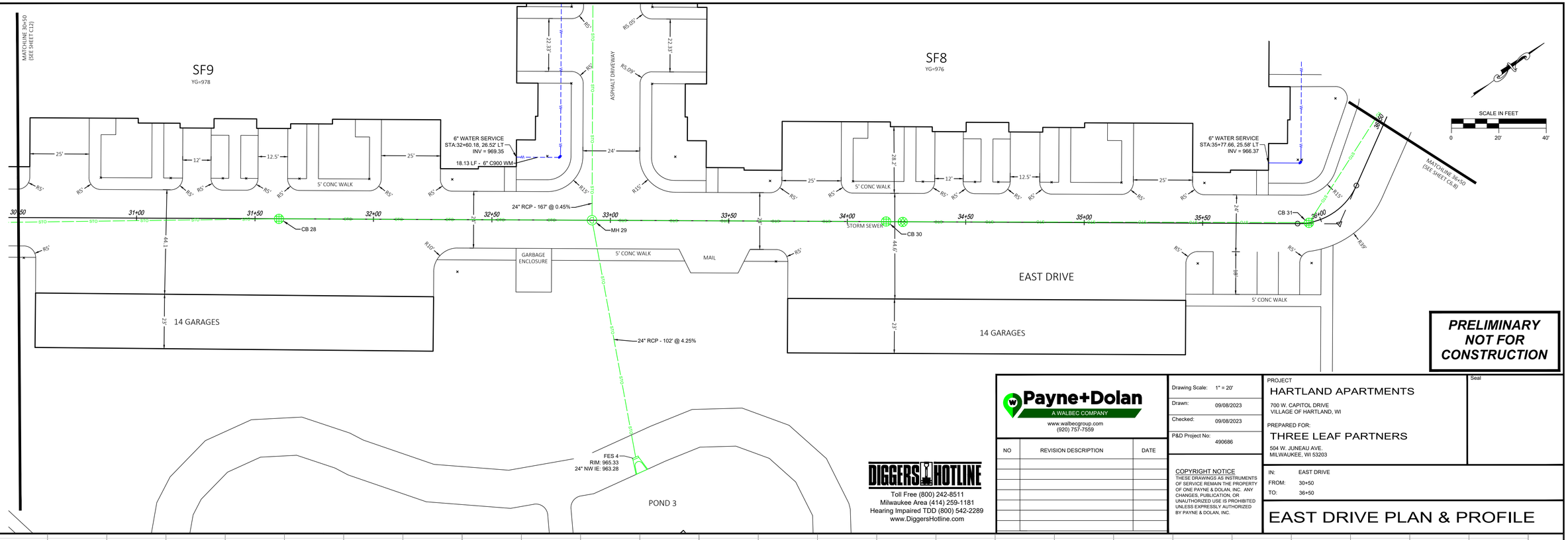

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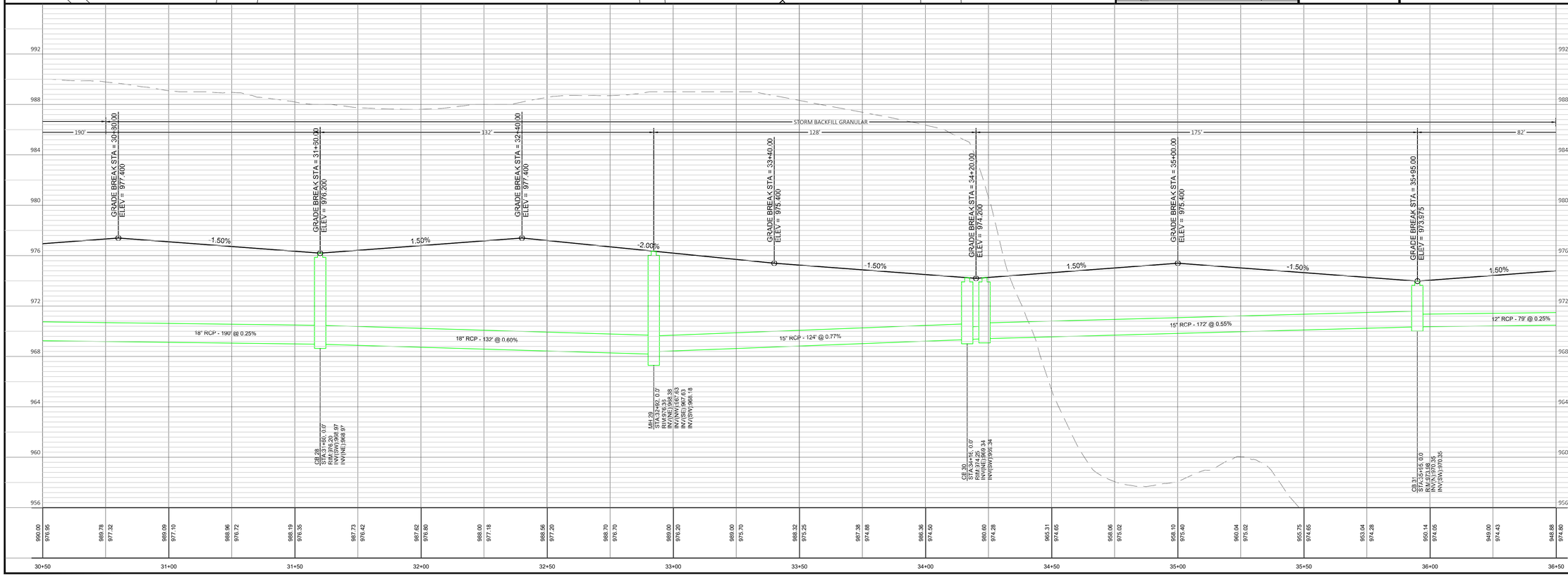
PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: EAST DRIVE
FROM: 30+50
TO: 36+50

EAST DRIVE PLAN & PROFILE



C6.6

Sep 13, 2023 - 11:00am
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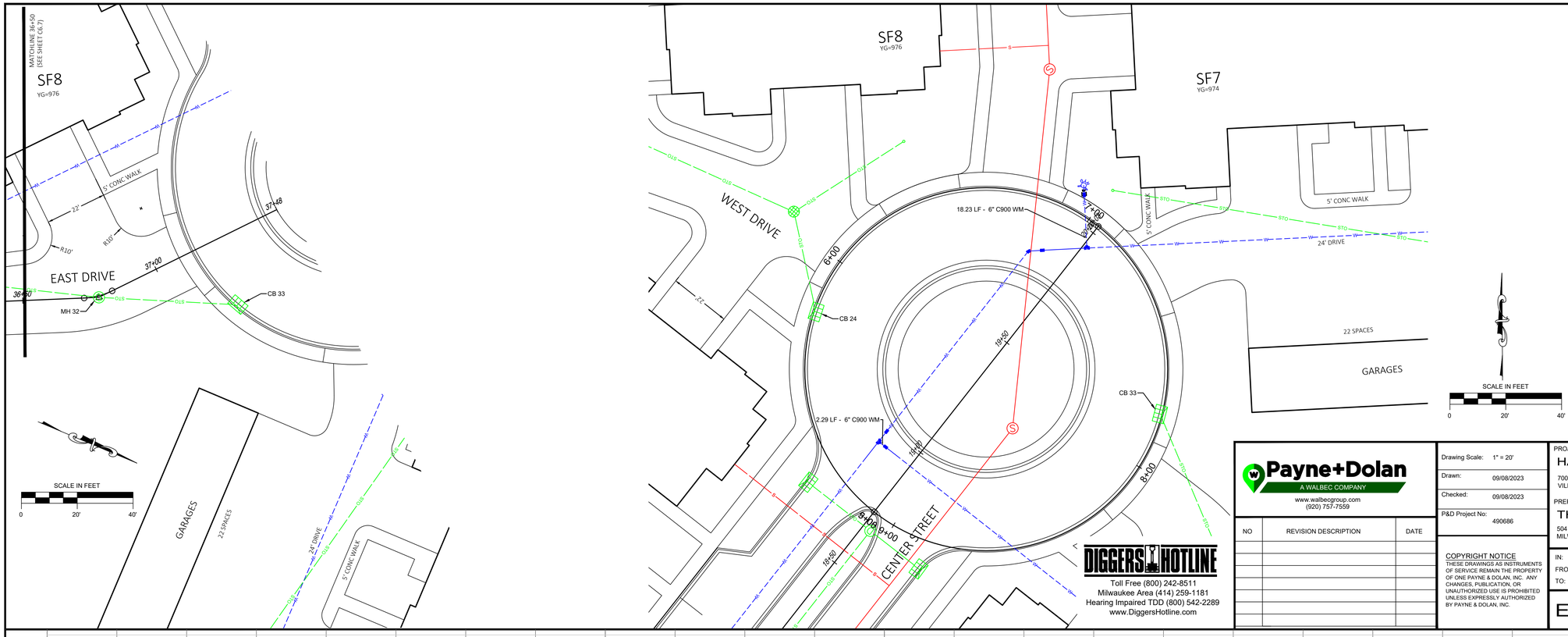

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PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: EAST DRIVE
FROM: 36+50
TO: 37+50

EAST DRIVE PLAN & PROFILE

C6.7

Sep 13, 2023 - 11:00am
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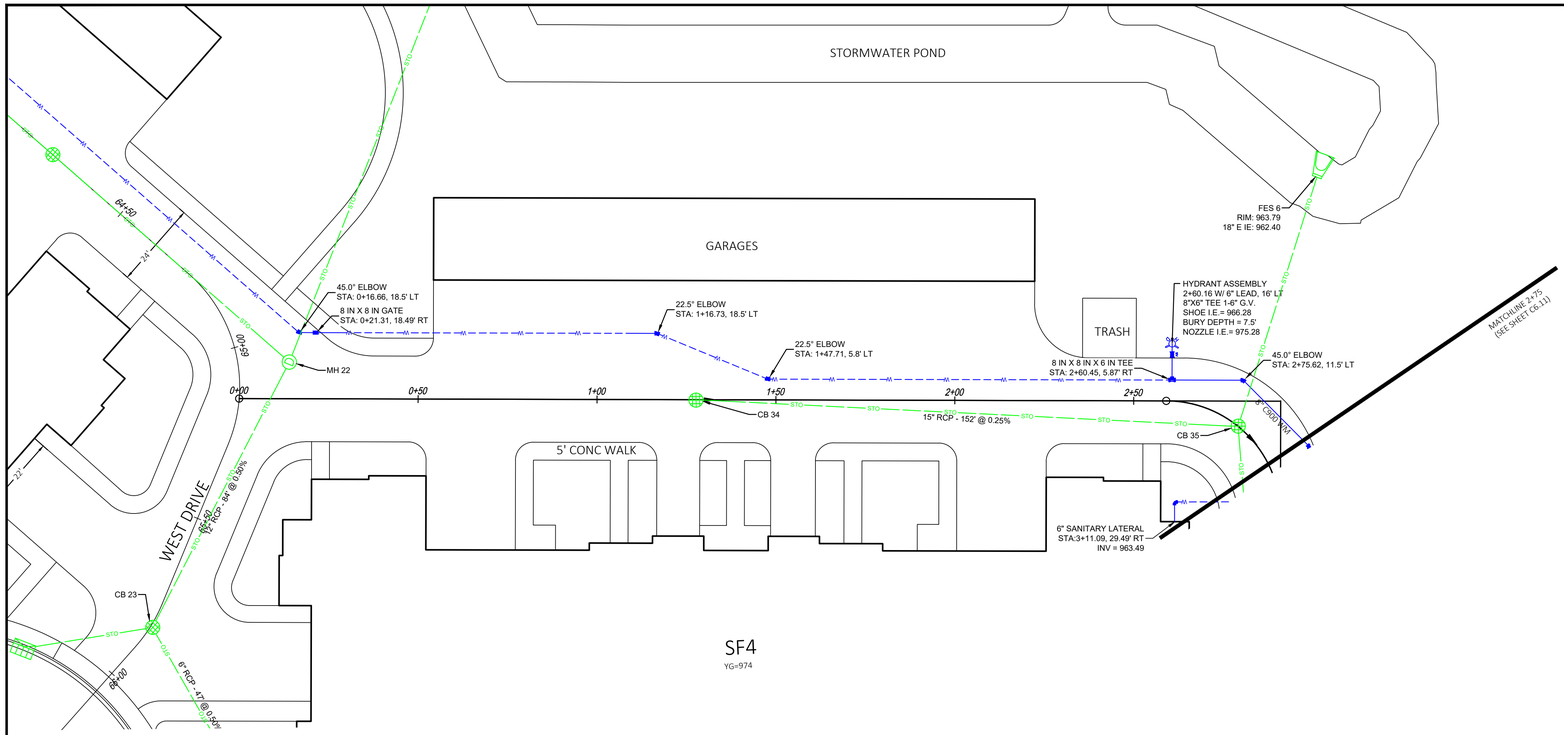

SCALE IN FEET

0 20' 40'

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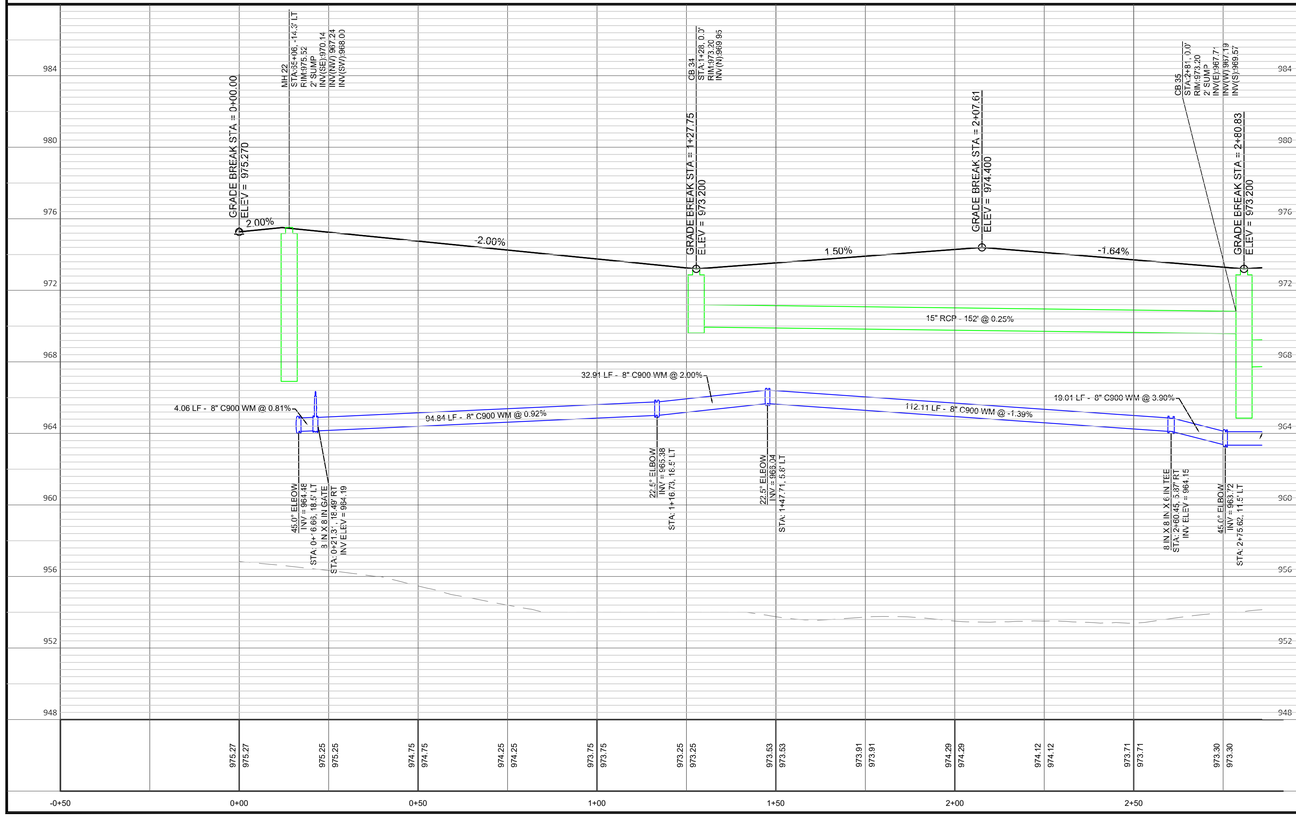
PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: NORTH STACKED FLATS
FROM: 0+00
TO: 3+00

STACKED FLATS PLAN & PROFILE



C6.8

Sep 13, 2023 — 11:01:01
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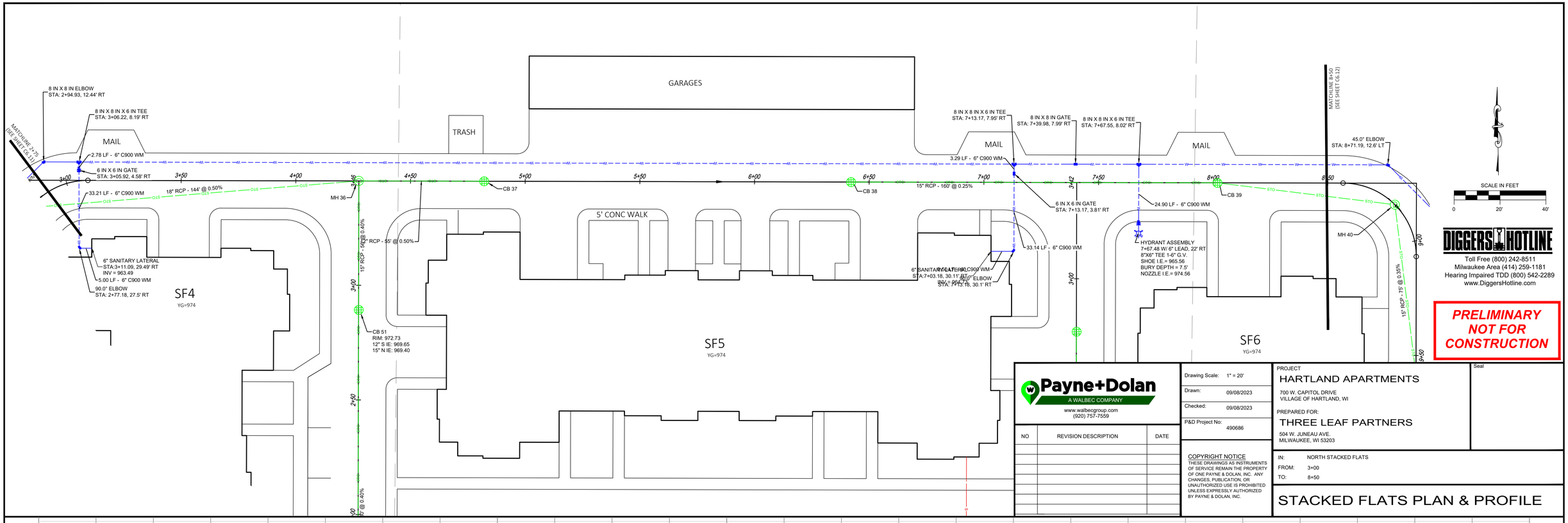
8 IN X 8 IN ELBOW
STA: 2+94.93, 12.44' RT
8 IN X 8 IN X 6 IN TEE
STA: 3+06.22, 8.19' RT
MATCHLINE 2+75
(SEE SHEET C6.11)
MAIL
2.78 LF - 6" C900 WM
6 IN X 6 IN GATE
STA: 3+05.92, 4.58' RT
33.21 LF - 6" C900 WM
18" RCP - 144' @ 0.50%
6" SANITARY LATERAL
STA:3+11.09, 29.49' RT
INV = 963.49
5.00 LF - 6" C900 WM
90.0° ELBOW
STA: 2+77.18, 27.5' RT
SF4
YG=974
GARAGES
TRASH
MH 36
CB 37
CB 38
RCP - 55' @ 0.50%
15" RCP - 40' @ 0.40%
5' CONC WALK
CB 51
RIM: 972.73
12" S IE: 969.65
15" N IE: 969.40
SF5
YG=974
8 IN X 8 IN X 6 IN TEE
STA: 7+13.17, 7.95' RT
8 IN X 8 IN GATE
STA: 7+39.98, 7.99' RT
8 IN X 8 IN X 6 IN TEE
STA: 7+67.55, 8.02' RT
MAIL
3.29 LF - 6" C900 WM
15" RCP - 160' @ 0.25%
6 IN X 6 IN GATE
STA: 7+13.17, 3.81' RT
33.14 LF - 6" C900 WM
6" SANITARY LATERAL
STA:7+03.18, 30.11' RT
INV = 964.92
90.0° ELBOW
STA: 7+13.18, 30.1' RT
24.90 LF - 6" C900 WM
HYDRANT ASSEMBLY
7+67.48 W/ 6" LEAD, 22' RT
8"X6" TEE 1-6" G.V.
SHOE I.E.= 965.56
BURY DEPTH = 7.5'
NOZZLE I.E.= 974.56
SF6
YG=974
MATCHLINE 8+50
(SEE SHEET C6.12)
45.0° ELBOW
STA: 8+71.19, 12.6' LT
MH 40
15" RCP - 75' @ 0.35%
SCALE IN FEET
0
20'
40'
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PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI
PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203
Seal
IN: NORTH STACKED FLATS
FROM: 3+00
TO: 8+50
STACKED FLATS PLAN & PROFILE
1.32%
-2.00%
1.50%
-1.50%
1.50%
-1.50%
1.82%
GRADE BREAK STA = 3+71.83
ELEV = 974.400
GRADE BREAK STA = 4+92.03
ELEV = 972.200
GRADE BREAK STA = 5+61.83
ELEV = 973.400
GRADE BREAK STA = 6+41.99
ELEV = 972.200
GRADE BREAK STA = 7+21.36
ELEV = 973.400
GRADE BREAK STA = 8+31.73
ELEV = 972.200
MH 36
STA:4+27, 0.3' LT
RIM: 972.73
INV(S):969.18
INV(E):968.93
INV(W):968.43
CB 37
STA:4+92, 0.0'
RIM: 972.20
INV(W):969.20
CB 38
STA:6+42, 0.0'
RIM:972.20
INV(E):968.96
CB 39
STA:7+92, 0.0'
RIM:972.20
INV(W):968.85
INV(E):968.87
18" RCP - 144' @ 0.50%
12" RCP - 55' @ 0.50%
15" RCP - 160' @ 0.25%
15" RCP - 78' @ 0.35%
25.57 LF - 8" C900 WM @ 0.00%
14.56 LF - 8" C900 WM @ 0.15%
400.58 LF - 8" C900 WM @ 0.30%
25.94 LF - 8" C900 WM @ -0.62%
26.69 LF - 8" C900 WM @ -0.62%
107.79 LF - 8" C900 WM @ -0.00%
45.0° ELBOW
INV = 963.72
STA: 2+94.93, 12.4' LT
8 IN X 8 IN X 6 IN TEE
STA: 3+06.22, 8.19' RT
INV ELEV = 963.41
8 IN X 8 IN X 6 IN TEE
STA: 7+13.17, 7.95' RT
INV ELEV = 964.65
8 IN X 8 IN GATE
STA: 7+39.98, 7.99' RT
INV ELEV = 964.48
8 IN X 8 IN X 6 IN TEE
STA: 7+67.55, 8.02' RT
INV ELEV = 964.32
984
980
976
972
968
964
960
956
952
948
973.30
973.45
973.78
974.11
974.34
973.84
973.34
972.84
972.34
972.47
972.85
973.22
973.20
972.83
972.45
972.32
972.70
973.07
973.35
972.98
972.60
972.23
972.62
973.08
3+00
3+50
4+00
4+50
5+00
5+50
6+00
6+50
7+00
7+50
8+00
8+50
C6.9
Sep 13, 2023 - 11:01am
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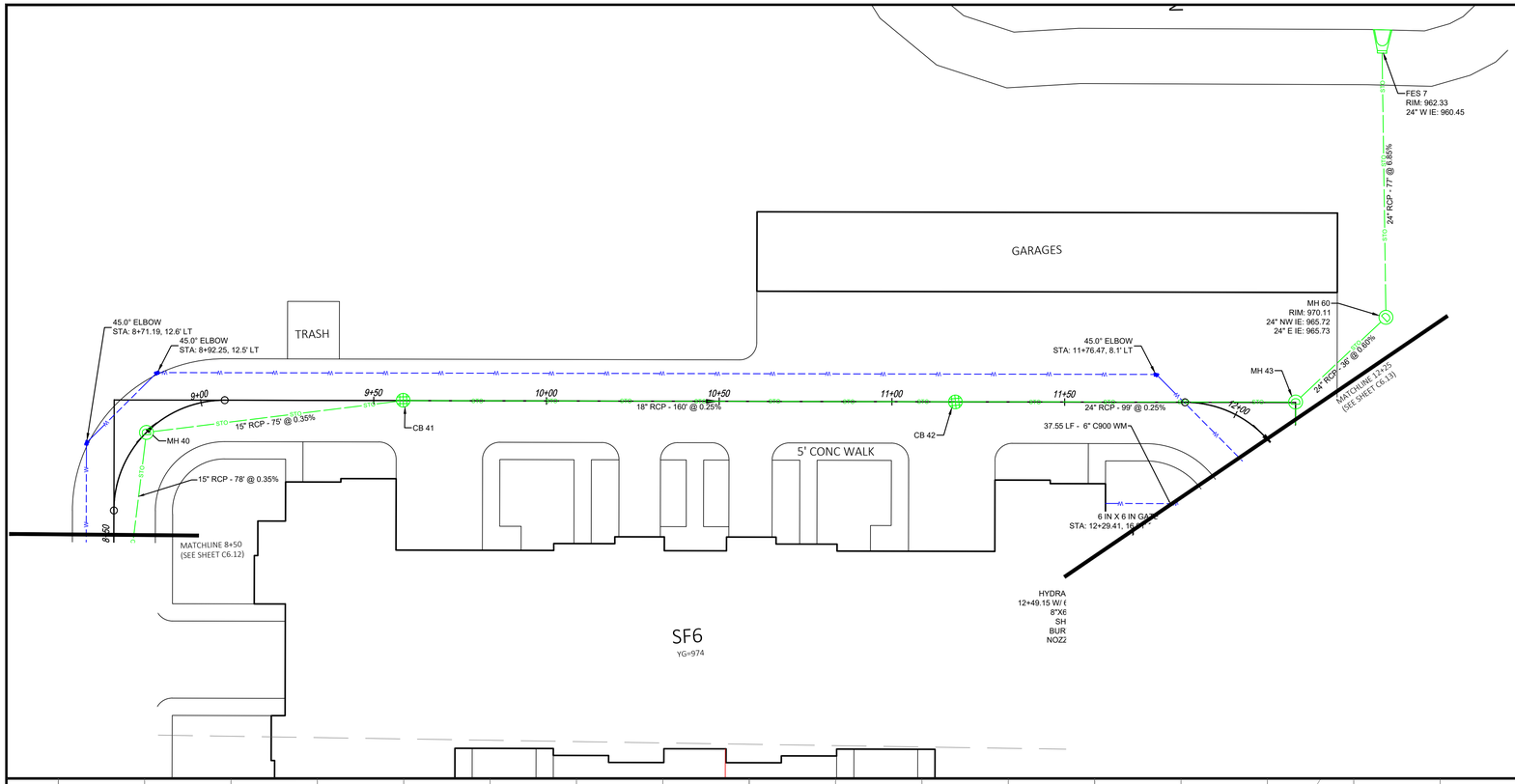

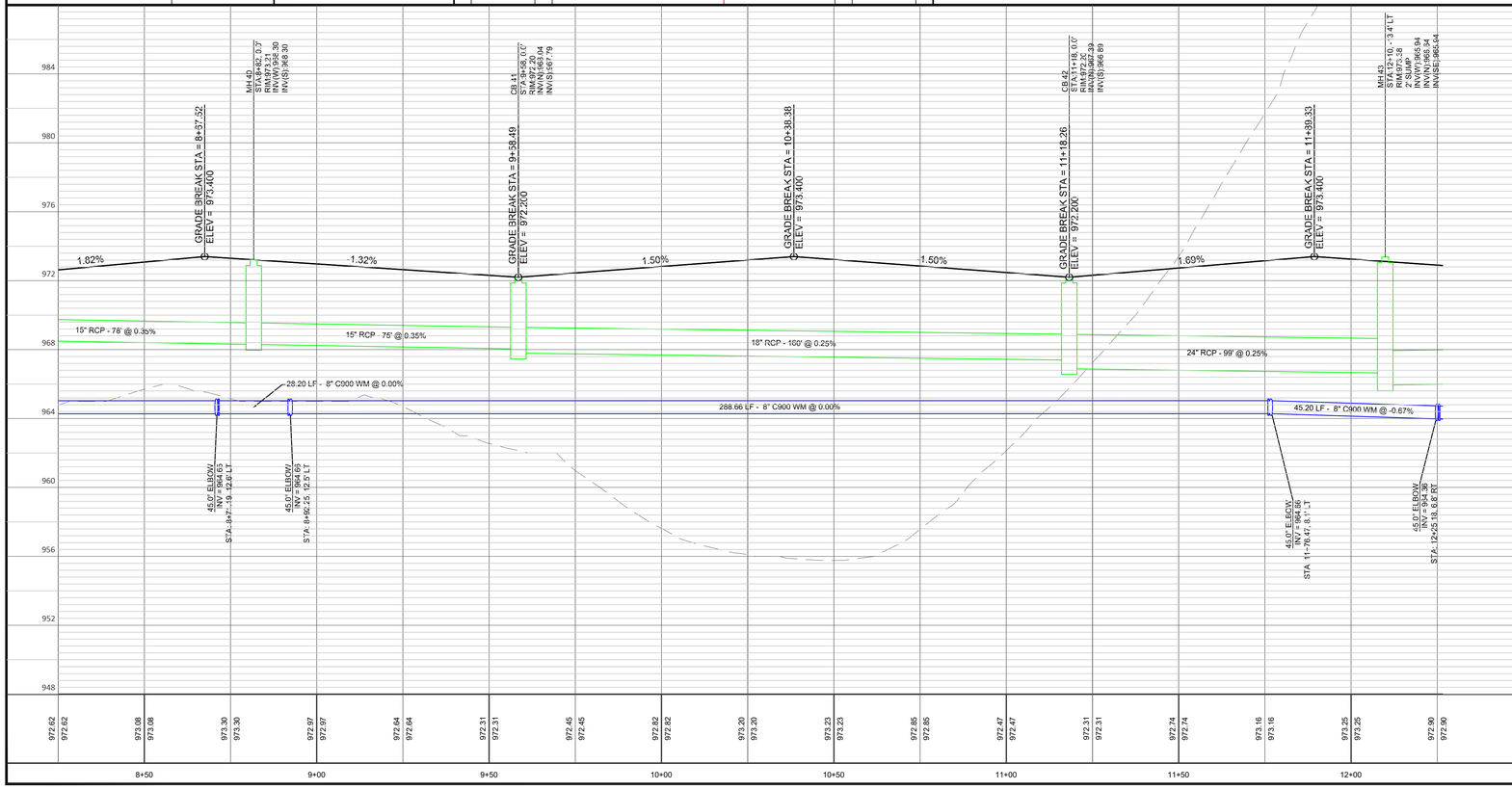

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0 20' 40'

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PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: NORTH STACKED FLATS
FROM: 8+50
TO: 12+00

STACKED FLATS PLAN & PROFILE

C6.10

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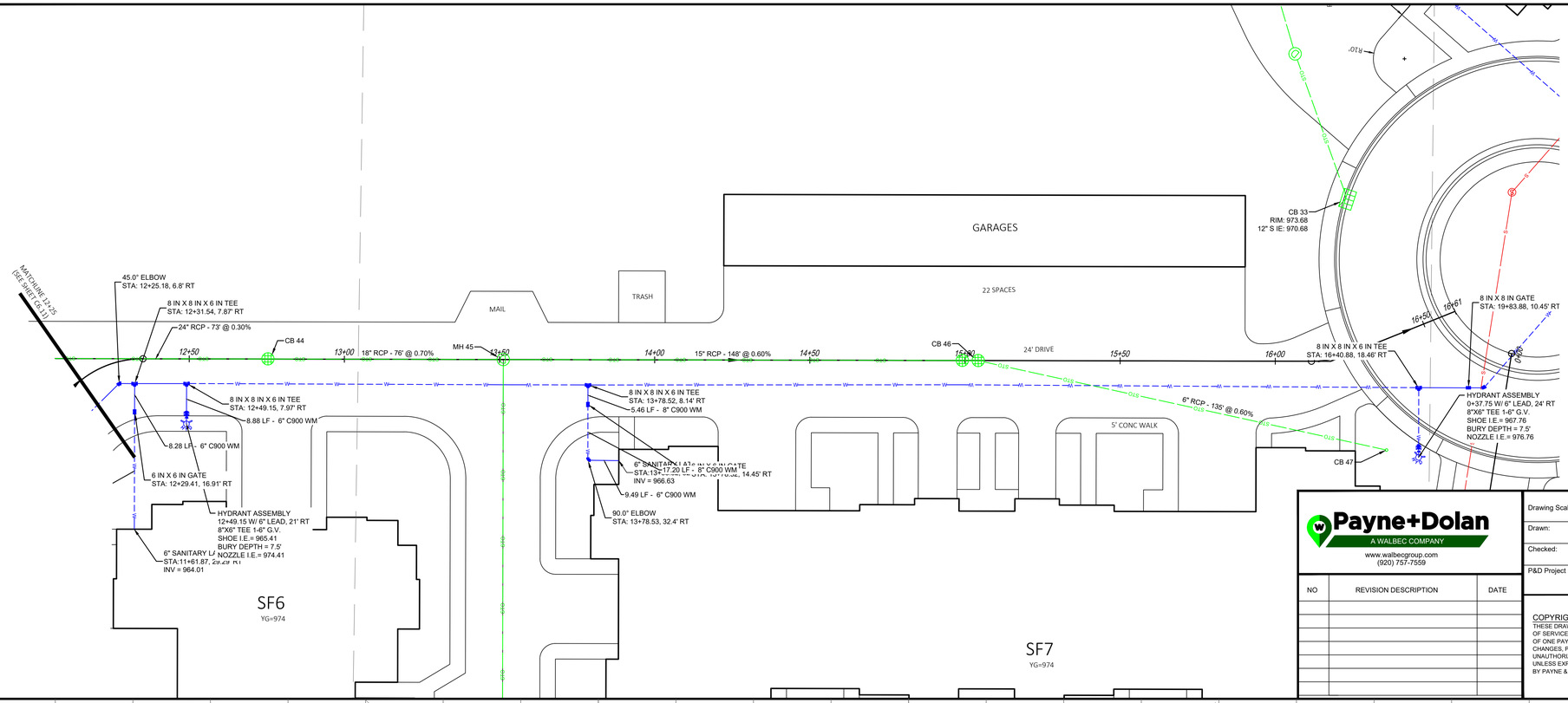

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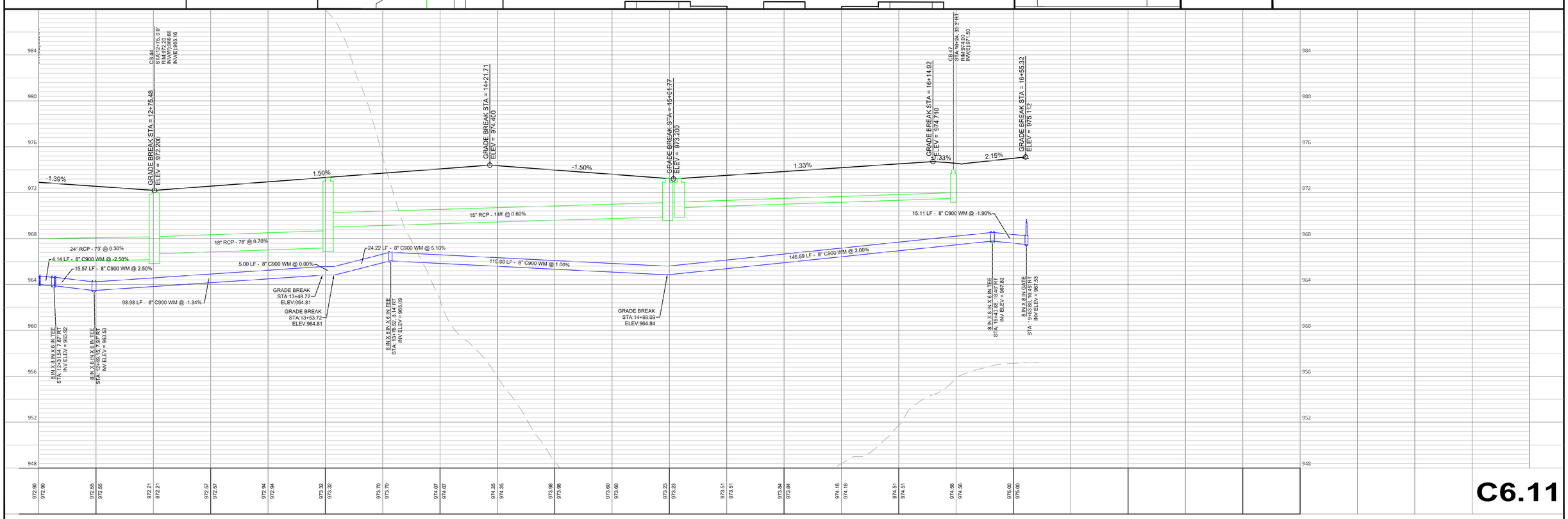
PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: NORTH STACKED FLATS
FROM: 12+00
TO: 16+61

STACKED FLATS PLAN & PROFILE



C6.11

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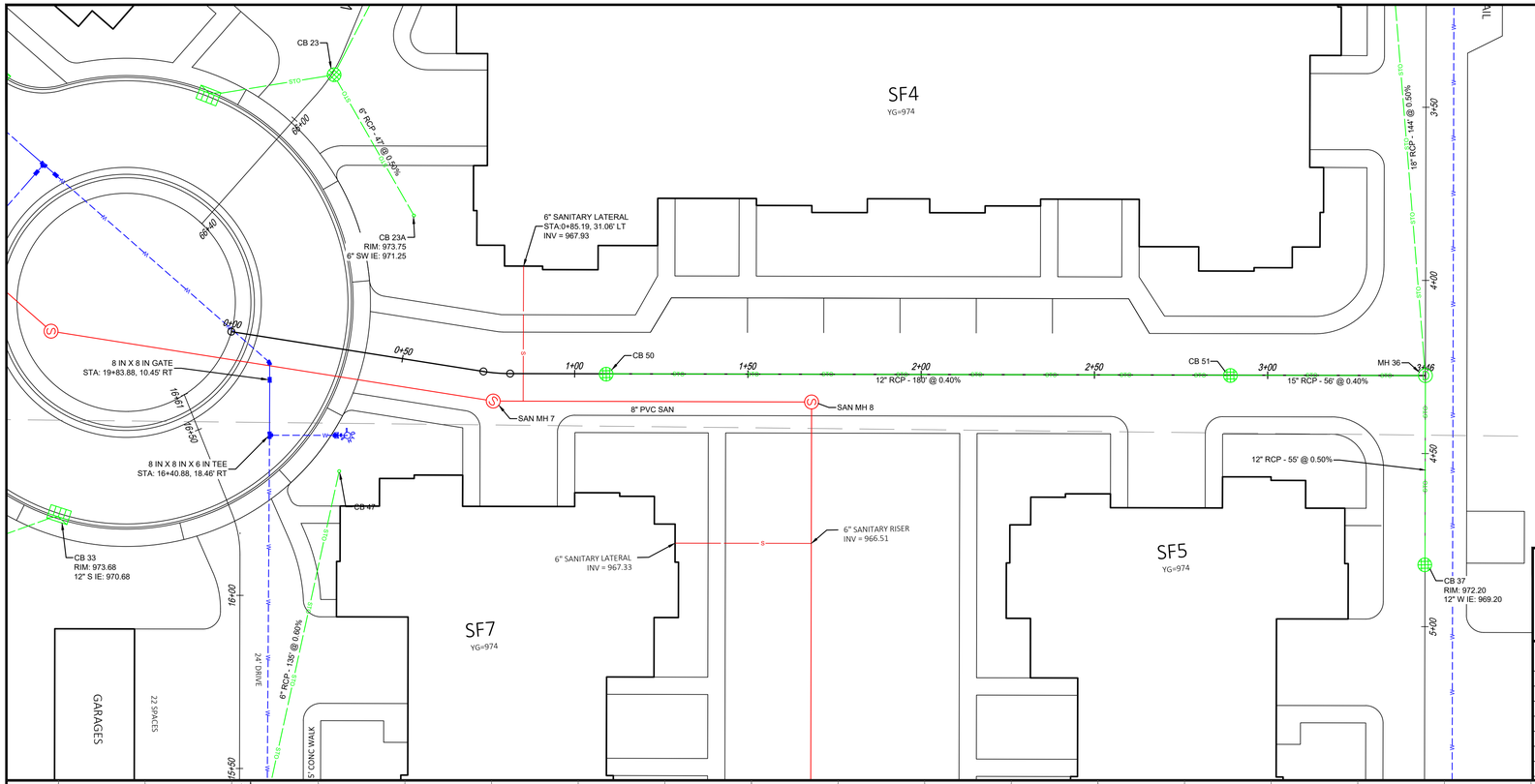

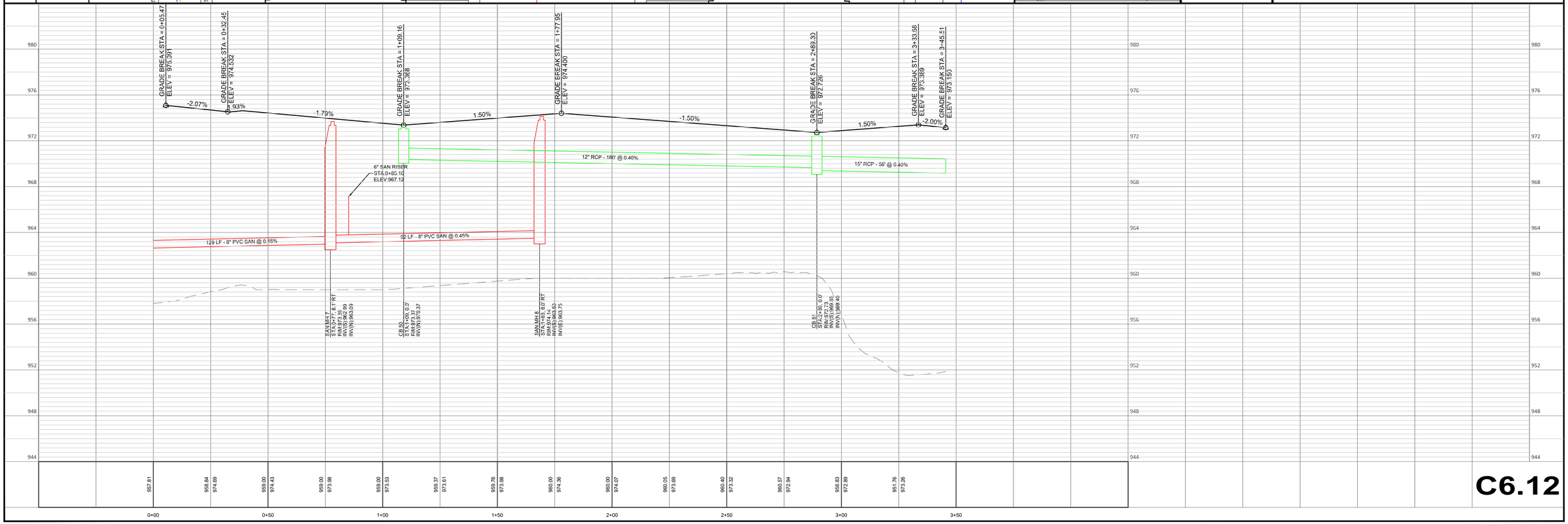

SCALE IN FEET
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700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: NORTH STACKED FLATS
FROM: 0+00
TO: 3+46

STACKED FLATS PLAN & PROFILE

C6.12

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SF7
YG=974

SF5
YG=974

SF6
YG=974

6 IN X 6 IN GATE
STA: 13+78.52, 14.45' RT

17.20 LF - 8" C900 WM

6" SANITARY LATERAL
STA:13+88.52, 32.52' RT
INV = 966.63

6" SANITARY RISER
INV = 966.14

6" SANITARY LATERAL
INV = 967.33

6" SANITARY LATERAL
STA:7+03.18, 30.11' RT
INV = 964.73

33.14 LF - 6" C900 WM

6 IN X 6 IN GATE
STA: 7+13.17, 3.81' RT

MH 45

SAN MH 9

CB 48

CB 49

18" RCP - 173' @ 0.70%

12" RCP - 99' @ 0.25%

15" RCP - 148' @ 0.60%

15" RCP - 160' @ 0.25%

13" RCP - 76' @ 0.70%

6" SANITARY LATERAL
STA:1+64.86, 47.50' RT
INV = 964.85

HYDRANT ASSEMBLY
12+49.15 W/ 6" LEAD, 21' RT
8"X6" TEE 1-6" G.V.
SHOE I.E.= 965.41
BURY DEPTH = 7.5'
NOZZLE I.E.= 974.41

24" RCP - 73' @ 0.30%

6 IN X 6 IN GATE
STA: 12+29.41, 16.91' RT

0+00 0+50 1+00 1+50 2+00 2+50 3+00 3+42

14+50 14+00 13+50 13+00 12+50 6+50 7+00 7+50 8+00 8+50

SCALE IN FEET
0 20' 40'

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NO	REVISION DESCRIPTION	DATE

Drawing Scale: 1" = 20'
Drawn: 09/08/2023
Checked: 09/08/2023
P&D Project No: 490686

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PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: NORTH STACKED FLATS
FROM: 0+00
TO: 3+42

STACKED FLATS PLAN & PROFILE

GRADE BREAK STA = 0+00.00
ELEV = 973.440
2.00%
GRADE BREAK STA = 0+57.21
ELEV = 974.353
1.50%
-1.50%
GRADE BREAK STA = 0+97.00
ELEV = 973.760
-2.00%
GRADE BREAK STA = 1+75.06
ELEV = 972.200
2.00%
GRADE BREAK STA = 2+26.00
ELEV = 973.219
-2.00%
GRADE BREAK STA = 2+76.95
ELEV = 972.200
2.00%
GRADE BREAK STA = 3+29.88
ELEV = 973.260
-2.00%
GRADE BREAK STA = 3+41.98
ELEV = 973.020

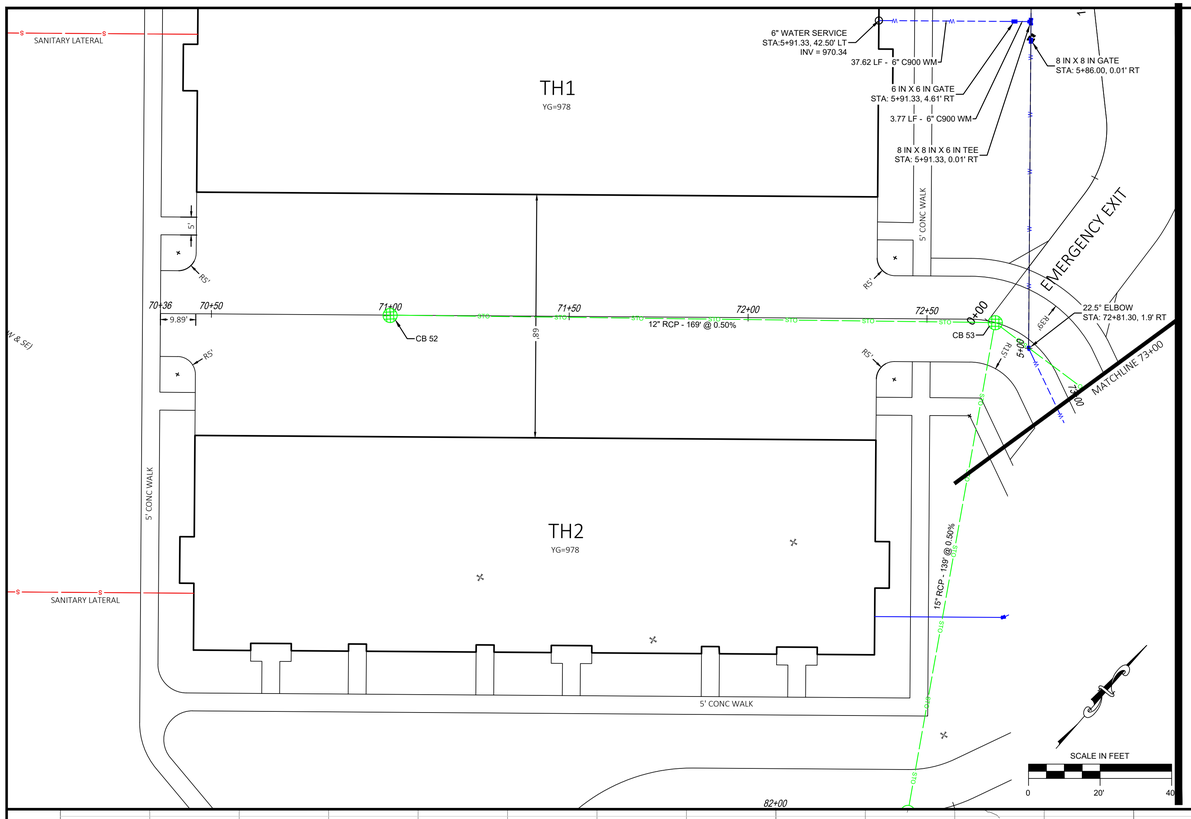
6" SAN RISER
STA:1+65.00
ELEV:963.69

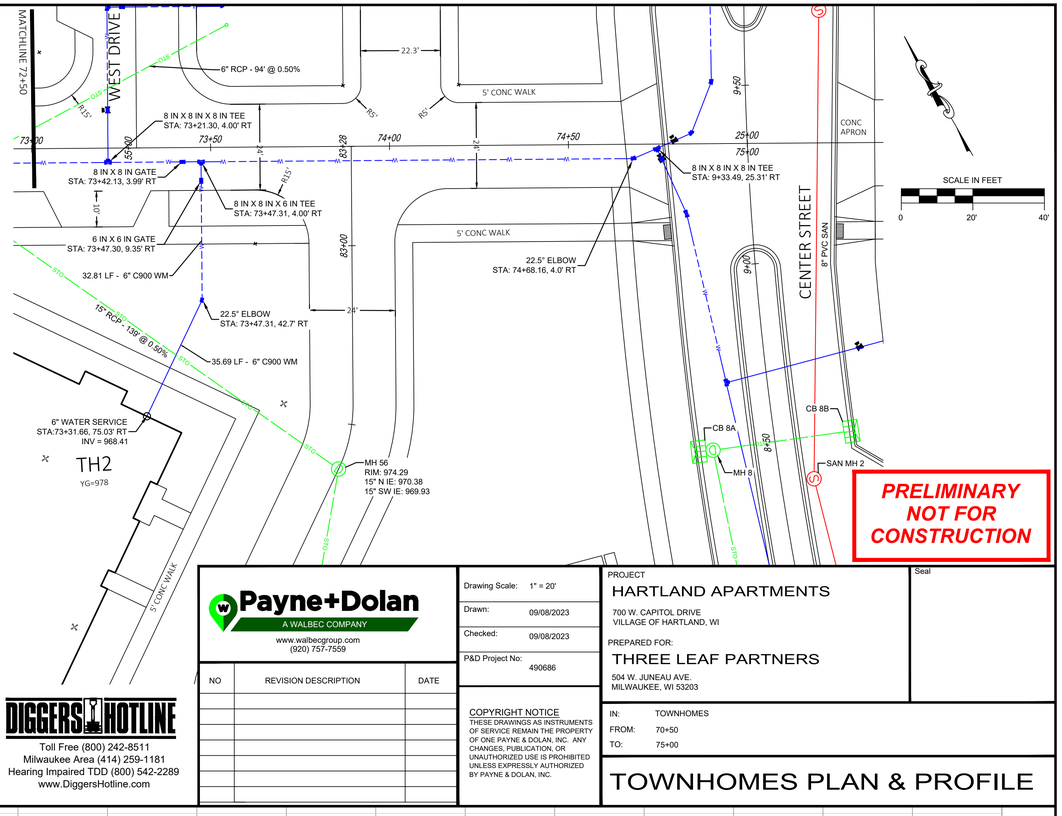
SAN MH 9
STA:1+65.00, 8.0' LT
RIM:972.84
INV(W):955.09

CB 48
STA:1+78.00, 0.0'
RIM:973.287
INV(E):968.77
INV(N):968.95

CB 49
STA:2+77.00, 0.0'
RIM:972.20
INV(S):968.20

| | | |





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Drawn: 09/08/2023
Checked: 09/08/2023
P&D Project No: 490686

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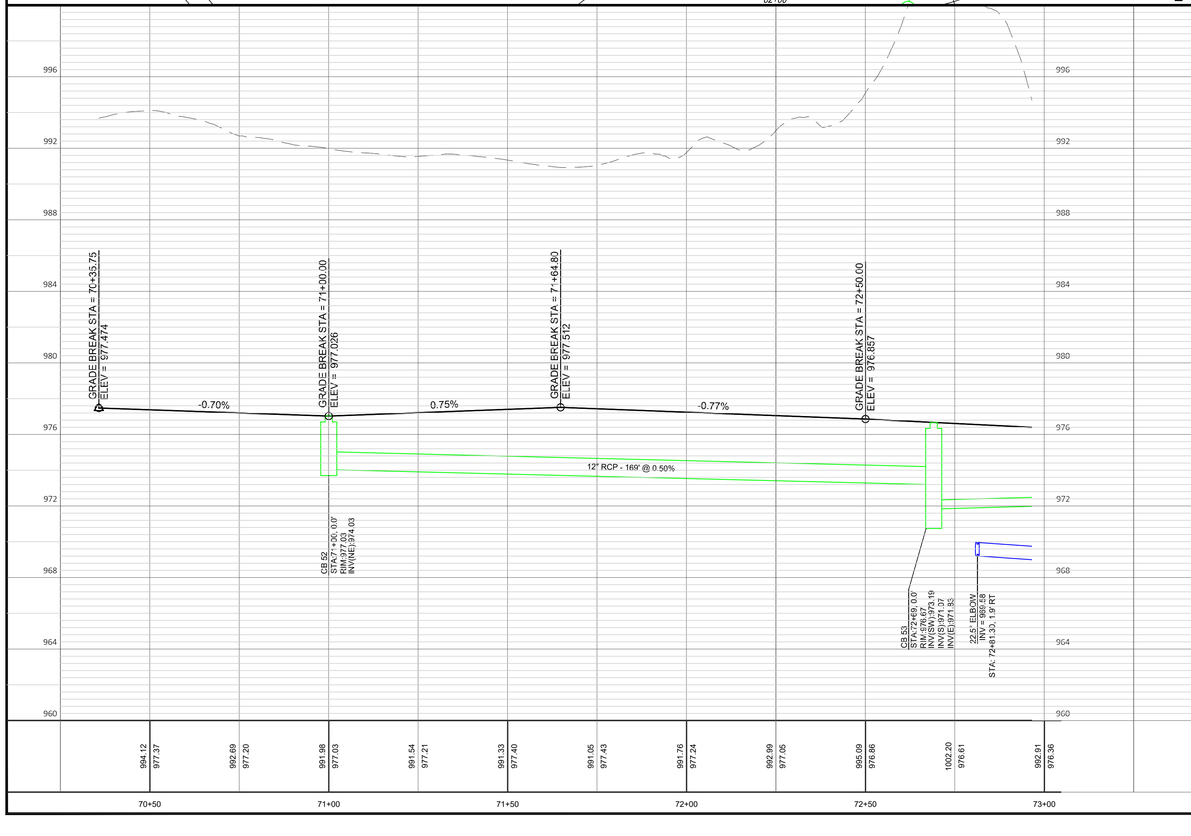
PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

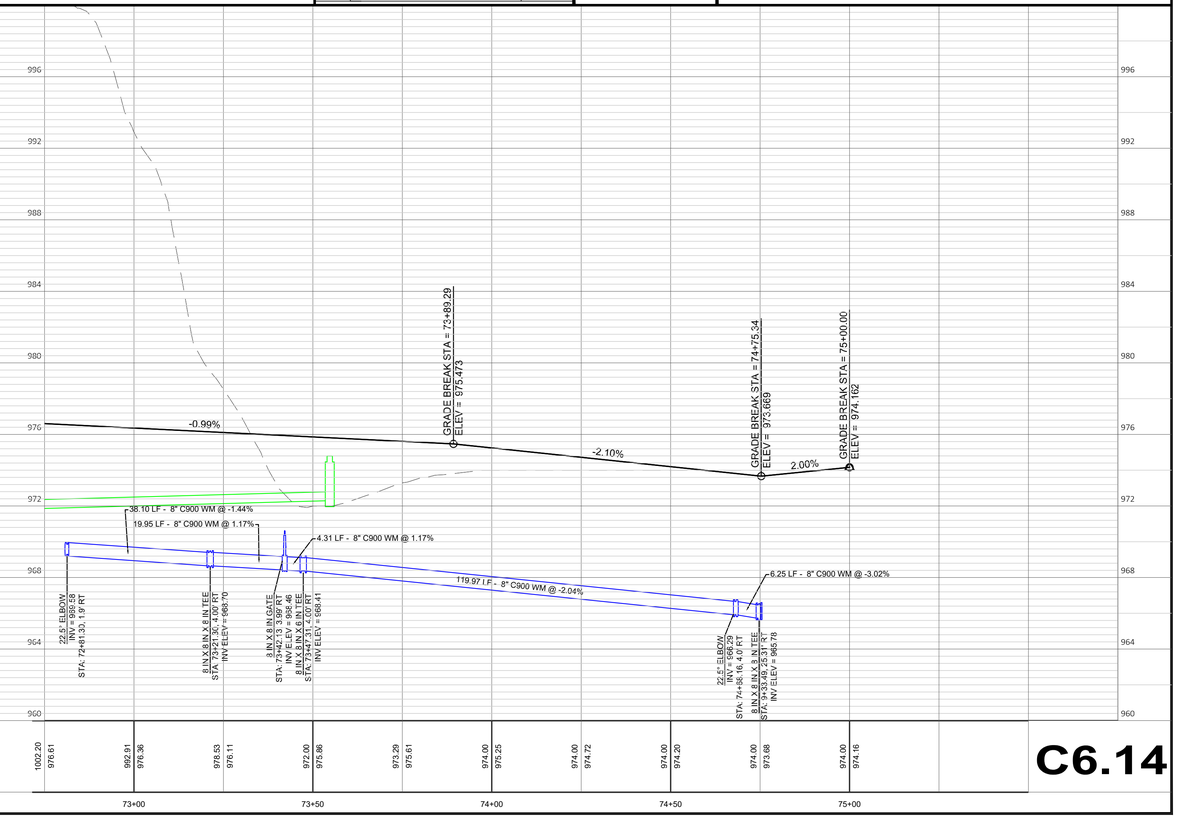
PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: TOWNHOMES
FROM: 70+50
TO: 75+00

TOWNHOMES PLAN & PROFILE





C6.14

Sep 13, 2023 - 11:03am
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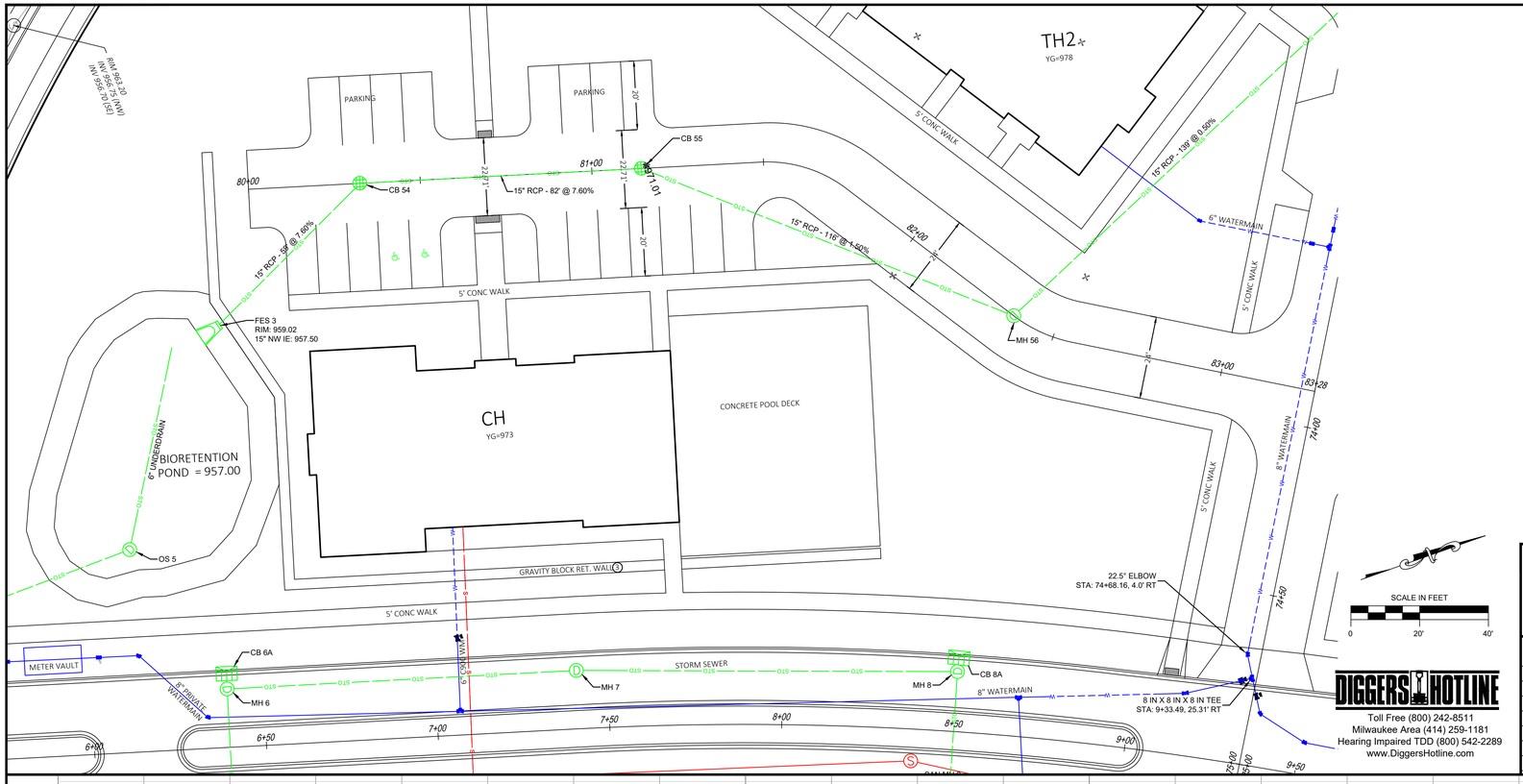

SCALE IN FEET
0 20' 40'

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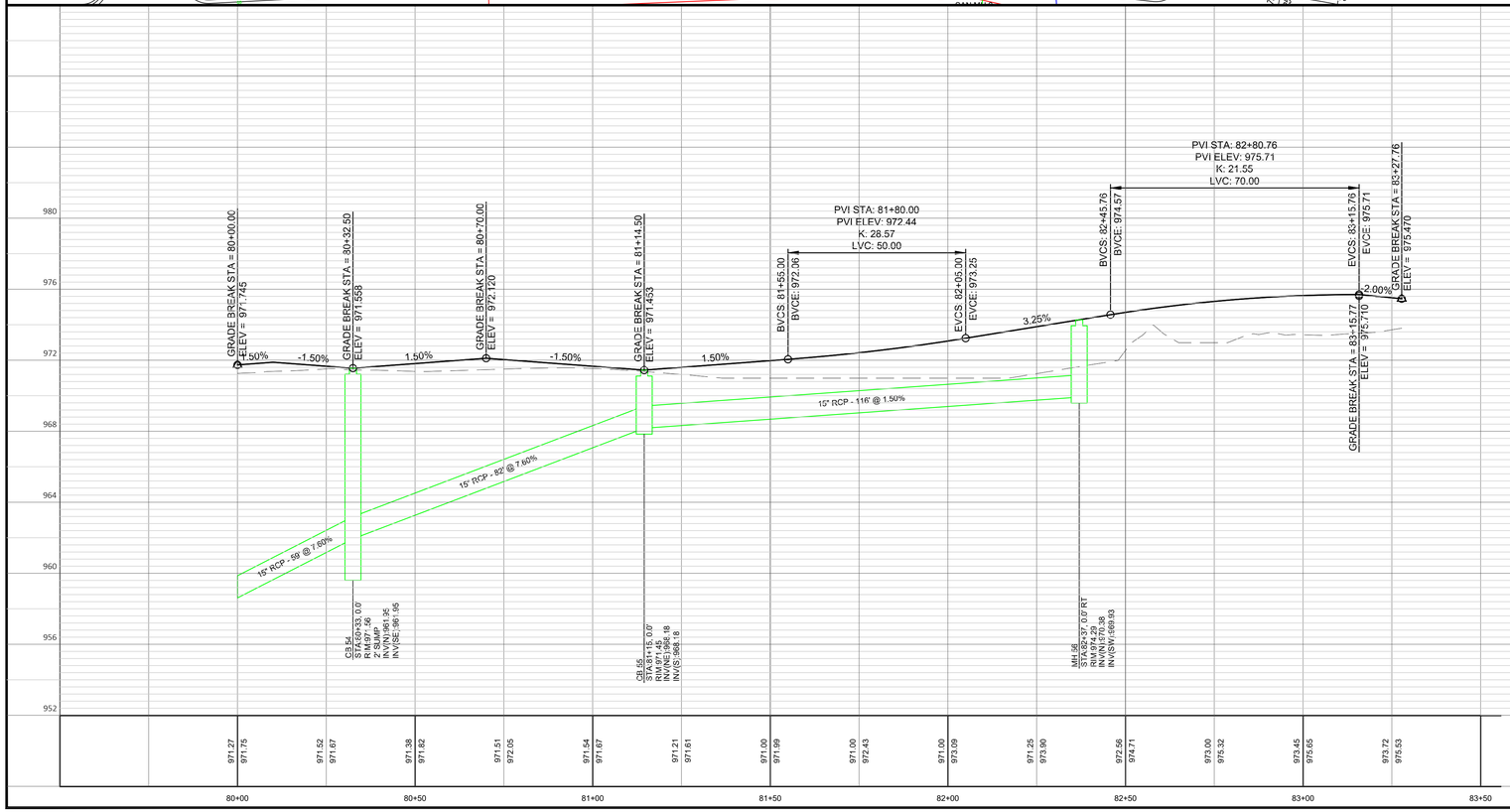
PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: TOWNHOMES
FROM: 80+00
TO: 82+27.53

TOWNHOMES PLAN & PROFILE



Sep 13, 2023 — 11:03am
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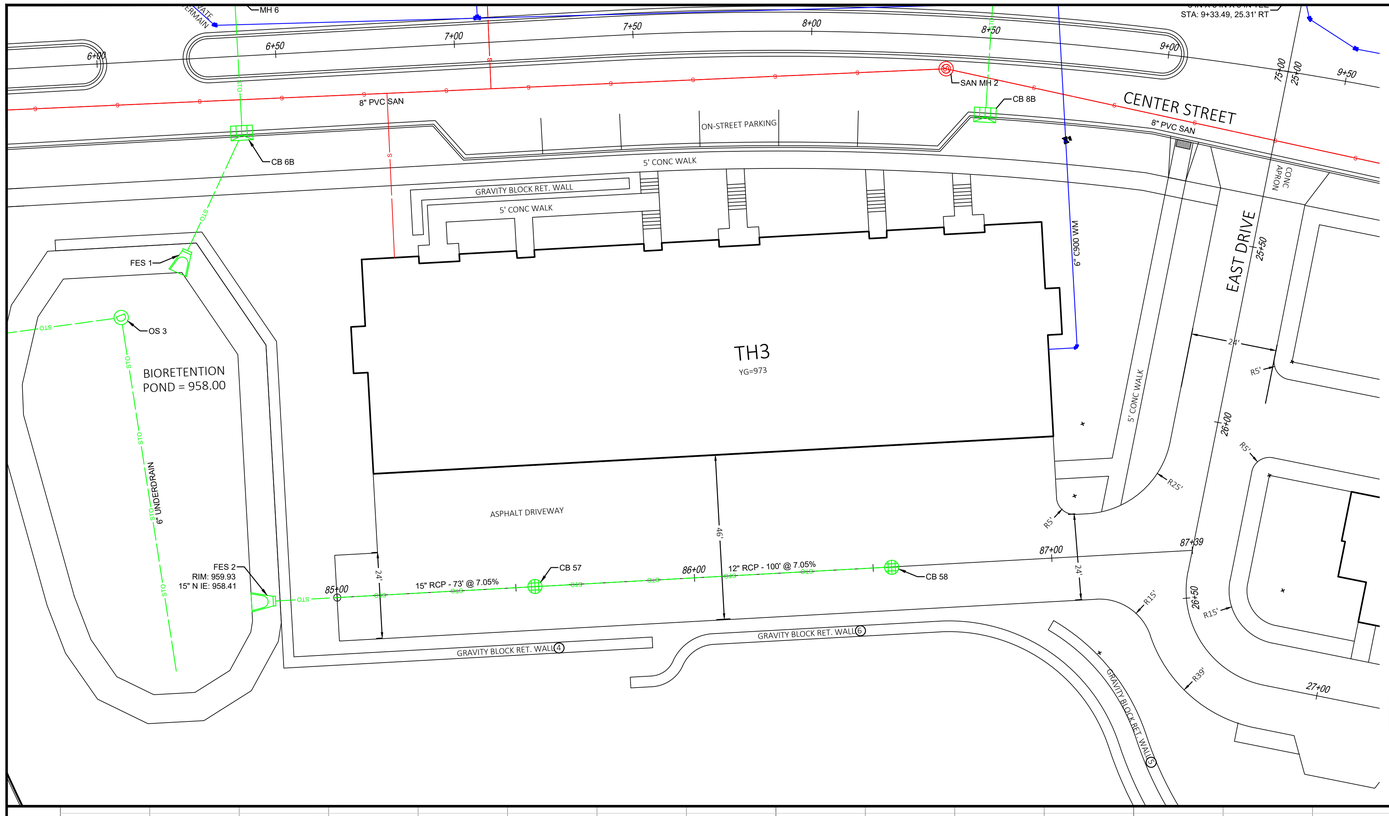

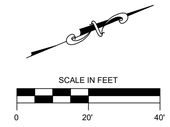

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P&D Project No: 490686

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700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
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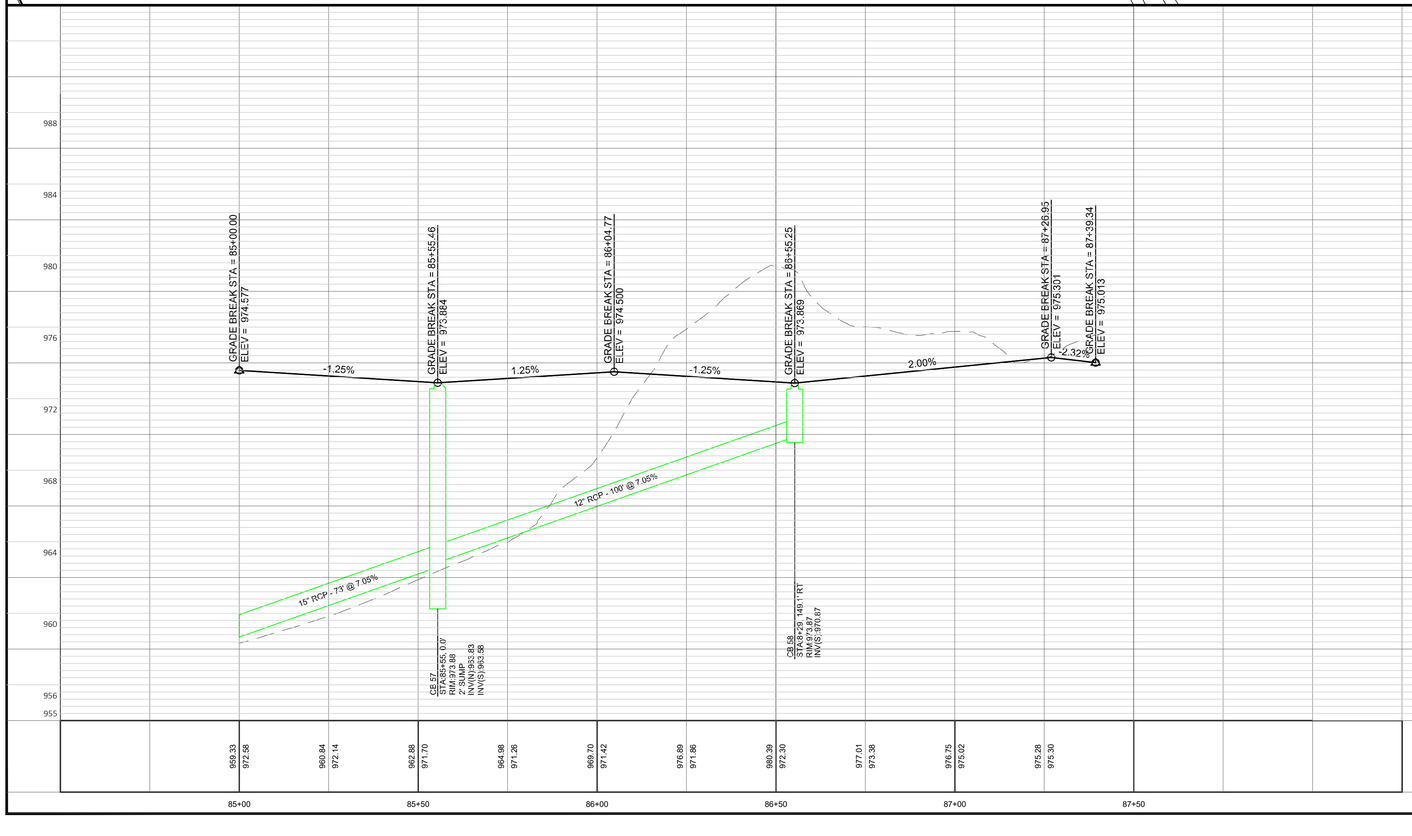
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: TOWNHOMES
FROM: 85+00
TO: 87+39.34

TOWNHOMES PLAN & PROFILE



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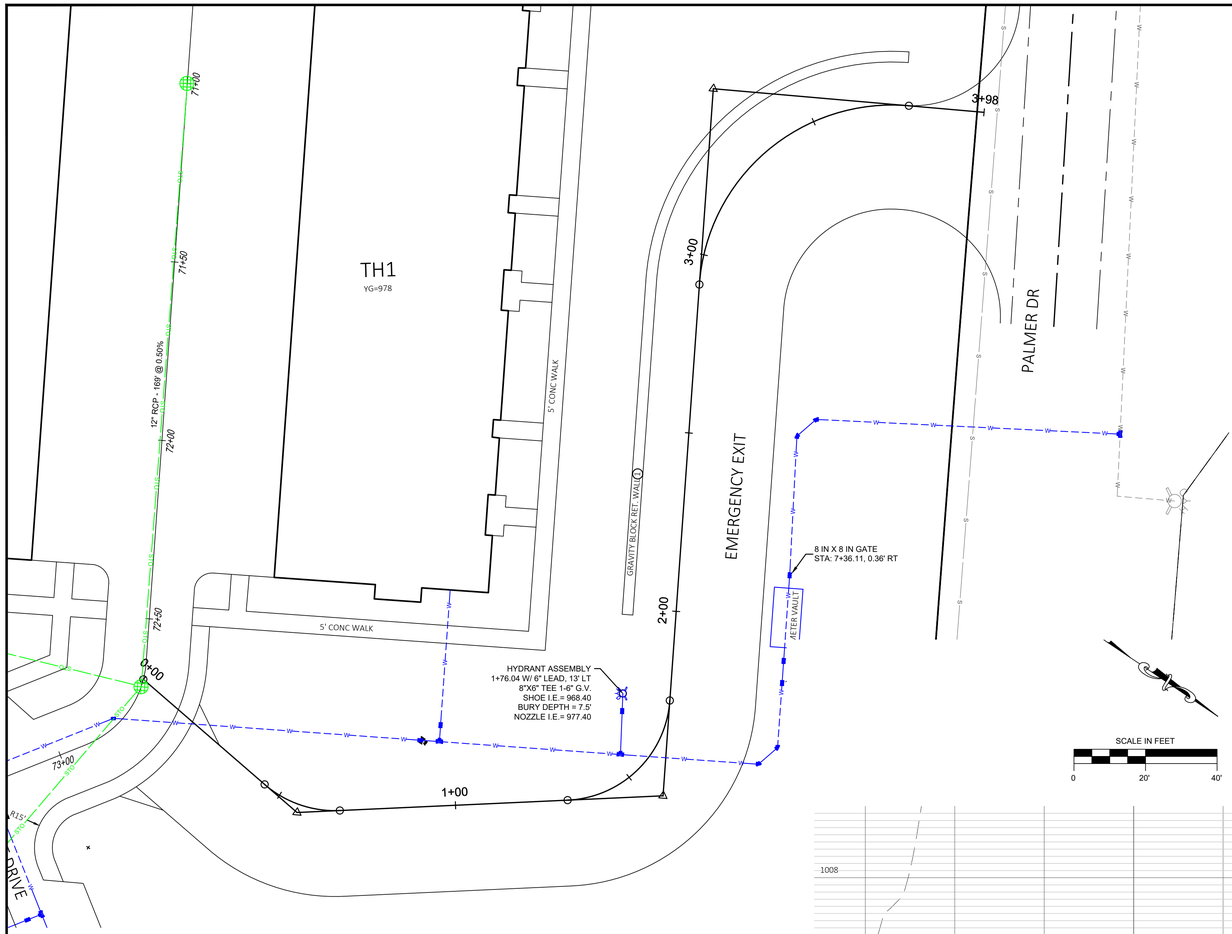

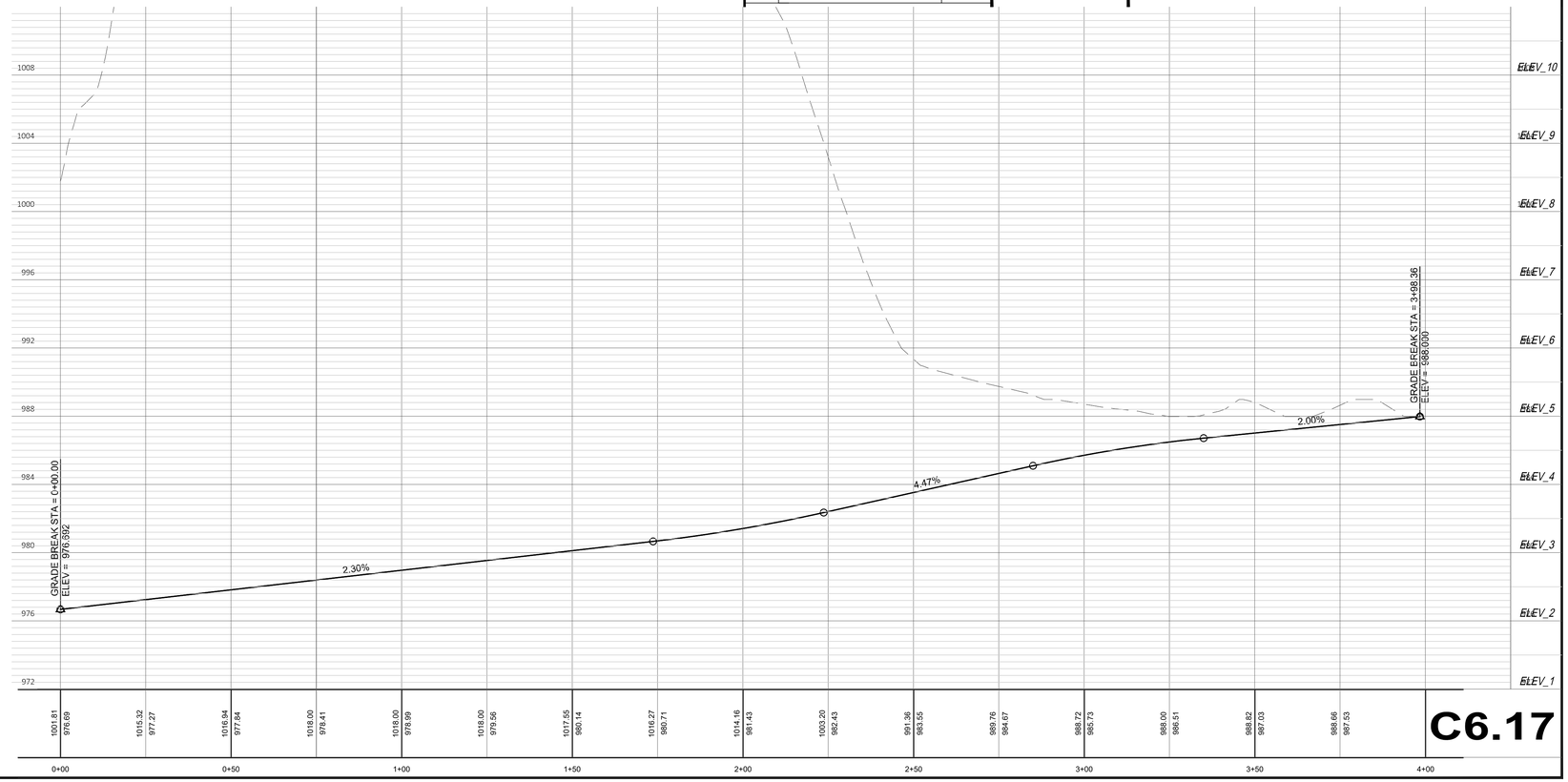

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700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
THREE LEAF PARTNERS
504 W. JUNEAU AVE.
MILWAUKEE, WI 53203

Seal

IN: TOWNHOMES
FROM: 0+00
TO: 3+98.37

FIRE EXIT PLAN & PROFILE

C6.17

Sep 13, 2023 - 11:04am
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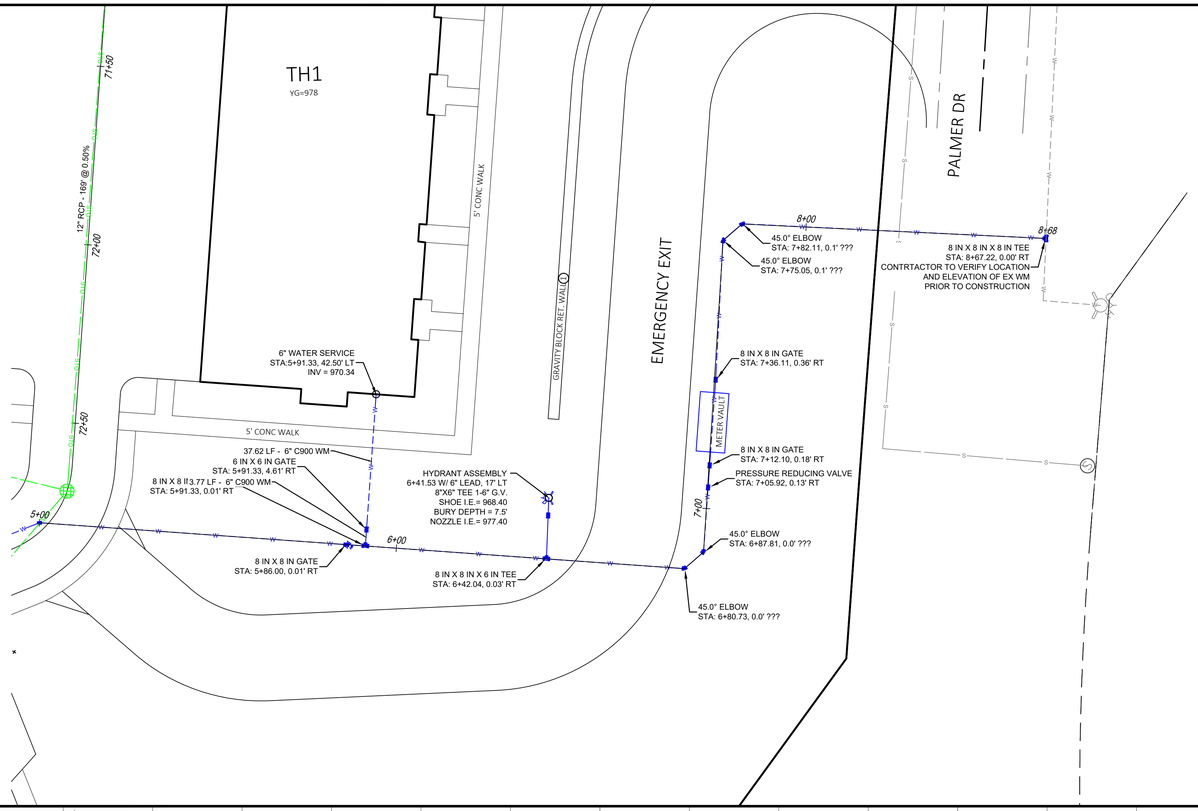

SCALE IN FEET

0 20' 40'

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700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

PREPARED FOR:
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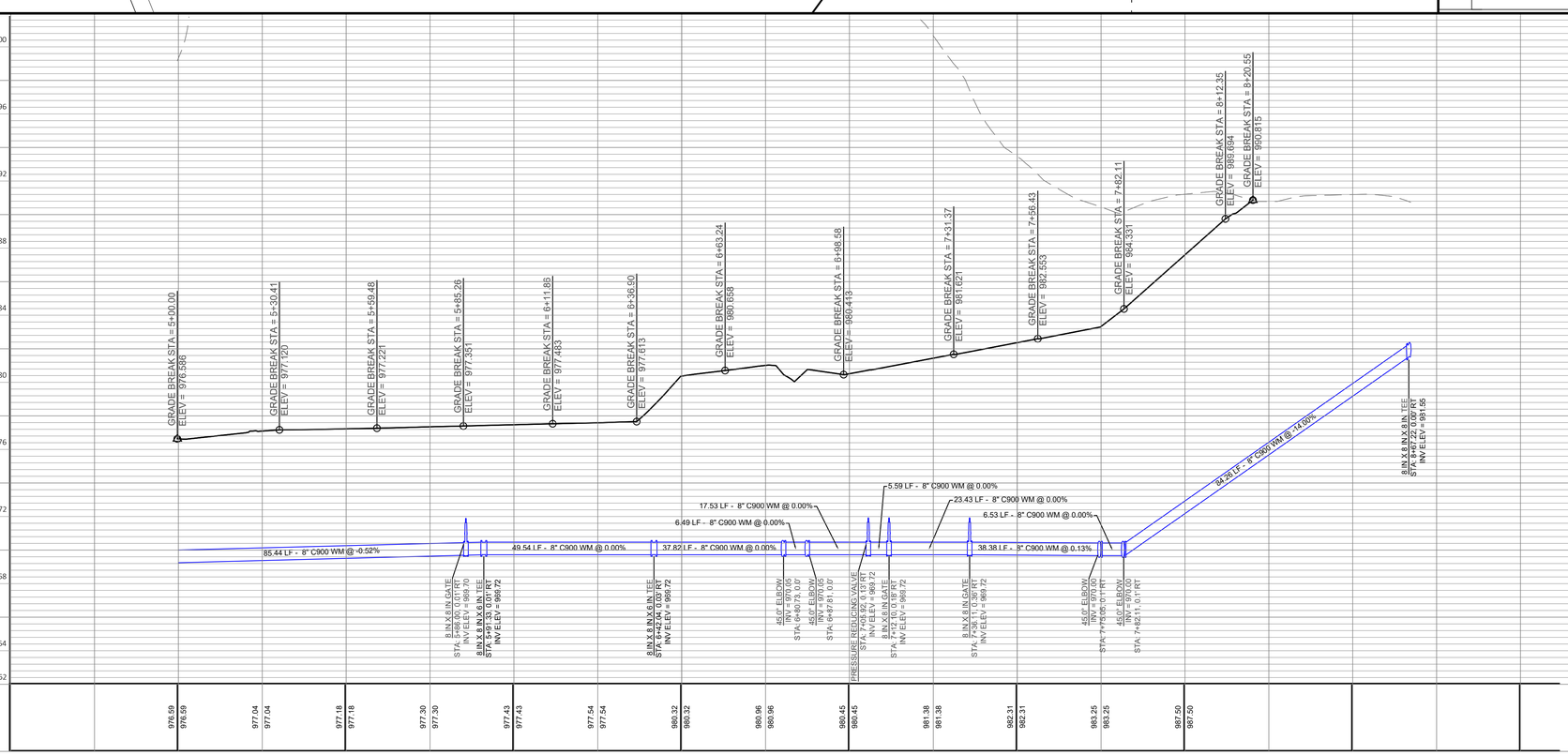
MILWAUKEE, WI 53203

Seal

IN: FIRE EXIT
FROM: 20+00
TO: 22+72

PALMER CONN WM P&P



C6.18

Sep 13, 2023 - 11:04am
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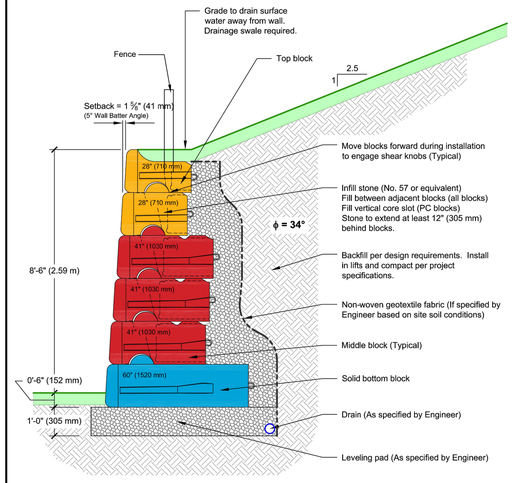
ϕ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

LOAD CONDITION C | 1:2.5 BACK SLOPE, NO LIVE LOAD SURCHARGE, NO TOE SLOPE

6 BLOCK HIGH SECTION
(2) 28" (710 mm) Blocks
(3) 41" (1030 mm) Blocks
(1) 60" (1520 mm) Block

PRELIMINARY
Professional Engineering Design
Required for Construction



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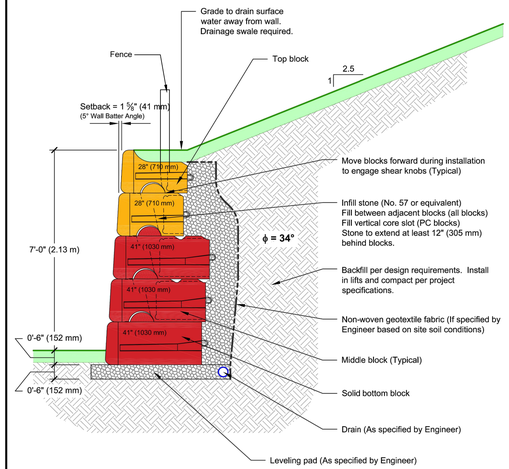
DRAWN BY: C. Kruger	TITLE: **Preliminary Wall Section** Dense Well-Graded Sand or Sand and Gravel, **ϕ = 34°** 1 : 2.5 Back Slope, No Live Load Surcharge, No Toe Slope	REDI-ROCK® 05481 US 31 SOUTH, CHARLEVOIX, MI 49720 (866) 222-8400 ext 3010 • engineering@redi-rock.com www.redi-rock.com
APPROVED BY: J. Johnson		
DATE: June 8, 2015		
SHEET: 1 of 1	FILE: C_34_B_60_108_cad.dwg	

ϕ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

LOAD CONDITION C | 1:2.5 BACK SLOPE, NO LIVE LOAD SURCHARGE, NO TOE SLOPE

5 BLOCK HIGH SECTION
(2) 28" (710 mm) Blocks
(3) 41" (1030 mm) Blocks

PRELIMINARY
Professional Engineering Design
Required for Construction



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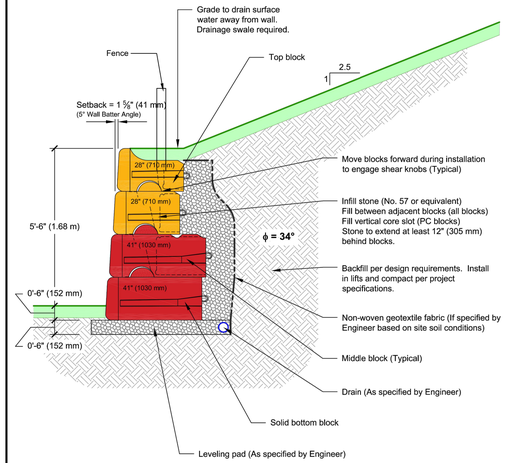
APPROVED BY: J. Johnson		
DATE: June 8, 2015		
SHEET: 1 of 1	FILE: C_34_B_41_90_cad.dwg	

ϕ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

LOAD CONDITION C | 1:2.5 BACK SLOPE, NO LIVE LOAD SURCHARGE, NO TOE SLOPE

4 BLOCK HIGH SECTION
(2) 28" (710 mm) Blocks
(2) 41" (1030 mm) Blocks

PRELIMINARY
Professional Engineering Design
Required for Construction



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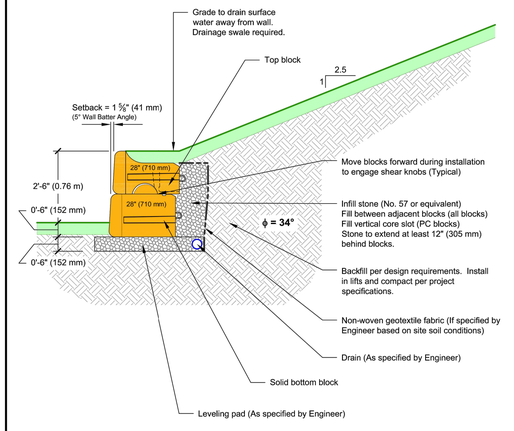
DRAWN BY: C. Kruger	TITLE: **Preliminary Wall Section** Dense Well-Graded Sand or Sand and Gravel, **ϕ = 34°** 1 : 2.5 Back Slope, No Live Load Surcharge, No Toe Slope	REDI-ROCK® 05481 US 31 SOUTH, CHARLEVOIX, MI 49720 (866) 222-8400 ext 3010 • engineering@redi-rock.com www.redi-rock.com
APPROVED BY: J. Johnson		
DATE: June 8, 2015		
SHEET: 1 of 1	FILE: C_34_B_41_72_cad.dwg	

ϕ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

LOAD CONDITION C | 1:2.5 BACK SLOPE, NO LIVE LOAD SURCHARGE, NO TOE SLOPE

2 BLOCK HIGH SECTION
(2) 28" (710 mm) Blocks

PRELIMINARY
Professional Engineering Design
Required for Construction



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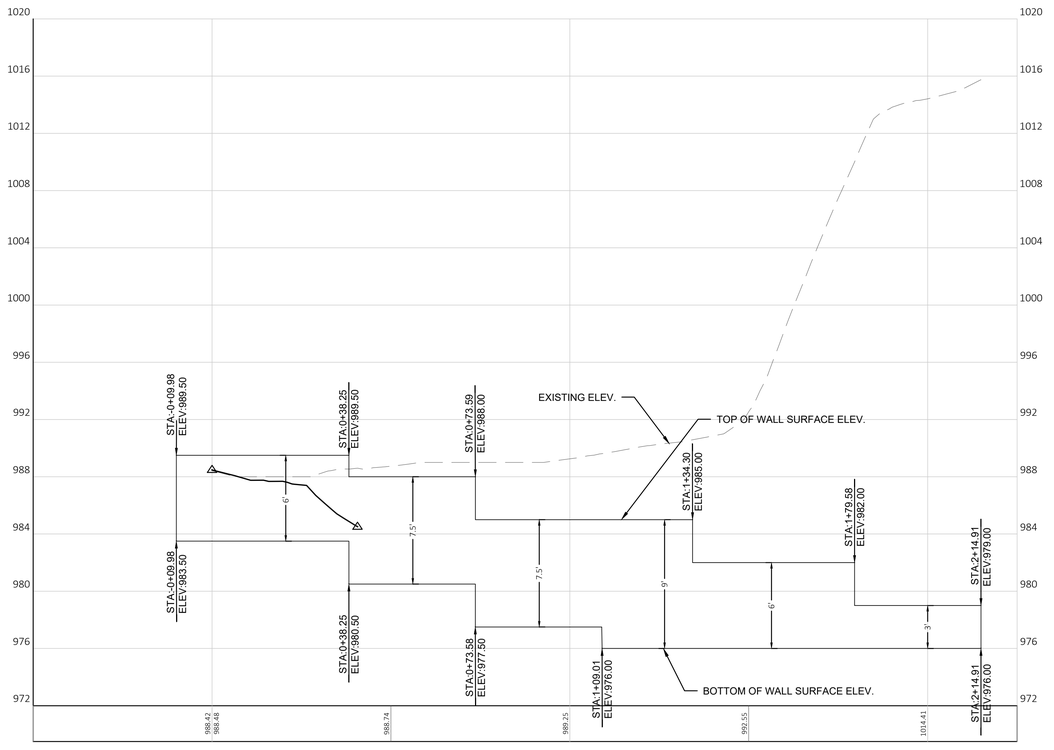
DRAWN BY: C. Kruger	TITLE: **Preliminary Wall Section** Dense Well-Graded Sand or Sand and Gravel, **ϕ = 34°** 1 : 2.5 Back Slope, No Live Load Surcharge, No Toe Slope	REDI-ROCK® 05481 US 31 SOUTH, CHARLEVOIX, MI 49720 (866) 222-8400 ext 3010 • engineering@redi-rock.com www.redi-rock.com
APPROVED BY: J. Johnson		
DATE: June 8, 2015		
SHEET: 1 of 1	FILE: C_34_B_28_36_cad.dwg	



GRAVITY WALL NOTES

1. *RETAINING WALLS TO BE RECON, REDI–ROCK OR EQUIVALENT PRODUCT.*
2. *RETAINING WALLS GREATER THAN 4–FEET IN HEIGHT SHALL BE PREPARED, STAMPED AND SIGNED BY A WISCONSIN LICENSED PROFESSIONAL ENGINEER.*
3. *CONTRACTOR TO PROVIDE RETAINING WALL SHOP DRAWINGS AND STAMPED RETAINING WALL PLANS BASED ON CONSTRUCTION PLANS AND FIELD CONDITIONS FOR FINAL APPROVAL BY THEE VILLAGE PRIOR TO INSTALLATION.*
4. *RETAINING WALL COLOR SHALL BE NATURAL CONCRETE, UNSTAINED. WALL BLOCK FINISH SHALL BE LIMESTONE TEXTURE WITH A 42–INCH DECORATIVE, BLACK ALUMINUM FENCE PLACED AT THE TOP OF THE FINISHED WALL PER FINAL APPROVAL BY THE VILLAGE.*
5. *1,425 SF OF BLOCK*

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NO	REVISION DESCRIPTION	DATE

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PROJECT
HARTLAND APARTMENTS
700 W CAPITOL DR
VILLAGE OF HARTLAND, WI

CLIENT
THREE LEAF PARTNERS
504 W. JUNEAU AVE
MILWAUKEE, WI 53203

Seal

SHEET TITLE
CONSTRUCTION DETAILS
WALL 1 PROFILE - INSIDE FIRE LANE
GRAVITY BLOCK WALL

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Drawn:	NJO 09/08/2023
Checked:	CTD 09/08/2023
P&D Project No:	490686

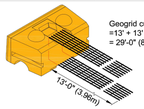
Sheet No.
C7.0

ϕ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

LOAD CONDITION CR | 1:2 CREST SLOPE, 10' (3.0m) HIGH, 250 lb/ft² (12 kPa) SURCHARGE AT CREST

12 BLOCK HIGH SECTION
(12) 28" (710 mm) Blocks

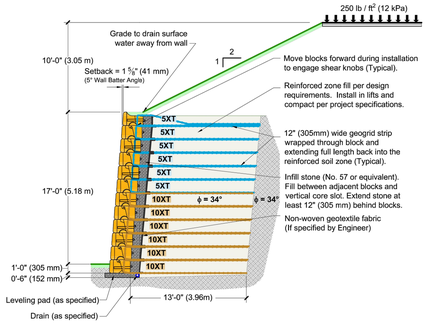
PRELIMINARY
Professional Engineering Design
Required for Construction



Geogrid cut length:
=13' + 13' + 3'
= 29'-0" (8.84m)

Geogrid Rolls Required per Wall Length		
Type	*Rolls / linear ft*	*Rolls / linear m*
5XT	± 0.26	± 0.85
10XT	± 0.26	± 0.85

Geogrid shall be 12" (305 mm) wide strips of Mirafi geogrid, type as noted. Geogrid shall be **Factory cut** and **Certified** for width and strength by TenCate Mirafi.



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DRAWN BY:	B. Lindfors
APPROVED BY:	J. Johnson
DATE:	Oct 30, 2015
SHEET:	1 of 1
TITLE:	**Preliminary Wall Section** Dense Well-Graded Sand or Sand and Gravel, Ø=34° 1:2 Crest Slope, 10' (3.0m) High, 250 lb/ft² (12 kPa) Surcharge
FILE:	CR_34_PC_28_216_cad.dwg

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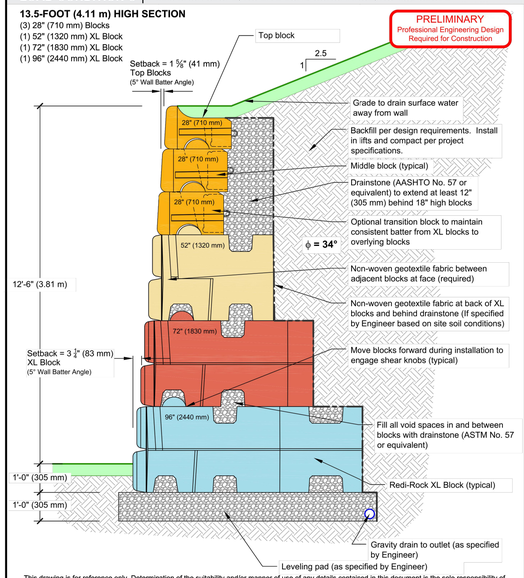
(866) 222-8400 ext 3010 • engineering@redi-rock.com
www.redi-rock.com

ϕ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

LOAD CONDITION C | 1:2.5 BACK SLOPE, NO LIVE LOAD SURCHARGE, NO TOE SLOPE

13.5-FOOT (4.11 m) HIGH SECTION
(3) 28" (710 mm) Blocks
(1) 52" (1320 mm) XL Block
(1) 72" (1830 mm) XL Block
(1) 96" (2440 mm) XL Block

PRELIMINARY
Professional Engineering Design
Required for Construction



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DRAWN BY:	N. Lindwall
APPROVED BY:	J. Johnson
DATE:	May 13, 2019
SHEET:	1 of 1
TITLE:	**Preliminary Wall Section** Dense Well-Graded Sand or Sand and Gravel, ϕ = 34° 1 : 2.5 Back Slope, No Live Load Surcharge, No Toe Slope
FILE:	C_34_XL_162_cad.dwg

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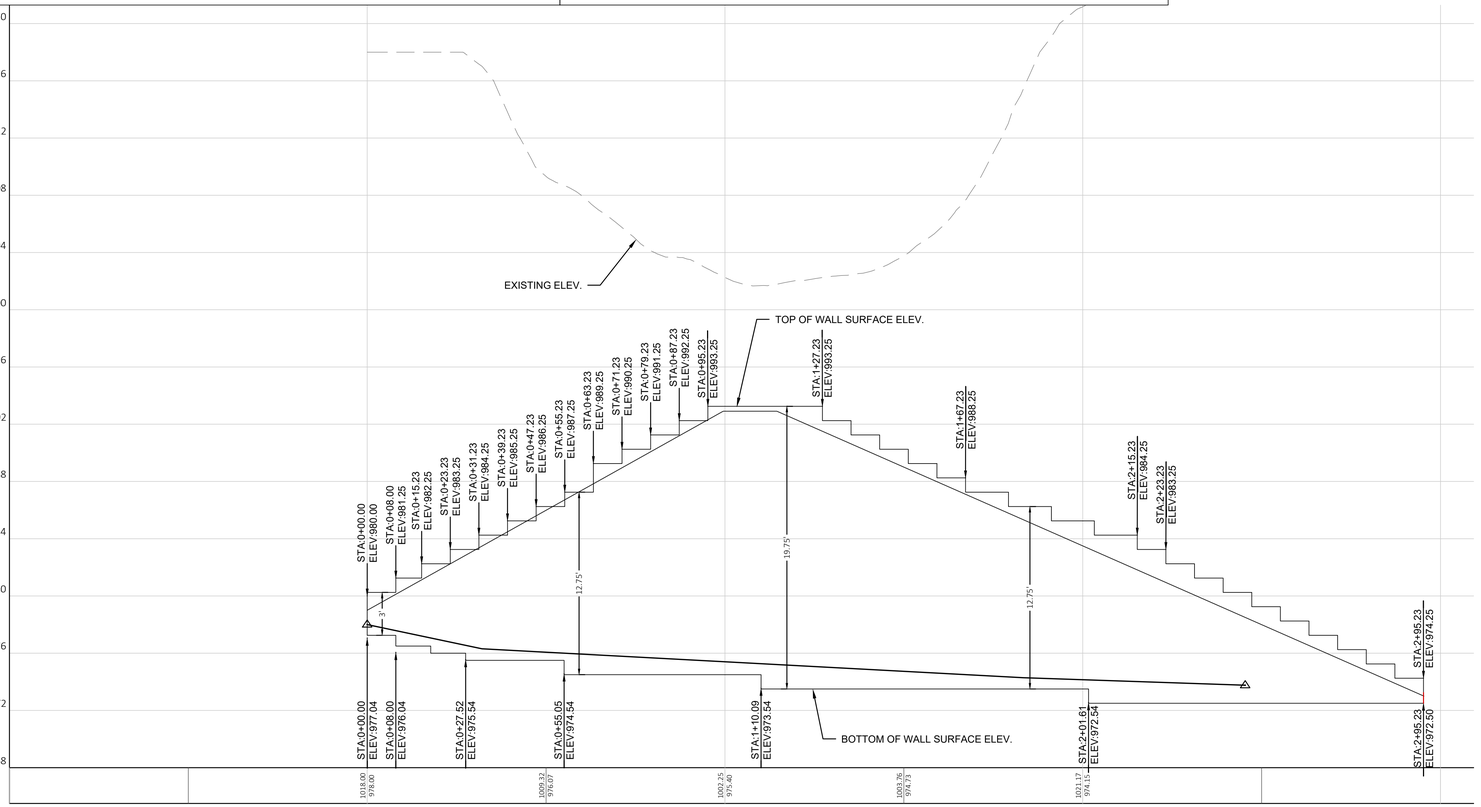

GRAVITY WALL NOTES

1. *RETAINING WALLS TO BE RECON, REDI–ROCK OR EQUIVALENT PRODUCT.*
2. *RETAINING WALLS GREATER THAN 4–FEET IN HEIGHT SHALL BE PREPARED, STAMPED AND SIGNED BY A WISCONSIN LICENSED PROFESSIONAL ENGINEER.*
3. *CONTRACTOR TO PROVIDE RETAINING WALL SHOP DRAWINGS AND STAMPED RETAINING WALL PLANS BASED ON CONSTRUCTION PLANS AND FIELD CONDITIONS FOR FINAL APPROVAL BY THE VILLAGE PRIOR TO INSTALLATION.*
4. *RETAINING WALL COLOR SHALL BE NATURAL CONCRETE, UNSTAINED. WALL BLOCK FINISH SHALL BE LIMESTONE TEXTURE WITH A 3–FOOT DECORATIVE, BLACK ALUMINUM FENCE PLACED AT THE TOP OF THE FINISHED WALL PER FINAL APPROVAL BY THE VILLAGE.*
5. *3,412 SF OF BLOCK*

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VILLAGE OF HARTLAND, WI

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MILWAUKEE, WI 53203

Seal

SHEET TITLE
CONSTRUCTION DETAILS
WALL 2 PROFILE - SF1
GRAVITY BLOCK WALL

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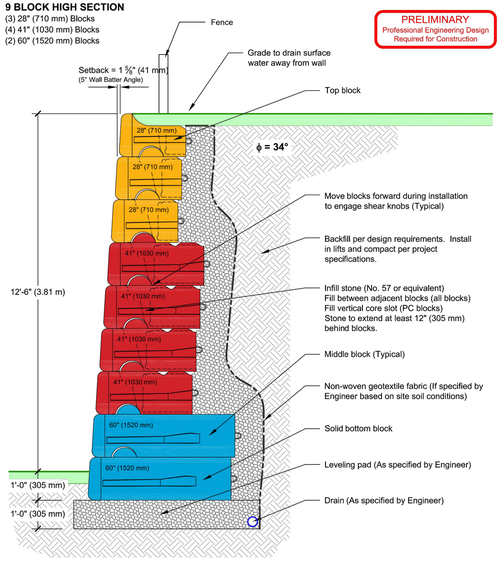
Checked:	CTD 09/08/2023
P&D Project No:	490686
Sheet No.	**C7.1**

ϕ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

LOAD CONDITION A | NO LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE

9 BLOCK HIGH SECTION
(3) 28" (710 mm) Blocks
(4) 41" (1030 mm) Blocks
(2) 60" (1520 mm) Blocks

PRELIMINARY
Professional Engineering Design
Required for Construction



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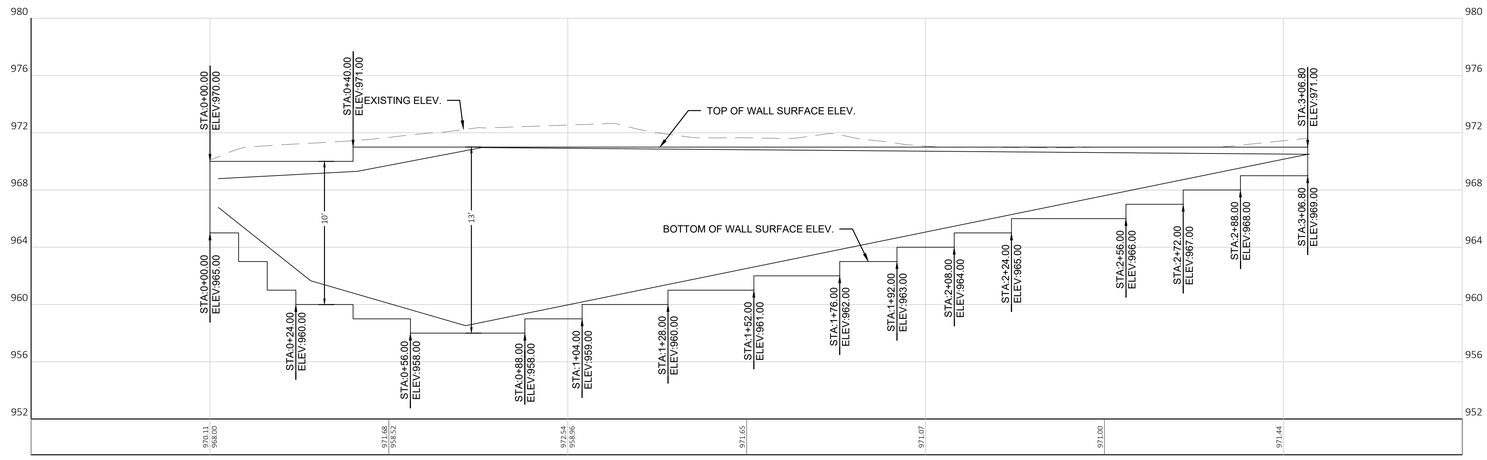
DRAWN BY: C. Kruger	TITLE: **Preliminary Wall Section**	REDI-ROCK®
APPROVED BY: J. Johnson	Dense Well-Graded Sand or Sand and Gravel, **ϕ = 34°**	05481 US 31 SOUTH, CHARLEVOIX, MI 49720
DATE: June 4, 2015	No Live Load Surcharge, No Back Slope, No Toe Slope	(866) 222-8400 ext 3010 • engineering@redi-rock.com
SHEET: 1 of 1	FILE: A_34_B_60_162_cad.dwg	www.redi-rock.com

GRAVITY WALL NOTES

1. *RETAINING WALLS TO BE RECON, REDI-ROCK OR EQUIVALENT PRODUCT.*
2. *RETAINING WALLS GREATER THAN 4-FEET IN HEIGHT SHALL BE PREPARED, STAMPED AND SIGNED BY A WISCONSIN LICENSED PROFESSIONAL ENGINEER.*
3. *CONTRACTOR TO PROVIDE RETAINING WALL SHOP DRAWINGS AND STAMPED RETAINING WALL PLANS BASED ON CONSTRUCTION PLANS AND FIELD CONDITIONS FOR FINAL APPROVAL BY THE VILLAGE PRIOR TO INSTALLATION.*
4. *RETAINING WALL COLOR SHALL BE NATURAL CONCRETE, UNSTAINED. WALL BLOCK FINISH SHALL BE LIMESTONE TEXTURE WITH A 3-FOOT DECORATIVE, BLACK ALUMINUM FENCE PLACED AT THE TOP OF THE FINISHED WALL PER FINAL APPROVAL BY THE VILLAGE.*
5. *2,493 SF OF BLOCK*

PRELIMINARY NOT FOR CONSTRUCTION



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SHEET TITLE
CONSTRUCTION DETAILS
WALL 3 PROFILE - CLUBHOUSE
GRAVITY BLOCK WALL

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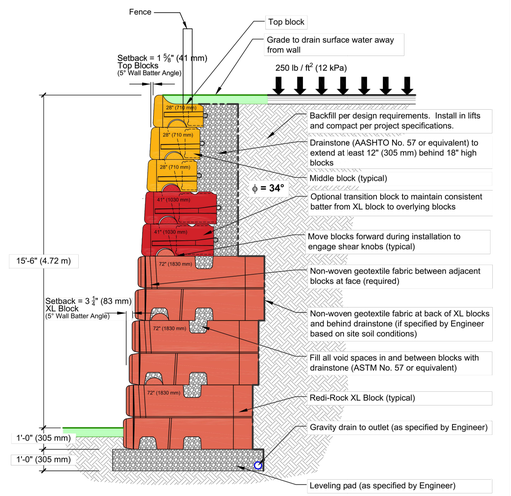
P&D Project No:	490686
Sheet No.	**C7.2**

ϕ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

LOAD CONDITION B | 250 lb/ft² (12 kPa) LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE

16.5-FOOT (5.03 m) HIGH SECTION
(3) 28" (710 mm) Blocks
(2) 41" (1030 mm) Blocks
(3) 72" (1830 mm) XL Blocks

PRELIMINARY
Professional Engineering Design
Required for Construction



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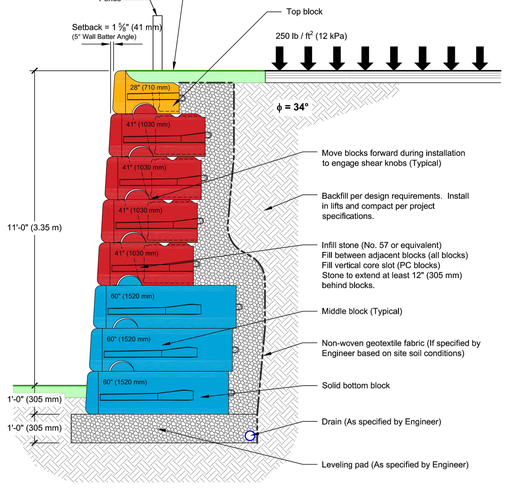
DRAWN BY: N. Lindwall	TITLE: **Preliminary Wall Section**	REDI-ROCK® 05481 US 31 SOUTH, CHARLEVOIX, MI 49720 (866) 222-8400 ext 3010 ● engineering@redi-rock.com www.redi-rock.com
APPROVED BY: J. Johnson	Dense Well-Graded Sand or Sand and Gravel, **ϕ = 34°** 250 lb/ft² (12 kPa) Live Load Surcharge	
DATE: May 13, 2019		
SHEET: 1 of 1	FILE: B_34_XL_198_cad.dwg	

ϕ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

LOAD CONDITION B | 250 lb/ft² (12 kPa) LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE

8 BLOCK HIGH SECTION
(1) 28" (710 mm) Block
(4) 41" (1030 mm) Blocks
(3) 60" (1520 mm) Blocks

PRELIMINARY
Professional Engineering Design
Required for Construction



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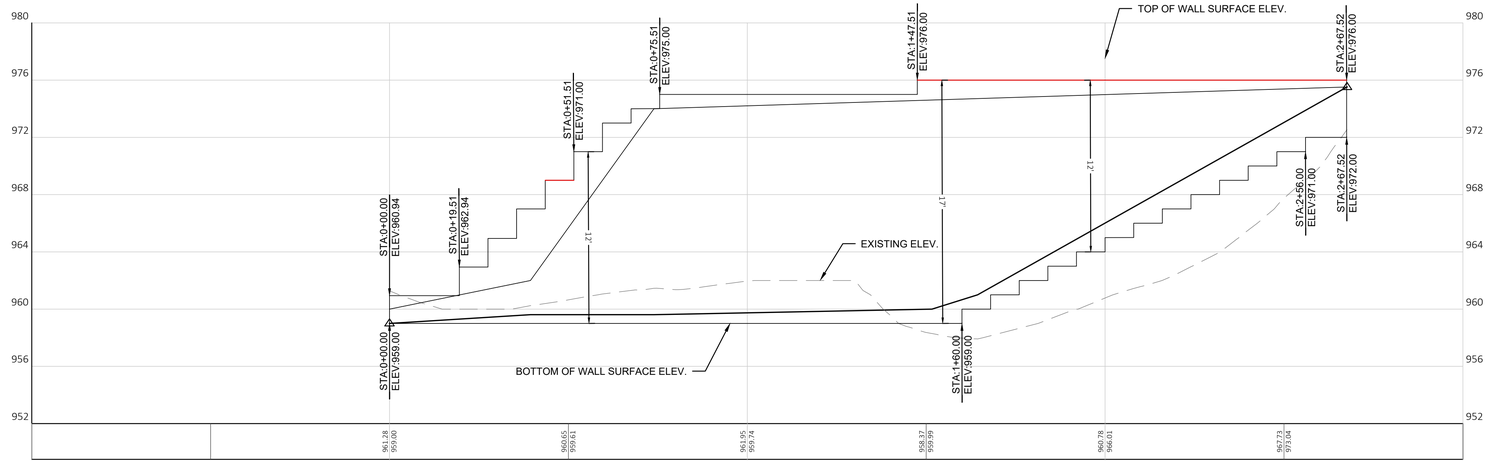
DRAWN BY: C. Kruger	TITLE: **Preliminary Wall Section**	REDI-ROCK® 05481 US 31 SOUTH, CHARLEVOIX, MI 49720 (866) 222-8400 ext 3010 ● engineering@redi-rock.com www.redi-rock.com
APPROVED BY: J. Johnson	Dense Well-Graded Sand or Sand and Gravel, **ϕ = 34°** 250 lb/ft² (12 kPa) Live Load Surcharge	
DATE: June 5, 2015		
SHEET: 1 of 1	FILE: B_34_B_60_144_cad.dwg	

GRAVITY WALL NOTES

1. *RETAINING WALLS TO BE RECON, REDI-ROCK OR EQUIVALENT PRODUCT.*
2. *RETAINING WALLS GREATER THAN 4-FEET IN HEIGHT SHALL BE PREPARED, STAMPED AND SIGNED BY A WISCONSIN LICENSED PROFESSIONAL ENGINEER.*
3. *CONTRACTOR TO PROVIDE RETAINING WALL SHOP DRAWINGS AND STAMPED RETAINING WALL PLANS BASED ON CONSTRUCTION PLANS AND FIELD CONDITIONS FOR FINAL APPROVAL BY THE VILLAGE PRIOR TO INSTALLATION.*
4. *RETAINING WALL COLOR SHALL BE NATURAL CONCRETE, UNSTAINED. WALL BLOCK FINISH SHALL BE LIMESTONE TEXTURE WITH A 3-FOOT DECORATIVE, BLACK ALUMINUM FENCE PLACED AT THE TOP OF THE FINISHED WALL PER FINAL APPROVAL BY THE VILLAGE.*
5. *3,007 SF OF BLOCK*

PRELIMINARY NOT FOR CONSTRUCTION



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SHEET TITLE
CONSTRUCTION DETAILS
WALL 4 PROFILE - TOWNHOUSE 3
GRAVITY BLOCK WALL

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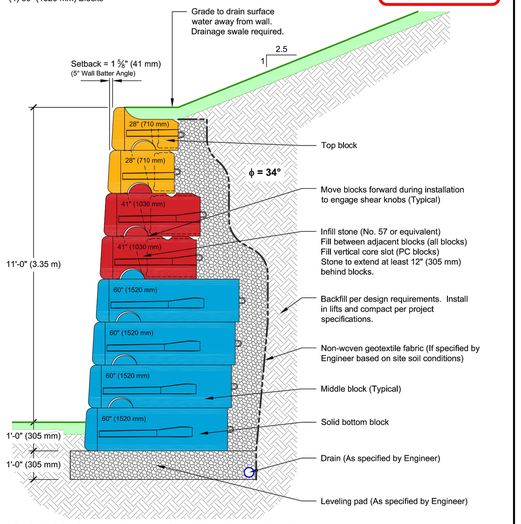
P&D Project No:	490686
Sheet No.	**C7.3**

ϕ = 34° | DENSE WELL-GRADED SAND or SAND AND GRAVEL

LOAD CONDITION C | 1:2.5 BACK SLOPE, NO LIVE LOAD SURCHARGE, NO TOE SLOPE

8 BLOCK HIGH SECTION
(2) 28" (710 mm) Blocks
(2) 41" (1030 mm) Blocks
(4) 60" (1520 mm) Blocks

PRELIMINARY
Professional Engineering Design
Required for Construction



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DRAWN BY:	C. Kruger
APPROVED BY:	J. Johnson
DATE:	June 5, 2015
SHEET:	1 of 1
TITLE:	**Preliminary Wall Section**
	Dense Well-Graded Sand or Sand and Gravel, ϕ = 34°
	1 : 2.5 Back Slope, No Live Load Surcharge, No Toe Slope
FILE:	C_34_B_60_144_cad.dwg

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GRAVITY WALL NOTES

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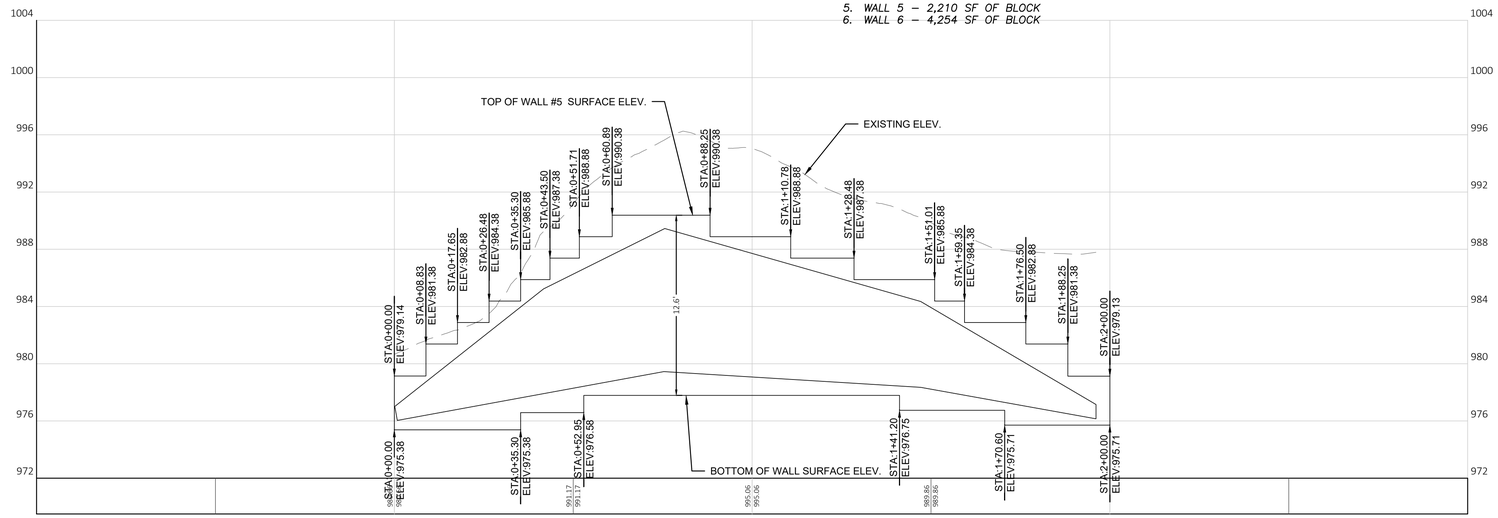
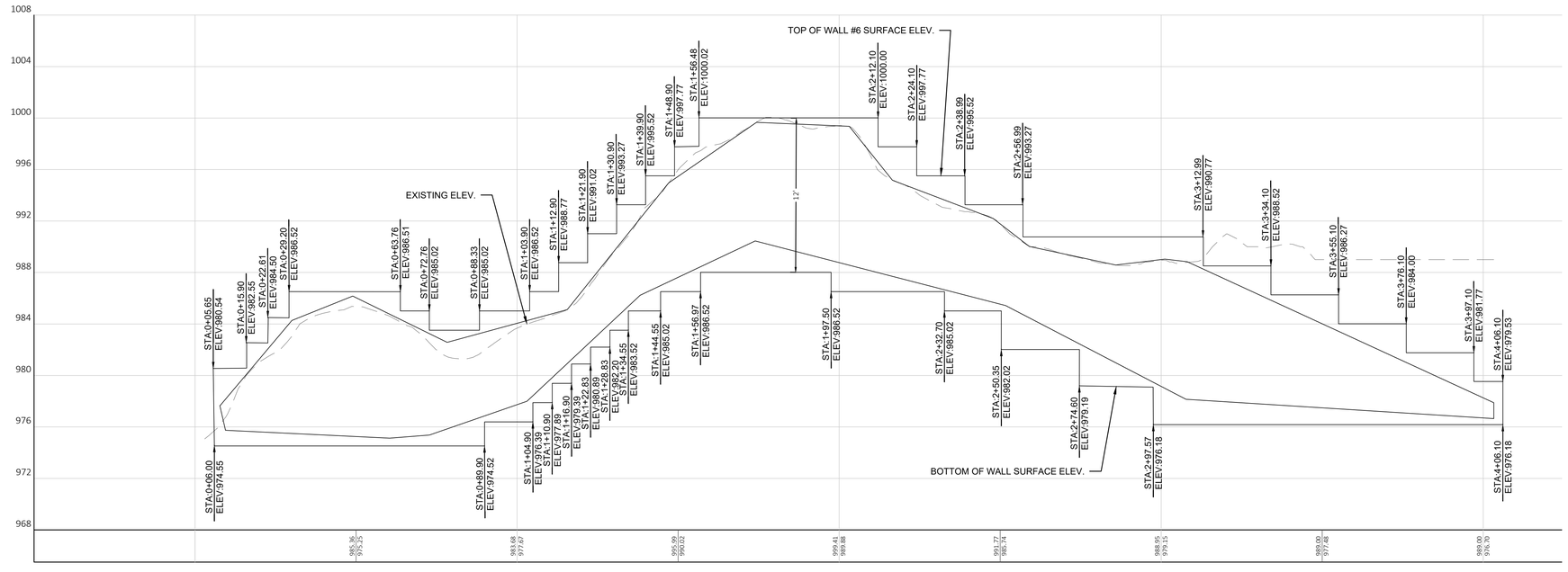
5. WALL 5 – 2,210 SF OF BLOCK
6. WALL 6 – 4,254 SF OF BLOCK

PRELIMINARY NOT FOR CONSTRUCTION





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SHEET TITLE
CONSTRUCTION DETAILS
WALL 5 PROFILE - EAST DRIVE
GRAVITY BLOCK WALL

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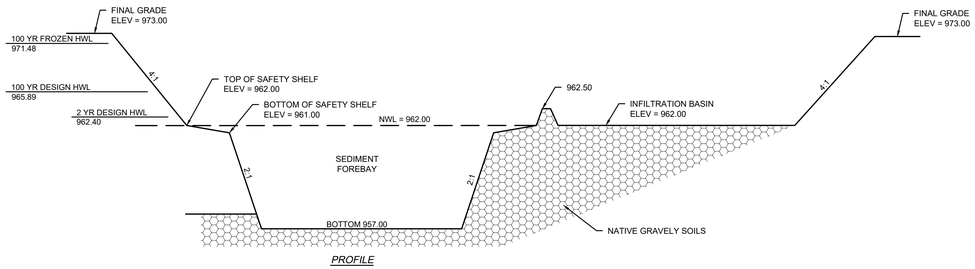
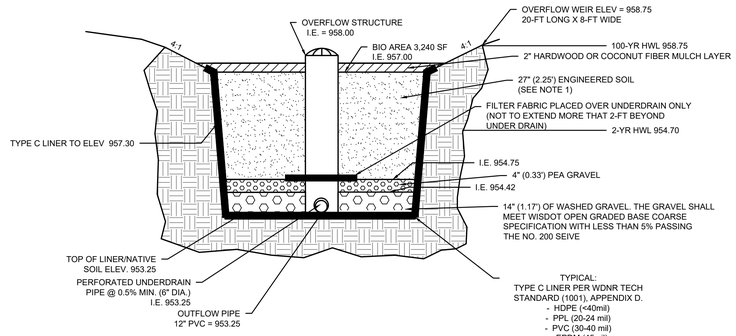
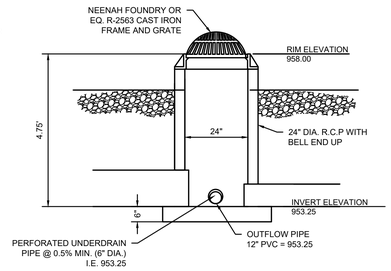


PROFILE

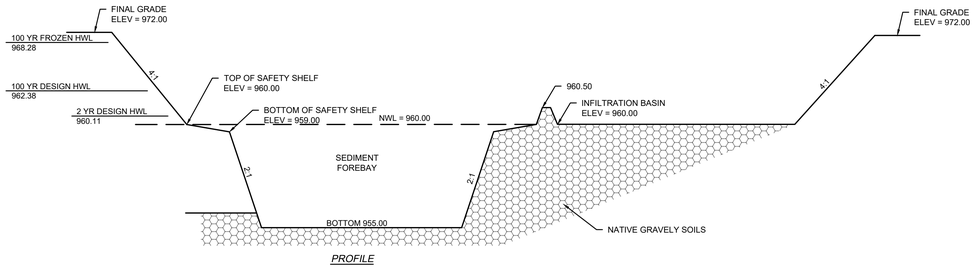
NW INFILTRATION POND DETAIL
1P



SW BIORETENTION POND
4P

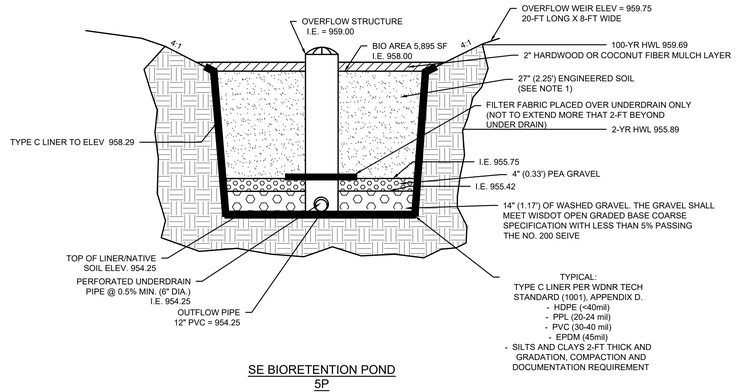


BIORETENTION OVERFLOW
STRUCTURE DETAIL

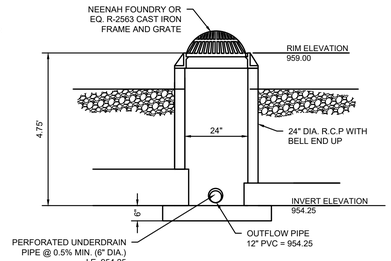


PROFILE

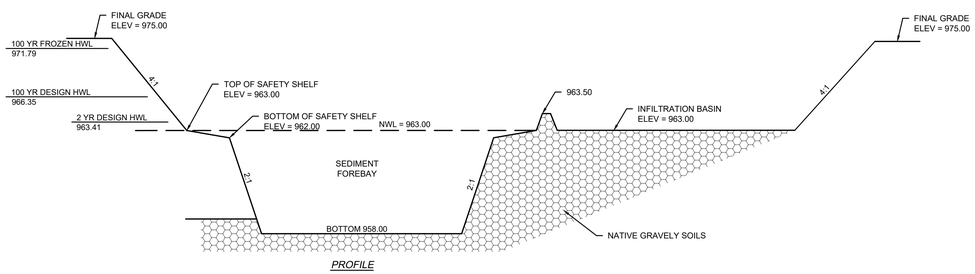
NE INFILTRATION POND DETAIL
2P



SE BIORETENTION POND
5P



BIORETENTION OVERFLOW
STRUCTURE DETAIL



PROFILE

EAST INFILTRATION POND DETAIL
3P

BIORETENTION NOTES:

1. DO NOT ADD ENGINEERED MEDIA UNTIL AFTER THE PAVING IS COMPLETED AND LANDSCAPE AREAS ARE STABILIZED.
2. ENGINEERED SOIL MIX SHALL BE PLACE WITH NO MECHANICAL COMPACTION (INCLUDING EQUIPMENT TRACKING OVER THE SURFACE).
3. ENGINEERED SOIL SHALL BE PLACED IN 6" LIFTS AND SPRINKLED WITH WATER AFTER EACH LIFT TO ACHIEVE SETTLEMENT.
4. ENGINEERED SOIL SHALL CONSIST OF A MIXTURE OF 70% TO 75% SAND AND 25% TO 30% COMPOST. THE PERCENTAGES ARE BASED ON VOLUME. THE ENGINEERED SOIL SHALL MEET THE REQUIREMENTS OF WDNR TECHNICAL STANDARD 1004.
5. SAND INTERFACE LAYER: 3-INCHES OF SAND SHALL BE PLACED BELOW THE GRAVEL LAYER AND VERTICALLY MIXED WITH THE NATIVE SOIL TO A DEPTH OF 4-INCHES, PER WDNR TECHNICAL STANDARD 1002.
6. A PERSON TRAINED AND EXPERIENCED IN THE CONSTRUCTION, OPERATION AND MAINTENANCE OF INFILTRATIONS DEVICES SHALL BE RESPONSIBLE FOR CONSTRUCTION OF THE DEVICE.
7. CONSTRUCTION OF THE BIORETENTION DEVICE SHALL FOLLOW THE REQUIREMENTS OF WDNR TECHNICAL STANDARD 1002. CONSTRUCTION AND OVERSIGHT SHALL FOLLOW SECTION "C" OF THE TECHNICAL STANDARD.

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MILWAUKEE, WI 53203

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SHEET TITLE
CONSTRUCTION DETAILS
POND DETAILS

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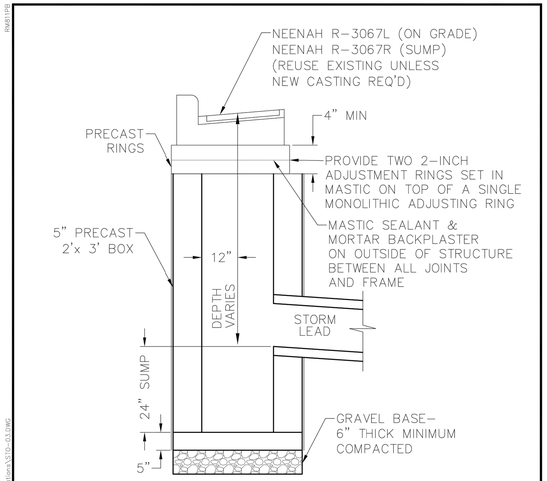
P&D Project No:	490686
Sheet No.	**C8.0**

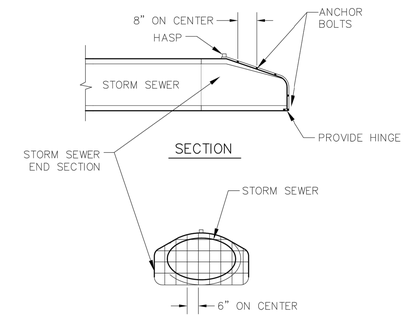


1. INLET TO BE PROTECTED WITH GEOTEXTILE FABRIC BETWEEN THE GRATE AND FRAME. PROTECTION TO REMAIN IN PLACE UNTIL SITE VEGETATION IS ESTABLISHED.
2. IN AREAS WITH ROLL FACE CURB, REPLACEMENT CURB SHALL TRANSITION TO VERTICAL FACE CURB & GUTTER AT INLET FRAME.

CATCH BASIN DETAIL NO SCALE

STO-03 20

EXHIBIT STO-03



END VIEW

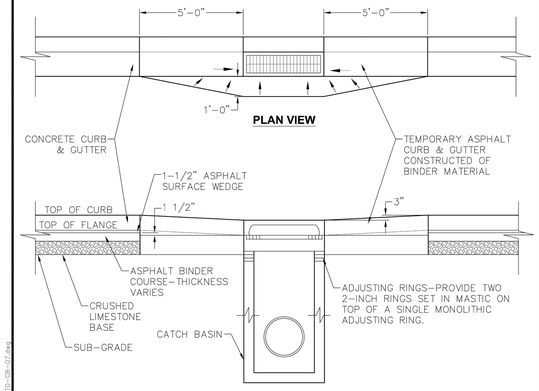
NOTES:

1) TRASH RACK BARS TO BE GALVANIZED.
2) CONNECTOR PLATE WITH BOLT ATTACHED AT THREE POINTS TO ENDWALL.
3) PLANT FIT TRASH RACK CONFIGURATION TO FIT RELATIVE END SECTION.

TRASH RACK NO SCALE

STO-GRATE-04 96

EXHIBIT STO-04



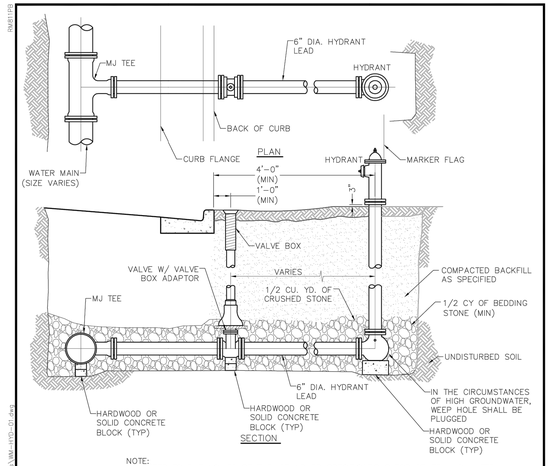
CROSS SECTION

NOTE:
TEMPORARY BITUMINOUS CONCRETE CURB AND GUTTER TO REMAIN IN PLACE UNTIL FINISHED ASPHALT SURFACE COURSE IS SCHEDULED. PRIOR TO REPLACEMENT OF ASPHALT SURFACE COURSE, CONTRACTOR TO REMOVE TEMPORARY ASPHALT BINDER, CURB AND GUTTER, ADJUST FRAME TO PROPER GRADE AND POUR CONCRETE CURB AND GUTTER

INTERIM CATCH BASIN NO SCALE

STO-CB-07 32

EXHIBIT STO-05

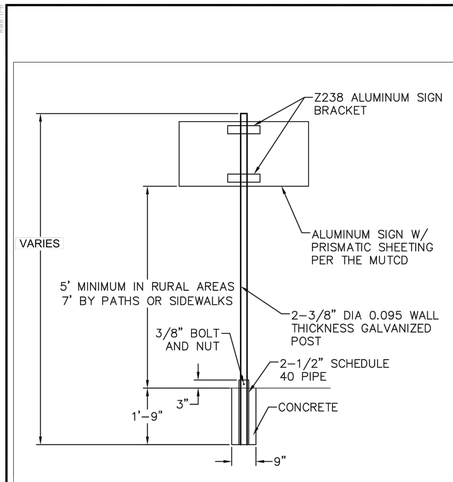


NOTE:
1. REFER TO FILE NO. 38 OF THE "STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN" FOR FURTHER INFORMATION.
2. ALL JOINTS ON HYDRANT LEADS SHALL HAVE MEGALUG RESTRAINTS.
3. BURY DEPTH OF HYDRANT AND LEAD SHALL BE 7.5 FEET FOR NEW CONSTRUCTION AND SHALL BE FIELD VERIFIED BY CONTRACTOR FOR REPLACEMENT.

HYDRANT SETTING DETAIL NO SCALE

WM-HYD-01 24

EXHIBIT WM-01

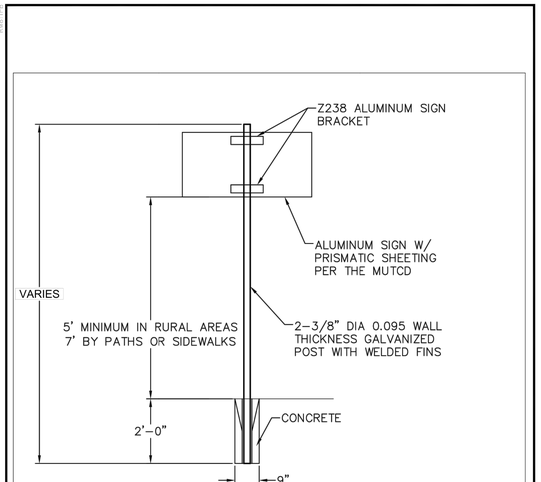


ALL SIGN INSTALLATIONS TO MEET MUTCD STANDARDS.
SIGNS TO BE HELD TO THE BRACKETS WITH STAINLESS STEEL NYLOK LOCK NUTS.
ALL PEDESTRIAN AND SCHOOL CROSSING SIGNS HAVE TO BE FYGHIP.
STREET NAME PLATES SHALL BE 9" BLADE WITH 6" UPPER/LOWER CASE LETTERING, WHITE ON GREEN LETTERING. (FOR PRIVATE ROADS LETTERING IS WHITE ON BLUE)

SIGN POST DETAIL IN PAVEMENT NO SCALE

Sign post detail in pavement 2

EXHIBIT GN-01



ALL SIGN INSTALLATIONS TO MEET MUTCD STANDARDS.
SIGNS TO BE HELD TO THE BRACKETS WITH STAINLESS STEEL NYLOK LOCK NUTS.
ALL PEDESTRIAN AND SCHOOL CROSSING SIGNS HAVE TO BE FYGHIP.
STREET NAME PLATES SHALL BE 9" BLADE WITH 6" UPPER/LOWER CASE LETTERING, WHITE ON GREEN LETTERING. (FOR PRIVATE ROADS LETTERING IS WHITE ON BLUE)

SIGN POST DETAIL IN UNPAVED AREAS NO SCALE

Sign post detail in rural 2

EXHIBIT GN-02

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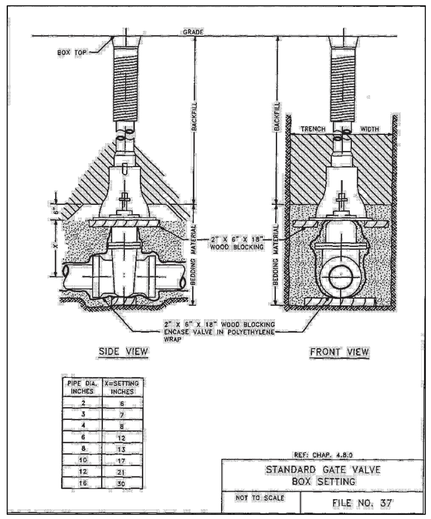
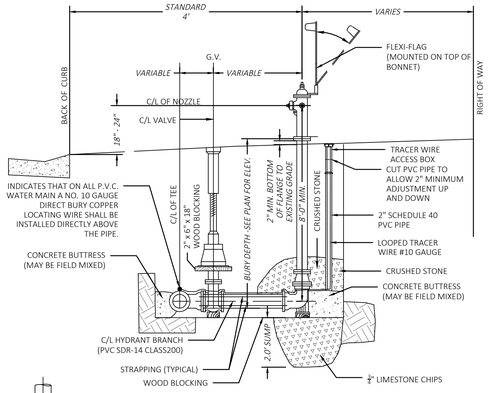


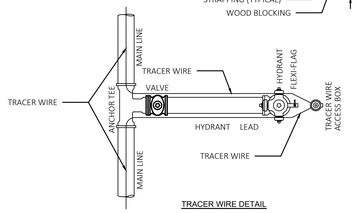
PIPE DIA. INCHES	X=SETTING INCHES
2	6
3	7
4	8
6	12
8	13
10	17
12	21
16	30

REF: CHAP. 4.8.0

STANDARD GATE VALVE BOX SETTING

NOT TO SCALE | FILE NO. 37





TRACER WIRE DETAIL

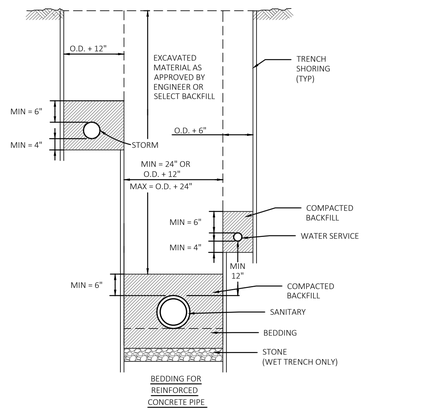
HYDRANT ASSEMBLY

N.T.S.

NOTE :
STRAP HYDRANT TO VALVE & STRAP VALVE TO TEE , USE 3/4" STRAPS. (BARS) OR MEGALUG RESTRAINING GLANDS ON ALL MECHANICAL JOINTS, THE BOLTS & NUTS ARE TO BE HIGH STRENGTH LOW ALLOY STEEL (CORTEN) AS PER SECTION 11.6.5 OF A.W.W.A. C-111.

CITY OF MUSKEGO NOTES:

1. HYDRANT BRANCH MATERIAL SHALL BE PVC SDR-14 CLASS 200.
2. HYDRANT BRANCH SHALL BE FULLY RESTRAINED.
3. LOCATOR BOX SHALL BE ADJACENT TO HYDRANT.
4. DOUBLE POLYWRAP ALL VALVES, VALVE STEMS, FITTINGS, HYDRANT SHOE, HYDRANT BARREL AND VERTICAL STACK. CONTRACTOR SHALL MAKE A SLIT OPENING IN THE BOTTOM OF THE HYDRANT SHOE POLYWRAP TO DRAIN HYDRANT BARREL.
5. CONTRACTOR SHALL PLUG ALL HYDRANTS BEING CONSTRUCTED IN GROUNDWATER. CONTRACTOR SHALL NOTIFY THE CITY OF ALL HYDRANTS THAT NEED TO BE PLUGGED.



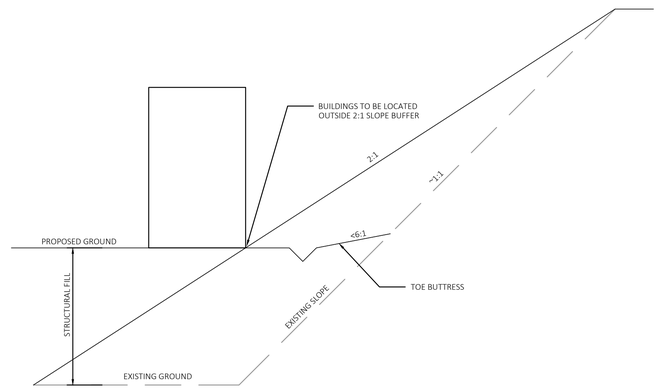
BEDDING FOR REINFORCED CONCRETE PIPE

BACKFILL MATERIAL CONTAINING NO STONES LARGER THAN 3" AND NO HARD OR FROZEN LUMPS OF EARTH.

WASHED, GRAVEL OR CRUSHED STONE

BUILDING SERVICES

N.T.S.



SLOPE STABILITY DETAIL

N.T.S.

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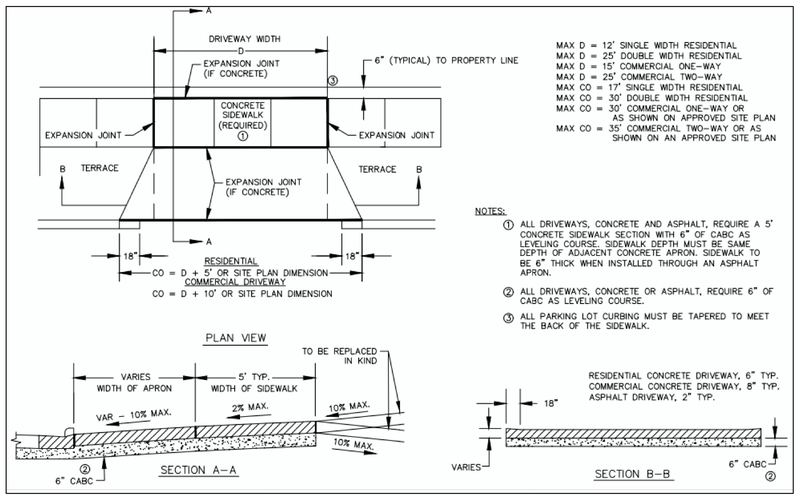


MAX D = 12' SINGLE WIDTH RESIDENTIAL
MAX D = 25' DOUBLE WIDTH RESIDENTIAL
MAX D = 15' COMMERCIAL ONE-WAY
MAX D = 25' COMMERCIAL TWO-WAY
MAX CO = 17' SINGLE WIDTH RESIDENTIAL
MAX CO = 30' DOUBLE WIDTH RESIDENTIAL
MAX CO = 30' COMMERCIAL ONE-WAY OR AS SHOWN ON APPROVED SITE PLAN
MAX CO = 35' COMMERCIAL TWO-WAY OR AS SHOWN ON AN APPROVED SITE PLAN

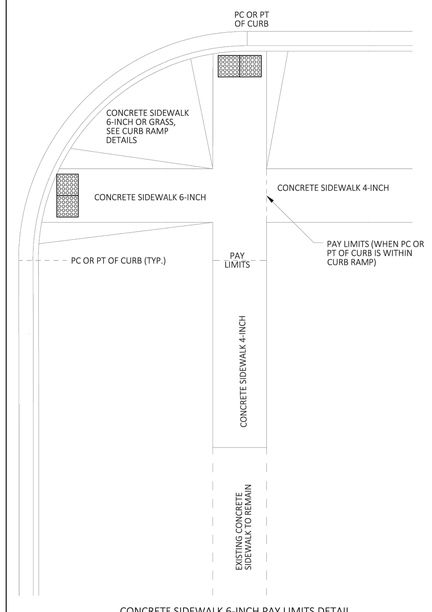
NOTES:

① ALL DRIVEWAYS, CONCRETE AND ASPHALT, REQUIRE A 5' CONCRETE SIDEWALK SECTION WITH 6" OF CABC AS LEVELING COURSE. SIDEWALK DEPTH MUST BE SAME DEPTH OF ADJACENT CONCRETE APRON. SIDEWALK TO BE 6" THICK WHEN INSTALLED THROUGH AN ASPHALT APRON.

② ALL DRIVEWAYS, CONCRETE OR ASPHALT, REQUIRE 6" OF CABC AS LEVELING COURSE.

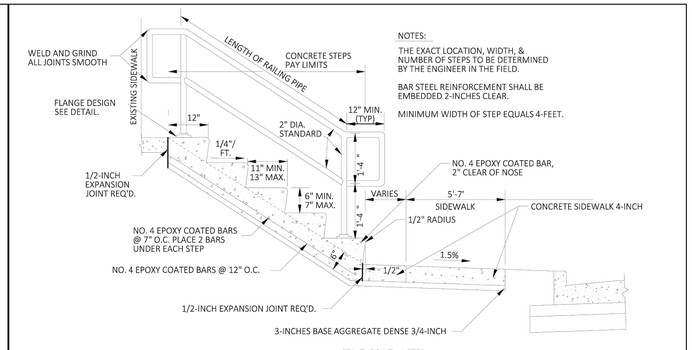
③ ALL PARKING LOT CURBING MUST BE TAPERED TO MEET THE BACK OF THE SIDEWALK.

RESIDENTIAL CONCRETE DRIVEWAY, 6" TYP.
COMMERCIAL CONCRETE DRIVEWAY, 8" TYP.
ASPHALT DRIVEWAY, 2" TYP.



CONCRETE SIDEWALK 6-INCH PAY LIMITS DETAIL

SCALE: NONE



NOTES:
THE EXACT LOCATION, WIDTH, & NUMBER OF STEPS TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

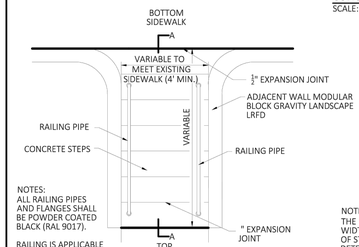
BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2-INCHES CLEAR.

MINIMUM WIDTH OF STEP EQUALS 4-FEET.

STA. 7+26, LT - 1 STEP
STA. 13+55, RT - 2 STEPS
STA. 14+05, RT - 5 STEPS

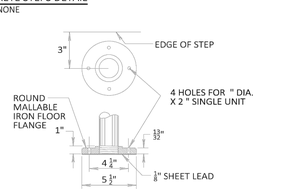
CONCRETE STEPS DETAIL

SCALE: NONE



NOTES:
ALL RAILING PIPES AND FLANGES SHALL BE POWDER COATED BLACK (RAL 9017).

RAILING IS APPLICABLE ON STEPS WITH GREATER THAN 2 RISERS



FLANGE DETAIL

NOTES:
THE EXACT LOCATION, WIDTHS, & NUMBER OF STEPS TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

STEEL REINFORCEMENT NOT REQUIRED ON STEPS WITH 2 RISERS OR LESS.

BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2 INCHES CLEAR.

RAILING AND FLANGE MAY BE INSTALLED AFTER STEP CONSTRUCTION OR PER MANUFACTURER'S SPECIFICATIONS.

MINIMUM WIDTH OF STEP EQUALS 4 FEET.

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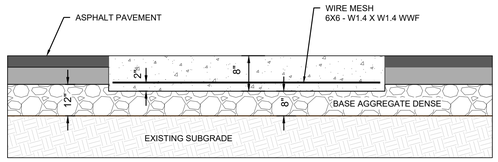
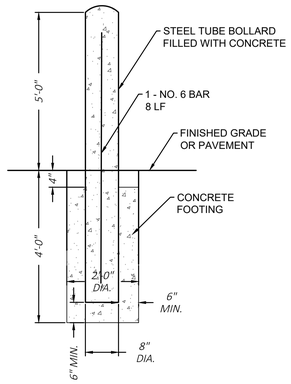
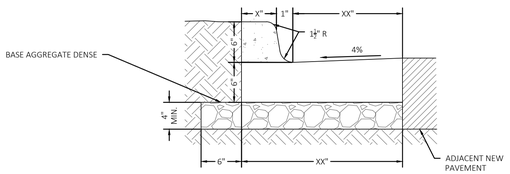


8" CONCRETE DUMPSTER PAD
N.T.S.

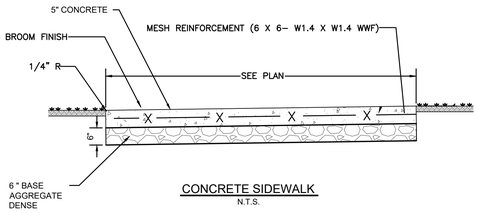


STEEL TUBE BOLLARD
FILLED WITH CONCRETE

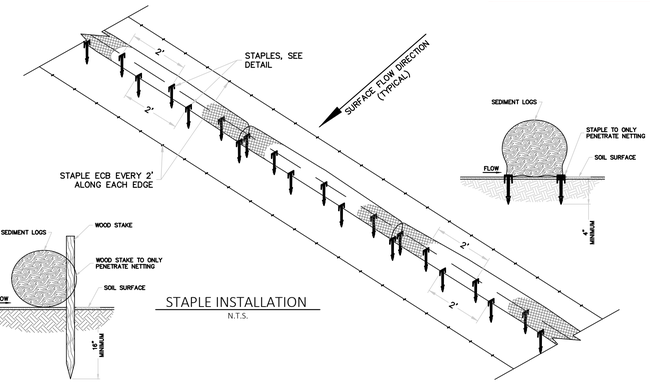


NOTES:
4000 PSI CONCRETE SHALL BE USED IN CONSTRUCTION OF THE CURB & GUTTER. GUTTER PAN SLOPE SHALL MATCH ADJACENT PAVEMENT SLOPE. 1/2" PREFORMED EXPANSION JOINT FILLER SHALL BE PLACED TRANSVERSELY IN THE CURB AS FOLLOWS:
1) AT EACH JUNCTION OF RADIUS RETURN CURB AND THE CURB WHICH IS PARALLEL TO THE PROJECT CENTER LINE.
2) AT EACH JUNCTION WITH EXISTING CONCRETE CURB OR CONCRETE CURB & GUTTER.
3) AT EACH JUNCTION WITH EXISTING CONCRETE SIDEWALK, TO THE DEPTH OF THE SIDEWALK.

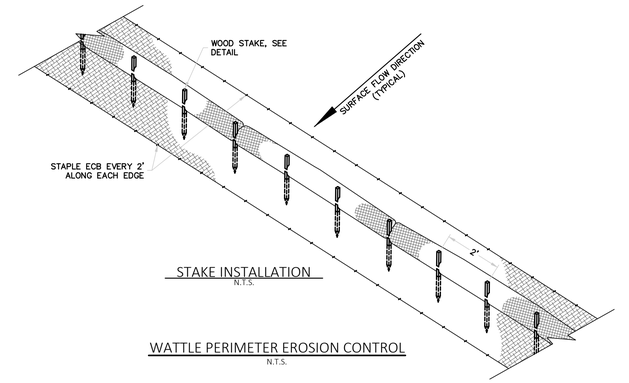
X-INCH STANDARD CONCRETE
CURB & GUTTER DETAIL
N.T.S.



CONCRETE SIDEWALK
N.T.S.

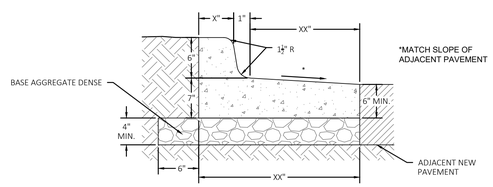


STAPLE INSTALLATION
N.T.S.



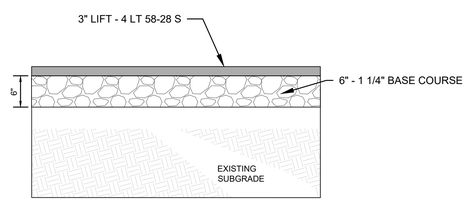
STAKE INSTALLATION
N.T.S.

WATTLE PERIMETER EROSION CONTROL
N.T.S.

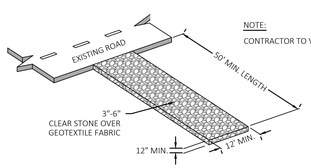


NOTES:
4000 PSI CONCRETE SHALL BE USED IN CONSTRUCTION OF THE CURB & GUTTER. GUTTER PAN SLOPE SHALL MATCH ADJACENT PAVEMENT SLOPE. 1/2" PREFORMED EXPANSION JOINT FILLER SHALL BE PLACED TRANSVERSELY IN THE CURB AS FOLLOWS:
1) AT EACH JUNCTION OF RADIUS RETURN CURB AND THE CURB WHICH IS PARALLEL TO THE PROJECT CENTER LINE.
2) AT EACH JUNCTION WITH EXISTING CONCRETE CURB OR CONCRETE CURB & GUTTER.
3) AT EACH JUNCTION WITH EXISTING CONCRETE SIDEWALK, TO THE DEPTH OF THE SIDEWALK.

X-INCH REJECT CONCRETE
CURB & GUTTER DETAIL
N.T.S.



PROPOSED 3-INCH HMA PATH
N.T.S.



NOTE:
CONTRACTOR TO VERIFY LOCATION WITH OWNER

CONSTRUCTION ENTRANCE
N.T.S.

GENERAL NOTES

1. TRACKING PADS SHALL BE INSTALLED PRIOR TO ANY TRAFFIC LEAVING THE SITE.
2. THE AGGREGATE FOR TRACKING PADS SHALL BE 3 TO 6-INCH CLEAR OR WASHED STONE. ALL MATERIAL TO BE RETAINED ON A 3-INCH SIEVE.
3. THE AGGREGATE SHALL BE PLACED IN A LAYER AT LEAST 12-INCHES THICK. ON SITES WHERE SATURATED CONDITIONS ARE EXPECTED DURING THE LIFE OF THE PAD, THE PAD SHALL BE UNDERLAIN WITH WisDOT TYPE "R" GEOTEXTILE FABRIC TO PREVENT MIGRATION OF UNDERLYING SOILS INTO THE STONE LAYER.
4. THE TRACKING PAD SHALL BE THE FULL WIDTH OF THE EGRESS POINT. THE TRACKING PAD SHALL BE A MINIMUM 50-FEET LONG.
5. ANY SEDIMENT TRACKED ONTO A PUBLIC OR PRIVATE ROAD SHOULD BE REMOVED BY STREET CLEANING, NOT FLUSHING, AT THE END OF EACH WORKING DAY.
6. TRACKING PADS SHALL, AT A MINIMUM, BE INSPECTED WEEKLY AND WITHIN 24-HOURS AFTER EVERY PRECIPITATION EVENT THAT PRODUCES 0.5-INCHES OF RAIN OR MORE DURING A 24-HOUR PERIOD.
7. THE TRACKING PAD PERFORMANCE SHALL BE MAINTAINED BY SCRAPING OR TOP-DRESSING WITH ADDITIONAL AGGREGATE.

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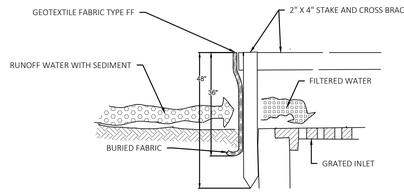
NOTES:
1. FABRIC SHALL BE REPLACED AT THE ENGINEERS DISCRETION.
2. MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED FOR THE INLET PROTECTION TYPE SPECIFIED
3. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

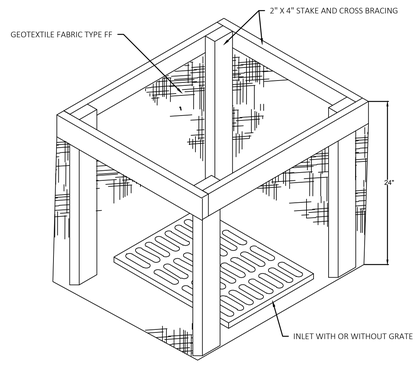
① EXTEND FABRIC A MINIMUM OF 6" AROUND GRATE PERIMETER FOR MAINTENANCE OR REMOVAL IS REQUIRED.

② FOR INLET PROTECTION, TYPE C, WITH A CURB BOX, AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX.

FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2"x4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

NOTE: ATTACH GEOTEXTILE FABRIC, TYPE FF, TO THE TOP OF STAKES AND CROSS BRACING





INLET PROTECTION, TYPE A
N.T.S.

GENERAL NOTES
1. SILT FENCE SHALL BE ANCHORED BY SPREADING AT LEAST 8-INCHES OF FABRIC IN A 4-INCH WIDE AND 6-INCH DEEP TRENCH OR 6-INCH DEEP V-TRENCH ON THE UPSLOPE SIDE OF THE FENCE. TRENCHES SHALL NOT BE EXCAVATED WIDER OR DEEPER THAN NECESSARY FOR PROPER INSTALLATION.
2. FOLD MATERIAL TO FIT TRENCH AND BACKFILL AND COMPACT TRENCH WITH EXCAVATED SOIL.
3. WOOD POSTS SHALL BE A MINIMUM SIZE OF 1.125-INCHES x 1.125-INCHES OF DRIED OAK OR HICKORY.
4. SILT FENCE TO EXTEND ABOVE THE TOP OF PIPE.
5. SILT FENCE CONSTRUCTION AND GEOTEXTILE FABRIC SHALL CONFORM TO WDNR TECHNICAL STANDARD 1056.
6. POST SPACING SHALL BE SELECTED BASED ON GEOTEXTILE FABRIC (8-FEET FOR WOVEN & 3-FEET FOR NON-WOVEN).

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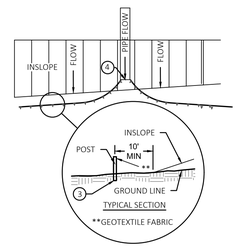
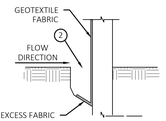
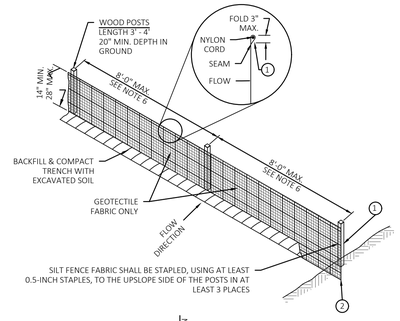


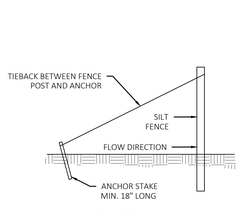
SILT FENCE ALOND SLOPES & OUTFALLS
N.T.S.



NOTE: ADDITIONAL POST DEPTH OR TIE BACKS MAY BE REQUIRED IN UNSTABLE SOILS

TRENCH DETAIL
N.T.S.

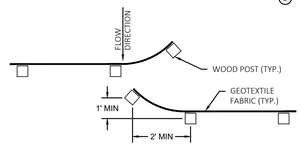




JOINT (TWIST METHOD)
N.T.S.

SILT FENCE TIE BACK
(WHEN ADDITIONAL SUPPORT REQUIRED)
N.T.S.

SILT FENCE DETAIL
N.T.S.



JOINT (HOOK METHOD)
N.T.S.

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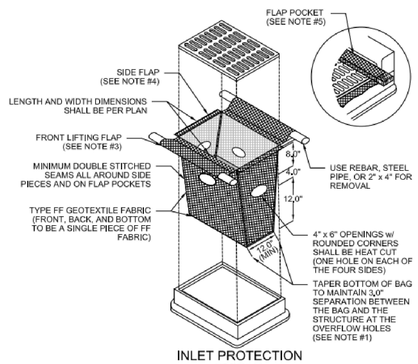
C8.4

FIGURE 2. INLET PROTECTION TYPE D



INLET PROTECTION
TYPE D
CAN BE INSTALLED IN INLETS WITH OR WITHOUT CURB BOXES

NOTES:
1. TAPER BOTTOM OF BAG TO MAINTAIN 3" OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.
2. GEOTEXTILE FABRIC TYPE FF FOR FLAPS, TOP AND BOTTOM OF OUTSIDE OF FILTER BAG. FRONT, BACK, AND BOTTOM OF FILTER BAG BEING ONE PIECE.
3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.
4. SIDE FLAPS SHALL BE A MAXIMUM OF 2" LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4", THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

MAINTENANCE NOTES:
1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE INLET SHALL BE IMMEDIATELY REMOVED.

WISCONSIN DEPT. OF NATURAL RESOURCES

1060	TECHNICAL STANDARD No.
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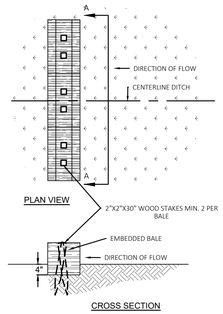
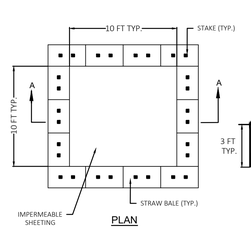
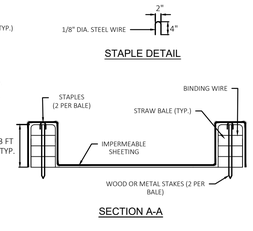


SECTION A-A

NOTES:
1. INSTALL BALES BY DIGGING A 4" DEEP TRENCH WIDE ENOUGH FOR BALE. EMBED BALE IN TRENCH AND SECURE WITH STAKES.
2. BALES SHALL BE INSPECTED WITHIN 24 HOURS AFTER EACH RAINFALL OR DAILY DURING PERIODS OF PROLONGED RAIN. REPAIR OR REPLACEMENT SHALL BE MADE IMMEDIATELY.
3. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT OR WHEN DEPOSITS REACH ONE HALF THE HEIGHT OF THE BARRIER.
4. BALES SHALL BE REMOVED ONLY WHEN THE THREAT OF EROSION HAS PASSED AND PERMANENT VEGETATION HAS BEEN ESTABLISHED.

STRAW BALE DITCH CHECK
N.T.S.





NOTE:
CAN BE TWO STACKED BALESOR PARTIALLY EXCAVATED TO REACH 3 FT DEPTH.

CONSTRUCTION SPECIFICATIONS
1. LOCATE WASHOUT STRUCTURE A MINIMUM OF 50 FEET AWAY FROM OPEN CHANNELS, STORM DRAIN INLETS, SENSITIVE AREAS, WETLANDS, BUFFERS AND WATER COURSES AND AWAY FROM CONSTRUCTION TRAFFIC.
2. SIZE WASHOUT STRUCTURE FOR VOLUME NECESSARY TO CONTAIN WASH WATER AND SOLIDS AND MAINTAIN AT LEAST 4 INCHES OF FREEBOARD. TYPICAL DIMENSIONS ARE 10 FEET X 10 FEET X 3 FEET DEEP.
3. PREPARE SOIL BASE FREE OF ROCKS OR OTHER DEBRIS THAT MAY CAUSE TEARS OR HOLES IN THE LINER. FOR LINER, USE 10 MIL OR THICKER UV RESISTANT, IMPERMEABLE SHEETING, FREE OF HOLES AND TEARS OR OTHER DEFECTS THAT COMPROMISE IMPERMEABILITY OF THE MATERIAL.
4. PROVIDE A SIGN FOR THE WASHOUT IN CLOSE PROXIMITY TO THE FACILITY.
5. KEEP CONCRETE WASHOUT STRUCTURE WATER TIGHT. REPLACE IMPERMEABLE LINER IF DAMAGED (E.G., RIPPED OR PUNCTURED). EMPTY OR REPLACE WASHOUT STRUCTURE THAT IS 75 PERCENT FULL, AND DISPOSE OF ACCUMULATED MATERIAL PROPERLY. DO NOT REUSE PLASTIC LINER. WET-VACUUM STORED LIQUIDS THAT HAVE NOT EVAPORATED AND DISPOSE OF IN AN APPROVED MANNER. PRIOR TO FORECASTED RAINSTORMS, REMOVE LIQUIDS OR COVER STRUCTURE TO PREVENT OVERFLOWS. REMOVE HARDENED SOLIDS, WHOLE OR BROKEN UP, FOR DISPOSAL OR RECYCLING. MAINTAIN RUNOFF DIVERSION AROUND EXCAVATED WASHOUT STRUCTURE UNTIL STRUCTURE IS REMOVED.

CONCRETE WASHOUT
WITH STRAW BALES
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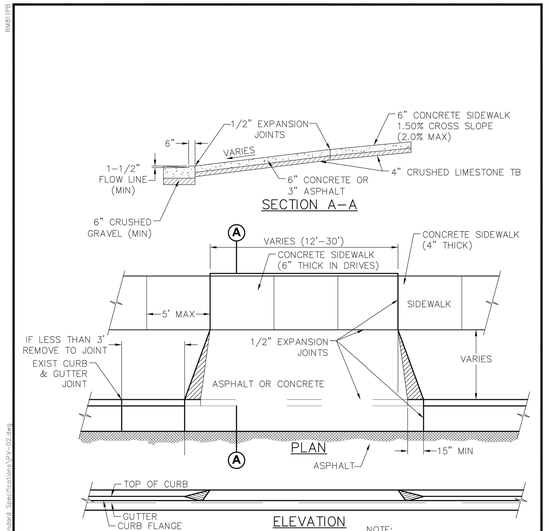

ASPHALT OR CONCRETE DRIVEWAY NO SCALE

Driveppr 48

Mar 03, 2017 7:37am
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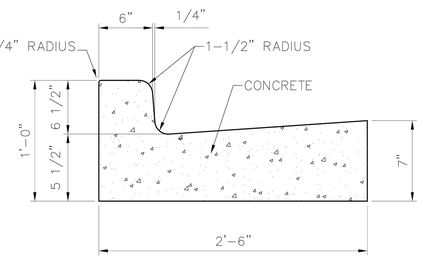
EXHIBIT PV-02



30" VERTICAL FACE CURB & GUTTER NO SCALE

02770C&G2 1

Mar 03, 2017 7:41am
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EXHIBIT PV-04

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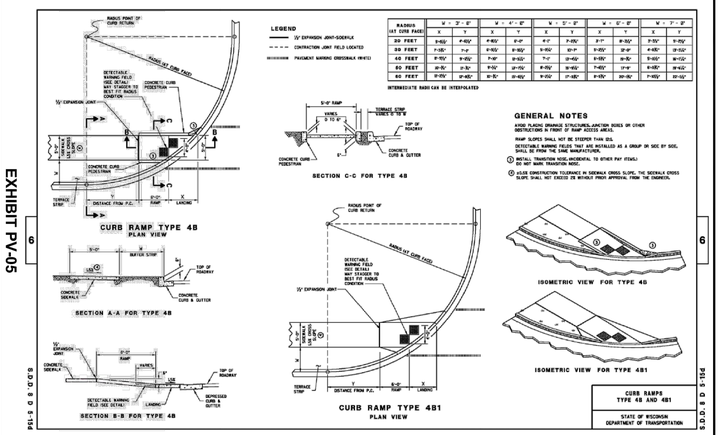
EXHIBIT PV-05



RADIUS (AT CURB FACE)	W = 3'-0"		W = 4'-0"		W = 5'-0"		W = 6'-0"		W = 7'-0"	
	X	Y	X	Y	X	Y	X	Y	X	Y
20 FEET	9'-5½"	4'-6½"	9'-8½"	5'-0"	9'-11½"	5'-5"	10'-2½"	5'-9½"	10'-5½"	6'-1½"
30 FEET	9'-10½"	5'-0"	10'-1½"	5'-5"	10'-4½"	5'-9½"	10'-7½"	6'-1½"	10'-10½"	6'-5½"
40 FEET	10'-1½"	5'-5½"	10'-4½"	5'-9½"	10'-7½"	6'-1½"	10'-10½"	6'-5½"	11'-1½"	6'-9½"
50 FEET	10'-3½"	5'-9½"	10'-6½"	6'-1½"	10'-9½"	6'-5½"	11'-0½"	6'-9½"	11'-3½"	7'-1½"
60 FEET	10'-5½"	6'-1½"	10'-8½"	6'-5½"	10'-11½"	6'-9½"	11'-2½"	7'-1½"	11'-5½"	7'-5½"

INTERMEDIATE RADII CAN BE INTERPOLATED

GENERAL NOTES

AVOID PLACING DRAINAGE STRUCTURES, JUNCTION BOXES OR OTHER OBSTRUCTIONS IN FRONT OF RAMP ACCESS AREAS.

RAMP SLOPES SHALL NOT BE STEEPER THAN 20:1.

DETECTABLE WARNING FIELDS THAT ARE INSTALLED AS A GROUP OR SIDE BY SIDE, SHALL BE FROM THE SAME MANUFACTURER.

(A) INSTALL TRANSITION NON-ORIENTABLE TO OTHER PAV'T(S)/ DO NOT MARK TRANSITION NON-.

(B) ALLOW CONSTRUCTION TOLERANCE IN SIDEWALK CROSS SLOPE, THE SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

NOTE: TRUNCATED DOME PANELS SHALL BE YELLOW METAL

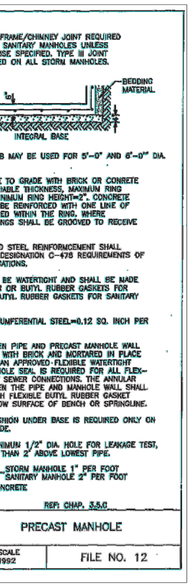


TABLE NO. 1		
PIPE DIA.	MANHOLE DIA.	WALL THICKNESS
8" THRU 27"	3'-6"	4 1/2"
30"	4'-0"	5"
36"	5'-0"	6"
42"	6'-0"	7"

NOTE:
1. USE SINGLE LAYER MONOLITHIC RING AND TWO 2-INCH ADJUSTING RINGS IN CHIMNEY.
2. NO STEPS ALLOWED IN TOP FIVE FEET OF MANHOLE, MEASURED FROM RIM ELEVATION DOWN.
3. SET ADJUSTING RINGS AND FRAME IN MASTIC.
4. BACKPLASTER OUTSIDE OF STRUCTURE, NO BACKPLASTER ALLOWED INSIDE MANHOLE.

Mar 03, 2017 7:42am
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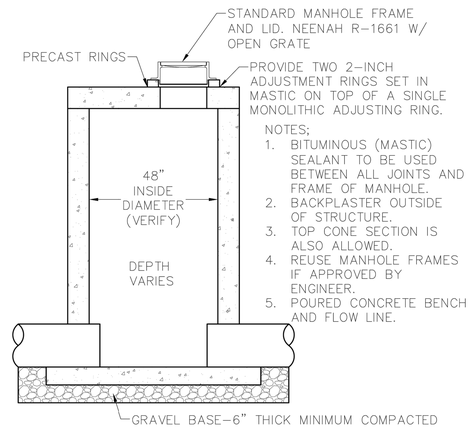
EXHIBIT SAN-01



STORM MANHOLE DETAIL NO SCALE

STO-01 20

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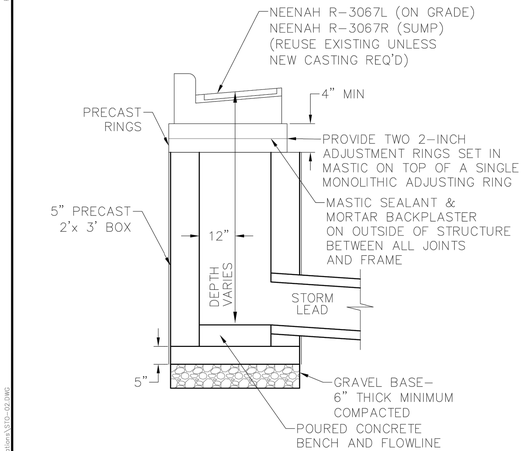

1. INLET TO BE PROTECTED WITH GEOTEXTILE FABRIC BETWEEN THE GRATE AND FRAME. PROTECTION TO REMAIN IN PLACE UNTIL SITE VEGETATION IS ESTABLISHED.
2. IN AREAS WITH ROLL FACE CURB, REPLACEMENT CURB SHALL TRANSITION TO VERTICAL FACE CURB & GUTTER AT INLET FRAME.

STORM INLET DETAIL NO SCALE

STO-02 20

Mar 03, 2017 7:43am
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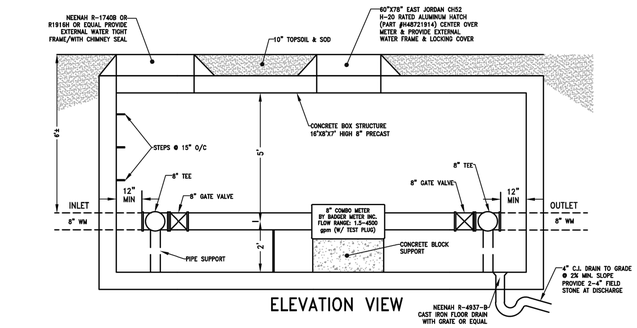
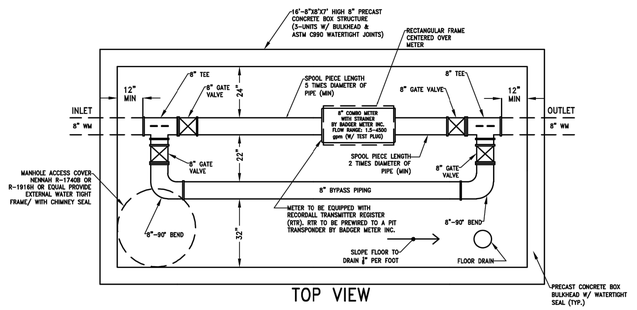


ELEVATION VIEW



TOP VIEW

WATER MAIN MONITORING METER VAULT DETAIL

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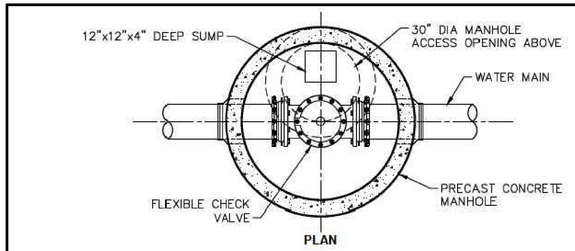
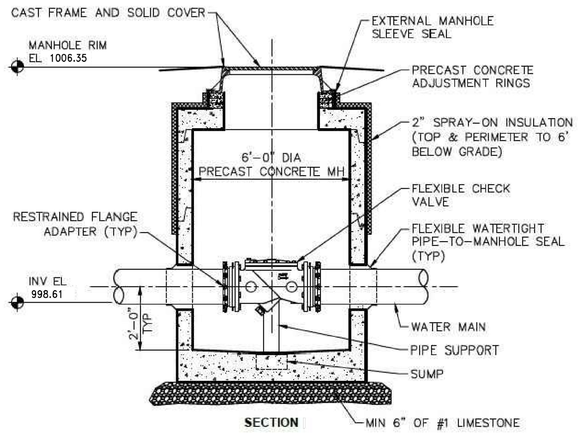
SHOP DRAWING TO BE REVIEWED & APPROVED BY VILLAGE PRIOR TO ORDERING MATERIALS.

NOTE:
VILLAGE WILL PROVIDE THE PHYSICAL METER FOR METER PIT. ALL OTHER METER PIT RELATED MATERIALS/EQUIPMENT TO BE PROVIDED BY THE DEVELOPER/CONTRACTOR.



PLAN



SECTION

INTEGRAL BASE (SHOWN) IS ACCEPTABLE PROVIDED EQUIVALENT PROTECTION FROM HYDROSTATIC UPLIFT IS PROVIDED.

B 1002 **CHECK VALVE MANHOLE**

Sdt-Check Valve MH 24

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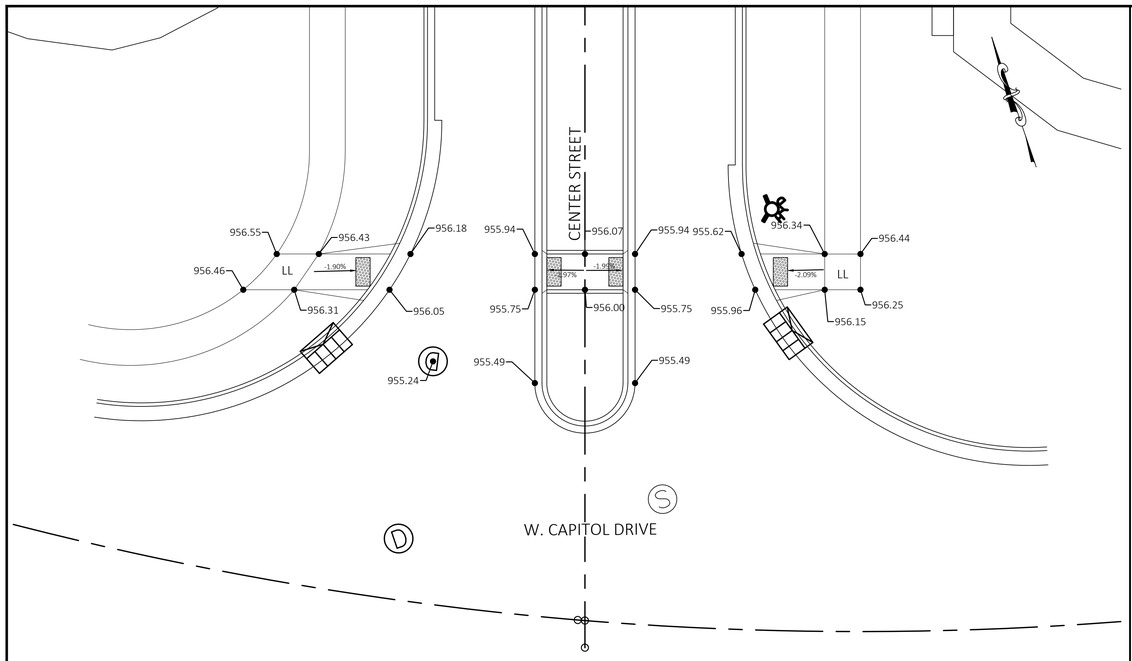
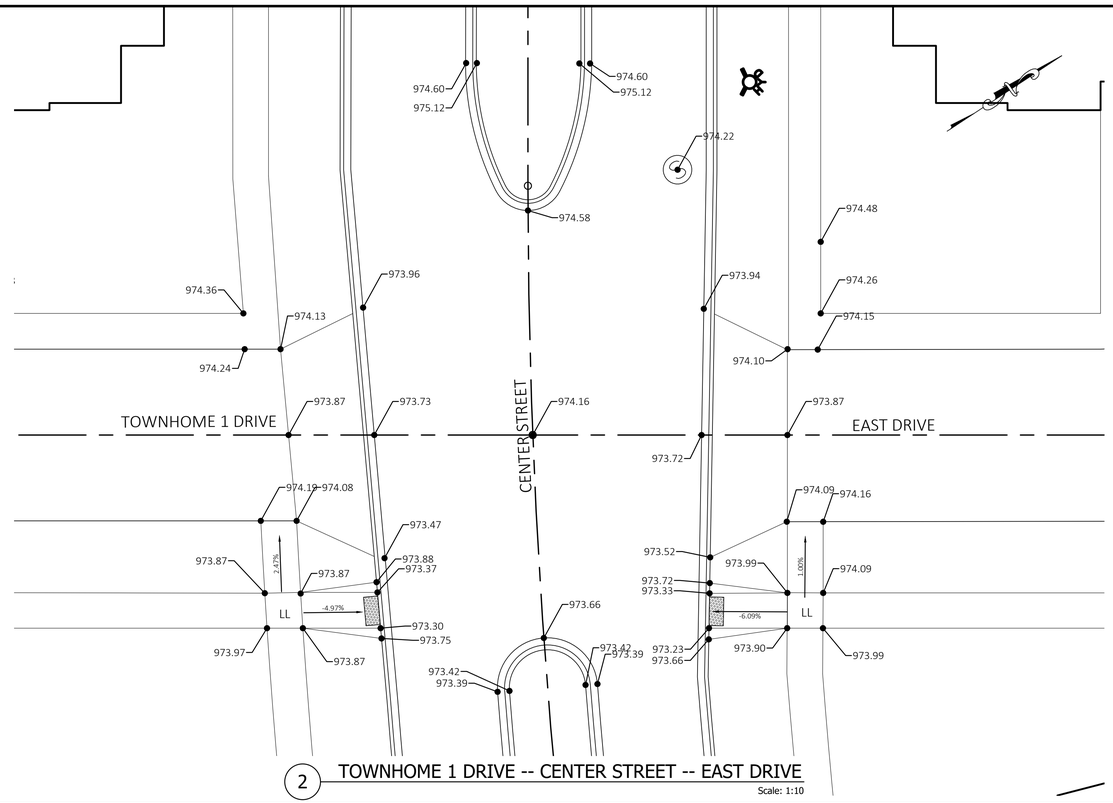


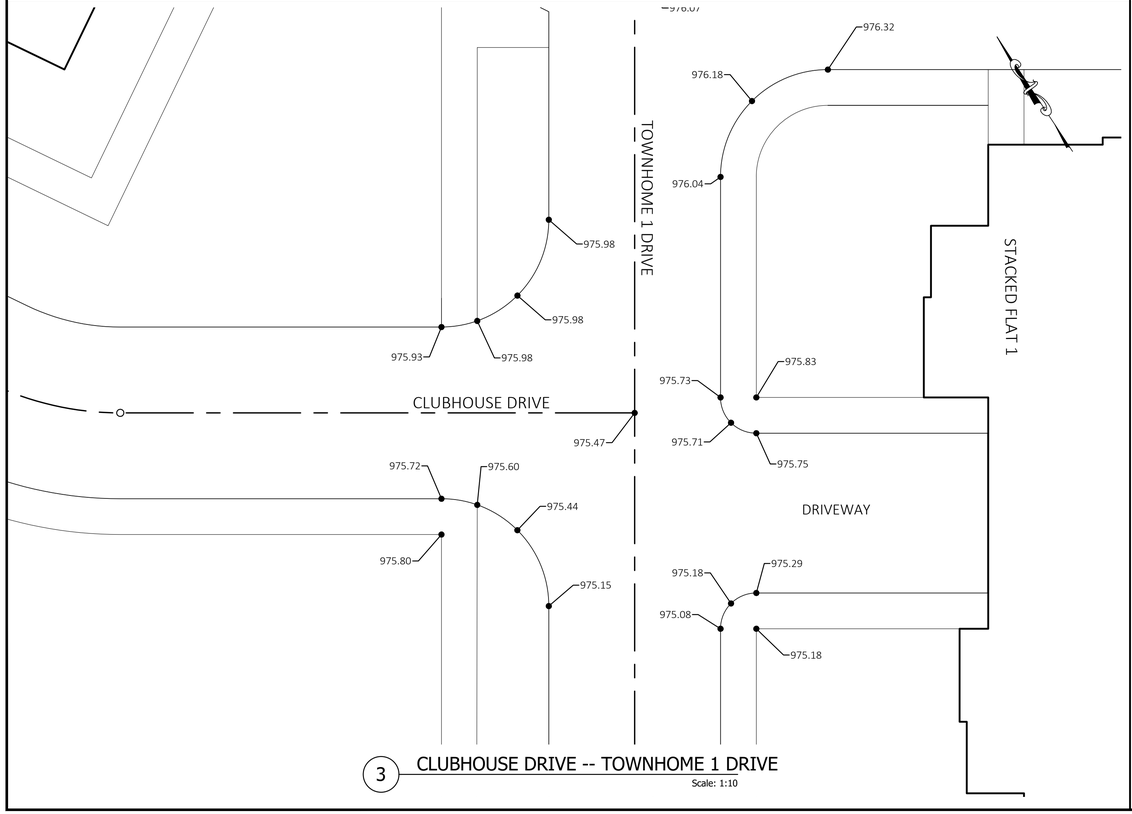
1 W. CAPITOL DRIVE -- CENTER STREET

Scale: 1:10



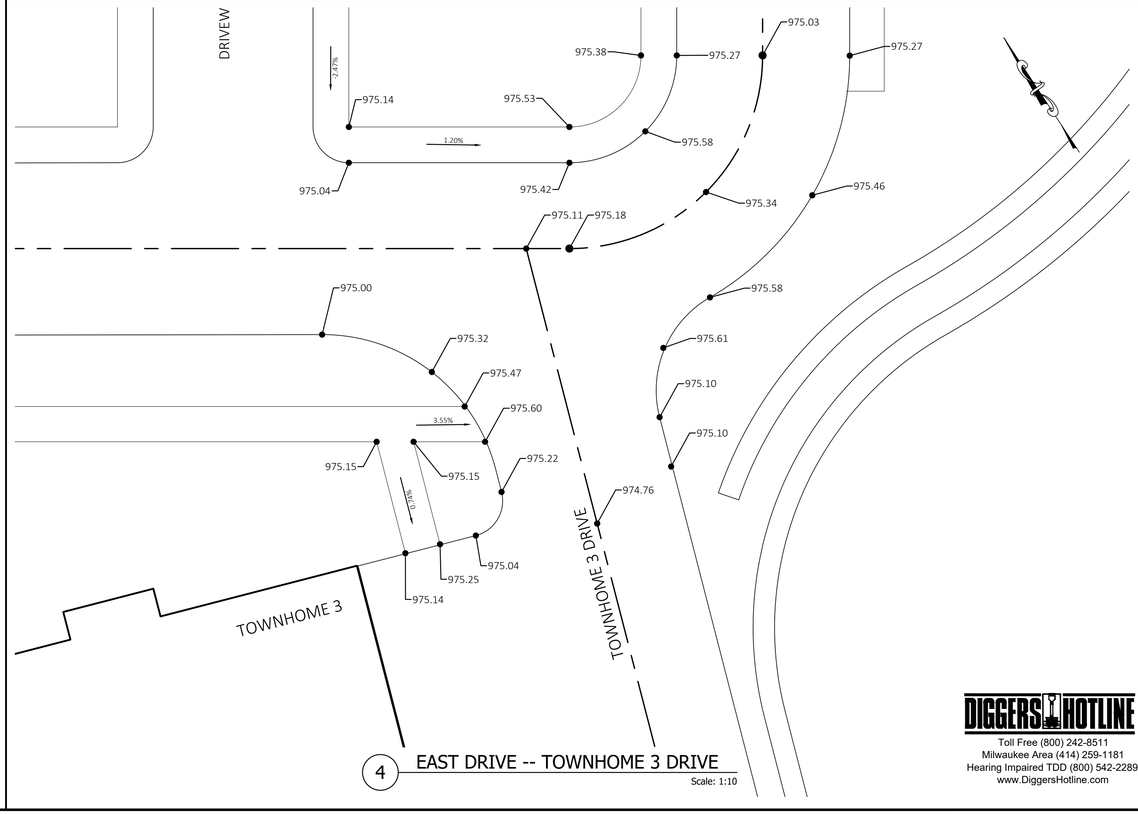
2 TOWNHOME 1 DRIVE -- CENTER STREET -- EAST DRIVE

Scale: 1:10



3 CLUBHOUSE DRIVE -- TOWNHOME 1 DRIVE

Scale: 1:10



4 EAST DRIVE -- TOWNHOME 3 DRIVE

Scale: 1:10

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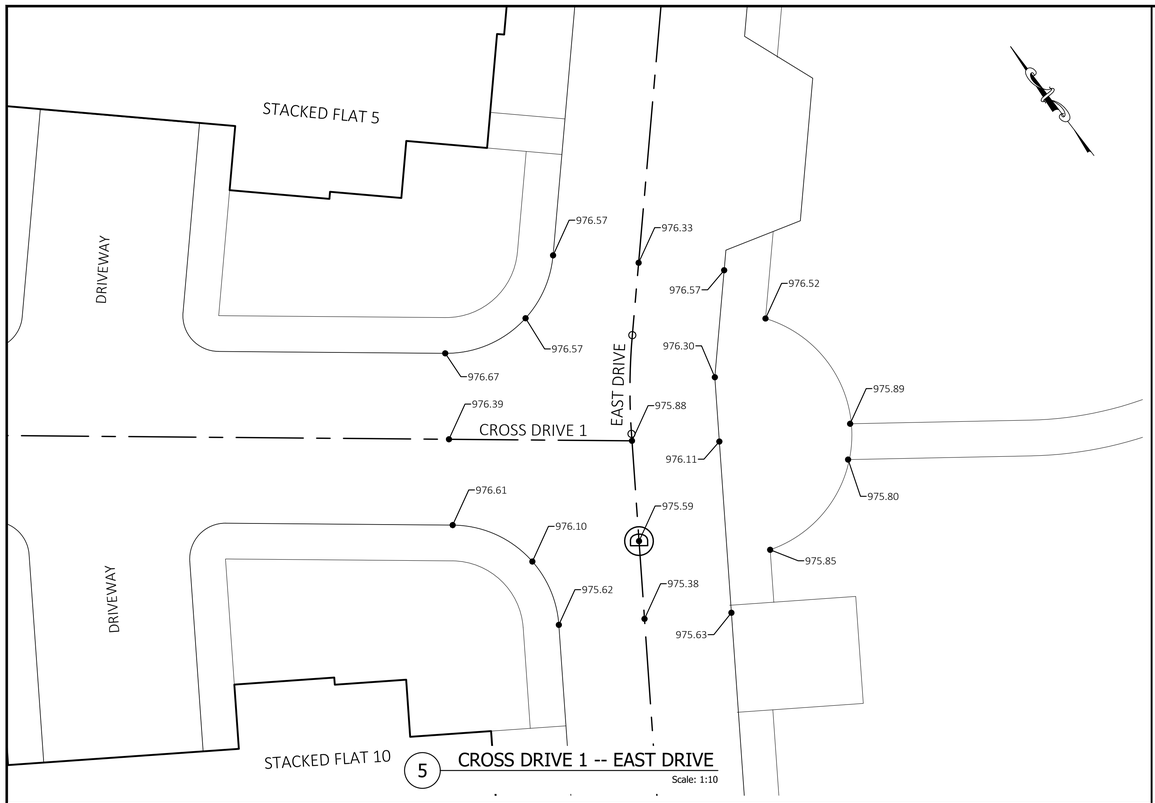

5 CROSS DRIVE 1 -- EAST DRIVE
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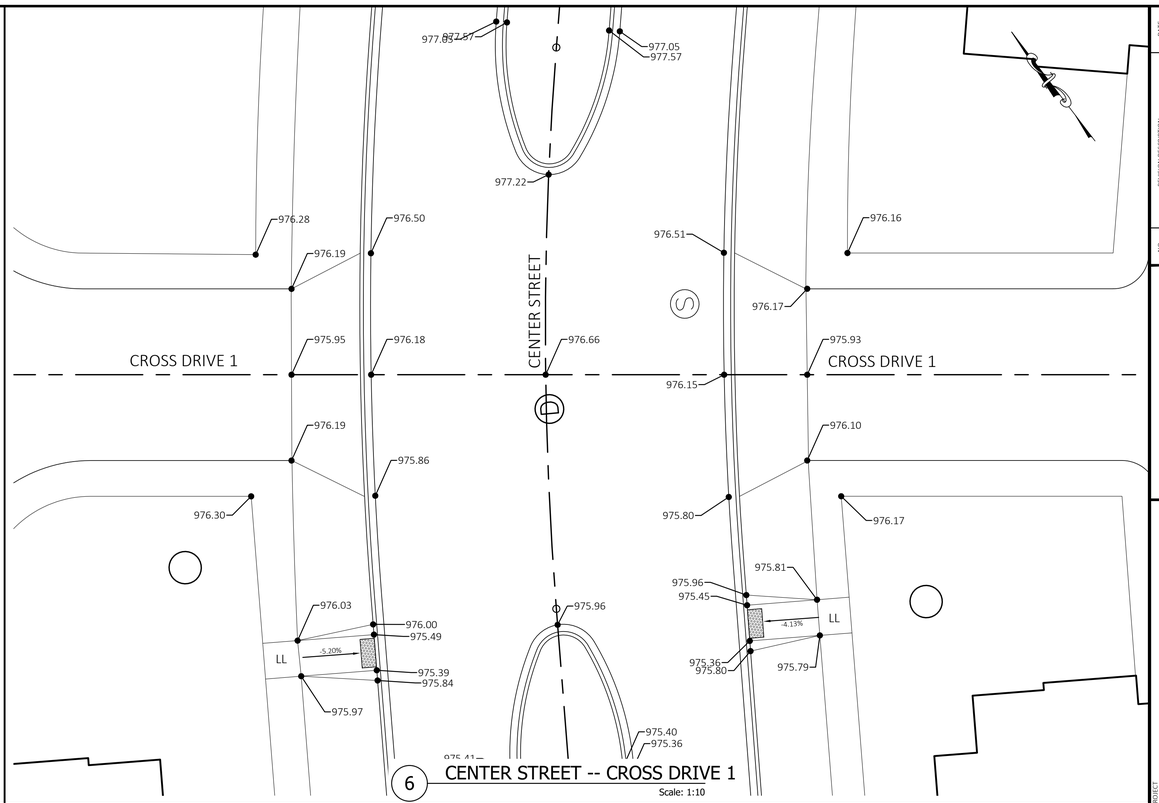

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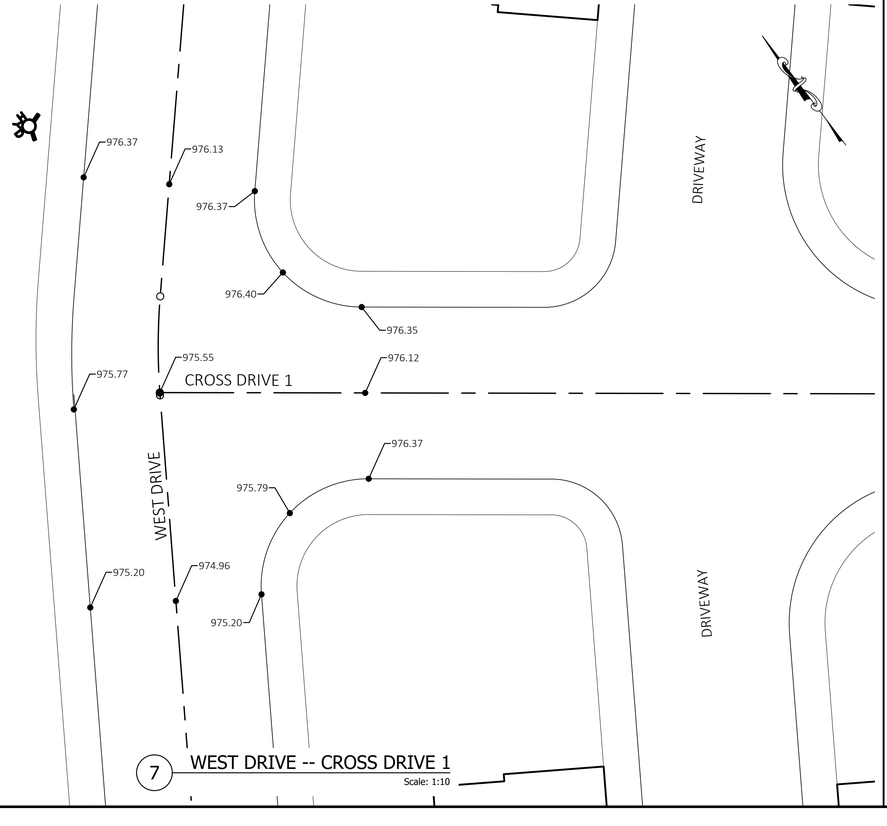

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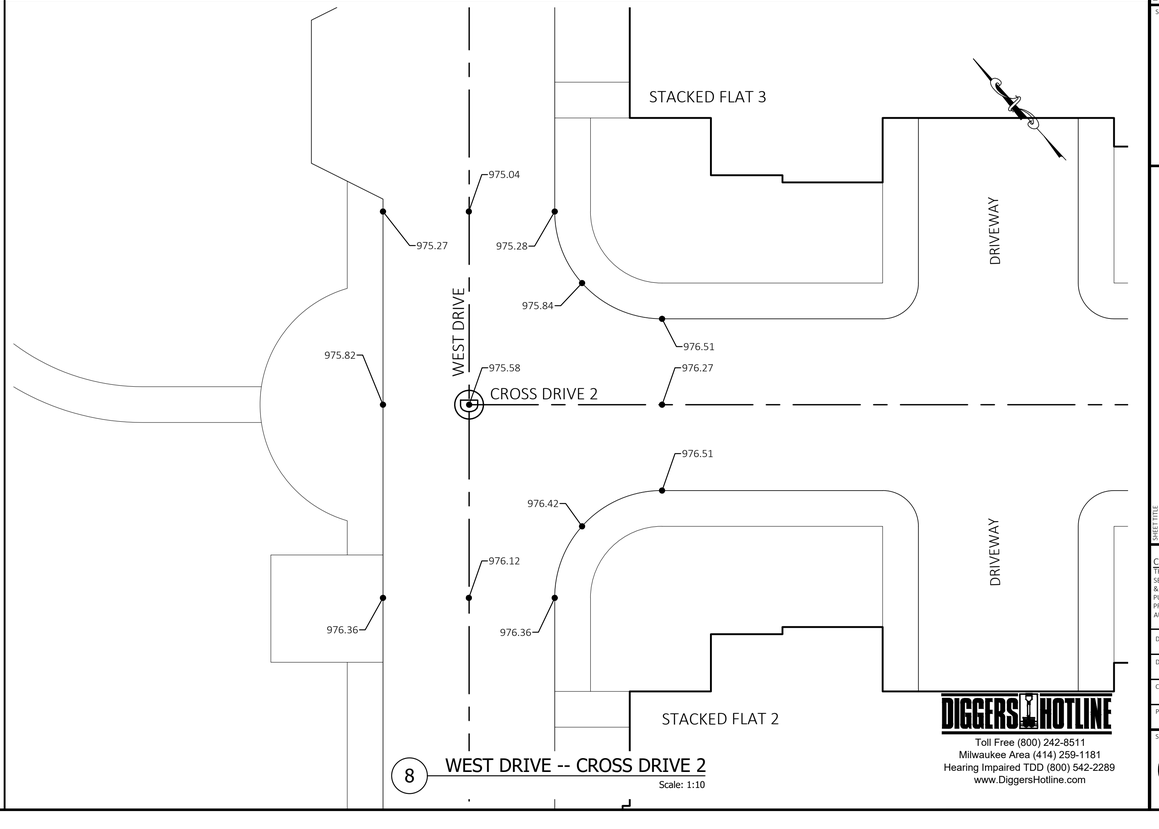

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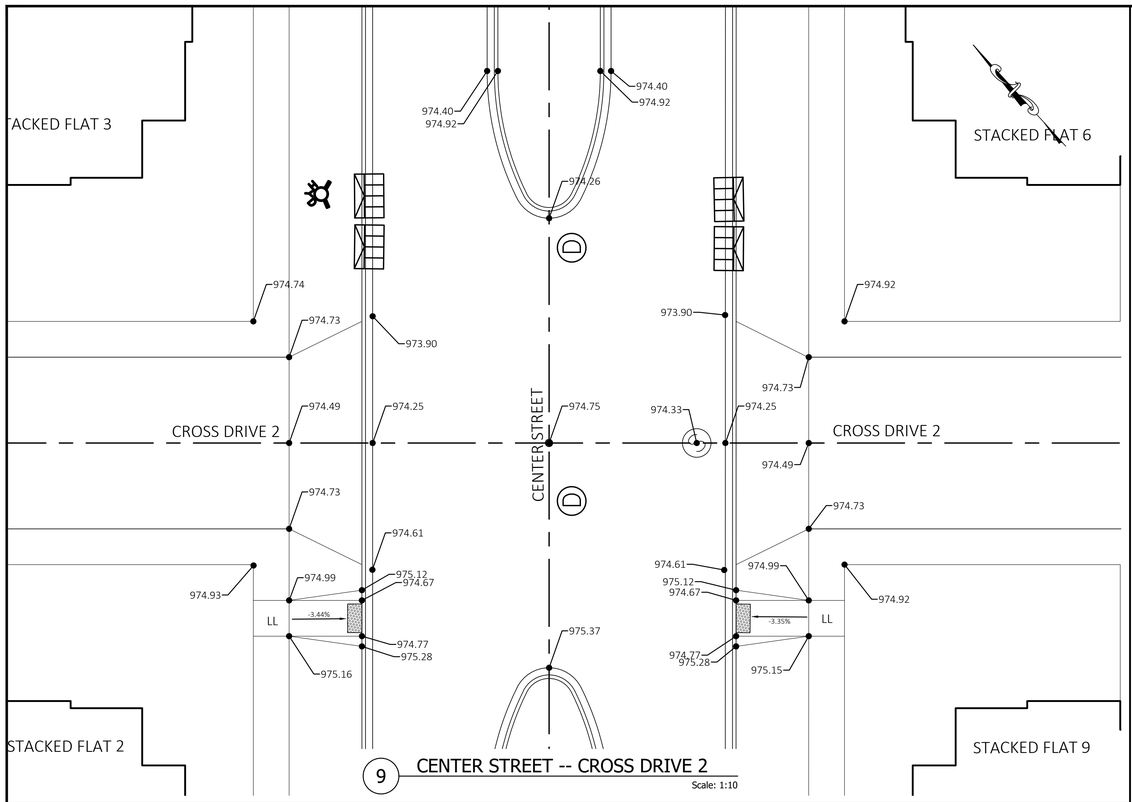

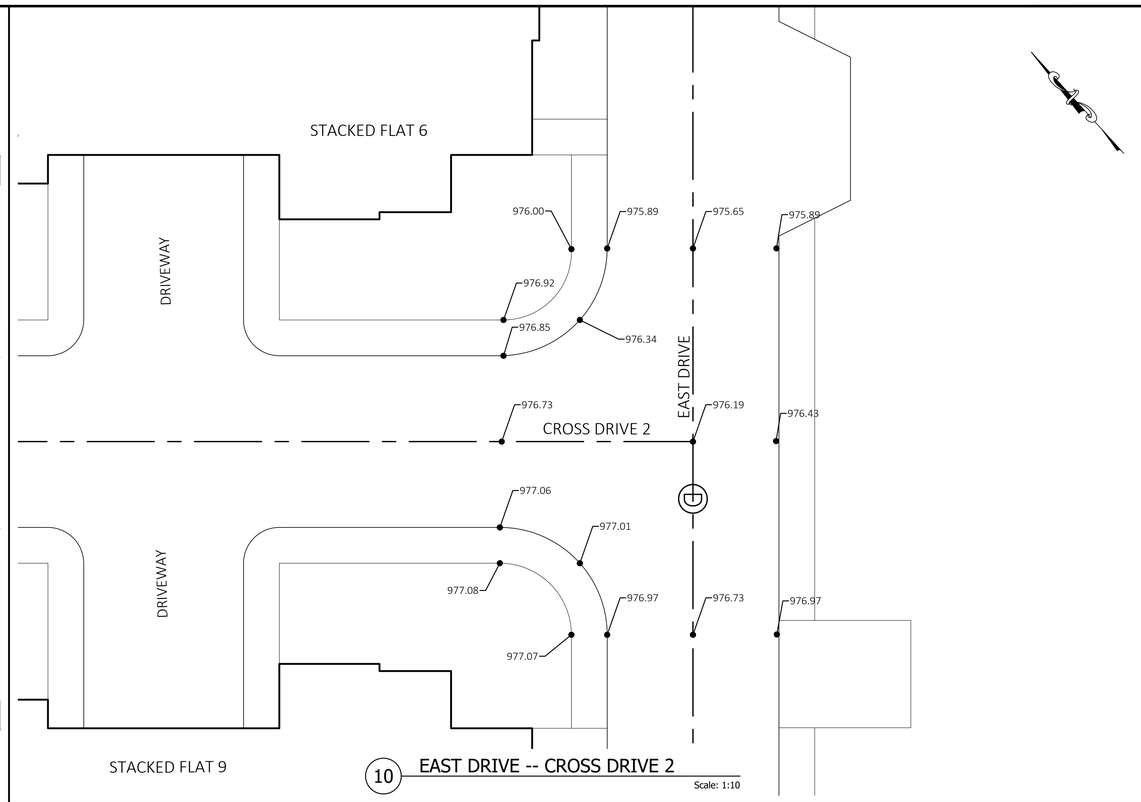

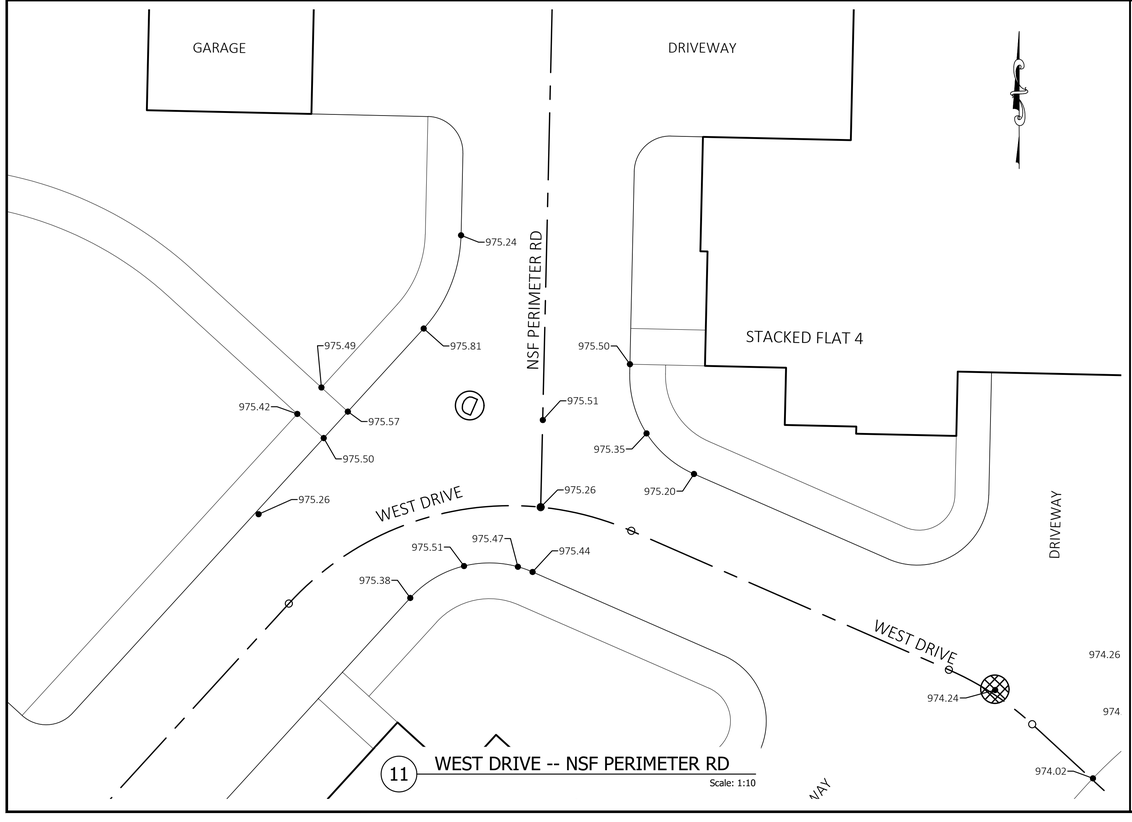

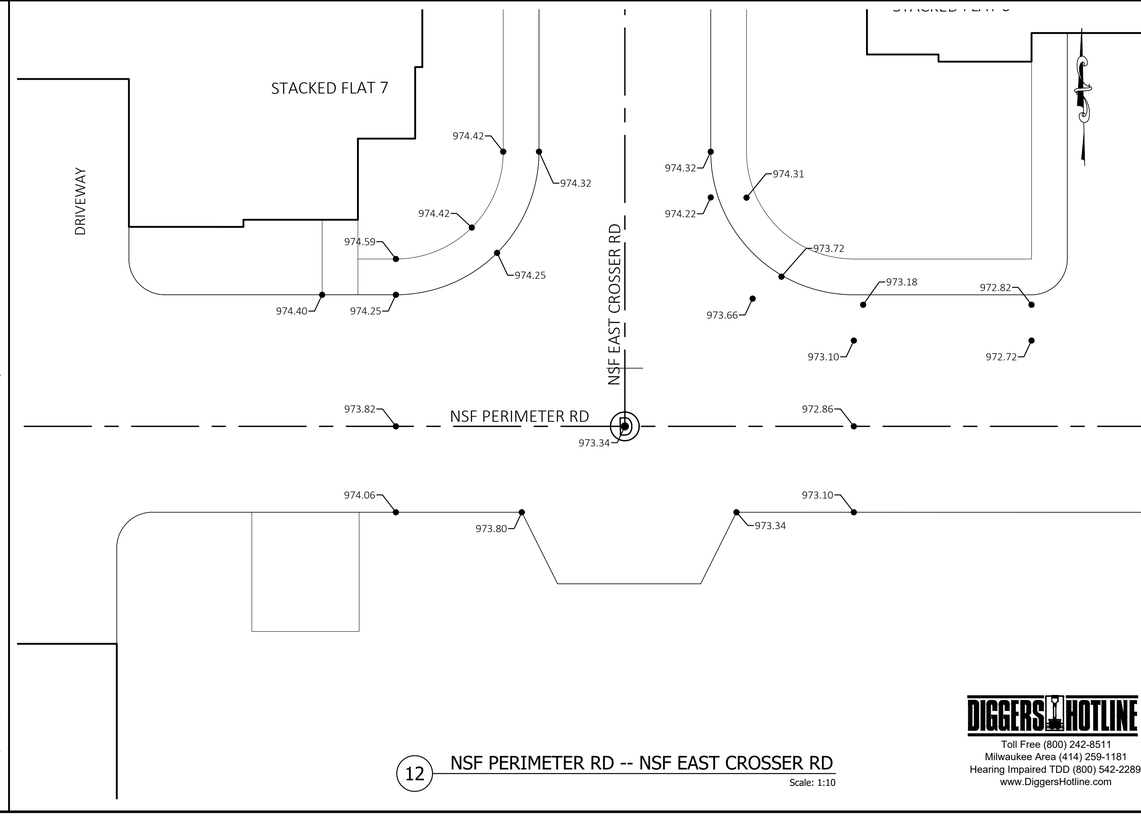

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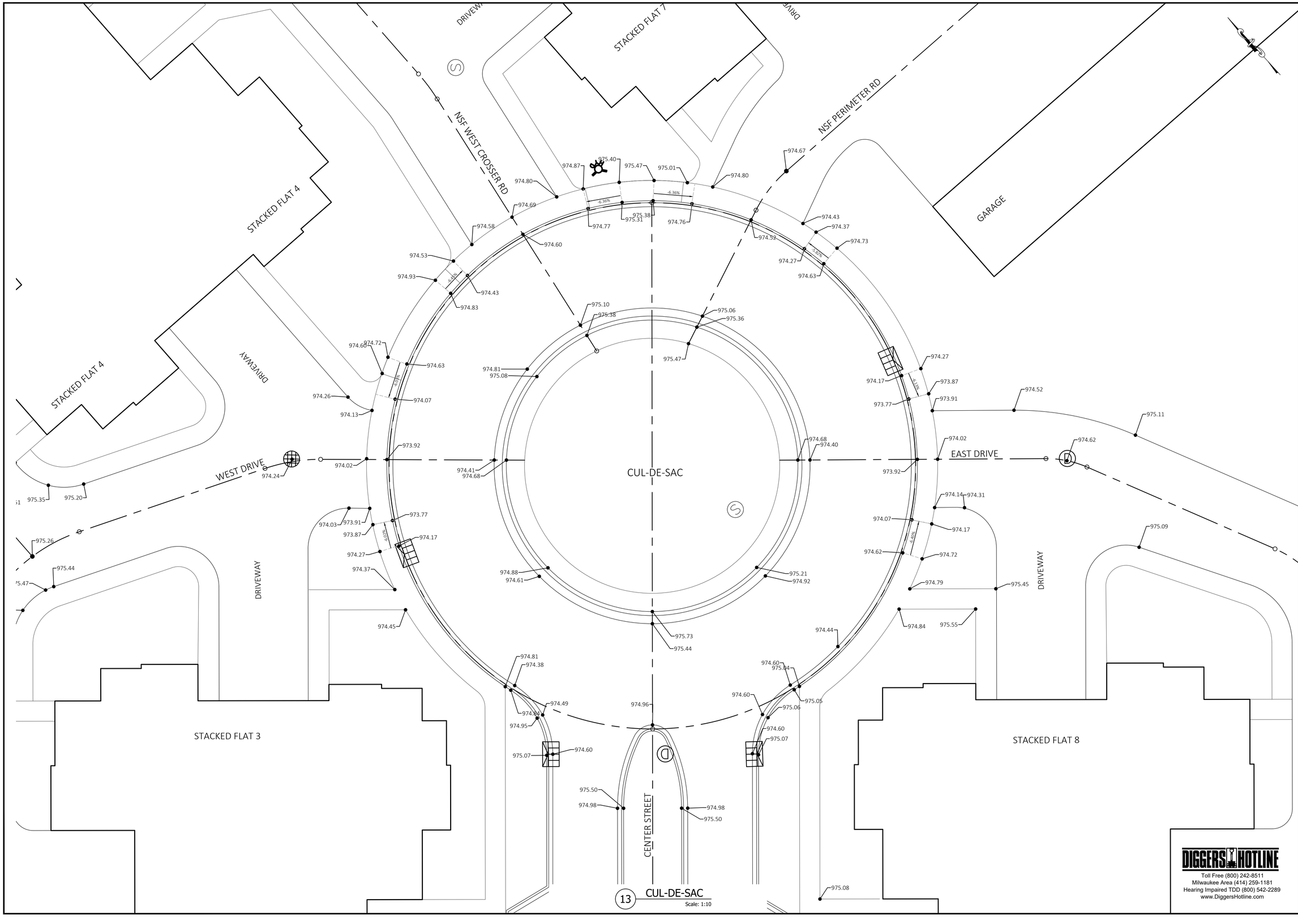

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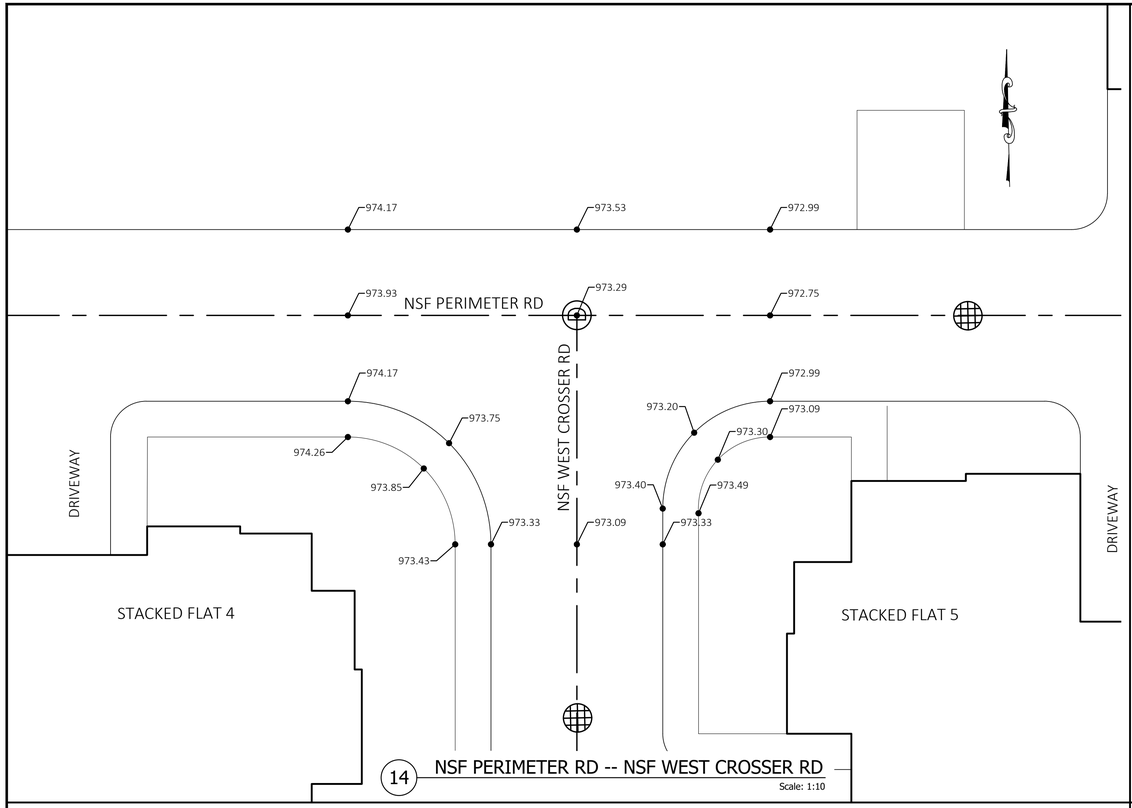

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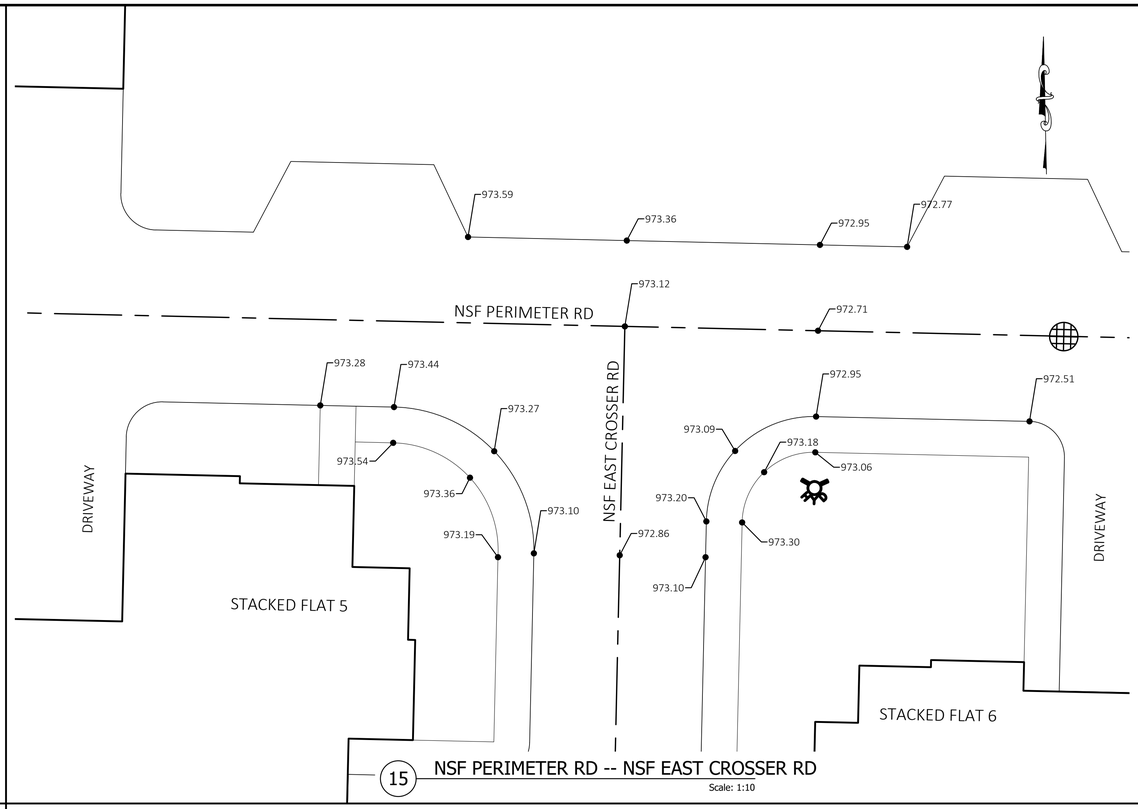

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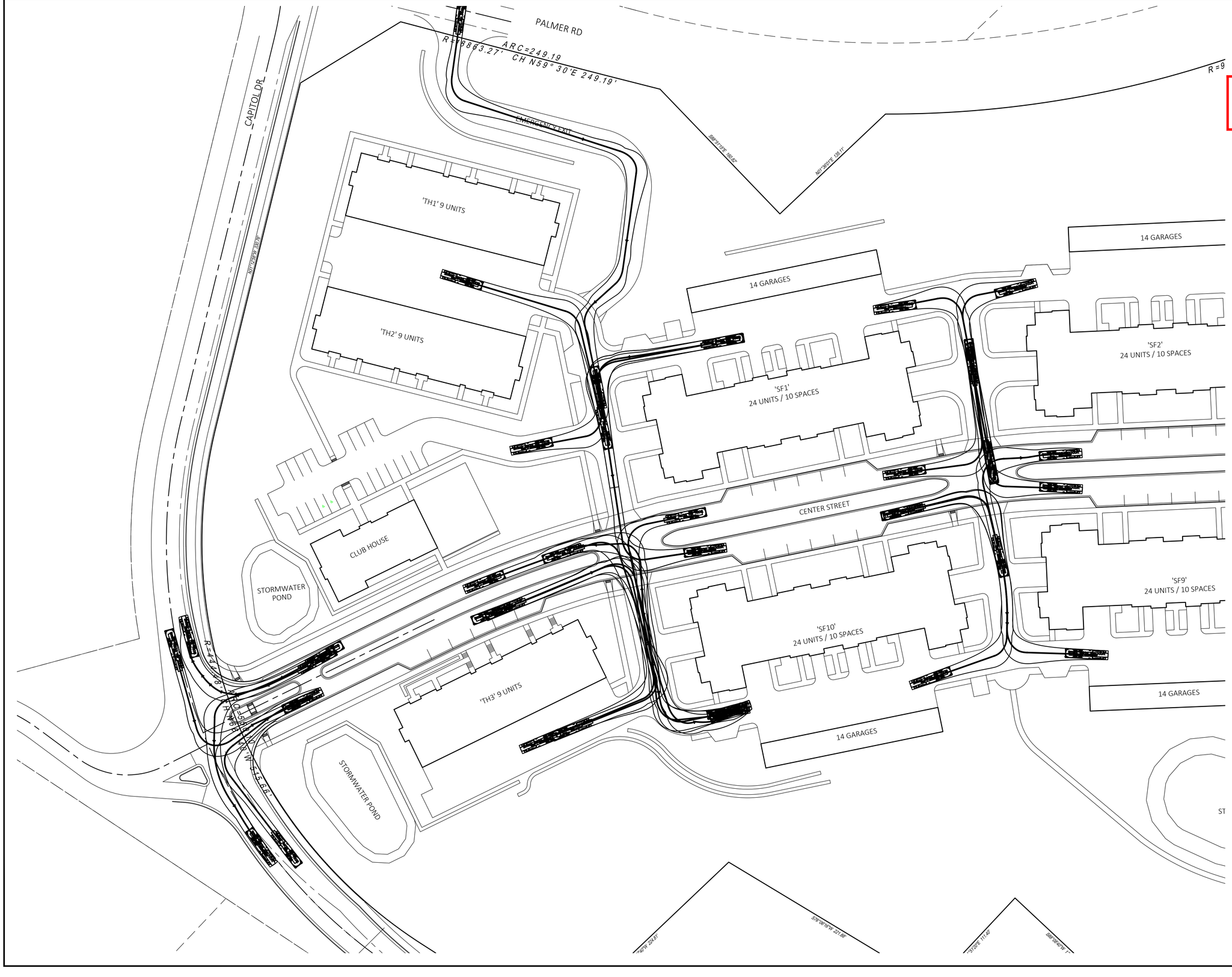

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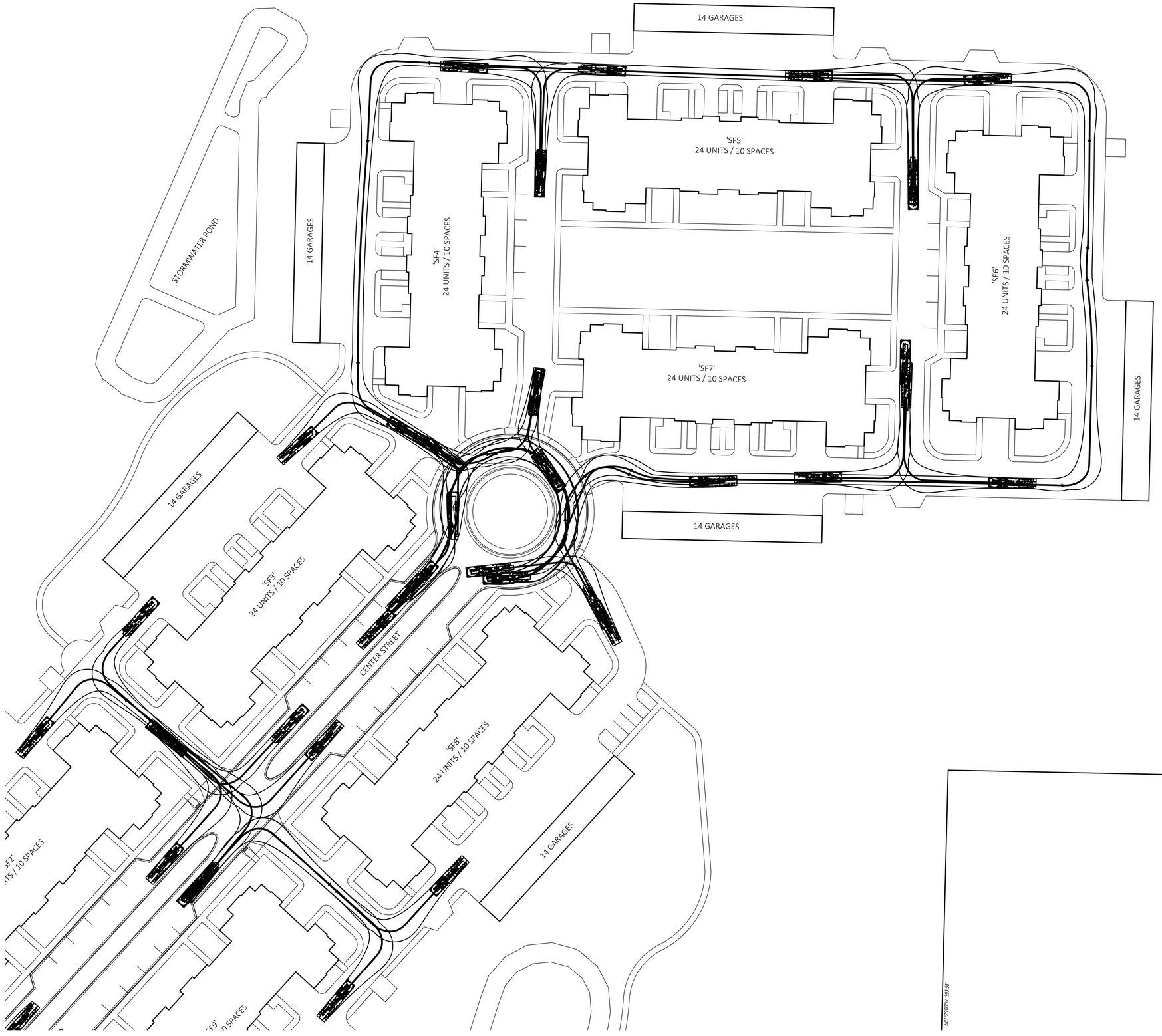

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Project:

Hartland Apartments
700 W. Capitol Drive

Location:
Village of Hartland, Wisconsin

STORM WATER MANAGEMENT PLAN

Preparer:

Project Number: 490686
Last Revised: August 25, 2023

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Appendix 3 Drainage Area Maps
Appendix 4 HydroCAD Model Results
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1.0 INTRODUCTION

The Hartland Apartments development is located at 700/701 W. Capitol Drive, south of STH 16 and east of STH 83. The site lies within a quarry that was mined for road gravel from the 1930s to the 1960s after which concrete plant operations took place in the southwest corner of the property. Neither of these uses are active any longer. Three infiltration basins and two bioretention basins are planned for the property to comply with the storm water management requirements of the Village of Hartland, Waukesha County and Wisconsin Department of Natural Resources (WDNR).

The 49 acre study area is located within part of the NW ¼ of Section 3, T7N, R18E in the Village of Hartland, Waukesha County, Wisconsin. A location map for the site is located in **Appendix 1**.

Storm water management is required by the Wisconsin Department of Natural Resources (DNR) through Chapter NR 151 Runoff Management and the Village of Hartland Chapter 76 – Stormwater Management, Sec. 76-7 – Performance Standards because the proposed development causes a land disturbing activity of one acre or more. Therefore, development is required to implement the following controls:

Total suspended solids. BMPs shall be designed, installed and maintained to control total suspended solids carried in runoff from the post-construction site as follows: for new development TSS Reduction shall be ≥ 80%.

Total phosphorous. BMPs shall be designed, installed and maintained to control total phosphorous carried in runoff from the post-construction site as follows: for new development TP Reduction shall be ≥ 30%.

Peak discharge. The stormwater management facilities shall contain sufficient storage to contain the runoff from the 100-year, 24-hour rainfall event under developed conditions, while utilizing a peak discharge rate from the developed site which does not exceed the peak runoff rate from the site for a 10-year, 24-hour rainfall even under pre-developed conditions. By design, BMPs shall be employed to maintain or reduce the 10-year, 24-hour post-construction peak runoff discharge rates to the 2-year, 24-hour pre-development peak runoff discharge rate. Peak discharges shall be calculated using TR-55 runoff curve number methodology, Atlas 14 precipitation depths, and the appropriate NRCS Wisconsin MSE3 precipitation distribution.

Frozen condition for internally drained sites. The Village of Hartland refers to the Waukesha County Stormwater Management & Erosion Control Ordinance Chapter 14, Article VIII for modeling the 100-year frozen condition of an internally drained site.

Flows generated by the 100-year, 24- hour design storm under planned land use conditions may exceed the design capacity of conveyance systems, but shall not come in contact with any buildings. For buildings designed for human occupation on a regular basis, the following additional requirements shall apply:

(i) The lowest elevation of the structure that is exposed to the ground surface shall be a minimum of two (2) feet above the maximum water surface elevation produced by the 100-year, 24 hour design storm, including flows through any stormwater BMP that may temporarily or permanently store water at a depth of greater than one (1) foot; and

(ii) The structure shall be setback at least 50 feet from any stormwater BMP that may temporarily or permanently store water at a depth of greater than one (1) foot, including any internally drained area with a significant contributing watershed and/or limited runoff

storage capacity, as determined by the LRD. Setback distance shall be measured from the closest edge of water at the elevation produced by the 100-year, 24-hour design storm. The LRD may exempt existing structures and structures with no basement from this requirement if the LRD determines other site risks are minimal based on soil and site conditions.

Infiltration. For development with more than 40 percent and up to 80 percent connected imperviousness, such as medium and high density residential, multi-family development, industrial and institutional development, and office parks, infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 75 percent of the predevelopment infiltration volume, based on an average annual rainfall.

2.0 HYDROLOGIC CALCULATIONS

HydroCAD version 10.20-3c has been used to analyze storm water hydrologic characteristics for the site. HydroCAD uses the TR-55 methodology for determining peak discharge runoff rates. Curve numbers for the existing ground cover were selected as woods/grass combination, "A" soil type in "poor" condition. This CN 57 exceeds the maximum values for woodland and grassland specified in Chapter 76, 30 and 39 respectively, but is appropriate since the entire area is considered a gravel pit. Storm water modeling was conducted using the 1-year, 2-year, 10-year and 100-year storm events using the MSE3 rainfall distribution with rainfall depths per Chapter 32. The USDA Web Soil Survey and a Geotechnical Report completed by GeoTest and dated May 4, 2023 are included in **Appendix 2**.

NOAA Atlas 14, Volume 8, Version 2 for Village of Harland, WI, USA
Lat: 43.1028°, Long: -88.3577°

Storm Recurrence Interval	24-hour Rainfall Depth
1-year	2.40 inches
2-year	2.71 inches
10-year	3.83 inches
100-year	6.26 inches

Web Soil Survey
National Cooperative Soil Survey
Hydrologic Soil Group – Waukesha County, WI

Map Unit Name	Rating
Gravel Pit	
Casco-Rodman Complex	B
Theresa Silt Loam	C
Hocheim Loam	D

3.0 PRE-DEVELOPED CONDITIONS

The drainage study areas were determined using 1-foot topographic mapping generated from topographic field survey data developed for the project. A drainage area map is included in **Appendix 3**. The existing site is generally internally drained but the southern portion does drain south towards Capitol Drive and modeling for this area was completed for comparison with the proposed condition. A 6-minute minimum time of concentration was used for the east pre-development area due to the impervious and steep slope conditions. The following table presents the results of the hydrological analysis for the existing conditions:

Hydrologic Analysis of Pre-Developed Conditions

	Area (Ac)	Runoff Curve Number	Time of Conc. (min.)	Peak Flow Rate (cfs)			
				1-year	2-year	10-year	100-year
South (S1)	13.856	72	6.0	10.70	15.02	33.16	79.58

Detailed hydrologic calculations for the study area are included in **Appendix 4**.

4.0 POST-DEVELOPMENT CONDITIONS

The post-development condition consists of fourteen separate buildings, including a single-story clubhouse, two- and three-story apartment buildings and single-story garage buildings. The development also includes parking and drive areas, three stormwater infiltration basins and two stormwater bioretention basins.

The post-development drainage basins match those of the existing conditions. Subareas 1S, 2S and 3S are internally drained. Subareas 4S and 5S combined are smaller than the existing area that discharges towards Capitol Drive.

Referencing the Waukesha County Basement Wetness and Flooding Preventions Standards for design standards, the 100-year frozen condition was modeled for the internally drained subareas and infiltration ponds by using 6.26" rain depth and NRCS runoff curve number 98 and removing any infiltration credit.

The following table summarizes the results of the analysis of proposed conditions:

Hydrologic Analysis of Post-Developed Conditions

	Area (Ac)	Runoff Curve Number	Time of Conc. (min.)	Peak Flow Rate (cfs)			
				1-year	2-year	10-year	100-year
1S	13.71	62	6.0	1.90	4.48	17.31	55.62
2S	13.66	60	6.0	1.06	2.87	14.44	50.79
3S	13.50	66	6.0	4.85	8.11	22.87	63.90
4S (south)	3.42	68	6.0	1.66	2.57	6.56	17.33
5S (south)	4.37	70	6.0	2.73	3.99	9.41	23.63
Total (w/o infiltration or detention)	48.65	---	---	11.91	21.84	70.52	211.25

Detention Features		1-year	2-year	10-year	100-year
Inf Pond 1P	Peak Inflow (cfs)	1.90	4.48	17.31	55.62
	Peak Outflow (cfs) Infiltrated	0.73	0.87	1.37	2.02
	High Water Level	962.18	962.40	963.37	965.89
	FROZEN High Water Level	--	--	--	971.48
Inf Pond 2P	Peak Inflow (cfs)	1.06	2.87	14.44	50.79
	Peak Outflow (cfs) Infiltrated	0.62	1.24	1.81	2.43
	High Water Level	960.06	960.11	960.64	962.38
	FROZEN High Water Level	--	--	--	968.28

Inf Pond 3P	Peak Inflow (cfs)	4.85	8.11	22.87	63.90
	Peak Outflow (cfs) Infiltrated	1.19	1.36	1.93	2.43
	High Water Level	963.23	963.41	964.19	966.35
	FROZEN High Water Level	--	--	--	971.79
Bioretention 4P	Peak Inflow (cfs)	1.66	2.57	6.56	17.33
	Peak Outflow (cfs)	0.48	0.71	1.37	7.40
	High Water Level	954.22	954.70	957.29	958.75
Bioretention 5P	Peak Inflow (cfs)	2.73	3.99	9.41	23.63
	Peak Outflow (cfs)	0.46	0.66	1.16	7.35
	High Water Level	955.39	955.89	958.29	959.69

Detailed hydrologic calculations are included in **Appendix 4 and 5**.

Pond 1P Controls
Forebay NWL = 962.00
Forebay Surface area = 4365 sf
Forebay Bottom Elev.= 957.00
Inf. Surface Elev. = 962.00
Top of pond elev. = 973.00

Pond 2P Controls
Forebay NWL = 960.00
Forebay Surface area = 6890 sf
Forebay Bottom Elev.= 955.00
Inf. Surface Elev. = 960.00
Top of pond elev. = 972.00

Pond 3P Controls
Forebay NWL = 963.00
Forebay Surface area = 7430 sf
Forebay Bottom Elev. = 958.00
Inf. Surface Elev. = 963.00
Top of pond elev. = 975.00

Pond 4P Controls
Bio Surface Elev. = 957.00
12" Outflow Culvert ie = 953.25
6" Underdrain inlet ie = 953.55
6" Underdrain outlet ie = 953.25
24" Outlet Grate ie = 958.00
Top of berm Elev. = 959.25

Pond 5P Controls
Bio Surface Elev. = 958.00
12" Outflow Culvert ie = 954.25
6" Underdrain inlet ie = 954.75
6" Underdrain outlet ie = 954.25
24" Outlet Grate ie = 959.00
Top of berm Elev. = 960.25

5.0 ALLOWABLE PEAK RUNOFF RATES

Hydrologic analysis included in this report was performed using the HydroCAD hydrologic simulation computer model, version 10.20-3c by HydroCAD Software Solutions LLC. The discharges were generated using the SCS Dimensionless Unit Hydrograph Method for a 24-hour duration storm. Model parameters include drainage area, SCS runoff curve number, time of concentration and 24-hour precipitation with MSE3 NRCS rainfall distribution curve. A 6-minute minimum time of concentration was used for the post-development area. The following table summarize the results of the analysis.

Comparison of Pre- and Post-Development Flows

	1-year	2-year	10-year	100-year
Total Discharge (cfs)	Pre-developed Flows			
	10.70	15.02	33.16	79.58
	Post-developed Flows			
	0.94	1.35	2.52	14.74

6.0 STORM WATER QUALITY CONTROL

The post-development site will utilize the forebays of the three infiltration basins and the two bioretention basins to achieve post-construction storm water quality control in accordance with the State of Wisconsin requirements for suspended solids removal.

The requirement is 80% removal of the Total Suspended Solids (TSS) as compared to no controls. Water quality analysis included in this report was performed using the Source Loading and Management Model (WINSLAMM) computer model, version 10.5. WINSLAMM was adopted and calibrated by the Wisconsin Department of Natural Resources to better understand the relationships between sources of urban runoff pollutants and runoff quality. Detailed computations are provided in **Appendix 6**.

The water quality modeling results for the study area are as follows:

Water Quality Modeling Results

Site	**% Reduction**
Total Suspended Solids	74%
Total Phosphorous	57%

TSS reduction is provided via the 3 infiltration ponds' forebays and the bioretention basin(s). The infiltration basins themselves are not modeled in WinSLAMM otherwise the output would read 100%. Per WDNR Technical Standard pretreatment for residential development is required upstream of the infiltration basins to remove 60% of the total suspended solids and for ponds 1P, 2P and 3P provide 70%, 77% and 73% reductions respectively. The bioretention basins each provide 80%.

7.0 INFILTRATION

The development will provide infiltration where soil and subsurface conditions permit, per WDNR and Village code requirements. The infiltration basins will be the primary (reported) infiltration practices for the site, however due to the gravel condition, other undeveloped and landscape areas will also contribute to the total infiltration. The south area of the site that is draining toward Capitol Drive has been decreased from the existing condition and the north area will remain internally drained with zero discharged released.

8.0 WISCONSIN DNR SOIL LOSS CALCULATIONS

The erosion control best management practices and construction sequence for the proposed development has been developed using the Wisconsin DNR Sediment Loss & Discharge Calculation Tool Version 2.0. See **Appendix 7**.

9.0 STORMWATER MANAGEMENT MAINTENANCE PLAN

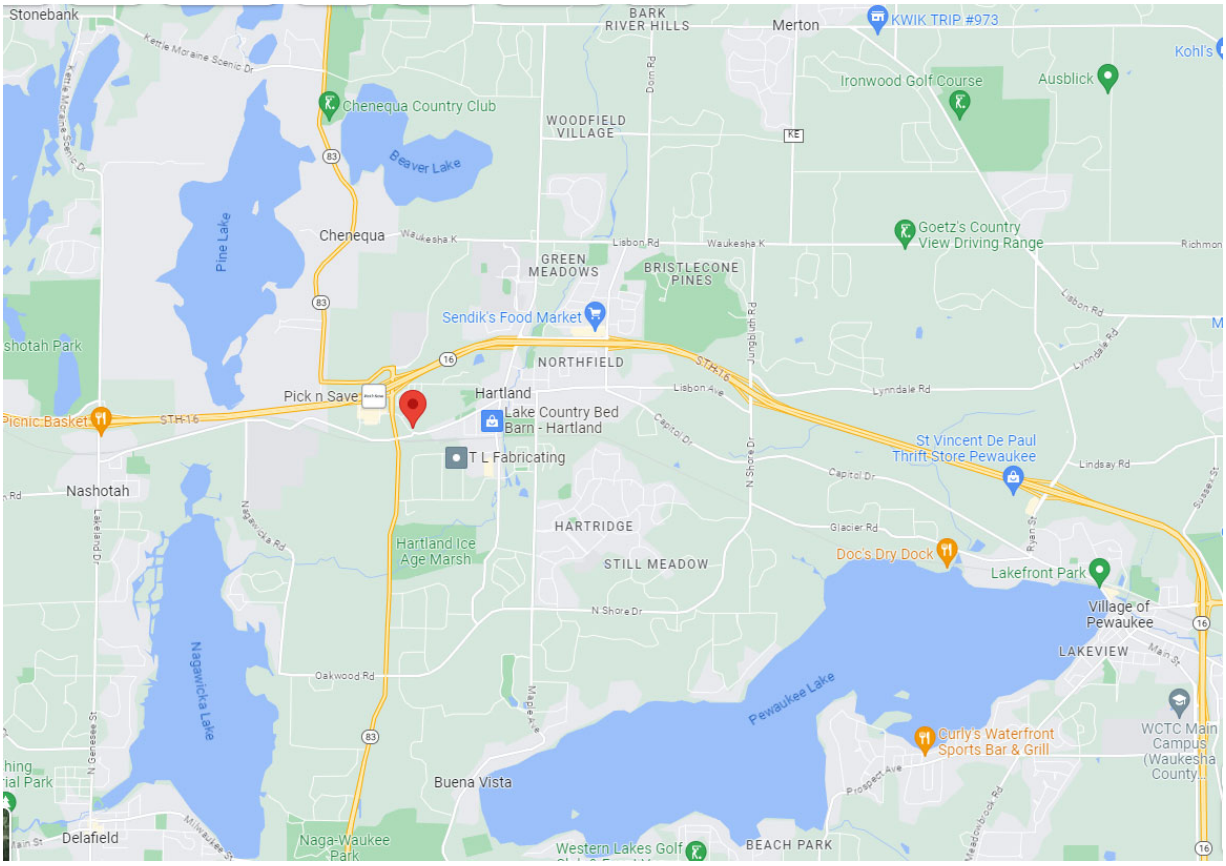
The stormwater management maintenance provisions and inspection checklist are detailed in **Appendix 9.**

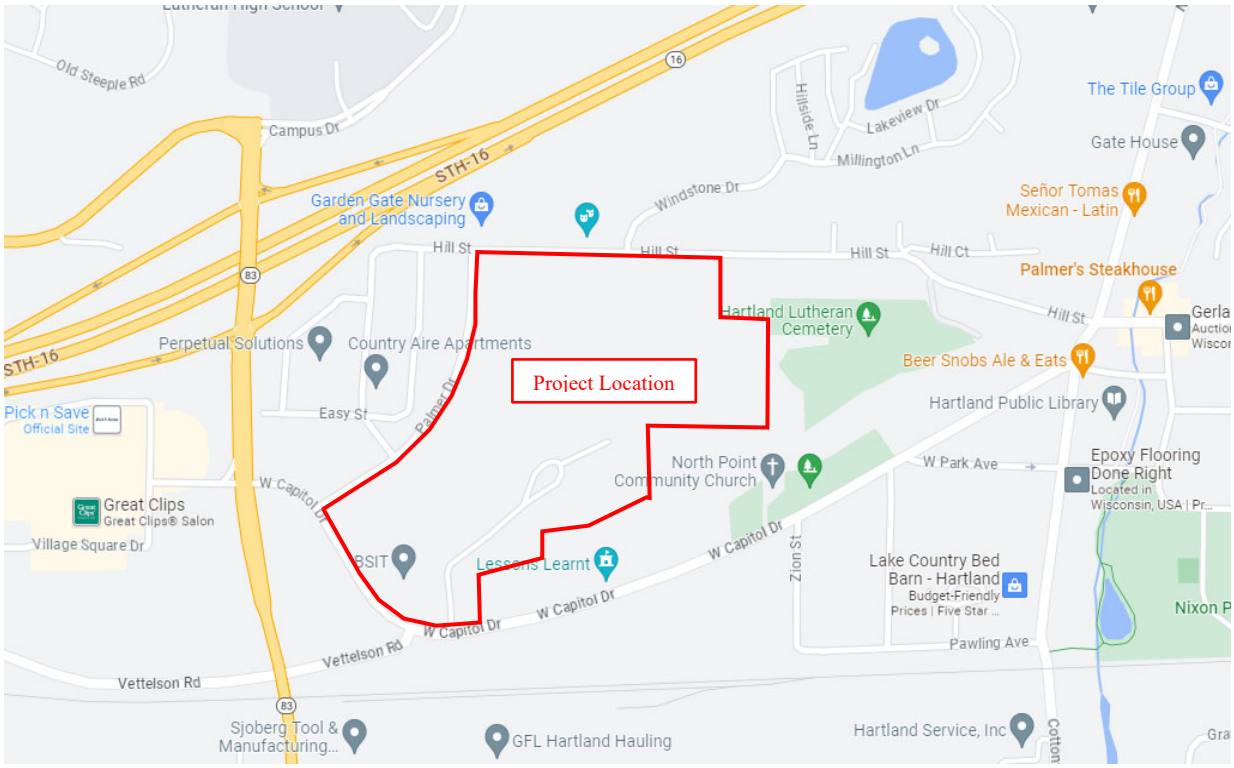
Appendix 1

Site Location Map

Site Location Map

Located at 700/701 W. Capitol Drive, Hartland, Wisconsin 53029:





Appendix 2

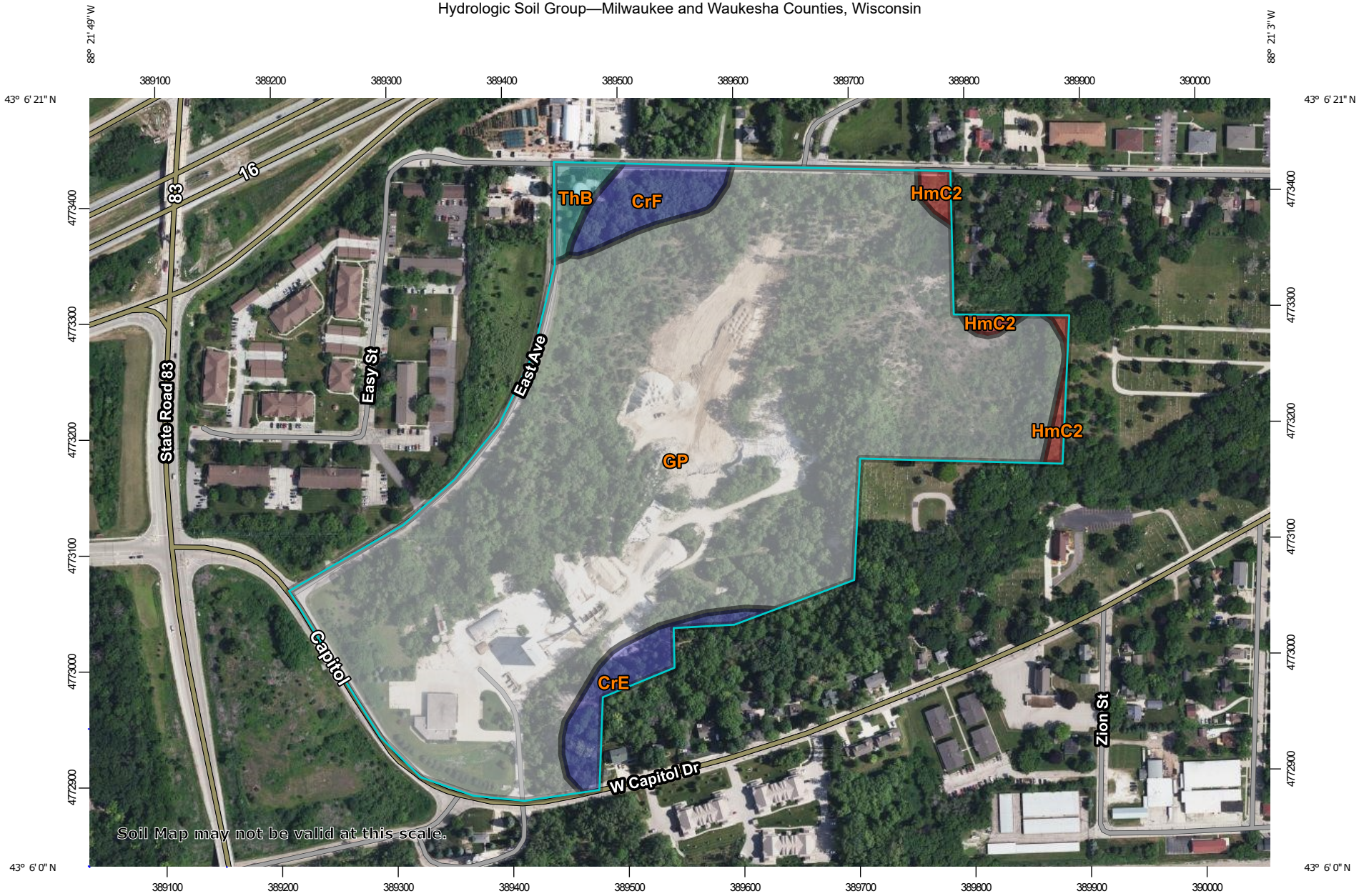
USDA Web Soil Survey

and Geotechnical Report

Payne+Dolan
A WALBEC COMPANY
www.walbecgroup.com
(920) 757-7559

Project #490686

August 2023



Map Scale: 1:4,670 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Milwaukee and Waukesha Counties, Wisconsin
Survey Area Data: Version 18, Sep 7, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 6, 2020—Jun 28, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CrE	Casco-Rodman complex, 20 to 30 percent slopes	B	1.5	3.0%
CrF	Casco-Rodman complex, 30 to 45 percent slopes	B	1.5	3.2%
GP	Gravel pit		44.0	91.0%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	D	0.7	1.4%
ThB	Theresa silt loam, 2 to 6 percent slopes	C	0.6	1.3%
Totals for Area of Interest			**48.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

2135 South 116th Street
West Allis, WI 53227

May 4, 2023

John Ford
President
Three Leaf Partners
504 W. Juneau Avenue
Milwaukee WI, 53203

Subject: Geotechnical Subsurface Investigation
Hartland Quarry Apartments
700/701 W. Capitol Drive, Hartland, Wisconsin

Dear Mr. Ford:

GeoTest, Inc. (GeoTest) has prepared this geotechnical engineering report related to the above-referenced project. This report describes the subsurface exploration and laboratory testing programs and presents recommendations regarding foundation support of the proposed structures, construction of floor slabs, pavements, and stormwater management systems, bluff stabilization, and includes other construction considerations. All environmental-related services are being provided by others.

Project Description

Three Leaf Partners is proposing to develop the property located at 700/701 W. Capitol Drive in the Village of Hartland, Wisconsin. The location of the project is illustrated in Figure 1 in Appendix A. The boundaries of the combined 45-acre property are illustrated in Figure 2 in Appendix A.

The proposed development consists of eighteen separate buildings, including a single-story club house, two- and three-story apartment buildings (some slab-on-grade and some with below-grade parking), and single-story garage buildings. The development will also include parking and drive paved areas and multiple stormwater management devises. The proposed development is illustrated in Figure 3 in Appendix A.

Structural loads have not been provided. However, we anticipate that column and wall loads will not exceed 300 kips and 5 kips per linear foot, respectively.

The finished floor elevations for the new buildings have not been provided but are expected to vary across the property. The preliminary civil engineering plans indicate cuts and fills of up to 15 feet are anticipated to achieve the final site grades.

The stormwater management facilities are designed, on a preliminary basis, to consist of four infiltration ponds. The entire development will be internally drained.

The perimeter bluffs currently have slopes steeper than 1h:1v, with many sections close to 0.75h:1v. The proposed development plan assumes the final slopes will be designed for 2h:1v.

Property History

To develop an appropriate geotechnical scope of work for this project, research and a site walk-through were completed. The research included reviewing local well logs (available from Waukesha County), a past environmental investigation report (produced by Drake Environmental, Inc.), and construction materials testing reports (produced by Gestra Engineering, Inc.). The Well logs and Drake and Gestra documents are included in Appendix B.

We interviewed individuals familiar with past activities at the property, including Jason Palmer with Cass Custom Crushing and Ed Troxell with Riv/Crete Ready Mix. We also toured the property with Jason and Ed, along with employees from Walbec Group, the project's civil engineering consultant.

The geologic settling at the property was described as granular (primarily sand and gravel) glacial deposits. The property was mined for road gravel from the 1930's to the 1960's (known as Palmer Sand & Gravel), after which it became a concrete plant under multiple company names. The concrete plant operations were located in the southwest corner of the property but are no longer active.

The property owners began accepting fill materials in the 1970's, which still occurs. Most of the fills appear to consist of soil and concrete wastes, but also occasional inert materials that include asphalt, building materials, wood, and metal. It is currently being used as an operational base for a trucking company and to store construction equipment.

Most of the property perimeter was lined with bluffs formed by past mining operations. Although the property's ground surface was near the adjacent property elevations in the southwest corner, the remaining elevation differences were as high as 85 feet. Therefore, an integral aspect of the development plan includes addressing the substantial perimeter embankments, not only for safety but also to maximize the buildable area.

Two areas that were unusual, with an unknown history, were the apparent overburden stockpiled soils forming the north boundary of the former concrete plant area at the southwest corner of the property, and the bluff peninsula in the east portion of the former pit that extends northward from the south property boundary. It was believed that the overburden stockpiled soils were placed as a buffer between the adjacent residential area to the west and to serve as a ramp for trucks to unload into a crusher. No one had an explanation for why the bluff peninsula was not excavated during the

mining operations, other than maybe they were unsuitable for production. These two areas were identified for evaluation, in addition to the overall pit base and bluffs.

Scope of Work

Geotechnical Subsurface Exploration

The research identified five areas with different soils and materials to be targeted for evaluation. These areas (described below) are illustrated on Figure 4 in Appendix A. This figure does not illustrate the bluff areas, although they also warranted evaluation.

- Industrial Development Area (including the apparent overburden stockpiled soils)
- Construction Debris Fill
- Soft Clay/Silt Sediment
- Compacted Imported Soil Fill
- Native Soils – Pit Base

The following geotechnical exploration program was developed to evaluate these areas:

- Nine test pits were excavated to depths of about 6 to 11 feet.
- Nineteen surface samples were collected from the perimeter bluffs.

The approximate sampling locations are identified on the Sampling Location Diagram (Figure 5) in Appendix A. Representative samples from the test pits and bluffs were collected in buckets and returned to GeoTest for laboratory testing and classification.

The test pit locations, the ground surface elevations at the test pits, and their depths were measured by a Walbec surveyor at the time they were excavated. Their locations and the elevation/depth data are represented on two figures provided by Walbec, which are included in Appendix B.

Laboratory Testing

The laboratory testing program consisted of the following:

- Modified Proctor testing of four samples.
- Grain Size Analyses of twenty-three samples.
- Atterberg Limits testing of one sample.

All laboratory results are presented in reports included in Appendix C.

In addition, a GeoTest geotechnical engineer examined and visually classified each sample, based on texture and plasticity, in accordance with the Unified Soil Classification System (USCS). General notes and a description of the USCS

classification system are included in Appendix C. The soil descriptions are presented in this report.

The recovered soil samples will be retained for 60 days after the date of this report. Unless other instructions as to their disposition are received, they will be discarded at that point.

Soil and Groundwater Conditions

The following narrative is a generalization of the subsurface conditions encountered on the property. Please recognize that the conditions can vary in areas between the sample locations.

Subsurface Conditions

The dominant geology on the property was described as well-grade granular glacial deposits, consisting of sand and gravel with variable percentages of fines (clay and silt), along with occasional cobbles and boulders. Differences from these native deposits included the placement of imported fill soils and man-made materials, primarily concrete in various forms.

The results of the test pit and bluff sampling programs are presented below. Following that information, the five ground surface areas are discussed.

Test Pits - The GeoTest test pit exploration program was designed to evaluate the subsurface conditions at each of the five areas where different soils or materials were expected. The following table summarizes the soils/materials encountered at the test pits.

Test Pit	Depth, ft	Description
TP-1 & TP-2[1]	0-6.4	SC-SM: Fine to coarse sand, some gravel, little clay and silt, occasional cobbles and boulders; brown; moist (32.8% gravel, 43.6% sand, 23.6% fines) – appeared to be native soil deposits.
TP-3[3]	0-5.6	SW-SM: Fine to coarse sand and gravel, few clay and silt, occasional cobbles; brown; moist (43.0% gravel, 46.4% sand, 12.6% fines) – appeared to be native soil deposits.
TP-4[2]	0-11.3	FILL (Rubble): Concrete and asphalt fragments, metal, wood, intermixed sand and gravel.
TP-5[2]	0-3	FILL (Rubble): Concrete fragments intermixed sand and gravel.
TP-5[3]	3-9.1	FILL (SP-SM): Fine sand, little medium to coarse sand, little gravel, few silt; brown; moist (20.7% gravel, 66.9% sand, 12.4% fines) – appeared to be fill soils.
TP-6[4]	8.1	GW: Fine to coarse gravel, some fine to coarse sand, trace silt, occasional cobbles and boulders; brown; moist (61.8% gravel, 35.3% sand, 2.9% fines) – appeared to be native soil deposits.

TP-7[5]	0-9	FILL (SW-SM): Fine to coarse sand, some gravel, few silt; brown; moist – compacted fill (tested by Gestra) that originated from a local utility construction project.
TP-7[4]	9-10.4	GW: Fine to coarse gravel, some fine to coarse sand, trace silt, occasional cobbles and boulders; brown; moist – appeared to be native soil deposits.
TP-8[6]	0-5.5	SEDIMENT (CL-ML): Clayey silt, trace fine sand; orange-brown; saturated; soft – appeared to be sediment run-off from the adjacent bluff peninsula and concrete fill area.
TP-8[4]	5.5-6.2	GW: Fine to coarse gravel, some fine to coarse sand, trace silt, occasional cobbles and boulders; brown; moist – appeared to be native soil deposits.
TP-9	6.6	GW: Fine to coarse gravel, some fine to coarse sand, few silt, occasional cobbles and boulders; brown; moist (56.2% gravel, 37.0% sand, 6.8% fines) – appeared to be native soil deposits.

Notes:

1- The samples from TP-1 and TP-2 were composited because these soils are expected to be excavated and reused as an engineered fill.
2- No sample was collected because these materials will be segregated, and the soil and concrete will be crushed for reuse as an engineered fill.
3- This sample was subjected to the Modified Proctor test because it is projected to be excavated and reused as an engineered fill.
4- This sample was not subjected to the Modified Proctor test because it will not be excavated for reuse as an engineered fill.
5- This sample was not tested because it will not be excavated for reuse as an engineered fill (the Gestra field density test results passed).
6- This sample was not tested because it should be excavated and is not suitable for reuse as an engineered fill.

Bluff Samples - The samples collected from the perimeter bluffs were subjected to Grain Size Analyses (sieve testing) to understand the grain size distribution and determine certain material coefficients that can be used in slope stability analyses. The following table summarizes the distribution of gravel, sand, and fines.

Bluff Sample	Percent Gravel	Percent Sand	Percent Fines	USCS Class
1	54.9	44.0	1.1	GW
2	0.0	3.2	96.8	CL
3	55.1	38.6	6.3	GW-GM
4	56.3	40.6	3.1	GW
5	36.1	57.4	6.5	SW-SM
6	28.5	62.2	9.3	SW-SM
7	8.0	84.3	7.7	SW-SM
8	11.5	57.6	30.9	SM

9	9.4	61.7	28.9	SM
10	42.7	47.9	9.4	SW-SM
11	11.6	61.4	27.0	SM
12	20.1	69.1	10.8	SW-SM
13	54.6	40.9	4.5	GW-GM
14	18.5	45.6	35.9	SM
15	29.5	52.3	18.2	SM
16	13.5	62.1	24.4	SC
17	9.3	67.4	23.3	SC
18	42.4	43.9	13.7	SM
19	42.9	46.2	10.9	SM

In summary, the above results indicate that the bluff soils are almost entirely granular and vary in their fine content. Only one sample was a fine soil (clay), present along the south side of the bluff peninsula in the east portion of the property that extends from the south property boundary. The majority of the bluff soils met the OSHA definition of Type C, which requires a minimum slope of 1.5h:1v. Some areas met Type B, which require a minimum slope of 1h:1v.

Industrial Development Area - The boring logs generated by Drake during their environmental investigation indicated that the soils present in the southwest portion of the property primarily consisted of layered sands, with variable clay, silt, and gravel content. Occasional silt layers were also noted. Most of the soil to depths of 10 to 15 feet was described as fill or possible fill, which could have been placed to facilitate the existing development, including backfill in the former underground storage tank (UST) cavities.

The Drake boring logs indicated the granular soils exhibited very loose to very dense relative densities, with N-values ranging from 1 to 72. The lowest values (less than 5) were located at the former UST cavity. Excluding the UST backfill soils, all N-values (except two) exceeded 10 and averaged 32. The relatively uniform and high N-values suggest most of the soils are likely native deposits and not fills.

Two test pits were excavated (TP-1 and TP-2) and two bluff samples (B18 and B19) were collected to evaluate the nature of the apparent overburden stockpiled soils. The test pit and bluff samples were similar in nature, and all appeared to be native soil. A visual evaluation of the soils making up this area concluded that there is a combination of both native glacial deposits and fills soils that make up this higher ground.

One test pit (TP-3) was excavated to determine if the former concrete plant area is underlain by native or fill soils. This sample appeared to be native and were similar to the samples from TP-1 and TP-2.

Construction Debris Fill Area – Two test pits (TP-4 and TP-5) were excavated in this area. As anticipated, the materials at TP-4 were mostly buried concrete rubble and concrete truck washouts. The profile also included other inert materials, such as asphalt, metal, wood, and intermixed sand and gravel soil. The fill extended deeper than could be excavated. The materials at TP-5 consisted of concrete rubble overlying fine sand fill. The sand fill likely is the remnant of a stockpile created during the past mining and concrete plant operations.

Compacted Soil Fill Area - The soils placed in this area are represented by the Gestra documents and the sample from TP-7. This soil was imported from a local utility construction project by Musson Brothers and described as sandy gravel. We were told that the soil was placed in 1-foot lifts and compacted. Gestra tested them for compaction at three surface locations, which passed the 95% specification. The test pit exposed soils also described as sand and gravel fill to a depth of about 9 feet overlying native sand and gravel. The test pit walls remained vertical, and the soil appeared to be dense and well compacted.

Soft Clay/Silt Sediment – The soils in this area are represented by the sample from TP-8. They appeared to have accumulated as run-off from the adjacent higher finger bluff and concrete rubble fill areas. They were fine grained clay and silt that were saturated. While traversing this area with the backhoe, it sank about 3 feet, prompting the decision to excavate the test pit. The soft, saturated sediments extended to a depth of about 5.5 feet and overlay native sand and gravel soil.

Native Soils – Pit Base Area – Two test pits (TP-6 and TP-9) were excavated in the areas believed to be the final base of the original mining pit. These two samples were similar in nature and both described as mostly well-graded gravel with some sand and trace to few silt fines. These soils were also similar to bluff samples B1, B3, B4, and B13, where the original pit was terminated due to property boundary restrictions.

Groundwater Conditions

Free groundwater was not encountered in any of the test pits. Groundwater was noted in the Drake report at depths of 8 to 10 feet. The nearby potable well reports indicated the depth to groundwater ranged from 55 to 135 feet, from ground surface elevations up to 85 feet above the pit base. Based on this data, the normal groundwater table likely exists at a depth of about 10 to 20 feet below the pit base.

Fluctuations in the groundwater table elevation should be expected with variations in precipitation, evapotranspiration, surface runoff, etc. Also, shallow perched groundwater conditions should be expected where relatively permeable granular soils are underlain by relatively impermeable cohesive soils, especially following precipitation events.

Analysis and Recommendations

There are eight primary issues that should be considered when planning this project.

- Fill materials exist on the property. The fills vary from construction soil placed in the developed area, UST backfill, construction rubble, compacted imported soil, and general grading materials. Other than the compacted imported soil, most other fills are not suitable for support of engineered fill and structural elements.
- Most building foundations will bear upon engineered fill placed to raise low areas of the property. It will be important to plan for sufficient quality-control measures during site grading and construction to ensure competent bearing conditions.
- Saturated clay and silt soils exist in the "Sediment" area, which are highly sensitive to construction activity and are not suitable for the support of engineered fill and structural elements.
- The compacted imported soil area only had three field density tests. Additional testing should be conducted to confirm they are consistent and suitable for the support of engineered fill and structural elements.
- Unexpected materials or items could be buried on the property that would not be suitable for reuse, such as construction equipment, organic material such as timber and vegetation.
- Subsurface elements related to past developments exist, including foundations, slabs, and utilities. These features should be identified and removed within structural areas.
- Although not encountered during this evaluation, it is possible that clay and silt soils could be encountered during the site improvement activities. These soil types are sensitive to moisture variations and could cause construction challenges and schedule delays.
- Although the perimeter bluffs vary in soil type, they should all be uniformly designed for safety and stability.

Foundation Support

Once the property has been properly prepared (described below), the proposed buildings can be supported on conventional, shallow spread footings. The foundations can likely be designed using an allowable bearing capacity value of 3,000 psf to 6,000 psf, depending on the final grades and localized bearing conditions. Properly designed and constructed footings should experience total and differential settlements of less than 1 inch and ¾ inch, respectively.

Traditionally, perimeter footings and interior footings in unheated areas should bear at a depth of at least 48 inches below the final exterior grade to provide adequate frost protection. If desired, exterior footings can bear at shallower depths by following ASCE 32-01 (American Society of Civil Engineers, Design and Construction of Frost-Protected Shallow Foundations, 2001). Interior footings not subject to frost can bear directly beneath the floor slab.

Seismic Design

The soil conditions present at a site are utilized in determining the Seismic Design Category (SDC) for structures. Part of selecting the SDC is determining the Site Class for the soils, which categorizes common soil conditions into broad classes, where typical ground motion attenuation and amplification effects are assigned. Site Class is determined based on the average properties of the soil within 100 feet of the ground surface. Geotechnical engineers use a variety of parameters to characterize the engineering properties of these soils, including general soil classifications (e.g., hard rock, soft clay, etc.), N-values, and laboratory testing.

Site Class A includes hard rock that is typically found only in the eastern United States. The types of rock typically found in the western states include various volcanic deposits, sandstones, shales, and granites that commonly have the characteristic appropriate to either Site Class B or C. Sites with very dense sands and gravels or very stiff to hard clay deposits also may qualify as Site Class C. Sites with relatively stiff cohesive or medium dense non-cohesive soils, including mixtures of clays, silts, and sands, are categorized as Site Class D. Site Class D is the most common site class throughout the United States. Sites along rivers or other waterways underlain by deep soft clay deposits are categorized as Site Class E. Sites where soils are subject to liquefaction or other ground instabilities are categorized as Site Class F and site-specific analyses are required.

Based on the types of soils present at the boring locations at this property, and their apparent engineering properties, Site Class D is assigned to the site, as defined in the International Building Code (2015) Section 1613.

Floor Slab Support

The expected final subgrade soils should be suitable for support of concrete floor slabs. However, the floor slab areas should be proof-rolled and soft areas removed or improved prior to the placement of base course materials. An average subgrade modulus value of 150 pounds per cubic inch (pci) is appropriate.

Below-grade Walls

A coefficient of friction of 0.35 may be used with dead load forces for wall footings that bear on suitable (as defined in the geotechnical report) native soils or engineered fill.

The lateral earth pressure value ranges presented below assume that the walls are vertical, that a clean, free-draining granular fill (P200 <6%) is used as backfill within 2 feet behind the wall, the backfill condition at the ground surface is level, and that adequate drainage is provided to prevent the buildup of hydrostatic pressures.

Retaining Wall Design Parameters	
Soil Unit Weight	140 pcf
Angle of Internal Friction	35°
Soil Cohesion	0 psf
Earth Pressure Coefficient	
At Rest Design Parameters	0.46
Active Design Parameters	0.30
Passive Design Parameters	3.35

We recommend using a minimum safety factor of 2.0 in passive earth pressure calculations, ignoring the upper 2 feet of soil in frost protected areas and 4 feet of soil in other areas. For walls that are free to rotate at least 0.001 times the height of the wall, such as a temporary earth retention system and retaining walls, an active earth pressure condition will develop. For walls that will be restrained, such as permanent below-grade walls, an at-rest condition will develop. For walls that rotate towards the soil, a passive condition will develop. Below-grade and retaining wall design should also consider surface and subgrade surcharge loading.

Special attention should be employed during placement of backfill against below-grade and retaining walls. Inadequate placement and compaction of backfill will result in at-grade structural elements and slab/pavement settlement and distress. To achieve a balance between minimizing excessive pressures against the walls during construction and reducing the settlement of the wall backfill, the granular backfill should be compacted to at least 90 percent of the maximum dry density obtained in accordance with ASTM Specification D1557, Modified Proctor Method. Where backfill supports structural elements, sidewalks, or pavements, the upper 4 feet should be compacted to 95% of the maximum dry density (Modified Proctor). Lifts of 4 to 6 inches can be effective in achieving compaction requirements.

Drainage should be provided behind below-grade walls to prevent the buildup of hydrostatic pressures. We recommend that free-draining granular drainage aggregate be placed within 2 feet behind the back face of the walls.

A relatively impermeable barrier at the ground surface is recommended, such as a minimum 2-foot-thick clay cap or Bituminous or Portland cement concrete (i.e., walkways and drives) to minimize surface water infiltration into backfill against walls. The impermeable barrier should slope away from the structure at a minimum 2 percent grade.

Engineered Fill, Wall, and Utility Trench Backfill

The on-site soil and materials (if processed properly) can be reused as engineered fill. All engineered fill, wall, and utility trench backfill should consist of inorganic materials,

free of debris, not exceed 3 inches in size, and should be placed in 8 to 10-inch loose lifts compacted to a minimum of 95 percent of the maximum dry density (Modified Proctor). If the engineered fills are less than 7 feet in thickness, they should be moisture conditioned to be within +/- 3% of the optimum moisture content. Where engineered fills exceed 7 feet, they should be moisture conditioned to be at the optimum moisture to + 3% above.

Pavement Design

The Wisconsin Asphalt Pavement Association (WAPA) Design Guide should be utilized to design the new asphalt surface parking areas. Traffic Class I was assumed for parking areas that are mainly used by light passenger vehicles and Traffic Class II for medium-loaded drive areas.

The minimum pavement section should consist of the following:

Material	Traffic Class I	Traffic Class II	WisDOT Specification
Asphalt Surface Course	2 inches	2 inches	Section 460
Asphalt Binder Course	2 inches	2.5 inches	Section 460
Dense Graded Base Course	8 inches	10 inches	Section 305

The pavement sections above are not intended to support on-going construction traffic. Also, the pavement sections presented above should not be used for areas that experience heavy truck traffic, equipment or truck parking areas, entrances and exit aprons, or trash-dumpster loading zones. In these areas, a Portland Cement Concrete (PCC) pavement should be used. The PCC layer thickness is recommended to be 7 inches with a minimum of 6-inch-thick crushed stone base course. The reinforcement details for PCC layers and final pavement section should be designed by the project design engineer.

These recommendations assume the subgrade is prepared as described in this report. Additional corrective action may be warranted at the time of construction, depending on the site conditions. If any clay or silt soils exist in pavement areas, it may be beneficial to install a geotextile fabric (e.g., GEOTEX 315) as a separating layer between such a subgrade and the base course after the subgrade has been evaluated by proof-roll testing.

Stormwater Management

Three stormwater management devices are proposed for the development. Based on the soil descriptions at two of those areas (TP-6 and TP-9), the prevailing soils were classified as “Coarse Sand and Gravel”. Consequently, the devices would be exempt from the Wisconsin Department of Natural Resources (WDNR) infiltration requirements. The estimated static infiltration rate based on the Standard 1002 – Table 2 would be 3.60 inches per hour (in/hr).

Bluff Stability

The prevailing soil type making up the perimeter bluffs is described as sand and gravel that meet the OSHA definition for Type C. Some soils meet the Type B description, but they are not consistent. Therefore, the bluffs should be designed for minimum slopes of 1.5h:1v for safety and stability.

Construction Considerations

Because of the presence of undocumented fill on the property, extra caution should be exercised during construction. All poor soil/fills should be stripped from structural and engineered fill areas prior to any construction activities. Additional effort should also be taken to identify the former UST cavities, which were likely backfilled will soils that are not suitable for the support of engineered fill and structural elements. The exposed subgrade soils and all engineered fills should be observed, tested, and documented by a representative of the geotechnical engineer. Large structural areas, such as building footprints and beneath engineered fill and pavements, should be proof-rolled to identify low-strength or disturbed areas that need to be removed or improved.

Footing excavations and all engineered fill subgrade soils should be evaluated to confirm the bearing materials are consistent with those identified in this report and anticipated by the geotechnical and structural engineers. If unanticipated conditions are encountered, the geotechnical and structural engineers should be notified immediately. All footing pads must bear upon suitable native soils or engineered fill soils that have been confirmed in the field by a representative of the geotechnical engineer. Where unsuitable bearing soils, such as organic, disturbed, wet, frozen, or low-strength (less than the design bearing capacity) soils are encountered, the excavation should be extended to competent bearing soil. If extended, the footing pads can be constructed at the base of the excavations, or the excavations can be backfilled with clean, crushed stone or lean concrete.

Buried structural elements from past developments exist. Therefore, efforts should be taken during site grading to identify all existing structural elements and undocumented fills. Existing foundations should be removed to a depth of at least 4 feet below proposed foundations. Existing concrete slabs below a depth of 4 feet should be removed or broken into minimum 1-foot pieces to avoid water pooling. Utilities may also exist that could require abandonment.

It is unlikely that excavations will encounter groundwater. However, if any do or if perched water is encountered, filtered sump pumps and drawing water from sump pits should be adequate to remove water that collects in excavations. Excavated sump pits should be lined with a geotextile and filled with open-graded, free- draining aggregate.

Surface water should not be allowed to be collected in excavations or on prepared subgrades during or after construction. Areas should be sloped to facilitate removal of

collected surface runoff. Positive site drainage should be provided to reduce infiltration of surface water around the perimeter of structures and within pavement areas.

Excavation walls may need to be sloped or braced for stability and safety reasons. The Owner and Contractor should be aware of, and become familiar with, applicable local, state, and federal safety regulations, including current OSHA Excavation and Trench Safety Standards. Construction-site safety generally is the responsibility of the Contractor, who should also be responsible for the means, methods, and sequencing of construction operations.

The Contractor should be aware that slope height, slope inclination, or excavation depths should in no case exceed those specified in local, state, or federal safety regulations, (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926), or successor regulations. The on-site soils are generally considered Type C soils when applying the OSHA regulations. Such regulations are strictly enforced, and if they are not followed, the Owner, Contractor, and/or earthwork Subcontractor(s) could be liable for substantial penalties.

General Qualifications

The services provided by GeoTest on this project were performed with the degree of skill and care typically performed by other members of the geotechnical engineering profession, practicing in this locale, at this time. No other warranty, expressed or implied, is given.

We appreciate the opportunity to provide geotechnical engineering services for this project. If you have any questions, or require any further assistance, please feel free to contact us.

Sincerely,

Michael D. Frede, P.E.
Technical Director/Senior Engineer

Appendix A

Figure 1 – Site Location Diagram

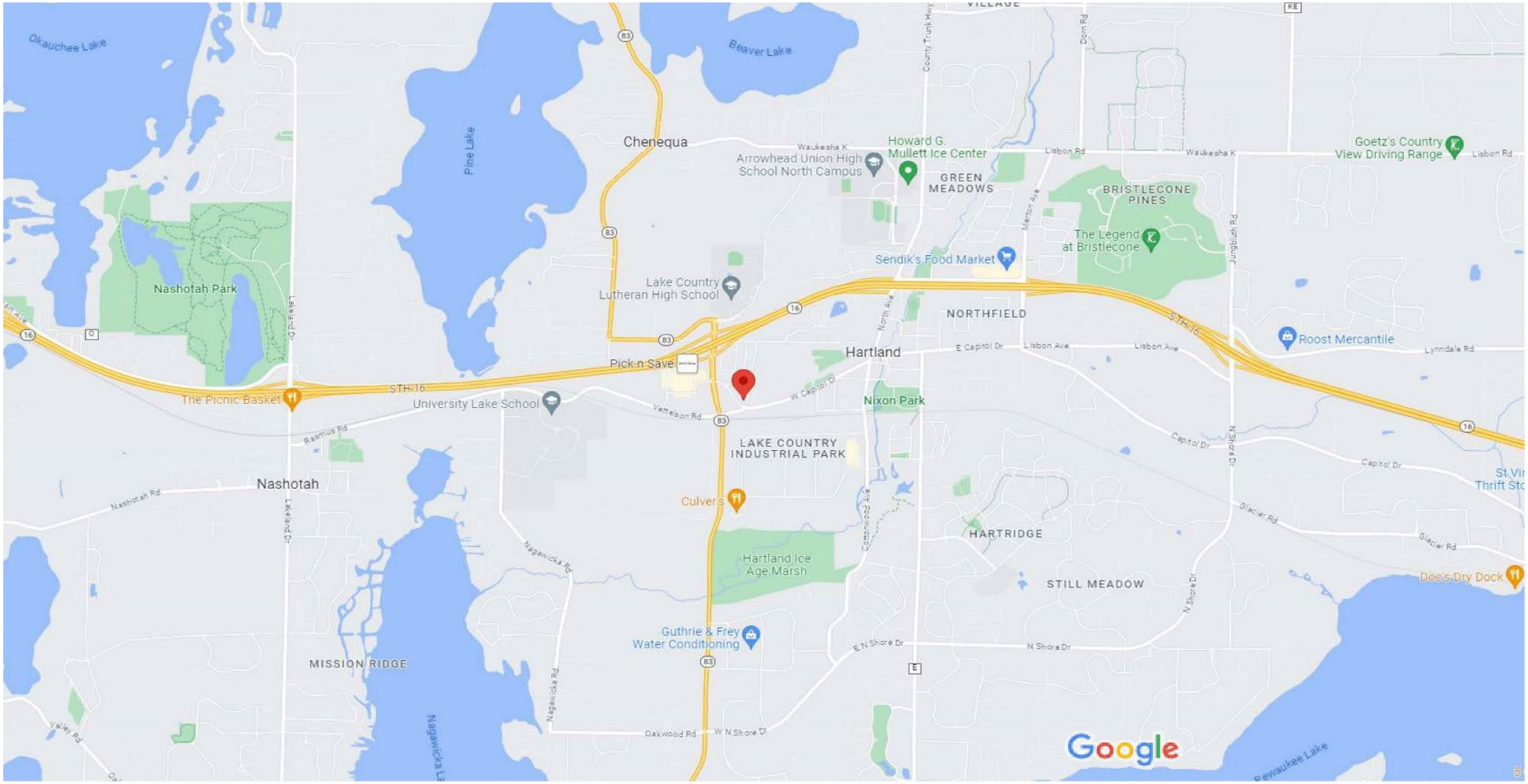
Figure 2 – Property Boundary Diagram

Figure 3 – Proposed Development Diagram

Figure 4 – Geotechnical Areas of Interest Diagram

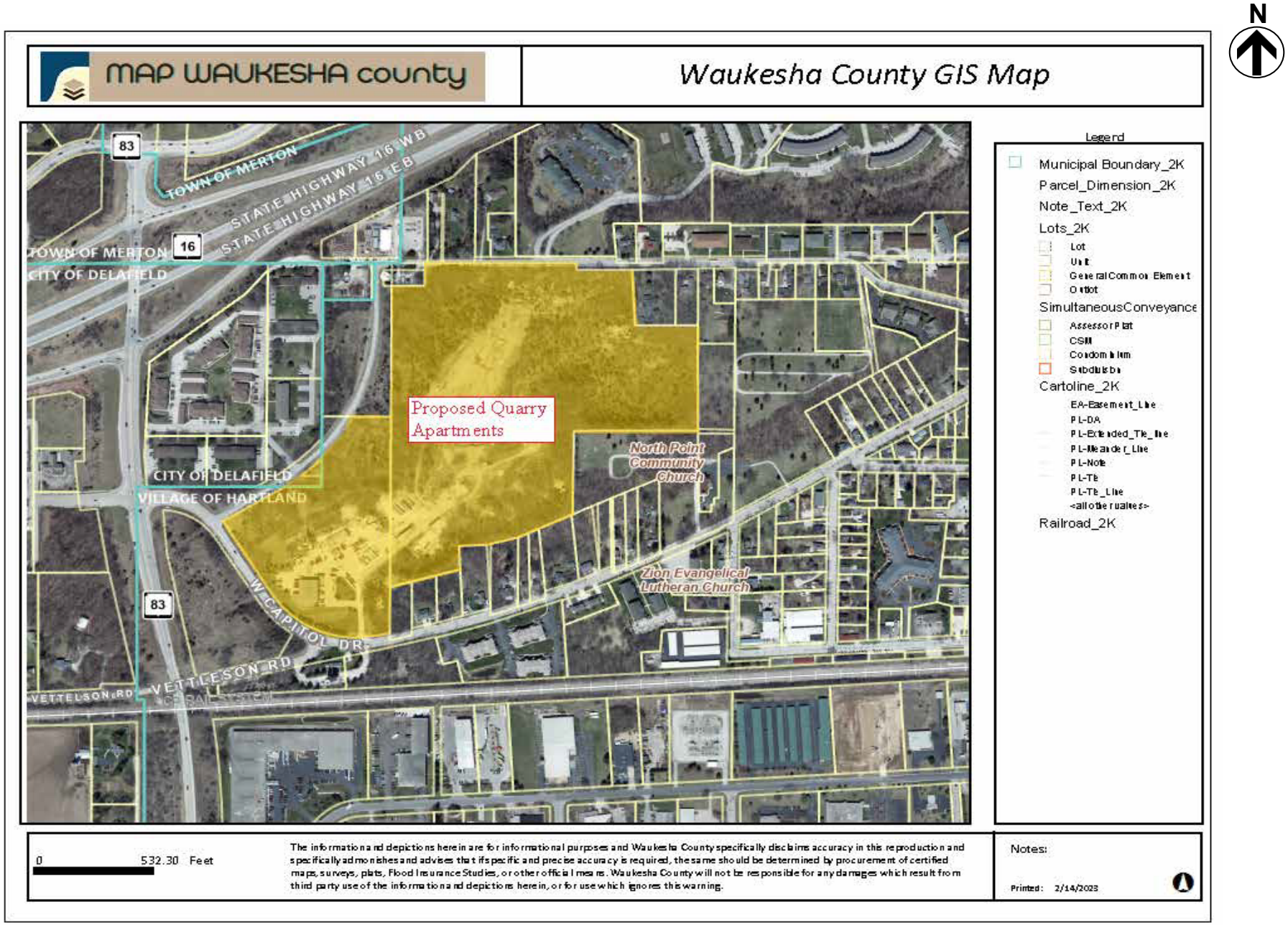
Figure 5 – Sampling Location Diagram

N



Map data ©2023 Google 2000 ft

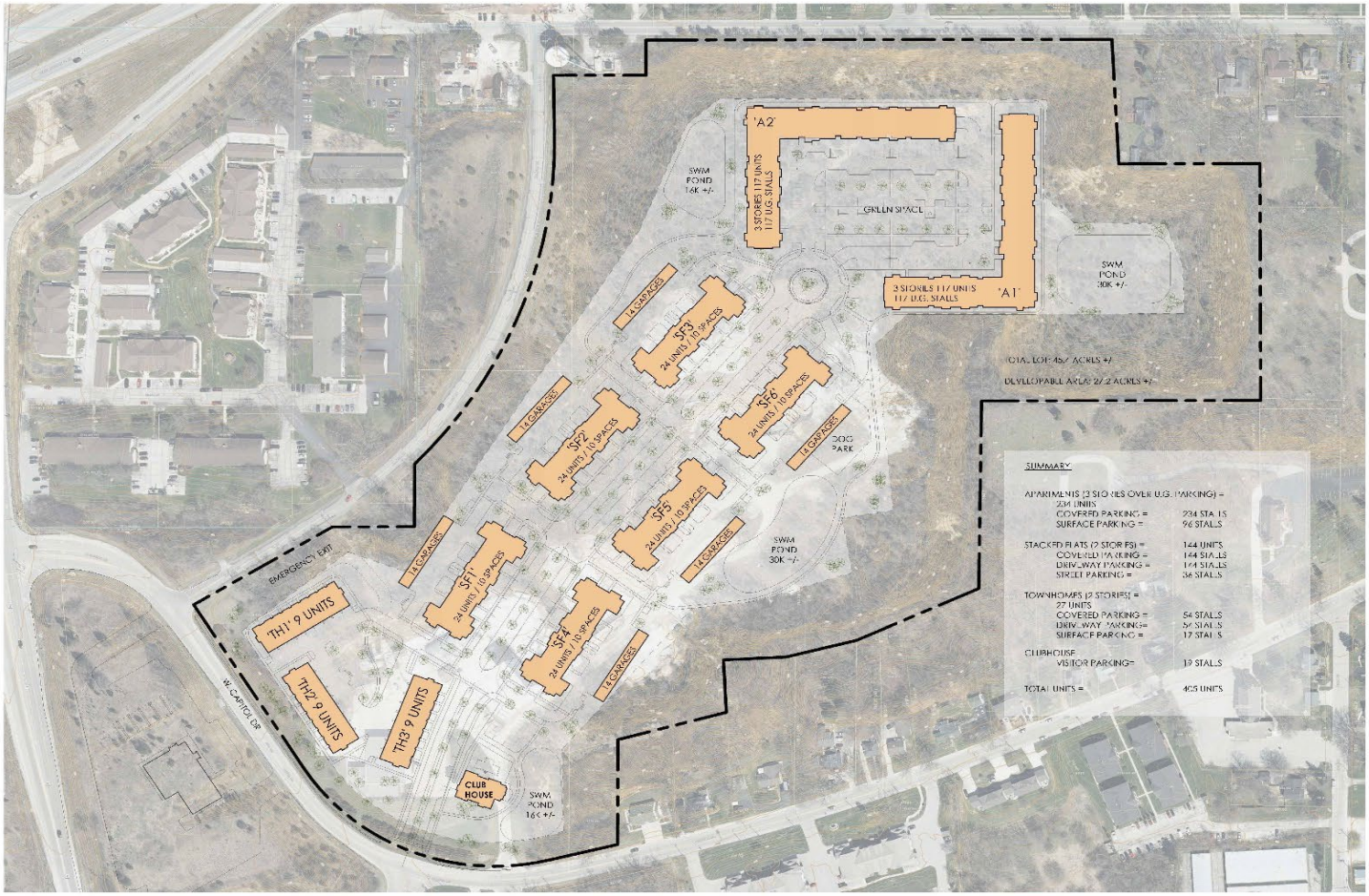
GeoTest	**Project Name:**	Hartland Quarry Apartments	**Project No.:**	7708	**FIGURE 1** **Site Location Diagram**
	Project Location:	700/701 W. Capitol Drive Hartland, Wisconsin Waukesha County	**Date:**	4/29/23	
			Drawn By:	MDF	
			Scale:	NTS	



GeoTest

Project Name:	Hartland Quarry Apartments	**Project No.:**	7708
Project Location:	700/701 W. Capitol Drive Hartland, Wisconsin Waukesha County	**Date:**	4/29/23
		Drawn By:	MDF
		Scale:	NTS

FIGURE 2
Property Boundary Diagram



1 ARCHITECTURAL SITE PLAN
1" = 100'-0"

N

JLA ARCHITECTS
MADISON | MILWAUKEE | DENVER
JLA-AP.COM

JLA PROJECT NUMBER: 22013

HARTLAND QUARRY APARTMENTS
Plan Commission Submittal

PROGRESS DOCUMENTS
These documents reflect progress and in part one may be relied to change, including additional detail. These are not final construction documents and should not be used for final bidding or construction related purposes.

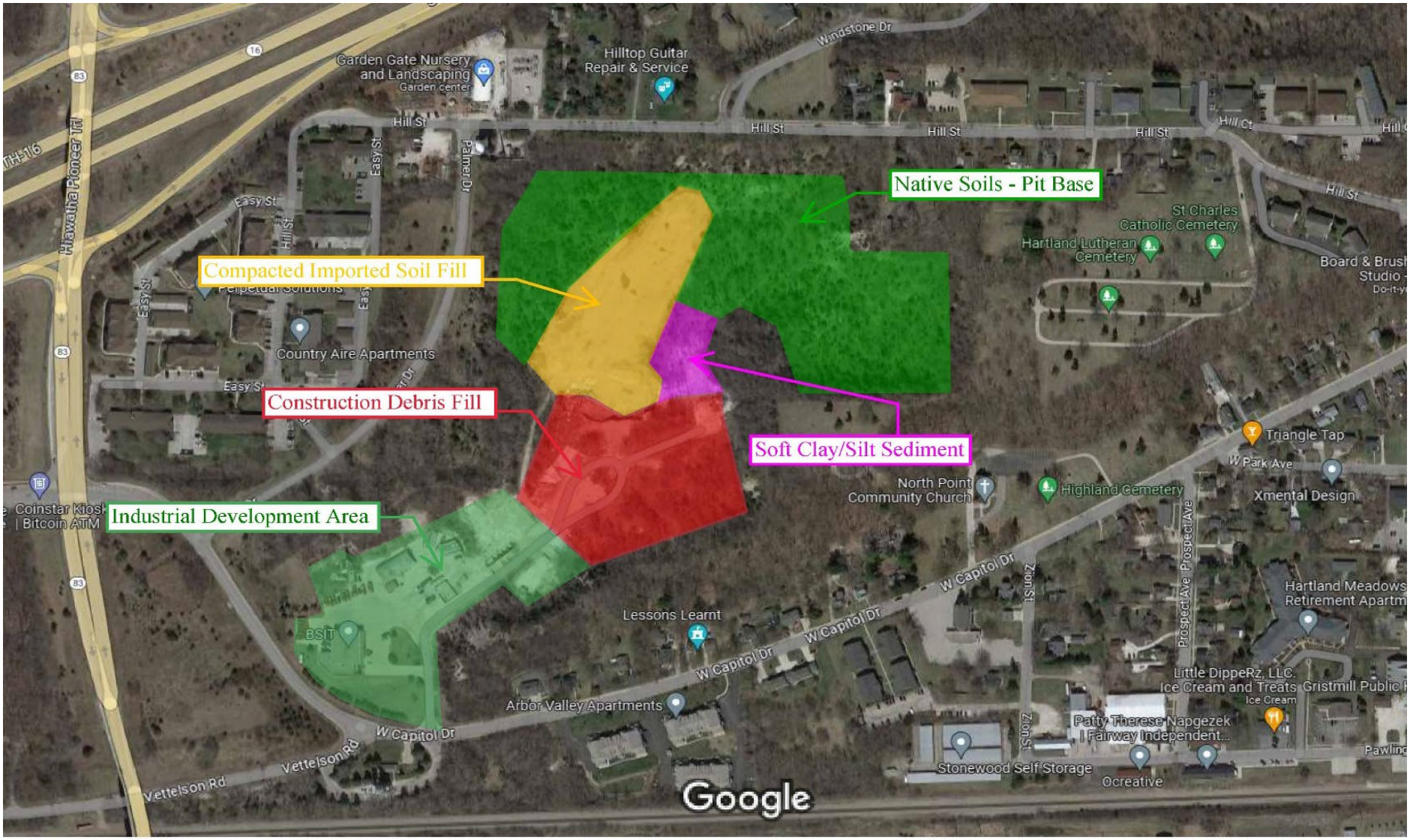
DATE OF ISSUANCE 3/31/2023

REVISION SCHEDULE
MARK | DESCRIPTION | DATE

SHEET TITLE
ARCHITECTURAL SITE LAYOUT PLAN

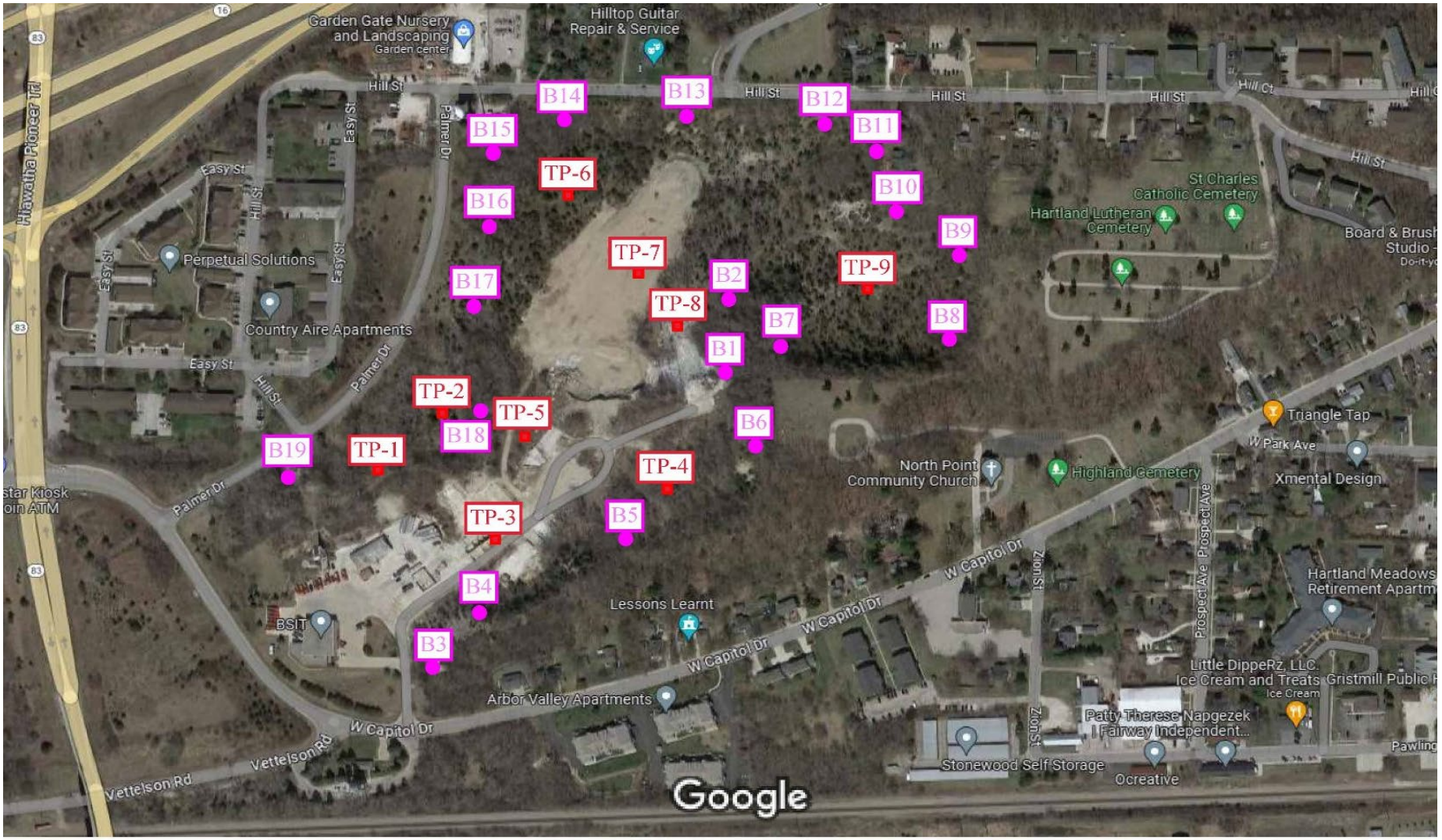
SHEET NUMBER
ASP-100

GeoTest	**Project Name:** Hartland Quarry Apartments **Project Location:** 700/701 W. Capitol Drive Hartland, Wisconsin Waukesha County	**Project No.:** 7708 **Date:** 4/29/23 **Drawn By:** MDF **Scale:** NTS	**FIGURE 3** **Proposed Development Diagram**



Imagery ©2023 CNES / Airbus, Maxar Technologies, U.S. Geological Survey, USDA/FPAC/GEO, Map data ©2023

GeoTest	**Project Name:** Hartland Quarry Apartments **Project Location:** 700/701 W. Capitol Drive Hartland, Wisconsin Waukesha County	**Project No.:** 7708 **Date:** 4/29/23 **Drawn By:** MDF **Scale:** NTS	**FIGURE 4** **Geotechnical Areas of Interest Diagram**



GeoTest	**Project Name:** Hartland Quarry Apartments **Project Location:** 700/701 W. Capitol Drive Hartland, Wisconsin Waukesha County	**Project No.:** 7708 **Date:** 4/29/23 **Drawn By:** MDF **Scale:** NTS	**FIGURE 5** **Sampling Location Diagram**

Appendix B

Well Logs

- 8KM754_WCR
- 8KM755_WCR
- 8KM756_WCR
- 8NM185_WCR
- 8NN038_WCR
- IJ288_WCR

Drake Environmental Geologic Information

- Diagrams
- Boring Logs

Gestra Laboratory Reports

- Proctor Analysis (D1557)
- Field Density Testing

Walbec Test Pit Survey Diagrams

- Test Pits 1 through 5
- Test Pits 6 through 9

WELL CONSTRUCTOR'S REPORT

WISCONSIN STATE BOARD OF HEALTH

Wel 6

1. COUNTY: Waukesha

CHECK ONE: ☒ Town ☐ Village ☐ City

NAME: Delafield

2. LOCATION (Number and Street or ¼ section, section, township and range. Also give subdivision name, lot and block numbers when available): NW¼ Sec 3 T7N R18E.

RECEIVED

3. OWNER AT TIME OF DRILLING: Robert Steinman

JUN 24 1966

4 OWNER'S COMPLETE MAIL ADDRESS: Hill St Hartland Wisc.

SANITARY ENGINEER

5. Distance in feet from well to nearest: (Record answer in appropriate block)

BUILDING	SANITARY SEWER C. I.	SANITARY SEWER TILE	FLOOR DRAIN C. I	FLOOR DRAIN TILE	FOUNDATION DRAIN SEWER CONNECTED	FOUNDATION DRAIN INDEPENDENT	WATER DRAIN C. I.	WATER DRAIN TILE

CLEAR WATER DRAIN C. I.	CLEAR WATER DRAIN TILE	SEPTIC TANK	PRIVY	SEEPAGE PIT	ABSORPTION FIELD	BARN	SILO	ABANDONED WELL	SINK HOLE
		60		75					

OTHER POLLUTION SOURCES (Give description such as dump, quarry, drainage well, stream, pond, lake, etc.)

6. Well is intended to supply water for: ~~Home~~ Service Station

7. DRILLHOLE

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
6"	Surface	268			

8. CASING, LINER, CURBING, AND SCREEN

Dia. (in.)	Kind and Weight	From (ft.)	To (ft.)
6"	Standard Steel	Surface	268

9. GROUT OR OTHER SEALING MATERIAL

Kind	From (ft.)	To (ft.)
	Surface	

10. FORMATIONS

Kind	From (ft.)	To (ft.)
Sand & gravel Brown	Surface	190
Gray sand & gravel	190	170
Clay & Sand	170	233
Sand & gravel	233	268

WK 35647

11. MISCELLANEOUS DATA

Yield test: 12 Hrs. at 12 GPM

Depth from surface to normal water level 190 ft.

Depth to water level when pumping 130 ft.

Well construction completed on May 11 1966

Well is terminated 4 inches ☒ above ☐ below final grade

Well disinfected upon completion ☒ Yes ☐ No

Well sealed watertight upon completion ☒ Yes ☐ No

Water sample sent to Madison laboratory on: May 11 1966

Your opinion concerning other pollution hazards, information concerning difficulties encountered, and data relating to nearby wells, screens, seals, type of casing joints, method of finishing the well, amount of cement used in grouting, blasting, subsurface pumprooms, access pits, etc., should be given on reverse side.

SIGNATURE: R. Bough Registered Well Driller

COMPLETE MAIL ADDRESS: Hartland Wisc

Please do not write in space below

COLIFORM TEST RESULT	GAS — 24 HRS.	GAS — 48 HRS	CONFIRMED	REMARKS
				plot 752104

WELL CONSTRUCTOR'S REPORT

WISCONSIN STATE BOARD OF HEALTH

Wel 6

1. COUNTY: Waukesha

CHECK ONE: ☒ Town ☐ Village ☐ City

NAME: Delafield

2. LOCATION (Number and Street or ¼ section, section, township and range. Also give subdivision name, lot and block numbers when available.)

Hartland Hy 16 & Hill St. T7N R18E NW¼ Sec 3

3. OWNER AT TIME OF DRILLING: Bob Steinman

4. OWNER'S COMPLETE MAIL ADDRESS: Hartland Wisc

RECEIVED

MAY 11 1966

STATE BOARD OF HEALTH ENG.

5. Distance in feet from well to nearest: (Record answer in appropriate block)

BUILDING	SANITARY SEWER C. I.	SANITARY SEWER TILE	FLOOR DRAIN C. I	FLOOR DRAIN TILE	FOUNDATION DRAIN SEWER CONNECTED	FOUNDATION DRAIN INDEPENDENT	WASTE WATER DRAIN TILE
10							

CLEAR WATER DRAIN C. I.	CLEAR WATER DRAIN TILE	SEPTIC TANK	PRIVY	SEEPAGE PIT	ABSORPTION FIELD	BARN	SILO	ABANDONED WELL	SINK HOLE
		60		70					

OTHER POLLUTION SOURCES (Give description such as dump, quarry, drainage well, stream, pond, lake, etc.)

6. Well is intended to supply water for: Service Station

7. DRILLHOLE

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
6	Surface	268			

8. CASING, LINER, CURBING, AND SCREEN

Dia. (in.)	Kind and Weight	From (ft.)	To (ft.)
6	Standard Steel	Surface	268

9. GROUT OR OTHER SEALING MATERIAL

Kind	From (ft.)	To (ft.)
	Surface	

10. FORMATIONS

Kind	From (ft.)	To (ft.)
	Surface	
Sand & gravel	-	120
Brown Sand & gravel	120	140
Grey Sand & gravel	140	170
Gray clay & sand	170	185
Brown Sand	185	225
Gray Sand & clay	225	233
Brown sand & gravel	233	268

W K 3 5 6 4 8

11. MISCELLANEOUS DATA

Yield test: 6 Hrs. at 20 GPM

Depth from surface to normal water level 104 ft.

Depth to water level when pumping 180 ft.

Well construction completed on April 13 1966

Well is terminated 6 inches ☒ above ☐ below final grade

Well disinfected upon completion ☒ Yes ☐ No

Well sealed watertight upon completion ☒ Yes ☐ No

Water sample sent to Madison laboratory on: April 13 1966

Your opinion concerning other pollution hazards, information concerning difficulties encountered, and data relating to nearby wells, screens, seals, type of casing joints, method of finishing the well, amount of cement used in grouting, blasting, sub-surface pumprooms, access pits, etc., should be given on reverse side.

SIGNATURE: E. Bayer Registered Well Driller

COMPLETE MAIL ADDRESS: Hartland Wisc

Please do not write in space below

COLIFORM TEST RESULT	GAS — 24 HRS.	GAS — 48 HRS.	CONFIRMED	REMARKS
				plot 762103

NW, Sec 3 T7N R18E

Wel 6

WELL CONSTRUCTOR'S REPORT TO WISCONSIN STATE BOARD OF HEALTH

See Instructions on Reverse Side

1. County Waukesha — Town ☐ Village ☑ Hartland — City ☐ — Check one and give name

2. Location ~~SW¼ NW¼~~ Sec 3 T7N R18E
Name of street and number of premise or Section, Town and Range numbers

3. Owner ☐ or Agent ☐ Hartland Washed Sand & Gravel
Name of individual, partnership or firm

4. Mail Address Hartland
Complete address required

5. From well to nearest: Building 10 ft; sewer — ft; drain — ft; septic tank — ft; dry well or filter bed — ft; abandoned well — ft.

6. Well is intended to supply water for: Office

7. DRILLHOLE:

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
6	0	77			

8. CASING AND LINER PIPE OR CURBING:

Dia. (in.)	Kind and Weight	From (ft.)	To (ft.)
6	Stl Steel	0	78'5"

9. GROUT:

Kind	From (ft.)	To (ft.)

10. FORMATIONS:

Kind	From (ft.)	To (ft.)
Gravel	0	77

RECEIVED
NOV 2 1950

Construction of the well was completed on: Jan. 6 19 50

The well is terminated — inches ☑ above, below ☐ the permanent ground surface.

Was the well disinfected upon completion? Yes ✓ No —

Was the well sealed watertight upon completion? Yes ✓ No —

11. MISCELLANEOUS DATA:

Yield test: 3 Hrs. at 10 GPM.

Depth from surface to water-level: 55 ft.

Water-level when pumping: 58 ft.

Water sample was sent to the state laboratory at: Madison on — 19—
City

H. A. BUTLER
WELL CONTRACTOR
DELAFIELD, WIS.

Signature — Registered Well Driller — Complete Mail Address

Please do not write in space below

Rec'd — No —

Ans'd —

Interpretation —

WK 3 5 6 4 9

	10 ml	10 ml	10 ml	10 ml	10 ml
Gas—24 hrs.					
48 hrs.					
Confirm					
B. Coli					

Examiner —

WK-1254-U

WELL CONSTRUCTION REPORT — DEPARTMENT OF NATURAL RESOURCES

1. COUNTY: Waukesha

CHECK ONE: ☒ Town ☐ Village ☐ City — NAME: Delafield

2. LOCATION (Number and Street or ¼ section, section, township and range. Also give subdivision name, lot and block numbers when available.)
SW, NW, NW Section 3 T 7N R 18E — PER APPROVAL LETTER — SW, NW, NW, Sec 3

3. OWNER AT TIME OF DRILLING
per USGS: Gyas Construction Co. (W.F. Gyas + Freda D. Gyas Owners)

4. OWNER'S COMPLETE MAIL ADDRESS
Route #1, Box #63, Delafield, Wis

5. Distance in feet from well to nearest: (Record answer in appropriate block)

BUILDING	SANITARY SEWER C. I.	SANITARY SEWER TILE	FLOOR DRAIN C. I.	FLOOR DRAIN TILE	FOUNDATION DRAIN SEWER CONNECTED	FOUNDATION DRAIN INDEPENDENT	WASTE WATER DRAIN C. I.	WASTE WATER DRAIN TILE
18	✓	✓	45	✓	✓	✓	✓	✓

CLEAR WATER DRAIN C. I.	CLEAR WATER DRAIN TILE	SEPTIC TANK	PRIVY	SEEPAGE PIT	ABSORPTION FIELD	BARN	SILO	ABANDONED WELL	SINK HOLE
✓	✓	306	✓	✓	330	✓	✓	✓	✓ Perm Well #88024

OTHER POLLUTION SOURCES (Give description such as dump, quarry, drainage well, stream, pond, lake, etc.)
None — Well #3

6. Well is intended to supply water for:
2 Apartment Houses — Muni #26

7. DRILLHOLE

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
10	Surface	20			
6	20	120			

8. CASING, LINER, CURBING, AND SCREEN

Dia. (in.)	Kind and Weight	From (ft.)	To (ft.)
10	ASTM-A53 Grade B	Surface	20
6	ASTM-A53 Grade B	20	106
	.280 P/E		
	weld fit		
6	Silica Brass screen	106	120

9. GROUT OR OTHER SEALING MATERIAL

Kind	From (ft.)	To (ft.)
Cement slurry	Surface	20

10. FORMATIONS

Kind	From (ft.)	To (ft.)
Clay top soil	Surface	8
Gravel	8	104
Gravel + Sand (Water Bg)	104	120
WAS INSTALLED IN 3 SECTIONS WITH 1 FROT PIPE NIPPLES BETWEEN THE 3 SECTIONS. THE LOWER SECTION HAS A 28 THOUSANDTH SLOT, THE MIDDLE SECTION 25 AND THE UPPER SECTION 18.		

WK 3 5 6 5 0

Well construction completed on 10/10 19 68

11. MISCELLANEOUS DATA
Yield test: 24 Hrs. at 60 GPM

Depth from surface to normal water level 87 ft.

Depth to water level when pumping 88'-6" ft.

Well is terminated 20 Inches ☒ above ☐ below final grade

Well disinfected upon completion ☒ Yes ☐ No

Well sealed watertight upon completion ☒ Yes ☐ No

Water sample sent to Madison laboratory on: 10/26 19 68

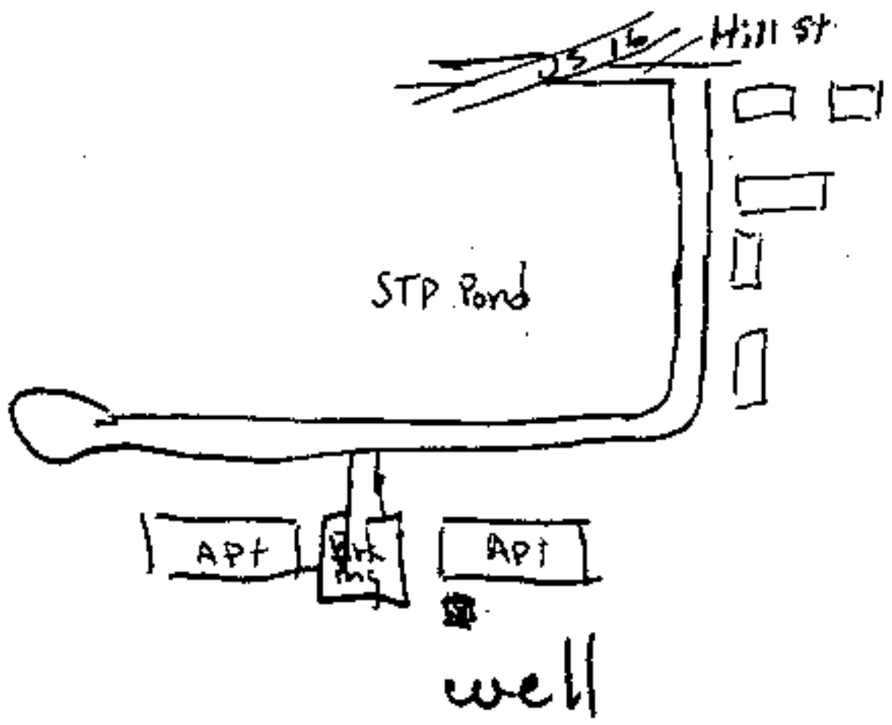
Your opinion concerning other pollution hazards, information concerning difficulties encountered, and data relating to nearby wells, screens, seals, type of casing joints, method of finishing the well, amount of cement used in grouting, blasting, subsurface pumprooms, access pits, etc., should be given on reverse side.

SIGNATURE: Aqua Well Drilling + Pump Co. Inc. — Fred J. Bollhagen, Registered Well Driller

COMPLETE MAIL ADDRESS: Rt 1, Hartford, Wis.

Please do not write in space below

COLIFORM TEST RESULT	GAS — 24 HRS.	GAS — 48 HRS.	CONFIRMED	REMARKS
11-Capacity Well. Approved 11-6-68 11: Delafield	11-6-68	SEE OTHER SIDE	plot 702105	re: M.E. Ostrom 12-4-68



8

AIC 934
D 620
C 814
W - 87
847 + 10/68

775

151

WK35650_2

Corrected Report

OCT - 2 1974

WELL CONSTRUCTOR'S REPORT

Wel-6

WHITE COPY – DIVISION'S COPY
GREEN COPY – DRILLER'S COPY
YELLOW COPY – OWNER'S COPY

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
Box 450
Madison, Wisconsin 53701

1 COUNTY: WAUKESHA

CHECK ONE: ☒ Town ☐ Village ☐ City

NAME: MERTON

2. LOCATION (Number and Street or ¼ section, section, township and range. Also give subdivision name, lot and block numbers when available.)
N. 48 W. 30756 HILL ST. TOWN of MERTON. T8N R18E

3. OWNER AT TIME OF DRILLING
WAGEN REALTY CO.

SE, SE, SW, SW, Sec. 34

4. OWNER'S COMPLETE MAIL ADDRESS
318 LAKE Rd, OCONOMOWOC, WIS.

5. Distance in feet from well to nearest: (Record answer in appropriate block)

BUILDING	SANITARY SEWER C. I.	SANITARY SEWER TILE	FLOOR DRAIN C. I.	FLOOR DRAIN TILE	FOUNDATION DRAIN SEWER CONNECTED	FOUNDATION DRAIN INDEPENDENT	WASTE WATER DRAIN C. I.	WASTE WATER DRAIN TILE
8	40	—	60	—	—	—	45	—

CLEAR WATER DRAIN C. I.	CLEAR WATER DRAIN TILE	SEPTIC TANK	PRIVY	SEEPAGE PIT	ABSORPTION FIELD	BARN	SILO	ABANDONED WELL	SINK HOLE
—	—	70	—	—	95	—	—	—	—

OTHER POLLUTION SOURCES (Give description such as dump, quarry, drainage well, stream, pond, lake, etc.)

6. Well is intended to supply water for: FURNITURE STORE

7. DRILLHOLE

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
6	Surface		UNKNOWN		
	REDRILL				

8. CASING, LINER, CURBING, AND SCREEN

Dia. (in.)	Kind and Weight	From (ft.)	To (ft.)
6	NEW BLK. STEEL	Surface	134
	T&C. 0,280		
6	UNKNOWN	134	260

9. GROUT OR OTHER SEALING MATERIAL

Kind	From (ft.)	To (ft.)
UNKNOWN	Surface	~~126~~

10. FORMATIONS

Kind	From (ft.)	To (ft)
UNKNOWN	Surface	126
SAND	126	160
HARDPAN	160	205
GRAVEL	205	260

WK 31760

11. MISCELLANEOUS DATA

Yield test: 8 Hrs. at 10 GPM

Depth from surface to normal water level 135 ft.

Depth to water level when pumping 135 ft.

Well construction completed on Aug 29 1974

Well is terminated 8 inches ☒ above ☐ below final grade

Well disinfected upon completion ☒ Yes ☐ No

Well sealed watertight upon completion ☒ Yes ☐ No

Water sample sent to Madison, WIS. laboratory on: Sept 16 1974

Your opinion concerning other pollution hazards, information concerning difficulties encountered, and data relating to nearby wells, screens, seals, type of casing joints, method of finishing the well, amount of cement used in grouting, blasting, sub-surface pumprooms, access pits, etc., should be given on reverse side.

SIGNATURE

Henry Hartman Registered Well Driller

COMPLETE MAIL ADDRESS

5100 N. 56 ST. MILWAUKEE, WIS.

Please do not write in space below

COLIFORM TEST RESULT	GAS – 24 HRS.	GAS – 48 HRS.	CONFIRMED	REMARKS
See letter	driller's file		9/24/74	plot 782049

REV 11-68

Page 2 of 2

SEP 17 1974 OCT 2 1974

WELL CONSTRUCTOR'S REPORT
FORM 3300–15

NOTE
WHITE COPY – DIVISION'S COPY
GREEN COPY – DRILLER'S COPY
YELLOW COPY – OWNER'S COPY

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
Box 450
Madison, Wisconsin 53701

1. COUNTY WAUKESHA

CHECK ONE: ☒ Town ☐ Village ☐ City — NAME: MERTON

2. LOCATION – ✓ ¼ Section | Section | Township | Range
SE, SE, SW | SW | 34 | 8N | 18E

OR – Grid or street no. N. 48 W. 30756 — Street name: HILL ST

AND – If available subdivision name, lot & block no.: SE, SE, SW, SW Sec 34

3. OWNER AT TIME OF DRILLING WARREN REALTY CO.

ADDRESS: 318 LAKE Rd.

POST OFFICE: OCONOMOWOC, WIS

4. Distance in feet from well to nearest: (Record answer in appropriate block)

BUILDING	SANITARY SEWER C. I.	SANITARY SEWER TILE	FLOOR DRAIN C. I.	FLOOR DRAIN TILE	FOUNDATION DRAIN SEWER CONNECTED	FOUNDATION DRAIN INDEPENDENT	WASTE WATER DRAIN C. I.	WASTE WATER DRAIN TILE
8	40	—	60	—	—	—	45	—

CLEAR WATER DRAIN C. I.	CLEAR WATER DRAIN TILE	SEPTIC TANK	PRIVY	SEEPAGE PIT	ABSORPTION FIELD	BARN	SILO	ABANDONED WELL	SINK HOLE
—	—	70	—	—	95	—	—	—	—

OTHER POLLUTION SOURCES (Give description such as dump, quarry, drainage well, stream, pond, lake, etc.)

5. Well is intended to supply water for: STORE FURNITURE

6. DRILLHOLE

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
	Surface	REDRILL			

7. CASING, LINER, CURBING, AND SCREEN

Dia. (in.)	Kind and Weight	From (ft.)	To (ft.)
6	UNKNOWN	Surface	126
6" New, Steel, BLK, TYC 0.280		126	260

8. GROUT OR OTHER SEALING MATERIAL

Kind	From (ft.)	To (ft.)
X	Surface	X

9. FORMATIONS

Kind	From (ft.)	To (ft.)
UNKNOWN	Surface	126
SAND	126	160
HARDPAN	160	205
GRAVEL	205	260

10. TYPE OF DRILLING MACHINE USED

☒ Cable Tool ☐ Direct Rotary ☐ Reverse Rotary
☐ Rotary – air w/drilling mud ☐ Rotary – hammer with drilling mud & air ☐ Jetting with ☐ Air ☐ Water

Well construction completed on aug 27 1974

Well is terminated 8 inches ☒ above ☐ below final grade

Well disinfected upon completion ☒ Yes ☐ No

Well sealed watertight upon completion ☒ Yes ☐ No

11. MISCELLANEOUS DATA

Yield test: 8 Hrs. at 10 GPM

Depth from surface to normal water level 135 ft.

Depth to water level when pumping 135 ft.

Water sample sent to Madison, Wis laboratory on: Sept 16 1974

Your opinion concerning other pollution hazards, information concerning difficulties encountered, and data relating to nearby wells, screens, seals, type of casing joints, method of finishing the well, amount of cement used in grouting, blasting, sub-surface pumprooms, access pits, etc., should be given on reverse side.

SIGNATURE: Henry Kautman Registered Well Driller

COMPLETE MAIL ADDRESS: 5100 N. 56 St. Milw. Wis

Please do not write in space below

COLIFORM TEST RESULT	GAS – 24 HRS.	GAS – 48 HRS.	CONFIRMED	REMARKS
WK 31760-2				

REV. 3–71

Well Construction Report
WISCONSIN UNIQUE WELL NUMBER IJ288

Drinking Water and Groundwater - DG/5
Department of Natural Resources, Box 7921
Madison WI 53707
Form 3300-077A

Property Owner: GARDEN GATE NURSERY			Phone #
Mailing Address: N48 W30756 HILL ST			
City: HARTLAND	State: WI	Zip Code: 53029	
County: Waukesha	Co. Permit #	Notification #	Completed: 06-22-1995

Well Constructor (Business Name): MICHAEL HARTMAN	Lic. #: 436	Facility ID # (Public Wells)	
Address: W82 N28280 MARSHALL HARTLAND WI 53029		Well Plan Approval #	
		Approval Date (mm-dd-yyyy)	
Hicap Permanent Well #	Common Well #	Specific Capacity: 0.8	

1. Well Location

Town of MERTON

Fire # (if avail.)

Street Address or Road Name and Number: N48 W30756 HILL ST

Subdivision Name	Lot #	Block #

Latitude / Longitude in Decimal Degree (DD): 43.1059 °N -88.3586 °W

Method Code: GCD013

SW SW or Govt Lot #	Section: 34	Township: 8 N	Range: 18 E

2. Well Type Replacement

of previous unique well # constructed in

Reason for replaced or reconstructed well ?: OUT OF WATER

Construction Type: Drilled

3. Well serves 1 # of NURSERY

Non-community

Heat Exchange____# of drillholes

Hicap Well ? No

Hicap Property ? No

Hicap Potable ?

4. Potential Contamination Sources - ON REVERSE SIDE

5. Drillhole Dimensions and Construction Method

Dia. (in.)	From (ft.)	To (ft.)
6	Surface	278

Upper Enlarged Drillhole / Lower Open Bedrock

- Rotary - Mud Circulation .....
- Rotary - Air .....
- Rotary - Air & Foam .....
- Drill-Through Casing Hammer
- Reverse Rotary
- Cable-tool Bit ____in. dia...
- Dual Rotary .....
- Temp. Outer Casing ____in. dia
  - Removed? ____depth ft. (If NO explain on back side)

8. Geology

Geology Codes	8. Geology Type, Caving/Noncaving, Color, Hardness, etc...	From (ft.)	To (ft.)
C	CLAY	Surface	10
Y	SAND @ GRAVEL	10	50
P	HARDPAN	50	90
S	SAND	90	125
P	HARDPAN	125	145
Y	SAND @ GRAVEL	145	170
P	HARDPAN	170	250
Y	SAND @ GRAVEL	250	278

6. Casing, Liner, Screen

Dia. (in.)	Material, Weight, Specification Manufacturer & Method of Assembly	From (ft.)	To (ft.)
6	0 280 A 53 GRB SAWHILL STEEL WELDED	Surface	278
Dia. (in.)	Screen type, material & slot size	From (ft.)	To (ft.)

9. Static Water Level

120 ft. below ground surface

10. Pump Test

Pumping level 180 ft. below surface

Pumping at 50 GP M for 4 Hrs.

Pumping Method ?

11. Well Is

18 in. above grade

Developed ? Yes

Disinfected ? Yes

Capped ? Yes

7. Grout or Other Sealing Material

Method MOUNDED

Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
CRUMBLES DRILL	Surface	0	

12. Notified Owner of need to fill & seal ?

Filled & Sealed Well(s) as needed? No

PUMP MAN TO DO

13. Constructor / Supervisory Driller	Lic #	Date Signed
MH		06-26-1995
Drill Rig Operator	**Lic or Reg #**	**Date Signed**
MA		

4a. Potential Contamination Sources Is the well located in floodplain ? No

Type	Qualifier	Distance	Type	Qualifier	Distance
Building Overhang		9	Collector Sewer - San or Storm		90
			Sewer - Building Sanitary		40

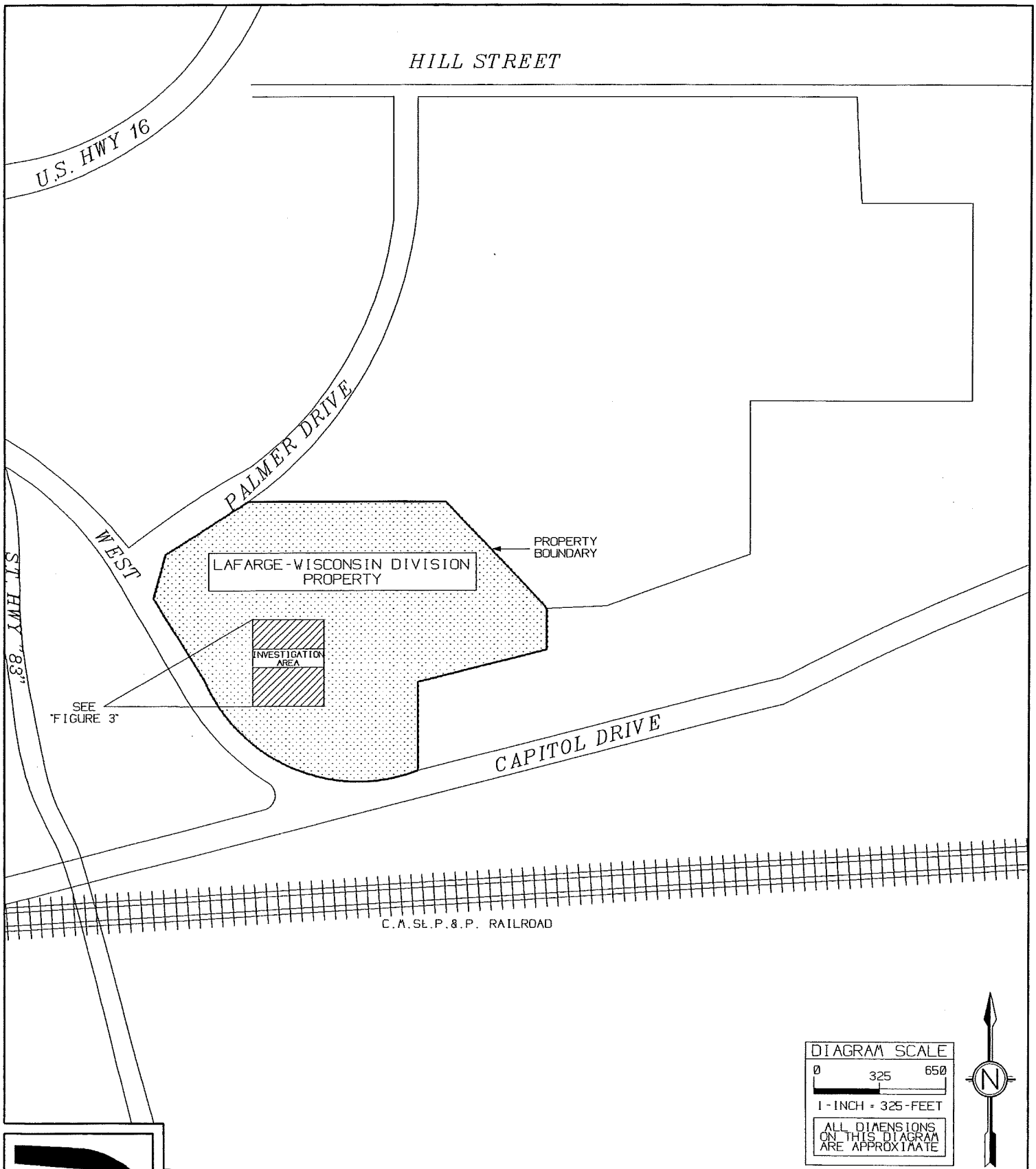
Comment:

Water Quality Text:

Water Quantity Text:

Difficulty Text:

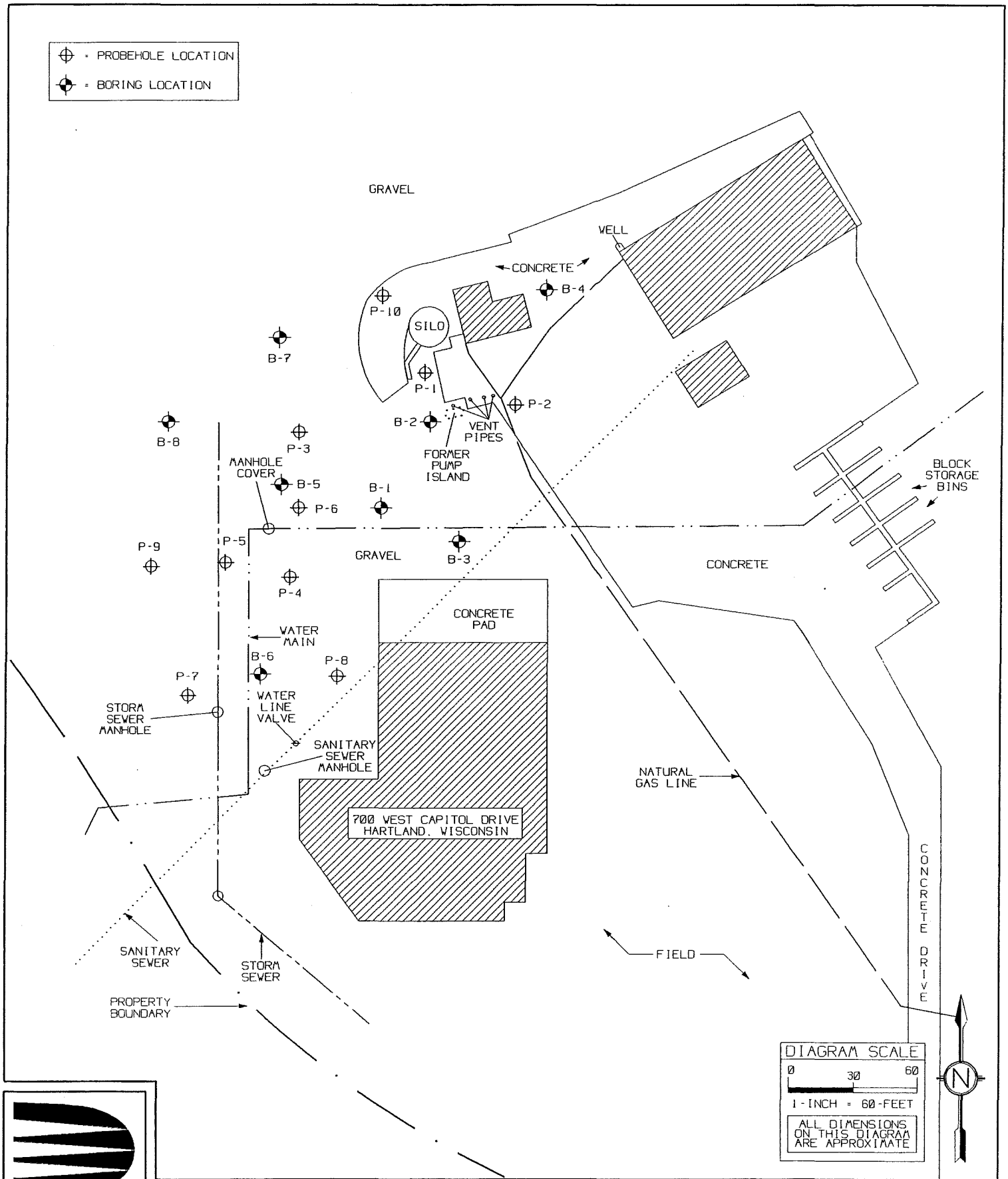
Created On: 10-10-1995 Created by: HFRC LOAD Updated On: 07-12-2019 Updated by: PARCEL_MATCH



DRAKE ENVIRONMENTAL, INC.

LAFARGE - HARTLAND REMEDIAL INVESTIGATION	PROJECT NO. J98109 PM DWF DRAWN BY JAM DATE: 11/18/98 CHKD BY DWF DATE 12-2-98 APRVD BY RKJ DATE 12-4-98	LOCATION DIAGRAM	FIGURE 2

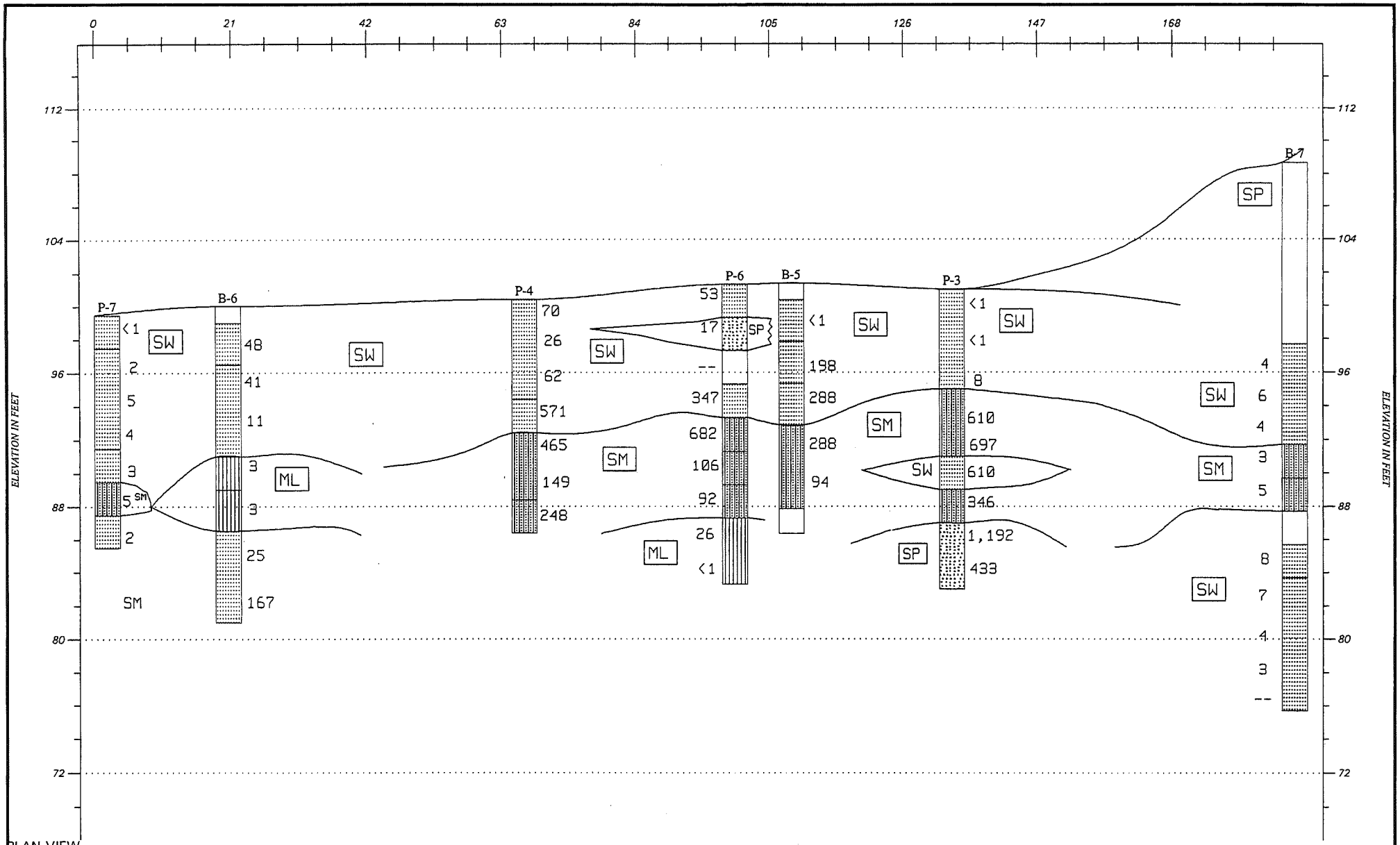
FILE: JB109A(L1)



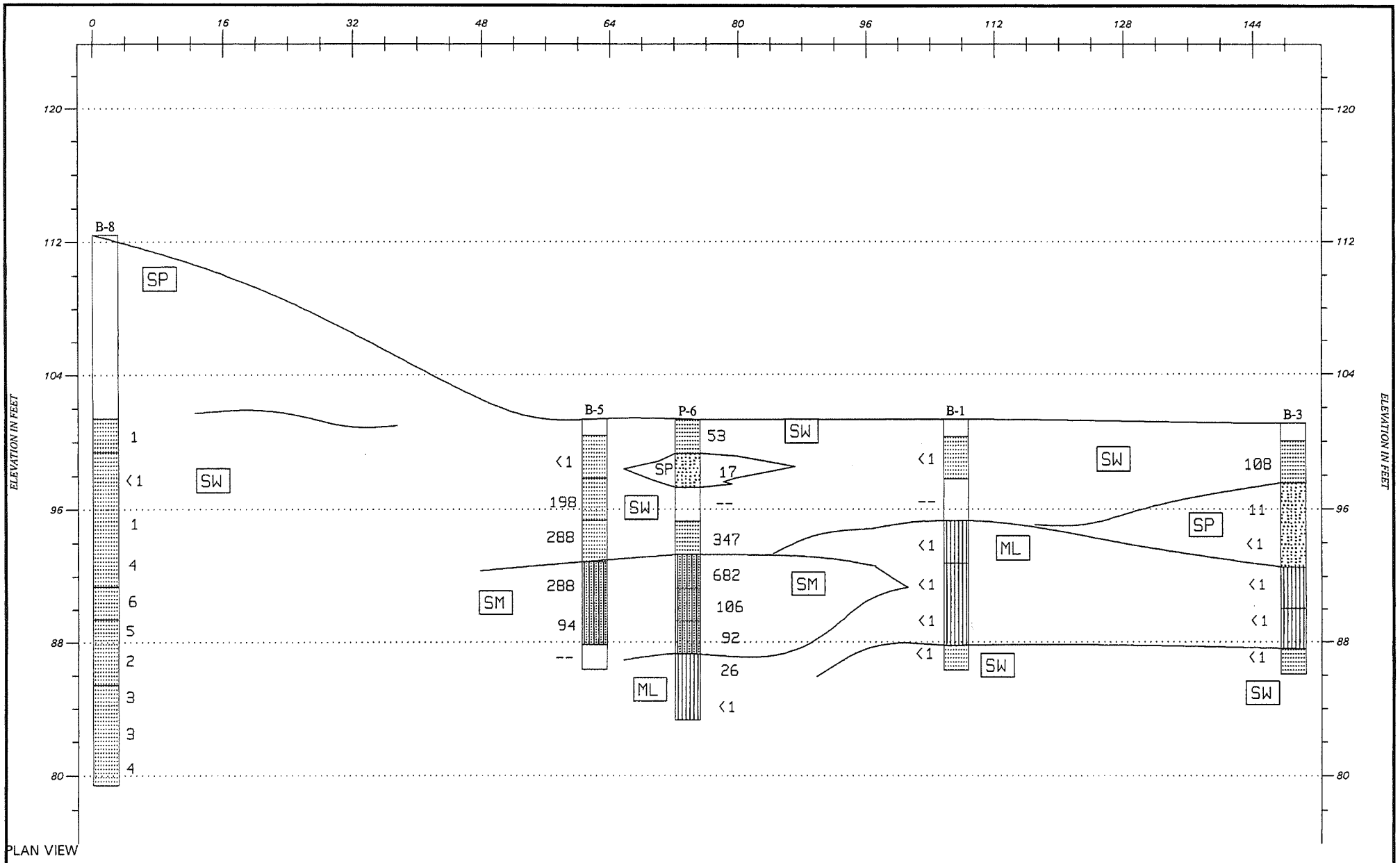
DRAKE ENVIRONMENTAL, INC.

LAFARGE - HARTLAND REMEDIAL INVESTIGATION	PROJECT NO. J98109 | PM DWF DRAWN BY JMM DATE: 07/30/99 CHKD BY DWF DATE 7-21-99 APRVD BY TM DATE 9-21-99	PROBEHOLE AND BORING LOCATIONS DIAGRAM	FIGURE 4

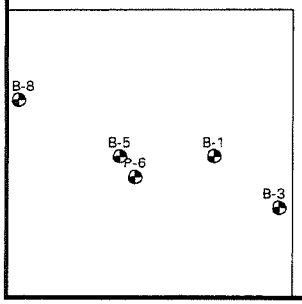
FILE: J98109BL1/4/6)



DRAKE ENVIRONMENTAL, INC.		
GEOLOGICAL CROSS SECTION		
HORIZONTAL SCALE: 1"=(proportional)'	FIELD TECHNICIAN	DATE DRAWN
VERTICAL SCALE: 1"=8'	TJO	8/23/1999
LAFARGE - HARTLAND		
PROJECT NUMBER: J98109		FIGURE NUMBER 6



PLAN VIEW



DRAKE ENVIRONMENTAL, INC.

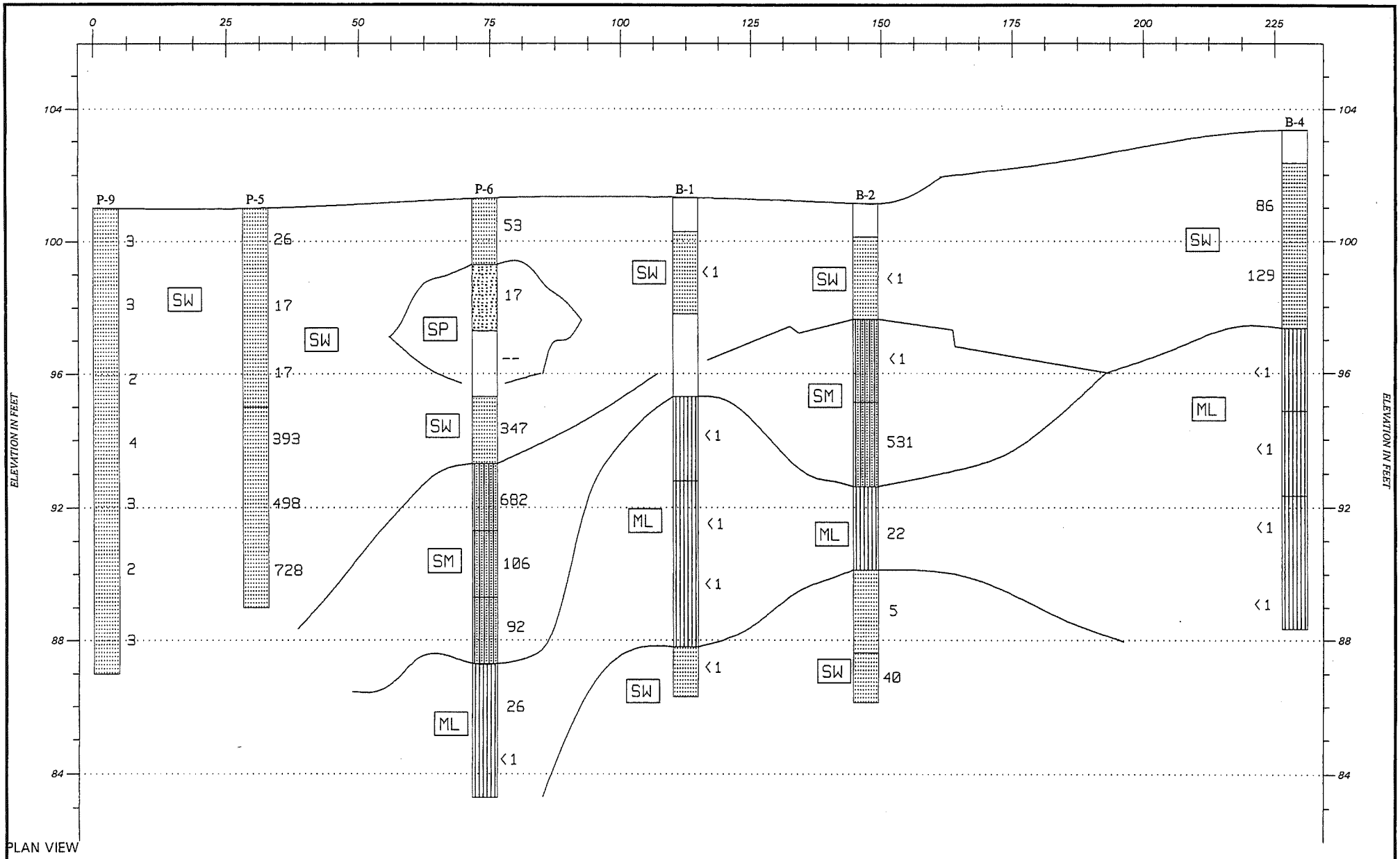
GEOLOGICAL CROSS SECTION

HORIZONTAL SCALE: 1" =(proportional)'	FIELD TECHNICIAN	DATE DRAWN
VERTICAL SCALE: 1" = 8'	TJO	8/23/1999

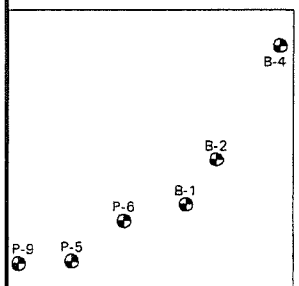
LAFARGE - HARTLAND

PROJECT NUMBER: J98109

FIGURE NUMBER 7



PLAN VIEW



DRAKE ENVIRONMENTAL, INC.

GEOLOGICAL CROSS SECTION

HORIZONTAL SCALE: 1"=(proportional)'	FIELD TECHNICIAN	DATE DRAWN
VERTICAL SCALE: 1"=4'	TJO	8/22/1999

LAFARGE - HARTLAND

PROJECT NUMBER: J98109

FIGURE NUMBER 8

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	PROBE NUMBER
LAFARGE - HARTLAND	TJO	DWF	P-1
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	25 FEET NE OF FORMER UST		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0–1	1	PR	--	--	MEDIUM TO COARSE SAND WITH SILTY FINE SAND AND FINE TO COARSE GRAVEL, TRACE ROOTS - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET (FILL)	SW	<1	
2–3	2	PR	--	--	MEDIUM TO COARSE SAND, WITH FINE SAND; FEW FINE TO COARSE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST (FILL), FINE SANDY SILT TO SILTY CLAY; FEW MEDIUM TO COARSE SAND, DAMP TO MOIST (POSSIBLE FILL)	SW	<1	
4–5	3	PR	--	--	SILT, TRACE COARSE SAND TO FINE GRAVEL - DARK YELLOWISH BROWN (10YR 4/6) - DAMP (POSSIBLE FILL)	ML	17	
6–7	4	PR	--	--	SILTY FINE TO MEDIUM SAND, TRACE COARSE SAND AND FINE GRAVEL - GRAYISH BROWN (10YR 5/2) - DAMP, PETROLEUM ODOR (POSSIBLE FILL)	SM	*2260	
8–9	5	PR	--	--	SILTY FINE TO MEDIUM SAND, TRACE COARSE SAND, TRACE FINE GRAVEL - GRAYISH BROWN (10YR 5/2) - DAMP TO MOIST, PETROLEUM ODOR (POSSIBLE FILL)	SM	1,073	
10–11	6	PR	--	--	SILTY FINE SAND TO FINE SANDY SILT, TRACE COARSE SAND - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET, SLIGHT ODOR	SM	70	
12–13	7	PR	--	--	FINE SANDY SILT, TRACE COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - WET	ML	17	
14–15	8	PR	--	--	SILTY FINE SAND, TRACE MEDIUM AND COARSE SAND, TRACE FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST, PETROLEUM ODOR	SM	*365	
16–21					PROBEHOLE TERMINATED AT 16.0 FEET			

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 1-25-99	DRILL RIG: Geoprobe Model 5400
DRILLED BY: UNDERGROUND POWER CORP.	
BORING DRILLED WITH GEOPROBE 2' INTERVALS	
PROBEHOLE ABANDONED WITH BENTONITE	
GROUND SURFACE AT 0.0 DURING DRILLING	
GROUNDWATER AT APPROX 10' DURING DRILLING	

NOTES

*SUBMITTED FOR LABORATORY ANALYSIS

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	PROBE NUMBER
LAFARGE - HARTLAND	TJO	DWF	P-2
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	30 FEET EAST OF FORMER UST		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1					8 INCHES CONCRETE			
2	1	PR	--	--	SILTY FINE SAND, FEW MEDIUM TO COARSE SND, TRACE FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - DAMP (FILL)	SM	<1	
3								
4	2	PR	--	--	FINE SAND, TRACE MEDIUM TO COARSE SAND, TRACE FINE GRAVEL - YELLOWISH BROWN (10YR 5/6) - DAMP (FILL)	SW	<1	
5								
6	3	PR	--	--	SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - PALE BROWN (10YR 6/3) - DAMP (FILL)	SM	<1	
7								
8	4	PR	--	--	SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - PALE BROWN (10YR 6/3) - DAMP (FILL), LITTLE RECOVERY	SM	*<1	
9					SILTY FINE SAND, FINE MEDIUM TO COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - WET, FILL	SM		
10	5	PR	--	--	FINE SANDY SILT, TRACE COARSE SAND - YELLOWISH BROWN (10YR 5/4) - WET	ML	<1	
11					FINE SANDY SILT, TRACE COARSE SAND AND FINE GRAVEL - BROWN (10YR 5/3)	ML		
12	6	PR	--	--	SILTY CLAY, TRACE SILT, TRACE COARSE SAND AND FINE GRAVEL - DARK GRAY (10YR 4/1) - MOIST TO WET	CL	*<1	
13					PROBEHOLE TERMINATED AT 13.0 FEET			
14								
15								
16								
17								
18								
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 1-25-99	DRILL RIG: Geoprobe Model 5400
DRILLED BY: UNDERGROUND POWER CORP.	
BORING DRILLED WITH GEOPROBE 2' INTERVALS	
PROBEHOLE ABANDONED WITH BENTONITE	
GROUND SURFACE AT 0.0 DURING DRILLING	
GROUNDWATER AT APPROX 9' DURING DRILLING	

NOTES

*SUBMITTED FOR LABORATORY ANALYSIS

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	PROBE NUMBER
LAFARGE - HARTLAND	TJO	DWF	
CLIENT	PROJECT NUMBER		P-3
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	70 FEET WEST OF FORMER UST		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1	1	PR	--	--	MEDIUM TO COARSE SAND WITH SILTY FINE SAND AND FINE TO COARSE GRAVEL, TRACE ROOTS - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET (FILL)	SW	<1	
2								
3	2	PR	--	--			<1	
4								
5	3	PR	--	--			8	
6								
7	4	PR	--	--	SILTY FINE SAND WITH MEDIUM SAND, TRACE COARSE SAND AND FINE GRAVEL - GRAY BROWN (10YR 5/2) - WET, PETROLEUM ODOR (FILL)	SM	610	
8								
9	5	PR	--	--			*697	
10								
11	6	PR	--	--	FINE TO MEDIUM SAND, TRACE COARSE SAND AND FINE GRAVEL - GRAYISH BROWN (10YR 5/2) - WET, PETROLEUM ODOR (FILL)	SW	610	
12								
13	7	PR	--	--	SILTY FINE SAND, FEW MEDIUM SAND, TRACE COARSE SAND AND FINE GRAVEL, TRACE FINE SANDY SILT - YELLOWISH BROWN (10YR 5/4) - WET, PETROLEUM ODOR (FILL)	SM	346	
14								
15	8	PR	--	--	PEA GRAVEL, TRACE SILTY FINE AND MEDIUM SAND - DARK GRAY TO VERY DARK GRAY (10YR 3.5/1) - WET, PETROLEUM ODOR (FILL)	SP	1,192	
16								
17	9	PR	--	--			*433	
18					PROBEHOLE TERMINATED AT 18.0 FEET			
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 1-25-99	DRILL RIG: Geoprobe Model 5400
DRILLED BY: UNDERGROUND POWER CORP.	
BORING DRILLED WITH GEOPROBE 2' INTERVALS	
PROBEHOLE ABANDONED WITH BENTONITE	
GROUND SURFACE AT 0.0 DURING DRILLING	
GROUNDWATER AT APPROX 7' DURING DRILLING	

NOTES

*SUBMITTED FOR LABORATORY ANALYSIS

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	PROBE NUMBER
LAFARGE - HARTLAND	TJO	DWF	P-4
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	100 FEET SW OF FORMER UST		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1	1	PR	--	--	MEDIUM TO COARSE SAND WITH SILTY FINE SAND AND FINE TO COARSE GRAVEL, TRACE ROOTS - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET (FILL)	SW	70	
2								
3	2	PR	--	--			26	
4								
5	3	PR	--	--			62	
6								
7	4	PR	--	--	FINE SAND WITH MEDIUM TO COARSE SAND, TRACE FINE GRAVEL - GREYISH BROWN (10YR 5/2) - MOIST, PETROLEUM ODOR, WET	SW	*571	
8								
9	5	PR	--	--	SILTY FINE SAND, TRACE COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST, PETROLEUM ODOR (FILL)	SM	465	
10								
11	6	PR	--	--			149	
12								
13	7	PR	--	--	SILTY FINE SAND TO SANDY SILT, TRACE COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST, PETROLEUM ODOR, FILL	SM	*248	
14					PROBEHOLE TERMINATED AT 14.0 FEET			
15								
16								
17								
18								
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 1-25-99	DRILL RIG: Geoprobe Model 5400
DRILLED BY: UNDERGROUND POWER CORP.	
BORING DRILLED WITH GEOPROBE 2' INTERVALS	
PROBEHOLE ABANDONED WITH BENTONITE	
GROUND SURFACE AT 0.0 DURING DRILLING	
GROUNDWATER AT APPROX. DURING DRILLING	

NOTES

*SUBMITTED FOR LABORATORY ANALYSIS

DRAKE ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	PROBE NUMBER
LAFARGE - HARTLAND	TJO	DWF	P-5
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	110 FEET SW OF FORMER UST		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1	1	PR	--	--	MEDIUM TO COARSE SAND WITH SILTY FINE SAND AND FINE TO COARSE GRAVEL, TRACE ROOTS - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET (FILL)	SW	26	
2								
3	2	PR	--	--			17	
4								
5	3	PR	--	--			17	
6								
7	4	PR	--	--	MEDIUM TO COARSE SAND, WITH SILTY FINE SAND AND FINE GRAVEL - GRAYISH BROWN (10YR 5/2) - MOIST TO WET, PETROLEUM ODOR (FILL)	SW	*393	
8								
9	5	PR	--	--			498	
10								
11	6	PR	--	--			*728	
12					PROBEHOLE TERMINATED AT 12.0 FEET			
13								
14								
15								
16								
17								
18								
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 1-25-99	DRILL RIG: Geoprobe Model 5400
DRILLED BY: UNDERGROUND POWER CORP.	
BORING DRILLED WITH GEOPROBE 2' INTERVALS	
PROBEHOLE ABANDONED WITH BENTONITE	
GROUND SURFACE AT 0.0 DURING DRILLING	
GROUNDWATER AT APPROX. DURING DRILLING	

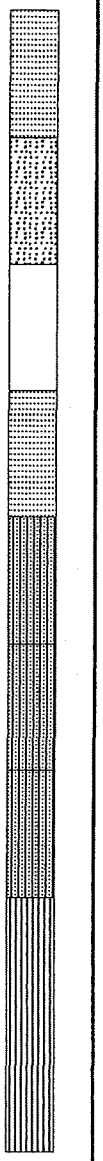
NOTES

*SUBMITTED FOR LABORATORY ANALYSIS

DRAKE ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	PROBE NUMBER
LAFARGE - HARTLAND	TJO	DWF	P-6
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	80 FEET SW OF FORMER UST		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID
0							
1	1	PR	--	--	MEDIUM TO COARSE SAND WITH SILTY FINE SAND AND FINE TO COARSE GRAVEL, TRACE ROOTS - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET (FILL)	SW	53
2							
3	2	PR	--	--	FINE GRAVEL, TRACE FINE SAND - YELLOWISH BROWN (10YR 5/4) -DAMP (FILL)	SP	17
4							
5	3	PR	--	--	NO RECOVERY		--
6							
7	4	PR	--	--	FINE TO COARSE SAND, TRACE FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET, PETROLEUM ODOR (FILL)	SW	347
8							
9	5	PR	--	--	SILTY FINE SAND, TRACE MEDIUM AND COARSE SAND - YELLOWISH BROWN (10YR 5/4) - MOIST, PETROLEUM ODOR (FILL)	SM	*682
10							
11	6	PR	--	--	SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - GRAYISH BROWN (10YR 5/2) - WET, PETROLEUM ODOR (FILL)	SM	106
12							
13	7	PR	--	--	SILTY FINE SAND, TRACE FINE SANDY SILT, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - GRAYISH BROWN (10YR 5/2) - WET, PETROLEUM ODOR (FILL)	SM	92
14							
15	8	PR	--	--	FINE SANDY SILT, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - WET	ML	26
16							
17	9	PR	--	--			*<1
18					PROBEHOLE TERMINATED AT 18.0 FEET		
19							
20							
21							



NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 1-25-99	DRILL RIG: Geoprobe Model 5400
DRILLED BY: UNDERGROUND POWER CORP.	
BORING DRILLED WITH GEOPROBE 2' INTERVALS	
PROBEHOLE ABANDONED WITH BENTONITE	
GROUND SURFACE AT 0.0 DURING DRILLING	
GROUNDWATER AT APPROX 10' DURING DRILLING	

NOTES

*SUBMITTED FOR LABORATORY ANALYSIS

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	PROBE NUMBER
LAFARGE - HARTLAND	TJO	DWF	P-7
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	170 FEET SW OF FORMER UST		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1	1	PR	--	--	MEDIUM TO COARSE SAND, WITH SILTY FINE SAND ND FINE TO COARSE GRAVEL, TRACE ROOTS - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET (FILL)	SW	1	
2								
3	2	PR	--	--	FINE TO MEDIUM SAND, TRACE COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST (FILL)	SW	2	
4								
5	3	PR	--	--			5	
6								
7	4	PR	--	--			*4	
8								
9	5	PR	--	--	FINE TO MEDIUM SAND, TRACE COARSE SAND AND FINE GRAVEL, BLACK SILTY SAND LAYER - YELLOWISH BROWN (10YR 5/4) - MOIST (FILL)	SW	3	
10								
11	6	PR	--	--	FINE SILTY SAND, TRACE COARSE SAND AND FINE GRAVEL - LIGHT YELLOWISH BROWN (10YR 6/4) - MOIST (FILL)	SM	5	
12								
13	7	PR	--	--	FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - WET (FILL)	SW	2	
14								
15					PROBEHOLE TERMINATED AT 14.0 FEET			
16								
17								
18								
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 1-26-99	DRILL RIG: Geoprobe Model 5400
DRILLED BY: UNDERGROUND POWER CORP.	
BORING DRILLED WITH GEOPROBE 2' INTERVALS	
PROBEHOLE ABANDONED WITH BENTONITE	
GROUND SURFACE AT 0.0 DURING DRILLING	
GROUNDWATER AT APPROX 12' DURING DRILLING	

NOTES

*SUBMITTED FOR LABORATORY ANALYSIS

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	PROBE NUMBER
LAFARGE - HARTLAND	TJO	DWF	P-8
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	130 FEET SW OF FORMER UST		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1	1	PR	--	--	FINE TO MEDIUM SAND, TRACE COARSE SAND AND FINE GRAVEL - DARK YELLOWISH BROWN (10YR 4/4) - MOIST (FILL)	SW	*55	
2								
3	2	PR	--	--	FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST (FILL)	SW	8	
4								
5	3	PR	--	--			4	
6								
7	4	PR	--	--	FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST (FILL), LITTLE RECOVERY	SW	*4	
8								
9	5	PR	--	--			3	
10								
11	6	PR	--	--	FINE SILTY SAND TO SANDY SILT, TRACE MEDIUM AND COARSE SAND, TRACE FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET (FILL)	SM	2	
12								
13	7	PR	--	--	SILTY FINE TO MEDIUM SAND, TRACE COARSE SAND, TRACE FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - WET, FILL	SM	3	
14					PROBEHOLE TERMINATED AT 14.0 FEET			
15								
16								
17								
18								
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 1-26-99	DRILL RIG: Geoprobe Model 5400
DRILLED BY: UNDERGROUND POWER CORP.	
BORING DRILLED WITH GEOPROBE 2' INTERVALS	
PROBEHOLE ABANDONED WITH BENTONITE	
GROUND SURFACE AT 0.0 DURING DRILLING	
GROUNDWATER AT APPROX 11' DURING DRILLING	

NOTES

*SUBMITTED FOR LABORATORY ANALYSIS

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	PROBE NUMBER
LAFARGE - HARTLAND	TJO	DWF	P-9
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	150 FEET SW OF FORMER UST		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1	1	PR	--	--	FINE TO MEDIUM SAND, TRACE COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - DAMP TO MOIST (FILL)	SW	3	
2								
3	2	PR	--	--			3	
4								
5	3	PR	--	--			2	
6								
7	4	PR	--	--			*4	
8								
9	5	PR	--	--			3	
10								
11	6	PR	--	--			2	
12								
13	7	PR	--	--			3	
14					PROBEHOLE TERMINATED AT 14.0 FEET			
15								
16								
17								
18								
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 1-26-99	DRILL RIG: Geoprobe Model 5400
DRILLED BY: UNDERGROUND POWER CORP.	
BORING DRILLED WITH GEOPROBE 2' INTERVALS	
PROBEHOLE ABANDONED WITH BENTONITE	
GROUND SURFACE AT 0.0 DURING DRILLING	
GROUNDWATER AT APPROX. DURING DRILLING	

NOTES

*SUBMITTED FOR LABORATORY ANALYSIS

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	PROBE NUMBER
LAFARGE - HARTLAND	TJO	DWF	P-10
CLIENT: LAFARGE - WISCONSIN DIVISION	PROJECT NUMBER: J98109		
LOCATION: 700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	LOCATION DESCRIPTION: 65 FEET NW OF FORMER UST		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1	1	PR	--	--	FINE TO MEDIUM SAND, TRACE COARSE SAND AND FINE GRAVEL - GRAY (10YR 5/1) - WET, CEMENT ODOR (FILL)	SW	351	
2								
3	2	PR	--	--	SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - GRAY (10YR 6/1) - WET, CEMENT ODOR (FILL)	SM	381	
4								
5	3	PR	--	--			483	
6								
7	4	PR	--	--	SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - GRAY (10YR 6/1) - WET, CEMENT AND PETROLEUM ODOR (FILL)	SM	*723	
8								
9	5	PR	--	--	FINE SILTY SAND, FEW MEDIUM TO COARSE SAND AND FINE GRAVEL - VERY DARK GRAYISH BROWN (10YR 3/2) - WET, PETROLEUM ODOR (FILL)	SM	767	
10								
11	6	PR	--	--	FINE TO MEDIUM SILTY SAND, TRACE COARSE SAND - GRAY (10YR 5/1) - WET, PETROLEUM ODOR (FILL)	SM	307	
12								
13	7	PR	--	--			398	
14								
15	8	PR	--	--			*556	
16					PROBEHOLE TERMINATED AT 16.0 FEET			
17								
18								
19								
20								
21								

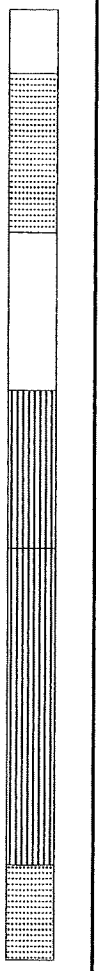
NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 1-26-99 / DRILL RIG: Geoprobe Model 5400	NOTES
DRILLED BY: UNDERGROUND POWER CORP.	*SUBMITTED FOR LABORATORY ANALYSIS
BORING DRILLED WITH GEOPROBE 2' INTERVALS	
PROBEHOLE ABANDONED WITH BENTONITE	
GROUND SURFACE AT 0.0 DURING DRILLING	
GROUNDWATER AT APPROX. DURING DRILLING	

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	BORING NUMBER
LAFARGE - HARTLAND	TJO	DWF	B-1
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	75'N, 4'E OF NW CORNER OF BLDG		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID
0							
1							
2	1	SS	22	--	FINE TO COARSE SAND, FINE TO MEDIUM GRAVEL (PEA GRAVEL) - YELLOWISH BROWN (10YR 5/4) - MOIST (FILL)	SW	<1
3							
4	2	SS	--	--	NO RECOVERY		--
5							
6	3	SS	15	--	FINE SANDY SILT TO SILTY SAND, TRACE MEDIUM SAND, FINE TO MEDIUM GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET (FILL)	ML	*<1
7							
8							
9	4	SS	33	--	FINE SANDY SILT TO SILTY SAND, TRACE MEDIUM SAND, FINE TO MEDIUM GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST (FILL)	ML	<1
10							
11	5	SS	31	--			<1
12							
13							
14	6	SS	25	--	FINE TO COARSE SAND, FINE TO MEDIUM GRAVEL (PEA GRAVEL) - YELLOWISH BROWN (10YR 5/4) - MOIST	SW	<1
15					BOREHOLE TERMINATED AT 15.0 FEET		
16							
17							
18							
19							
20							
21							



NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 3-8-99 | DRILL RIG: FOREMOST MOBILE

DRILLED BY: BRIOHN ENVIRONMENTAL CONTRACTORS

BORING DRILLED WITH 4.25 INCH I.D. HSA

BOREHOLE BACKFILLED WITH BENTONITE

GROUND SURFACE AT 101.30 DURING DRILLING

NOTES

*SAMPLE SUBMITTED FOR LABORATORY ANALYSIS
SS = SPLIT SPOON

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	BORING NUMBER
LAFARGE - HARTLAND	TJO	DWF	B-2
CLIENT: LAFARGE - WISCONSIN DIVISION	PROJECT NUMBER: J98109		
LOCATION: 700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	LOCATION DESCRIPTION: 105'N, 25'E OF NW CRNR OF BLDG		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1	1	SS	72	--	FINE TO COARSE SAND, FINE TO MEDIUM GRAVEL (PEA GRAVEL) - YELLOWISH BROWN (10YR 5/4) - MOIST (FILL)	SW	<1	
2								
3								
4	2	SS	19	--	SILTY FINE SAND TO FINE SANDY SILT, TRACE MEDIUM TO COARSE SAND, TRACE COARSE GRAVEL - YELLOWISH BROWN (10YR 5/4) - DAMP (FILL)	SM	<1	
5								
6	3	SS	20	--	SILTY FINE SAND TO FINE SANDY SILT, TRACE MEDIUM TO COARSE SAND, TRACE COARSE GRAVEL - YELLOWISH BROWN (10YR 5/4) - DAMP (FILL), SLIGHT ODOR, VERY LITTLE RECOVERY	SM	531	
7								
8	4	SS	16	--	FINE SANDY SILT, TRACE MEDIUM TO COARSE SAND - YELLOWISH BROWN (10YR 5/4) - MOIST TO WET (FILL)	ML	*22	
9								
10	5	SS	18	--	FINE TO COARSE SAND, FINE TO MEDIUM GRAVEL (PEA GRAVEL) - YELLOWISH BROWN (10YR 5/4) - WET (FILL)	SW	5	
11								
12								
13	6	SS	16	--	FINE TO COARSE SAND, FINE TO MEDIUM GRAVEL (PEA GRAVEL) - YELLOWISH BROWN (10YR 5/4) - WET (FILL), SLIGHT ODOR	SW	*40	
14								
15					BOREHOLE TERMINATED AT 15.0 FEET			
16								
17								
18								
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 3-8-99 | DRILL RIG: FOREMOST MOBILE

DRILLED BY: BRIOHN ENVIRONMENTAL CONTRACTORS

BORING DRILLED WITH 4.25 INCH I.D. HSA

BOREHOLE BACKFILLED WITH BENTONITE

GROUND SURFACE AT 101.13 DURING DRILLING

NOTES

*SAMPLE SUBMITTED FOR LABORATORY ANALYSIS
SS = SPLIT SPOON
WELL SET AT 15' WITH 10' SCREEN
DNR UID #JN379

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	BORING NUMBER
LAFARGE - HARTLAND	TJO	DWF	B-3
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	48'N, 38'E OF NW CORNR OF BLDG		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1	1	SS	5	--	FINE TO COARSE SAND, FINE TO MEDIUM GRAVEL (PEA GRAVEL) - YELLOWISH BROWN (10YR 5/4) - WET (FILL)	SW	*108	
2								
3								
4	2	SS	1	--	MEDIUM GRAVEL, WET (FILL)	SP	11	
5								
6	3	SS	1	--			<1	
7								
8								
9	4	SS	21	--	FINE SANDY SILT TO SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND, TRACE FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - DAMP (FILL)	ML	<1	
10								
11	5	SS	41	--	FINE SANDY SILT TO SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND, TRACE FINE TO COARSE GRAVEL - YELLOWISH BROWN (10YR 5/4) - WET (FILL)	ML	<1	
12								
13								
14	6	SS	41	--	FINE SAND, TRACE MEDIUM TO COARSE GRAVEL, DAMP (FILL)	SW	<1	
15					BOREHOLE TERMINATED AT 15.0 FEET			
16								
17								
18								
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 3-8-99 | DRILL RIG: FOREMOST MOBILE

DRILLED BY: BRIOHN ENVIRONMENTAL CONTRACTORS

BORING DRILLED WITH 4.25 INCH I.D. HSA

GROUND SURFACE AT 101.06 DURING DRILLING

NOTES

*SAMPLE SUBMITTED FOR LABORATORY ANALYSIS
SS = SPLIT SPOON
WELL SET AT 15' WITH 10' SCREEN
DNR UID #JN378

DRAKE ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	BORING NUMBER
LAFARGE - HARTLAND	TJO	DWF	
CLIENT	PROJECT NUMBER		B-4
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	15'N OF NE CORNER OF SILO BLDG		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1								
2	1	SS	47	--	FINE TO COARSE SAND, FINE TO MEDIUM GRAVEL (PEA GRAVEL), COARSE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST (FILL), CEMENT ODOR	SW	86	
3								
4	2	SS	27	--			*129	
5								
6								
7	3	SS	34	--	FINE SANDY SILT, TRACE SILTY CLAY, TRACE MEDIUM TO COARSE SAND, TRACE FINE TO MEDIUM GRAVEL - BROWN (10YR 5/3) - DAMP (FILL)	ML	<1	
8								
9	4	SS	9	--	FINE SANDY SILT, TRACE SANDY CLAY, TRACE MEDIUM SAND AND FINE GRAVEL - BROWN (10YR 5/3) - WET	ML	<1	
10								
11								
12	5	SS	14	--	FINE SANDY SILT TO SILTY CLAY, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL - BROWN (10YR 5/3) - WET	ML	<1	
13								
14	6	SS	21	--			<1	
15					BOREHOLE TERMINATED AT 15.0 FEET			
16								
17								
18								
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 3-8-99	DRILL RIG: FOREMOST MOBILE
DRILLED BY: BRIOHN ENVIRONMENTAL CONTRACTORS	
BORING DRILLED WITH 4.25 INCH I.D. HSA	
GROUND SURFACE AT 103.36 DURING DRILLING	

NOTES

*SAMPLE SUBMITTED FOR LABORATORY ANALYSIS
SS = SPLIT SPOON
WELL SET AT 15' WITH 10' SCREEN
DNR UID #JN377

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	BORING NUMBER
LAFARGE - HARTLAND	TJO	DWF	B-5
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	75'N, 45'W OF NW CORNR OF BLDG		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0								
1								
2	1	SS	38	--	FINE TO COARSE SAND, FINE TO MEDIUM GRAVEL (PEA GRAVEL) - YELLOWISH BROWN (10YR 5/4) - DAMP	SW	<1	
3								
4	2	SS	38	--	FINE TO COARSE SAND, FINE TO MEDIUM GRAVEL (PEA GRAVEL) - YELLOWISH BROWN (10YR 5/4) - MOIST	SW	198	
5								
6	3	SS	9	--	FINE TO COARSE SAND, FINE TO MEDIUM GRAVEL (PEA GRAVEL) - YELLOWISH BROWN (10YR 5/4) - MOIST, ODOR	SW	*288	
7								
8								
9	4	SS	3	--	FINE SILTY SAND, TRACE MEDIUM TO COARSE SAND, TRACE FINE GRAVEL - BROWN (10YR 5/3) - WET (FILL), ODOR	SM	288	
10								
11	5	SS	28	--			*94	
12								
13								
14	6	SS	22	--	NO RECOVERY		--	
15					BOREHOLE TERMINATED AT 15.0 FEET			
16								
17								
18								
19								
20								
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 3-8-99 | DRILL RIG: FOREMOST MOBILE

DRILLED BY: BRIOHN ENVIRONMENTAL CONTRACTORS

BORING DRILLED WITH 4.25 INCH I.D. HSA

GROUND SURFACE AT 101.37 DURING DRILLING

NOTES

*SAMPLE SUBMITTED FOR LABORATORY ANALYSIS
SS = SPLIT SPOON
WELL SET AT 15' WITH 10' SCREEN
DNR UID #JK522

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	BORING NUMBER
LAFARGE - HARTLAND	TJO	DWF	B-6
CLIENT	PROJECT NUMBER		
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	15'S, 55'W OF NW CORNR OF BLDG		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID
0							
1							
2	1	SS	30	--	FINE TO MEDIUM SAND, TRACE COARSE SAND, TRACE FINE GRAVEL - DARK BROWN (10YR 4/3) - DAMP (FILL)	SW	48
3							
4	2	SS	30	--	FINE TO MEDIUM SAND, TRACE COARSE SAND, TRACE FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - DAMP (FILL)	SW	41
5							
6	3	SS	51	--			11
7							
8							
9	4	SS	16	--	FINE SANDY SILT, TRACE COARSE SAND TO FINE GRAVEL - BROWN (10YR 5/3) - MOIST TO WET	ML	*3
10							
11	5	SS	18	--	FINE SANDY SILT TO SILTY FINE SAND, TRACE COARSE SAND AND FINE GRAVEL - BROWN (10YR 5/3) - 3 INCH SEAM, SILT, TRACE SILTY CLAY - DARK GRAY (10YR 4/1) - MOIST	ML	3
12							
13							
14	6	SS	28	--	FINE SAND, MEDIUM TO COARSE SAND, TRACE FINE GRAVEL - BROWN (10YR 5/3) - MOIST	SW	25
15							
16							
17	7	SS	30				*167
18							
19					BOREHOLE TERMINATED AT 19.0 FEET		
20							
21							

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 3-26-99 | DRILL RIG: FOREMOST MOBILE

DRILLED BY: BRIOHN ENVIRONMENTAL CONTRACTORS

BORING DRILLED WITH 4.25 INCH I.D. HSA

GROUND SURFACE AT 100.02 DURING DRILLING

NOTES

*SAMPLE SUBMITTED FOR LABORATORY ANALYSIS
SS = SPLIT SPOON
WELL SET AT 19' WITH 10' SCREEN
DNR UID #JK523

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	BORING NUMBER
LAFARGE - HARTLAND	TJO	DWF	
CLIENT	PROJECT NUMBER		B-7
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	145'N, 46'W OF NW CRNR OF BLDG		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0					BLIND DRILLED TO 11.0 FEET			
11	1	SS	9	--	FINE SAND TO SILTY FINE SAND WITH MEDIUM TO COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST	SW	4	
13	2	SS	10	--			6	
15	3	SS	26	--			4	
17	4	SS	43	--	SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND, TRACE FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST	SM	3	
19	5	SS	26	--	SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND - PALE BROWN (10YR 6/3) - MOIST	SM	5	
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 3-26-99 | DRILL RIG: TRACKED ATV

DRILLED BY: BRIOHN ENVIRONMENTAL CONTRACTORS

BORING DRILLED WITH 4.25 INCH I.D. HSA

GROUND SURFACE AT 108.71 DURING DRILLING

NOTES

*SAMPLE SUBMITTED FOR LABORATORY ANALYSIS
SS = SPLIT SPOON
WELL SET AT 33' WITH 15' SCREEN
DNR UID #JK524

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	BORING NUMBER
LAFARGE - HARTLAND	TJO	DWF	
CLIENT	PROJECT NUMBER		B-7
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	145'N, 46'W OF NW CRNR OF BLDG		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
21					NO RECOVERY			
22	6	SS	35	--			--	
23								
24	7	SS	18	--	FINE SAND TO SILTY FINE SAND WITH MEDIUM TO COARSE SAND AND FINE GRAVEL - YELLOWISH BROWN (10YR 5/4) - MOIST	SW	*8	
25								
26	8	SS	32	--	FINE SAND, TRACE MEDIUM TO COARSE SAND, WET	SW	7	
27								
28	9	SS	14	--			4	
29								
30	10	SS	12	--			*3	
31								
32	11	SS	--	--			--	
33					BOREHOLE TERMINATED AT 33.0 FEET			
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	BORING NUMBER
LAFARGE - HARTLAND	TJO	DWF	
CLIENT	PROJECT NUMBER		B-8
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	105'N, 98'W OF NW CRNR OF BLDG		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
0					BLIND DRILLED TO 11.0 FEET			
11	1	SS	57	--	FINE SAND WITH MEDIUM TO COARSE SAND, TRACE FINE GRAVEL - LIGHT GRAY (10YR 7/2) - DAMP	SW	1	
13	2	SS	68	--	FINE SAND TO FINE SILTY SAND, TRACE MEDIUM TO COARSE SAND, TRACE FINE GRAVEL - BROWN (10YR 5/3) - DAMP	SW	<1	
15	3	SS	53	--			1	
17	4	SS	51	--			4	
19	5	SS	49	--			*6	
21								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

DRILLING DATE: 3-26-99 | DRILL RIG: TRACKED ATV

DRILLED BY: BRIOHN ENVIRONMENTAL CONTRACTORS

BORING DRILLED WITH 4.25 INCH I.D. HSA

GROUND SURFACE AT 112.42 DURING DRILLING

NOTES

*SAMPLE SUBMITTED FOR LABORATORY ANALYSIS
SS = SPLIT SPOON
WELL SET AT 33' WITH 15' SCREEN
DNR UID #JK525

DRAKE
ENVIRONMENTAL, INC.

PROJECT NAME	FIELD TEC	DRAWN BY	BORING NUMBER
LAFARGE - HARTLAND	TJO	DWF	
CLIENT	PROJECT NUMBER		B-8
LAFARGE - WISCONSIN DIVISION	J98109		
LOCATION	LOCATION DESCRIPTION		
700 W CAPITOL DR, HARTLAND, WI NW 1/4 NW 1/4 SEC 3 T7N R18E	105'N, 98'W OF NW CRNR OF BLDG		

DEPTH	SAMPLE	TYPE	N	QP	DESCRIPTION	USCS	PID	GRAPHIC
21								
22	6	SS	50	--	FINE SAND, TRACE MEDIUM TO COARSE SAND, TRACE FINE GRAVEL - BROWN (10YR 5/3) - MOIST, LITTLE RECOVERY	SW	5	
23								
24	7	SS	52	--	FINE TO MEDIUM SAND WITH COARSE SAND, TRACE FINE GRAVEL - BROWN (10YR 5/3) - MOIST	SW	2	
25								
26	8	SS	58	--			3	
27								
28	9	SS	54	--	FINE SAND, TRACE MEDIUM AND COARSE SAND - BROWN (10YR 5/3) - WET	SW	3	
29								
30	10	SS	--	--			*4	
31								
32	11	SS	--	--			--	
33					BOREHOLE TERMINATED AT 33.0 FEET			
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								

NOTE: THE STRATIFICATION LINES ARE APPROXIMATE BOUNDARIES. ACTUAL TRANSITION MAY BE GRADUAL.

191 W. Edgerton Ave
Milwaukee, WI 53207
(414)933-7444

Report On: Proctor

Lab No: 20-06843
Report No: 20-06843
Page 1 of 1

Project No: 20072-40 **Cust No:** 0111

Client: Musson Brothers, Inc.
Bob Draths
1522 Pearl St.
Waukesha, WI 53186

Project: Sunnyslope Dr. Storm Sewer, Sanitary Sewer and Water Main.

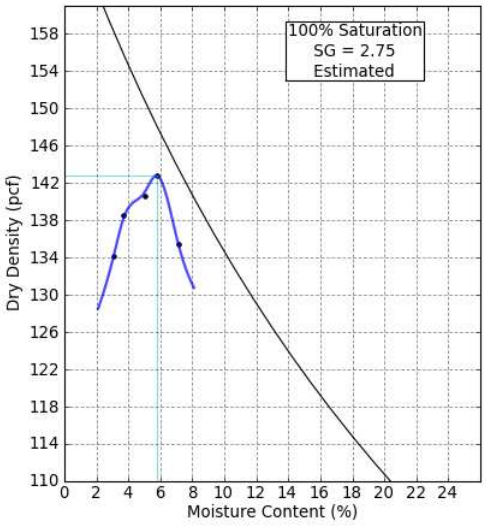
Engineer: Ruekert Mielke

Location: Fill Site

Material: Trench Spoils

Report Date: 08/11/2020

Sample Date: 08/11/2020
Sampled By: Max Piehl



% Moisture		Dry Density Lbs./Cu.Ft.	
3.1		134.1	
3.7		138.6	
5.0		140.6	
5.8		142.8	
7.1		135.5	
5.8	Optimum	142.8	Maximum

Color: Brown
Description: sandy gravel

Desc of Rammer:Mechanical
Preparation Method:Dry
Oversized Material:

Test Method (As Applicable):AASHTO T-180, AASHTO T-99, ASTM D-1557, ASTM D-1559, ASTM D-2041, ASTM D-558, ASTM D-698 Method-C

Orig: Musson Brothers, Inc. Attn: Bob Draths
(1-ec copy)
1-ec Ruekert Mielke Attn: Peter Gesch
1-cc Laboratory

Respectfully Submitted,

Andrew Davis, Project Manager

THIS REPORT APPLIES ONLY TO THE STANDARDS OR PROCEDURES INDICATED AND TO THE SAMPLE(S) TESTED AND/OR OBSERVED AND ARE NOT NECESSARILY INDICATIVE OF THE QUALITIES OF APPARENTLY IDENTICAL OR SIMILAR PRODUCTS OR PROCEDURES, NOR DO THEY REPRESENT AN ONGOING QUALITY ASSURANCE PROGRAM UNLESS SO NOTED. THESE REPORTS ARE FOR THE EXCLUSIVE USE OF THE ADDRESSED CLIENT AND ARE NOT TO BE REPRODUCED WITHOUT WRITTEN PERMISSION.
REPORT CREATED BY ElmTree SYSTEM

GESTRA Engineering, Inc.
191 W. Edgerton Avenue
Milwaukee, WI 53207
Phone 414-933-7444
Fax 414-933-7844

FIELD DENSITY REPORT

General Information

Project Name:	Sunnyslope Drive	Report to:	City of Hartland	Page:	1 of 1
Project Number:	20072-40	Contractor:	Musson Brothers	Date:	8/4/2020
Project Location:	Hartland, WI	Technician:	Max Piehl	Total hrs on Job:	1.3
Proctor Type:	Modified ASTM D1557	Time Arrive:	11:45 AM	Travel Time:	1.2
Req.Compaction:	95%	Time Depart:	1:05 PM	Milage (R/T):	64

Test Locations:

Test #	General Test Area	Reference	Distance from Ref (ft) N/S	Distance from Ref (ft) E/W	Elevation (ft)	Rod Depth (in)
1	Fill Site	SW Corner of Site				6
2	Fill Site	NE Corner of Site				6
3	Fill Site	E Side of Site				6

Test Results:

Test #	Proctor Number	Field Moisture (%)	Moisture Difference (%)	Wet Density (lb/ft³)	Dry Density (lb/ft³)	Compaction (%)	Pass / Fail	Retest Number
1	1	8.1	2.3	150.9	139.5	98%	Pass	
2	1	8.8	3.0	148.0	136.0	95%	Pass	
3	1	6.7	0.9	144.2	135.1	95%	Pass	

Nuclear Gauge & Proctor Information

Brand:	CPN	Serial Number:	8972	Standard Density Count:	
Model:	MC1DRP	Test Mode:	Direct	Standard Moisture Count:	

Proctor #	Soil Description	Max Dry Density (lb/ft³)	Gravel Content (%)	Optimum Moisture (%)
1	Spoils from Sunnyslope Dr.	142.8		5.8

Remarks:

SG = Subgrade

Reviewed by: A. Davis

TEST PIT 1
EXISTING GRADE = 1018.14
DEPTH = 6.42

TEST PIT 2
EXISTING GRADE = 1021.64
DEPTH = 5.58'

TEST PIT 3
EXISTING GRADE = 986.11
DEPTH = 5.61'

TEST PIT 4
EXISTING GRADE = 984.49
DEPTH = 11.25'

TEST PIT 5
EXISTING GRADE = 976.05
DEPTH = 9.14'

CONC. EDGE
METAL SHED
SHED
BUILDING (NO ROOF)
CONCRETE
GRAVEL PATH
BROKEN CONCRETE
CONC.
GRASS
BRICK
CONC. EDGE
GRAVEL PATH
SHED
GRAVEL PATH
CONCRETE
GRASS
CONC. DRIVE
ACCESS
CONC. CURB
CONC. CURB
CONC. WALK
CAPITOL DR.
LEGAL DESCRIPTION OVERLAP

S57°40'W 224.81'
S57°40'W 164.42'
S76°16'16"W 221.86'
S81°51'59"E 111.40'
S80°26'40"W 124.30'
S63°11'08"W 362.
S75°56'15"W 402.9'
S87°18'34"W 281.89'

SCALE IN FEET
0 40' 80'

PRELIMINARY NOT FOR CONSTRUCTION

DIGGERS HOTLINE
Toll Free (800) 242-8511
Milwaukee Area (414) 259-1181
Hearing Impaired TDD (800) 542-2289
www.DiggersHotline.com

NO	REVISION DESCRIPTION	DATE

Payne+Dolan
A WALBEC COMPANY
www.walbecgroup.com
(920) 757-7559

PROJECT
Hartland Apartments
700 W. Capitol Drive
Hartland, WI

CLIENT
Three Leaf Partners
504 W. Juneau Ave.
Milwaukee, WI 53203

SHEET TITLE
Soil Testing 1 of 2

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Drawing Scale: 1 : 40
Drawn:
Checked:
P&D Project No: 490683
Sheet No.

Apr 28, 2023 – 1:50pm
S:\Design & Construction Services\080-C30\Wandel Group\Hartland Apartments\10 – SURVEY\Hartland Boring Locations Exhibit.dwg

Apr 28, 2023 – 1:50pm
S:\Design & Construction Services\080-C30\Mandel Group\Hartland Apartments\10 – SURVEY\Hartland Boring Locations Exhibit.dwg

NO	REVISION DESCRIPTION	DATE

Payne+Dolan
A WALBEC COMPANY
www.walbecgroup.com
(920) 757-7559

PROJECT
Hartland Apartments
700 W Capitol Drive
Village of Hartland, WI

CLIENT
Three Leaf Partners
504 W Juneau Ave
Milwaukee, WI 53203

Seal

SHEET TITLE
Soil Testing 2 of 2

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Drawing Scale: 1 : 40

Drawn:

Checked:

P&D Project No: 490686

Sheet No.

Appendix C

Laboratory Reports

- Modified Proctor (D1557) & Grain Size Analysis (D6913)
  - TP-1/TP-2 - composite
  - TP-3
  - TP-5
  - B6/B7 - composite (Grain Size Analysis below)
- Grain Size Analysis (D6913)
  - TP-6
  - TP-9
  - B1
  - B2 (including Atterberg Limits (D4318)
  - B3
  - B4
  - B5
  - B6
  - B7
  - B8
  - B9
  - B10
  - B11
  - B12
  - B13
  - B14
  - B15
  - B16
  - B17
  - B18
  - B19
- General Notes
- USCS Description

Material Test Report

Report #: CSPL-000001-00

West Allis
2135 S. 116th Street
West Allis, WI 53227
Phone: 888-436-8378
Fax: 414-321-8359

Client:

Three Leaf Partners
504 W Juneau Avenue
Milwaukee, WI 53203

Project:

7708
Hartland Quarry Apartments
700/701 Capitol Drive
Hartland, WI

Sample Information

Sample Date:	04/17/2023
Sample No:	7157
Source:	Jobsite
Supplier:	Client
Sampled By:	Michael Frede
Sample From:	Test Pit
Sampling Method:	Not Provided
Field ID:	TP-1 + TP-2 Combined
Application:	Test Pit
Visual Description:	Light Brown Silty Sand with few Gravel
Specification:	

Sieve Analysis Data

ASTM C136/C117

Sieve Size	% Passing	Upper/Lower Limits
2 in (50 mm)	100.0	
1-1/2 in (37.5 mm)	100.0	
1-1/4 in (31.75 mm)	93.7	
1 in (25 mm)	91.7	
3/4 in (19 mm)	86.4	
1/2 in (12.5 mm)	79.5	
3/8 in (9.5 mm)	75.3	
No 4 (4.75 mm)	67.2	
No 10 (2 mm)	60.9	
No 20 (850 µm)	55.5	
No 40 (425 µm)	47.5	
No 60 (250 µm)	38.1	
No 100 (150 µm)	30.1	
No 140 (106 µm)	26.3	
No 200 (75 µm)	23.6	

Test Completed Date: 04/21/2023

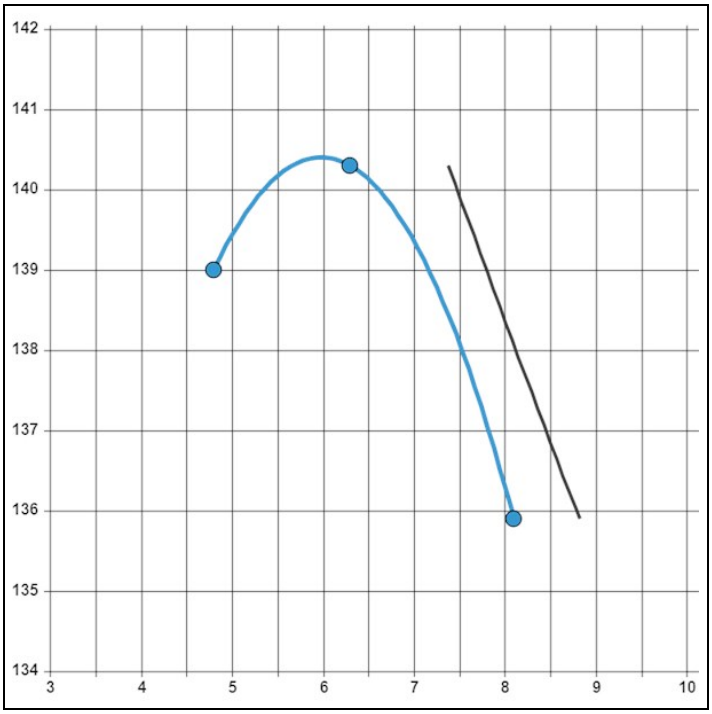
Test Completed By: Abdel Deif

Laboratory Compaction Data (Proctor)

ASTM D1557

Maximum Dry Density (lb/ft³): **140.4**

Optimum Moisture (%): **6.0**



Compaction Method:	B (ASTM D1557)
Type of Rammer:	Manual
Est. Specific Gravity:	2.70
Oversize Correction Needed:	Yes

Plasticity Details

ASTM D4318

Liquid Limit (LL): **Plastic Limit (PL):**

Plasticity Index (PI):

Imtiaz Ahmed, Laboratory Manager
Apr 27, 2023

Material Test Report

Report #: CSPL-000002-00

West Allis
2135 S. 116th Street
West Allis, WI 53227
Phone: 888-436-8378
Fax: 414-321-8359

Client:

Three Leaf Partners
504 W Juneau Avenue
Milwaukee, WI 53203

Project:

7708
Hartland Quarry Apartments
700/701 Capitol Drive
Hartland, WI

Sample Information

Sample Date:	04/17/2023
Sample No:	7158
Source:	Jobsite
Supplier:	Client
Sampled By:	Michael Frede
Sample From:	Test Pit
Sampling Method:	Not Provided
Field ID:	TP-3
Application:	Test Pit
Visual Description:	Brown Sand and Gravel, trace Silt
Specification:	

Sieve Analysis Data

ASTM C136/C117

Sieve Size	% Passing	Upper/Lower Limits
2 in (50 mm)	100.0	
1-1/2 in (37.5 mm)	100.0	
1-1/4 in (31.75 mm)	93.4	
1 in (25 mm)	90.7	
3/4 in (19 mm)	84.0	
1/2 in (12.5 mm)	75.2	
3/8 in (9.5 mm)	69.6	
No 4 (4.75 mm)	57.0	
No 10 (2 mm)	47.6	
No 20 (850 µm)	40.3	
No 40 (425 µm)	32.0	
No 60 (250 µm)	23.0	
No 100 (150 µm)	17.3	
No 140 (106 µm)	14.9	
No 200 (75 µm)	12.6	

Test Completed Date: 04/25/2023

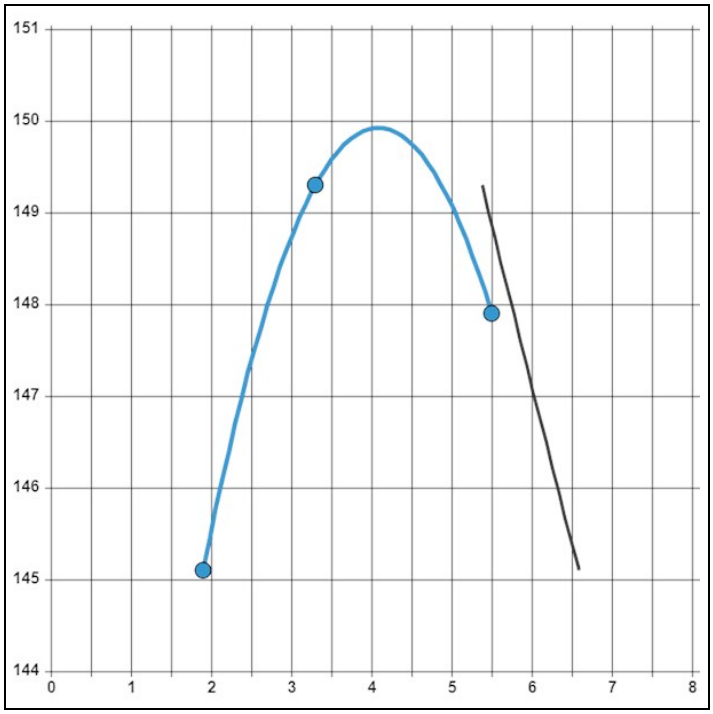
Test Completed By: Abdel Deif

Laboratory Compaction Data (Proctor)

ASTM D1557

Maximum Dry Density (lb/ft³): **150.0**

Optimum Moisture (%): **4.1**



Compaction Method:	C (ASTM D1557)
Type of Rammer:	Manual
Est. Specific Gravity:	2.75
Oversize Correction Needed:	Yes

Plasticity Details

ASTM D4318

Liquid Limit (LL): **Plastic Limit (PL):**

Plasticity Index (PI):

Imtiaz Ahmed, Laboratory Manager
Apr 27, 2023

Material Test Report

Report #: CSPL-000003-00

West Allis
2135 S. 116th Street
West Allis, WI 53227
Phone: 888-436-8378
Fax: 414-321-8359

Client:

Three Leaf Partners
504 W Juneau Avenue
Milwaukee, WI 53203

Project:

7708
Hartland Quarry Apartments
700/701 Capitol Drive
Hartland, WI

Sample Information

Sample Date:	04/17/2023
Sample No:	7159
Source:	Jobsite
Supplier:	Client
Sampled By:	Michael Frede
Sample From:	Test Pit
Sampling Method:	Not Provided
Field ID:	TP-5
Application:	Test Pit
Visual Description:	Brown Silty Sand with few Gravel
Specification:	

Sieve Analysis Data

ASTM C136/C117

Sieve Size	% Passing	Upper/Lower Limits
2 in (50 mm)	100.0	
1-1/2 in (37.5 mm)	100.0	
1-1/4 in (31.75 mm)	97.6	
1 in (25 mm)	95.1	
3/4 in (19 mm)	92.8	
1/2 in (12.5 mm)	88.6	
3/8 in (9.5 mm)	85.6	
No 4 (4.75 mm)	79.3	
No 10 (2 mm)	73.6	
No 20 (850 µm)	68.2	
No 40 (425 µm)	60.0	
No 60 (250 µm)	43.6	
No 100 (150 µm)	24.4	
No 140 (106 µm)	17.0	
No 200 (75 µm)	12.4	

Test Completed Date: 04/24/2023

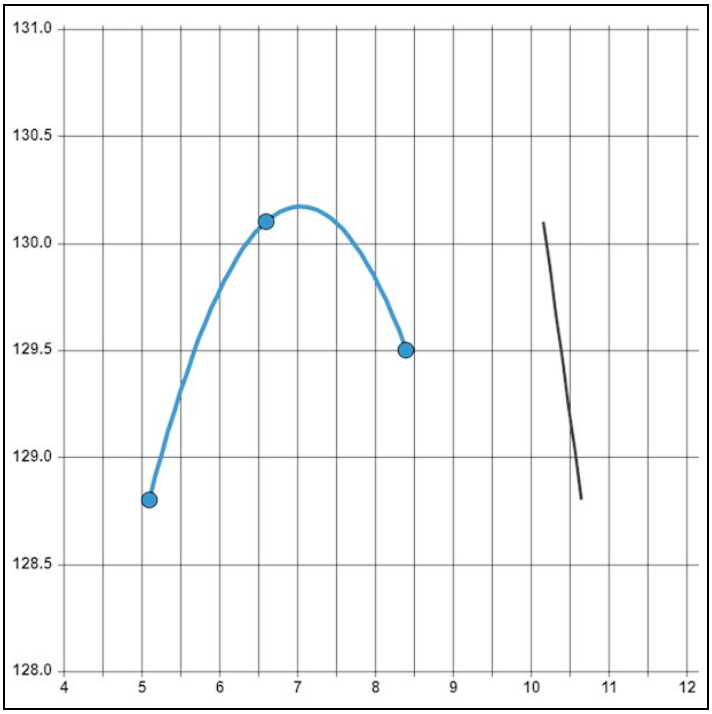
Test Completed By: Abdel Deif

Laboratory Compaction Data (Proctor)

ASTM D1557

Maximum Dry Density (lb/ft³): **130.2**

Optimum Moisture (%): **7.1**



Compaction Method:	A (ASTM D1557)
Type of Rammer:	Manual
Est. Specific Gravity:	2.65
Oversize Correction Needed:	Yes

Plasticity Details

ASTM D4318

Liquid Limit (LL): **Plastic Limit (PL):**

Plasticity Index (PI):

Imtiaz Ahmed, Laboratory Manager
Apr 27, 2023

Laboratory Compaction Report

ASTMD1557/AASHTOT180

Report #: LCR-000001-00

West Allis
2135 S. 116th Street
West Allis, WI 53227
Phone: 888-436-8378
Fax: 414-321-8359

Client:

Three Leaf Partners
504 W Juneau Avenue
Milwaukee, WI 53203

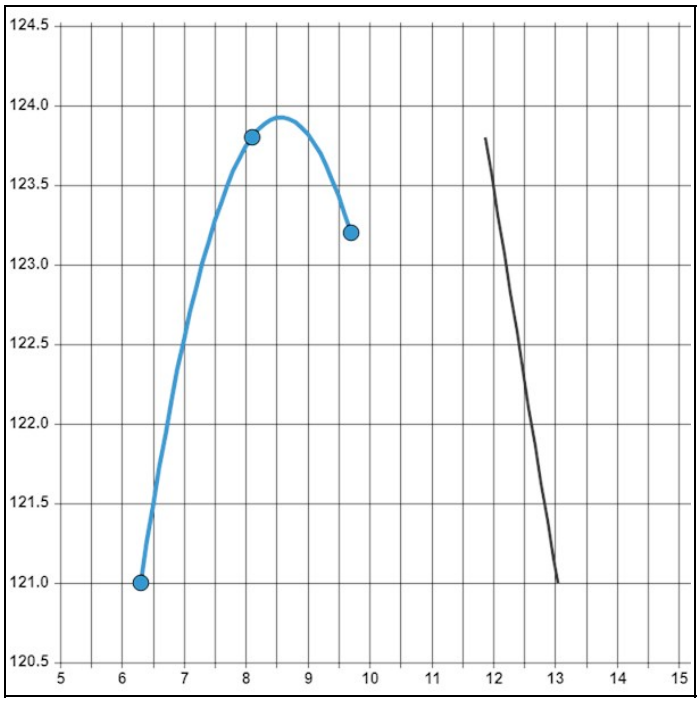
Project:

7708
Hartland Quarry Apartments
700/701 Capitol Drive
Hartland, WI

Sample Information

Sample Date:	04/18/2023	**Sample Number:**	7190
Sample From:	Test Pit	**Field ID:**	Bluff 6 + 7 Combined
Sample Location :	Onsite	**Sampled By:**	Michael Frede

Test Results



Sample Photo

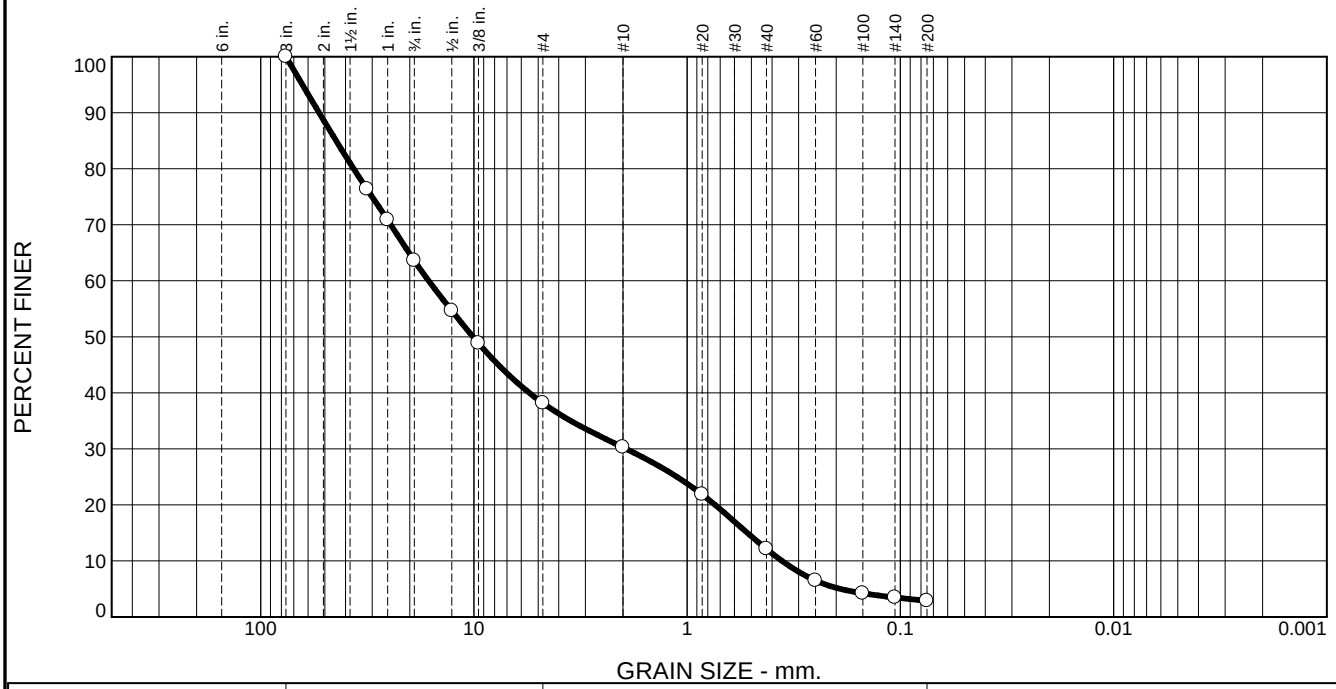
Oversize Correction Needed:	Yes
Maximum Dry Density (lb/ft³):	**123.9**
Optimum Moisture (%):	**8.5**

Visual Description:	Dark Brown Silty Clay with Organic
Compaction Method Used:	A (ASTM D1557)
Type of Rammer Used:	Manual
Sp. Gravity (Est):	2.60

Test Date:	04/25/2023	**Lab Technician:**	Abdel Deif

Imtiaz Ahmed, Laboratory Manager
Apr 27, 2023

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	36.4	25.4	7.9	18.2	9.2	2.9	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	76.4		
1"	70.9		
3/4"	63.6		
1/2"	54.7		
3/8"	48.9		
#4	38.2		
#10	30.3		
#20	21.9		
#40	12.1		
#60	6.5		
#100	4.2		
#140	3.5		
#200	2.9		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 53.2485 D_{85}= 44.3097 D_{60}= 16.3112
D_{50}= 10.1019 D_{30}= 1.9347 D_{15}= 0.5218
D_{10}= 0.3589 C_u= 45.45 C_c= 0.64

Remarks

F.M.=5.82

Date Received: 4/17/23 **Date Tested:** 4/27/23

Tested By: Luke Emery

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: TP **Depth:** Onsite **Date Sampled:** 4/17/23

Sample Number: 6

GeoTest, Inc.

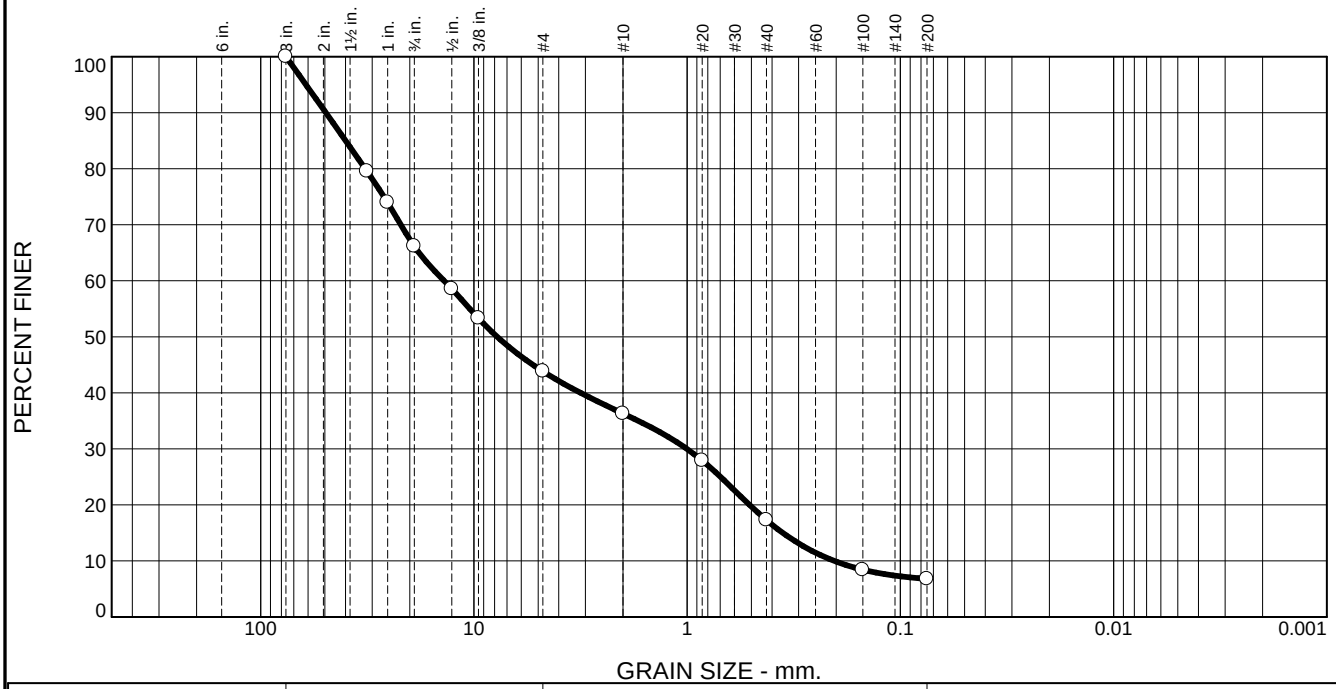
West Allis, WI

Client: Three Leaf Partners

Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7160-6836

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	33.8	22.4	7.5	19.0	10.5	6.8	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	79.5		
1"	74.0		
3/4"	66.2		
1/2"	58.6		
3/8"	53.3		
#4	43.8		
#10	36.3		
#20	27.9		
#40	17.3		
#100	8.4		
#200	6.8		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 49.4912 D_{85}= 39.9751 D_{60}= 13.8034
D_{50}= 7.7767 D_{30}= 1.0033 D_{15}= 0.3560
D_{10}= 0.2043 C_u= 67.57 C_c= 0.36

Remarks

F.M.=5.39

Date Received: 4/17/23 **Date Tested:** 4/27/23

Tested By: Luke Emery

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: TP **Depth:** Onsite **Date Sampled:** 4/17/23

Sample Number: 9

GeoTest, Inc.

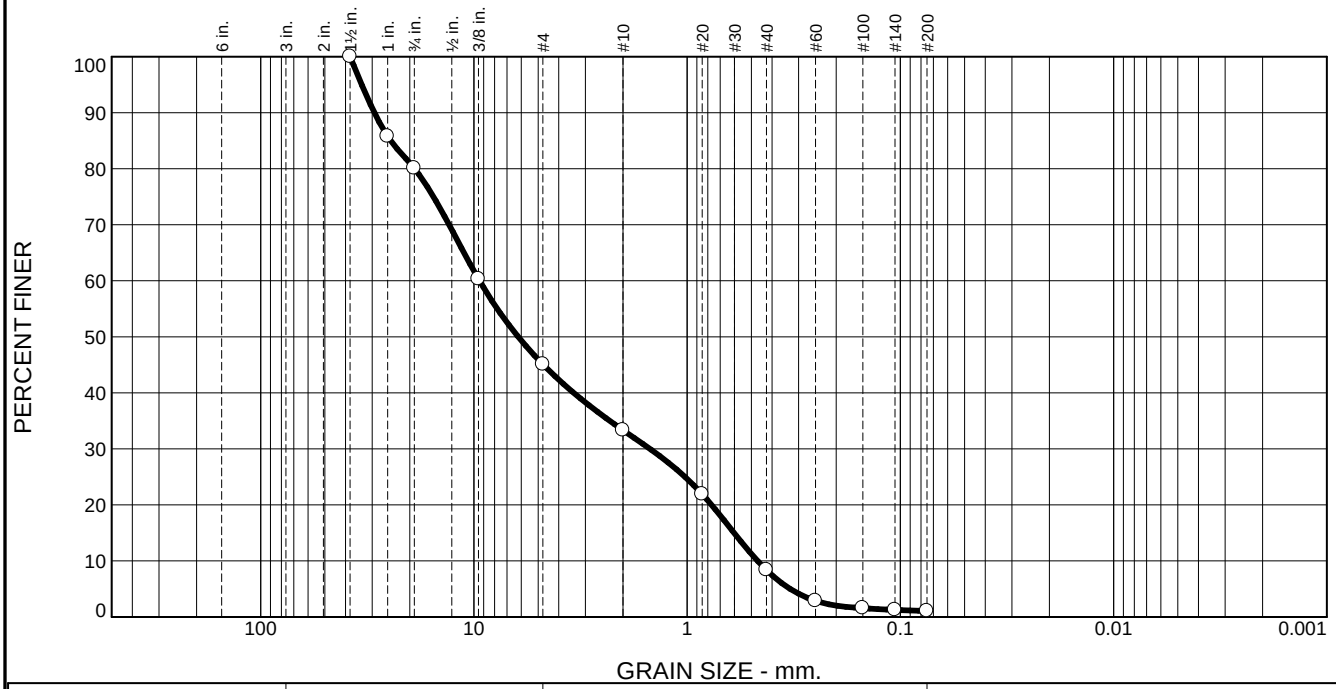
West Allis, WI

Client: Three Leaf Partners

Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7162-6838

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	19.9	35.0	11.8	24.9	7.3	1.1	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1-1/2"	100.0		
1"	85.8		
3/4"	80.1		
3/8"	60.3		
#4	45.1		
#10	33.3		
#20	21.9		
#40	8.4		
#60	2.9		
#100	1.6		
#140	1.3		
#200	1.1		

* (no specification provided)

Material Description

Brown f to c sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 29.3003 D_{85}= 24.5860 D_{60}= 9.4124
D_{50}= 6.1982 D_{30}= 1.4946 D_{15}= 0.6023
D_{10}= 0.4674 C_u= 20.14 C_c= 0.51

Remarks

F.M.=5.32

Date Received: 4/17/23 **Date Tested:** 4/19/23

Tested By: Hiten Soni

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/17/23

Sample Number: 1

GeoTest, Inc.

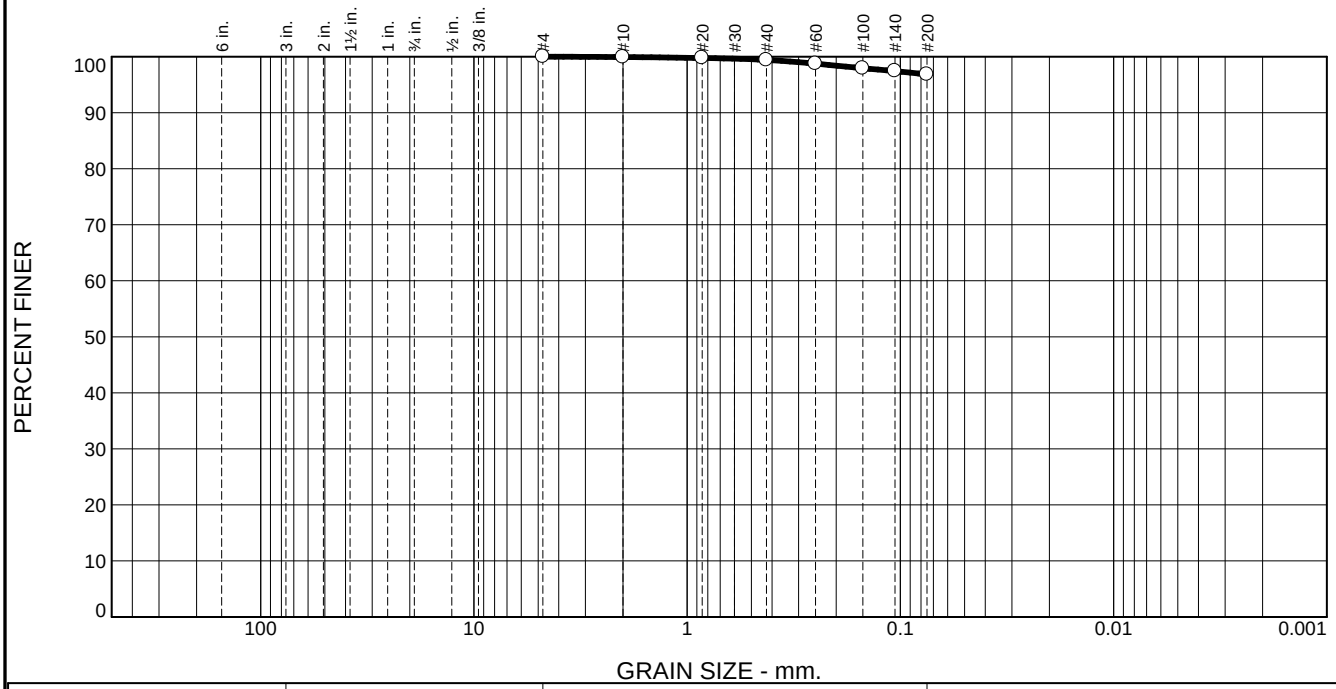
West Allis, WI

Client: Three Leaf Partners

Project: Hatland Quarry Apartments

Project No: 7708 **Test No**

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.5	2.6	96.8	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	99.8		
#40	99.4		
#60	98.8		
#100	97.9		
#140	97.4		
#200	96.8		

* (no specification provided)

Material Description

Brown lean clay

Atterberg Limits (ASTM D 4318)

PL= 22.5 **LL=** 34.7 **PI=** 12.2

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6(13)

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.04

Date Received: 4/17/23 **Date Tested:** 4/19/23

Tested By: Hiten Soni

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/17/23
Sample Number: 2

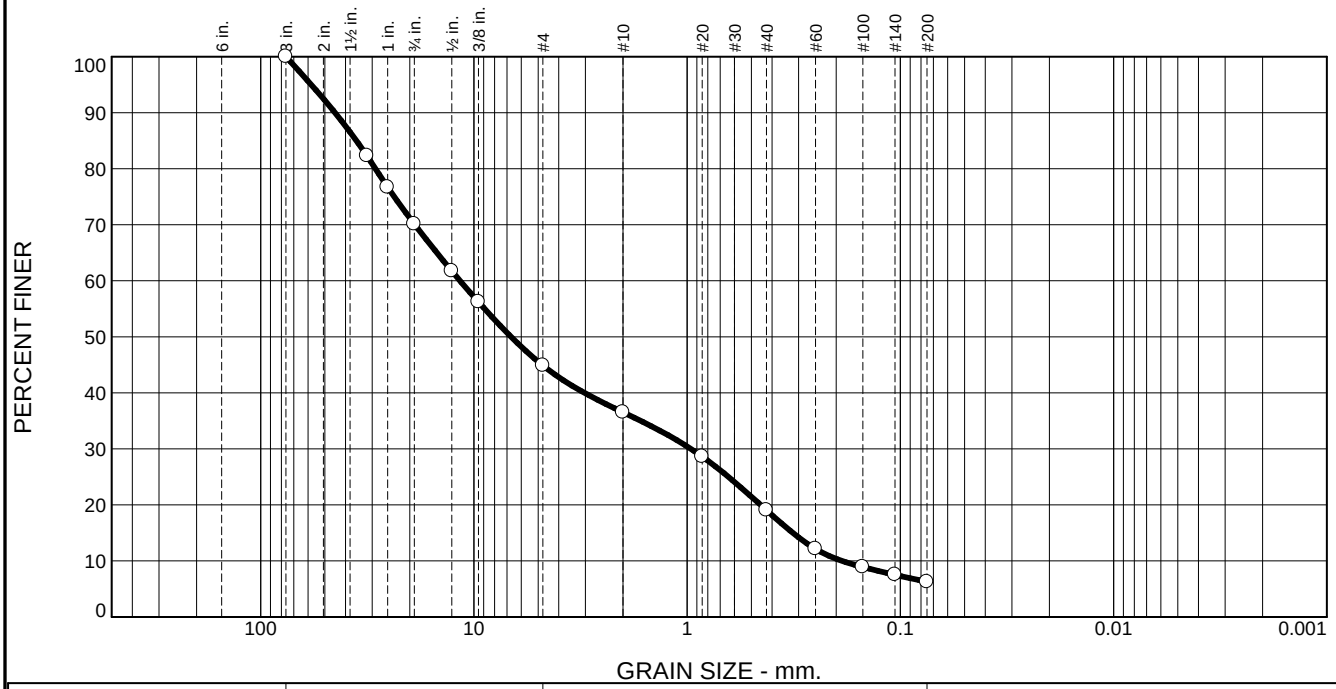
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7164-6840

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	29.9	25.2	8.4	17.4	12.8	6.3	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	82.3		
1"	76.7		
3/4"	70.1		
1/2"	61.7		
3/8"	56.2		
#4	44.9		
#10	36.5		
#20	28.6		
#40	19.1		
#60	12.1		
#100	8.9		
#140	7.5		
#200	6.3		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 44.8239 D_{85}= 35.5744 D_{60}= 11.6219
D_{50}= 6.6981 D_{30}= 0.9602 D_{15}= 0.3195
D_{10}= 0.1880 C_u= 61.82 C_c= 0.42

Remarks

F.M.=5.25

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 3

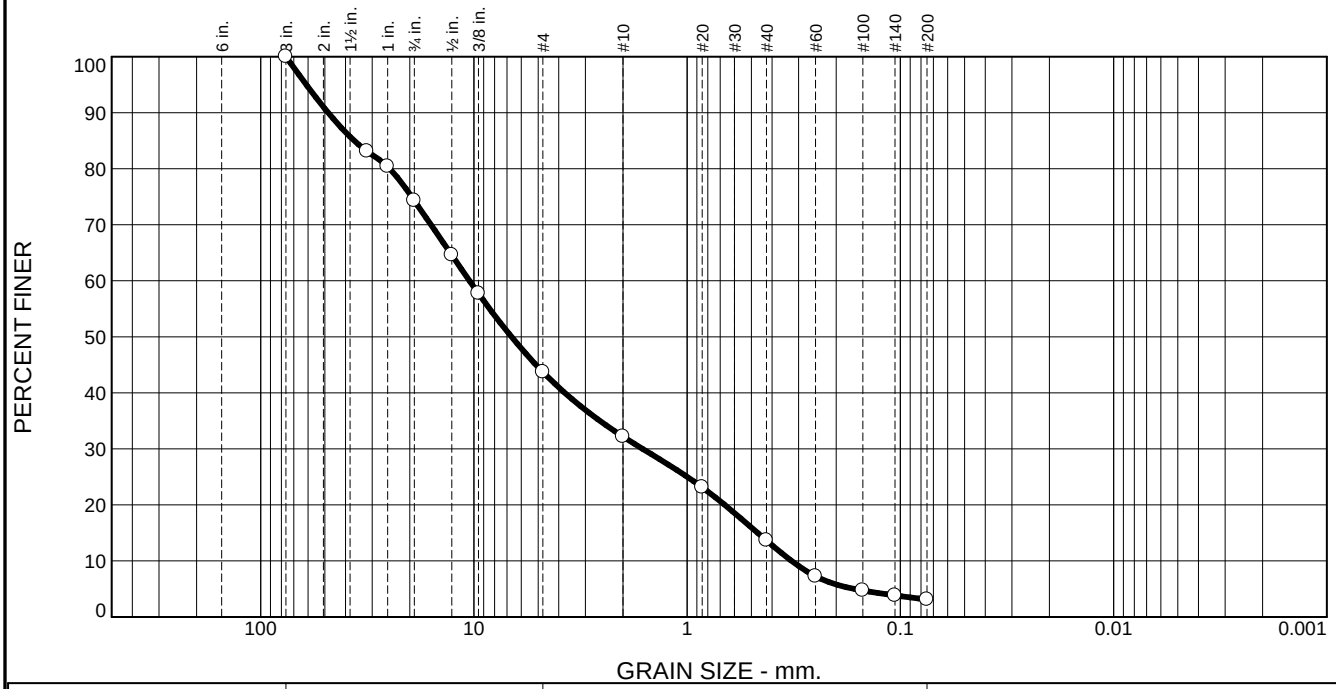
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7173-6848

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	25.7	30.6	11.5	18.5	10.6	3.1	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	83.1		
1"	80.4		
3/4"	74.3		
1/2"	64.6		
3/8"	57.7		
#4	43.7		
#10	32.2		
#20	23.1		
#40	13.7		
#60	7.3		
#100	4.7		
#140	3.8		
#200	3.1		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 48.2763 D_{85}= 36.4131 D_{60}= 10.4876
D_{50}= 6.6655 D_{30}= 1.6184 D_{15}= 0.4670
D_{10}= 0.3238 C_u= 32.39 C_c= 0.77

Remarks

F.M.=5.45

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 4

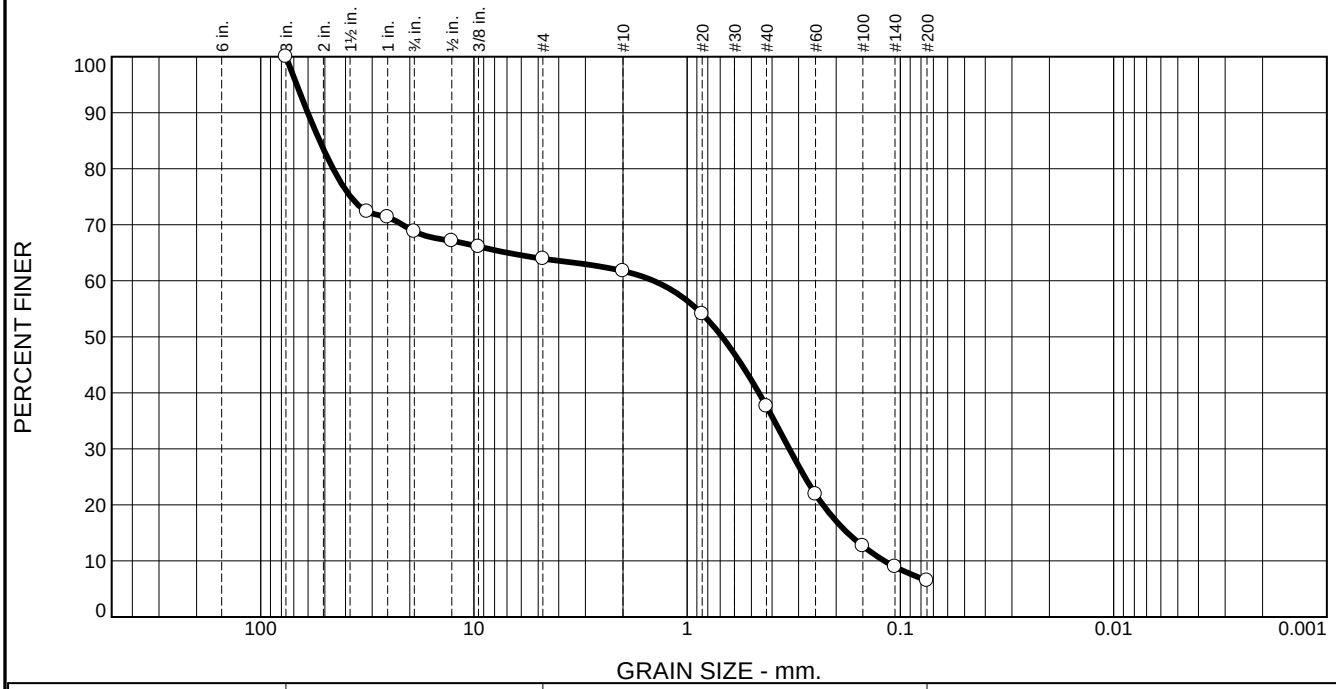
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7174-6849

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	31.2	4.9	2.2	24.1	31.1	6.5	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	72.3		
1"	71.3		
3/4"	68.8		
1/2"	67.1		
3/8"	66.1		
#4	63.9		
#10	61.7		
#20	54.1		
#40	37.6		
#60	21.9		
#100	12.7		
#140	8.9		
#200	6.5		

* (no specification provided)

Material Description

Dark Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 60.1653 D_{85}= 52.9287 D_{60}= 1.4365
D_{50}= 0.6859 D_{30}= 0.3320 D_{15}= 0.1768
D_{10}= 0.1188 C_u= 12.09 C_c= 0.65

Remarks

F.M.=4.19

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23

Sample Number: 5

GeoTest, Inc.

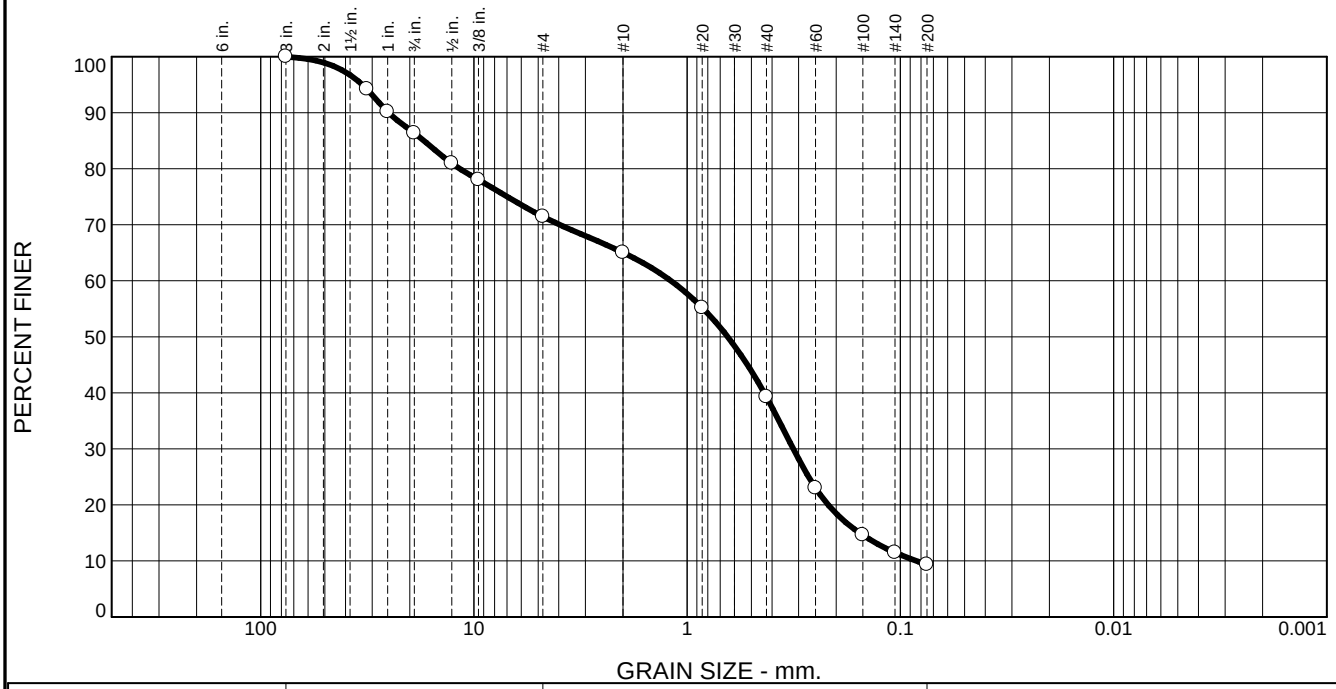
West Allis, WI

Client: Three Leaf Partners

Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7175-6850

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.6	14.9	6.5	25.7	30.0	9.3	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	94.2		
1"	90.2		
3/4"	86.4		
1/2"	81.0		
3/8"	78.0		
#4	71.5		
#10	65.0		
#20	55.2		
#40	39.3		
#60	23.0		
#100	14.6		
#140	11.5		
#200	9.3		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 25.1604 D_{85}= 17.1823 D_{60}= 1.1920
D_{50}= 0.6455 D_{30}= 0.3180 D_{15}= 0.1553
D_{10}= 0.0841 C_u= 14.17 C_c= 1.01

Remarks

F.M.=3.50

Date Received: 11/18/23 **Date Tested:** 4/27/23

Tested By: Luke Emery

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 11/18/23

Sample Number: 6

GeoTest, Inc.

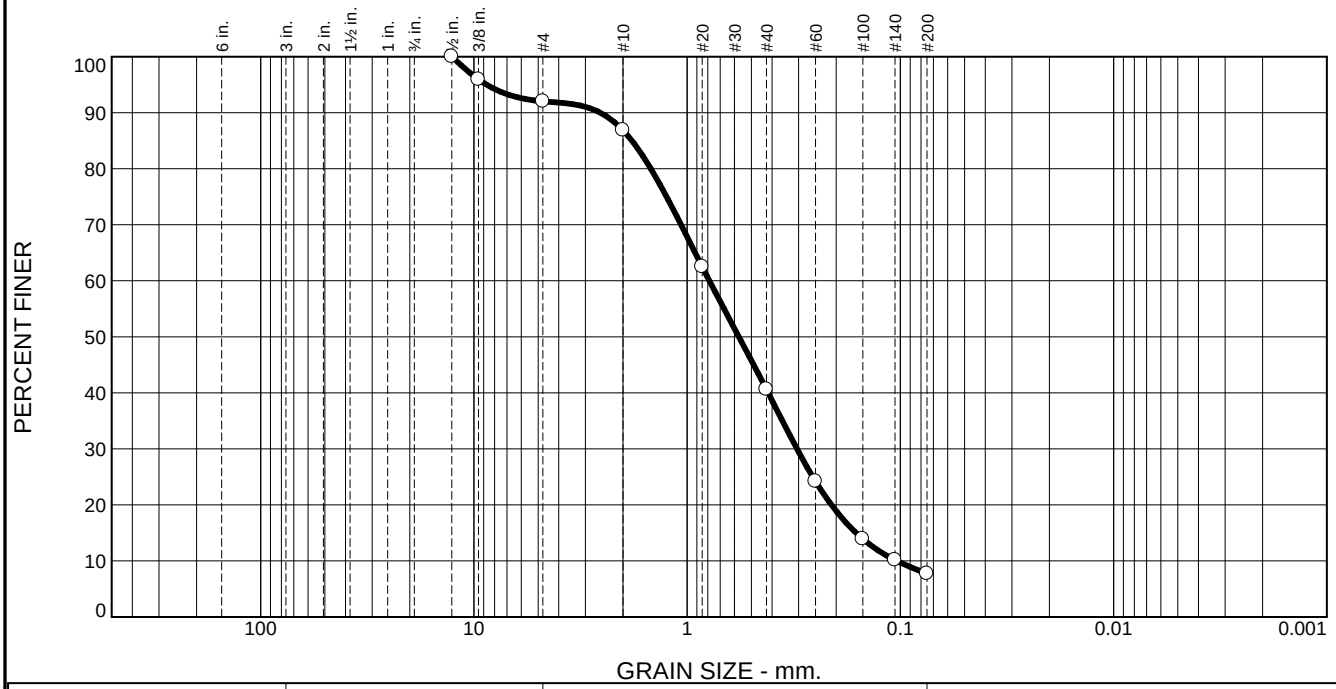
West Allis, WI

Client: Three Leaf Partners

Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7176-6851

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.0	5.1	46.3	32.9	7.7	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	95.9		
#4	92.0		
#10	86.9		
#20	62.5		
#40	40.6		
#60	24.2		
#100	13.9		
#140	10.2		
#200	7.7		

* (no specification provided)

Material Description

Brown f to c sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 2.5558 D_{85}= 1.8143 D_{60}= 0.7865
D_{50}= 0.5722 D_{30}= 0.3055 D_{15}= 0.1615
D_{10}= 0.1040 C_u= 7.56 C_c= 1.14

Remarks

F.M.=2.55

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Luke Emery

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23

Sample Number: 7

GeoTest, Inc.

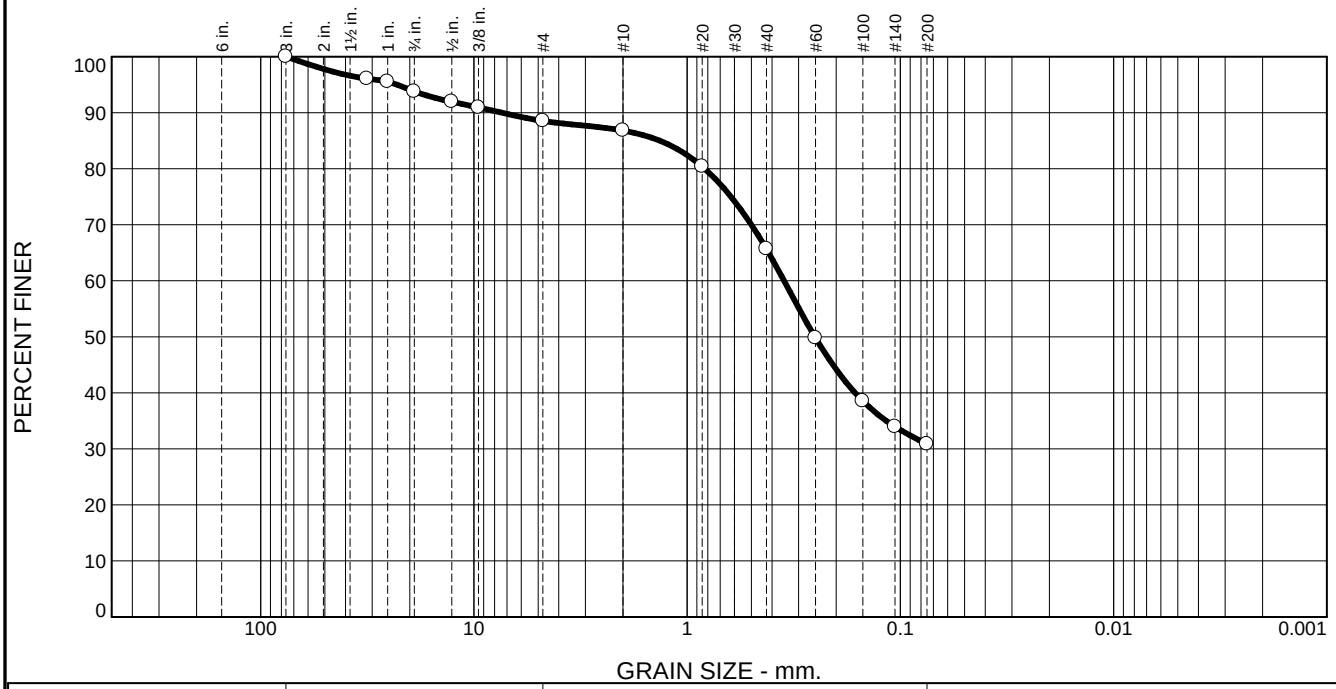
West Allis, WI

Client: Three Leaf Partners

Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7177-6852

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.2	5.3	1.7	21.1	34.8	30.9	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	96.1		
1"	95.5		
3/4"	93.8		
1/2"	92.0		
3/8"	90.9		
#4	88.5		
#10	86.8		
#20	80.4		
#40	65.7		
#60	49.8		
#100	38.5		
#140	34.0		
#200	30.9		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 7.4064 D_{85}= 1.3432 D_{60}= 0.3512
D_{50}= 0.2518 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.91

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 8

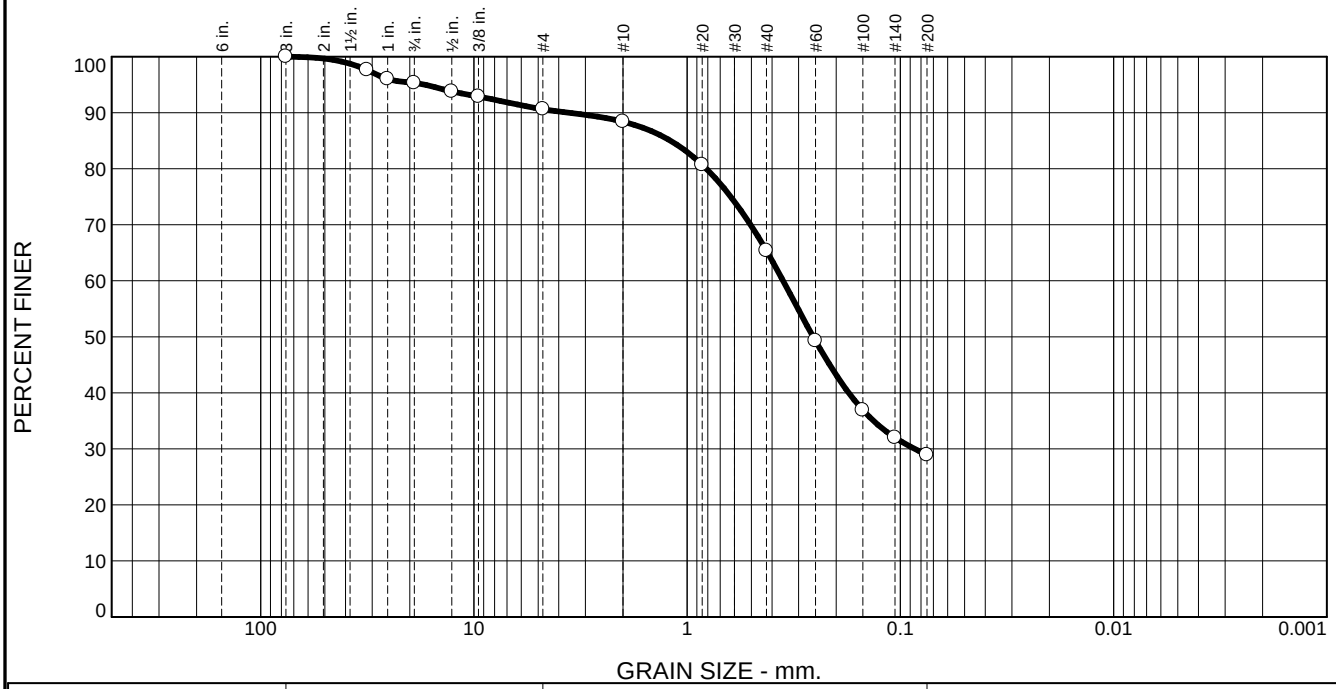
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7178-6853

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.7	4.7	2.2	23.0	36.5	28.9	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	97.6		
1"	96.0		
3/4"	95.3		
1/2"	93.8		
3/8"	92.9		
#4	90.6		
#10	88.4		
#20	80.7		
#40	65.4		
#60	49.3		
#100	36.9		
#140	32.0		
#200	28.9		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 3.6204 D_{85}= 1.1979 D_{60}= 0.3550
D_{50}= 0.2564 D_{30}= 0.0857 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.83

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 9

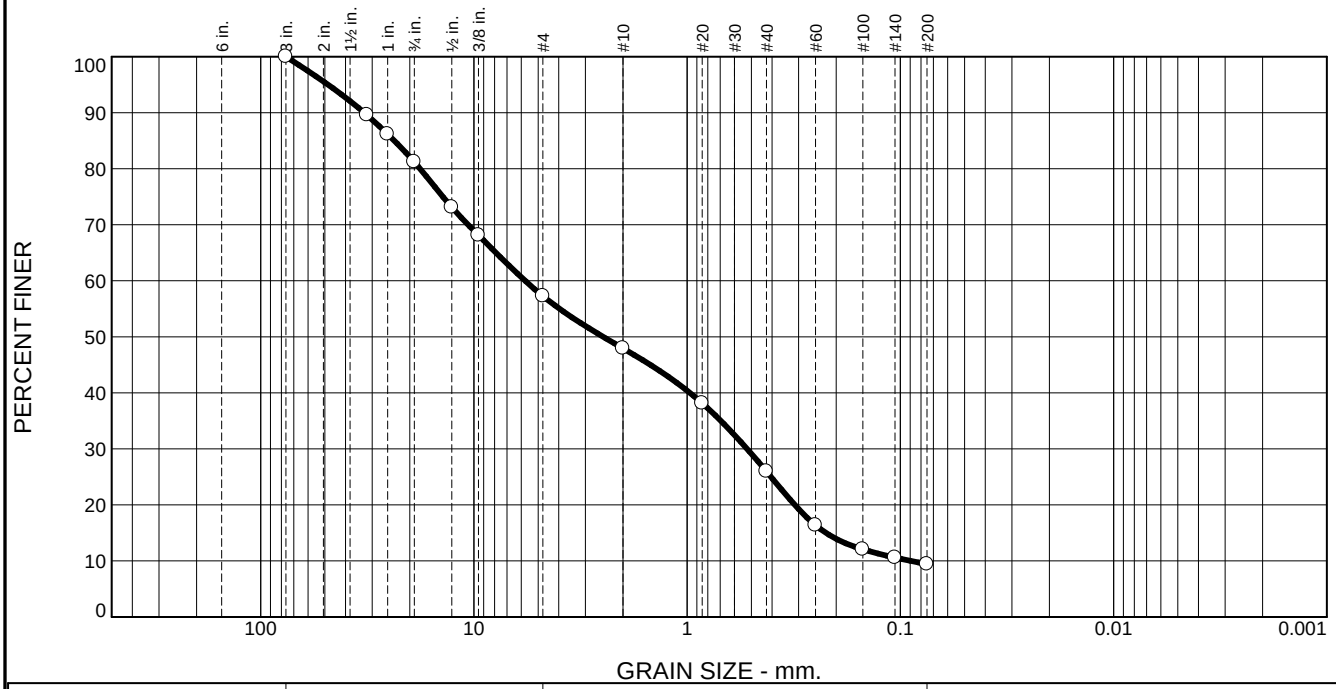
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7179-6854

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.8	23.9	9.4	21.9	16.6	9.4	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	89.6		
1"	86.2		
3/4"	81.2		
1/2"	73.1		
3/8"	68.1		
#4	57.3		
#10	47.9		
#20	38.2		
#40	26.0		
#60	16.4		
#100	12.1		
#140	10.6		
#200	9.4		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 32.6990 D_{85}= 23.6371 D_{60}= 5.7505
D_{50}= 2.4748 D_{30}= 0.5236 D_{15}= 0.2235
D_{10}= 0.0894 C_u= 64.32 C_c= 0.53

Remarks

F.M.=4.46

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23

Sample Number: 10

GeoTest, Inc.

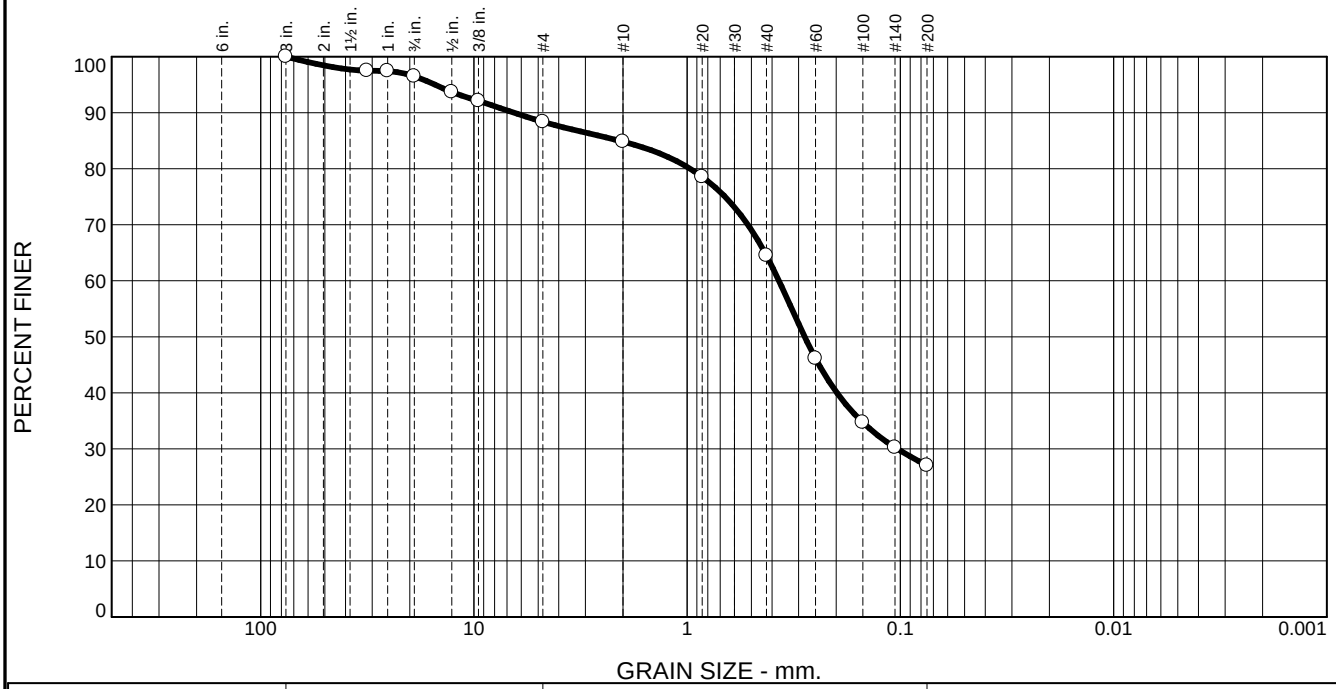
West Allis, WI

Client: Three Leaf Partners

Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7180-6855

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.5	8.1	3.6	20.3	37.5	27.0	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	97.5		
1"	97.4		
3/4"	96.5		
1/2"	93.7		
3/8"	92.1		
#4	88.4		
#10	84.8		
#20	78.5		
#40	64.5		
#60	46.1		
#100	34.7		
#140	30.3		
#200	27.0		

* (no specification provided)

Material Description

Brown sandy silt, little topsoil

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 6.4931 D_{85}= 2.0810 D_{60}= 0.3712
D_{50}= 0.2810 D_{30}= 0.1034 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.98

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 11

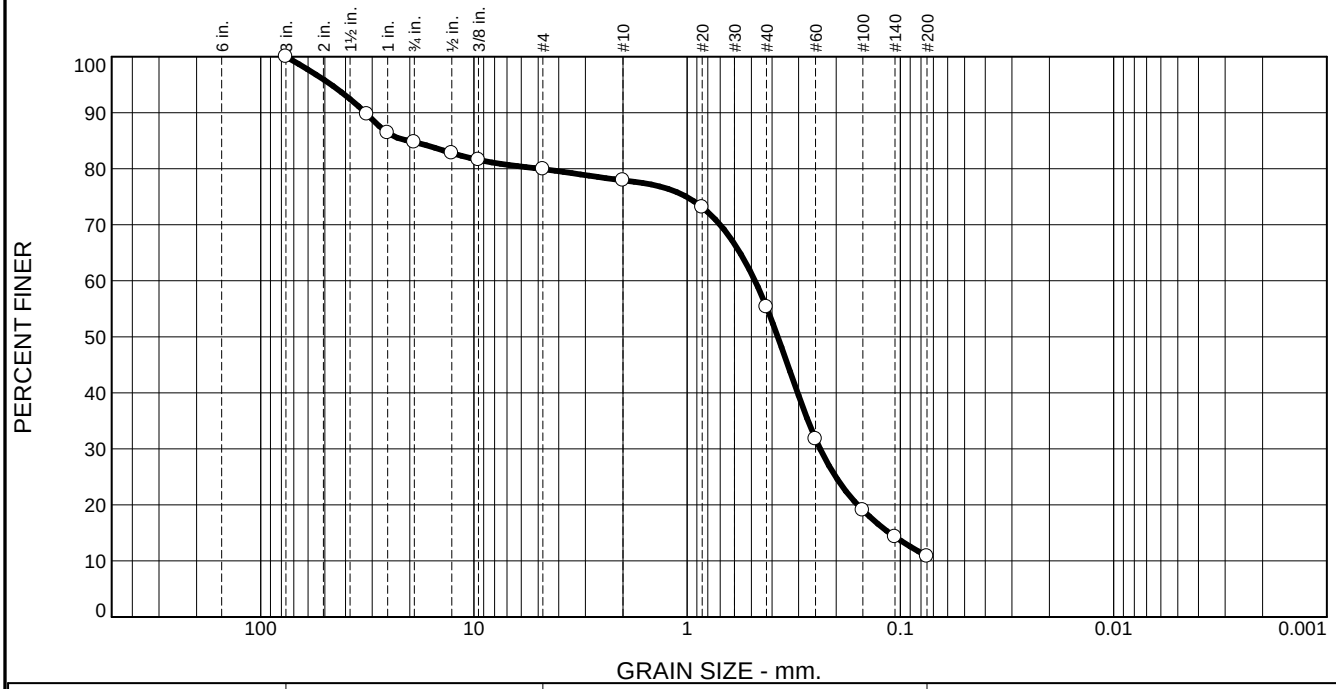
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7181-6856

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.3	4.8	2.0	22.6	44.5	10.8	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	89.7		
1"	86.4		
3/4"	84.7		
1/2"	82.8		
3/8"	81.6		
#4	79.9		
#10	77.9		
#20	73.1		
#40	55.3		
#60	31.8		
#100	19.1		
#140	14.3		
#200	10.8		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 32.2820 D_{85}= 20.4121 D_{60}= 0.4808
D_{50}= 0.3760 D_{30}= 0.2379 D_{15}= 0.1125
D_{10}= C_u= C_c=

Remarks

F.M.=2.82

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 12

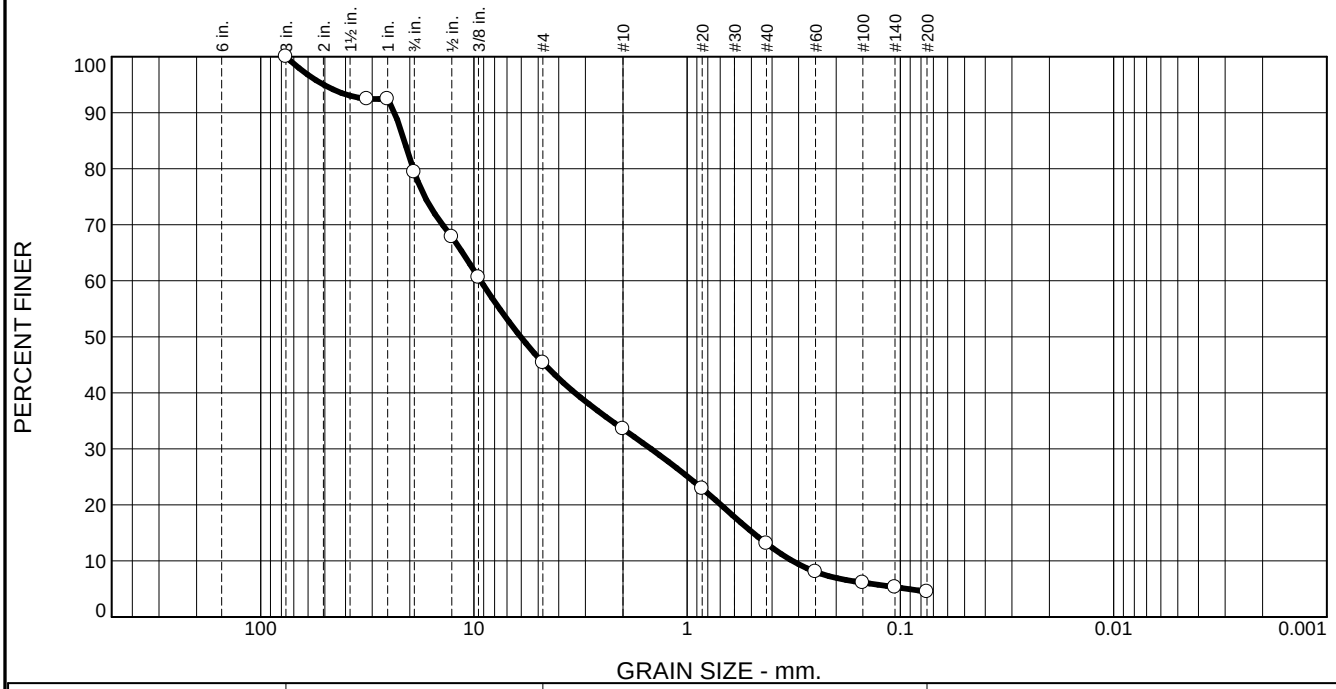
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7182-6857

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.6	34.0	11.8	20.5	8.6	4.5	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	92.5		
1"	92.5		
3/4"	79.4		
1/2"	67.8		
3/8"	60.6		
#4	45.4		
#10	33.6		
#20	22.9		
#40	13.1		
#60	8.0		
#100	6.1		
#140	5.3		
#200	4.5		

* (no specification provided)

Material Description

Brown sand and gravel, little topsoil

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 23.5441 D_{85}= 21.2405 D_{60}= 9.3029
D_{50}= 6.0393 D_{30}= 1.4790 D_{15}= 0.4908
D_{10}= 0.3207 C_u= 29.01 C_c= 0.73

Remarks

F.M.=5.25

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23

Sample Number: 13

GeoTest, Inc.

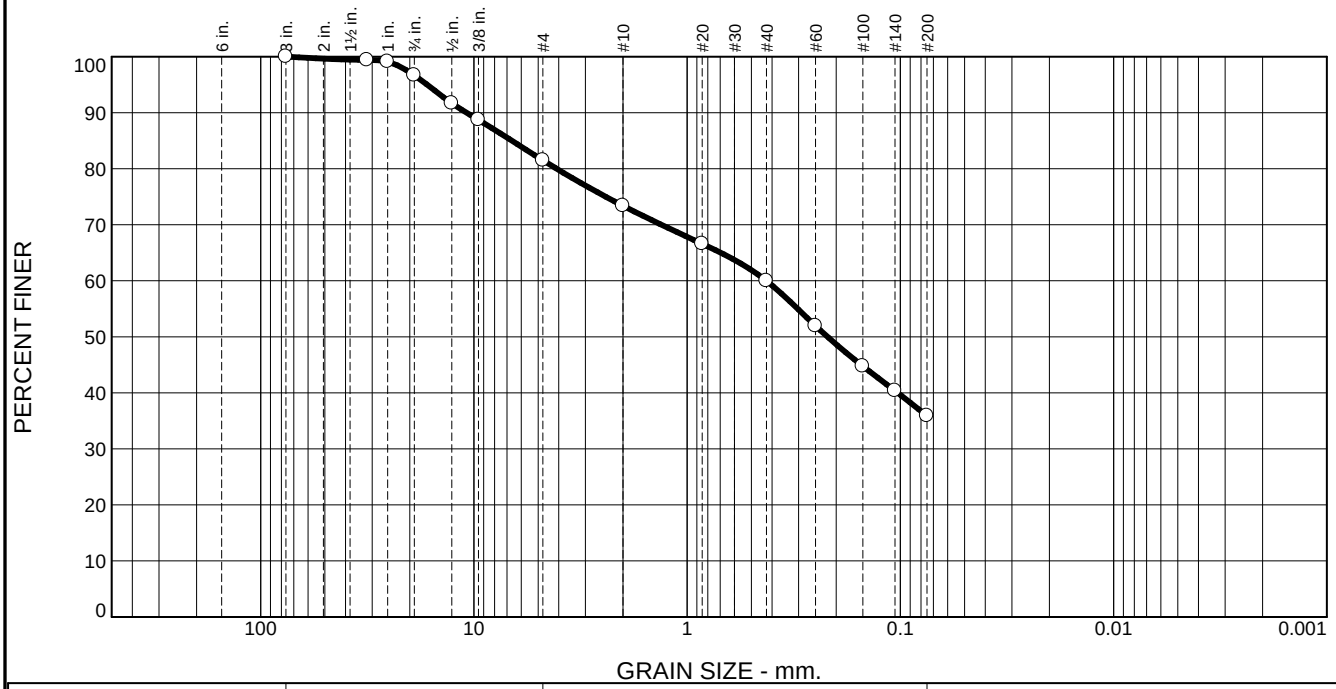
West Allis, WI

Client: Three Leaf Partners

Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7183-6858

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.3	15.2	8.1	13.4	24.1	35.9	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	99.4		
1"	99.1		
3/4"	96.7		
1/2"	91.7		
3/8"	88.7		
#4	81.5		
#10	73.4		
#20	66.6		
#40	60.0		
#60	52.0		
#100	44.8		
#140	40.4		
#200	35.9		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 10.8312 D_{85}= 6.6383 D_{60}= 0.4254
D_{50}= 0.2195 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=2.26

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 14

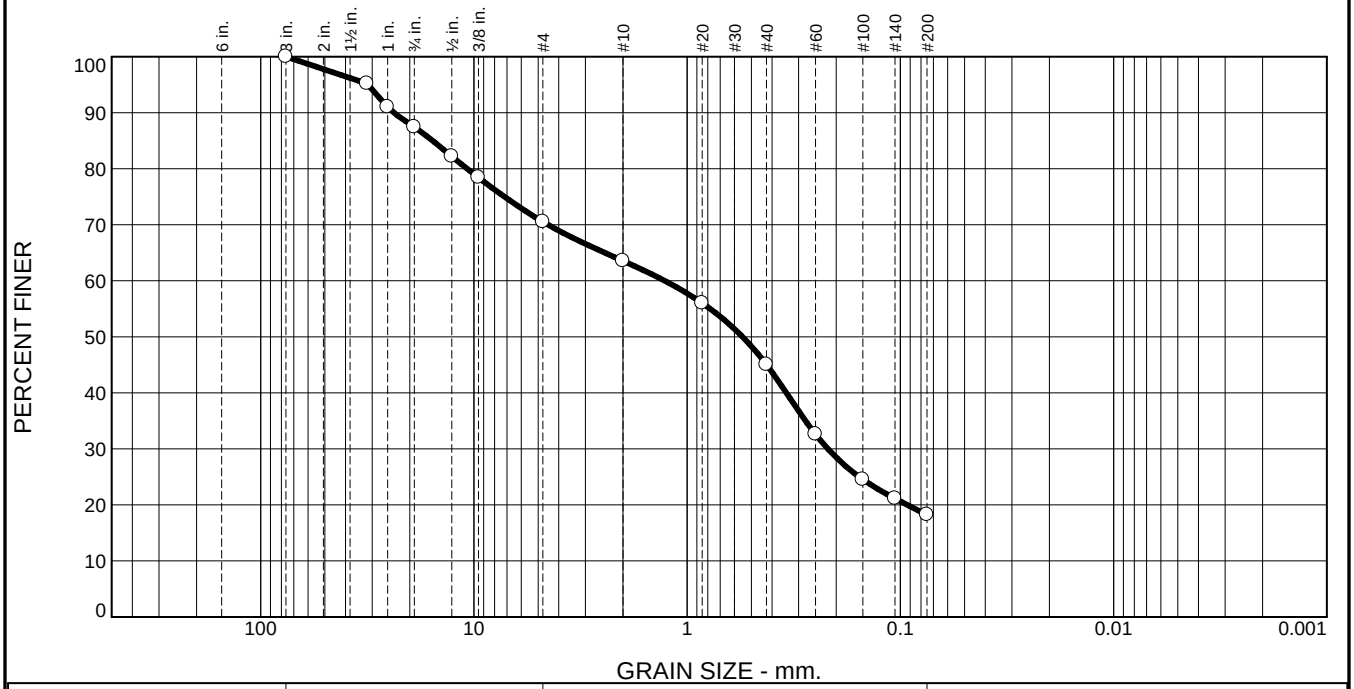
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7184-6859

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.6	16.9	6.9	18.5	26.9	18.2	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	95.2		
1"	91.0		
3/4"	87.4		
1/2"	82.2		
3/8"	78.4		
#4	70.5		
#10	63.6		
#20	56.0		
#40	45.1		
#60	32.6		
#100	24.5		
#140	21.1		
#200	18.2		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 23.7282 D_{85}= 15.6351 D_{60}= 1.2733
D_{50}= 0.5496 D_{30}= 0.2188 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=3.31

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 15

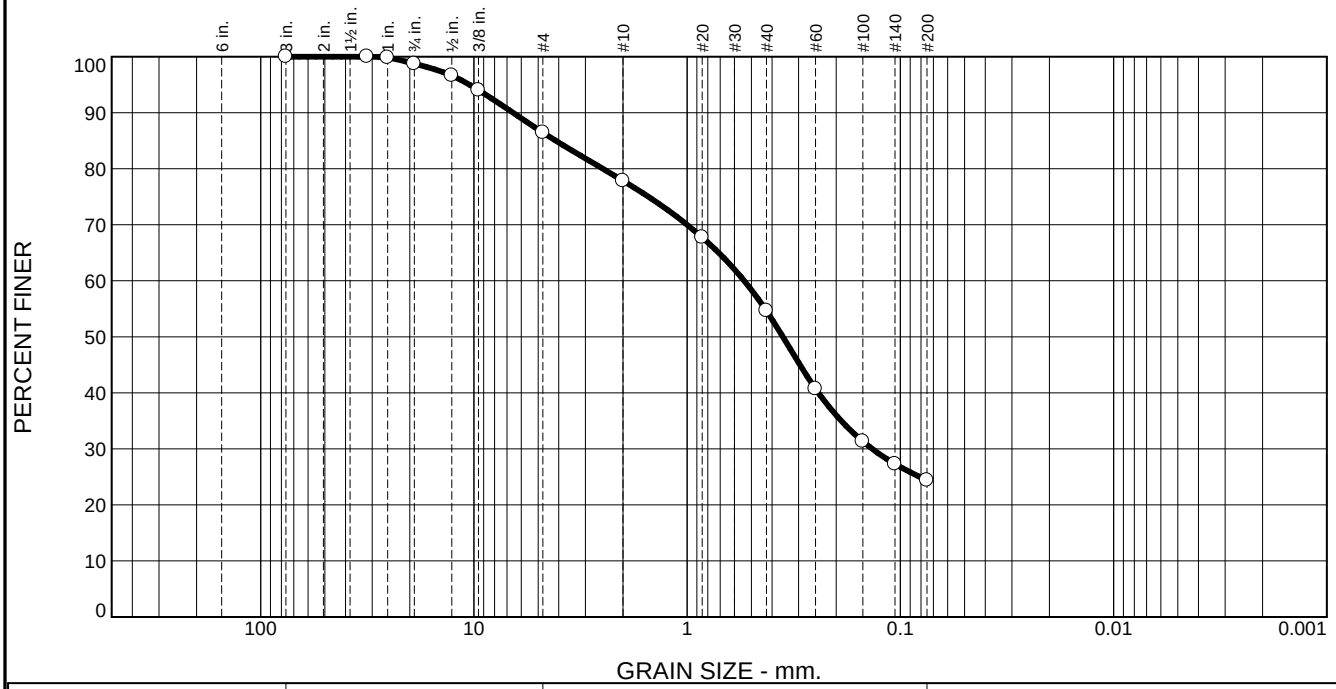
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7185-6860

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.3	12.2	8.6	23.3	30.2	24.4	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	100.0		
1"	99.8		
3/4"	98.7		
1/2"	96.6		
3/8"	94.0		
#4	86.5		
#10	77.9		
#20	67.7		
#40	54.6		
#60	40.7		
#100	31.3		
#140	27.3		
#200	24.4		

* (no specification provided)

Material Description

Brown clay with gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 6.5592 D_{85}= 4.1299 D_{60}= 0.5399
D_{50}= 0.3558 D_{30}= 0.1356 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=2.30

Date Received: 4/18/23 **Date Tested:** 4/27/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 16

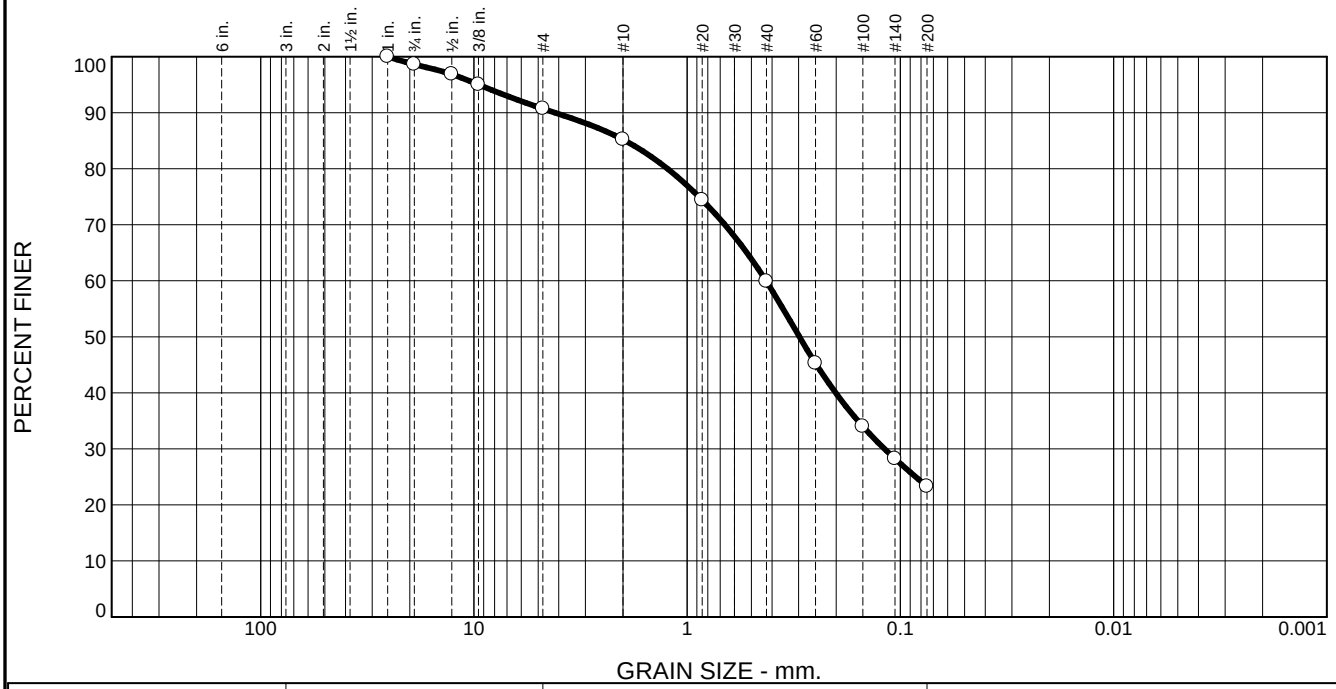
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7186-6861

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.4	7.9	5.5	25.3	36.6	23.3	

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	98.6		
1/2"	96.9		
3/8"	95.0		
#4	90.7		
#10	85.2		
#20	74.4		
#40	59.9		
#60	45.3		
#100	34.0		
#140	28.2		
#200	23.3		

* (no specification provided)

Material Description

Brown clay

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 4.1716 D_{85}= 1.9521 D_{60}= 0.4269
D_{50}= 0.2976 D_{30}= 0.1187 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.98

Date Received: 4/18/23 **Date Tested:** 4/28/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 17

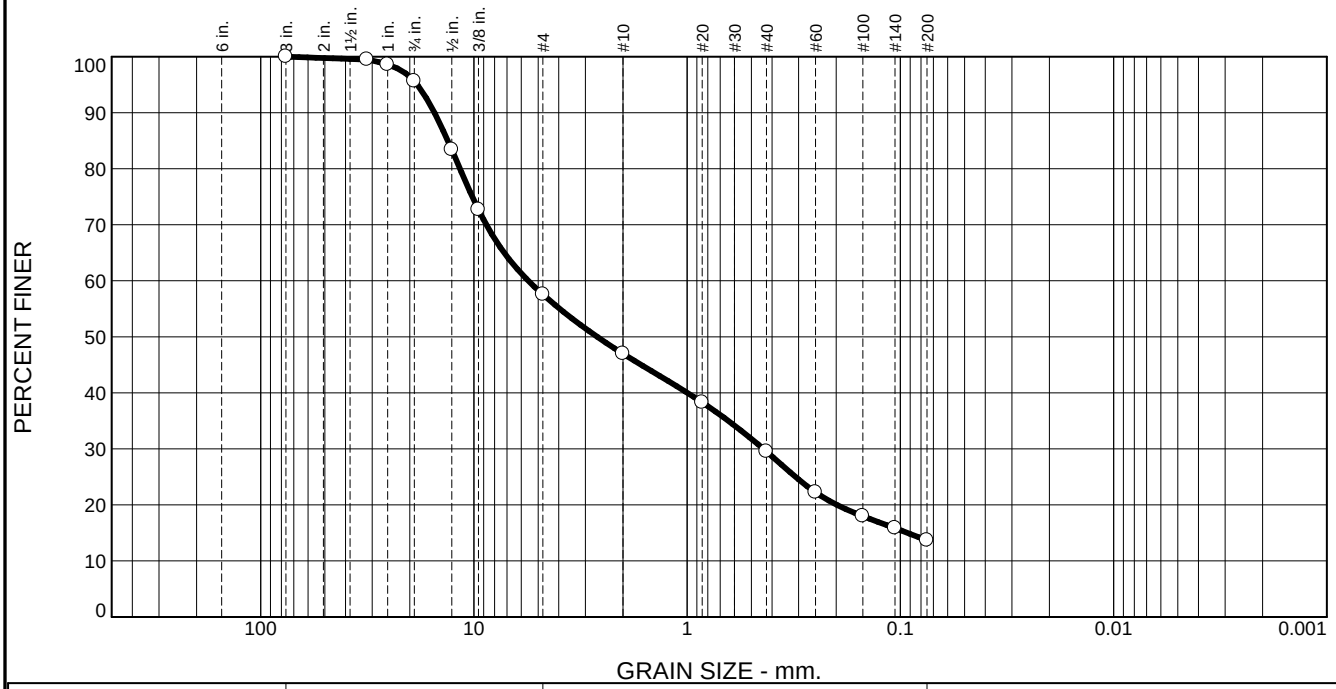
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7187-6862

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.4	38.0	10.6	17.5	15.8	13.7	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	99.5		
1"	98.6		
3/4"	95.6		
1/2"	83.4		
3/8"	72.7		
#4	57.6		
#10	47.0		
#20	38.3		
#40	29.5		
#60	22.2		
#100	18.0		
#140	15.8		
#200	13.7		

* (no specification provided)

Material Description

Brown sand and gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 15.3163 D_{85}= 13.2611 D_{60}= 5.5607
D_{50}= 2.6404 D_{30}= 0.4391 D_{15}= 0.0926
D_{10}= C_u= C_c=

Remarks

F.M.=4.07

Date Received: 4/18/23 **Date Tested:** 4/28/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 18

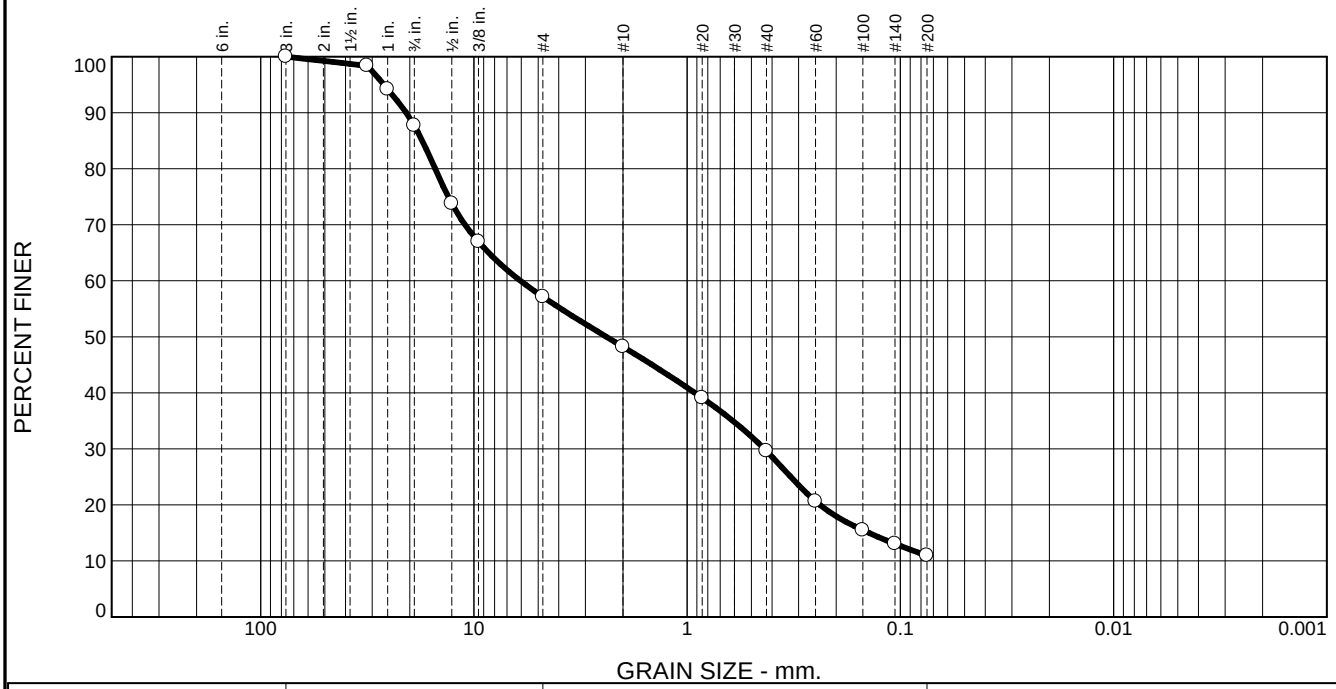
GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7188-6863

Sieve Analysis Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.3	30.6	8.9	18.6	18.7	10.9	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1 1/4"	98.4		
1"	94.2		
3/4"	87.7		
1/2"	73.8		
3/8"	67.0		
#4	57.1		
#10	48.2		
#20	39.1		
#40	29.6		
#60	20.6		
#100	15.5		
#140	13.1		
#200	10.9		

* (no specification provided)

Material Description

Brown sand and gravel with topsoil

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 20.7905 D_{85}= 17.4838 D_{60}= 6.0538
D_{50}= 2.3916 D_{30}= 0.4347 D_{15}= 0.1404
D_{10}= C_u= C_c=

Remarks

F.M.=4.23

Date Received: 4/18/23 **Date Tested:** 4/28/23

Tested By: Craig Englund

Checked By: Imtiaz Ahmed

Title: Lab Manager

Source of Sample: Bluff **Depth:** Onsite **Date Sampled:** 4/18/23
Sample Number: 19

GeoTest, Inc.

West Allis, WI

Client: Three Leaf Partners
Project: Hatland Quarry Apartments

Project No: 7708 **Test No** 7189-6864

Appendix 3

Drainage Area Maps

Payne+Dolan
A WALBEC COMPANY
www.walbecgroup.com
(920) 757-7559

Project #490686

August 2023

PRELIMINARY NOT FOR CONSTRUCTION

SCALE IN FEET
0 100' 200'

DIGGERS HOTLINE
Toll Free (800) 242-8511
Milwaukee Area (414) 259-1181
Hearing Impaired TDD (800) 542-2289
www.DiggersHotline.com

NO	REVISION DESCRIPTION	DATE

Payne+Dolan
A WALBEC COMPANY
www.walbecgroup.com
(920) 757-7559

PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

CLIENT
THREE LEAF PARTNERS
504 W. JUNEAU AVENUE
MILWAUKEE, WI 53203

Seal

SHEET TITLE
EXISTING HYROLOGY EXHIBIT

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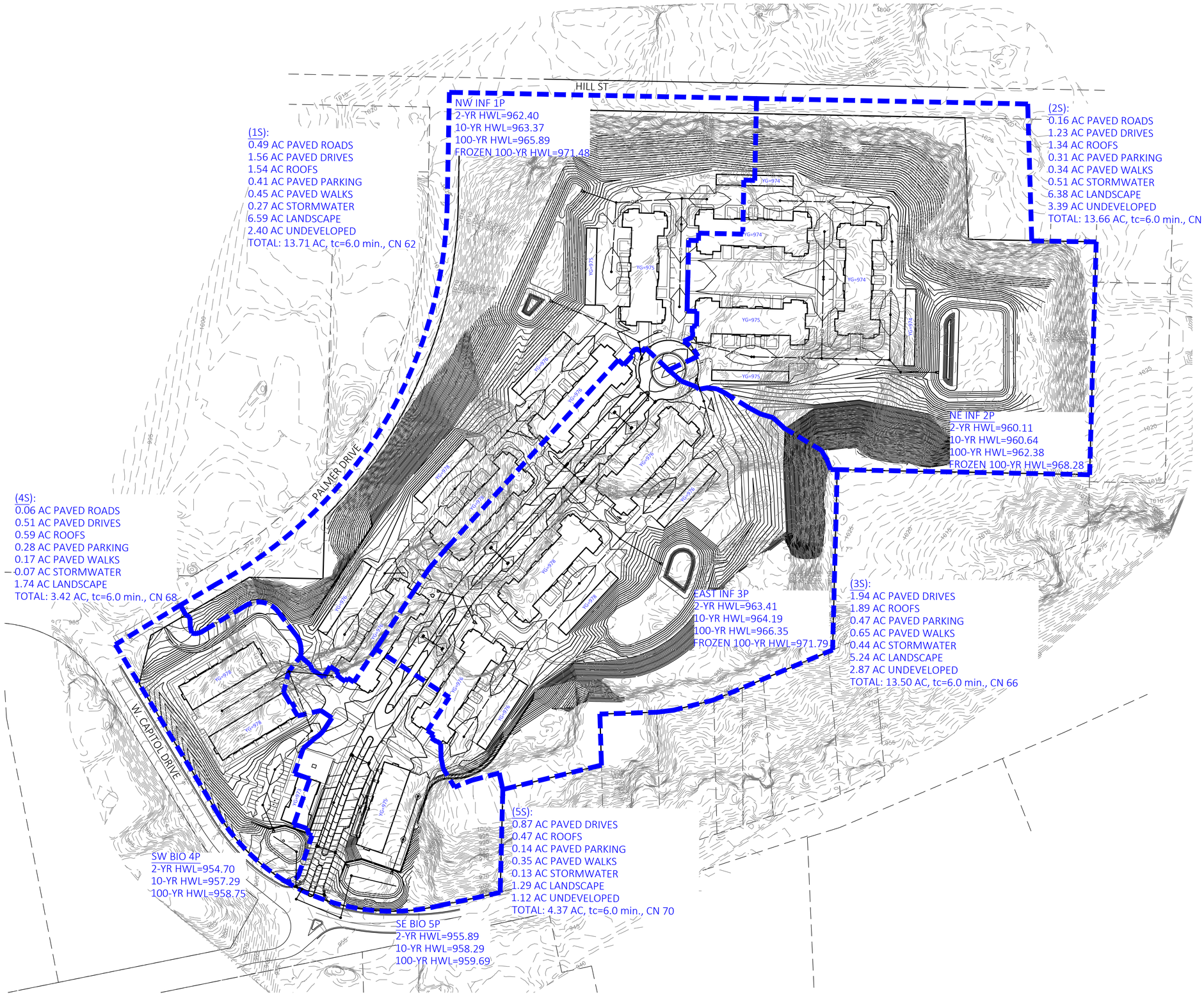
Drawing Scale:	1"=100'
Drawn:	JNL 08/25/2023
Checked:	CTD 08/25/2023
P&D Project No:	490686

Sheet No.
EX1



PRELIMINARY NOT FOR CONSTRUCTION

SCALE IN FEET
0 100' 200'

NO.	REVISION DESCRIPTION	DATE

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PROJECT
HARTLAND APARTMENTS
700 W. CAPITOL DRIVE
VILLAGE OF HARTLAND, WI

CLIENT
THREE LEAF PARTNERS
504 W. JUNEAU AVENUE
MILWAUKEE, WI 53203

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Checked:	CTD 08/25/2023
P&D Project No:	490686
Sheet No.	EX2

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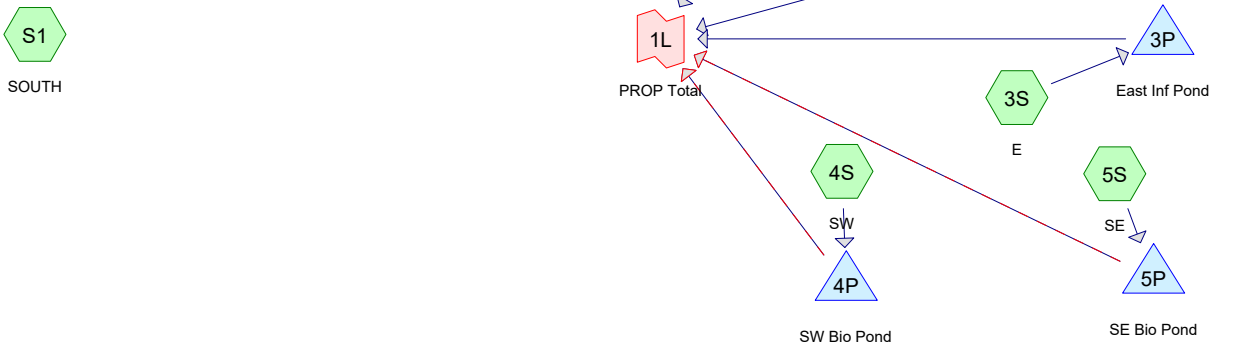
Appendix 4

HydroCAD Model Results

Payne+Dolan
A WALBEC COMPANY
www.walbecgroup.com
(920) 757-7559

August 2023

Project #490686



Subcat Reach Pond Link

Routing Diagram for Hartland Apartments
Prepared by Payne & Dolan, Printed 8/25/2023
HydroCAD® 10.20-3c s/n 08699 © 2023 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
21.237	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 4S, 5S)
4.858	98	Gravel, HSG A (S1)
6.106	98	Paved drives, HSG A (1S, 2S, 3S, 4S, 5S)
1.603	98	Paved parking, HSG A (1S, 2S, 3S, 4S, 5S)
0.876	98	Paved roads, HSG B (1S, 2S, 4S, S1)
1.957	98	Paved walks, HSG A (1S, 2S, 3S, 4S, 5S)
5.835	98	Roofs, HSG A (1S, 2S, 3S, 4S, 5S)
18.615	57	Undeveloped Woods/grass comb., Poor, HSG A (1S, 2S, 3S, 5S, S1)
1.424	98	Water Surface, 0% imp, HSG A (1S, 2S, 3S, 4S, 5S)
62.511	**66**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
61.635	HSG A	1S, 2S, 3S, 4S, 5S, S1
0.876	HSG B	1S, 2S, 4S, S1
0.000	HSG C	
0.000	HSG D	
0.000	Other	
62.511		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
21.237	0.000	0.000	0.000	0.000	21.237	>75% Grass cover, Good	
4.858	0.000	0.000	0.000	0.000	4.858	Gravel	
6.106	0.000	0.000	0.000	0.000	6.106	Paved drives	
1.603	0.000	0.000	0.000	0.000	1.603	Paved parking	
0.000	0.876	0.000	0.000	0.000	0.876	Paved roads	
1.957	0.000	0.000	0.000	0.000	1.957	Paved walks	
5.835	0.000	0.000	0.000	0.000	5.835	Roofs	
18.615	0.000	0.000	0.000	0.000	18.615	Undeveloped Woods/grass comb., Poor	
1.424	0.000	0.000	0.000	0.000	1.424	Water Surface, 0% imp	
61.635	**0.876**	**0.000**	**0.000**	**0.000**	**62.511**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	4P	953.25	952.84	75.0	0.0055	0.013	0.0	12.0	0.0	
2	4P	953.55	953.25	60.0	0.0050	0.010	0.0	6.0	0.0	
3	5P	954.25	953.00	95.0	0.0132	0.013	0.0	12.0	0.0	
4	5P	954.75	954.25	100.0	0.0050	0.010	0.0	6.0	0.0	

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: NW Runoff Area=13.711 ac 32.53% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=62 Runoff=55.62 cfs 2.594 af

Subcatchment 2S: NE Runoff Area=13.655 ac 24.75% Impervious Runoff Depth=2.09"
Tc=6.0 min CN=60 Runoff=50.79 cfs 2.382 af

Subcatchment 3S: E Runoff Area=13.501 ac 36.63% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=66 Runoff=63.90 cfs 2.964 af

Subcatchment 4S: SW Runoff Area=3.418 ac 46.78% Impervious Runoff Depth=2.82"
Tc=6.0 min CN=68 Runoff=17.33 cfs 0.804 af

Subcatchment 5S: SE Runoff Area=4.370 ac 41.76% Impervious Runoff Depth=3.01"
Tc=6.0 min CN=70 Runoff=23.63 cfs 1.097 af

Subcatchment S1: SOUTH Runoff Area=13.856 ac 36.27% Impervious Runoff Depth=3.21"
Tc=6.0 min CN=72 Runoff=79.58 cfs 3.703 af

Pond 1P: NW Inf Pond Peak Elev=965.89' Storage=68,401 cf Inflow=55.62 cfs 2.594 af
Outflow=2.02 cfs 2.594 af

Pond 2P: NE Inf Pond Peak Elev=962.38' Storage=57,897 cf Inflow=50.79 cfs 2.382 af
Outflow=2.43 cfs 2.382 af

Pond 3P: East Inf Pond Peak Elev=966.35' Storage=78,038 cf Inflow=63.90 cfs 2.964 af
Outflow=2.43 cfs 2.964 af

Pond 4P: SW Bio Pond Peak Elev=958.75' Storage=10,688 cf Inflow=17.33 cfs 0.804 af
Primary=7.40 cfs 0.796 af Secondary=0.00 cfs 0.000 af Outflow=7.40 cfs 0.796 af

Pond 5P: SE Bio Pond Peak Elev=959.69' Storage=18,347 cf Inflow=23.63 cfs 1.097 af
Primary=7.35 cfs 1.075 af Secondary=0.00 cfs 0.000 af Outflow=7.35 cfs 1.075 af

Link 1L: PROP Total Inflow=14.74 cfs 1.871 af
Primary=14.74 cfs 1.871 af

Total Runoff Area = 62.511 ac Runoff Volume = 13.545 af Average Runoff Depth = 2.60"
66.03% Pervious = 41.276 ac 33.97% Impervious = 21.235 ac

Summary for Subcatchment 1S: NW

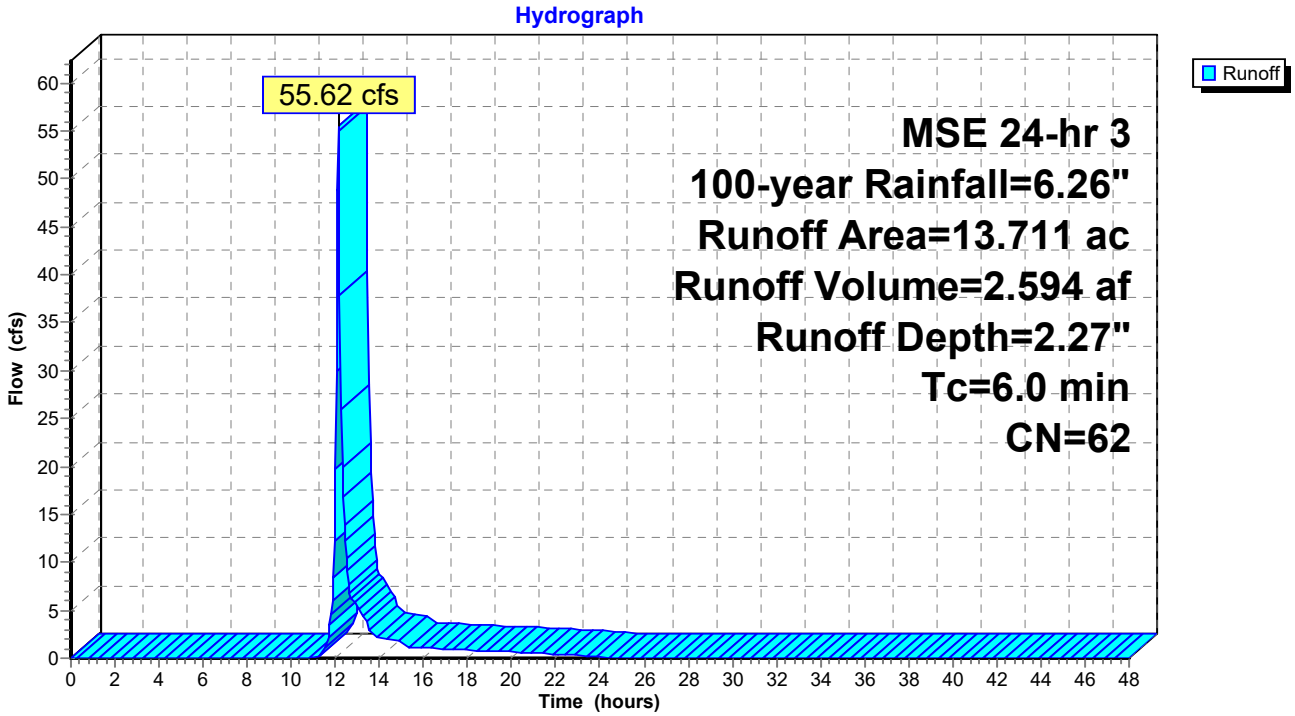
Runoff = 55.62 cfs @ 12.14 hrs, Volume= 2.594 af, Depth= 2.27"
Routed to Pond 1P : NW Inf Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-year Rainfall=6.26"

	Area (ac)	CN	Description
*	0.491	98	Paved roads, HSG B
*	1.562	98	Paved drives, HSG A
	1.544	98	Roofs, HSG A
	0.408	98	Paved parking, HSG A
*	0.455	98	Paved walks, HSG A
	0.267	98	Water Surface, 0% imp, HSG A
	6.586	39	>75% Grass cover, Good, HSG A
	2.398	57	Undeveloped Woods/grass comb., Poor, HSG A
	13.711	62	Weighted Average
	9.251		67.47% Pervious Area
	4.460		32.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum**

Subcatchment 1S: NW



Summary for Subcatchment 2S: NE

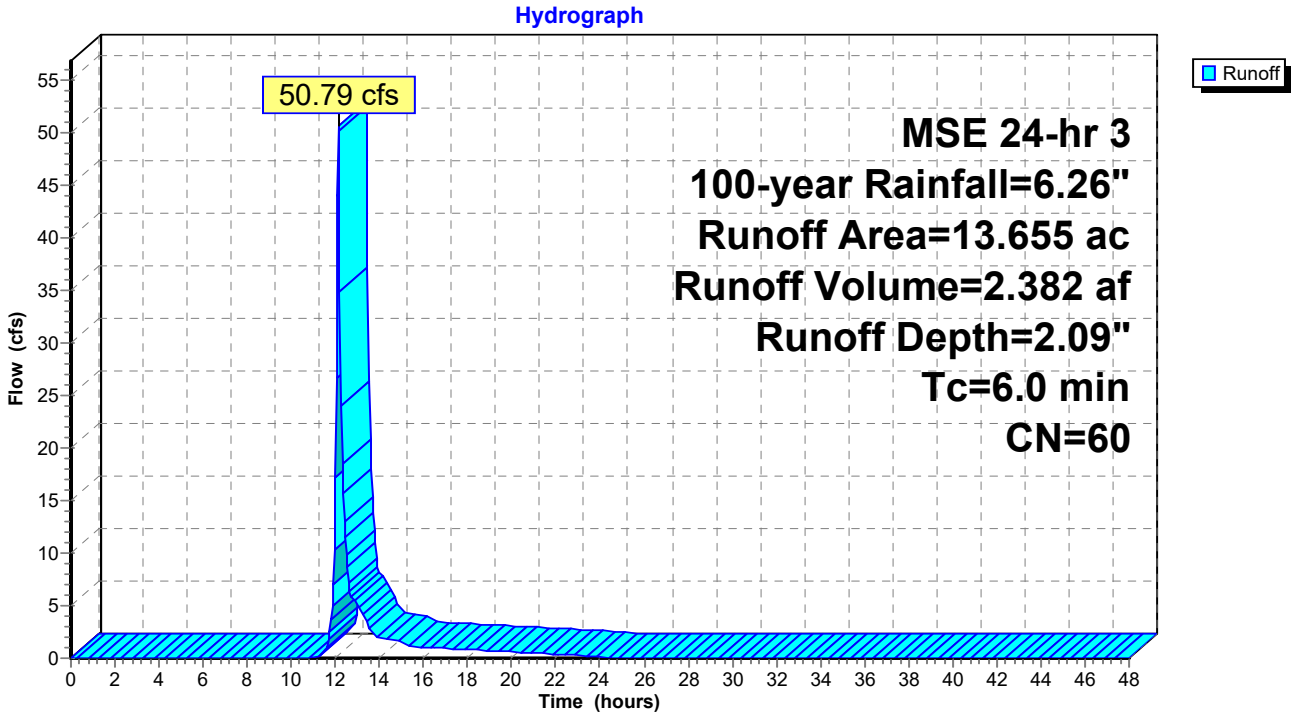
Runoff = 50.79 cfs @ 12.14 hrs, Volume= 2.382 af, Depth= 2.09"
Routed to Pond 2P : NE Inf Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-year Rainfall=6.26"

	Area (ac)	CN	Description
*	0.163	98	Paved roads, HSG B
*	1.227	98	Paved drives, HSG A
	1.346	98	Roofs, HSG A
	0.307	98	Paved parking, HSG A
*	0.337	98	Paved walks, HSG A
	0.506	98	Water Surface, 0% imp, HSG A
	6.376	39	>75% Grass cover, Good, HSG A
	3.393	57	Undeveloped Woods/grass comb., Poor, HSG A
	13.655	60	Weighted Average
	10.275		75.25% Pervious Area
	3.380		24.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum**

Subcatchment 2S: NE



Summary for Subcatchment 3S: E

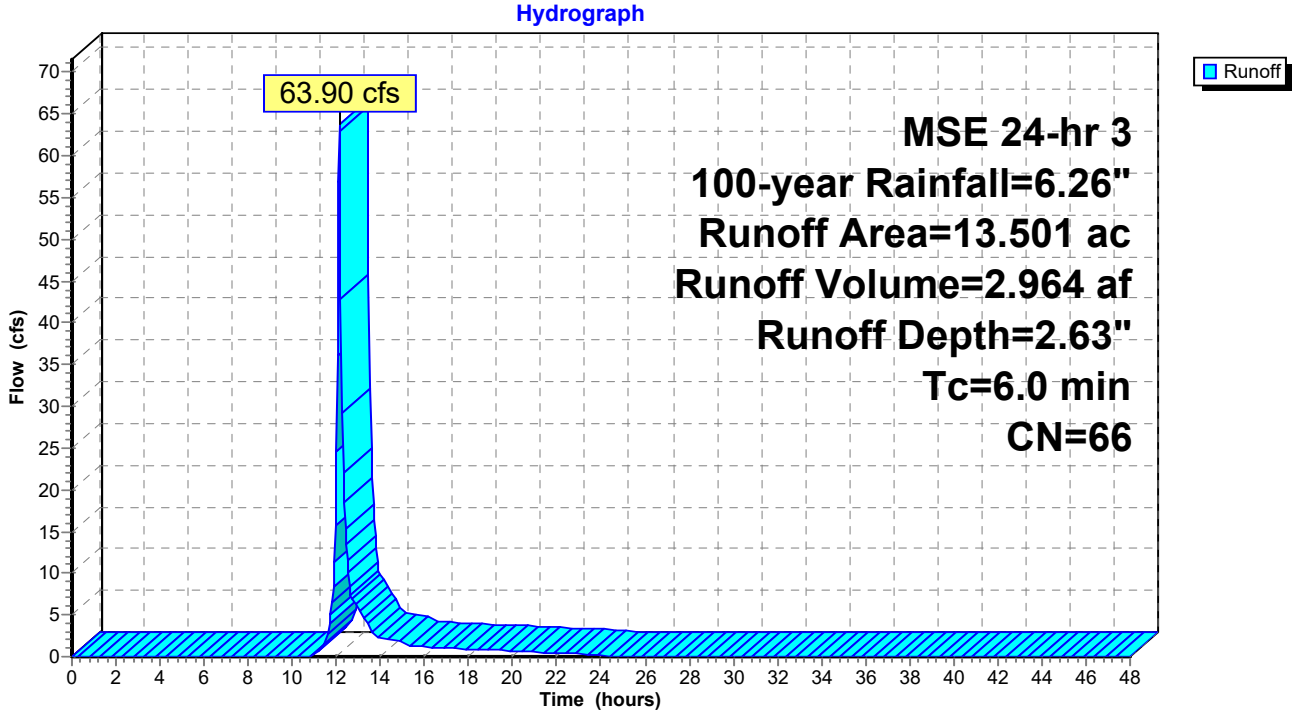
Runoff = 63.90 cfs @ 12.14 hrs, Volume= 2.964 af, Depth= 2.63"
Routed to Pond 3P : East Inf Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-year Rainfall=6.26"

	Area (ac)	CN	Description
*	1.934	98	Paved drives, HSG A
	1.888	98	Roofs, HSG A
	0.472	98	Paved parking, HSG A
*	0.652	98	Paved walks, HSG A
	0.442	98	Water Surface, 0% imp, HSG A
	5.239	39	>75% Grass cover, Good, HSG A
	2.874	57	Undeveloped Woods/grass comb., Poor, HSG A
	13.501	66	Weighted Average
	8.555		63.37% Pervious Area
	4.946		36.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum**

Subcatchment 3S: E



Summary for Subcatchment 4S: SW

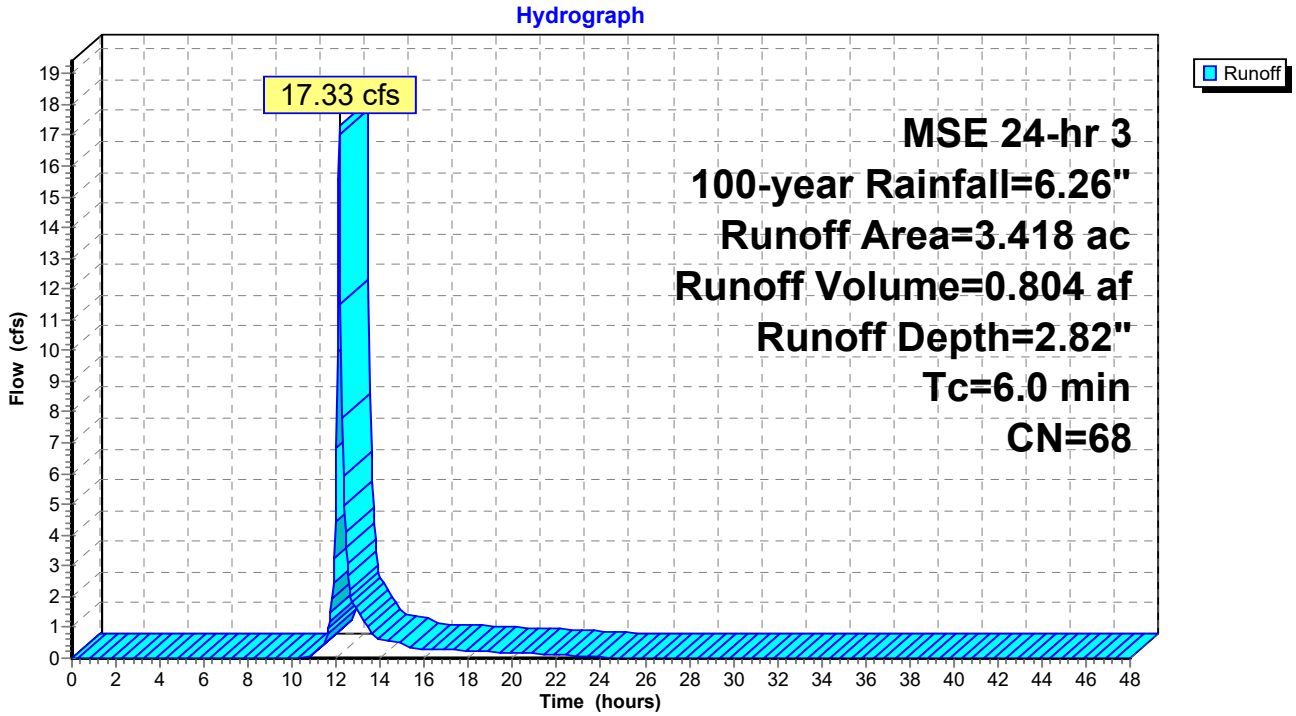
Runoff = 17.33 cfs @ 12.14 hrs, Volume= 0.804 af, Depth= 2.82"
Routed to Pond 4P : SW Bio Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-year Rainfall=6.26"

	Area (ac)	CN	Description
*	0.055	98	Paved roads, HSG B
*	0.514	98	Paved drives, HSG A
	0.587	98	Roofs, HSG A
	0.275	98	Paved parking, HSG A
*	0.168	98	Paved walks, HSG A
	0.074	98	Water Surface, 0% imp, HSG A
	1.745	39	>75% Grass cover, Good, HSG A
	0.000	57	Undeveloped Woods/grass comb., Poor, HSG A
	3.418	68	Weighted Average
	1.819		53.22% Pervious Area
	1.599		46.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum**

Subcatchment 4S: SW



Summary for Subcatchment 5S: SE

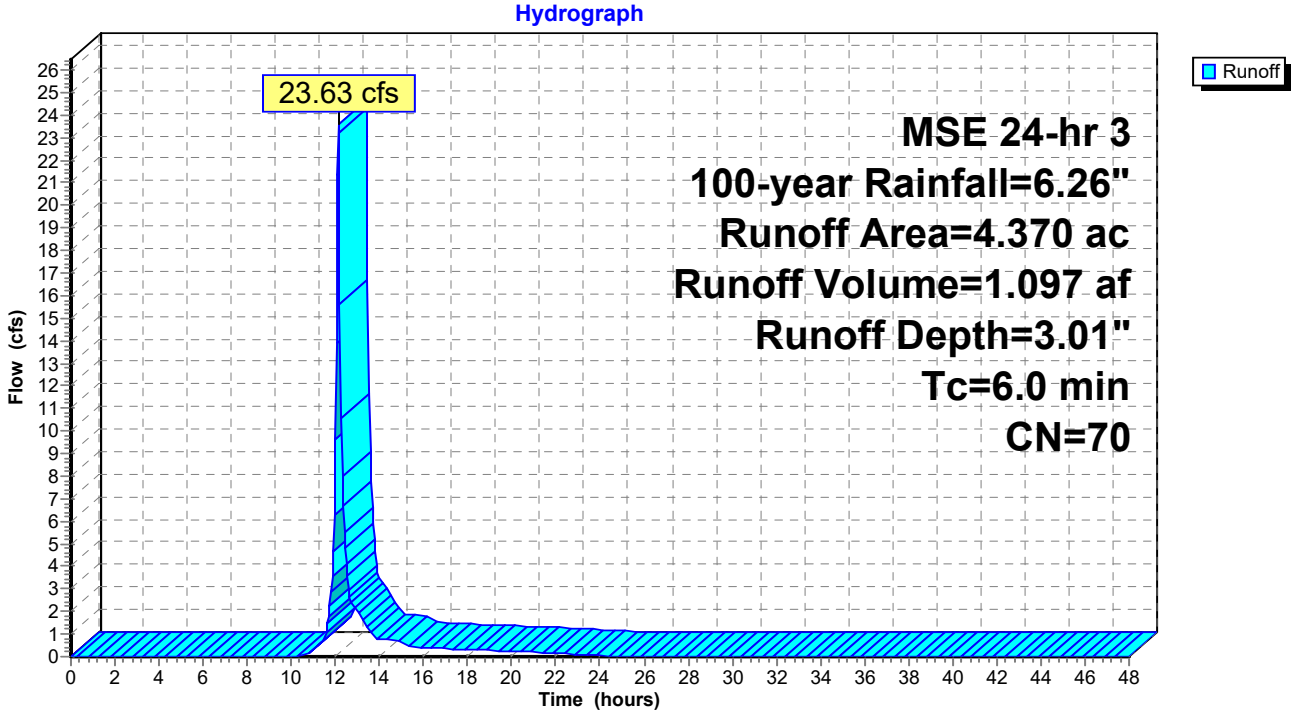
Runoff = 23.63 cfs @ 12.13 hrs, Volume= 1.097 af, Depth= 3.01"
Routed to Pond 5P : SE Bio Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-year Rainfall=6.26"

	Area (ac)	CN	Description
*	0.869	98	Paved drives, HSG A
	0.470	98	Roofs, HSG A
	0.141	98	Paved parking, HSG A
*	0.345	98	Paved walks, HSG A
	0.135	98	Water Surface, 0% imp, HSG A
	1.291	39	>75% Grass cover, Good, HSG A
	1.119	57	Undeveloped Woods/grass comb., Poor, HSG A
	4.370	70	Weighted Average
	2.545		58.24% Pervious Area
	1.825		41.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum**

Subcatchment 5S: SE



Summary for Subcatchment S1: SOUTH

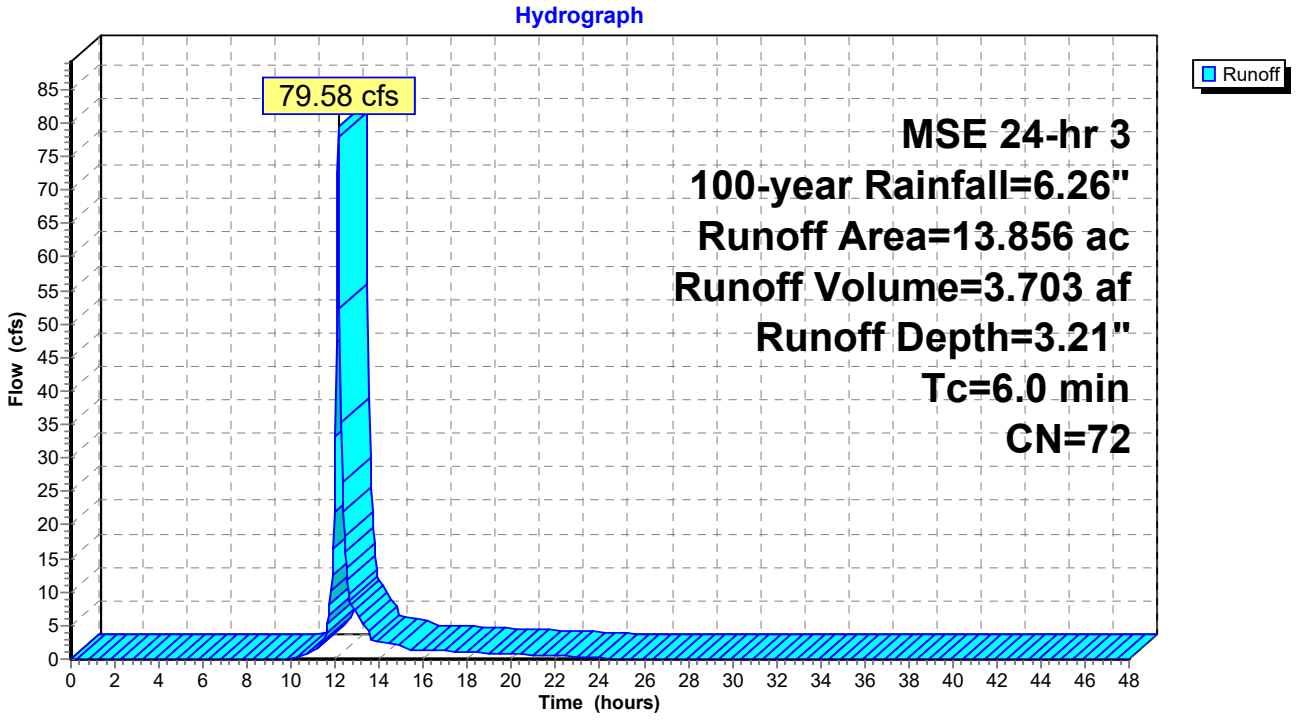
Runoff = 79.58 cfs @ 12.13 hrs, Volume= 3.703 af, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-year Rainfall=6.26"

	Area (ac)	CN	Description
*	0.167	98	Paved roads, HSG B
*	4.858	98	Gravel, HSG A
*	8.831	57	Undeveloped Woods/grass comb., Poor, HSG A
	13.856	72	Weighted Average
	8.831		63.73% Pervious Area
	5.025		36.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum**

Subcatchment S1: SOUTH



Summary for Pond 1P: NW Inf Pond

Inflow Area = 13.711 ac, 32.53% Impervious, Inflow Depth = 2.27" for 100-year event
Inflow = 55.62 cfs @ 12.14 hrs, Volume= 2.594 af
Outflow = 2.02 cfs @ 14.23 hrs, Volume= 2.594 af, Atten= 96%, Lag= 125.7 min
Discarded = 2.02 cfs @ 14.23 hrs, Volume= 2.594 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 965.89' @ 14.23 hrs Surf.Area= 24,264 sf Storage= 68,401 cf

Plug-Flow detention time= 397.4 min calculated for 2.591 af (100% of inflow)
Center-of-Mass det. time= 397.5 min (1,220.7 - 823.2)

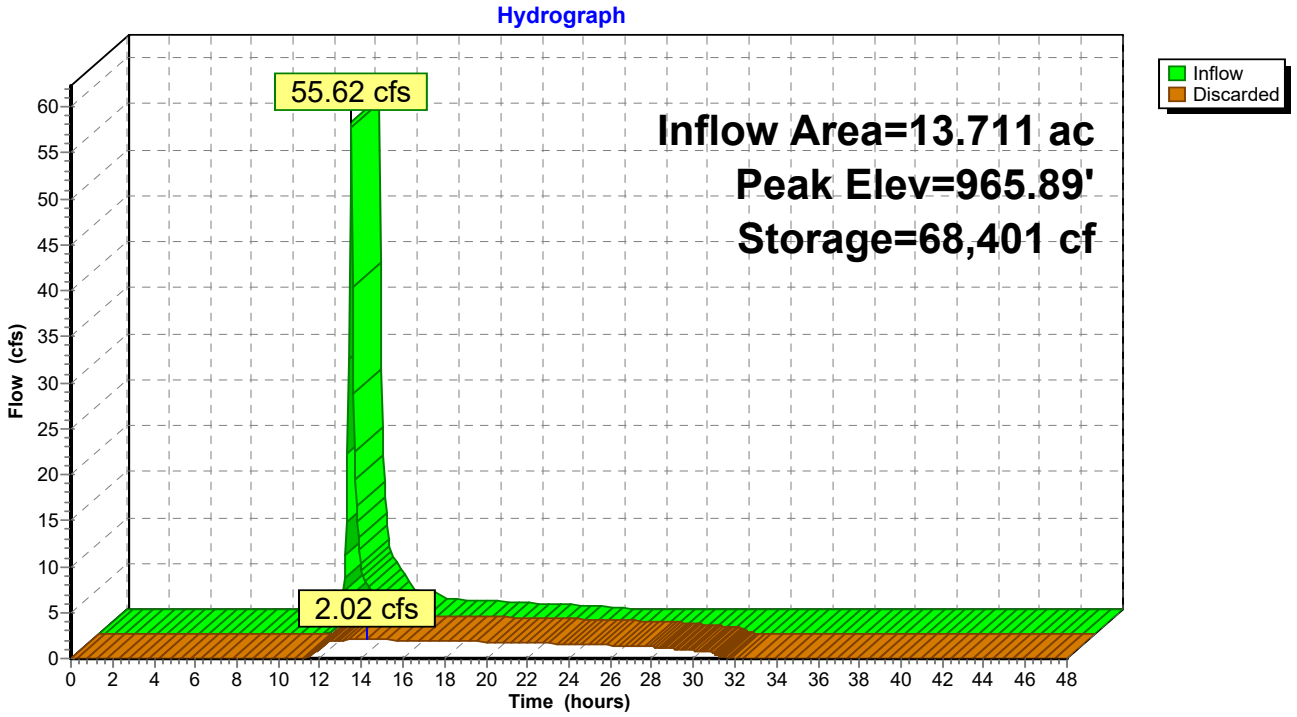
Volume	Invert	Avail.Storage	Storage Description
#1	962.00'	416,608 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.00	7,245	0	0
963.00	15,330	11,288	11,288
964.00	18,315	16,823	28,110
965.00	21,405	19,860	47,970
966.00	24,600	23,003	70,973
967.00	28,570	26,585	97,558
968.00	34,660	31,615	129,173
969.00	41,790	38,225	167,398
970.00	49,670	45,730	213,128
971.00	61,720	55,695	268,823
972.00	73,620	67,670	336,493
973.00	86,610	80,115	416,608

Device	Routing	Invert	Outlet Devices
#1	Discarded	962.00'	**3.600 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.02 cfs @ 14.23 hrs HW=965.89' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 2.02 cfs)

Pond 1P: NW Inf Pond



Summary for Pond 2P: NE Inf Pond

Inflow Area = 13.655 ac, 24.75% Impervious, Inflow Depth = 2.09" for 100-year event
Inflow = 50.79 cfs @ 12.14 hrs, Volume= 2.382 af
Outflow = 2.43 cfs @ 13.60 hrs, Volume= 2.382 af, Atten= 95%, Lag= 87.8 min
Discarded = 2.43 cfs @ 13.60 hrs, Volume= 2.382 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 962.38' @ 13.60 hrs Surf.Area= 29,169 sf Storage= 57,897 cf

Plug-Flow detention time= 257.7 min calculated for 2.380 af (100% of inflow)
Center-of-Mass det. time= 257.6 min (1,084.5 - 827.0)

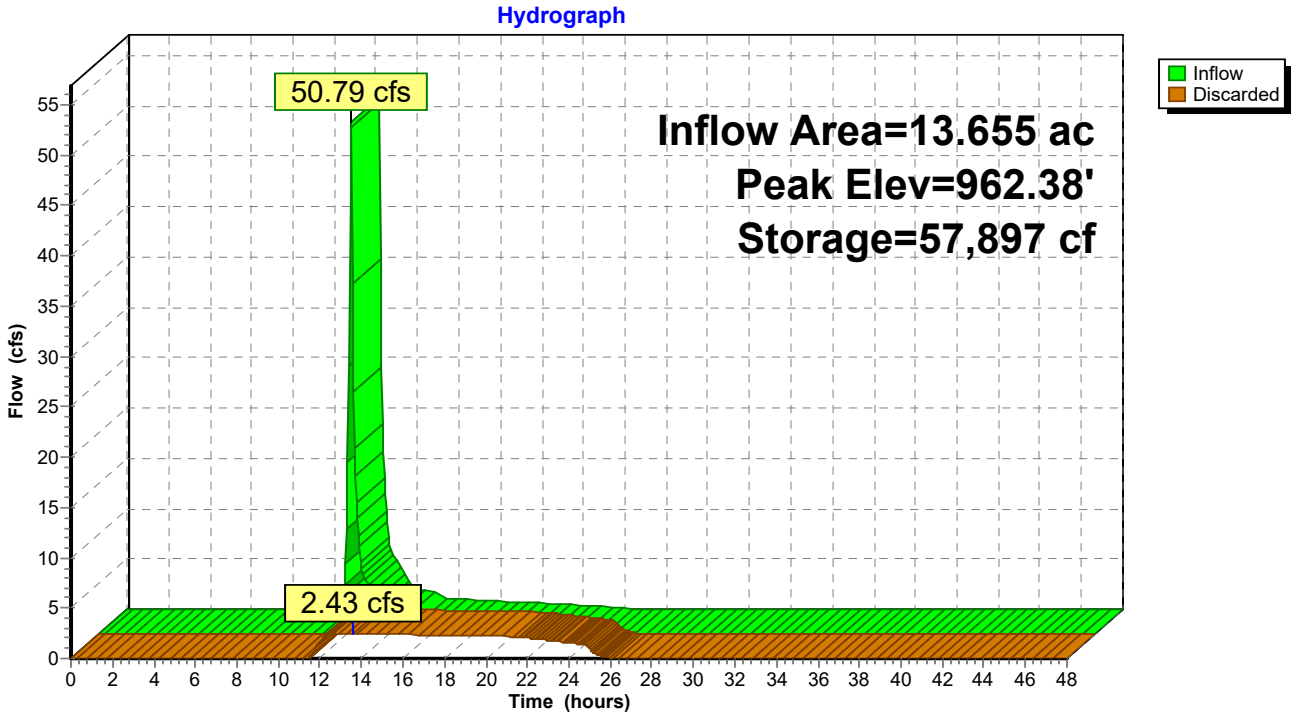
Volume	Invert	Avail.Storage	Storage Description
#1	960.00'	567,415 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
960.00	14,595	0	0
961.00	25,680	20,138	20,138
962.00	28,185	26,933	47,070
963.00	30,790	29,488	76,558
964.00	33,495	32,143	108,700
965.00	39,885	36,690	145,390
966.00	43,300	41,593	186,983
967.00	47,800	45,550	232,533
968.00	53,360	50,580	283,113
969.00	60,550	56,955	340,068
970.00	69,030	64,790	404,858
971.00	80,830	74,930	479,788
972.00	94,425	87,628	567,415

Device	Routing	Invert	Outlet Devices
#1	Discarded	960.00'	**3.600 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.43 cfs @ 13.60 hrs HW=962.38' (Free Discharge)
1=Exfiltration (Exfiltration Controls 2.43 cfs)

Pond 2P: NE Inf Pond



Summary for Pond 3P: East Inf Pond

Inflow Area = 13.501 ac, 36.63% Impervious, Inflow Depth = 2.63" for 100-year event
Inflow = 63.90 cfs @ 12.14 hrs, Volume= 2.964 af
Outflow = 2.43 cfs @ 13.66 hrs, Volume= 2.964 af, Atten= 96%, Lag= 91.7 min
Discarded = 2.43 cfs @ 13.66 hrs, Volume= 2.964 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 966.35' @ 13.66 hrs Surf.Area= 29,143 sf Storage= 78,038 cf

Plug-Flow detention time= 356.7 min calculated for 2.961 af (100% of inflow)
Center-of-Mass det. time= 356.7 min (1,173.0 - 816.2)

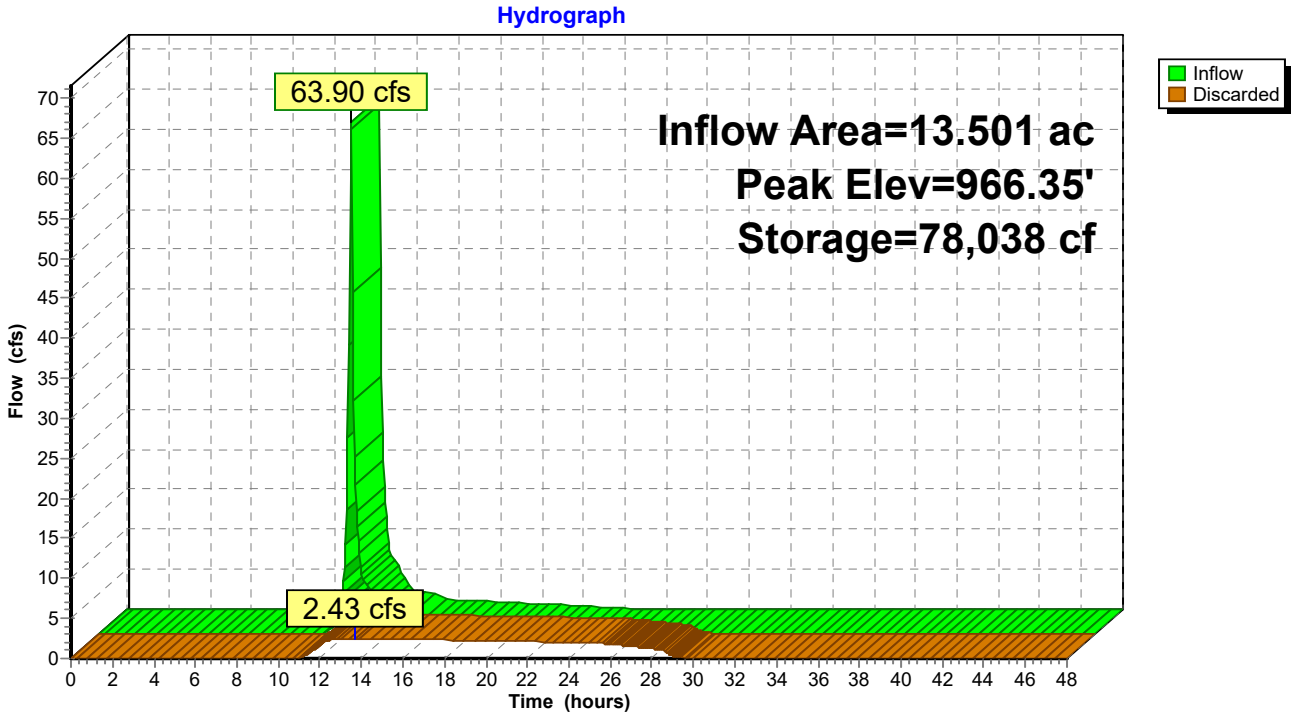
Volume	Invert	Avail.Storage	Storage Description
#1	963.00'	544,443 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
963.00	11,805	0	0
964.00	22,650	17,228	17,228
965.00	25,340	23,995	41,223
966.00	28,125	26,733	67,955
967.00	31,015	29,570	97,525
968.00	34,225	32,620	130,145
969.00	38,050	36,138	166,283
970.00	43,800	40,925	207,208
971.00	49,335	46,568	253,775
972.00	57,675	53,505	307,280
973.00	69,980	63,828	371,108
974.00	85,260	77,620	448,728
975.00	106,170	95,715	544,443

Device	Routing	Invert	Outlet Devices
#1	Discarded	963.00'	**3.600 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.43 cfs @ 13.66 hrs HW=966.35' (Free Discharge)
1=Exfiltration (Exfiltration Controls 2.43 cfs)

Pond 3P: East Inf Pond



Summary for Pond 4P: SW Bio Pond

Inflow Area = 3.418 ac, 46.78% Impervious, Inflow Depth = 2.82" for 100-year event
Inflow = 17.33 cfs @ 12.14 hrs, Volume= 0.804 af
Outflow = 7.40 cfs @ 12.27 hrs, Volume= 0.796 af, Atten= 57%, Lag= 7.8 min
Primary = 7.40 cfs @ 12.27 hrs, Volume= 0.796 af
Routed to Link 1L : PROP Total
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 1L : PROP Total

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 958.75' @ 12.27 hrs Surf.Area= 4,908 sf Storage= 10,688 cf

Plug-Flow detention time= 46.6 min calculated for 0.796 af (99% of inflow)
Center-of-Mass det. time= 41.5 min (854.4 - 812.9)

Volume	Invert	Avail.Storage	Storage Description
#1	953.25'	11,962 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

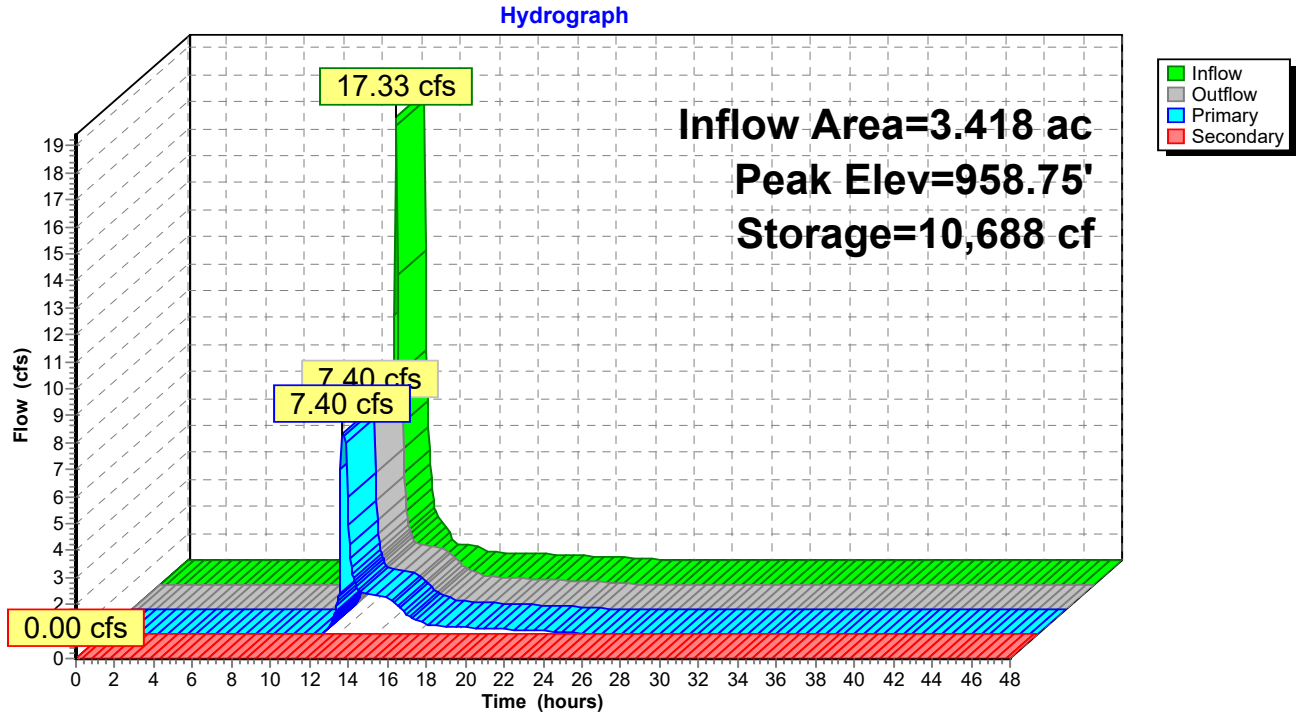
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
953.25	3,240	0.0	0	0
954.42	3,240	33.0	1,251	1,251
954.75	3,240	33.0	353	1,604
957.00	3,240	27.0	1,968	3,572
959.00	5,150	100.0	8,390	11,962

Device	Routing	Invert	Outlet Devices
#1	Primary	953.25'	**12.0" Round Culvert** L= 75.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 953.25' / 952.84' S= 0.0055 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	953.55'	**6.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 953.55' / 953.25' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 1	958.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	958.75'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=7.40 cfs @ 12.27 hrs HW=958.74' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.40 cfs @ 9.42 fps)
└**2=Culvert** (Passes < 1.62 cfs potential flow)
└**3=Orifice/Grate** (Passes < 12.96 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=953.25' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: SW Bio Pond



Summary for Pond 5P: SE Bio Pond

Inflow Area = 4.370 ac, 41.76% Impervious, Inflow Depth = 3.01" for 100-year event
Inflow = 23.63 cfs @ 12.13 hrs, Volume= 1.097 af
Outflow = 7.35 cfs @ 12.32 hrs, Volume= 1.075 af, Atten= 69%, Lag= 11.3 min
Primary = 7.35 cfs @ 12.32 hrs, Volume= 1.075 af
Routed to Link 1L : PROP Total
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 1L : PROP Total

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 959.69' @ 12.32 hrs Surf.Area= 8,129 sf Storage= 18,347 cf

Plug-Flow detention time= 94.1 min calculated for 1.073 af (98% of inflow)
Center-of-Mass det. time= 83.2 min (892.9 - 809.6)

Volume	Invert	Avail.Storage	Storage Description
#1	954.25'	20,934 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

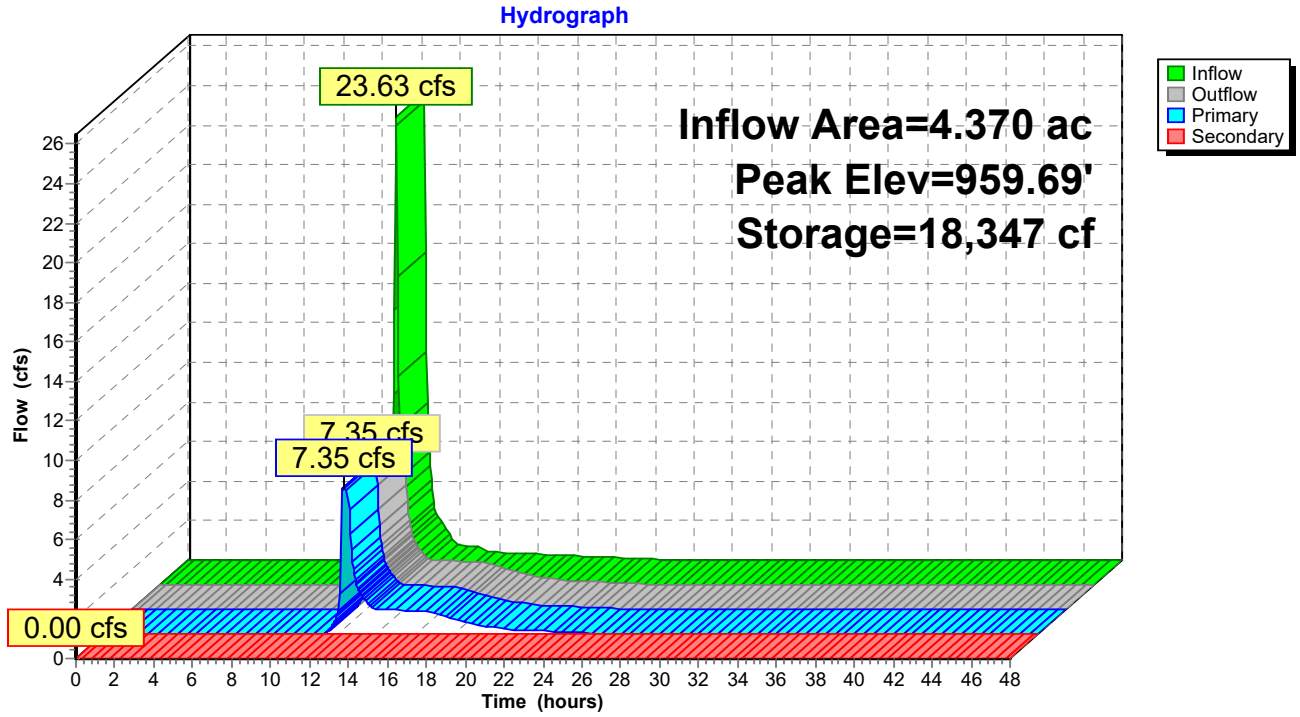
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.25	5,895	0.0	0	0
955.42	5,895	33.0	2,276	2,276
955.75	5,895	33.0	642	2,918
958.00	5,895	27.0	3,581	6,499
960.00	8,540	100.0	14,435	20,934

Device	Routing	Invert	Outlet Devices
#1	Primary	954.25'	**12.0" Round Culvert** L= 95.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 954.25' / 953.00' S= 0.0132 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	954.75'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 954.75' / 954.25' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 1	959.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	959.75'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=7.35 cfs @ 12.32 hrs HW=959.68' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.35 cfs @ 9.35 fps)
└**2=Culvert** (Passes < 1.36 cfs potential flow)
└**3=Orifice/Grate** (Passes < 11.63 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=954.25' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: SE Bio Pond

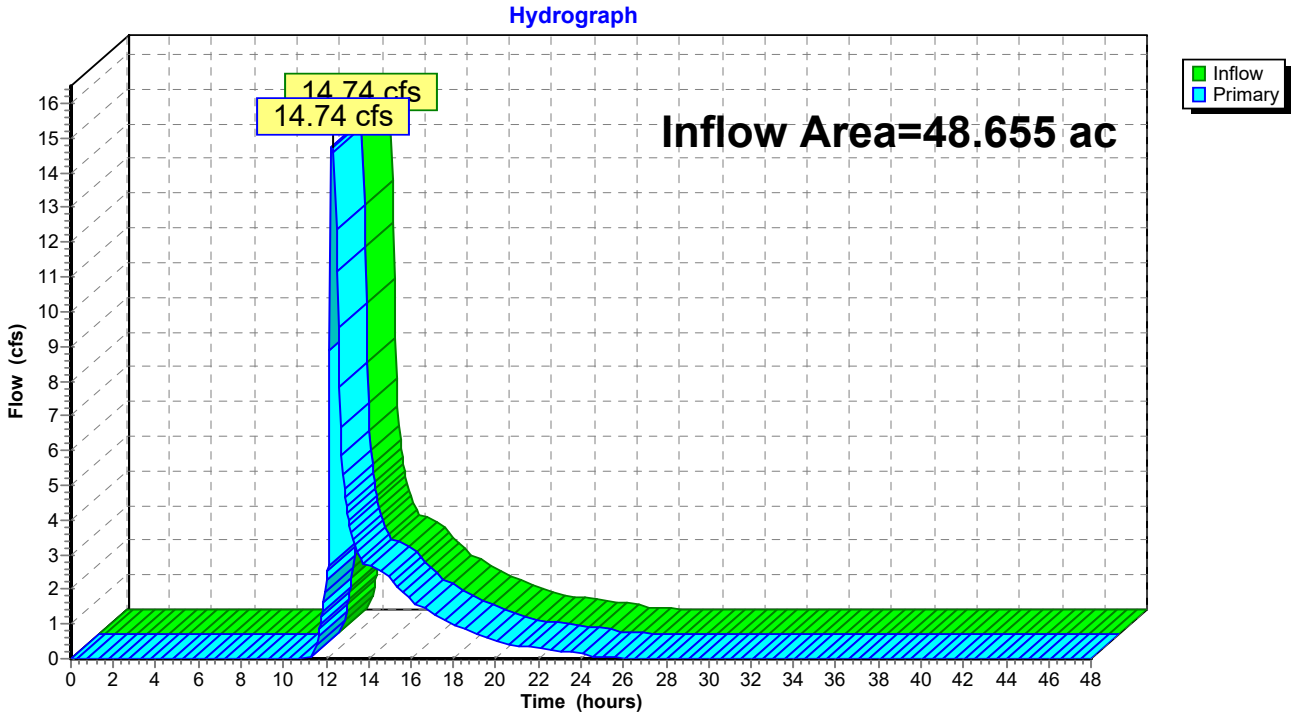


Summary for Link 1L: PROP Total

Inflow Area = 48.655 ac, 33.32% Impervious, Inflow Depth = 0.46" for 100-year event
Inflow = 14.74 cfs @ 12.28 hrs, Volume= 1.871 af
Primary = 14.74 cfs @ 12.28 hrs, Volume= 1.871 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 1L: PROP Total



Appendix 5

Frozen Condition

HydroCAD Model Results

Payne+Dolan
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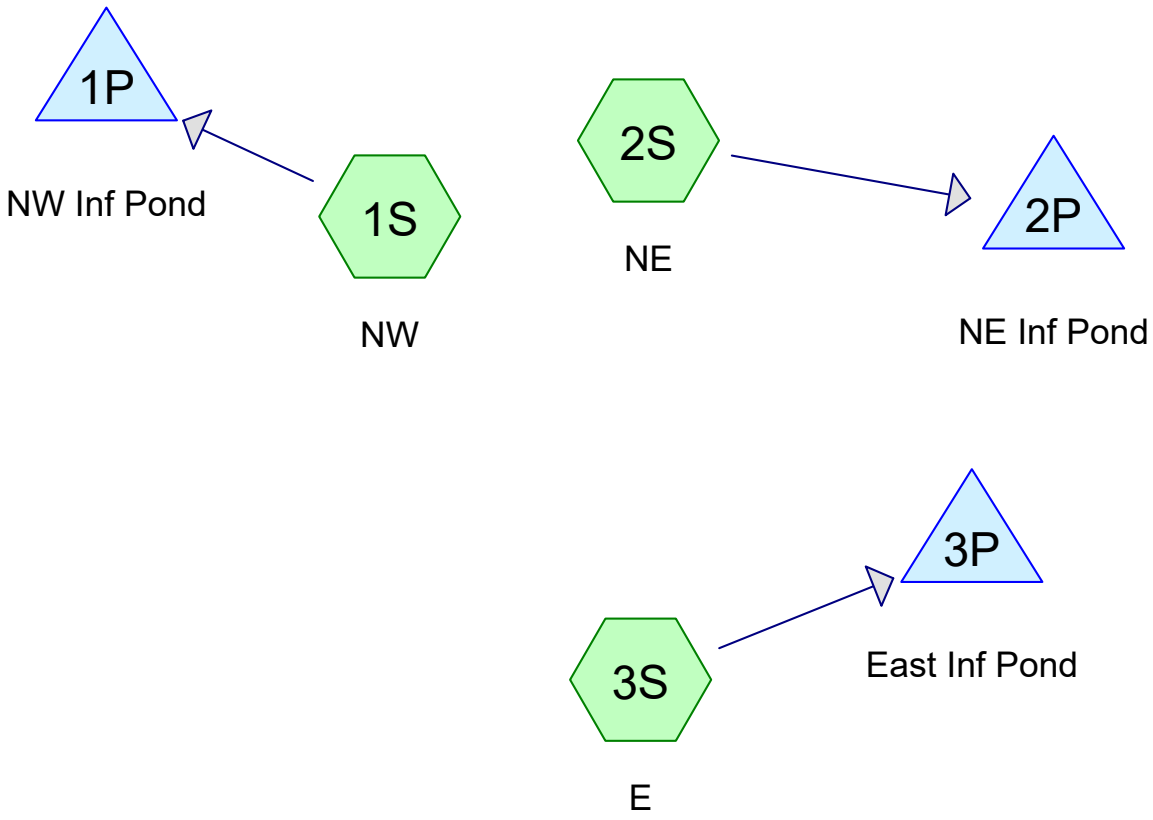
August 2023

Project #490686



Subcat Reach Pond Link

Routing Diagram for FROZEN Hartland Apartments
Prepared by Payne & Dolan, Printed 8/25/2023
HydroCAD® 10.20-3c s/n 08699 © 2023 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
18.201	98	>75% Grass cover, Good, HSG A (1S, 2S, 3S)
4.723	98	Paved drives, HSG A (1S, 2S, 3S)
1.187	98	Paved parking, HSG A (1S, 2S, 3S)
0.654	98	Paved roads, HSG B (1S, 2S)
1.444	98	Paved walks, HSG A (1S, 2S, 3S)
4.778	98	Roofs, HSG A (1S, 2S, 3S)
8.665	98	Undeveloped Woods/grass comb., Poor, HSG A (1S, 2S, 3S)
1.215	98	Water Surface, 0% imp, HSG A (1S, 2S, 3S)
40.867	**98**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
40.213	HSG A	1S, 2S, 3S
0.654	HSG B	1S, 2S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
40.867		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
18.201	0.000	0.000	0.000	0.000	18.201	>75% Grass cover, Good	
4.723	0.000	0.000	0.000	0.000	4.723	Paved drives	
1.187	0.000	0.000	0.000	0.000	1.187	Paved parking	
0.000	0.654	0.000	0.000	0.000	0.654	Paved roads	
1.444	0.000	0.000	0.000	0.000	1.444	Paved walks	
4.778	0.000	0.000	0.000	0.000	4.778	Roofs	
8.665	0.000	0.000	0.000	0.000	8.665	Undeveloped Woods/grass comb., Poor	
1.215	0.000	0.000	0.000	0.000	1.215	Water Surface, 0% imp	
40.213	**0.654**	**0.000**	**0.000**	**0.000**	**40.867**	**TOTAL AREA**	

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: NW Runoff Area=13.711 ac 98.05% Impervious Runoff Depth=6.02"
Tc=6.0 min CN=98 Runoff=123.41 cfs 6.880 af

Subcatchment 2S: NE Runoff Area=13.655 ac 96.29% Impervious Runoff Depth=6.02"
Tc=6.0 min CN=98 Runoff=122.90 cfs 6.852 af

Subcatchment 3S: E Runoff Area=13.501 ac 96.73% Impervious Runoff Depth=6.02"
Tc=6.0 min CN=98 Runoff=121.52 cfs 6.775 af

Pond 1P: NW Inf Pond Peak Elev=971.48' Storage=299,690 cf Inflow=123.41 cfs 6.880 af
Outflow=0.00 cfs 0.000 af

Pond 2P: NE Inf Pond Peak Elev=968.28' Storage=298,475 cf Inflow=122.90 cfs 6.852 af
Outflow=0.00 cfs 0.000 af

Pond 3P: East Inf Pond Peak Elev=971.79' Storage=295,100 cf Inflow=121.52 cfs 6.775 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 40.867 ac Runoff Volume = 20.507 af Average Runoff Depth = 6.02"
2.97% Pervious = 1.215 ac 97.03% Impervious = 39.652 ac

Summary for Subcatchment 1S: NW

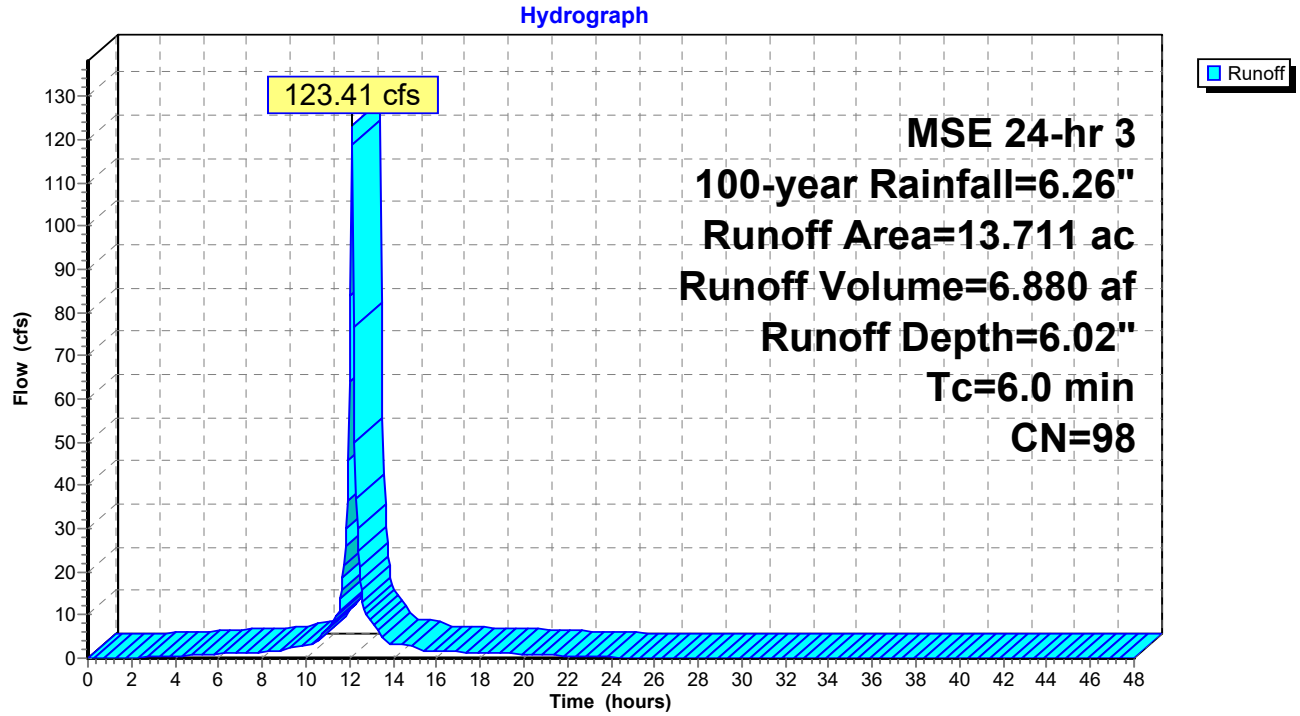
Runoff = 123.41 cfs @ 12.13 hrs, Volume= 6.880 af, Depth= 6.02"
Routed to Pond 1P : NW Inf Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-year Rainfall=6.26"

	Area (ac)	CN	Description
*	0.491	98	Paved roads, HSG B
*	1.562	98	Paved drives, HSG A
	1.544	98	Roofs, HSG A
	0.408	98	Paved parking, HSG A
*	0.455	98	Paved walks, HSG A
	0.267	98	Water Surface, 0% imp, HSG A
*	6.586	98	>75% Grass cover, Good, HSG A
*	2.398	98	Undeveloped Woods/grass comb., Poor, HSG A
	13.711	98	Weighted Average
	0.267		1.95% Pervious Area
	13.444		98.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum**

Subcatchment 1S: NW



Summary for Subcatchment 2S: NE

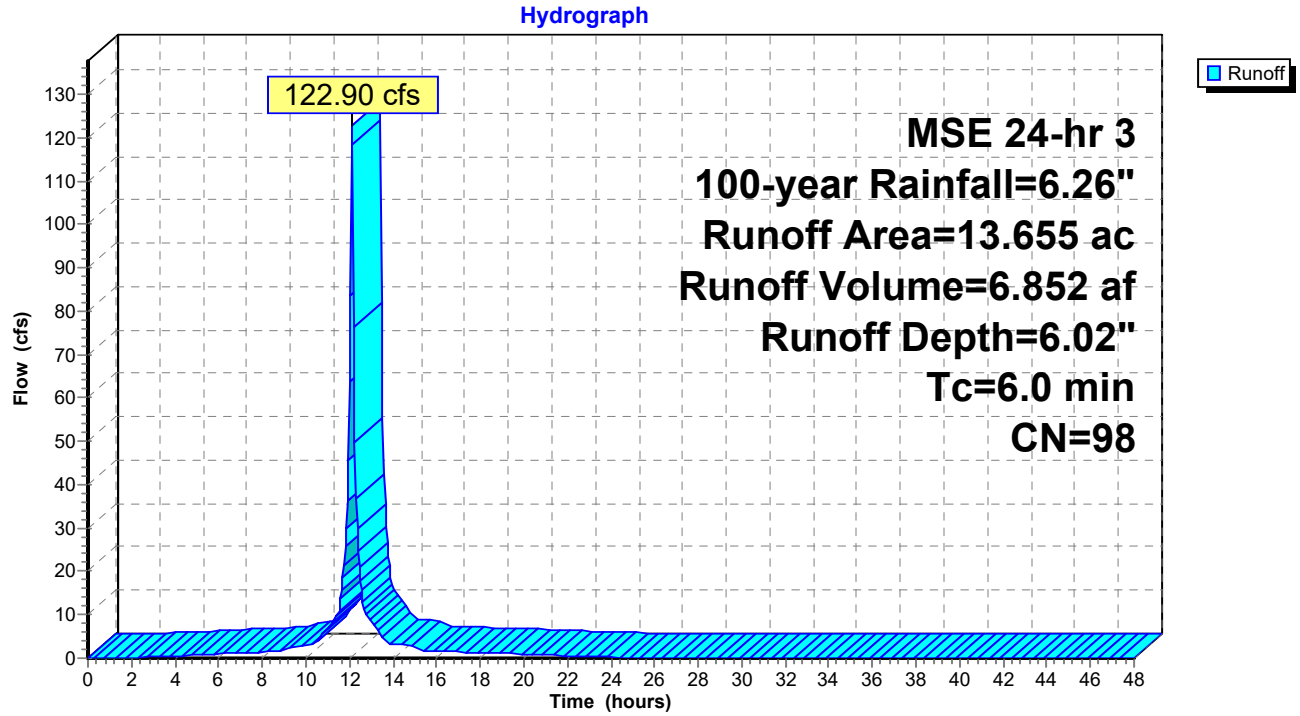
Runoff = 122.90 cfs @ 12.13 hrs, Volume= 6.852 af, Depth= 6.02"
Routed to Pond 2P : NE Inf Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-year Rainfall=6.26"

	Area (ac)	CN	Description
*	0.163	98	Paved roads, HSG B
*	1.227	98	Paved drives, HSG A
	1.346	98	Roofs, HSG A
	0.307	98	Paved parking, HSG A
*	0.337	98	Paved walks, HSG A
	0.506	98	Water Surface, 0% imp, HSG A
*	6.376	98	>75% Grass cover, Good, HSG A
*	3.393	98	Undeveloped Woods/grass comb., Poor, HSG A
	13.655	98	Weighted Average
	0.506		3.71% Pervious Area
	13.149		96.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum**

Subcatchment 2S: NE



Summary for Subcatchment 3S: E

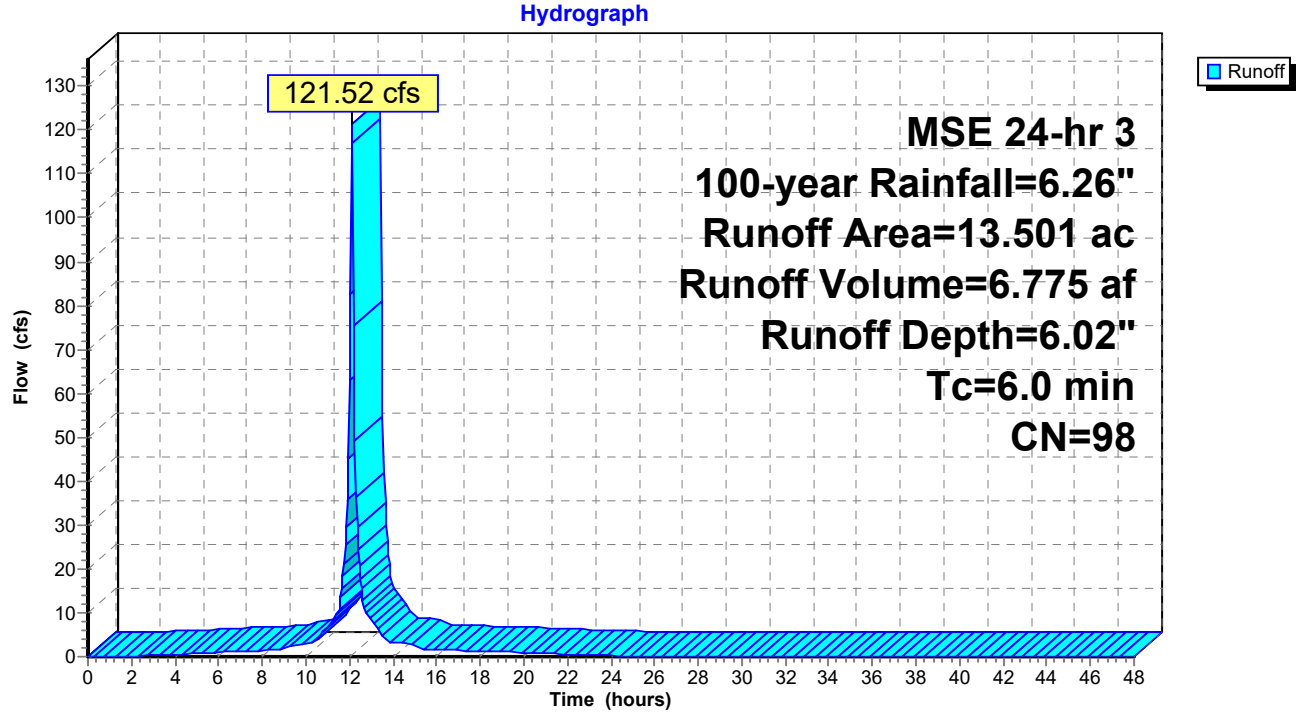
Runoff = 121.52 cfs @ 12.13 hrs, Volume= 6.775 af, Depth= 6.02"
Routed to Pond 3P : East Inf Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-year Rainfall=6.26"

	Area (ac)	CN	Description
*	1.934	98	Paved drives, HSG A
	1.888	98	Roofs, HSG A
	0.472	98	Paved parking, HSG A
*	0.652	98	Paved walks, HSG A
	0.442	98	Water Surface, 0% imp, HSG A
*	5.239	98	>75% Grass cover, Good, HSG A
*	2.874	98	Undeveloped Woods/grass comb., Poor, HSG A
	13.501	98	Weighted Average
	0.442		3.27% Pervious Area
	13.059		96.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum**

Subcatchment 3S: E



Summary for Pond 1P: NW Inf Pond

Inflow Area = 13.711 ac, 98.05% Impervious, Inflow Depth = 6.02" for 100-year event
Inflow = 123.41 cfs @ 12.13 hrs, Volume= 6.880 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

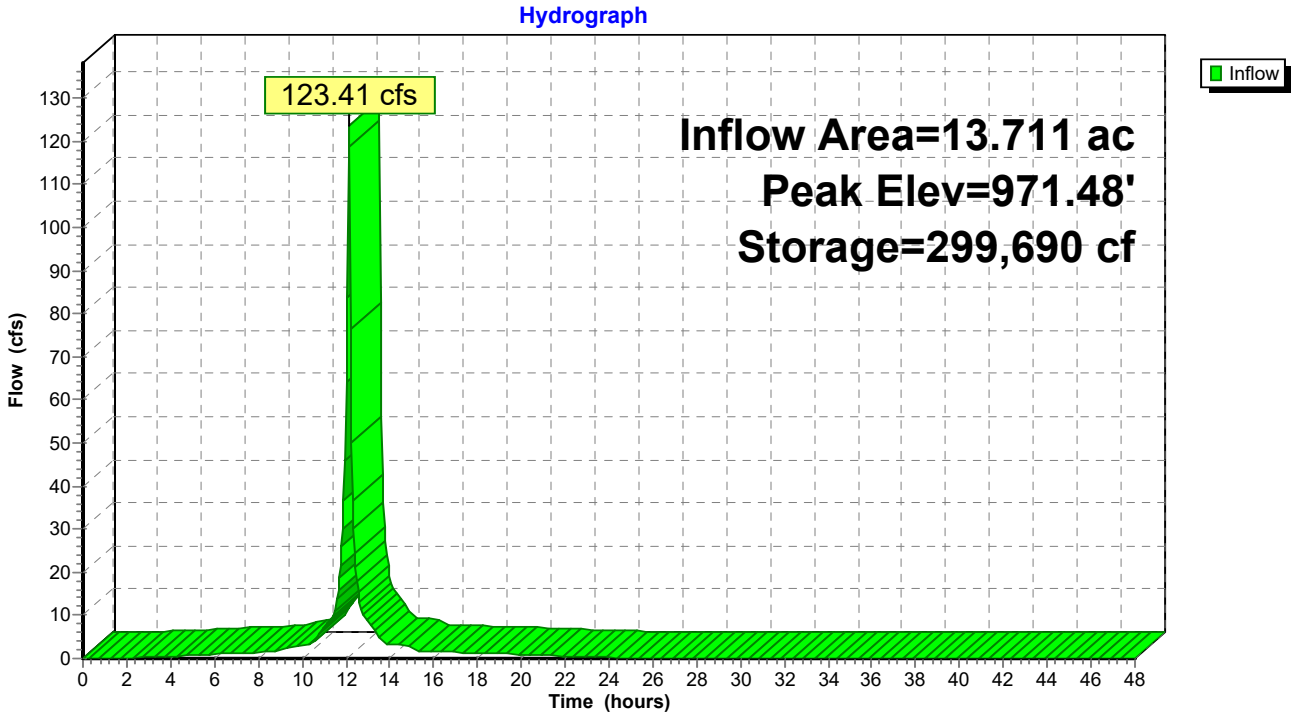
Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 971.48' @ 24.40 hrs Surf.Area= 67,409 sf Storage= 299,690 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	962.00'	416,608 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.00	7,245	0	0
963.00	15,330	11,288	11,288
964.00	18,315	16,823	28,110
965.00	21,405	19,860	47,970
966.00	24,600	23,003	70,973
967.00	28,570	26,585	97,558
968.00	34,660	31,615	129,173
969.00	41,790	38,225	167,398
970.00	49,670	45,730	213,128
971.00	61,720	55,695	268,823
972.00	73,620	67,670	336,493
973.00	86,610	80,115	416,608

Pond 1P: NW Inf Pond



Summary for Pond 2P: NE Inf Pond

Inflow Area = 13.655 ac, 96.29% Impervious, Inflow Depth = 6.02" for 100-year event
Inflow = 122.90 cfs @ 12.13 hrs, Volume= 6.852 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

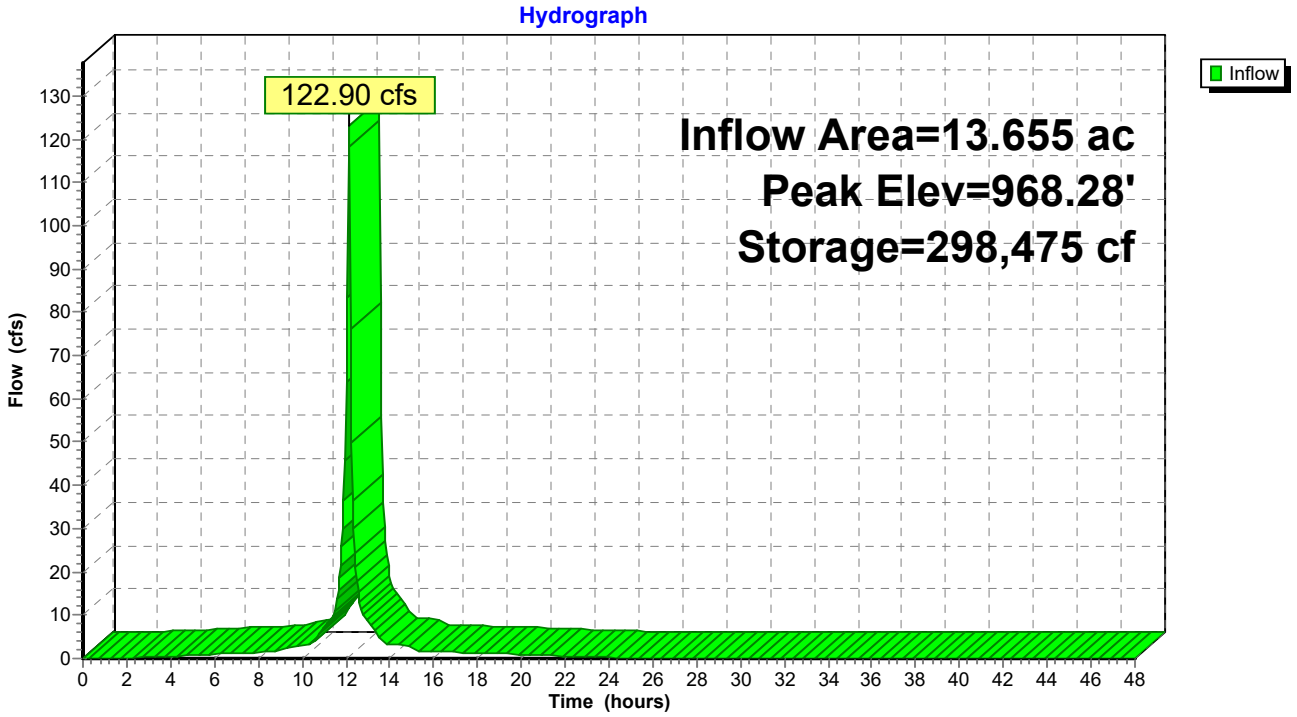
Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 968.28' @ 24.40 hrs Surf.Area= 55,391 sf Storage= 298,475 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	960.00'	567,415 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
960.00	14,595	0	0
961.00	25,680	20,138	20,138
962.00	28,185	26,933	47,070
963.00	30,790	29,488	76,558
964.00	33,495	32,143	108,700
965.00	39,885	36,690	145,390
966.00	43,300	41,593	186,983
967.00	47,800	45,550	232,533
968.00	53,360	50,580	283,113
969.00	60,550	56,955	340,068
970.00	69,030	64,790	404,858
971.00	80,830	74,930	479,788
972.00	94,425	87,628	567,415

Pond 2P: NE Inf Pond



Summary for Pond 3P: East Inf Pond

Inflow Area = 13.501 ac, 96.73% Impervious, Inflow Depth = 6.02" for 100-year event
Inflow = 121.52 cfs @ 12.13 hrs, Volume= 6.775 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

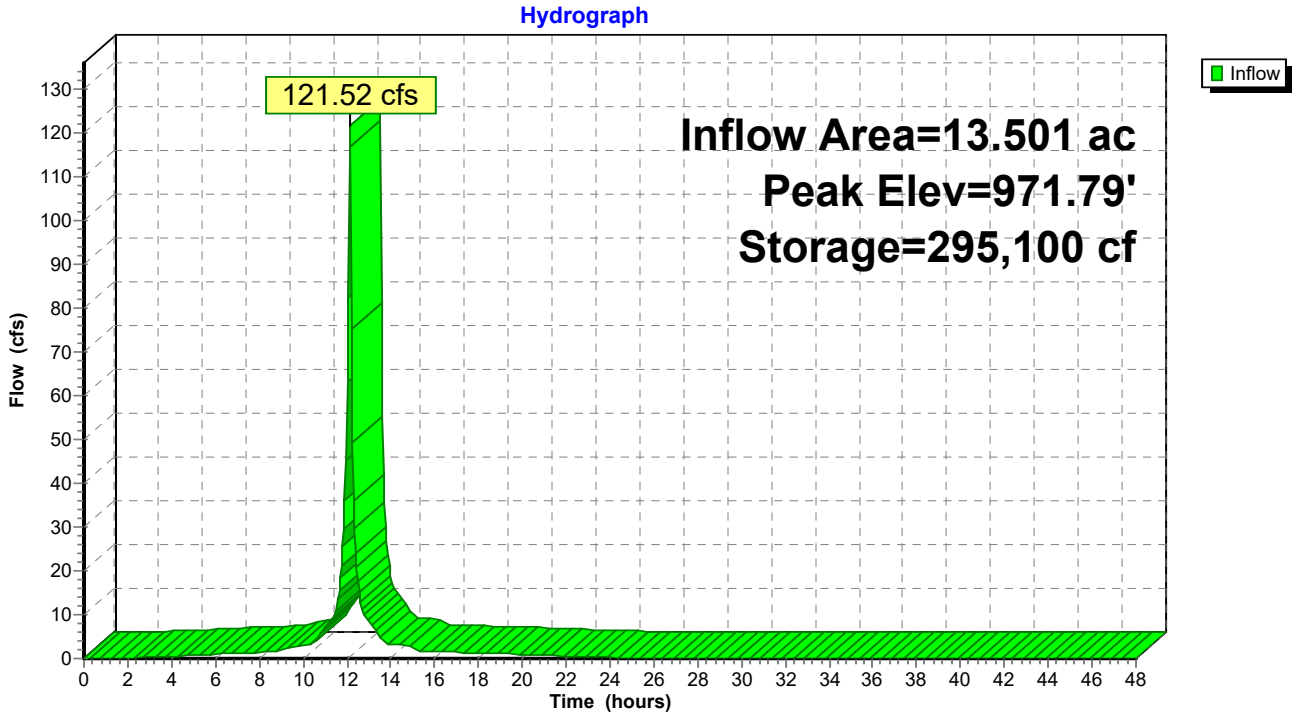
Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 971.79' @ 24.40 hrs Surf.Area= 55,886 sf Storage= 295,100 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	963.00'	544,443 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

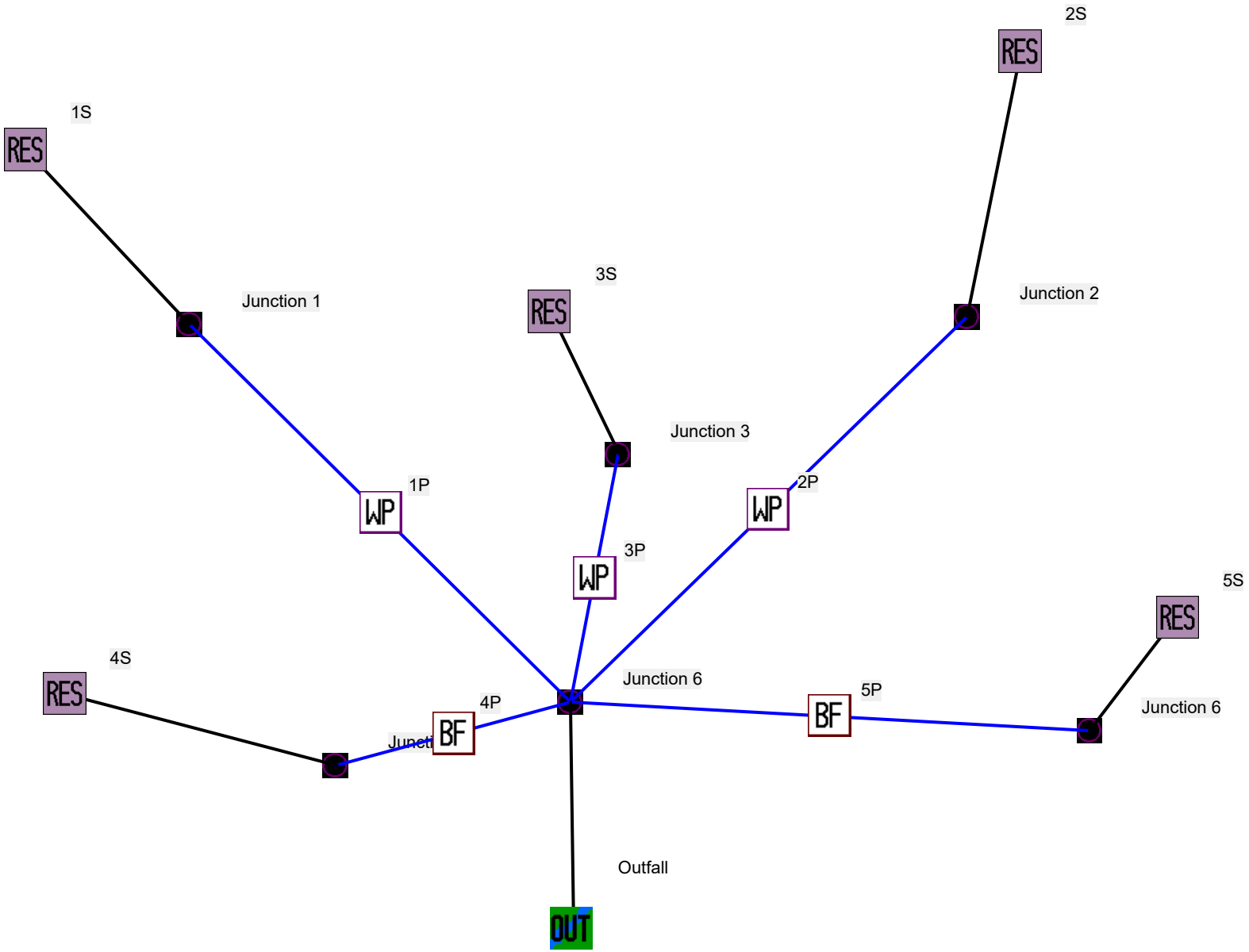
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
963.00	11,805	0	0
964.00	22,650	17,228	17,228
965.00	25,340	23,995	41,223
966.00	28,125	26,733	67,955
967.00	31,015	29,570	97,525
968.00	34,225	32,620	130,145
969.00	38,050	36,138	166,283
970.00	43,800	40,925	207,208
971.00	49,335	46,568	253,775
972.00	57,675	53,505	307,280
973.00	69,980	63,828	371,108
974.00	85,260	77,620	448,728
975.00	106,170	95,715	544,443

Pond 3P: East Inf Pond



Appendix 6

WinSLAMM Input/Output


2S
RES
1S
RES
Junction 1
3S
RES
Junction 2
Junction 3
1P
WP
2P
WP
3P
WP
5S
RES
4S
RES
Junction 6
4P
BF
5P
BF
Junction 6
Outfall
OUT

Data file name: S:\Design & Construction Services\Mandel\490686 Hartland\Stormwater\WinSLAMM\Hartland Apartments.mdb
WinSLAMM Version 10.5.0
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee Five Year Rainfall.ran
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/02/66 Study period ending date: 12/29/70
Start of Winter Season: 12/02 End of Winter Season: 03/12
Date: 08-25-2023 Time: 09:21:58
Site information:
Hartland Apartments Site

LU# 1 - Residential: 1S Total area (ac): 13.711
  1 - Roofs 1: 1.544 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  13 - Paved Parking 1: 0.408 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  25 - Driveways 1: 1.562 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  31 - Sidewalks 1: 0.455 ac. Disconnected Normal Sandy Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  37 - Streets 1: 0.491 ac. Intermediate Street Length = 0.3376 mi Street Width = 11.99867 ft Street Edges = 2
    Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  51 - Small Landscaped Areas 1: 6.586 ac. Normal Sandy Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  57 - Undeveloped Areas 1: 2.398 ac. Normal Sandy Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
  70 - Water Body Areas: 0.267 ac. Source Area PSD File:

LU# 2 - Residential: 2S   Total area (ac): 13.655
     1 - Roofs 1: 1.346 ac.   Pitched   Connected   Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     13 - Paved Parking 1: 0.307 ac.   Connected   Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1: 1.227 ac.   Connected   Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     31 - Sidewalks 1: 0.337 ac.   Disconnected   Normal Sandy   Source Area
PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1: 0.163 ac.   Intermediate   Street Length = 0.1121 mi
Street Width = 11.99599 ft   Street Edges = 1
            Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area
PSD File: C:\WinSLAMM Files\NURP.cpz
     51 - Small Landscaped Areas 1: 6.376 ac.   Normal Sandy   Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     57 - Undeveloped Areas 1: 3.393 ac.   Normal Sandy   Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     70 - Water Body Areas: 0.506 ac.   Source Area PSD File:

LU# 3 - Residential: 3S   Total area (ac): 13.501
     1 - Roofs 1: 1.888 ac.   Pitched   Connected   Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     13 - Paved Parking 1: 0.472 ac.   Connected   Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1: 1.934 ac.   Connected   Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     31 - Sidewalks 1: 0.652 ac.   Disconnected   Normal Sandy   Source Area
PSD File: C:\WinSLAMM Files\NURP.cpz
     51 - Small Landscaped Areas 1: 5.239 ac.   Normal Sandy   Source Area PSD
File: C:\WinSLAMM Files\NURP.cpz
     57 - Undeveloped Areas 1: 2.874 ac.   Normal Sandy   Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     70 - Water Body Areas: 0.442 ac.   Source Area PSD File:

LU# 4 - Residential: 4S   Total area (ac): 3.418
     1 - Roofs 1: 0.587 ac.   Pitched   Connected   Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     13 - Paved Parking 1: 0.275 ac.   Connected   Source Area PSD File:
C:\WinSLAMM Files\NURP.cpz
     25 - Driveways 1: 0.514 ac.   Connected   Source Area PSD File: C:\WinSLAMM
Files\NURP.cpz
     31 - Sidewalks 1: 0.168 ac.   Disconnected   Normal Sandy   Source Area
PSD File: C:\WinSLAMM Files\NURP.cpz
     37 - Streets 1: 0.055 ac.   Intermediate   Street Length = 0.0378 mi
Street Width = 12.00397 ft   Street Edges = 1
            Default St. Dirt Accum.   Annual Winter Load = 2500 lbs   Source Area
PSD File: C:\WinSLAMM Files\NURP.cpz

51 - Small Landscaped Areas 1: 1.745 ac. Normal Sandy Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.074 ac. Source Area PSD File:

LU# 5 - Residential: 5S Total area (ac): 4.370
1 - Roofs 1: 0.470 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.141 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.869 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.345 ac. Disconnected Normal Sandy Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.291 ac. Normal Sandy Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 1.119 ac. Normal Sandy Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.135 ac. Source Area PSD File:

Control Practice 1: Wet Detention Pond CP# 1 (DS) - 1P
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 5
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 45
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 5.5
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0083	0.00	0.00
2	1.00	0.0147	0.00	0.00
3	2.00	0.0232	0.00	0.00
4	3.00	0.0344	0.00	0.00
5	4.00	0.0489	0.00	0.00

6	5.00	0.1003	0.00	0.00
7	6.00	0.3519	0.00	0.00
8	7.00	0.4205	0.00	0.00
9	8.00	0.4914	0.00	0.00
10	9.00	0.5647	0.00	0.00
11	10.00	0.6559	0.00	0.00
12	11.00	0.7957	0.00	0.00
13	12.00	0.9594	0.00	0.00
14	13.00	1.1403	0.00	0.00
15	14.00	1.4169	0.00	0.00
16	15.00	1.6901	0.00	0.00
17	16.00	1.9883	0.00	0.00

Control Practice 2: Wet Detention Pond CP# 2 (DS) - 2P

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 5

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 165
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 5.5

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0151	0.00	0.00
2	1.00	0.0281	0.00	0.00
3	2.00	0.0420	0.00	0.00
4	3.00	0.0566	0.00	

0.00

	5	4.00	0.0720	0.00
0.00				
	6	5.00	0.1582	0.00
0.00				
	7	6.00	0.5895	0.00
0.00				
	8	7.00	0.6470	0.00
0.00				
	9	8.00	0.7068	0.00
0.00				
	10	9.00	0.7689	0.00
0.00				
	11	10.00	0.9156	0.00
0.00				
	12	11.00	0.9940	0.00
0.00				
	13	12.00	1.0973	0.00
0.00				
	14	13.00	1.2250	0.00
0.00				
	15	14.00	1.3900	0.00
0.00				
	16	15.00	1.5847	0.00
0.00				
	17	16.00	1.8556	0.00
0.00				
	18	17.00	2.1677	0.00
0.00				

Control Practice 3: Wet Detention Pond CP# 3 (DS) - 3P
Particle Size Distribution file name: Not needed - calculated by program
Initial stage elevation (ft): 0
Peak to Average Flow Ratio: 3.8
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 70
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 5.5
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0605	0.00	0.00

2	1.00	0.0701	0.00	0.00
3	2.00	0.0804	0.00	0.00
4	3.00	0.0913	0.00	0.00
5	4.00	0.1029	0.00	0.00
6	5.00	0.1706	0.00	0.00
7	6.00	0.5200	0.00	0.00
8	7.00	0.5817	0.00	0.00
9	8.00	0.6457	0.00	0.00
10	9.00	0.7120	0.00	0.00
11	10.00	0.7857	0.00	0.00
12	11.00	0.8735	0.00	0.00
13	12.00	1.0055	0.00	0.00
14	13.00	1.1326	0.00	0.00
15	14.00	1.3240	0.00	0.00
16	15.00	1.6065	0.00	0.00
17	16.00	1.9573	0.00	0.00
18	17.00	2.4373	0.00	0.00

Control Practice 4: Biofilter CP# 1 (DS) - 4P

1. Top area (square feet) = 5150
2. Bottom aea (square feet) = 3240
3. Depth (ft): 5.85
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 3.6
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 0.001
9. Depth of biofilter that is rock filled (ft) 1.5
10. Porosity of rock filled volume = 0.33
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 2.25
13. Engineered soil porosity = 0.27

14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data | Soil Type Fraction in Eng. Soil
User-Defined Media Type | 1.000

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir
1. Weir crest length (ft): 20
2. Weir crest width (ft): 8
3. Height of datum to bottom of weir opening: 5.75

Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 2
2. Stand pipe height above datum (ft): 4.75

Outlet type: Drain Tile/Underdrain
1. Underdrain outlet diameter (ft): 0.5
2. Invert elevation above datum (ft): 0
3. Number of underdrain outlets: 1

Control Practice 5: Biofilter CP# 2 (DS) - 5P
1. Top area (square feet) = 8540
2. Bottom aea (square feet) = 5895
3. Depth (ft): 5.85
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 3.6
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 0.001
9. Depth of biofilter that is rock filled (ft) 1.5
10. Porosity of rock filled volume = 0.33
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 2.25
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data | Soil Type Fraction in Eng. Soil
User-Defined Media Type | 1.000

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir
1. Weir crest length (ft): 20
2. Weir crest width (ft): 8
3. Height of datum to bottom of weir opening: 5.75

Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 2
2. Stand pipe height above datum (ft): 4.75

Outlet type: Drain Tile/Underdrain

1. Underdrain outlet diameter (ft): 0.5
2. Invert elevation above datum (ft): 0
3. Number of underdrain outlets: 1

SLAMM for Windows Version 10.5.0
(c) Copyright Robert Pitt and John Voorhees 2019, All Rights Reserved

Data file name: S:\Design & Construction Services\Mandel\490686 Hartland\Stormwater\WinSLAMM\Hartland Apartments.mdb
WinSLAMM Version 10.5.0
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee Five Year Rainfall.ran
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/02/66 Study period ending date: 12/29/70
Start of Winter Season: 12/02 End of Winter Season: 03/12
Model Run Start Date: 01/02/66 Model Run End Date: 12/29/70
Date of run: 08-25-2023 Time of run: 09:21:05
Total Area Modeled (acres): 48.655
Years in Model Run: 4.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	5.895E+06	-	101.8	37460	-
Outfall Total with Controls:	5.852E+06	0.73%	26.41	9647	74.25%
Annualized Total After Outfall Controls:	1.172E+06			1933	

Pollutant	Conc. No Controls	Conc. With Controls	Conc. Units	Pollutant Yield No Controls	Pollutant Yield With Controls	Pol. Yield Units	Percent Reduction
Particulate Solids	101.8	26.41	mg/L	37460	9647	lbs	74.25 %
Total Phosphorus	0.3306	0.1431	mg/L	121.7	52.28	lbs	57.04 %

Biofilter # 1 is expected to clog in 11.85 years.. Percent Solids Reduction due to Engineered Media = 80
Biofilter # 2 is expected to clog in 20.59 years.. Percent Solids Reduction due to Engineered Media = 80

Appendix 7

USLE Soil Loss Calculation and

Erosion Control Plan

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Appendix 8

Storm Water Details

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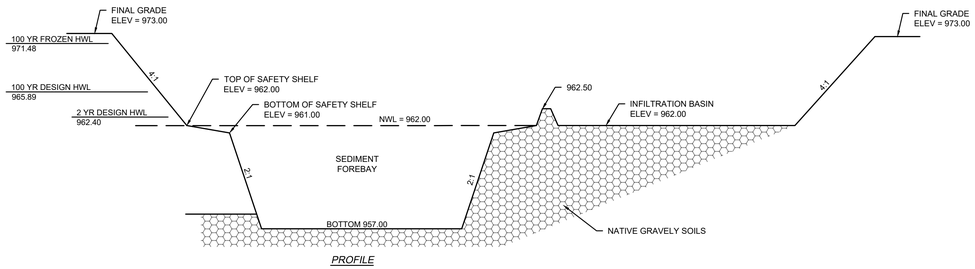
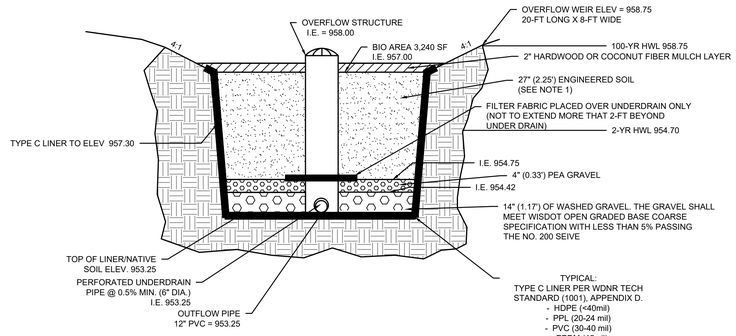
PRELIMINARY NOT FOR CONSTRUCTION

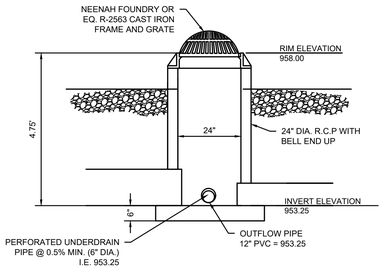


PROFILE

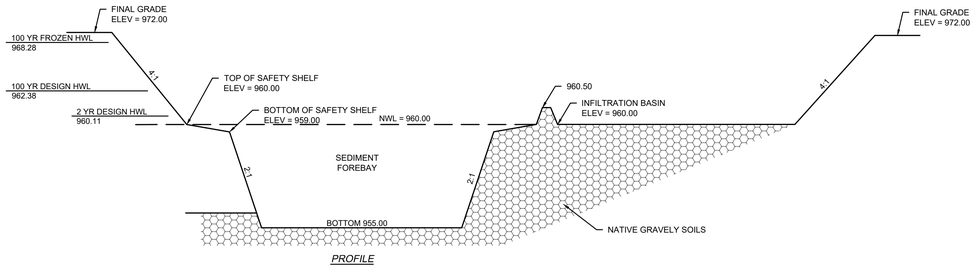
NW INFILTRATION POND DETAIL
1P



SW BIORETENTION POND
4P

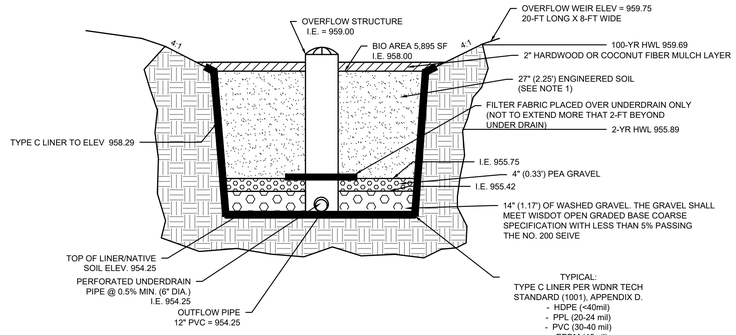


BIORETENTION OVERFLOW
STRUCTURE DETAIL

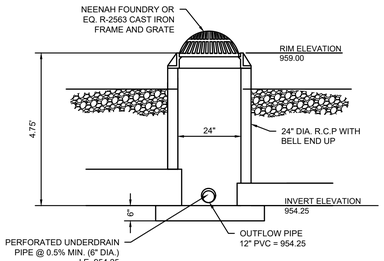


PROFILE

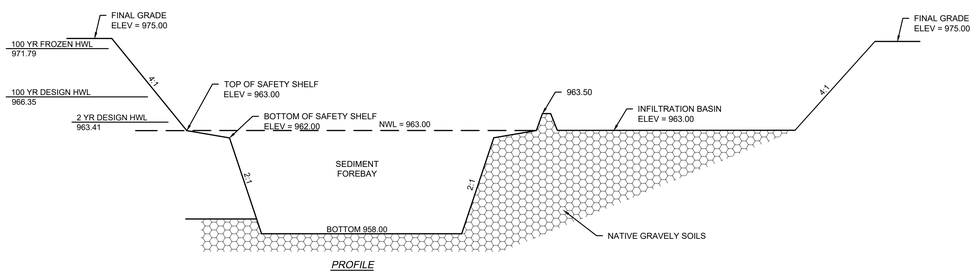
NE INFILTRATION POND DETAIL
2P



SE BIORETENTION POND
5P



BIORETENTION OVERFLOW
STRUCTURE DETAIL



PROFILE

EAST INFILTRATION POND DETAIL
3P

BIORETENTION NOTES:

1. DO NOT ADD ENGINEERED MEDIA UNTIL AFTER THE PAVING IS COMPLETED AND LANDSCAPE AREAS ARE STABILIZED.
2. ENGINEERED SOIL MIX SHALL BE PLACE WITH NO MECHANICAL COMPACTION (INCLUDING EQUIPMENT TRACKING OVER THE SURFACE).
3. ENGINEERED SOIL SHALL BE PLACED IN 6" LIFTS AND SPRINKLED WITH WATER AFTER EACH LIFT TO ACHIEVE SETTLEMENT.
4. ENGINEERED SOIL SHALL CONSIST OF A MIXTURE OF 70% TO 75% SAND AND 25% TO 30% COMPOST. THE PERCENTAGES ARE BASED ON VOLUME. THE ENGINEERED SOIL SHALL MEET THE REQUIREMENTS OF WDNR TECHNICAL STANDARD 1004.
5. SAND INTERFACE LAYER: 3-INCHES OF SAND SHALL BE PLACED BELOW THE GRAVEL LAYER AND VERTICALLY MIXED WITH THE NATIVE SOIL TO A DEPTH OF 4-INCHES, PER WDNR TECHNICAL STANDARD 1002.
6. A PERSON TRAINED AND EXPERIENCED IN THE CONSTRUCTION, OPERATION AND MAINTENANCE OF INFILTRATIONS DEVICES SHALL BE RESPONSIBLE FOR CONSTRUCTION OF THE DEVICE.
7. CONSTRUCTION OF THE BIORETENTION DEVICE SHALL FOLLOW THE REQUIREMENTS OF WDNR TECHNICAL STANDARD 1002. CONSTRUCTION AND OVERSIGHT SHALL FOLLOW SECTION "C" OF THE TECHNICAL STANDARD.

DIGGERS HOTLINE
Toll Free (800) 242-8511
Milwaukee Area (414) 259-1181
Hearing Impaired TDD (800) 542-2289
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NO	REVISION DESCRIPTION	DATE

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(920) 757-7559

PROJECT
HARTLAND APARTMENTS
700 W CAPITOL DR
VILLAGE OF HARTLAND, WI

CLIENT
THREE LEAF PARTNERS
504 W JUNEAU AVE
MILWAUKEE, WI 53203

Seal

SHEET TITLE
CONSTRUCTION DETAILS
POND DETAILS

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Drawing Scale:	1" = 20'
Drawn:	JNL 08/25/2023
Checked:	
P&D Project No:	490686
Sheet No.	**8.0**

Appendix 9

Storm Water Maintenance Agreement

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August 2023

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