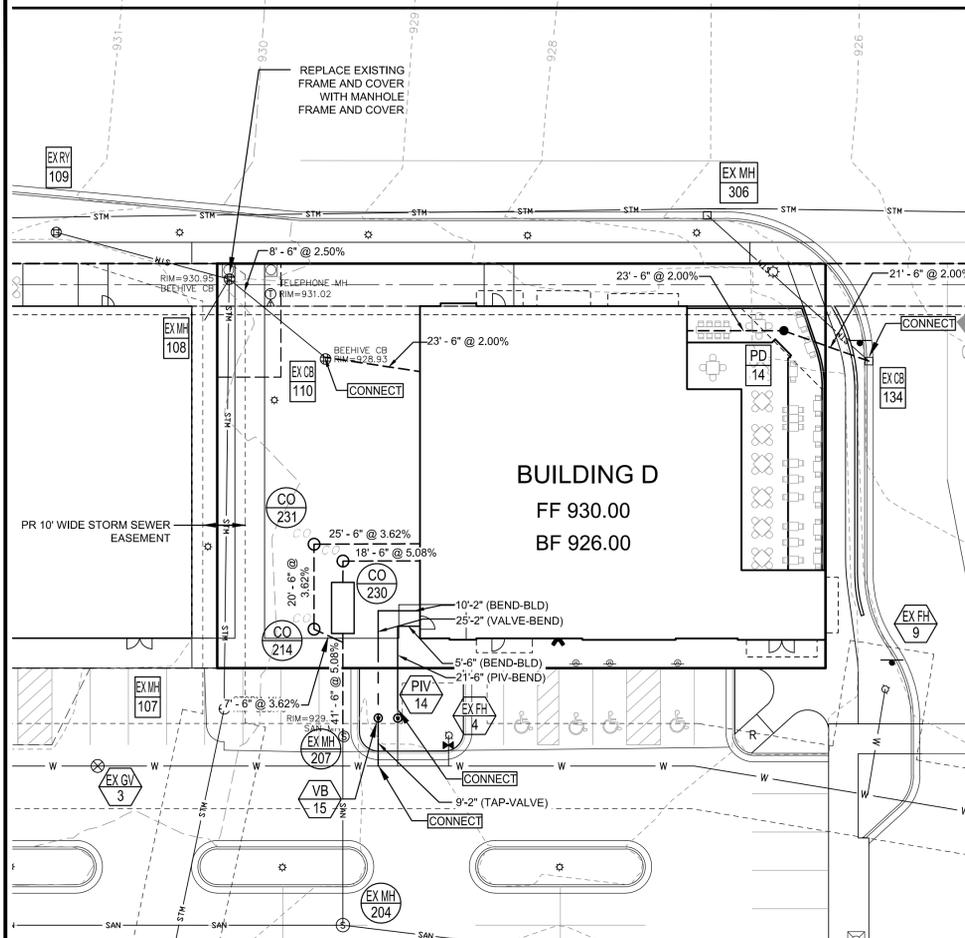


ANN ARBOR-SALINE ROAD
(PUBLIC, 120' WIDE)



NOTES:

1. NEW FRANCHISED UTILITY LOCATIONS WILL BE SHOWN ON THE AS-BUILT PLANS. IF LOCATIONS ARE KNOWN PRIOR TO CONSTRUCTION, UTILITY ROUTING WILL BE ADDED TO THE CONSTRUCTION PLANS.

MATERIALS:

1. STORM SEWER: ROOF DRAIN LEADS - 6" - PVC, SCH 40
 2. SANITARY SEWER: 6" LEADS - SDR 26 PVC SANITARY SEWER MANHOLES SHALL NOT HAVE SUMPS UNLESS NOTED
 3. GREASE INTERCEPTOR: CONCRETE GREASE INTERCEPTOR
 4. WATERMAIN: 6" - DUCTILE IRON CL 54 DOUBLE CEMENT LINED
2" - TYPE 'K' COPPER
- DOMESTIC
ALL WATERMAIN SHALL BE RESTRAINED PER
DIPRA
STANDARDS

CONNECT NOTE:

CONNECT

CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT CONNECTIONS AND CROSSINGS AND SUPPLY ELEVATIONS AND LOCATIONS TO THE DESIGN ENGINEER TO CONFIRM OR ADJUST DESIGN. CONTRACTOR SHALL CONNECT BUILDING FIRE SERVICE AND HYDRANT LEADS TO THE EXISTING TEES CONSTRUCTED PER THE APPROVED PHASE 1 CONSTRUCTION PLANS DATED APRIL 18, 2014 AND RECORD DRAWING PLANS, INCLUDING ANY UPDATED PLANS DURING CONSTRUCTION.

COMPACTION NOTE:

COMPACTION OF TRENCHES IS REQUIRED IN ROADWAY CORRIDORS, SIDEWALKS AND PARKING LOTS. (CLASS II GRANULAR BACKFILL AT 95% COMPACTION)

CGM - COMPACTED CL II GRANULAR MATERIAL

UTILITY NOTES:

1. REFER TO ARCHITECTURAL PLANS TO COORDINATE ALL:
 - A. WATER SUPPLY, METERING, SPRINKLER AND FDC PIPING, DESIGN AND COORDINATION
 - B. BUILDING SEWER, BUILDING DRAIN DESIGN AND CONNECTIONS TO CLEAN OUTS AND ROOF CONNECTORS
 - C. GAS, ELECTRIC AND COMMUNICATION SERVICES, AND LIGHTING DETAILS
 - D. ALL BUILDING ACCESS WALKS AND ENTRY DETAILS, INCLUDING SUPPORTED SLABS
 - E. ALL WORK TO CONSTRUCT THE BUILDING AND ALL ITEMS CONNECTED TO IT
2. ALL TRENCHES WITHIN A ONE ON ONE SLOPE OF PAVEMENT SHALL BE BACKFILLED WITH SAND (MDOT CLASS II MINIMUM) AND MECHANICALLY COMPACTED IN NOT MORE THAN 9" LAYER TO 95% MAXIMUM DRY DENSITY PER MODIFIED PROCTER COMPACTION TEST ASTM D-1557. COMPACTED SAND BACKFILL SHALL ALSO BE PROVIDED FOR ALL SEWER TRENCHES LOCATED UNDER, OR WITHIN, THREE FEET OF PAVEMENT.
3. A MINIMUM VERTICAL CLEARANCE OF 18 INCHES IS REQUIRED AT UTILITY CROSSINGS (MEASURED FROM THE OUTSIDE OF PIPE TO THE OUTSIDE OF PIPE). POSITIVE PROVISIONS SHALL BE MADE TO ENSURE THAT ALL UTILITY TRENCHES ARE FREE DRAINING DURING ALL PHASES OF CONSTRUCTION.
4. THE MINIMUM SLOPE FOR A BUILDING LEAD IS 1%. LEADS SHALL ONLY BE CONNECTED TO THE MAIN LINE WITH WYES.
5. ALL STORM SEWER PIPE SHALL BE CONSTRUCTED WITH RUBBER GASKET (PREMIUM) JOINTS.
6. THE CONTRACTOR SHALL COORDINATE THE REMOVAL OF ALL UTILITY LINES AND STRUCTURES, AS OUTLINED ON THE DEMOLITION PLAN, WITH THE INSTALLATION OF UTILITY IMPROVEMENTS.
7. CONTRACTOR SHALL BE REQUIRED TO COORDINATE THE INSTALLATION OF GAS, ELECTRIC, PHONE, CABLE, SPRINKLERS ETC., IN SUCH A MANNER THAT WILL FACILITATE THEIR PROPER INSTALLATION PRIOR TO PLACING THE PAVEMENT MATERIALS. ENSURE THAT ALL REQUIRED PIPES, CONDUITS, CABLES AND SLEEVES ARE PROPERLY PLACED AND THAT THE TRENCHES ARE PROPERLY BACKFILLED AND COMPACTED.
8. THE CONTRACTOR SHALL REMOVE UTILITIES, WHICH HAVE BEEN ABANDONED IN PLACE, AS REQUIRED TO COMPLETE INSTALLATION OF NEW UTILITIES. WHENEVER ABANDONED UTILITIES ARE CUT, CONTRACTOR SHALL COMPLETELY CAP BOTH ENDS TO PREVENT THE INFILTRATION OF SOILS.
9. NO CONNECTION MAY BE MADE TO ANY EXISTING WATER MAIN UNTIL THE NEW MAIN HAS PASSED ALL PRESSURE AND BACTERIOLOGICAL TESTING.
10. ROADWAY, DRIVEWAY AND PARKING AREA CROSSINGS SHALL BE TEMPORARILY CONDITIONED IMMEDIATELY AFTER CROSSING BY PLACING 8" OF MDOT 22A GRAVEL OR SLAG AGGREGATE, AND SHALL BE MAINTAINED IN GOOD, DUST FREE CONDITION UNTIL PAVEMENT RESTORATION IS MADE.
11. WATER LEADS SHALL HAVE A MINIMUM OF 6 FEET OF COVER.
12. IT IS THE CONTRACTOR'S RESPONSIBILITY TO TELEVISION AND VERIFY EX UTILITIES AND BUILDING LEADS THAT WILL BE RE-USED AND ARE FULLY FUNCTIONAL. ANY BROKEN OR DEFECTIVE MATERIAL MUST BE REPLACED AS PART OF THIS SITE PLAN.
13. THE TOWNSHIP OF PITTSFIELD'S INSPECTING ENGINEER SHALL VERIFY THE BEARING CAPACITY OF THE NATIVE SOILS TO VERIFY AN ADEQUATE BEDDING DEPTH IS PROVIDED.
14. ALL FIELD MEASUREMENT (FM) INFORMATION PROVIDED BY STANTEC.



Engineers
Surveyors
Planners
Landscape Architects
Environmental Specialists

1025 E. Maple Road
Suite 100
Birmingham, MI 48009
p (248) 852-3100
f (248) 852-6372
www.giffelswebster.com

Executive: M.P.
Manager: N.M.S.
Designer: N.M.S.
Quality Control:
Section: 7
T-3-S R-6-E

Professional Seal



| DATE: | ISSUE: |
|------------|------------------------------|
| 12.14.2015 | SUBMIT PRELIMINARY SITE PLAN |
| 02.02.2016 | RESUBMIT SITE PLAN |
| 02.15.2016 | ADD WALL AROUND FOUNTAIN |
| 03.18.2016 | RESUBMIT SITE PLAN |

Developed For:
VERSA DEVELOPMENT

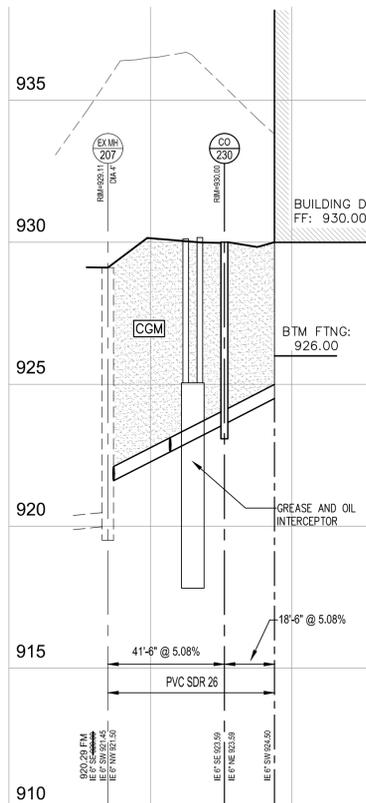
25900 W. 11 MILE ROAD
SUITE 250
SOUTHFIELD, MI 48034
(248) 416-1985

UTILITY PLAN AND PROFILES

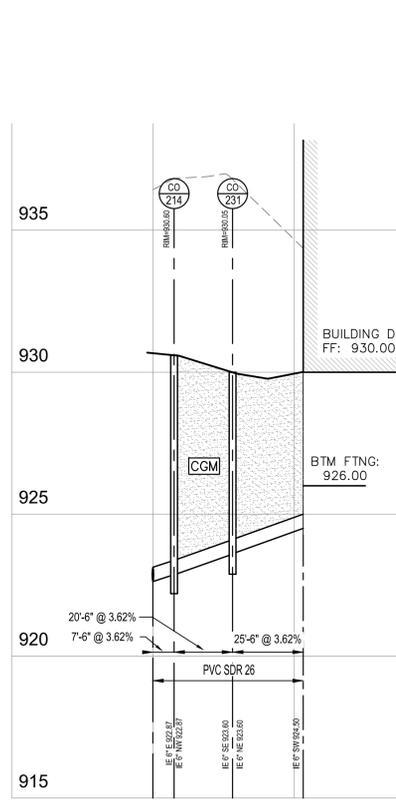
VERSA PITTSFIELD PAD D
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY
MICHIGAN

Date: 12.14.2015
Scale: 1" = 20'
Sheet: 8
Project: 18270.30

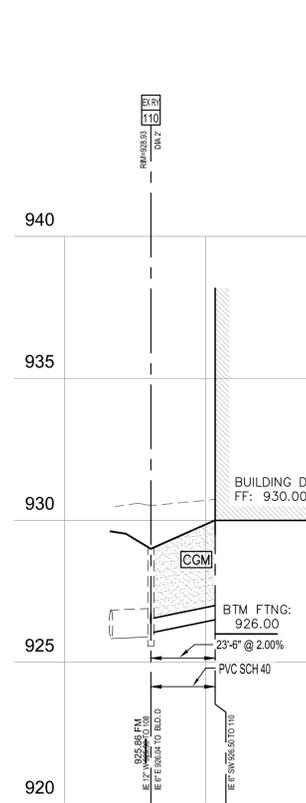
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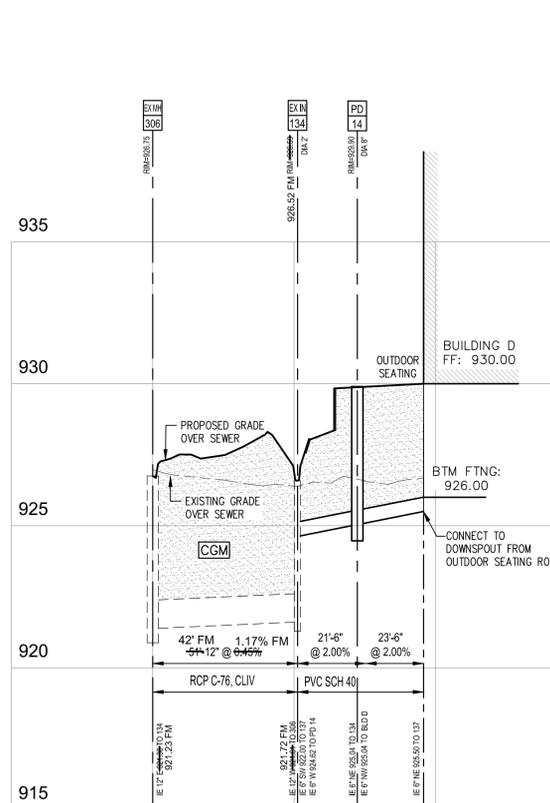
SANITARY-GREASE
SCALE: H:1"=30', V: 1"=3'



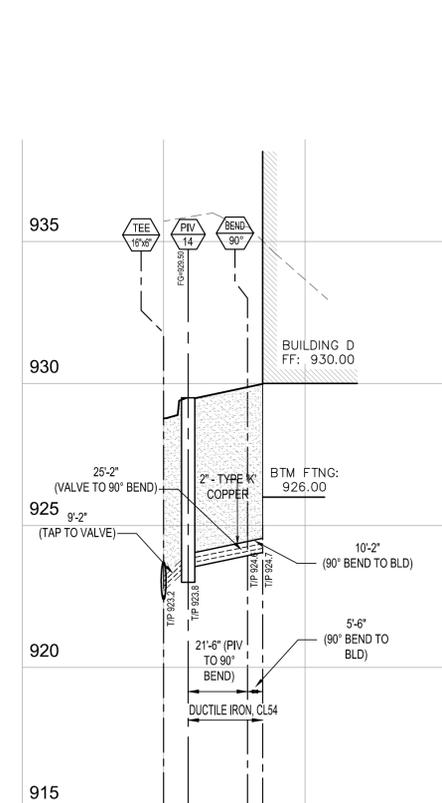
SANITARY
SCALE: H:1"=30', V: 1"=3'



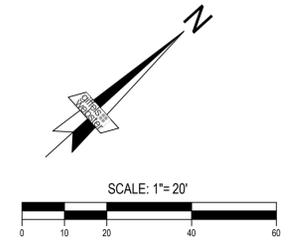
STORM: RY10-BLD
SCALE: H:1"=30', V: 1"=3'



STORM: IN134-BLD
SCALE: H:1"=30', V: 1"=3'



WATER LEAD
SCALE: H:1"=30', V: 1"=3'



| From | To | Catchment Area (acres) | Runoff C Factor | Total Equip Area (acres) | Total Time of Concentration Tc (min) | Total Rainfall Intensity (in/hr) | Total Flow (cfs) | Pipe Capacity (cfs) | Pipe Diameter (inches) | Pipe Length (feet) | Pipe Slope (percent) | Pipe Velocity (ft/s) | Time of Flow (min) | Upstream Rim Elevation | Downstream Rim Elevation | Upstream Invert Elevation | Downstream Invert Elevation | HGL Slope (percent) | Upstream HGL (feet) | Downstream HGL (feet) | |
|--|-----------|------------------------|-----------------|--------------------------|--------------------------------------|----------------------------------|------------------|---------------------|------------------------|--------------------|----------------------|----------------------|--------------------|------------------------|--------------------------|---------------------------|-----------------------------|---------------------|---------------------|-----------------------|--|
| Southwest Detention System | | | | | | | | | | | | | | | | | | | | | |
| Bld A Lead | RY 106 | 0.11 | 0.95 | 0.10 | 15.00 | 4.38 | 0.48 | 0.79 | 6 | 12 | 2.00% | 4.05 | 0.05 | 932.50 | 932.50 | 929.84 | 929.80 | 0.66 | 930.38 | 930.30 | |
| RY 106 | MH 105 | 0.05 | 0.41 | 0.13 | 15.05 | 4.37 | 0.55 | 2.39 | 12 | 24 | 0.45% | 3.05 | 0.13 | 932.50 | 934.38 | 929.50 | 929.39 | 0.02 | 930.30 | 930.19 | |
| MH 105 | CB 104 | 0.00 | 0.00 | 0.13 | 15.18 | 4.36 | 0.55 | 6.37 | 12 | 153 | 3.20% | 8.14 | 0.31 | 934.38 | 929.40 | 929.30 | 924.40 | 0.02 | 930.10 | 925.20 | |
| CB 104 | MH 101 | 0.30 | 0.88 | 0.39 | 15.48 | 4.32 | 1.68 | 4.83 | 12 | 38 | 1.84% | 6.17 | 0.10 | 929.40 | 929.19 | 924.30 | 923.60 | 0.22 | 925.10 | 924.40 | |
| MH 101 | DETENTION | 0.00 | 0.00 | 1.59 | 15.60 | 4.31 | 6.83 | 7.05 | 18 | 22 | 0.45% | 4.00 | 0.09 | 929.19 | | 921.35 | 921.25 | 0.42 | 922.55 | 922.45 | |
| IN 111 | CB 102 | 0.44 | 0.88 | 0.39 | 15.00 | 4.38 | 1.69 | 2.39 | 12 | 98 | 0.45% | 3.05 | 0.54 | 927.00 | 928.00 | 922.50 | 922.06 | 0.23 | 923.30 | 922.89 | |
| CB 102 | MH 101 | 0.33 | 0.91 | 0.87 | 15.54 | 4.32 | 3.76 | 5.36 | 18 | 93 | 0.26% | 3.04 | 0.51 | 928.00 | 29.19 | 921.69 | 921.45 | 0.13 | 922.89 | 922.65 | |
| Bld D Lead | PD 13 | 0.10 | 0.95 | 0.10 | 15.00 | 4.38 | 0.42 | 0.69 | 6 | 5 | 1.50% | 3.51 | 0.02 | 930.60 | 930.00 | 928.08 | 928.00 | 0.55 | 926.50 | 926.47 | |
| PD 13 | PD 12 | 0.02 | 0.53 | 0.11 | 16.05 | 4.28 | 0.45 | 0.89 | 6 | 50 | 1.50% | 3.51 | 0.24 | 930.00 | 930.67 | 925.96 | 925.21 | 0.64 | 926.96 | 926.64 | |
| PD 12 | MH 108 | 0.02 | 0.54 | 0.12 | 0.00 | 7.00 | 0.81 | 0.89 | 6 | 8 | 2.50% | 4.53 | 0.03 | 930.00 | 930.67 | 925.41 | 925.21 | 2.10 | 926.64 | 926.47 | |
| MH 108 | MH 107 | 0.00 | 0.51 | 0.18 | 15.02 | 4.37 | 0.80 | 2.39 | 12 | 102 | 0.45% | 3.05 | 0.56 | 930.00 | 930.67 | 925.67 | 925.21 | 0.05 | 926.47 | 926.01 | |
| MH 107 | CB 102 | 0.00 | 0.00 | 0.18 | 15.58 | 4.31 | 0.79 | 5.58 | 12 | 86 | 2.45% | 7.12 | 0.20 | 930.67 | 928.00 | 925.11 | 923.00 | 0.05 | 925.91 | 923.80 | |
| Bld B Lead | RY 108 | 0.07 | 0.95 | 0.07 | 15.00 | 4.38 | 0.29 | 0.79 | 6 | 10 | 2.00% | 4.05 | 0.04 | | 930.00 | 928.40 | 928.20 | 0.27 | 928.80 | 928.60 | |
| PD 1 | PD 2 | 0.0041 | 0.95 | 0.00 | 15.00 | 4.38 | 0.02 | 0.59 | 6 | 10 | 1.10% | 3.01 | 0.06 | 933.00 | 933.40 | 929.40 | 929.29 | 0.00 | 929.80 | 929.69 | |
| PD 2 | PD 3 | 0.0028 | 0.95 | 0.01 | 15.06 | 4.37 | 0.03 | 0.59 | 6 | 10 | 1.10% | 3.01 | 0.06 | 933.40 | 933.40 | 929.29 | 929.18 | 0.00 | 929.69 | 929.58 | |
| PD 3 | PD 4 | 0.0028 | 0.95 | 0.01 | 15.11 | 4.36 | 0.04 | 0.59 | 6 | 8 | 1.10% | 3.01 | 0.04 | 933.40 | 933.40 | 929.17 | 929.08 | 0.01 | 929.57 | 929.49 | |
| PD 4 | PD 5 | 0.0025 | 0.95 | 0.01 | 15.16 | 4.36 | 0.05 | 0.59 | 6 | 10 | 1.10% | 3.01 | 0.06 | 933.40 | 933.40 | 929.09 | 928.98 | 0.01 | 929.49 | 929.38 | |
| PD 5 | PD 6 | 0.0023 | 0.95 | 0.01 | 15.21 | 4.35 | 0.06 | 0.59 | 6 | 10 | 1.10% | 3.01 | 0.06 | 933.40 | 933.40 | 928.88 | 928.87 | 0.01 | 929.38 | 929.27 | |
| PD 6 | PD 7 | 0.0023 | 0.95 | 0.02 | 15.27 | 4.35 | 0.07 | 0.59 | 6 | 10 | 1.10% | 3.01 | 0.06 | 933.40 | 933.40 | 928.87 | 928.76 | 0.02 | 929.27 | 929.16 | |
| PD 7 | RY 116A | 0.0034 | 0.95 | 0.02 | 15.32 | 4.34 | 0.08 | 0.59 | 6 | 21 | 1.10% | 3.01 | 0.12 | 933.40 | 933.40 | 928.76 | 928.53 | 0.02 | 929.16 | 929.10 | |
| RY 116A | RY 116 | 0.04 | 0.54 | 0.04 | 15.44 | 4.33 | 0.18 | 2.39 | 12 | 40 | 0.45% | 3.05 | 0.22 | 933.00 | 932.70 | 928.30 | 928.12 | 0.00 | 929.10 | 928.92 | |
| RY 116 | RY 115 | 0.04 | 0.81 | 0.07 | 15.66 | 4.30 | 0.28 | 2.39 | 12 | 84 | 0.45% | 3.05 | 0.35 | 932.70 | 932.15 | 928.02 | 927.73 | 0.01 | 928.82 | 928.53 | |
| RY 115 | MH 114 | 0.08 | 0.59 | 0.11 | 16.01 | 4.27 | 0.48 | 2.39 | 12 | 31 | 0.45% | 3.05 | 0.17 | 932.15 | 931.51 | 927.63 | 927.49 | 0.02 | 928.43 | 928.29 | |
| MH 114 | RY 113 | 0.00 | 0.35 | 0.30 | 16.18 | 4.25 | 1.28 | 2.39 | 12 | 41 | 0.45% | 3.05 | 0.22 | 931.51 | 930.40 | 927.39 | 927.21 | 0.12 | 928.19 | 928.01 | |
| RY 113 | MH 112 | 0.05 | 0.57 | 0.32 | 16.40 | 4.23 | 1.37 | 2.39 | 12 | 50 | 0.45% | 3.05 | 0.27 | 930.40 | 931.23 | 927.11 | 926.89 | 0.15 | 927.91 | 927.69 | |
| MH 112 | MH 101 | 0.00 | 0.00 | 0.32 | 16.67 | 4.20 | 1.36 | 7.25 | 12 | 72 | 4.14% | 9.25 | 0.13 | 931.23 | 929.19 | 926.79 | 923.81 | 0.15 | 927.59 | 924.61 | |
| Bld A Lead | RY 114A | 0.11 | 0.95 | 0.10 | 15.00 | 4.38 | 0.46 | 0.79 | 6 | 14 | 2.00% | 4.05 | 0.06 | 932.38 | 932.38 | 928.36 | 928.08 | 0.66 | 928.76 | 928.48 | |
| RY 114A | MH 114 | 0.01 | 0.35 | 0.11 | 15.06 | 4.37 | 0.47 | 3.56 | 12 | 8 | 1.00% | 4.55 | 0.03 | 932.38 | 31.51 | 927.68 | 927.60 | 0.02 | 928.48 | 928.40 | |
| Bld B Lead | PD 11 | 0.07 | 0.95 | 0.07 | 15.00 | 4.38 | 0.29 | 0.79 | 6 | 5 | 2.00% | 4.05 | 0.02 | 931.40 | 931.40 | 928.13 | 928.03 | 0.27 | 928.53 | 928.43 | |
| PD 11 | MH 114 | 0.01 | 0.95 | 0.08 | 15.02 | 4.37 | 0.33 | 0.59 | 6 | 12 | 1.10% | 3.01 | 0.07 | 931.40 | 931.51 | 928.03 | 927.90 | 0.35 | 928.43 | 928.30 | |
| IN 119 | CB 118 | 0.14 | 0.70 | 0.10 | 15.00 | 4.38 | 0.43 | 4.19 | 12 | 87 | 1.38% | 5.34 | 0.27 | 928.50 | 927.30 | 923.50 | 922.30 | 0.01 | 924.30 | 923.10 | |
| CB 118 | MH 117 | 0.21 | 0.87 | 0.28 | 15.27 | 4.35 | 1.22 | 5.78 | 12 | 21 | 2.63% | 7.38 | 0.05 | 927.30 | 926.96 | 922.19 | 921.64 | 0.12 | 922.99 | 922.44 | |
| Southwest Connection to Existing Meijer | | | | | | | | | | | | | | | | | | | | | |
| IN 118 | Ex CB 7-4 | 0.38 | 0.90 | 0.34 | 15.00 | 4.38 | 1.50 | 2.57 | 12 | 97 | 0.82% | 3.28 | 0.49 | 928.00 | 925.51 | 921.00 | 920.50 | 0.18 | | | |
| Ex CB 7-4 | Ex MH 7 | 0.57 | 0.91 | 0.86 | 15.49 | 4.32 | 3.72 | | | | | | | | | | | | | | |
| Northeast System | | | | | | | | | | | | | | | | | | | | | |
| Bld C Lead | CO 148 | 0.001 | 0.95 | 0.001 | 15.00 | 4.38 | 0.004 | 0.56 | 6 | 11 | 1.00% | 2.87 | 0.06 | 925.50 | 924.57 | 921.72 | 921.61 | 0.00 | 922.12 | 922.01 | |
| CO 148 | CO 147 | 0.000 | 0.95 | 0.001 | 15.06 | 4.37 | 0.004 | 0.56 | 6 | 30 | 1.00% | 2.87 | 0.17 | 924.57 | 924.89 | 921.61 | 921.31 | 0.00 | 922.01 | 921.71 | |
| CO 147 | CO 146 | 0.002 | 0.95 | 0.003 | 15.24 | 4.35 | 0.012 | 0.56 | 6 | 15 | 1.00% | 2.87 | 0.09 | 924.89 | 924.87 | 921.31 | 921.16 | 0.00 | 921.71 | 921.56 | |
| CO 146 | IN 142 | 0.041 | 0.95 | 0.04 | 15.33 | 4.34 | 0.18 | 0.56 | 6 | 31 | 1.00% | 2.87 | 0.18 | 924.87 | 924.60 | 921.16 | 920.85 | 0.10 | 921.56 | 921.45 | |
| IN 142 | CB 141 | 0.04 | 0.70 | 0.07 | 15.51 | 4.32 | 0.31 | 2.39 | 12 | 62 | 0.45% | 3.05 | 0.34 | 924.60 | 924.40 | 920.65 | 920.37 | 0.01 | 921.45 | 921.17 | |
| CB 141 | MH 123 | 0.13 | 0.90 | 0.40 | 15.84 | 4.28 | 1.72 | 2.39 | 12 | 98 | 0.45% | 3.05 | 0.54 | 924.40 | 924.55 | 920.27 | 919.83 | 0.23 | 921.07 | 920.83 | |
| MH 123 | MH 122 | 0.00 | 0.86 | 0.65 | 16.38 | 4.23 | 2.74 | 3.82 | 15 | 48 | 0.35% | 3.12 | 0.28 | 924.55 | 924.77 | 919.83 | 919.66 | 0.18 | 920.83 | 920.66 | |
| MH 122 | CB 121 | 0.00 | 0.00 | 0.91 | 16.64 | 4.20 | 3.82 | 4.33 | 15 | 42 | 0.45% | 3.54 | 0.20 | 924.77 | 923.90 | 919.66 | 919.47 | 0.35 | 920.66 | 920.47 | |
| CB 121 | MH 120 | 0.15 | 0.80 | 1.09 | 16.83 | 4.18 | 4.55 | 5.85 | 18 | 15 | 0.31% | 3.32 | 0.08 | 923.90 | 924.44 | 917.24 | 917.19 | 0.19 | 918.44 | 918.39 | |
| Bld C Lead | CO 145 | 0.001 | 0.95 | 0.001 | 15.00 | 4.38 | 0.004 | 0.56 | 6 | 12 | 1.00% | 2.87 | 0.07 | 925.50 | 924.24 | 921.31 | 921.19 | 0.00 | 921.71 | 921.59 | |
| CO 145 | CO 144 | 0.000 | 0.95 | 0.001 | 15.07 | 4.37 | 0.004 | 0.56 | 6 | 29 | 1.00% | 2.87 | 0.17 | 925.24 | 925.20 | 921.19 | 920.90 | 0.00 | 921.59 | 921.30 | |
| CO 144 | CB 141 | 0.001 | 0.95 | 0.002 | 15.24 | 4.35 | 0.008 | 0.56 | 6 | 40 | 1.00% | 2.87 | 0.23 | 925.20 | 924.40 | 920.90 | 920.50 | 0.00 | 921.30 | 921.07 | |
| Bld E Lead | CO 152 | 0.001 | 0.95 | 0.001 | 15.00 | 4.38 | 0.004 | 0.56 | 6 | 6 | 1.00% | 2.87 | 0.03 | 927.00 | 926.34 | 922.50 | 922.44 | 0.00 | 922.90 | 922.84 | |
| CO 152 | CO 151 | 0.000 | 0.95 | 0.001 | 15.03 | 4.37 | 0.004 | 0.56 | 6 | 26 | 1.00% | 2.87 | 0.15 | 926.34 | 926.87 | 922.44 | 922.18 | 0.00 | 922.84 | 922.58 | |
| CO 151 | IN 142 | 0.001 | 0.95 | 0.002 | 15.19 | 4.35 | 0.008 | 0.56 | 6 | 133 | 1.00% | 2.87 | 0.77 | 926.87 | 924.60 | 922.18 | 920.85 | 0.00 | 922.58 | 921.45 | |
| Bld E Lead | CO 150 | 0.001 | 0.95 | 0.001 | 15.00 | 4.38 | 0.004 | 0.56 | 6 | 10 | 2.29% | 4.34 | 0.04 | 927.00 | 926.89 | 923.47 | 923.24 | 0.00 | 923.87 | 923.64 | |
| CO 150 | CO 149 | 0.000 | 0.95 | 0.001 | 15.04 | 4.37 | 0.004 | 0.56 | 6 | 32 | 2.29% | 4.34 | 0.12 | 926.89 | 926.89 | 923.24 | 922.81 | 0.00 | 923.64 | 923.41 | |
| CO 149 | CB 141 | 0.001 | 0.95 | 0.002 | 15.16 | 4.36 | 0.008 | 0.56 | 6 | 89 | 2.29% | 4.34 | 0.34 | 926.89 | 924.40 | 922.51 | 920.47 | 0.00 | 922.81 | 921.07 | |
| Bld E Lead | CB 141 | 0.22 | 0.95 | 0.21 | 15. | | | | | | | | | | | | | | | | |

| DATE | ISSUE |
|------------|------------------------------|
| 12.14.2015 | SUBMIT PRELIMINARY SITE PLAN |
| 02.02.2016 | RESUBMIT SITE PLAN |
| 02.15.2016 | ADD WALL AROUND FOUNTAIN |
| 03.18.2016 | RESUBMIT SITE PLAN |

Developed For:
VERSA DEVELOPMENT

25900 W. 11 MILE ROAD
SUITE 250
SOUTHFIELD, MI 48034
(248) 416-1985

SOIL BORING LOGS

VERSA PITTSFIELD PAD D

PITTSFIELD TOWNSHIP
WASHTENAW COUNTY
MICHIGAN

Date: 12.14.2015
Scale: NA
Sheet: 10
Project: 18270.30

McDOWELL & ASSOCIATES
Geotechnical, Environmental, & Hydrogeological Services
21355 Hasler Avenue • Ferndale, MI 48220
Phone: (248) 399-2066 • Fax: (248) 399-2157

LOG OF SOIL BORING NO. 4
PROJECT: Soil Boring Barm Areas
JOB NO. 13-021
DATE: 1-31-13
LOCATION: Ann Arbor-Saline Road and Oak Valley Drive
Pittsfield Township, Michigan

| Sample # | Depth | Legend | SOIL DESCRIPTION | Penetration Blows/ft | Moisture % | Natural Wt. P.C.F. | Dry Den. Wt. P.C.F. | Ulc. Comp. Strength P.S.F. | Sr. % |
|----------|-------|--------|--|----------------------|------------|--------------------|---------------------|----------------------------|-------|
| 1 | 0.0' | | Moist dark brown silty clayey TOPSOIL with sand and pebbles and vegetation, fill | | | | | | |
| 2 | 0.4' | | Moist dark brown silty clayey TOPSOIL with sand and pebbles and vegetation, fill | | | | | | |
| 3 | 0.8' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 4 | 1.2' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 5 | 1.6' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 6 | 2.0' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 7 | 2.4' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 8 | 2.8' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 9 | 3.2' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 10 | 3.6' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 11 | 4.0' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 12 | 4.4' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 13 | 4.8' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 14 | 5.2' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 15 | 5.6' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 16 | 6.0' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 17 | 6.4' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 18 | 6.8' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 19 | 7.2' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 20 | 7.6' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 21 | 8.0' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 22 | 8.4' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 23 | 8.8' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 24 | 9.2' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 25 | 9.6' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |

TYPE OF SAMPLE: D - DISTURBED, UL - UNDISTURBED, SL - SHREIB TUBE, SS - SHUT SPOON, RC - ROCK CORE, () - PENETROMETER

REMARKS: Standard Penetration Test - Driving 2" OD Sampler 1" With 140# Hammer Falling 30". Count Made at 6" Intervals

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT 0 FT. INS., G.W. ENCOUNTERED AT 0 FT. INS., G.W. AFTER COMPLETION none FT. INS., G.W. AFTER HRS. FT. INS., G.W. VOLUMES heavy

McDOWELL & ASSOCIATES
Geotechnical, Environmental, & Hydrogeological Services
21355 Hasler Avenue • Ferndale, MI 48220
Phone: (248) 399-2066 • Fax: (248) 399-2157

LOG OF SOIL BORING NO. 3
PROJECT: Soil Boring Barm Areas
JOB NO. 13-021
DATE: 1-31-13
LOCATION: Ann Arbor-Saline Road and Oak Valley Drive
Pittsfield Township, Michigan

| Sample # | Depth | Legend | SOIL DESCRIPTION | Penetration Blows/ft | Moisture % | Natural Wt. P.C.F. | Dry Den. Wt. P.C.F. | Ulc. Comp. Strength P.S.F. | Sr. % |
|----------|-------|--------|--|----------------------|------------|--------------------|---------------------|----------------------------|-------|
| 1 | 0.4' | | Moist dark brown silty clayey TOPSOIL with sand and pebbles and vegetation, fill | | | | | | |
| 2 | 0.8' | | Moist dark brown silty clayey TOPSOIL with sand and pebbles and vegetation, fill | | | | | | |
| 3 | 1.2' | | Moist brown silty CLAY with sand and pebbles, fill | | | | | | |
| 4 | 1.6' | | Moist brown silty CLAY with sand and pebbles, fill | | | | | | |
| 5 | 2.0' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 6 | 2.4' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 7 | 2.8' | | Moist brown and dark brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 8 | 3.2' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 9 | 3.6' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 10 | 4.0' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 11 | 4.4' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 12 | 4.8' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 13 | 5.2' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 14 | 5.6' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 15 | 6.0' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 16 | 6.4' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 17 | 6.8' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 18 | 7.2' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 19 | 7.6' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 20 | 8.0' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 21 | 8.4' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 22 | 8.8' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 23 | 9.2' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 24 | 9.6' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 25 | 10.0' | | Moist brown, dark brown and blue silty CLAY with sand and pebbles and vegetation, fill | | | | | | |

TYPE OF SAMPLE: D - DISTURBED, UL - UNDISTURBED, SL - SHREIB TUBE, SS - SHUT SPOON, RC - ROCK CORE, () - PENETROMETER

REMARKS: Standard Penetration Test - Driving 2" OD Sampler 1" With 140# Hammer Falling 30". Count Made at 6" Intervals

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT 0 FT. INS., G.W. ENCOUNTERED AT 0 FT. INS., G.W. AFTER COMPLETION none FT. INS., G.W. AFTER HRS. FT. INS., G.W. VOLUMES heavy

McDOWELL & ASSOCIATES
Geotechnical, Environmental, & Hydrogeological Services
21355 Hasler Avenue • Ferndale, MI 48220
Phone: (248) 399-2066 • Fax: (248) 399-2157

LOG OF SOIL BORING NO. 2
PROJECT: Soil Boring Barm Areas
JOB NO. 13-021
DATE: 1-31-13
LOCATION: Ann Arbor-Saline Road and Oak Valley Drive
Pittsfield Township, Michigan

| Sample # | Depth | Legend | SOIL DESCRIPTION | Penetration Blows/ft | Moisture % | Natural Wt. P.C.F. | Dry Den. Wt. P.C.F. | Ulc. Comp. Strength P.S.F. | Sr. % |
|----------|-------|--------|--|----------------------|------------|--------------------|---------------------|----------------------------|-------|
| 1 | 0.4' | | Moist dark brown silty clayey TOPSOIL with sand and pebbles and vegetation, fill | | | | | | |
| 2 | 0.8' | | Moist dark brown silty clayey TOPSOIL with sand and pebbles and vegetation, fill | | | | | | |
| 3 | 1.2' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 4 | 1.6' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 5 | 2.0' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 6 | 2.4' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 7 | 2.8' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 8 | 3.2' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 9 | 3.6' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 10 | 4.0' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 11 | 4.4' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 12 | 4.8' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 13 | 5.2' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 14 | 5.6' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 15 | 6.0' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 16 | 6.4' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 17 | 6.8' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 18 | 7.2' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 19 | 7.6' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 20 | 8.0' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 21 | 8.4' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 22 | 8.8' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 23 | 9.2' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 24 | 9.6' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 25 | 10.0' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |

TYPE OF SAMPLE: D - DISTURBED, UL - UNDISTURBED, SL - SHREIB TUBE, SS - SHUT SPOON, RC - ROCK CORE, () - PENETROMETER

REMARKS: Standard Penetration Test - Driving 2" OD Sampler 1" With 140# Hammer Falling 30". Count Made at 6" Intervals

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT 0 FT. INS., G.W. ENCOUNTERED AT 0 FT. INS., G.W. AFTER COMPLETION none FT. INS., G.W. AFTER HRS. FT. INS., G.W. VOLUMES heavy

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21355 Hasler Avenue • Ferndale, MI 48220
Phone: (248) 399-2066 • Fax: (248) 399-2157

LOG OF SOIL BORING NO. 1
PROJECT: Soil Boring Barm Areas
JOB NO. 13-021
DATE: 1-31-13
LOCATION: Ann Arbor-Saline Road and Oak Valley Drive
Pittsfield Township, Michigan

| Sample # | Depth | Legend | SOIL DESCRIPTION | Penetration Blows/ft | Moisture % | Natural Wt. P.C.F. | Dry Den. Wt. P.C.F. | Ulc. Comp. Strength P.S.F. | Sr. % |
|----------|-------|--------|---|----------------------|------------|--------------------|---------------------|----------------------------|-------|
| 1 | 0.0' | | Moist dark brown silty clayey TOPSOIL with sand and pebbles and vegetation, fill | | | | | | |
| 2 | 0.4' | | Moist dark brown silty clayey TOPSOIL with sand and pebbles and vegetation, fill | | | | | | |
| 3 | 0.8' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 4 | 1.2' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 5 | 1.6' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 6 | 2.0' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 7 | 2.4' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 8 | 2.8' | | Moist brown silty CLAY with sand and pebbles and vegetation, fill | | | | | | |
| 9 | 3.2' | | Moist brown and dark brown silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 10 | 3.6' | | Moist brown and dark brown silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 11 | 4.0' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 12 | 4.4' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 13 | 4.8' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 14 | 5.2' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 15 | 5.6' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 16 | 6.0' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 17 | 6.4' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
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| 19 | 7.2' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 20 | 7.6' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 21 | 8.0' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 22 | 8.4' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 23 | 8.8' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 24 | 9.2' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |
| 25 | 9.6' | | Moist brown, dark brown and blue silty sandy CLAY with pebbles and vegetation, fill | | | | | | |

TYPE OF SAMPLE: D - DISTURBED, UL - UNDISTURBED, SL - SHREIB TUBE, SS - SHUT SPOON, RC - ROCK CORE, () - PENETROMETER

REMARKS: Standard Penetration Test - Driving 2" OD Sampler 1" With 140# Hammer Falling 30". Count Made at 6" Intervals

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT 0 FT. INS., G.W. ENCOUNTERED AT 0 FT. INS., G.W. AFTER COMPLETION none FT. INS., G.W. AFTER HRS. FT. INS., G.W. VOLUMES heavy

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Geotechnical, Environmental, & Hydrogeological Services
21355 Hasler Avenue • Ferndale, MI 48220
Phone: (248) 399-2066 • Fax: (248) 399-2157

LOG OF SOIL BORING NO. 15
PROJECT: Soils Investigation - Proposed Restaurant Buildings - Meier's Outlets
JOB NO. 13-241
DATE: 8-20-13
LOCATION: Ann Arbor-Saline Road & Oak Valley Drive
Pittsfield Township, Michigan

| Sample # | Depth | Legend | SOIL DESCRIPTION | Penetration Blows/ft | Moisture % | Natural Wt. P.C.F. | Dry Den. Wt. P.C.F. | Ulc. Comp. Strength P.S.F. | Sr. % |
|----------|-------|--------|---|----------------------|------------|--------------------|---------------------|----------------------------|-------|
| 1 | 0.0' | | ASPHALT | | | | | | |
| 2 | 0.4' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 3 | 0.8' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 4 | 1.2' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 5 | 1.6' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 6 | 2.0' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 7 | 2.4' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 8 | 2.8' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 9 | 3.2' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 10 | 3.6' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 11 | 4.0' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 12 | 4.4' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 13 | 4.8' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 14 | 5.2' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 15 | 5.6' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 16 | 6.0' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 17 | 6.4' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 18 | 6.8' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 19 | 7.2' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 20 | 7.6' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 21 | 8.0' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 22 | 8.4' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 23 | 8.8' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 24 | 9.2' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |
| 25 | 9.6' | | Moist brown SAND & GRAVEL, aggregate fill | | | | | | |

TYPE OF SAMPLE: D - DISTURBED, UL - UNDISTURBED, SL - SHREIB TUBE, SS - SHUT SPOON, RC - ROCK CORE, () - PENETROMETER

REMARKS: Standard Penetration Test - Driving 2" OD Sampler 1" With 140# Hammer Falling 30". Count Made at 6" Intervals

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT 7 FT. 0 INS., G.W. ENCOUNTERED AT 7 FT. 0 INS., G.W. AFTER COMPLETION 6 FT. 8 INS., G.W. AFTER HRS. FT. INS., G.W. VOLUMES heavy

McDOWELL & ASSOCIATES
Geotechnical, Environmental, & Hydrogeological Services
21355 Hasler Avenue • Ferndale, MI 48220
Phone: (248) 399



Seal:



Title:
Site Plan

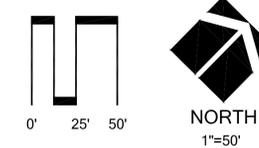
Project:
**Versa Pittsfield Phase 2
 Pittsfield Township, Michigan**

Prepared for:
 Versa Development
 25900 West 11 Mile, Suite 250
 Southfield, Michigan 48034

| Revision: | Issued: |
|--------------------|--------------------|
| Submission | December 14, 2012 |
| Resubmit Site Plan | April 25, 2013 |
| Revised | August 15, 2013 |
| Revised | September 26, 2013 |
| Revised | October 17, 2013 |
| Revised | November 22, 2013 |
| Revised | January 30, 2014 |
| Revised | March 17, 2014 |
| Revised | June 27, 2014 |
| Revised | July 25, 2014 |
| Revised | September 3, 2014 |
| Revised | December 2, 2014 |
| Revised | December 23, 2014 |
| Revised | December 15, 2015 |
| Revised | February 1, 2016 |
| Revised | March 18, 2016 |

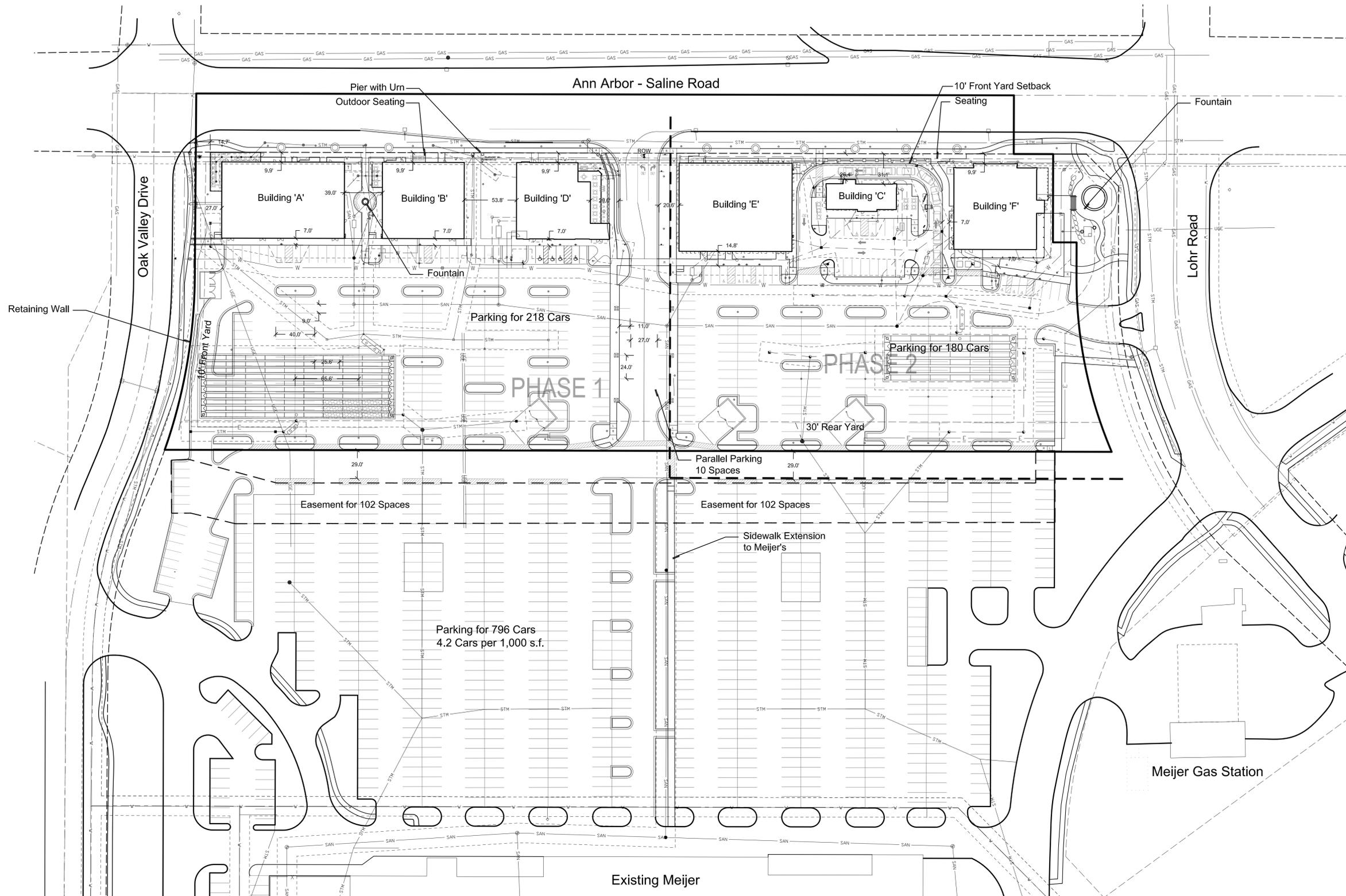
Job Number:
 12-028

Drawn By: jca Checked By: jca



Sheet No.

16-SP-1



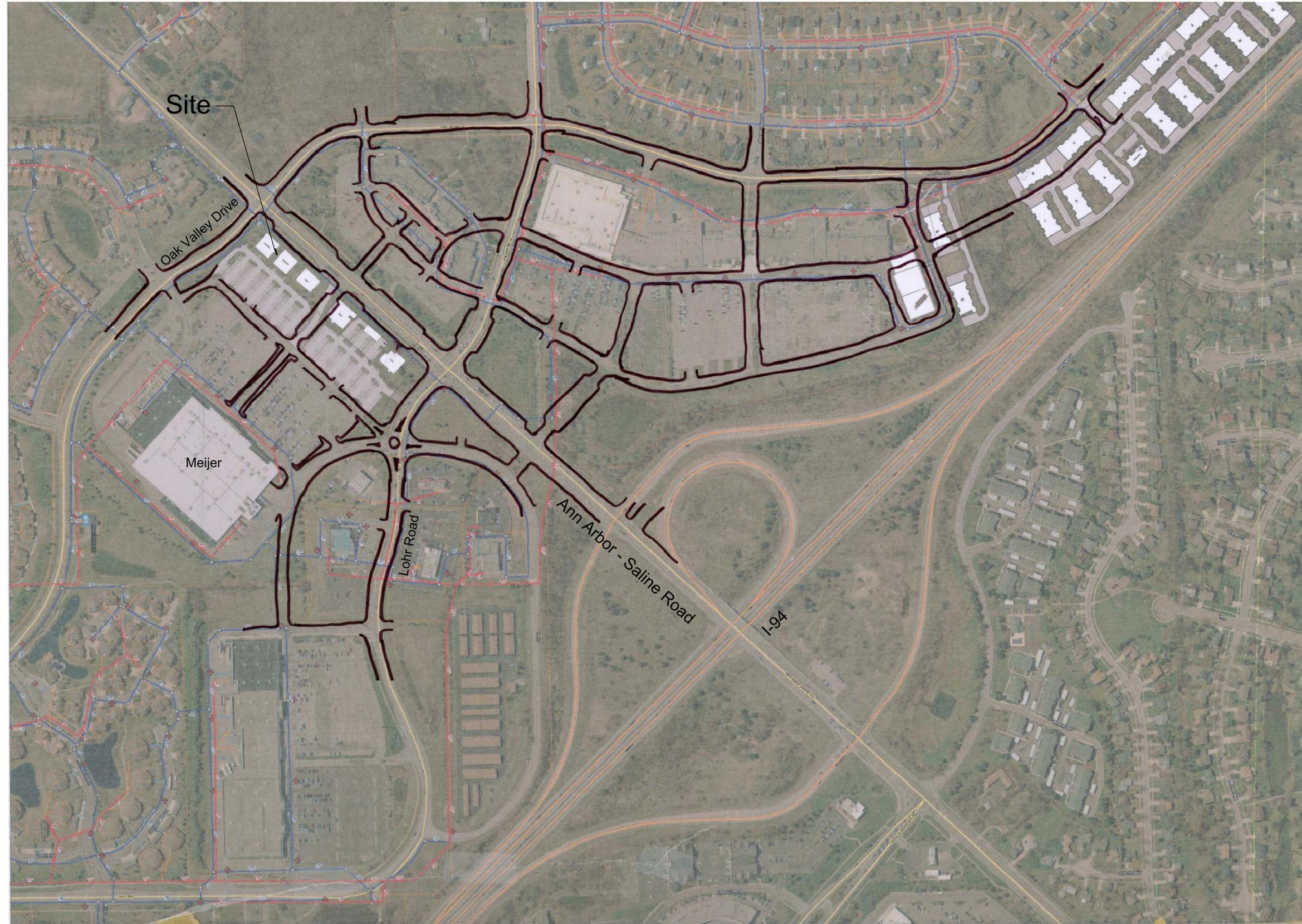
Site Summary

| | | | | | |
|---|--------------------------|-----------------------------|---------------------------------------|--|-----------------------------|
| Existing Zoning | FB (Form Based Zoning) | Building Frontage Length | 676 l.f. (Excluding Access Drive) | Building Height | 26' |
| Site Area | 7.50 Acres | 2 Story Frontage Required | 473' (70% x 676) | Minimum Height | 23' |
| Less ROW | 1.16 Acres | 2 Story Frontage Provided | 478' (566' with 12'-15' Screen Walls) | Height Shown | 23' |
| Net Site Area | 6.34 Acres | 3 Story Frontage Required | 338' (50% x 676) | Parking Building Area | 42,280 s.f. |
| | | 3 Story Frontage Provided | 0 | Parking Required | TBD * |
| Setbacks | | Impervious Surface Allowed | 5.7 s.f. (6.34 Ac x 90%) | Parking Shown | 510 Spaces |
| Front Yard Setback Required (Ann Arbor-Saline Road) | 10' to the Building Line | Pervious Area Provided | 0.86 Acres | 612 Spaces with Easement | |
| Front Yard Setback Provided | 9.9' to Buildings A-E | Impervious Surface Provided | 5.48 s.f. (6.34 - 0.86) | Parking Ratio | 14.4 per 1,000 s.f. Gross |
| | 12.7' to Building F | Landscape Area Required | 1.27 Ac (6.34 ac x 20%) | Restaurant Parking Standards are Based on Number of Employees and Seating Capacity. These Quantities are not Known at this Time. | |
| | 0' to Outdoor Seating | Open Space | 0.86 Ac | Meijer Building Area | 235,396 s.f. |
| Front Yard Setback Required (Oak Valley Drive) | 10' to the Building Line | Outdoor Seating | 0.09 Ac | Parking Required | 784 Spaces (1 per 300 s.f.) |
| Front Yard Setback Provided | 27.0' to Building | Streetscape | 0.06 Ac | Parking Provided | 796 Spaces |
| | 14.7' to Outdoor Seating | Landscape Area Provided | 1.01 Ac (15.9%) | | |
| | 30' | ROW Improvements | 0.13 Ac | | |
| Rear Yard Required | 196' | Corner Fountain | 0.16 Ac | | |
| Rear Yard Provided | 0' | Landscape Area Provided | 1.30 Ac (20.5%) | | |
| Side Yard Required | NA | With Off-Site Amenities | | | |
| Side Yard Provided | | | | | |

ULI-Shared Parking Standards

| Scenario A - Peak Hour | Parking Spaces Required | Area | Visitor | Employee |
|------------------------------------|-------------------------|--------------|---------|----------|
| Community Shopping Center (Retail) | 54.4 | 13,602 | 3.20 | 0.80 |
| Fine / Causal Dining | 539.55 | 26,708 | 17.00 | 3.20 |
| 1 Fast Food (Coffee) | 27.58 | 1,970 | 12.00 | 2.00 |
| Total Parking | 621.53 | 42280 | | |

| Peak Hours (100% Capacity) | |
|------------------------------------|------------------|
| Fine / Causal Dining | 8:00 PM |
| Fast Food (Coffee) | Noon and 1:00 PM |
| Community Shopping Center (Retail) | 2:00 and 3:00 PM |



Seal: _____

Title: **Context Plan**

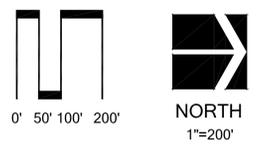
Project: **Pittsfield Commercial
Pittsfield Township, Michigan**

Prepared for: **Versa Development
25900 West 11 Mile, Suite 250
Southfield, Michigan 48034**

| Revision: | Issued: |
|--------------------|--------------------|
| Submission | December 14, 2012 |
| Resubmit Site Plan | April 25, 2013 |
| Revised | June 21, 2013 |
| Revised | August 15, 2013 |
| Revised | September 26, 2013 |
| Revised | October 17, 2013 |
| Revised | November 22, 2013 |
| Revised | January 30, 2014 |
| Revised | March 17, 2014 |
| Revised | June 27, 2014 |
| Revised | July 25, 2014 |
| Revised | December 2, 2014 |
| Revised | December 23, 2014 |
| Revised | December 15, 2015 |
| Revised | February 1, 2016 |
| Revised | March 18, 2016 |

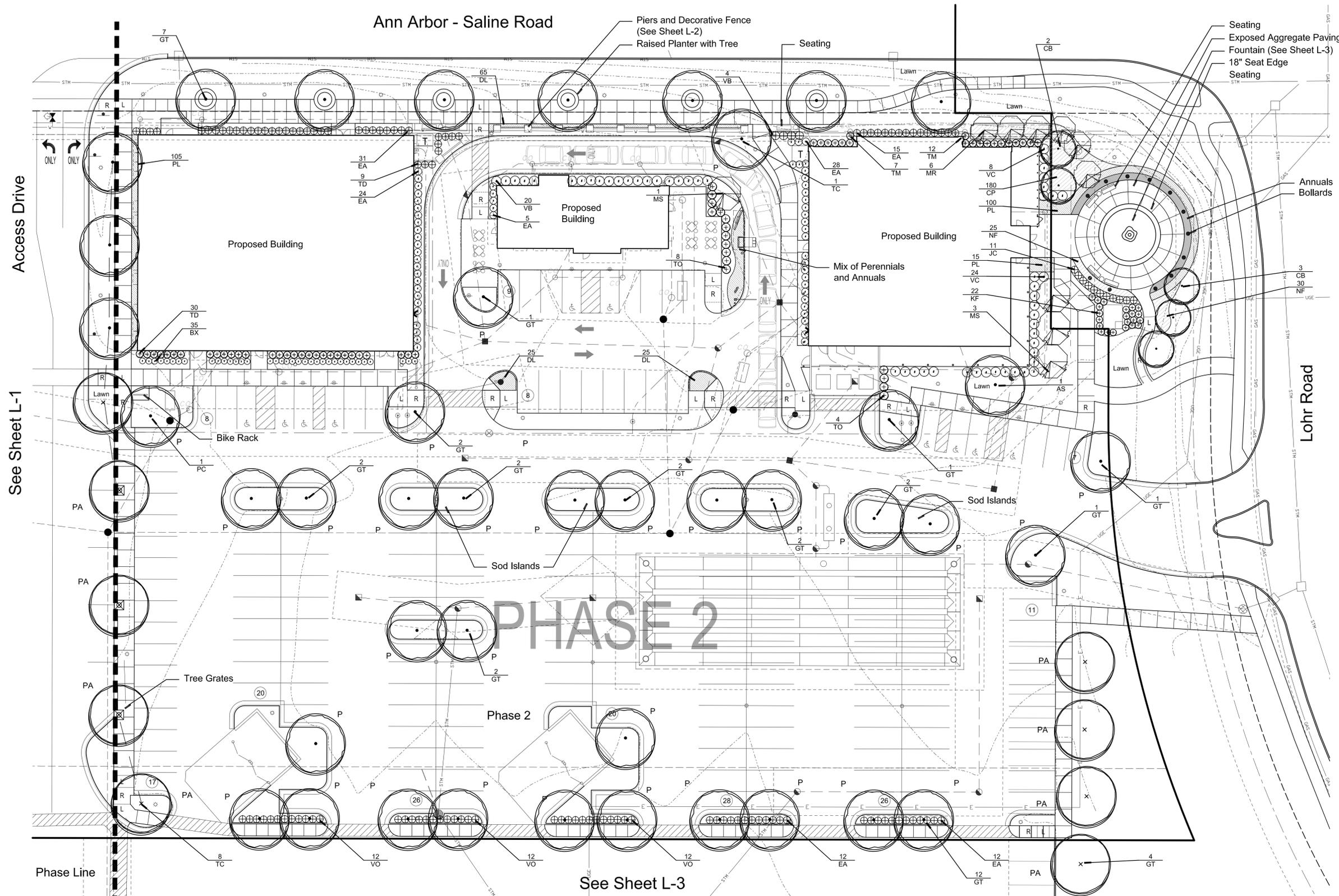
Job Number: **Revised**

Drawn By: **September 3, 2014** Checked By: **jca**

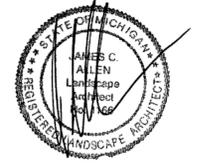


Sheet No. _____

Ann Arbor - Saline Road



Seal:



Title:
Landscape Plan

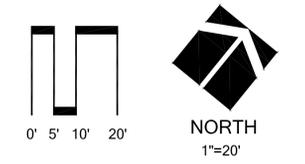
Project:
**Versa Pittsfield Phase 2
 Pittsfield Township, Michigan**

Prepared for:
 Versa Development
 25900 West 11 Mile, Suite 250
 Southfield, Michigan 48034

| Revision: | Issued: |
|--------------------|--------------------|
| Submission | December 14, 2012 |
| Resubmit Site Plan | April 23, 2013 |
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| Revised | December 2, 2014 |
| Revised | December 11, 2015 |
| Revised | February 1, 2016 |
| Revised | March 18, 2016 |

Job Number:
 12-028

Drawn By: JCA
 Checked By: jca



Sheet No.

21-L-1

Plant List

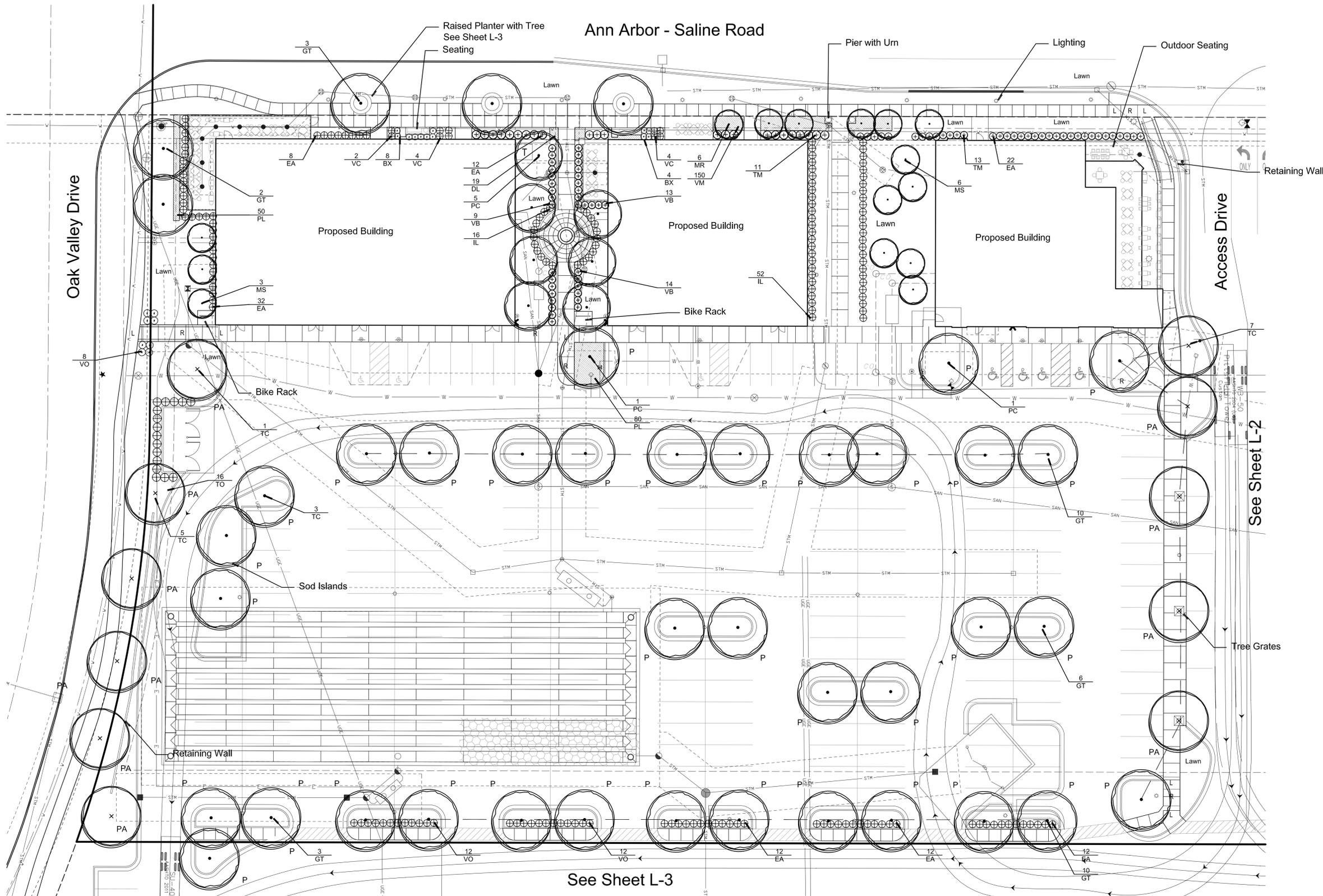
| sym. | qty. | botanical name | common name | caliper | spacing | root | height |
|------|------|--|-------------------------------------|---------|-------------|-------------|---------------|
| AS | 1 | Acer saccharum | Sugar Maple | 2.5" | as shown | B&B | |
| BX | 35 | Buxus microphylla | Boxwood | | as shown | B&B | 24" |
| CB | 5 | Carpinus betula | European Hornbeam | 2.5" | | B&B | |
| CP | 180 | Ceratostigma plumbaginoides | Dwarf Plumbago | | 18" o.c. | #1 | |
| DL | 115 | Hemerocallis 'Happy Returns' | Happy Returns Daylily | | | No. 2 Cont. | |
| EA | 131 | Euonymus alata 'Compact' | Compact Burning Bush | | as shown | B&B | 30" |
| GT | 41 | Gleditsia triacanthos var. 'hermis' | Honey Locust | 2.5" | | B&B | |
| JC | 11 | Juniperus chinensis 'Keteleer' | Kettler Juniper | | as shown | B&B | 5' Clip to 4' |
| KF | 22 | Calamagrostis x acutiflora 'Karl Foerster' | Karl Foerster Grass | | 24" | No. 2 Cont. | |
| MR | 6 | Malus sargentii | Sargent Crab | 2.0" | as shown | B&B | |
| MS | 7 | Malus 'Spring Snow' | Spring Snow Crab | 2.0" | as shown | B&B | |
| NF | 55 | Nepeta a faassenii | Walker's Low Catmint | | 18" o.c. | #2 | |
| PC | 1 | Pyrus calleryana 'Cleveland Select' | Cleveland Select Pear | 2.5" | as shown | B&B | |
| PL | 301 | Pennisetum a. 'Little Bunnies' | Little Bunnies Dwarf Fountain Grass | | No. 2 Cont. | | |
| TC | 9 | Tilia cordata 'Greenspire' | Greenspire Linden | 2.5" | as shown | B&B | |
| TD | 39 | Taxus x. m. 'Hicksii' | Hicks Yew | | as shown | B&B | 36" |
| TM | 11 | Taxus x. m. 'Densiformis' | Dense Yew | | as shown | B&B | 30" |
| TO | 12 | Thuja occidentalis 'Dark Green Heavy' | Dark Green Arborvitae | | as shown | B&B | 6' |
| VB | 17 | Viburnum x. burkwoodii | Burkwood Viburnum | | as shown | B&B | 30" |
| VC | 32 | Viburnum carlesii | Korean Spice Viburnum | | as shown | B&B | 30" |
| VO | 26 | Viburnum opulus 'Compacta' | European Cranberry Bush | | as shown | B&B | 30" |

Notes:
 "P" Denotes Required Parking Lot Tree
 "PA" Denotes Required Parking Lot Perimeter Trees
 See Sheet L-3 for Site Furnishings

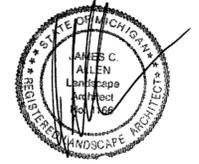
Owner Shall be Responsible for Replacing Trees Damaged by Utility Repairs

Landscape Summary

| Category | Value | Category | Value |
|--------------------------------|----------------------------------|--|----------------------|
| Interior Parking Lot Landscape | | Street Trees | |
| Parking Lot Area | 146,161 s.f. | Oak Valley | |
| Interior Landscape Required | 14,616 s.f. (146,161 s.f. x 10%) | Street Frontage | 252' |
| Interior Landscape Provided | 12,921 s.f. (8.8%) | Trees Required | 8 Trees (1 per 30') |
| | | Trees Provided | 8 Trees |
| Parking Lot Trees | | Ann Arbor Saline Road | |
| Spaces Shown | 412 Spaces | Street Frontage | 840' |
| Trees Required | 41 Trees (412 / 10) | Trees Required | 28 Trees (1 per 30') |
| Trees Provided | 70 Trees | Trees Provided | 29 Trees |
| Perimeter Trees | | 19 Trees of the Required Parking Lot Trees are Located in the Meijer Parking Lot | |
| Parking Lot Perimeter | 704' | | |
| Trees Required | 18 Trees (704' / 40) | | |
| Trees Provided | 18 Trees | | |



Seal:



Title:
Landscape Plan

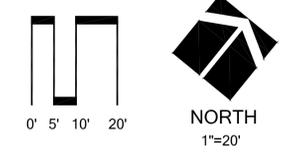
Project:
**Versa Pittsfield Phase 2
 Pittsfield Township, Michigan**

Prepared for:
 Versa Development
 25900 West 11 Mile, Suite 250
 Southfield, Michigan 48034

| Revision: | Issued: |
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Job Number:
 12-028

Drawn By: JCA
 Checked By: jca



Sheet No.

Landscape Summary

| Interior Parking Lot Landscape | | Street Trees | |
|--------------------------------|----------------------------------|--|----------------------|
| Parking Lot Area | 147,650 s.f. | Oak Valley | |
| Interior Landscape Required | 14,765 s.f. (147,650 s.f. x 10%) | Street Frontage | 252' |
| Interior Landscape Provided | 11,653 s.f. (7.9%) | Trees Required | 8 Trees (1 per 30') |
| | | Trees Provided | 8 Trees |
| Parking Lot Trees | | Ann Arbor Saline Road | |
| Spaces Shown | 441 Spaces | Street Frontage | 840' |
| Trees Required | 44 Trees (441 / 10) | Trees Required | 28 Trees (1 per 30') |
| Trees Provided | 71 Trees | Trees Provided | 29 Trees |
| Perimeter Trees | | 19 Trees of the Required Trees are Located in the Meijer Parking Lot | |
| Parking Lot Perimeter | 704' | | |
| Trees Required | 18 Trees (704' / 40) | | |
| Trees Provided | 18 Trees | | |

Notes:
 "P" Denotes Required Parking Lot Tree
 "PA" Denotes Required Parking Lot Perimeter Trees
 See Sheet L-3 for Site Furnishings

Plant List

| sym. | qty. | botanical name | common name | caliper | spacing | root | height |
|------|------|---------------------------------------|-------------------------------------|---------|-------------|------|------------|
| BX | 12 | Buxus microphylla | Boxwood | | as shown | | 24" |
| DL | 19 | Hemerocallis 'Happy Returns' | Happy Returns Daylily | | No. 2 Cont. | | |
| EA | 110 | Euonymus alata 'Compact' | Compact Burning Bush | | as shown | | 30" |
| GT | 34 | Gleditsia triacanthos var. 'Inermis' | Honey Locust | 2.5" | as shown | B&B | |
| IL | 68 | Ilex x. m. 'Blue Boy' and 'Blue Girl' | Blue Boy Holly | | as shown | | 30" |
| MR | 6 | Malus sargentii | Sargent Crab | 2.0" | as shown | B&B | |
| MS | 9 | Malus 'Spring Snow' | Spring Snow Crab | 2.0" | as shown | B&B | |
| PC | 7 | Pyrus calleryana 'Cleveland Select' | Cleveland Pear | 2.5" | as shown | B&B | |
| PL | 130 | Pennisetum a. 'Little Bunnies' | Little Bunnies Dwarf Fountain Grass | | No. 2 Cont. | | |
| TC | 16 | Tilia cordata 'Greenspire' | Greenspire Linden | | as shown | B&B | |
| TM | 24 | Taxus x. m. 'Densiflormis' | Dense Yew | | as shown | | 30" |
| TO | 16 | Thuja occidentalis 'Dark Green Heavy' | Dark Green Arborvitae | | as shown | B&B | 6' |
| VB | 36 | Viburnum x. burkwoodii | Burkwood Viburnum | | as shown | | 30" |
| VC | 10 | Viburnum carlesii | Korean Spice Viburnum | | as shown | | 30" |
| VO | 32 | Viburnum opulus 'Compacta' | European Cranberry Bush | | as shown | | 30" |
| VM | 150 | Vinca minor | Perrywinkle | | as shown | | 10" spread |

Bench



Kensington Bench by Conceptual Site
Powdercoat Finish - Silver

Litter



Urbane Litter by Conceptual Site
Powdercoat Finish - Silver

Raised Planter



Wall and Cap - Country Manor by Keystone
16" Height

Pier with Urn



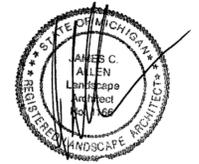
Country Manor by Keystone
Urn to be Determined

Bike Rack



M Bike Rack by Conceptual Site
Powdercoat Finish - Silver

Seal:



Title:

Landscape Details

Project:

Versa Pittsfield Phase 2
Pittsfield Township, Michigan

Prepared for:

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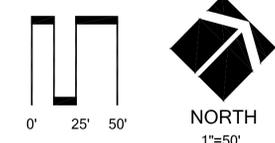
12-028

Drawn By:

jca

Checked By:

jca



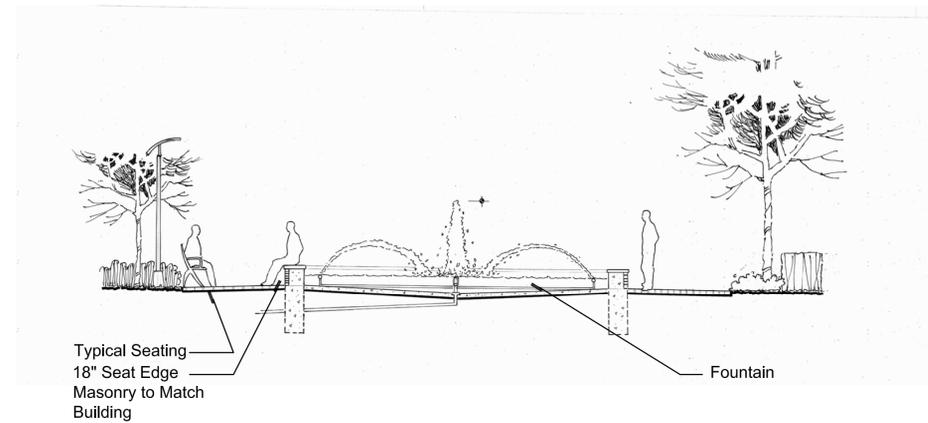
Sheet No.

23-L-3

Fountain Spray Pattern



Fountain Cross Section



Maintenance Statement

The owner of the property shall be responsible for all maintenance of site landscaping, as follows:

Continuing Care

Landscape shall be kept in a neat, orderly and healthy growing condition, free from debris and refuse. All landscape materials shall be maintained by a regular program of mowing, watering, weeding, feeding and pruning. Pruning shall be minimal at the time of installation, only to remove dead or diseased branches. Subsequent pruning shall assure proper maturation of plants to achieve their approved purpose.

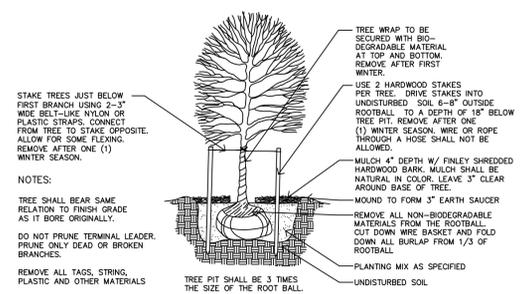
Replenishment

All dead or diseased plant material shall be removed and replaced within six (6) months after it dies or in the next planting season, whichever occurs first. For purposes of this planting season for deciduous plants shall be between March 1 and June 1 and from October 1 until the prepared soil becomes frozen. The planting season for evergreen plants shall be between March 1 and June 1. Plant material installed to replace dead or diseased material shall be as close as practical to the size of the material it is intended to replace.

Watering

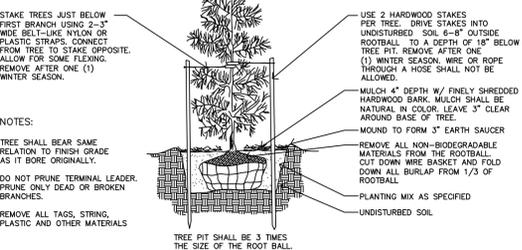
The developer, at the time of submission of the final site plan shall demonstrate that adequate provisions have been made to supply water to all landscape areas. This shall be accomplished by installation of an underground irrigation system to provide water for the landscape areas specified on the landscape plan.

Ann Arbor-Saline Road Piers



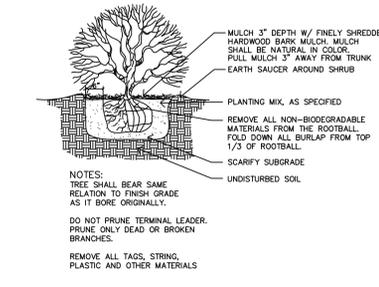
EVERGREEN TREE PLANTING DETAIL

NTS



SHRUB PLANTING DETAIL

NTS



LANDSCAPE REQUIREMENTS

- The work shall consist of providing all necessary materials, labor, warrants, equipment, tools and supervision required for the completion as shown on the drawings.
 - The plant materials shall conform to type stated on the plant list. Sizes shall be the minimum stated on the plant list or larger. All measurements shall be in accordance with the latest edition of the "A.A.N. Standards for nursery stock."
 - The plant materials shall be nursery grown and inspected by the owner's representative before planting. The owner's representative reserves the right to reject any plant material at any time.
 - Plants designated "B & B" shall be balled and burlapped with firm balls of earth.
 - The contractor is responsible for planting the materials at the correct grades and spacing. The plants shall be oriented as to give the best appearance.
 - When the plant has been properly set, the pit shall be backfilled with a topsoil mixture, gradually filling, tamping and setting with water.
 - All plant materials shall be pruned and injuries repaired. The amount of pruning shall be limited to the removal of dead or injured twigs and to compensate for the loss of roots from transplanting. Cuts should be flush, leaving no stubs. Cuts over 1" shall be painted with tree paint.
 - The contractor agrees to guarantee all plant materials for the period of two years. At that time the owner's representative reserves the right for a final inspection. Plant material with 25% die back, as determined by the owner's representative shall be replaced. This guarantee includes the furnishing of new plants, labor and materials. These new plants shall also be guaranteed for the period of one year.
 - Topsoil shall be friable, fertile topsoil of clay loam character containing at least 5% but not more than 20% by weight of organic matter with a pH range from 6.0 to 7.0. Soil shall be free from clay lumps, coarse sand, plant roots, sticks and other foreign materials, foreign materials.
 - Seed mix shall consist of the following types and proportions:
Kentucky Blue Grass - "Baron/Cheridolph" 60%
Chewing Chewng Fescue 15%
Creeping Reed Fescue 15%
Perennial Rye Grass 10%
Weed content shall not exceed 1%.
The mix shall be applied at a rate of 200 lbs./acre
 - Sod shall be two year old "Baron/Cheridolph" Kentucky Blue Grass grown in a sod nursery on loam soil.
 - The Contractor shall verify all rights of way, easements, property lines and limits of work, etc. prior to commencing work.
 - The Contractor shall be responsible for contacting and coordinating with all pertinent utility companies 72 hours in advance of any digging to make himself familiar with all underground utilities, pipes and structures. The Contractor shall take sole responsibility for any cost incurred due to damage of said utilities.
 - The Contractor shall not willfully proceed with construction as designed when it is obvious that unknown obstructions and/or grade differences exist. Such conditions shall be immediately brought to the attention of the owner's representative and/or Landscape Architect. The Contractor shall assume full responsibility for all necessary revisions due to failure to give such notification.
 - Any discrepancies between dimensioned layout and actual field conditions shall be reported to the Owner's representative and Landscape Architect. Failure to make such discrepancies known will result in Contractor's responsibility and liability for any changes and associated cost.
 - The Contractor to verify percolation of all planting pits prior to installation of plant material.
- Additional Notes:
1. All Landscaped Areas Shall be Irrigated with an Automatic, Underground System.
2. Planting Shall Occur Between March 1 - May 15 and October 15 - December 15

SANITARY SEWER AND MANHOLES

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all labor, tools, equipment and materials to construct all sanitary sewers, manholes and necessary appurtenant work as herein specified. No sewers shall be accepted until the sewer system has passed the system acceptance tests.

1.02 TESTING

A. General

- The CONTRACTOR shall furnish all equipment and personnel to conduct system acceptance tests as specified herein on all completed sewers. All tests shall be conducted under the supervision of the ENGINEER. No acceptance tests shall be conducted until the entire sewer system is constructed and has been installed for not less than 30 days.
- The CONTRACTOR may desire to make an air test prior to backfill for his own purposes but the line acceptance tests shall be conducted after backfilling or extensions.
- All sewer lines shall be televised while running enough water through the line to be visible at the next downstream manhole.
- All sewer lines shall be checked for alignment.
- All manholes shall be tested for leakage. All PVC lines shall be tested for deflection.
- Sewer pipe 30 inches and smaller shall be air tested. Sewer pipe larger than 30 inches shall be tested by either infiltration or exfiltration and shall be tested in lengths of 1600 feet or less.
- Should the results of any test fail to meet the criteria established in this Specification, the CONTRACTOR shall, at his own expense, locate and repair rejected section and retest until it is within specified allowance.

B. Test for Leakage - Air Test

- Section 33-95 (pg 30-6) 2004-Ten State Standards.
- After a manhole-to-manhole section of line has been backfilled and cleaned, it shall be plugged at each manhole with pneumatic plugs inflated to 35 psig internal pressure. The design of the pneumatic plugs shall be such that they will hold against the line test pressure without requiring external blocking or bracing.
- There shall be three (3) hose connections to the pneumatic plug. One hose shall be used only for inflation of the pneumatic plug. The second hose shall be used for continuously reading the air pressure rise in the sealed line. The third hose shall be used only for introducing low pressure air into the sealed line.
- There shall be a 0-30 psig gauge for reading the internal pressure of the line being tested. Calibrations from the 1-10 psig range shall be in tenths of lbs (not ounces) and this 0-10 portion shall cover 90% of the complete dial range.
- Low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average back pressure of any ground water pressure that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period, the third hose shall be disconnected.
- The portion of line being tested shall be accepted if the portion under test meets the following conditions.
 - DI, and RCP Pipes
 - The time requirement for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time given in the following table:

| Pipe | Min. Holding Time Seconds/100 ft. Pipe |
|---------|---|
| 4-inch | 18 |
| 6-inch | 42 |
| 8-inch | 72 |
| 10-inch | 90 |
| 12-inch | 108 |
| 15-inch | 126 |
| 18-inch | 144 |
| 21-inch | 180 |
| 24-inch | 216 |
| 27-inch | 252 |
| 30-inch | 288 |

- In areas where ground water is known to exist, the CONTRACTOR shall install a 1/2-inch diameter capped pipe nipple, approximately 10 inches long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the line acceptance test, the ground water level shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the pipe nipple. The hose shall be held vertically and a measurement of the height in feet of water shall be taken after the water stops rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the lbs of pressure that will be added to all readings. For example, if the height of water is 11-1/2 ft, then the added pressure will be 5 psig. This makes the 3.5 psig to be 8.5 psig, and the 2.5 psig to be 7.5 psig. The 1 lb allowable drop and the timing remains the same.

a. PVC Pipe

- The time requirement for the pressure to decrease from 3.5 to 3.0 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than that shown in the following table:

| (inches) | Pipe Size (inches) | Holding Time (seconds) | Minimum Holding Time |
|----------|-----------------------|---------------------------|----------------------|
| | 4-inch | 0.190xL | 113 |
| | 6-inch | 0.427xL | 170 |
| | 8-inch | 0.760xL | 227 |
| | 10-inch | 1.187xL | 283 |
| | 12-inch | 1.709xL | 340 |
| | 15-inch | 2.671xL | 425 |
| | 18-inch | 3.846xL | 512 |

- If any section of the sewer fails to meet this requirement, the CONTRACTOR shall perform a television inspection of the faulty section and repair or replace at his own expense all defective materials and/or workmanship to the satisfaction of the ENGINEER. The test procedure shall be repeated until the results are acceptable.

C. Test for Infiltration

- Sewer pipe over 18 inches shall be tested to measure the infiltration of ground water. If the measured leakage exceeds 100 gallons per inch diameter per mile of pipe per 24 hr period, the CONTRACTOR shall locate the points of excessive leakage and make the necessary repairs at his own expense.
- In the event the line does not pass the infiltration test as stated above, the test shall be repeated after suitable repairs have been completed.

D. Test for Exfiltration

- Where the ground water provides less than a 2 ft head on the sewer, an exfiltration test shall be conducted by filling the sewer with water to a 4 ft head or 4 ft above the ground water level, whichever is greater. The allowable water loss shall be 100 gal/in./mi/day as calculated above for infiltration.
- After the sewer has been filled with water, 4 hrs time shall be allowed for water absorption by the pipe before exfiltration tests are initiated.
- For the purpose of establishing the 4 ft test head, the head shall be measured from the center of the sewer pipe at the midpoint of the test section length. This procedure shall be used for both infiltration and exfiltration tests.

E. Test for Manhole Leakage

- All manholes shall be tested for leakage by using plugs on inlet-outletting sewers, and filling the manholes with water to the top of the man-hole. Four hours shall be allowed for water absorption by the manhole before testing is initiated. Allowable exfiltration for 48-inch diameter manholes shall be 2 gallons per foot of depth per day.

F. Test for Alignment

- All sewers shall be laid accurately to the line and grade designed by the ENGINEER. The sewers will be tested for alignment by shining a light through the pipe at a manhole and viewing the light from an adjacent manhole. Any section of sewer in which a light cannot be seen from one manhole to the next shall be corrected to the satisfaction of the ENGINEER to pass this test.

G. Test for Deflection of PVC Pipe

- PVC pipe sewers shall be installed in such a manner that the initial deflection of the conduit shall conform to the latest revision of ASTM D-3034.
- Deflection of PVC pipe shall be tested by pulling a rigid pig or equivalent through the pipe. The pig shall be constructed in accordance with the following table of maximum outside diameters and shall be submitted to the ENGINEER for review before testing is initiated.

| Pipe I.D. | Pig O.D. |
|-----------|--------------|
| 6 inches | 5.33 inches |
| 8 inches | 7.11 inches |
| 10 inches | 8.87 inches |
| 12 inches | 10.55 inches |
| 15 inches | 12.90 inches |
| 18 inches | 15.74 inches |
- The pig shall be drawn by hand through the pipe from manhole to manhole. Any portion of pipe through which the pig passes freely shall be deemed to have passed the deflection test. Sections of pipe through which the pig does not pass shall be located, un-covered and the pipe zone bedding improved and backfilled by the CONTRACTOR at his own expense. The pipe shall then be retested before acceptance is granted.

H. Material Tests

- The CONTRACTOR shall have tests of pipe and strength made by an independent testing laboratory. Tests of up to 4 lengths of sewer pipe per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturer's certificate of compliance to the Specifications.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings or data sheets for all pipe, manholes, manhole castings, pipe to manhole connections, and valves. The Contractor shall submit certification letter for all pipe proposed on the project. The letters shall contain the following: Contractor name, project name, township name, current date, certification of pipe provided and letterhead of the certifying company.

2.00 PRODUCTS

2.01 SEWER PIPE

- A. Pipe for sewer 24-inch diameter and smaller shall be polyvinyl chloride (PVC). Pipe for 30-inch diameter and larger shall be PVC truss pipe. Ductile iron pipe and reinforced concrete pipe shall be used as specified by the ENGINEER.
- B. Pipe for service leads 4 through 8 inches in diameter shall be polyvinyl chloride (PVC).
- C. Reinforced concrete pipe shall be no less than the latest revision of ASTM C76, with the class designation as shown on the Plans or in the Pro-posal.
- D. PVC pipe 4 inches through 15 inches in diameter shall meet or exceed all of the requirements of the current ASTM D-3034 SDR-26 polyvinyl chloride sewer pipe and fittings. 18-inch diameter PVC pipe shall meet or exceed all the requirements of the current ASTM F-794 SDR 26 polyvinyl chloride sewer pipe and fittings. Samples of pipe and physical and chemical data sheets shall be submitted to the ENGINEER for review. Approval shall be obtained before pipe is purchased.
- E. If the sewer pipe is greater than 15 feet deep PVC pipe shall be SDR 21.
- F. Truss pipe shall meet or exceed all of the requirements of the current ASTM D2680.
- G. Ductile iron pipe shall meet or exceed all the requirements of ANSI A21.50 with a cement lining.

2.02 SEWER PIPE FITTINGS

- A. Fittings shall be of the same material as the pipe, and in no case shall the walls be thinner than that of the pipe furnished.
- B. Wye and tee fittings for PVC pipe shall be reviewed by the ENGINEER before purchasing.
- C. The dry fit of all fittings must be snug. If the fit is such that it is loose, the pipe or fitting will be rejected as faulty and of improper size.

2.03 SEWER PIPE JOINTS

- A. Concrete pipe joints shall be made of a resilient material conforming to the latest revision of ASTM Designation C443. Proper lubricant shall be furnished by the joint manufacturer.
- B. Concrete pipe for use with rubber joints shall be smooth and precisely formed to provide a uniform annular space for joint materials.
- C. PVC pipe shall be jointed with ring gusseted bell ends. (ASTM-D3212) Jointing materials shall be applied to the bell end of the pipe at the point of manufacture in such a manner that a tight uniform joint will be achieved and such that when the joint is made up in the field, the joint material will not roll or tear from the pipe. A proper joint lubricant shall be furnished by the pipe manufacturer.
- D. All channels shall be constructed to the full flow depth of the pipe.

2.05 MORTAR FOR MANHOLES

A. Mortar for plastering manholes shall be made of one part Portland cement and two parts fine aggregate.

2.06 MANHOLE FRAMES AND COVERS

- A. Manhole frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitably notched for convenient removal of the cover. Each cover shall be marked with the Pittsfield Township logo and the letters, PITTSFIELD TWP SANITARY SEWER integrally cast into the cover.
- B. Covers shall be of the "self-sealing" design having a continuous gasket glued in a machined groove and a concealed pickhole. Frames and covers shall be East Jordan 1040Z, with Type AGS cover.
- C. All manhole frames and covers shall be coated by the manufacturer with coal tar pitch varnish or other asphaltum coating reviewed by the ENGINEER.

2.07 MANHOLE STEPS

A. Steps shall be plastic coated steel. They shall be M.A. Industries PS1-PF or PS1-B, or approved equal.

2.08 MANHOLE CONNECTIONS

- A. Sewer pipe (6-inch to 24-inch) to manhole connections shall be through: 1) a flexible rubber boot which shall be securely clamped into a core-drilled pipe port. Pipe ports shall be core-drilled at the point of manhole manufacturer and shall be accurately located within 1/2-inch of proposed sewer centerline (Kor-N-Seal); or 2) a self-adjusting mechanical pipe to manhole seal which provides a resilient flexible and infiltration-proof joint (Res-seal); or 3) a flexible rubber wedge firmly rammed into a rubber gasket which is cast into the manhole (Press Wedge II), or equal. All flexible pipe to manhole connections shall be installed per the manufacturers specifications.
- B. Neoprene rubber for the manhole boot shall meet ASTM Specification C443 and shall have a minimum thickness of 3/8-inch. Pipe clamp bands shall be of corrosion-resistant steel.
- C. Sewer pipe over 24 inches to manhole connections shall be in accordance with details shown on the Plan.

2.09 SANITARY MANHOLE ADJUSTMENTS

- A. All final grade adjustment of manhole covers and frame assemblies shall be completed utilizing injection molded High Density Polyethylene (HDPE) adjustment rings as manufactured by LADTECH, INC. or approved equal. The adjustment rings shall be manufactured from polyethylene plastic as identified in ASTM Designation D 1248.
- B. All adjustment for matching road grade shall be made utilizing a molded indexed slope ring.
- C. Each adjustment ring shall be sealed with a 3/16 to 1/4 inch bead of butyl rubber sealant per the manufacturer's instructions. Sealant shall meet ASTM specification C-990.
- D. All castings and adjustment rings shall be securely fastened to the cone of the structure with four 3/8-inch threaded rods. The rods shall be galvanized or stainless steel anchored to the structure with Rehead concrete anchors or equal. Stainless steel or galvanized nuts and washers shall be used to attach the casting.

2.10 MANHOLE DROPS

- A. Manhole drop connections shall be interior drops using the drop bowl as produced by Reliner-Duran Inc. or approved equal.
- B. Drop bowl model A-4" shall be used for all lines up through full 6-inch inlets. Drop bowl model A-6" shall be used for all 8-inch inlets. Drop bowl model B-8" shall be used for all 10-inch inlets. Lines larger than 10 inches shall be as directed by the ENGINEER.
- C. The force line hood shall be attached on models A-4" and A-6" when the incoming line is from a force main or the slope is 3 percent or greater.
- D. The drop pipe shall be secured to the manhole wall with Reliner-Duran, Inc. stainless steel adjustable clamping brackets or approved equal.
- E. The drop bowl and each clamping bracket shall be attached to the manhole wall with 3/8-inch x 3 x 3/4-inch bolts.
- F. The incoming pipe shall be trimmed such that it protrudes 2 inches into the manhole.
- G. A 1-inch V shaped notch shall be cut into the bottom edge of the incoming pipe.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill above a line 12 inches above the crown of the pipe shall conform to Section 2.04, Earthwork, of these Specifications.

3.02 BEDDING

- A. Reference Section 33.83a of 10 State Standards.
- B. Reference Section 33.83b of 10 State Standards.
- C. Ductile iron, and concrete pipes shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 3 inches for 24-inch and smaller pipe and not less than 4 inches for pipe larger than 24-inch conforming to Class B bedding as shown on the Plans. Where shown on the Plans or required by the ENGINEER, concrete encasement or concrete cradle shall be used.
- D. PVC pipe shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 4 inches conforming to Class B bedding as shown on the Plans. Where shown on the Plans, or where the pipe passes under a road with less than 4 ft of cover, the pipes shall be encased.
- E. For all pipes, compacted granular material shall be placed at the sides of the pipe and cover not less than 12 inches above the crown of the pipe.
- F. "Granular Material" shall be class 2NS sand, pea gravel or crushed stone conforming to ASTM C33 Size No. 67 placed in not more than 6-inch layers and com-pacted to not less than 95% standard density for PVC and 90% standard density for reinforced concrete.
- G. Pea gravel or crushed stone used for bedding shall be separated from the sand backfill with a non-woven geotextile fabric. The fabric shall be Amoco 4551, or approved equal.

3.03 PIPE INSTALLATION

- A. Installation of PVC pipe shall be in confor-mance with ASTM D2321-89.
- B. All pipe shall be laid true to the required lines and grades. All trenches when pipe laying is in progress shall be kept dry; and all pipes and fittings shall be uniformly supported on a properly trimmed bedding with holes at each joint to receive bells. All pipe shall be laid with bells uphill.
- C. All joints shall be made up in accordance with the manufacturer's instructions using materials and equipment especially prepared for the type of joint to be used.
- D. The grade as shown on the profiles is that of the pipe invert and that to which the work must conform. The grade shall be kept by levels, laser or other tools which shall be furnished by the CONTRACTOR at his expense. Each pipe shall be laid accurately to the line and grade as shown on the Plans and in such manner as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the invert. The interior of sewers shall, as the work progresses, be cleaned of all dirt, cement, debris and other superfluous materials of every description. Bulkheads shall be used to keep foreign materials out of the open end of the sewer when work is not in progress.
- E. The location of the piping as shown on the Plans has been determined to avoid, insofar as possible, interference with trees or structures or fixtures above ground and other underground mains, services, utilities, or structures. Any change in location or alignment of piping which may be found more feasible or practicable as the work progresses shall be made by the CONTRACTOR, as the ENGINEER may direct.
- F. All pipe and fittings shall be carefully lowered and moved into position in trench or vault in a controlled manner such as will prevent damage to the pipe and any coatings or lining. An excessive amount of scratching on the surface of the PVC pipe will be considered cause for rejection.
- G. The trench shall be backfilled closely behind the pipe laying. Unless otherwise directed or permitted by the ENGINEER, the backfilling shall follow and be completed to the top of the trench within two pipe lengths behind pipe laying.

3.04 CONNECTIONS TO EXISTING MANHOLES AND OTHER RIGID STRUCTURES

- A. When a sewer is connected to an existing manhole, a hole adequate to receive the new pipe shall be cut into the manhole.
- B. If the existing manhole is of brick construction, a single rowlock of brick shall be turned over the new pipe and the existing manhole brick work shall be cleaned, pointed and given a 1/2-inch mortar coat on the outside surface.
- C. For connections to existing precast reinforced concrete manholes, a hole shall be cored into the concrete manhole wall to receive the pipe. A Kor-N-Seal boot or engineer approved equal shall be clamped into the cored hole and used to make the connection.
- D. For connections to existing fiberglass manholes, a hole shall be cored into the manhole wall to receive the pipe. A Kor-N-Seal boot or engineer approved equal shall be installed using fiberglass reinforced pipe stubout for Kor-N-Seal boot sealing surface.

3.05 STREAM AND RIVER CROSSING

- A. Whenever a pipe is required to cross a stream or river, all work shall be in accordance with the provisions of Act 346, the Inland Lakes and Streams Act of 1962, and the rules and regulations promulgated thereunder. Stream crossings and all restoration required shall be completed within five days of the construction.
- B. The CONTRACTOR shall utilize such construction methods as are feasible and practicable to divert or stop stream flow to lay the pipe in the dry. Pipe shall be ductile iron, mechanical joint, or compression gasket joint pipe with joints at transition to other types of sewer pipe encased with no less than 1 cu yd of concrete, placed at a minimum of 6 inches thickness around the pipe. After the sewer is properly laid, jointed and encased, the stream-channel shall be cleaned of dirt and debris resulting from the CONTRACTOR's operations.
- C. After the crossing is made, heavy riprap and sodding shall be placed to protect the banks from corrosion as shown on the Plans.

PCT July 2008



Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108-9721
48108-9721
Tel. 734.822.3101
www.pittsfield-mi.gov

| | | | |
|----------|-----|-------|----------|
| TWP REV | BWA | DRW | 11.04.27 |
| UPDATES | BWA | DRW | 10.10.25 |
| UPDATES | TIN | DRW | 10.01.20 |
| Revision | By | Appd. | YY.MM.DD |

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|--------|----|-------|----------|
| Issued | By | Appd. | YY.MM.DD |
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| File Name: SS-02 | BWA | DRW | DRW | 07.10.01 |
| | Dwn. | Chkd. | Dsgn. | YY.MM.DD |

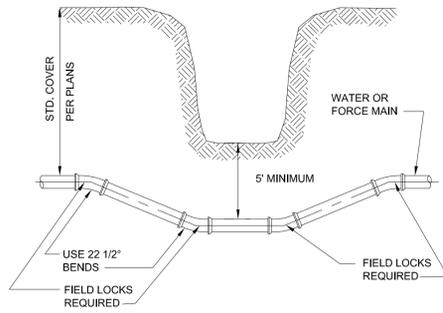
Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

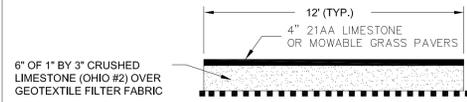
Pittsfield Township, Michigan

Title
SANITARY SEWER SPECIFICATIONS

Project No. 2075001300 Scale **NOT TO SCALE**

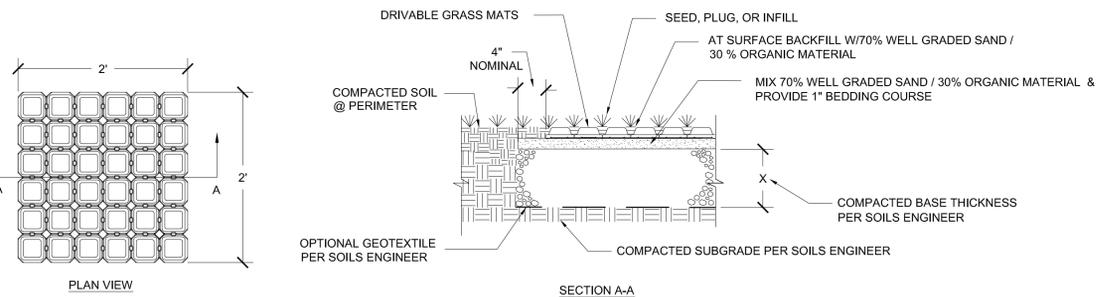


DITCH & STREAM CROSSING

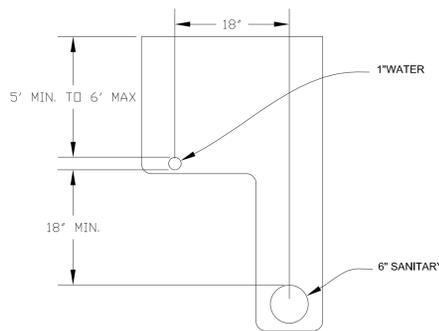


SANITARY SEWER ACCESS PATH

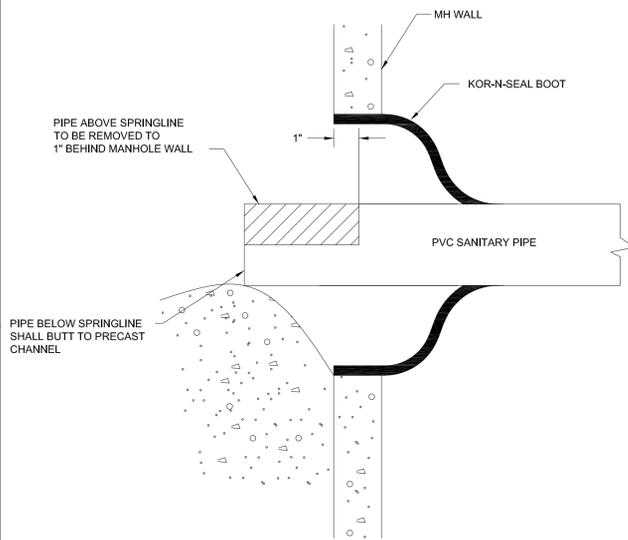
NOTE:
FOR STORMWATER MANAGEMENT APPLICATIONS INCLUDING STORAGE AND INFILTRATION, ALTERNATE INFILLS, BASE MATERIAL, AND DRAINAGE MAY BE REQUIRED



TYPICAL HEAVY TRAFFIC DRIVABLE GRASS DETAIL



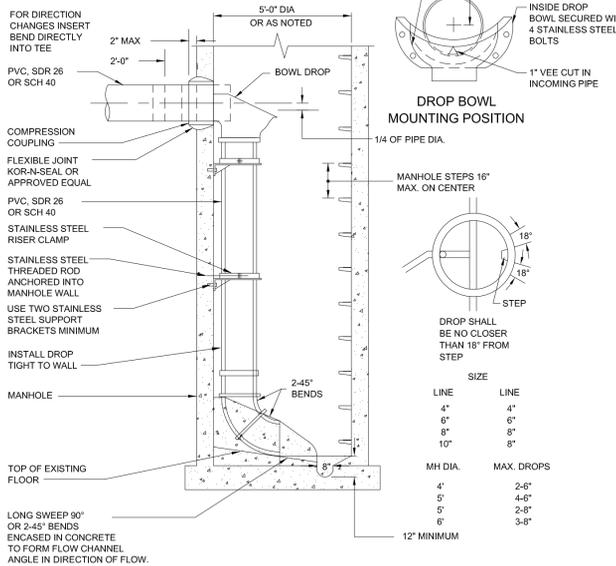
TYPICAL L TRENCH DETAIL
HOUSE LEADS



SANITARY PIPE PENETRATION

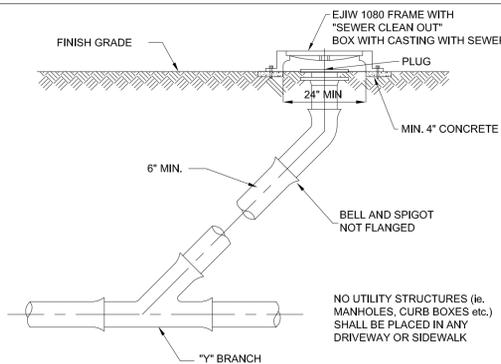
NOTES:

1. SECURE DROP PIPE TO MANHOLE WALL WITH RELINER-DURAN, INC STAINLESS STEEL ADJUSTABLE CLAMPING BRACKETS OR EQUAL.
2. ATTACH THE DROP BOWL & EACH CLAMPING BRACKET TO THE MANHOLE WALL WITH 3/8" X 3/4" RAMSET/RED HEAD BOLTS HELD IN PLACE WITH 2 STAGE EPOXY PASTE.

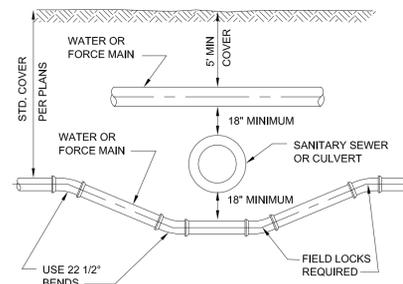


NO UTILITY STRUCTURES (ie. MANHOLES, CURB BOXES etc.) SHALL BE PLACED IN ANY DRIVEWAY OR SIDEWALK

INTERIOR DROP
SANITARY MANHOLE



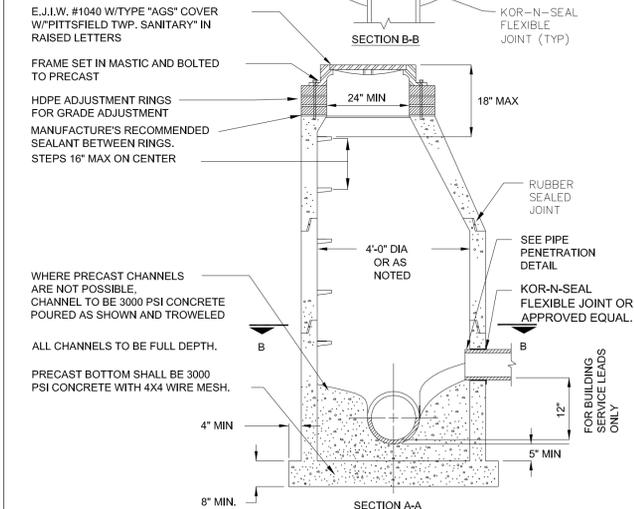
SANITARY SEWER CLEANOUT



SEWER OR CULVERT CROSSING

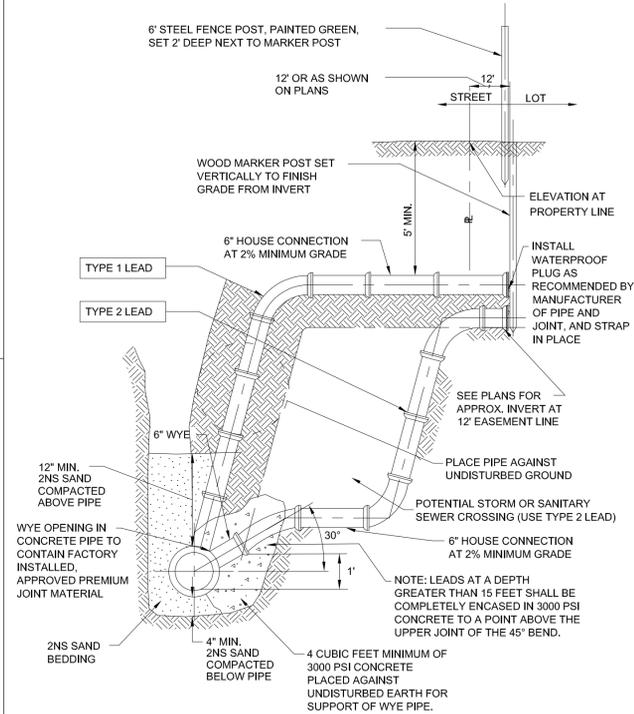
PRE-CAST CONCRETE MANHOLE

1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.
5. PROVIDE INTEGRAL BASE WITH PRECAST CONCRETE CHANNELS.
6. WHERE MANHOLES ARE CONSTRUCTED OVER EXISTING SEWERS, POURED IN PLACE OR PRECAST COOKIE AND DOGHOUSE STRUCTURES MAY BE USED IN PLACE OF INTEGRAL BASE.



NO UTILITY STRUCTURES (ie. MANHOLES, CURB BOXES etc.) SHALL BE PLACED IN ANY DRIVEWAY OR SIDEWALK

SANITARY MANHOLE



SANITARY SEWER SERVICE & RISER CONNECTION DETAIL



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Ann Arbor, MI 48108-9721
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| | | | |
|---------------------|-----|-------|----------|
| COVER DETAIL UPDATE | MRH | DRW | 14.01.24 |
| TWP REV | BWA | DRW | 11.04.27 |
| MANHOLE UPDATES | BWA | DRW | 10.10.25 |
| UPDATES | TIN | DRW | 10.01.20 |
| Revision | By | Appd. | YY.MM.DD |

Issued By Appd. YY.MM.DD

File Name: SS-01 BWA DRW DRW 07.10.01
Dwn. Chkd. Dsgn. YY.MM.DD

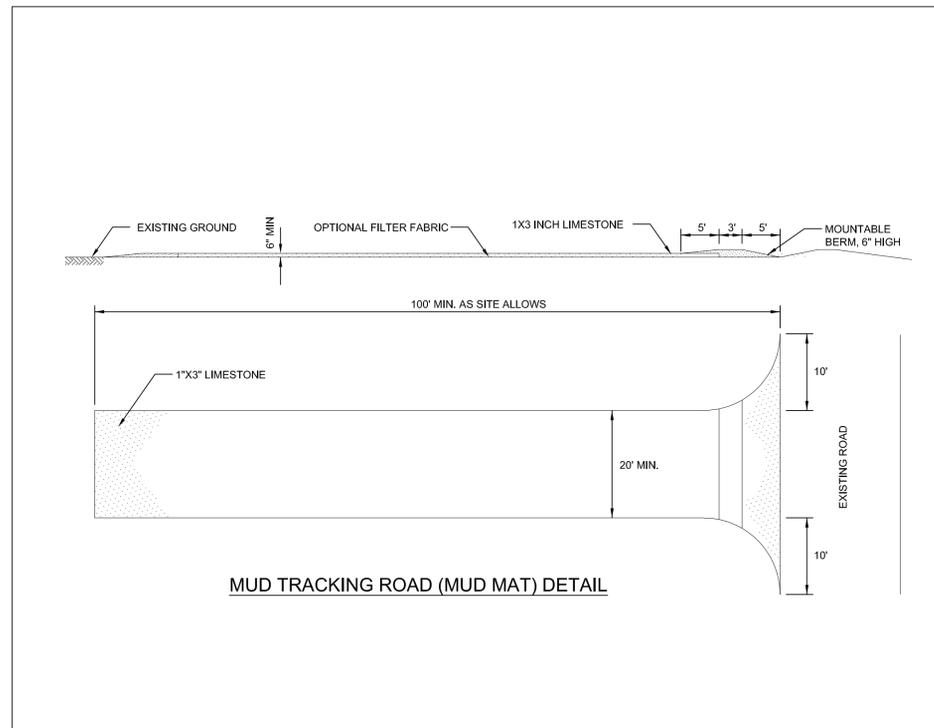
Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
SANITARY SEWER DETAILS

Project No. 2075001300 Scale NOT TO SCALE



MUD TRACKING ROAD (MUD MAT) DETAIL

**PITTSFIELD CHARTER TOWNSHIP
SOIL EROSION AND SEDIMENTATION CONTROL NOTES
GENERAL**

- The contractor shall implement and maintain the soil erosion control measures as shown on the plans at all times during construction on this project. Any modifications or additions to the soil erosion control measures due to construction or changed conditions, shall be complied with as required or directed by the owner, project engineer or Pittsfield Township.
- All soil erosion and sedimentation control work shall conform to the permit requirements of Pittsfield Township and the laws of the State of Michigan.
- A NPDES construction activity permit is required for all sites greater than 5 acres.
- Daily inspections shall be made by the contractor. Periodic inspections may be made by the owner/project engineer/Township to determine the effectiveness of erosion and sedimentation control measures. Any necessary corrections shall be made without delay.
- Erosion and sedimentation from work on the site shall be contained on the site and not be allowed to collect on any off-site areas or in waterways.
- All mud/dirt tracked onto roads from the site due to construction, shall be promptly removed by the contractor.
- Restoration of all disturbed areas, including placement of topsoil, seed, fertilizer and mulch and/or sod shall be done within 5 days of the completion of final grade.
- Construction operations shall be scheduled and performed so that preventative soil erosion control measures are in place prior to excavation in critical areas and temporary stabilization measures are in place immediately following backfilling operations.
- Special precautions will be taken in the use of construction equipment to prevent situations that promote erosion.
- Proper dust control shall be maintained during construction by use of water trucks and/or chloride as required.
- The contractor shall be responsible for maintaining all temporary soil erosion control measures and removal of some upon authorized completion of project. Completion of project will not be authorized until all site work, home building, road work and utility construction is complete and all soils are stabilized.
- The contractor shall not grade in existing wetland or conservation areas to be protected. Silt fence shall be installed and maintained adjacent to existing wetland and conservation areas to prevent grading, erosion and sedimentation into them.
- Tree protection fencing must remain intact until restoration of the site is complete.

SEQUENCE OF CONSTRUCTION

- Install sediment fence and tree protection fencing prior to any grading operation.
- Install mud-tracking pad.
- Construct temporary sediment/detention basin.
- Place topsoil, fertilizer, seed and mulch over the entire detention basin area.
- Rough grade site, stockpile topsoil and begin building construction.
- Install storm drainage system including riprap and parking lot inlet filters and detention basin standpipe.
- Maintain erosion and sedimentation control measures, as required.
- Install sanitary sewer and water systems.
- Bring pavement areas to sub-base grade, place sub-base and bituminous pavement.
- Install franchised utilities.
- Finish grade, redistribute topsoil, seed and mulch all disturbed areas.
- Remove any accumulated sediment within the detention basin and replace clean washed stone around standpipe.
- Complete construction of site.
- Insure all soil is stabilized. Remove all temporary soil erosion control measures.

SEEDING/SOD

- Seed or sod in accordance with project specifications.
- All areas of disturbed earth that are not to be paved or sodded shall have 4 inches of topsoil, seed, fertilizer and mulch.
- Immediately after seeding, mulch all seeded areas with unweathered small grain straw (preferably wheat) or hay spread. Spread uniformly at the rate of 1 1/2 to 2 tons or 100 pounds (2 to 3 bales) per 1,000 square foot. This mulch should be anchored with a disc-type mulch-anchoring tool.
- Any disturbed area not paved, seeded or mulched, sodded or built upon by November 15, is to be mulched in the manner as specified above, in order to provide soil erosion protection during the winter and early spring.
- All erosion and sedimentation control prevention procedures and structures are to comply with the Standards and Specifications for soil erosion and sediment control of the Washtenaw County Soil Conservation District.
- Drainage ditches and slopes steeper than 1:4 (25%) shall be stabilized with erosion control blankets.
- Slope areas that do not take upon initial seeding must be re-seeded and stabilized with erosion control blankets.
- Where excavation has been through lawn areas, the CONTRACTOR shall restore the disturbed area by placing topsoil and seeding or sodding over the final backfill material.

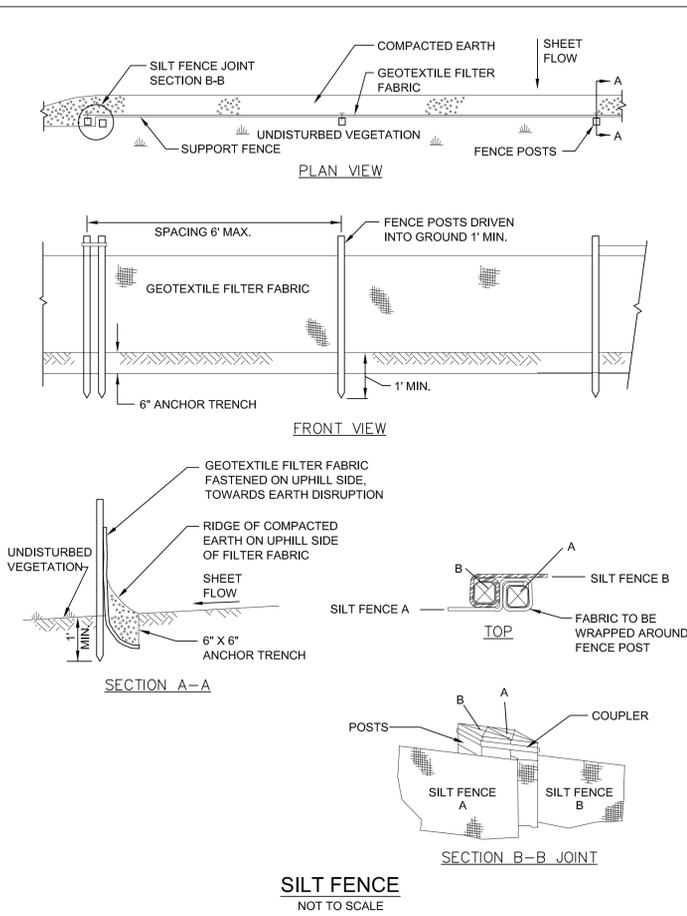
CATCH BASIN/MANHOLE PROTECTION

- Protect storm sewer catch basins with Siltsack, or approved equivalent as follows:

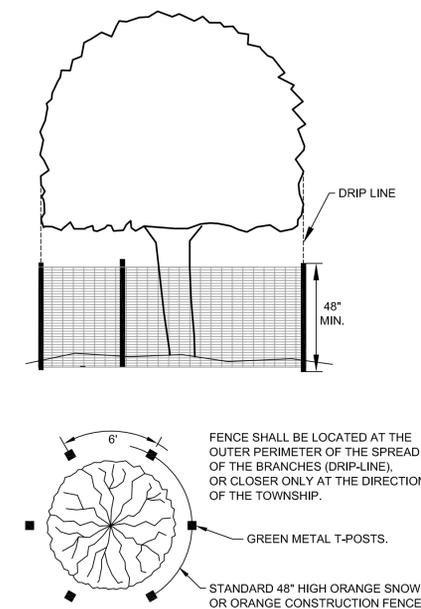
ROADS

- During construction, all roads shall be protected from unvegetated areas washing onto road surfaces by placement of silt fence behind curb or a 10 foot wide straw mulch bank behind the curb or other approved method and/or as shown on the plans.
- During construction of any portion of the project, roads shall be maintained free of dirt, silt and construction debris.

Pittsfield SEC 9/22/2009



SILT FENCE
NOT TO SCALE

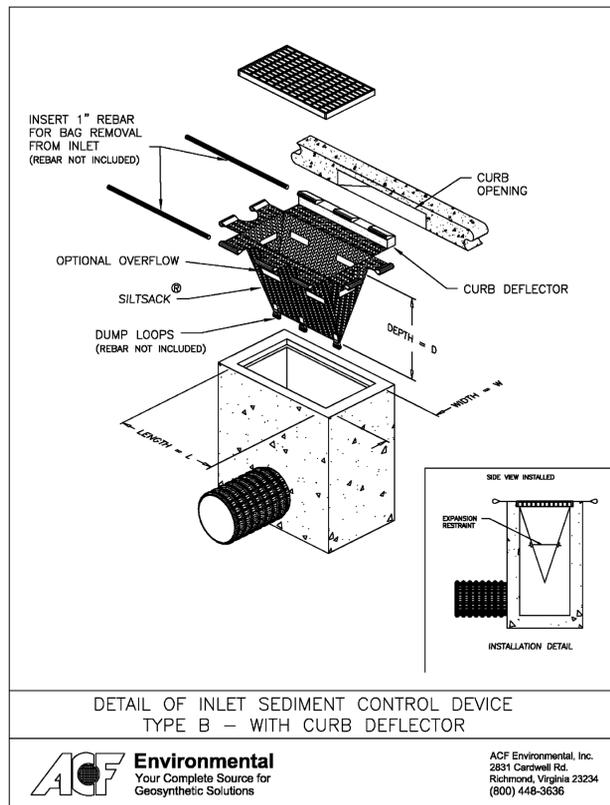


TREE PROTECTION FENCE DETAIL
NOT TO SCALE

- NOTES:
- ALL TREES TO BE REMOVED WILL BE IDENTIFIED BY RED FLAGGING.
 - TREE PROTECTION FENCING IS TO BE ERECTED PRIOR TO ANY EARTHWORK OR CONSTRUCTION AND IS TO REMAIN IN PLACE UNTIL CONSTRUCTION AND GRADING IS COMPLETE.
 - ALL DEBRIS, FILL, EQUIPMENT OR MATERIAL IS TO BE KEPT CLEAR OF AREA WITHIN PROTECTIVE FENCE. NO CLEANING OF EQUIPMENT OR MATERIAL OR STORAGE OR DISPOSAL OF ANY MATERIAL WITHIN THE DRIP LINE OF ANY TREES TO BE SAVED.



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6201 W. Michigan Ave.
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48108-9721
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DETAIL OF INLET SEDIMENT CONTROL DEVICE
TYPE B - WITH CURB DEFLECTOR



ACF Environmental, Inc.
2831 Carowell Rd.
Richmond, Virginia 23234
(800) 448-3636

**SILTSACK®
SPECIFICATIONS**

NOTE: THE SILTSACK® WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

REGULAR FLOW SILTSACK®

(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

| PROPERTIES | TEST METHOD | UNITS | |
|-------------------------|-------------|-------|------------------|
| GRAB TENSILE STRENGTH | ASTM D-4632 | | 300 LBS |
| GRAB TENSILE ELONGATION | ASTM D-4632 | | 20 % |
| PUNCTURE | ASTM D-4853 | | 120 LBS |
| MULLEN BURST | ASTM D-3786 | | 800 PSI |
| TRAPEZOID TEAR | ASTM D-4533 | | 120 LBS |
| UV RESISTANCE | ASTM D-4355 | | 90 % |
| APPARENT OPENING SIZE | ASTM D-4751 | | 40 US SIEVE |
| FLOW RATE | ASTM D-4491 | | 45 GAL/MIN/50 FT |
| PERMITTIVITY | ASTM D-4491 | | 0.55 SEC -1 |

*** HI-FLOW SILTSACK®**

(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

| PROPERTIES | TEST METHOD | UNITS | |
|-------------------------|-------------|-------|-------------------|
| GRAB TENSILE STRENGTH | ASTM D-4632 | | 265 LBS |
| GRAB TENSILE ELONGATION | ASTM D-4632 | | 20 % |
| PUNCTURE | ASTM D-4853 | | 135 LBS |
| MULLEN BURST | ASTM D-3786 | | 420 PSI |
| TRAPEZOID TEAR | ASTM D-4533 | | 45 LBS |
| UV RESISTANCE | ASTM D-4355 | | 90 % |
| APPARENT OPENING SIZE | ASTM D-4751 | | 80 US SIEVE |
| FLOW RATE | ASTM D-4491 | | 300 GAL/MIN/50 FT |
| PERMITTIVITY | ASTM D-4491 | | 1.5 SEC -1 |

OIL-ABSORBANT SILTSACK®

(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK WITH A WOVEN PILLLOW INSERT.

SILTSACK DISTRIBUTORS:
PRICE & COMPANY
(www.priceandcompany.com)

METRO GRAND RAPIDS, MI
425 36TH STREET SW
WYOMING, MI 49548-2108
1-800-248-8230

METRO DETROIT, MI
28165 WALL STREET
WIXOM, MI 48393-3525
1-866-960-4300

(* HI-FLOW SILT SACK SHALL BE USED FOR ALL APPLICATIONS WITHIN PITTSFIELD TOWNSHIP)

SILTSACK
NOT TO SCALE

| Revision | By | Appd. | YY.MM.DD |
|----------|-----|-------|----------|
| SILTSACK | BWA | DRW | 12.01.03 |
| TWP REV | BWA | DRW | 11.04.27 |
| UPDATES | TTN | DRW | 10.01.20 |
| Issued | By | Appd. | YY.MM.DD |

File Name: SE-01 TTN DRW DRW 07.10.01
Dwn. Chkd. Dsgn.

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
SOIL EROSION DETAILS AND NOTES

Project No. 2075001300 Scale NOT TO SCALE
Revision

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all labor, materials, and equipment required to construct a water main and necessary appurtenant work as herein specified. The water main shall be installed in the locations as shown on the Plans and shall meet all acceptance tests.

1.02 NOTIFICATION

- A. CONTRACTOR shall notify the ENGINEER and the Pittsfield Township Utilities Department at (734) 882-2110, 24 hours prior to flushing or chlorination of the water main.
- B. CONTRACTOR shall schedule bacteriological testing with the ENGINEER 48 hours prior.
- C. CONTRACTOR shall notify the ENGINEER and the Pittsfield Township Utilities Department 48 hours prior to connecting to an existing water main.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings or data sheets for all pipe, manholes, manhole castings, pipe to manhole connections, valves, hydrants and the B-1 Poly Pig. The Contractor shall submit a certification letter for all pipe proposed on the project. The letters shall contain the following: Contractor name, project name, Township name, current date, certification of pipe provided and letterhead of the certifying company.

1.04 TESTING

- A. General
 1. CONTRACTOR shall furnish all equipment and personnel to conduct system acceptance tests as specified herein. All tests shall be conducted under the supervision of the ENGINEER. All water mains, branches and valves shall be subject to cleaning with a poly-pig, hydrostatic pressure testing, disinfection and bacteriological testing. No acceptance tests shall be conducted until the water main has been installed and backfilled for not less than 30 days. A copy of all test results shall be furnished to the ENGINEER.
 2. Hydrostatic pressure testing must be performed in accordance with ANSI/AWWA C600. Disinfection and bacteriological testing must be performed in accordance with ANSI/AWWA C651.
 3. CONTRACTOR shall furnish all material and labor to provide for an acceptable full size blow-off to flush the poly-pigs out of the main at the far end of the project not connected to the existing system.
 4. Should the results of any test fail to meet the criteria established in this Specification, the CONTRACTOR shall, at his own expense, locate and repair the rejected section and retest until it is within the specified allowance.
 5. Only Pittsfield Township personnel or the CONTRACTOR under direct supervision of Pittsfield Township personnel may fill or flush lines.

B. Preparation

- 1. After the pipe has been laid and backfilled as specified, the CONTRACTOR shall fill the line, or a valve section thereof, to be tested with water in such a manner as to expel all air from the pipe. This may be done through fire hydrants at the high points; or, if no hydrant is available at such point, the CONTRACTOR shall make the taps necessary to accomplish the expulsion of all air. At the close of the test, all taps shall be satisfactorily plugged with brass plugs.

C. Sequence

- 1. All water mains connected to an existing water system shall be flushed, swabbed, chlorinated and bacteriological tested prior to pressure testing. The sequence for acceptance testing shall be:
 - a. Flushing with approved B-1 Poly-Pig
 - b. Chlorination
 - c. Flushing
 - d. Bacteriological Testing
 - e. Pressure Testing
- 2. Where mains can be totally isolated from the existing water system with airgaps, pressure testing shall precede chlorination and bacteriological testing. The sequence for acceptance testing shall be:
 - a. Pressure Testing
 - b. Connect to System
 - c. Flushing with approved B-1 Poly Pig
 - d. Chlorination
 - e. Flushing
 - f. Bacteriological Testing

D. Flushing

- 1. All flushing will be conducted by the TOWNSHIP with clean potable water until the water runs clear.

E. Chlorination

- 1. All new mains and pipe or any existing mains contaminated by the CONTRACTOR shall be chlorinated to a minimum residual chlorine concentration of fifty (50) parts per million with commercial liquid chlorine solution or approved equal. The chlorinated water shall be allowed to stand in the mains for 24 hours. The end of the 24-hour period the chlorinated water at all parts of the mains shall show a free available chlorine residual of not less than twenty-five (25) parts per million. If less than twenty-five (25) parts per million residual is shown at the end of the first 24 hours period, additional chlorine shall be added until a residual of not less than twenty-five (25) parts per million at all parts of the system is shown after a subsequent 24 hour period. The chlorinated water shall then be removed from the mains and the mains flushed with potable water for bacteriological testing. No flushing shall take place between the two required bacteriological testing.

F. Bacteriological Testing

- 1. The Pittsfield Township Utilities Department will take bacteriological samples of the water in the mains for analysis at two different times. The first samples will be taken 24 hours after the mains have been satisfactorily chlorinated, flushed and filled with potable water. The second sample will be taken 24 hours later. Each sample will be incubated for 48 hours. No flushing shall be done during or between tests, unless supervised and approved by ENGINEER. Two sets of safe consecutive bacteriological samples, collected at least 24 hours apart, must be obtained before placing the water main in service.
- 2. The CONTRACTOR shall provide a sufficient number of corporation cocks and copper tubing for taking samples. Samples shall not be collected from hoses or fire hydrants.
- 3. Bacteriological testing must begin on Mondays to allow Pittsfield Township personnel and the testing laboratory a full work week to conduct the testing.

G. Hydrostatic Pressure Testing

- 1. The CONTRACTOR shall pressure test sections of water main as sections of 2,000 feet or less unless otherwise authorized by the ENGINEER. When permitted to test lengths in excess of 2,000 feet, only the allowable leakage for 2,000 feet will be permitted.
- 2. All water mains shall be subjected to a hydrostatic pressure of 150 psi based on the elevation of the lowest point in the system. The main shall be maintained under the test pressure for a minimum continuous period of two (2) hours by pumping potable water into the line at frequent intervals. The volume of water so added shall be measured and considered to include the leakage from the main. No pipeline installed will be accepted until the leakage measured is less than 0.092 gallons per inch diameter of the pipe per 1 hour per 1,000 feet.
- 3. In the event that the leakage exceeds the specified amount, the main shall be carefully inspected for leaks and repaired as necessary. Any cracked or defective pipe, fittings, valves or hydrants discovered shall be removed and replaced with sound material and the test repeated to the satisfaction of the ENGINEER.
- 4. If the CONTRACTOR chooses to pressure test against an existing valve he assumes the responsibility of meeting the leakage requirements. The CONTRACTOR may at his discretion provide a physical break and cutting in sleeve for pressure testing.
- 5. Temporary connections (jumpers) between existing water mains and the newly constructed system for testing purposes, shall include a reduced zone backflow preventer to prevent backflow and possible contamination of the public water.

H. Material Tests

- 1. The CONTRACTOR shall have test of pipe and strength made by an independent testing laboratory. Tests of up to 4 lengths of water main per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturer's certificate of compliance to the specifications.

2.00 PRODUCTS

- A. All products shall be consistent with the current component part submittal sheet posted on the Township website.

2.01 PIPE AND FITTINGS

A. Ductile-iron pipe water main shall meet all the requirements of the latest revision of ANSI/AWWA C151/A21.51. Pipe shall be furnished in eighteen-foot or twenty-foot lengths, unless otherwise required. All joints, to include joints for fittings, valves and hydrants, must be of the push on joint type and compatible nylon joint gaskets. Ductile iron pipe must be designed in accordance with the latest revision of ANSI/AWWA C150/A21.50 to meet requirements for Pressure Class 350.

B. Ductile iron pipe and fittings shall be double-cement lined with an approved bituminous seal coat in accordance with ANSI/AWWA C104/A21.4.

C. Ductile iron fittings shall meet all the requirements of the latest revision of ANSI/AWWA C110/A21.10 for full body fittings and ANSI/AWWA C153/A21.53 for compact fittings for a minimum working pressure of 250 psi and be of the push-on joint type. Flugs, where shown on the plans, shall be solid mechanical joint plug type.

D. Restrained mechanical joints of the wedge action type shall use a follower gland and shall include a restraining mechanism which, when activated, impart multiple wedging action against the pipe, increasing its resistance as the pressure increases. Twist off nuts shall be used to insure proper actuating of the restraining device. Restrained mechanical joints for ductile iron pipe shall be Megalug, Series 1100, or approved equal. Mechanical joints shall be in conformity with the requirements of the latest revision of the ANSI AWWA C111/A21.11. Bolts and nuts must be type 304 stainless steel.

E. Push-on joints shall meet all requirements of ANSI/AWWA C111/A21.11. Push-on joints shall consist of a ductile-iron bell provided with a recess to receive a circular molder rubber gasket to effect the joint seal. A rubber gasket and sufficient lubricant to assemble the joint shall be furnished with each joint. The lubricant shall have no deleterious effect upon the color, taste or odor of potable water and shall not be corrosive to either the pipe or gasket. Pipe furnished with push-on type joints shall be equal in strength and leak tightness to pipe furnished with mechanical joints as specified when installed under identical conditions, and shall meet all other requirements of these specifications. In addition to the above requirements, the gasket and lubricant shall conform to the latest revision of ANSI/AWWA C111/A21.11. When it is necessary to utilize a locking mechanism for a push-on joint upstream or downstream of a restrained mechanical joint, field-lok gaskets or equal shall be utilized and shall be used in conformance with DIPRA Standards for restraint distance from a restrained mechanical joint fitting.

F. All pipe and fittings shall be manufactured in the United States of America.

G. The ENGINEER shall witness the delivery and unloading of all pipe and collect the appropriate manufacturer's certificate of compliance per Section 1.04 of this Specification.

2.02 VALVES

A. All valves installed under this Specification shall conform to the applicable requirements of ANSI/AWWA C500, C504 and C509 standards governing construction materials and workmanship. Each valve shall carry the name or trademark of the manufacturer. All valves shall have operating nuts that turn to the right (clockwise) to open.

B. Resilient-Seated Gate Valves

- 1. Resilient seated gate valves shall conform to the applicable requirements of ANSI/AWWA C515. Valves shall have a minimum working pressure of 250 psi. The gate shall be ductile iron encased in a bonded synthetic rubber to form resilient seating surfaces. Stem shall be bronze with a non-rising design and double O-ring packing. Joints shall be push-on type.
- 2. Resilient Seated Gate Valves shall be manufactured by American Flow Control or Clow.

C. Tapping Sleeves and Valves

- 1. Tapping sleeves shall be full length of heavy-duty stainless steel construction designed for use with the type of pipe to be tapped. Tapping sleeve flange and body shall be type 304 stainless steel. Bolts and nuts shall be 304 stainless steel. Gasket shall be full circumferential SBR compounded for water service. Tapping sleeve shall contain a test plug to assure seal prior to tapping. Tapping sleeve shall be JCM Industries 432; Romac Industries SST, Ford FAST, Powerseal 3490AS; Dresser 630 or equal.
- 2. Tapping valves shall meet the specifications for gate valves except that the valve shall have a flange compatible with the tapping sleeve.
- 3. The tapping sleeves and valves shall be subjected to a hydrostatic pressure of 200 psi. The sleeves and valves shall be maintained under pressure for a minimum continuous period of 5 minutes by pumping potable water into the sleeve. Upon any visual leakage observed by the ENGINEER, the tapping sleeve and valve shall be removed and replaced, and the test repeated at the CONTRACTOR'S expense to the satisfaction of the ENGINEER.

D. Corporation Stops

- 1. Corporation stops used for insertion into mains shall be ball valve type. All stops shall have no lead brass bodies, keys, stem washers and nuts. Inlet threads shall conform to the latest revision of AWWA C800. The outlet connection shall be of the compression type to receive copper service pipe.

E. Valve Boxes

- 1. Valves boxes shall be 5-1/4-inch and be of cast-iron construction. They shall be of three-piece, screw-type adjustment design. All valve boxes shall be installed flush with the top of the proposed site grade. Cover shall be designed to be removed easily to provide access to the valve. The base shall not rest upon the valve assembly. Valve boxes shall be Tyler 8680 Item DD with number 6 base, or equal.

F. Valve Extensions

- 1. All gate valves with operating nuts at a distance greater than 6.5 feet below ground surface shall be provided with an extension stem. The length of the extension stem shall reach within 6.5 feet of the ground surface. Details of the extension system and method of installation shall be approved by the ENGINEER prior to installation.

G. Post Indicators and Valves

- 1. Post indicators, when specified, shall be American Flow Control series A240 or Clow series 2945A with aluminum plates indicating OPEN and SHUT. Post indicators shall open left.
- 2. Post indicator valves shall be American Flow Control Model 2500 or Clow model F-6120. All valves shall open left.
- 3. Post indicators and their corresponding valves must be made by the same manufacturer.
- 4. Bollards must be placed to protect post indicators, except as specified by the ENGINEER.
- 5. Bollards shall be 4-inch diameter galvanized schedule 40 steel posts 36 to 48 inches high with minimum depth of 24 inches. The posts shall be set in and filled with 3000 psi concrete. Bollards protecting hydrants and PIVs shall be painted red.

G. Post Indicators and Valves

- 1. Post indicators, when specified, shall be American Flow Control series A240 or Clow series 2945A with aluminum plates indicating OPEN and SHUT. Post indicators shall open left.
- 2. Post indicator valves shall be American Flow Control Model 2500 or Clow model F-6120. All valves shall open left.
- 3. Post indicators and their corresponding valves must be made by the same manufacturer.
- 4. Bollards must be placed to protect post indicators, except as specified by the ENGINEER.
- 5. Bollards shall be 4-inch diameter galvanized schedule 40 steel posts 36 to 48 inches high with minimum depth of 24 inches. The posts shall be set in and filled with 3000 psi concrete. Bollards protecting hydrants and PIVs shall be painted red.

2.03 GATEWELLS

A. Gatewells shall conform to the latest revision of ASTM C478 for Precast Reinforced Concrete Manhole Sections. Section joints shall be rubber gasketed and shall conform to ASTM C990. Cone sections shall be eccentric, with an offset step configuration.

B. All gatewell components shall have the name of the manufacturer stenciled on the inside. The lettering shall be a minimum of 4-inches high.

C. Gatewells constructed over an existing water main shall have a doghouse mudded to an 8-inch thick cookie. All other gatewells shall have precast integral base sections.

D. Mortar for masonry or plastering outside of gatewells shall be made of one part of Portland Cement to two parts fine aggregate. Mortar materials and mixing shall correspond, in general, to those for concrete. All openings in gate wells shall be closed with brick and mortar in a manner that will make them watertight.

E. Gatewell steps shall be reinforced polypropylene coated steel. They shall be M.A. Industries models PS1-PF or PS1-B, or approved equal.

2.04 GATEWELL FRAMES AND COVERS

A. Gatewell frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitable notched for convenient removal of the cover.

B. Frames and covers shall be East Jordan Iron Works Model 1040Z frame with 1040 A cover. Each cover shall have the Pittsfield Township logo and the letters "PITTSFIELD TWP WATER" cast integrally into the cover.

C. All frames and covers shall be coated at the place of manufacturer with coal tar pitch varnish or other asphaltum coating approved by the ENGINEER.

2.05 GATEWELL CONNECTIONS

A. Water pipe to gate well connections shall be through a watertight flexible pipe-to-manhole connector, which shall be securely clamped into a core-drilled port. Pipe ports shall be core-drilled at the point of manufacturer and shall be accurately located within 1/2-inch of the proposed water main centerline. Flexible pipe-to-manhole connectors shall meet the requirements of ASTM C923 and shall be NFC, Kon-N-Seal, or equal.

B. All non-rubber components including wedges, bands and pipe clamps shall be stainless steel.

2.06 GATEWELL ADJUSTMENTS

A. All final grade adjustment of gatewell cover and frame assemblies shall be completed utilizing injection molded High Density Polyethylene (HDPE) adjustment rings as manufactured by Ladtech, Inc., or approved equal. The adjustment rings shall be manufactured from polyethylene plastic meeting the requirements of ASTM D4976. Brick adjustments are not acceptable.

B. All adjustment for matching road grade shall be made utilizing a molded indexed slope ring.

C. Each adjustment ring shall be sealed with a 3/16 to 1/4-inch bead of butyl rubber sealant per the manufacturer's instructions. Sealant shall meet the requirements of ASTM C990.

D. All castings and adjustment rings shall be securely fastened to the cone of the structure with four 3/8-inch threaded rods. The rods shall be galvanized or stainless steel anchored to the structure with Redhead Tru-bolt concrete anchors, or equal. Stainless steel or galvanized nuts and washers shall be used to attach the casting.

E. When the depth of the gate well requires an adjustment greater than the maximum allowed, the CONTRACTOR shall provide additional pre-cast gate well barrel sections required to maintain acceptable chimney heights.

2.07 HYDRANTS

A. Fire hydrants shall comply with the latest revision of ANSI/AWWA C502. Hydrants shall be compression type to open with the pressure. They shall have a 5-1/4" mechanical joint inlet. Hydrants shall have two 2-1/2" (4.05" O.D.) pumper connections with National Standard 7-1/2 threads per inch. All hydrants shall have City of Ann Arbor standard thread pattern.

B. Fire hydrants shall have an inside barrel dimension of not less than 7.375" I.D. from top to bottom. The 1-1/8" pentagon operating nut shall open left (counter clockwise).

C. All nozzles shall be on a removable head with a flange so that they may be rotated by changing the position of the flange.

D. Hydrant shall be fully bronze mounted, including top of the operating stem where it passes through the double O-ring seal in the bronze packing gland. The forged operating stem in the base and the valve seat shall also be of bronze. The molded valve shall be of composition rubber and the cast iron valve clamps shall be packed with O-ring seals and held tight to the stem by a threaded bronze hex retainer ring and threaded bronze locknut, anchored with set screws.

E. Hydrant shall be designed for 150 psi working pressure and tested to 300 psi. Those portions of the hydrant above grade shall have two coats of red enamel. All unpainted surfaces shall have two coats of coal tar pitch varnish.

F. The hydrants shall be EJIW WaterMaster 5BR-250 with mechanical joint connections and break flange barrel with standard head.

G. Hydrant bolts located below grade shall be type 304 stainless steel

H. All hydrants shall have a 4" Harrington Integral Hydra-Storz (HHS) adaptor. The HHS shall meet the requirements of AWWA C502 regarding material and pressure testing. Storz nozzle shall have a brass metal face and hard anodized ramps and lugs. The aluminum finish shall be hardcoat anodized to Mil-A-8625f, type 3 dark gray. The adaptor shall be made from forged or extruded 6061-T6 aluminum.

I. The blind cap shall have hard anodized aluminum Storz ramps and lugs, made of forged or extruded 6061-T6 aluminum, the cap shall be equipped with suction seal. The cap shall be connected to the adapter or the hydrant with 0.125 vinyl coated aircraft cable.

J. Fire hydrant extensions shall be manufactured by the hydrant manufacturer for use with the model hydrant being installed.

K. Hydrants adjacent to truck routes on commercial developments shall be protected by bollards.

2.08 SERVICE LEADS

A. Pipe for service leads 1-4inch to 2-inch shall be soft annealed Type K copper. Service leads 4-inch to 8-inch shall be Pressure Class 350 Ductile Iron, Double cement lined.

B. Curb Stops

1. Curb stops used for service connections shall be ball valve type. All parts shall be no lead brass. Both the inlet and outlet connections shall be of the compression type to receive copper service pipe. Curb stops shall be consistent with the most current shop drawing checklist posted on the Township website.

C. Curb Boxes

1. Curb boxes shall be the Bibby Screw Style V010 with S169 top, V201 bottom, V223 extension, and V240 water cover. All curb boxes shall be coated inside and out with a tar base enamel. The minimum bury shall be 5'-0" (60") and the maximum 6' (72"). Curb boxes shall be consistent with the most current shop drawing checklist posted on the Township website.

D. Couplings

- 1. Couplings used for service connections shall be located outside the pavement and more than 10 feet from any building wherever possible. They shall have a three part union, and both connections shall be of the compression type to receive copper service pipe. All parts shall be no lead brass.
- 2. All service connections between two copper service pipes (two-inch or less in diameter) located under the pavement or within 10 feet of a building shall be connected using wrought copper, solder-sweat type couplings conforming to ASME B16.18 or ASME B16.22. Fittings shall bear made in USA labels. Joining of copper piping shall be a solder-sweat connection using lead free Silfos. The use of 95-5, Tin-Antimony or equivalent solders will not be allowed.

2.09 TRACER WIRE

A. Tracer wire to be used on open cut pipe shall be AWG #12 single strand copper with blue 30 mil HDPE insulation. Connections shall be made using 3M DBR-6 wire connectors, or equal.

2.10 POLYETHYLENE ENCASEMENT

A. All ductile iron pipe and fittings must be polyethylene encased. In addition, the initial 24-inches of copper service lead must be encased from the corporation stop. Polyethylene encasement must be manufactured in accordance with the requirements of the latest revision of ANSI/AWWA C105/A21.5.

B. Polyethylene Encasement shall be black linear low-density polyethylene with a minimum thickness of 8 mils.

C. The wrap shall overlap the joint by 12 inches to either side and be secured to the pipe with polyethylene adhesive tape.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill shall conform to the Earthwork specification.

3.02 PIPE INSTALLATION

A. The installation of ductile iron water main must conform to the requirements of ANSI/AWWA C600.

B. Any pipe damaged in transport or handling shall be rejected and removed from the site of the work.

C. Before lowering in the trench, and while suspended, each pipe and fitting shall be inspected for defects. Defective, damaged or unsound pipe shall immediately be removed from the construction site. The interior of each pipe shall be inspected for cleanliness and cleared of all dirt and foreign matter before being lowered into the trench.

D. In handling and placing ductile iron pipe and fittings, no metal shall be used in contact with the inside of the pipe to fit or support the pipe. The pipe shall be moved only through the use of bell slings or automatic release type pipe tongs. Care shall be taken not to injure the pipe or pipe coating, and no damaged or imperfect pipe shall be used in the work except that minor damage to pipe coating may be repaired subject to the review of the ENGINEER.

E. Unless otherwise directed, pipe shall be laid with bell ends facing in the direction of laying. After a length of pipe is placed in the trench, the spigot shall be centered in the bell of the adjacent pipe; the pipe shoved into position and brought to a true alignment. It will then be secured with sand backfill tamped under and on each side of the pipe, except at bell holes. No earth or other foreign matter shall be allowed to enter the joint space.

F. All excavation and backfill above the pipe shall conform to specifications under Earthwork and as shown on the Drawings.

G. A minimum of 18-inches vertical clearance shall be provided between the water main and any existing underground facility, unless otherwise approved by the ENGINEER. Whenever a main is installed under any existing utility line such as gas, buried electric power, telephone line, sewer or water, provisions shall be made to properly support or distribute any concentrated load to avoid settlement and possible failure of either main. Such provisions shall consist of concrete bedding of the main, complete concrete encasement, or some other method as shown on the plans. Water mains passing under sewers, in addition, shall be protected by providing:

- 1. A vertical separation of at least 18-inches between the bottom of the sewer and the top of the water main.
- 2. Adequate structural support for the sewer to prevent excessive deflection of joints and settlement of the sewer about the water main, i.e., a concrete saddle under the pipe with a span length extending to undisturbed earth bearing.

H. Water mains shall be installed at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank, or subssoil treatment system. The distance shall be measured edge to edge.

I. In assembly of push-on or shove type joints, the bell socket recess and the gasket shall be wiped clean and the gasket placed properly in position. A thin film of lubricant shall then be applied to the surface of the gasket to come into contact with the entering pipe. The plain end of the entering pipe shall be cleaned and then entered and forced home to the base of the socket.

J. Where necessary to cut pipe, cutting shall be done with approved tools and cut ends of pipe shall be square and regular. Cutting shall be done in a manner to avoid damage to lining and coating. Minor damage may be repaired subject to review of the ENGINEER.

K. To prevent trench water from entering the pipe, joints, which for any reason may not be completed as the pipe is laid, shall be thoroughly packed with approved material. In a manner to make them watertight. Open ends of fittings shall be tightly closed with approved plugs and well packed, as shall the end of the last pipe laid whenever work is not in progress.

L. Each pipe shall be laid accurately to the line and grade shown on the Plans. Whenever deflections at joints are required by changes in grade or alignment or to plumb valve stems, the deflection at any bell and spigot joint shall not exceed that which will cause the spigot end of pipe to be away from home in the bell of the adjacent pipe a distance of 1/4 inch at the point of greatest opening.

M. The deflection at any mechanical joint shall not exceed three-quarters of the maximum deflection recommended by the manufacturer or 3 degrees, whichever is more conservative of the joint used.

N. The CONTRACTOR shall not be entitled to any additional compensation because depth is more than specified at certain locations or due to clearances at manholes, or due to unforeseen obstacles, or occasioned in order to avoid undue changes in grade.

O. Pipe shall be laid at depths to provide minimum cover of 5'-6" over the top of the pipe unless otherwise noted on the Drawings or elsewhere in these specifications.

3.03 GATE VALVES AND WELLS

A. All pre-cast section joints and lift holes shall be pointed and plugged, inside and outside, with mortar.

B. Gate valves shall be of the size and installed at the location as shown on the plans. They shall be set square with the line of the main and unless otherwise directed by the Township ENGINEER, all gate valves shall be set with stems plumb. At each side of gate valve, the CONTRACTOR shall furnish and install a 1-inch copper operation stop on the main as shown on the Standard Details.

C. All gate valves with operating nuts at a distance greater than 6.5 feet below ground surface shall be provided with an extension stem.

3.04 HYDRANTS

A. Fire hydrants shall be constructed in accordance with the details shown on the plans. Finish grade level to center of nozzle caps shall measure between 24 and 30 inches. A maximum of one hydrant barrel extension and one operating stem extension may be used to accommodate changes in grade. Under no conditions shall extended hydrant have more than one coupling in the operating stem. Pumper connections shall point toward the street.

B. Fire hydrants shall be installed with barrel vertical and properly based. Concrete thrust blocks shall be placed behind the hydrant, tee, and every bend. Care should be taken to insure the drain holes in the hydrant are not plugged by the thrust blocks. Hydrant shall be set in 1 yard of coarse gravel for drainage purposes. If ground water is encountered, the drain hole shall be plugged as directed by the manufacturer. The backfill shall be sand thoroughly tamped around the hydrant and valve box in 1 ft layers.

C. Fire hydrant and gate valve shall be set apart 24 inches. Gate valves and valve box shall be as specified under the valve paragraphs of this section.

D. Hydrant leads shall have a minimum of 5.5 feet of cover in all areas, including crossings through ditch sections.

E. Hydrants shall be carefully plumbed, braced and backfilled so they remain plumb.

F. All grade, facing, and vertical alignment adjustment of hydrants shall be completed prior to pressure testing and charging of the hydrants.

G. All hydrants shall be cleaned and painted with a rust inhibitive, oil base paint such as "rustoleum" or approved equal to the Township's color code prior to acceptance.

H. The lubricant reservoirs in all hydrants having such construction shall be filled with a lubricant acceptable to the Michigan Department of Environmental Quality and recommended by the hydrant manufacturer.

I. Backfilling around fire hydrants shall be carefully tamped sand in 12-inch layers from the centerline of the lead main to a height of 1-foot below finished grade.

J. CONTRACTOR shall place burlap sack or equivalent material over the hydrant nozzles after installation.

K. Fire hydrant nozzles shall be provided as required by the Township Fire Marshal.

L. Fire hydrant extensions shall be aligned as necessary so that the safety flange is located at or above surface grade.

3.05 TRACER WIRE

A. Tracer wire shall be installed along the top of all water mains. For directional drilling, the tracer wire shall be installed at the same line as the pipe. For open cut construction, the tracer wire shall be installed at a height of not more than 6 inches above the main line pipe or service leads. Wire shall be extended to all hydrants, blow-offs, dead ends, service leads and post indicator valves. Tracer wire shall be brought to grade, leaving enough excess material to avoid loss or damage to the wire during construction and subsequent activities. Wire shall be trimmed to finish grade following completion of the landscaping.

B. When tracer wire is to be run along short offsets (less than 20 feet), a loop of wire shall be utilized to loop to the end of the offset, bring the loop to grade and terminate it in an approved manner. For service leads and offsets of more than 20 feet in length, or installed by directional drilling method, a splice may be utilized to make the