

# *Owosso Planning Commission*



*Special Meeting  
7:00pm, Tuesday, February 2, 2016  
Owosso City Council Chambers*



## MEMORANDUM

---

301 W. MAIN ▪ OWOSSO, MICHIGAN 48867-2958 ▪ WWW.CI.OWOSSO.MI.US

---

DATE: January 29, 2016

TO: Chairman Wascher and the Owosso Planning Commission

FROM: Susan Montenegro, asst. city manager/director of community development

RE: Special Planning Commission Meeting: February 2, 2016

**The planning commission shall convene at 7:00pm on Tuesday, February 2, 2016 in the city council chambers of city hall.**

The special meeting will be to review the site plan for 1509 W. Oliver, also known as the Cargill project. Please see the staff report with comments attached to this packet. Detailed detention pond calculations for volume and discharge are attached as well as an aerial map. Doug Scott from ROWE will be presenting this evening and will be able to answer questions you may have regarding the site plan.

Please **RSVP for the meeting.** Feel free to contact me at 989.725.0544 if you have questions.

Sue

**AGENDA**  
**Owosso Planning Commission**  
**Special Meeting**  
Tuesday, February 2, 2016 at 7:00 p.m.  
Council Chambers – Owosso City Hall  
Owosso, MI 48867

CALL MEETING TO ORDER:

PLEDGE OF ALLEGIANCE:

ROLL CALL:

APPROVAL OF AGENDA: February 2, 2016

APPROVAL OF MINUTES: December 14, 2015

COMMUNICATIONS:

1. Staff memorandum.
2. PC minutes from December 14, 2015.
3. Site plan application.
4. Site plan for 1509 W. Oliver.
5. Staff review of site plan.
6. Construction standard detail sheet (utility).
7. Detention volume and discharge calculations.
8. Aerial site map.

COMMISSIONER/PUBLIC COMMENTS:

PUBLIC HEARINGS:

1. None

SITE PLAN REVIEW:

1. 1509 W. Oliver Street – parcel 050-537-000-048-00

BUSINESS ITEMS:

None.

ITEMS OF DISCUSSION:

None.

COMMISSIONER/PUBLIC COMMENTS:

ADJOURNMENT: **\*Next meeting will be Monday, February 22, 2016\***

**Commissioners, please call Sue at 725-0544 if you will be unable to attend the meeting on Tuesday, February 2, 2016.**

[The City of Owosso will provide necessary reasonable auxiliary aids and services, such as signers for the hearing impaired and audiotapes of printed materials being considered at the meeting, to individuals with disabilities at the meeting/hearing upon seventy-two (72) hours notice to the City of Owosso. Individuals with disabilities requiring auxiliary aids or services should contact the City of Owosso by writing or calling the following: Amy Kirkland, City Clerk, 301 W. Main St, Owosso, MI 48867 (989) 725-0500]. The City of Owosso website is: [www.ci.owosso.mi.us](http://www.ci.owosso.mi.us)

**Affirmative Resolutions**  
**Owosso Planning Commission**  
**Special Meeting**  
Tuesday, February 2, 2016 at 7:00 p.m.  
Council Chambers – Owosso City Hall  
Owosso, MI 48867

**Resolution 160202-01**

Motion: \_\_\_\_\_

Support: \_\_\_\_\_

The Owosso Planning Commission hereby approves the agenda of February 2, 2016 as presented.

Ayes: \_\_\_\_\_

Nays: \_\_\_\_\_

Approved: \_\_\_\_

Denied: \_\_\_\_

**Resolution 160202-02**

Motion: \_\_\_\_\_

Support: \_\_\_\_\_

The Owosso Planning Commission hereby approves the minutes of December 14, 2015 as presented.

Ayes: \_\_\_\_\_

Nays: \_\_\_\_\_

Approved: \_\_\_\_

Denied: \_\_\_\_

**Resolution 160202-03**

Motion: \_\_\_\_\_

Support: \_\_\_\_\_

The Owosso Planning Commission hereby approves/denies the application for site plan review for Cargill, Inc., 1509 W. Oliver Street – parcel 050-537-000-048-00 as applied and attached hereto in plans dated January 2016 with the following conditions/without conditions:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ayes: \_\_\_\_\_

Nays: \_\_\_\_\_

Approved: \_\_\_\_

Denied: \_\_\_\_

**Resolution 160202-04**

Motion: \_\_\_\_\_

Support: \_\_\_\_\_

The Owosso Planning Commission hereby adjourns the February 2, 2016 special meeting, effective at \_\_\_\_\_pm.

Ayes: \_\_\_\_\_

Nays: \_\_\_\_\_

Approved: \_\_\_\_

Denied: \_\_\_\_

**MINUTES  
REGULAR MEETING OF THE OWOSSO PLANNING COMMISSION  
COUNCIL CHAMBERS, CITY HALL  
MONDAY DECEMBER 14, 2015 – 7:00 P.M.**

- CALL TO ORDER:** Chairperson Bill Wascher called the meeting to order at 7:00 p.m.
- PLEDGE OF ALLEGIANCE:** Was recited.
- ROLL CALL:** Roll call was taken by Recording Secretary Roxane Cramer.
- MEMBERS PRESENT:** Chairman Bill Wascher, Vice-Chair Craig Weaver, Commissioners Tom Taylor, Michelle Collison, and Janae Fear.
- MEMBERS ABSENT:** Commissioners Frank Livingston, Mike O’Leary, Brent Smith and Garfield Warren.
- OTHERS PRESENT:** Susan Montenegro, Assistant City Manager and Director of Community Development.

**APPROVAL OF AGENDA:**  
**MOTION BY COMMISSIONER COLLISON, SUPPORTED BY COMMISSIONER TAYLOR TO APPROVE THE AGENDA FOR DECEMBER 14, 2015.**  
**YEAS ALL. MOTION CARRIED.**

**APPROVAL OF MINUTES:**  
**MOTION BY COMMISSIONER TAYLOR, SUPPORTED BY COMMISSIONER COLLISON TO APPROVE THE MINUTES FOR NOVEMBER 23, 2015 WITH THE FOLLOWING CHANGES: COMMISSIONER FEAR VOTED NO ON THE SITE PLAIN REVIEW.**  
**YEAS ALL. MOTION CARRIED.**

- COMMUNICATIONS:**
1. Staff memorandum
  2. PC minutes for November 23, 2015
  3. Rezoning applications for 820 E. Main Street.
  4. Public hearing notices for 820 E. Main Street.
  5. Medical Marihuana articles.

**COMMISSIONER/PUBLIC COMMENTS:** Commissioner Fear asked if there is an error in the minutes is it better to call prior to the meeting or bring it to attention at the meeting. Ms. Montenegro stated either way would be fine but it would have to be corrected in the record so correcting at the meeting would probably be the best way.

**PUBLIC HEARINGS:**

**1. 820 E. Main Street rezoning.**  
Michael Kovich, owner of the home, stated there are eleven buildings on that particular block and four have been rezoned for commercial use leaving 7 on the block as residential. He pointed out that across the street is zoned commercial. He feels that by rezoning it may help clean up the block. Ms. Montenegro stated that the rezoning would be from RM-1 to B-4 to match the zoning that is already on that block and across the street. There was a discussion among commissioners with most in agreement that it should be rezoned. Commissioner Fear asked

about the City Master Plan and stated this sounds like spot zoning which she thought the City Master Plan eliminated spot zoning.

**MOTION BY COMMISSIONER TAYLOR, SUPPORTED BY VICE CHAIR WEAVER THAT THE OWOSSO PLANNING COMMISSION HEREBY APPROVES THE REZONING REQUEST FOR 820 E. MAINSTREET FROM RM-1 TO B-4.**

Roll Call Vote.

AYES: Chairman Wascher, Vice-Chair Weaver, Commissioners Taylor, and Collison.

NAYS: Commissioner Fear.

ABSENT: Commissioners Livingston, O’Leary, Smith and Warren.

**BUSINESS ITEMS:**

None.

**ITEMS OF DISCUSSION:**

**1. Medical Marihuana and potential changes in the law regarding licensing.**

Ms. Montenegro explained that the City of Owosso Ordinance allows for dispensaries and growing facilities as long they are within the appropriate zoning district. She stated that she receives at least 6 – 10 people weekly looking for locations that work. There are potential changes that will be taking place at the state level.

**COMMISSIONER/PUBLIC COMMENTS:**

Chairman Wascher asked about the rezoning of the parcels on M-71 he thought they had already voted to rezone them. Ms. Montenegro explained that council didn’t vote on any of the parcels and this time she has listed them separately so they can pull certain ones out if they want to.

**ADJOURNMENT:**

**MOTION BY COMMISSIONER TAYLOR, SUPPORTED BY COMMISSIONER COLLISON TO ADJOURN AT 8:43 P.M. UNTIL THE NEXT MEETING ON JANUARY 25, 2016.**

**YEAS ALL, MOTION CARRIED.**

---

Janae Fear, Secretary

rc

**CITY OF OWOSSO, MICHIGAN**

**SITE PLAN REVIEW APPLICATION AND CHECKLIST**

Approval of the site plan is hereby requested for the following parcel(s) of land in the City of Owosso. This application is submitted with three (3) copies of the complete site plan and payment of the appropriate review fees. Applicant shall also submit a digital version of the site plan to the community development director. Application must be filed least 25 days prior to a scheduled planning commission meeting for staff review and proper notices.

Accompanying any site plan required hereunder, the applicant shall provide from a licensed engineer soil borings at the proposed construction site to ascertain bearing capacity of foundations soils at the time of footing excavation to certify such soil conditions meet or exceed design capacity of the foundation to support the proposed structure. These requirements shall comply with policies of the City of Owosso, copies of which can be obtained from the Building Department.

The attached checklist has been completed to certify the data contained on the site plan. If the required data has not been provided, the appropriate box has been checked with a statement of explanation on why the data has not been provided. I understand that if my site plan is deemed to be incomplete, it may be returned by the City for revisions without being forwarded to the Planning Commission for consideration, until such time as the requirements have been adequately met. By signing this application, the applicant hereby grants full authority to the City of Owosso, its agents, employees, representatives and/or appointees to enter upon the undersigned lands/parcel(s) for the purposes of inspection and examination.

**Application Filed On:** November 20, 2015

**Application Transmitted by City On:** \_\_\_\_\_

**Property Details:**

1. Name of Proposed Development: Cargill - Animal Nutrition Facility
2. Property Street Address: 1509 W. Oliver Street
3. Location of Property: On the (north, south, east, west side) of King  
Street, between W. Oliver and "Chestnut"  
Streets.
4. Legal Description of Property: Parcel #050-537-000-48
5. Site Area (in acres and square feet): 19.11 Acres (832,432 Sft)
6. Zoning Designation of Property: I1 (Light Industrial)

**Ownership:**

1. Name of Title/Deed Holder: Cargill Incorporated, Attn: Mr. Ken Knight
2. Address: 9380 Excelsior Blvd, Hopkins, MN 55343
3. Telephone No: (952) 412-7268
4. Fax No: (952) 367-0955
5. Email address: ken\_knight@cargill.com

**Applicant:**

1. Applicant (If different from owner above): \_\_\_\_\_
2. Address: \_\_\_\_\_
3. Telephone No: \_\_\_\_\_
4. Fax No: \_\_\_\_\_



5. Email address: \_\_\_\_\_  
 6. Interest in Property (potential buyer/lease holder/potential lessee/other): \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Architect/Surveyor/Engineer preparing site plan:**

1. Name of Individual: Douglas Scott, P.E. - Rowe Professional Services Company  
 2. Address: 540 S. Saginaw Street, Flint, MI 48502  
 3. Telephone No: 810-341-7500  
 4. Fax No: 810-341-7573  
 5. Email address: Dscott@rowepsc.com

**PLEASE NOTE:**

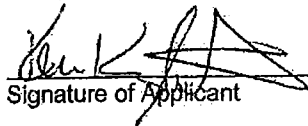
LLC establishments must have a current plan of operation.

Review Fees:

Paid: Yes/No

\*Site Plan Review Fees: \$150.00 (may be more if it requires review from outside firm)

Total Fees: \$ 150.00

 11/23/2015  
 Signature of Applicant Date

\_\_\_\_\_  
 Signature of Deed/Title Holder Date

**Please provide an overview of the project:**

The proposed project includes the construction of a new animal nutrition processing facility. The improvements include the construction of a production building and warehouse facility (79,300 sft), an office building (2,980 sft), four grain silos and liquid storage tanks. Additional site amenities include a rail spur, and perimeter roadways for site access. The facility will include a 28 space parking lot for employees, parking / staging area for five contract trucks and drivers, and an area to store six semi trailers. The facility will be serviced by public (City of Owosso) water, sanitary sewer and storm sewer. Natural gas and electric service will be provided by Consumers Energy. Storm water will be detained on site and discharged through a metered outlet to the Shiawassee River.

The project includes provisions for a 53,000 sft future expansion of the warehouse.

- Changes - Warehouse is 76,221 sq. ft.  
- office bldg is 1,900 sq. ft  
- 3 silos not 4  
- parking is 29 spaces  
- future expansion is 70,600 sq. ft.

### SITE PLAN REVIEW CHECKLIST

Check the appropriate line. If item is marked as 'not provided', attach detailed explanation.

Item	Provided	Not Provided
1. Site location Map.	X	
2. North arrow, scale (one (1) inch equals fifty (50) feet if the subject property is less than three (3) acres and one (1) inch equals one hundred (100) feet if three (3) acres or more.	X	
3. Revision dates.	X	
4. Signature and Seal of Architect/Surveyor/Engineer.	X	
5. Area of site (in acres and square feet).	X	
6. Boundary of the property outlined in solid line.	X	
7. Names, centerline and right-of-way widths of adjacent streets.	X	
8. Zoning designation of property.	X	
9. Zoning designation and use of adjacent properties.	X	
10. Existing and proposed elevations for building(s) parking lot areas and drives.	X	
11. Direction of surface water drainage and grading plan and any plans for storm water retention/detention on site.	X	
12. Required setbacks from property lines and adjacent parcels.	X	
13. Location and height of existing structures on site and within 100 feet of the property.	X	
14. Location and width of existing easements, alleys and drives.	X	
15. Location and width of all public sidewalks along the fronting street right-of-way and on the site, with details.	N/A	
16. Layout of existing/proposed parking lot, with space and aisle dimensions.	X	
17. Parking calculations per ordinance.	X	
18. Location of all utilities, including but not limited to gas, water, sanitary sewer, electricity, telephone.	X	
19. Soil erosion and sedimentation control measures during construction.	X	
20. Location and height of all exiting/proposed fences, screens, walls or other barriers.	X	
21. Location and details of dumpster enclosure and trash removal plan.	X	
22. Landscape plan indicating existing/proposed trees and plantings along frontage and on the site.	X	
23. Notation of landscape maintenance agreement.	X	
24. Notation of method of irrigation.	X	
25. Lighting plan indicating existing/proposed light poles on site, along site's frontage and any wall mounted lights.	X	
a. Cut-sheet detail of all proposed light fixtures.	X	
26. Architectural elevations of building (all facades). Identifying height, Materials used and colors.	X	
27. Existing/proposed floor plans.	X	
28. Roof mounted equipment and screening.	X	
29. Location and type of existing/proposed on-site signage.	X	
30. Notation of prior variances, if any.	X	
31. Notation of required local, state and federal permits, if any.	X	

32. Additional information or special data (for some sites only)

- |                                     |                        |                           |
|-------------------------------------|------------------------|---------------------------|
| a. Environmental Assessment Study.  | <u>      N/A      </u> | <u>                  </u> |
| b. Traffic Study. Trip Generation.  | <u>      X      </u>   | <u>                  </u> |
| c. Hazardous Waste Management Plan. | <u>      N/A      </u> | <u>                  </u> |

33. For residential development: a schedule indicating number of dwelling units, number of bedrooms, gross and usable floor area, parking provided, total area of paved and unpaved surfaces.

	<u>      N/A      </u>	<u>                  </u>
--	------------------------	---------------------------

34. LLC establishments must have a current Plan of Operation.

	<u>      N/A      </u>	<u>                  </u>
--	------------------------	---------------------------

35. Is property in the floodplain?

	<u>      NO      </u>	<u>                  </u>
--	-----------------------	---------------------------

36. Will this require MDEQ permitting?

	<u>      NO      </u>	<u>                  </u>
--	-----------------------	---------------------------

37. Performance Bond – when required.

	<u>      X      </u>	<u>                  </u>
--	----------------------	---------------------------

\*Additional data deemed necessary to enable to completion of an adequate review may be required by the Planning Commission, City and/or its consultants.

# SITE PLAN FOR CARGILL ANIMAL NUTRITION PROJECT SPARTAN

## OWOSSO, T7N-R2E SECTION 14 SHIAWASSEE COUNTY, MICHIGAN

**PROJECT  
LOCATION**

**SHEET INDEX**

- 1 C1 - COVER
- 2 C2 - NOTES
- 3 C3 - LEGEND
- 4 C4 - DETAILS 1 OF 3
- 5 C5 - DETAILS 2 OF 3
- 6 C6 - DETAILS 3 OF 3
- 7 C7 - EXISTING PLAN & REMOVALS
- 8 C8 - PROPOSED PLAN
- 9 C9 - GRADING PLAN & STORM WATER MANAGEMENT
- 10 C10 - LANDSCAPING PLAN
- 11 C11 - LANDSCAPING DETAILS
- 12 G1.1 - GENERAL FLOOR PLAN
- 13 G2.1 - BUILDING ELEVATIONS 1 OF 2
- 14 G2.2 - BUILDING ELEVATIONS 2 OF 2
- 15 G4.1 - 3D ISOMETRIC
- 16 ELP1 - LIGHTING PHOTOMETRIC

**PLAN SUBMITTAL LOG**

AGENCY	UTILITY	SUBMITTAL DATE
1. MICHIGAN GAS STORAGE 8613 PINE ROAD MARION, MI 49665-6397 (231) 743-6397	WATER & SANITARY	---
2. CONSUMERS ENERGY 530 WEST WILLOW STREET LANSING, MI 48867 (517) 374 - 2031 MR. JEREMY BEARD	GAS	---
3. CONSUMERS ENERGY 530 WEST WILLOW STREET LANSING, MI 48867 (517) 374 - 2255 MR. TOM BARNHILL	ELECTRIC	---
4. CHARTER COMMUNICATIONS 2525 STATE STREET SAGINAW, MI 48602 (989) 725 - 1053 EXT. 10 MR. CHAD ERSKINE	CABLE	---
5. VERIZON 224 WEST EXCHANGE STREET OWOSSO, MI 48867 (989) 723 - 0241 MR. ADAM WHITE	TELEPHONE	---
6. SHIAWASSEE COUNTY DRAIN COMMISSIONER 149 CORUNNA AVENUE, 1ST FLOOR CORUNNA, MI 48817 (989) 743-2398 MR. TONY NEWMAN	STORM/DRAINAGE	---
7. SHIAWASSEE COUNTY HEALTH DEPARTMENT ENVIRONMENTAL HEALTH DIVISION SURBECK BUILDING 201 N. SHIAWASSEE STREET CORUNNA, MI 48817 (989) 743-2930	SESC	---



**LOCATION MAP**  
NOT TO SCALE



**OWNER INFORMATION**

CARGILL, INCORPORATED  
MR. KEN KNIGHT, PROJECT MANAGER  
9380 EXCELSIOR BLVD., MS 14-7  
HOPKINS, MN 55343  
952-984-8933

**CIVIL ENGINEER**

ROWE PROFESSIONAL SERVICES COMPANY  
DOUGLAS SCOTT, P.E.  
540 S. SAGINAW STREET  
FLINT, MI 48502  
810-341-7500

**ARCHITECT/ENGINEER**

VAA, LLC  
2300 BERKSHIRE LANE NORTH, SUITE 200  
PLYMOUTH, MN 55441

**PROJECT DESCRIPTION**

THIS PROJECT INCLUDES A SITE DEVELOPMENT PLAN FOR CARGILL WHICH IS LOCATED IN THE CITY LIMITS OF OWOSSO, IN SHIAWASSEE COUNTY. THE PARCEL TO BE DEVELOPED IS 19.11 ACRES (18.1 ACRES PROPOSED). THE PROPOSED FACILITY WILL ACCEPT RAW INGREDIENTS TO PRODUCE ANIMAL FEEDS IN BULK QUANTITIES.

**GENERAL NOTES**

ALL PUBLIC FACILITIES SHALL BE LOCATED WITHIN A RIGHT-OF-WAY, AN EXISTING EASEMENT, OR SHALL HAVE AN EASEMENT GRANTED TO THE CITY OF OWOSSO FOR MAINTENANCE, REPAIR AND/OR REPLACEMENT.

EXISTING UTILITIES HAVE NOT BEEN EXPOSED FOR VERIFICATION OF LOCATION AND ELEVATIONS. THE CONTRACTOR SHALL EXCAVATE, LOCATE, AND VERIFY DEPTH OF ANY EXISTING UTILITIES PRIOR TO CONSTRUCTION.

THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR PROTECTION OF ALL EXISTING UTILITIES DURING CONSTRUCTION. ALL COSTS FOR LOCATING, REMOVING AND REPLACING OR RELOCATING THESE UTILITIES SHALL BE INCIDENTAL TO CONSTRUCTION. ALL UTILITIES DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH LIKE MATERIAL.

FOR ALL CONSTRUCTION ACTIVITY THAT DISTURBS 5 ACRES OR MORE OF LAND THE OWNER OF THE PROPERTY SHALL OBTAIN AN NPDES STORM WATER DISCHARGE PERMIT FOR CONSTRUCTION ACTIVITIES FROM THE MDEQ AS REQUIRED UNDER P.A. 245. THE NOTICE OF COVERAGE FORM SHALL BE SUBMITTED THROUGH SDCD WITH THE SOIL EROSION CONTROL PERMIT APPLICATION. THE DISTURBED AREA FOR THIS PROJECT IS APPROXIMATELY 15 ACRES. A NPDES PERMIT IS REQUIRED FOR THIS PROJECT.

**UTILITY WARNING:** UNDERGROUND UTILITY LOCATIONS AS SHOWN ON THE PLANS WERE OBTAINED FROM UTILITY OWNERS, AND WERE NOT FIELD LOCATED. A MINIMUM OF THREE (3) WORKING DAYS PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY "MISS DIG" (800-482-7171) AND HAVE ALL UNDERGROUND UTILITIES STAKED BEFORE ANY WORK MAY BEGIN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND/OR RELOCATION OF ALL UTILITIES THAT MAY INTERFERE WITH CONSTRUCTION. THREE (3) WORKING DAY BEFORE YOU DIG - CALL MISS DIG (800-482-7171).

LEGAL DESCRIPTION PER FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT  
No. NCS-743985-MPLS, DATED JULY 17, 2015 AT 8:00 AM

THE LAND REFERRED TO IN THIS COMMITMENT IS DESCRIBED AS FOLLOWS:

REAL PROPERTY IN THE CITY OF OWOSSO, COUNTY OF SHIAWASSEE, STATE OF MICHIGAN, DESCRIBED AS FOLLOWS:

PART OF THE NORTH 1/2 OF THE SOUTHWEST 1/4 OF SECTION 14, TOWNSHIP 7 NORTH, RANGE 2 EAST, IN THE CITY OF OWOSSO, SHIAWASSEE COUNTY, MICHIGAN, LYING SOUTHWEST OF M.C.R.R. RIGHT-OF-WAY AND ALL THAT PART OF THE NORTHEAST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 14, TOWNSHIP 7 NORTH, RANGE 2 EAST, LYING NORTHEAST OF A.A.R.R. RIGHT-OF-WAY DESCRIBED AS FOLLOWS: COMMENCING AT CENTER OF SAID SECTION 14, THENCE SOUTH 01 DEGREE 32 1/2 MINUTES WEST 33 FEET, EAST 418.73 FEET ALONG SOUTH LINE OF WEST KING STREET IN CITY OF OWOSSO, SOUTH 42 DEGREES 07 MINUTES EAST 1066.59 FEET NORTH 48 DEGREES 30 MINUTES EAST 34.45 FEET, SOUTH 43 DEGREES 23 MINUTES EAST 177.7 FEET, SOUTH 46 DEGREES 45 MINUTES EAST 180 FEET, SOUTH 42 DEGREES 07 MINUTES EAST 383.68 FEET, NORTH 89 DEGREE 59 MINUTES WEST 707.77 FEET ALONG SOUTH EAST AND WEST 1/8 LINE OF SAID SECTION 14, NORTHEASTERLY LINE OF A.A.R.R. RIGHT-OF-WAY; THENCE NORTH 40 DEGREES 33 1/2 MINUTES WEST 1782.62 FEET ALONG SAID RIGHT-OF-WAY LINE TO EAST AND WEST 1/4 LINE OF SAID SECTION 14; THENCE EAST 183 FEET ALONG SAID 1/4 LINE TO POINT OF BEGINNING.

EXCEPT PART OF THE SOUTHWEST 1/4 OF SECTION 14, TOWN 7 NORTH, RANGE 2 EAST, OWOSSO TOWNSHIP (NOW CITY), SHIAWASSEE COUNTY, MICHIGAN, DESCRIBED AS BEGINNING AT A POINT THAT IS SOUTH 90 DEGREES 00 MINUTES 00 SECONDS WEST ON THE EAST AND WEST 1/4 LINE OF SAID SECTION 14 A DISTANCE OF 1886.23 FEET AND SOUTH 42 DEGREES 07 MINUTES 00 SECONDS EAST 1201.61 FEET AND SOUTH 47 DEGREES 52 MINUTES 47 SECONDS WEST 242.36 FEET FROM THE EAST 1/4 CORNER OF SAID SECTION 14; THENCE SOUTH 42 DEGREES 07 MINUTES 00 SECONDS EAST 298.24 FEET; THENCE ON A CURVE TO THE RIGHT HAVING A RADIUS OF 245.00 FEET, A DELTA ANGLE OF 38 DEGREES 22 MINUTES 13 SECONDS AND A CHORD BEARING AND A DISTANCE OF NORTH 61 DEGREES 18 MINUTES 07 SECONDS WEST 161.02 FEET; THENCE NORTH 42 DEGREES 07 MINUTES 00 SECONDS WEST 146.16 FEET; THENCE NORTH 47 DEGREES 52 MINUTES 47 SECONDS EAST 52.92 FEET TO THE POINT OF BEGINNING.

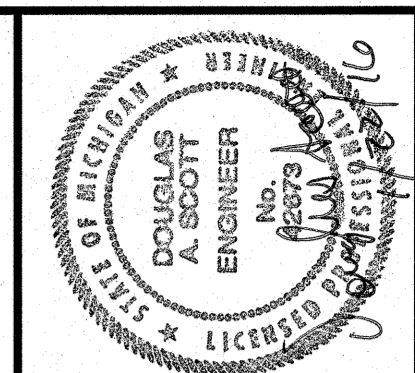
ALSO INCLUDING PART OF THE SOUTHWEST 1/4 OF SECTION 14, TOWN 7 NORTH, RANGE 2 EAST, OWOSSO TOWNSHIP (NOW CITY), SHIAWASSEE COUNTY, MICHIGAN, DESCRIBED AS BEGINNING AT A POINT THAT IS SOUTH 90 DEGREES 00 MINUTES 00 SECONDS WEST ON THE EAST AND WEST 1/4 LINE OF SAID SECTION 14 A DISTANCE OF 1886.23 FEET AND SOUTH 42 DEGREES 07 MINUTES 00 SECONDS EAST 1201.61 FEET AND SOUTH 47 DEGREES 52 MINUTES 47 SECONDS WEST 242.36 FEET AND SOUTH 42 DEGREES 07 SECONDS 00 MINUTES EAST 298.24 FEET FROM THE EAST 1/4 OF SAID SECTION 14; THENCE ON A CURVE TO THE LEFT HAVING A RADIUS OF 245.00 FEET, A DELTA ANGLE OF 09 DEGREES 29 MINUTES 47 SECONDS AND A CHORD BEARING AND DISTANCE OF SOUTH 85 DEGREES 14 MINUTES 07 SECONDS EAST 40.56 FEET; THENCE SOUTH 89 DEGREES 59 MINUTES 00 SECONDS EAST 154.05 FEET; THENCE ON A CURVE TO THE RIGHT HAVING A RADIUS 305.00, A DELTA ANGLE OF 36 DEGREES 33 MINUTES 20 SECONDS AND A CHORD BEARING AND DISTANCE OF SOUTH 71 DEGREES 42 MINUTES 20 SECONDS EAST 191.31 FEET TO THE EAST AND WEST 1/8 LINE IN THE SOUTHWEST 1/4 OF SAID SECTION 14; THENCE NORTH 89 DEGREES 59 MINUTES 00 SECONDS WEST ON SAID EAST AND WEST 1/8 LINE A DISTANCE OF 318.82 FEET; THENCE NORTH 42 DEGREES 07 MINUTES 00 SECONDS WEST 85.44 FEET TO THE POINT OF BEGINNING.

COMMONLY KNOWN AS PARCEL # 050-537-000-48-00



REVISIONS			
NO.	DATE	DESCRIPTION	BY

REV: **C1**  
SHT# **1** OF **16**  
JOB No: 15C0179



PLAN DATE: JANUARY 2016  
PROJECT MGR: DAS  
REVIEWER: JBM  
SCALE: NOT TO SCALE

**ROWE PROFESSIONAL SERVICES COMPANY**

The ROWE Building  
540 S. Saginaw St., Ste. 200  
Flint, MI 48502

O: (810) 341-7500  
F: (810) 341-7573  
www.rowepsc.com

PREPARED FOR  
**CARGILL ANIMAL NUTRITION PROJECT SPARTAN**  
SITE PLAN COVER



**STRUCTURE SYMBOLS**

- ◻ EXISTING CATCH BASIN IN CURB LINE
- PROPOSED CATCH BASIN IN CURB LINE
- EXISTING CATCH BASIN IN GREEN SPACE
- PROPOSED CATCH BASIN IN GREEN SPACE
- EXISTING STORM MANHOLE
- PROPOSED STORM MANHOLE
- ▶ PROPOSED CULVERT END SECTION
- ) EXISTING HEADWALL
- ) PROPOSED HEADWALL
- EXISTING WATER SHUTOFF (SERVICE VALVE)
- EXISTING GATE VALVE AND BOX (STOP BOX)
- PROPOSED GATE VALVE AND BOX
- EXISTING GATE VALVE AND WELL
- PROPOSED GATE VALVE AND WELL
- × EXISTING SPRINKLER HEAD
- EXISTING WATER WELL
- ◆ EXISTING FIRE HYDRANT
- ◆ PROPOSED FIRE HYDRANT
- ◆ PROPOSED WATER MAIN FITTINGS
- EXISTING CLEAN OUT
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER MANHOLE
- EXISTING MONITORING WELL

**EXISTING TOPOGRAPHICAL SYMBOLS**

- ◆ SIGN
- † STREET SIGN
- END OF PIPE
- ▬ SWAMP OR WETLAND
- DECIDUOUS TREE
- ☀ CONIFEROUS TREE
- ☆ TREE STUMP
- MAIL BOX
- ⊗ SOIL BORING
- ROCK
- METAL POST
- BUMPER BLOCK

**UTILITY SYMBOLS**

- UTILITY POLE
- › GUY ANCHOR CABLE
- \* LIGHT POLE / ORNAMENTAL LIGHT
- ◆ POWER LIGHT POLE
- TELEPHONE MANHOLE
- + UNDERGROUND GAS LINE MARKER
- GAS RISER
- GAS VENT
- GAS VALVE
- ⊕ RAILROAD SIGNAL
- \* METAL LIGHT POLE
- OUTLET
- CIRCUIT BREAKER PANEL
- ⊠ ELECTRICAL TRANSFORMER PAD
- ⊠ ELECTRICAL TRANSFORMER RISER
- ⊖ ELECTRIC METER
- TELEPHONE PEDESTAL / RISER
- ▬ TRAFFIC SIGNAL ON POLE
- PHONE BOOTH / PAY PHONE

**SURVEY SYMBOLS**

- MONUMENT
- ▲ BENCHMARK
- △ TRAVERSE POINT
- ▲ SECTION CORNER
- FOUND SURVEY MONUMENTATION

**MISCELLANEOUS SYMBOLS**

- ⬆ EXISTING STRUCTURE NUMBER
- ⬆ PROPOSED STRUCTURE NUMBER
- ~ FLOW DIRECTION
- ⊗ EXISTING RIP-RAP
- ⊗ PROPOSED RIP-RAP

**PLAN VIEW LINE TYPES**

- 12" STM --- EXISTING STORM SEWER
- 12" CWC --- EXISTING CULVERT
- PROPOSED STORM SEWER
- 12" SAN --- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- 12" WM --- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- SECTION LINE
- 60' ROW --- EXISTING RIGHT OF WAY
- 60' ROW --- PROPOSED RIGHT OF WAY
- PROPOSED EASEMENT
- EXISTING CENTER LINE DITCH
- PROPOSED DITCH CENTERLINE
- EXISTING CENTER LINE ROADWAY
- PARCEL LINE / LOT LINE
- 0/A --- EXISTING OVERHEAD UTILITIES
- 1/2 ELEC --- UNDERGROUND ELECTRICAL LINE
- 6" S-WP GAS --- GAS LINE OR PETROLEUM PIPELINE
- 1/2 TEL --- UNDERGROUND TELEPHONE LINE
- 1/2 CATV --- UNDERGROUND CABLE TV LINE
- 1/2 FIBER --- UNDERGROUND FIBER OPTIC
- 11+00 --- PROJECT CONTROL LINE
- ~ ~ ~ TREE LINE
- - - EXISTING FENCE
- - - PROPOSED FENCE
- • • EXISTING GUARD RAIL
- • • PROPOSED SLOPE STAKE LINE

**TOPOGRAPHY**

- 960 — EXISTING CONTOURS MAJOR
- 958 --- EXISTING CONTOURS MINOR
- 960 — PROPOSED CONTOUR MAJOR
- 958 --- PROPOSED CONTOURS MINOR

**PARCEL INFORMATION**

- 401-069 PARCEL/TAX IDENTIFICATION NUMBER
- #5324 ADDRESS/BUSINESS NAME

**PAVEMENT IDENTIFICATION**

- ==== EXISTING CURB AND GUTTER
- ==== PROPOSED CURB AND GUTTER
- EXISTING PAVEMENT
- ▨ EXISTING GRAVEL

**HATCHING LEGEND**

- ▨ REMOVE PAVEMENT
- ▨ COLD MILLING EXISTING PAVEMENT
- ▨ REMOVE SIDEWALK
- × × × × × REMOVE CURB AND GUTTER
- ▨ REMOVE AND REPLACE CURB AND GUTTER
- ▨ SAND BACKFILL (PROFILE)
- PROPOSED HMA

**PROPOSED CALLOUTS**

- | TOPO CALLOUTS | PLAN VIEW |                              |
|---------------|-----------|------------------------------|
| ADJ           | ADJ       | ADJUST STRUCTURE             |
| ADJ-B/O       | ADJ-B/O   | ADJUST STRUCTURE BY OTHERS   |
| REC           | REC       | RECONSTRUCT STRUCTURE        |
| REL           | REL       | RELOCATE                     |
| REL-B/O       | REL-B/O   | RELOCATE BY OTHERS           |
| REM           | R         | REMOVE                       |
| R&R           | R&R       | REMOVE AND REPLACE           |
| SALV          | SALV      | SALVAGE                      |
| SAVE          | S         | SAVE                         |
| ABN           | A         | ABANDON                      |
|               | B         | BULKHEAD                     |
|               | SR-F      | SIDEWALK RAMP TYPE           |
|               | 6         | SOIL EROSION CONTROL MEASURE |

**CAUTION SYMBOLS**

- CAUTION ● HAZARDOUS FLAMMABLE MATERIAL UNDERGROUND USED WITH UNDERGROUND GAS & ELECTRICAL LINES
- CAUTION ● FIBER OPTIC USED WITH FIBER OPTICS LINES



PLAN DATE: JANUARY 2016  
 PROJECT MGR: DAS  
 REVIEWER: JBM  
 SCALE: NOT TO SCALE

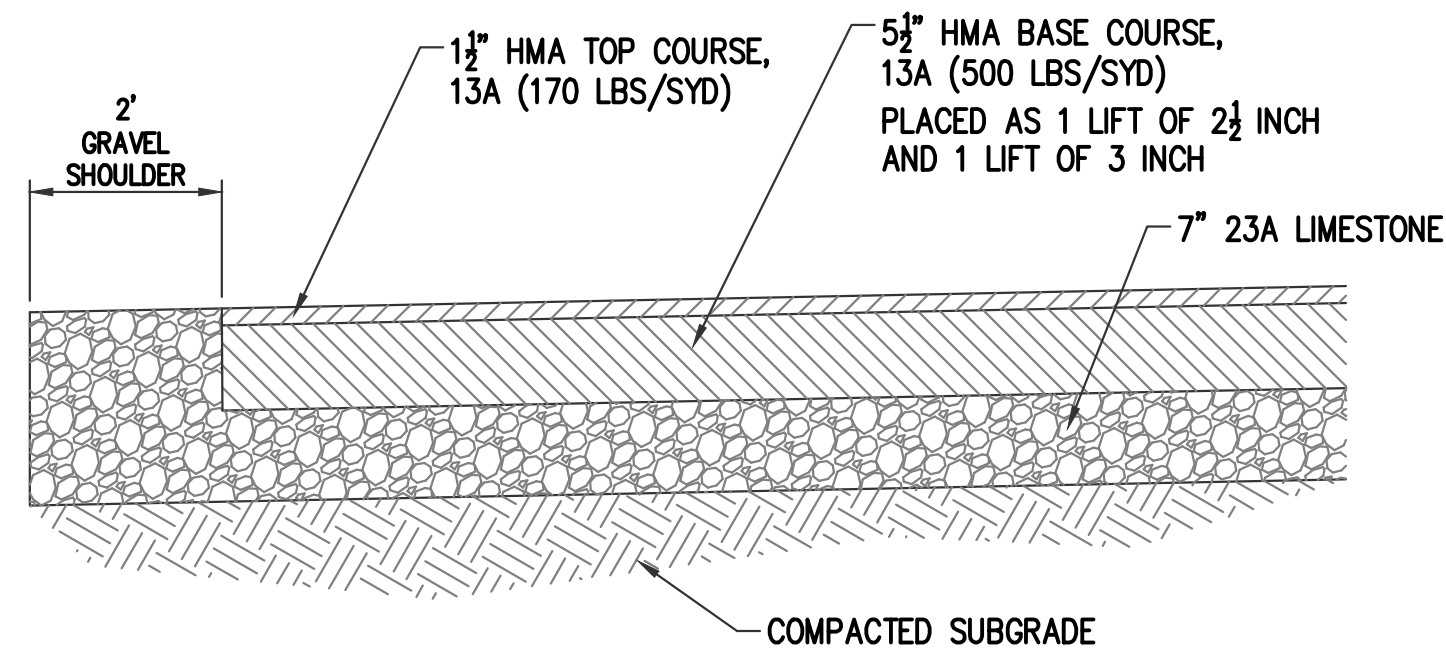
**ROWE PROFESSIONAL SERVICES COMPANY**  
 C: (810) 341-7500  
 F: (810) 341-7573  
 www.rowepsc.com

The ROWE Building  
 540 S. Saginaw St., Ste. 200  
 Flint, MI 48502

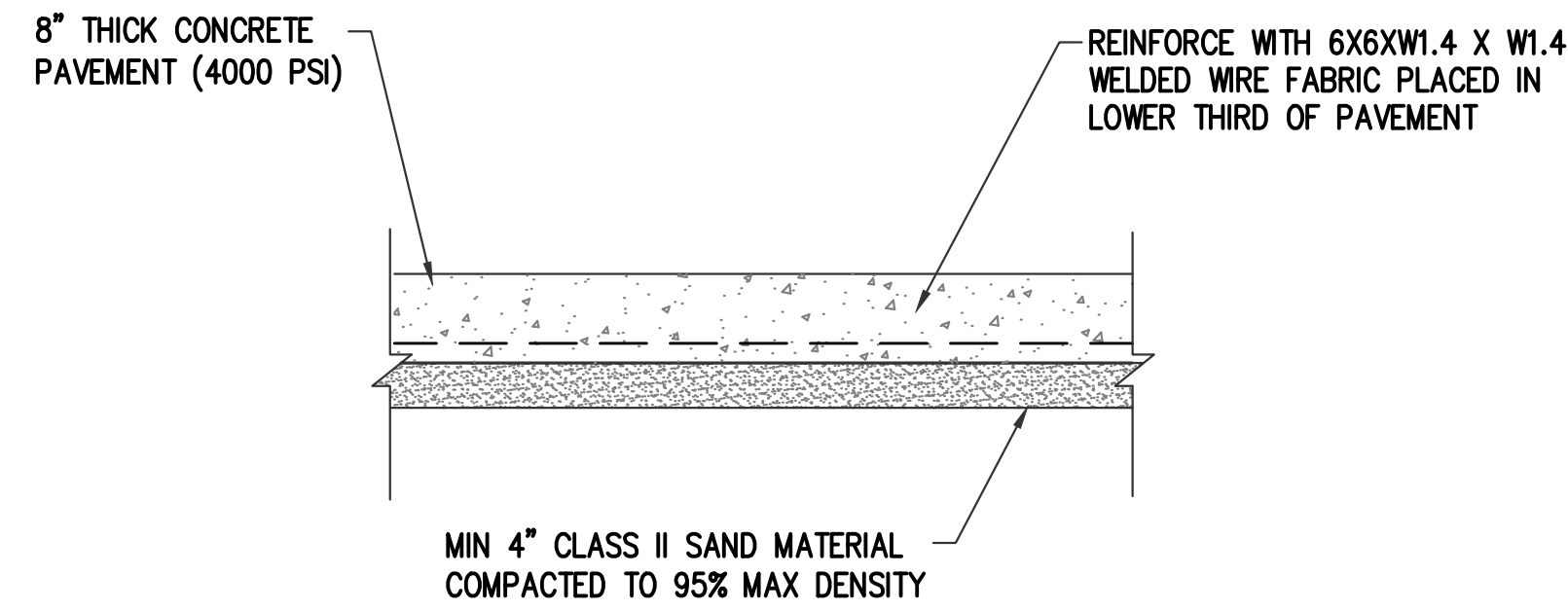
PREPARED FOR  
**CARGILL ANIMAL NUTRITION PROJECT SPARTAN**  
 SITE PLAN  
 LEGEND

REV: **C3**  
 SHT# **3** OF **16**  
 JOB No: 15C0179

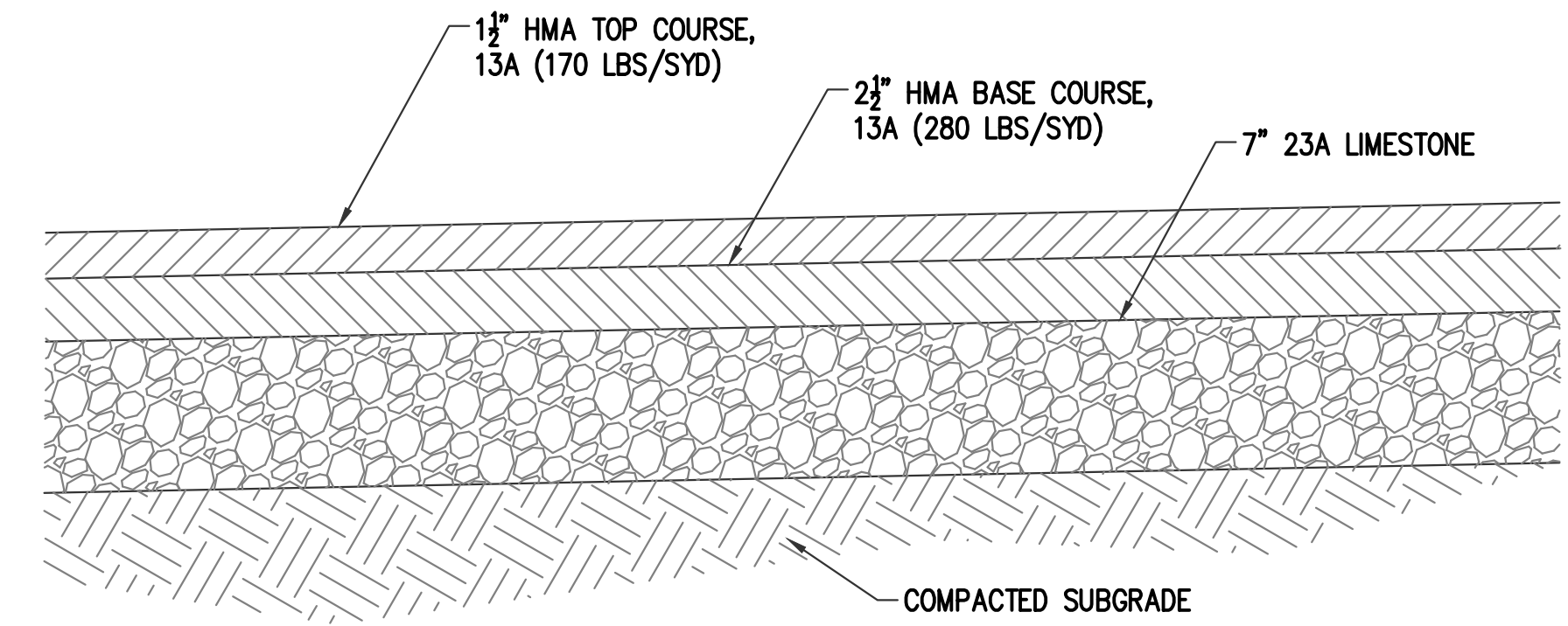
R: Y:\projects\15C0179\qwg\Site Plan Drawings\XX-15C0179-SITE PLAN-LEGEND.dwg PLOTDATE: 1/21/2016 12:23 PM



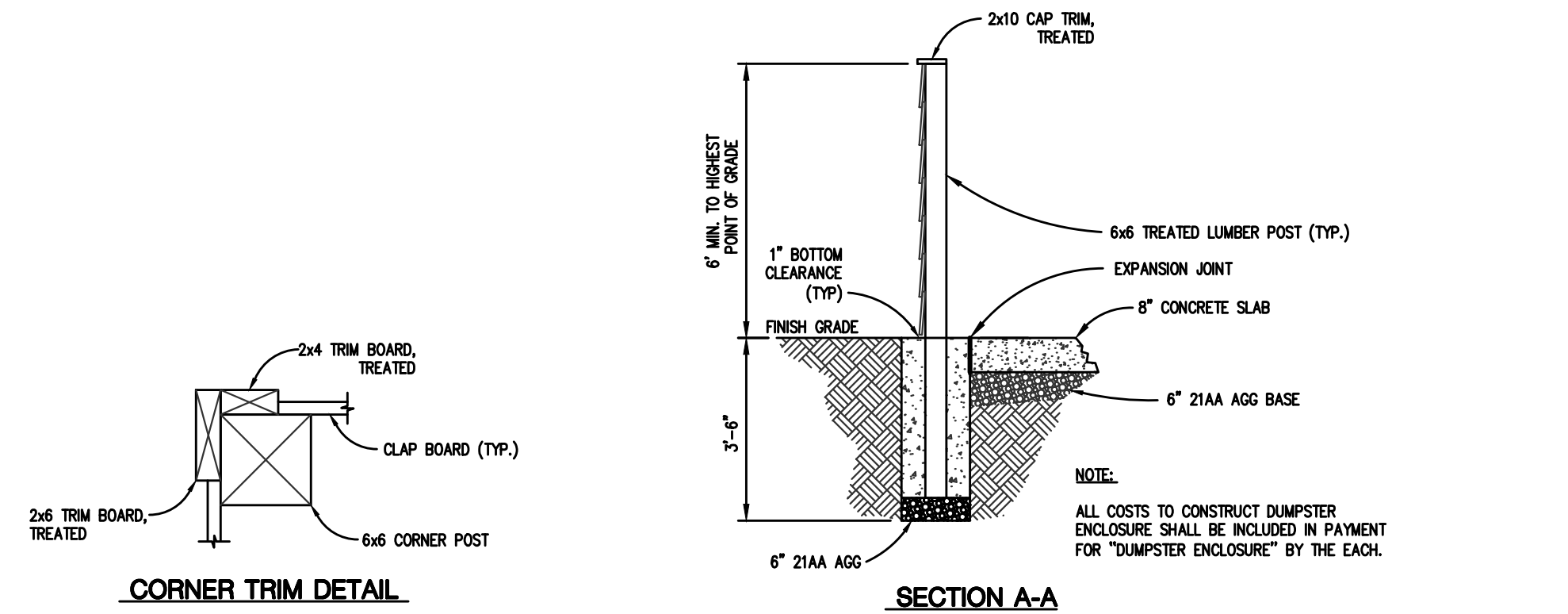
**HMA DRIVE CROSS SECTION**  
NOT TO SCALE



**CONCRETE PAVEMENT CROSS SECTION**  
NOT TO SCALE

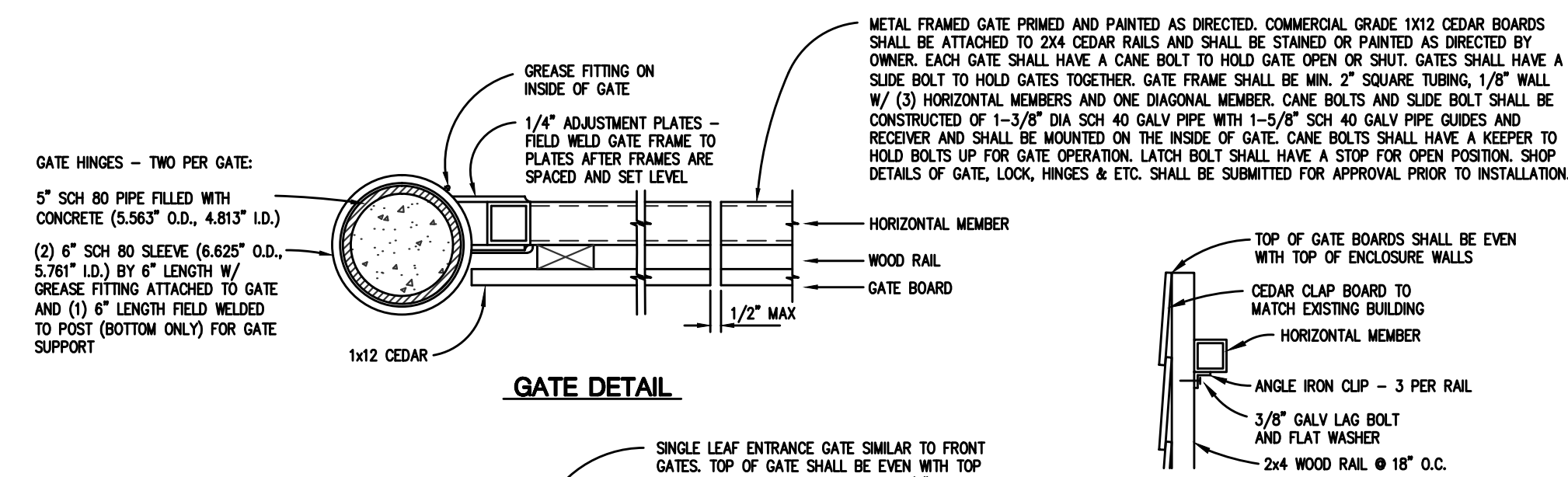


**HMA PARKING LOT CROSS SECTION**  
NOT TO SCALE



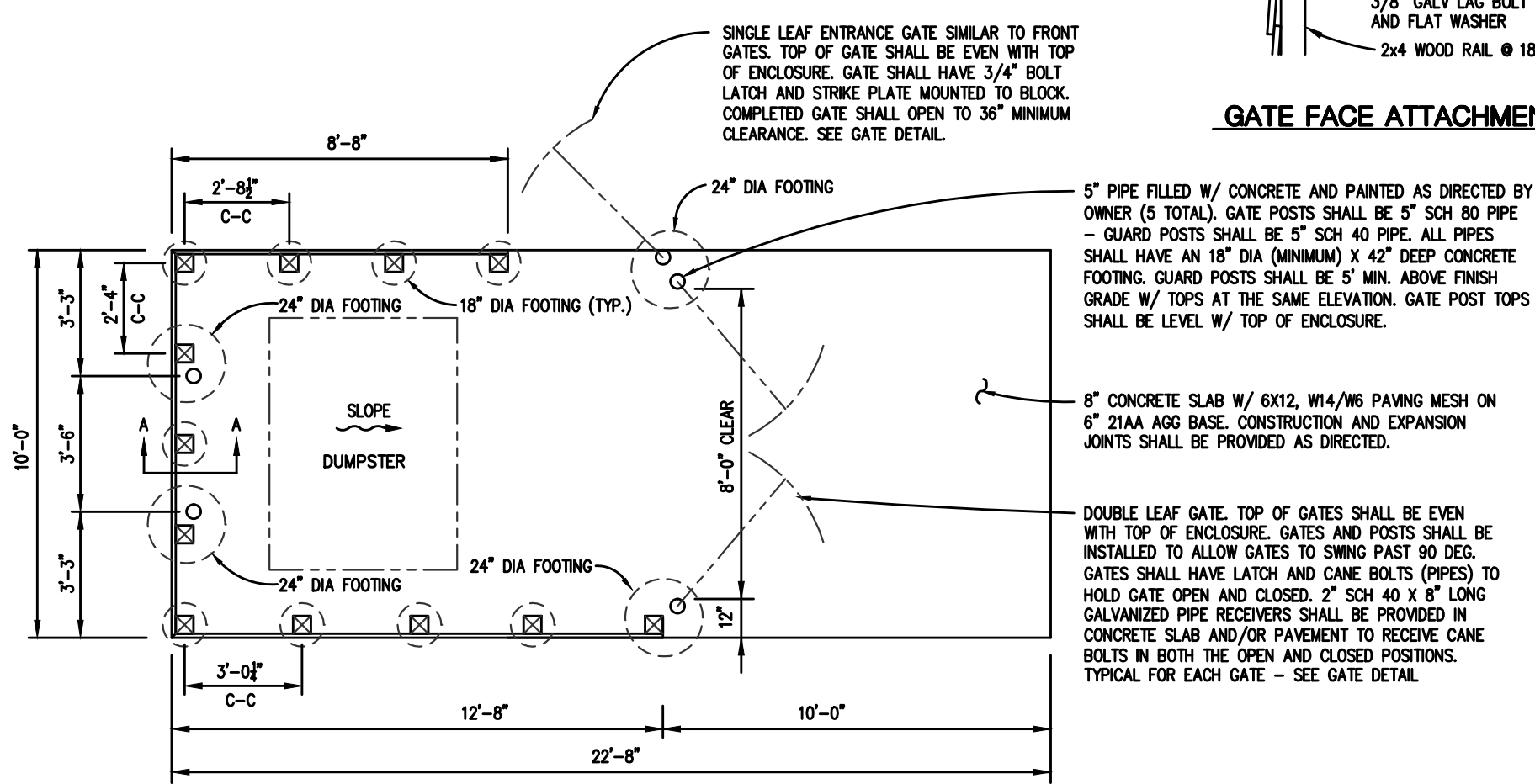
**CORNER TRIM DETAIL**

**SECTION A-A**

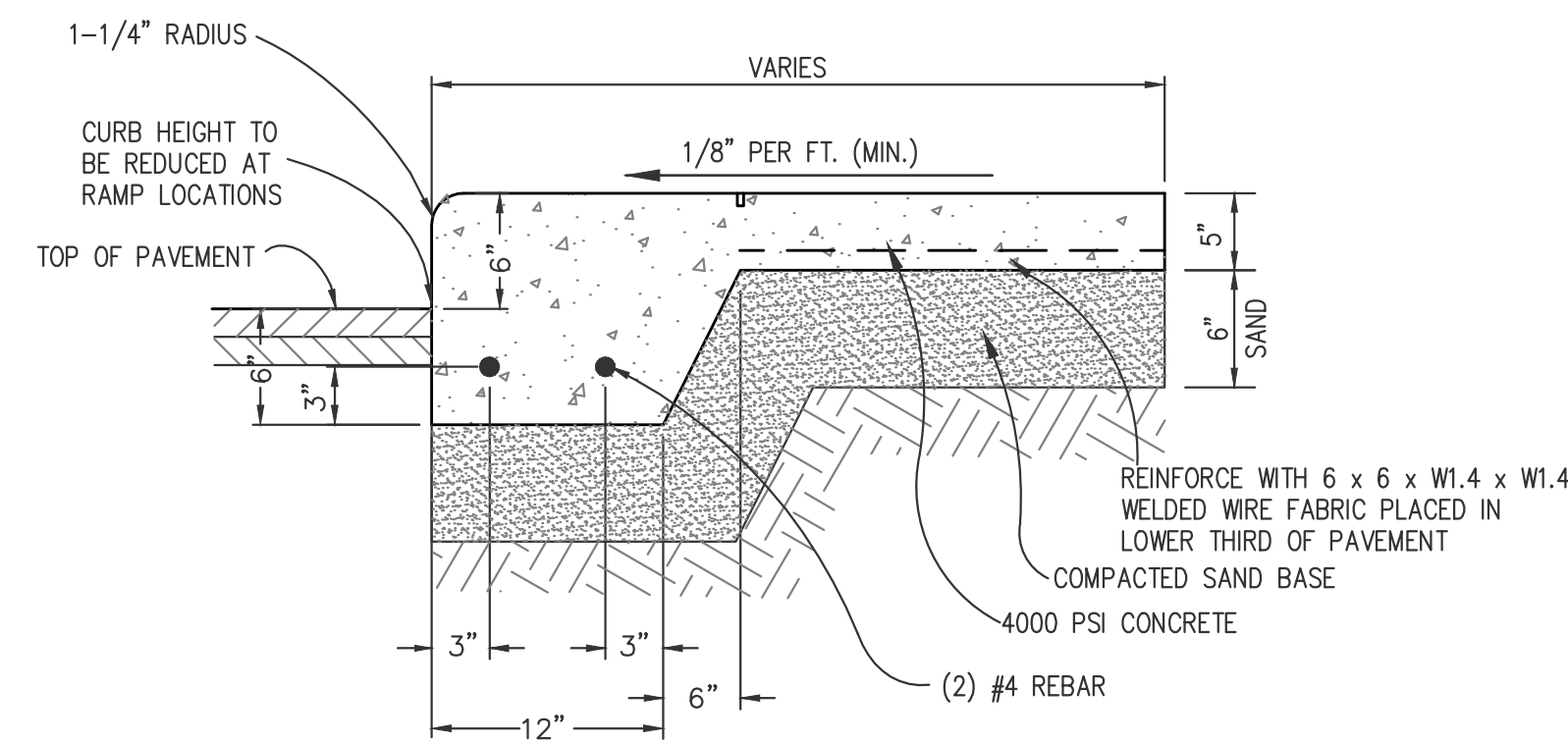


**GATE DETAIL**

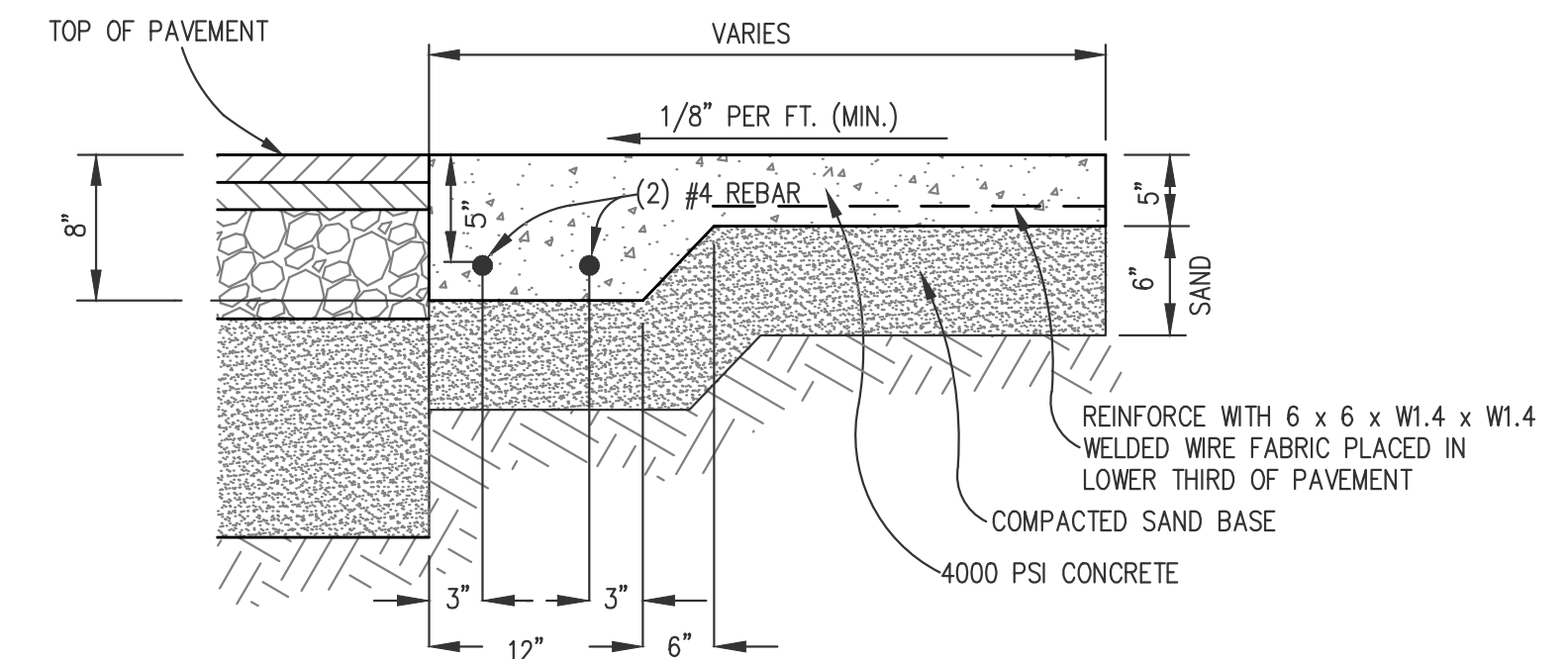
**GATE FACE ATTACHMENT DETAIL**



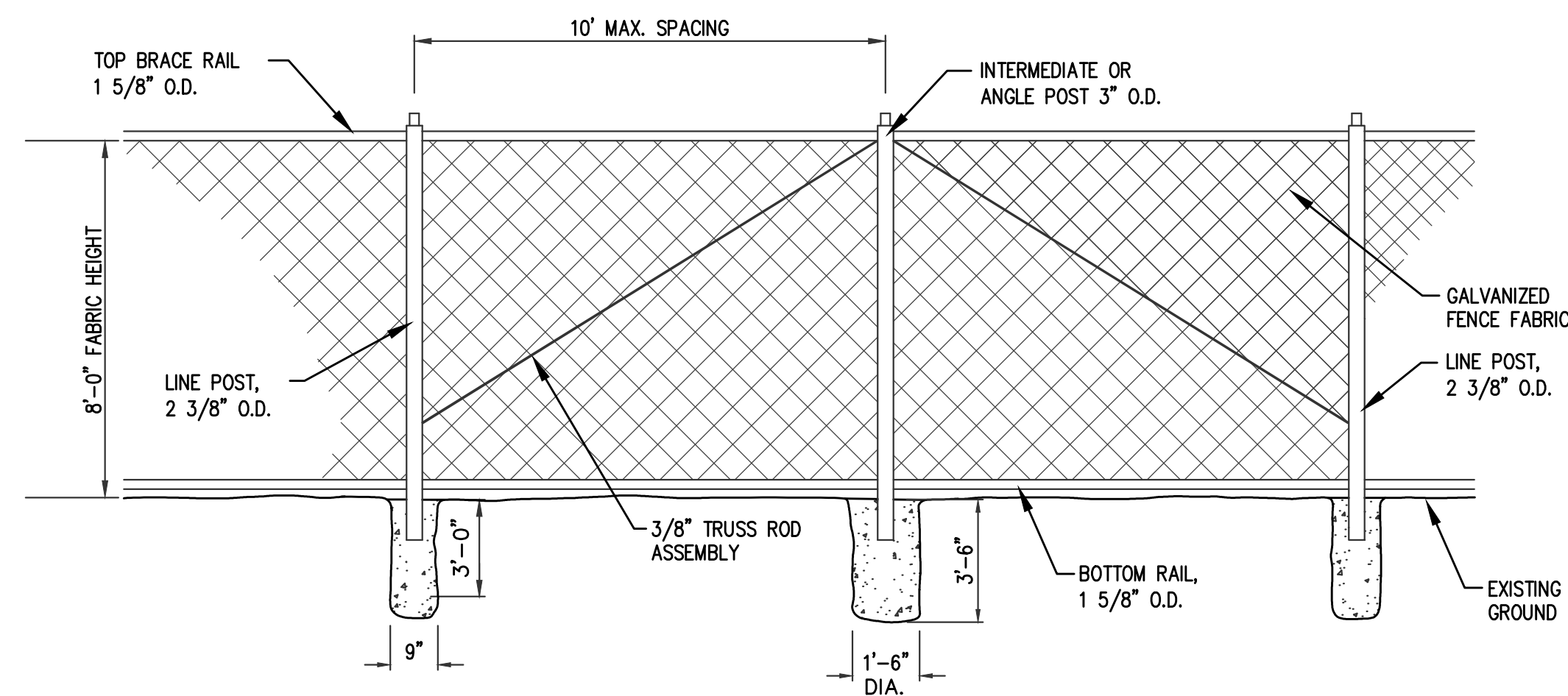
**DUMPSTER ENCLOSURE DETAIL**  
NOT TO SCALE



**RAISED EDGE WALK DETAIL**  
NOT TO SCALE



**THICKENED EDGE WALK DETAIL**  
NOT TO SCALE



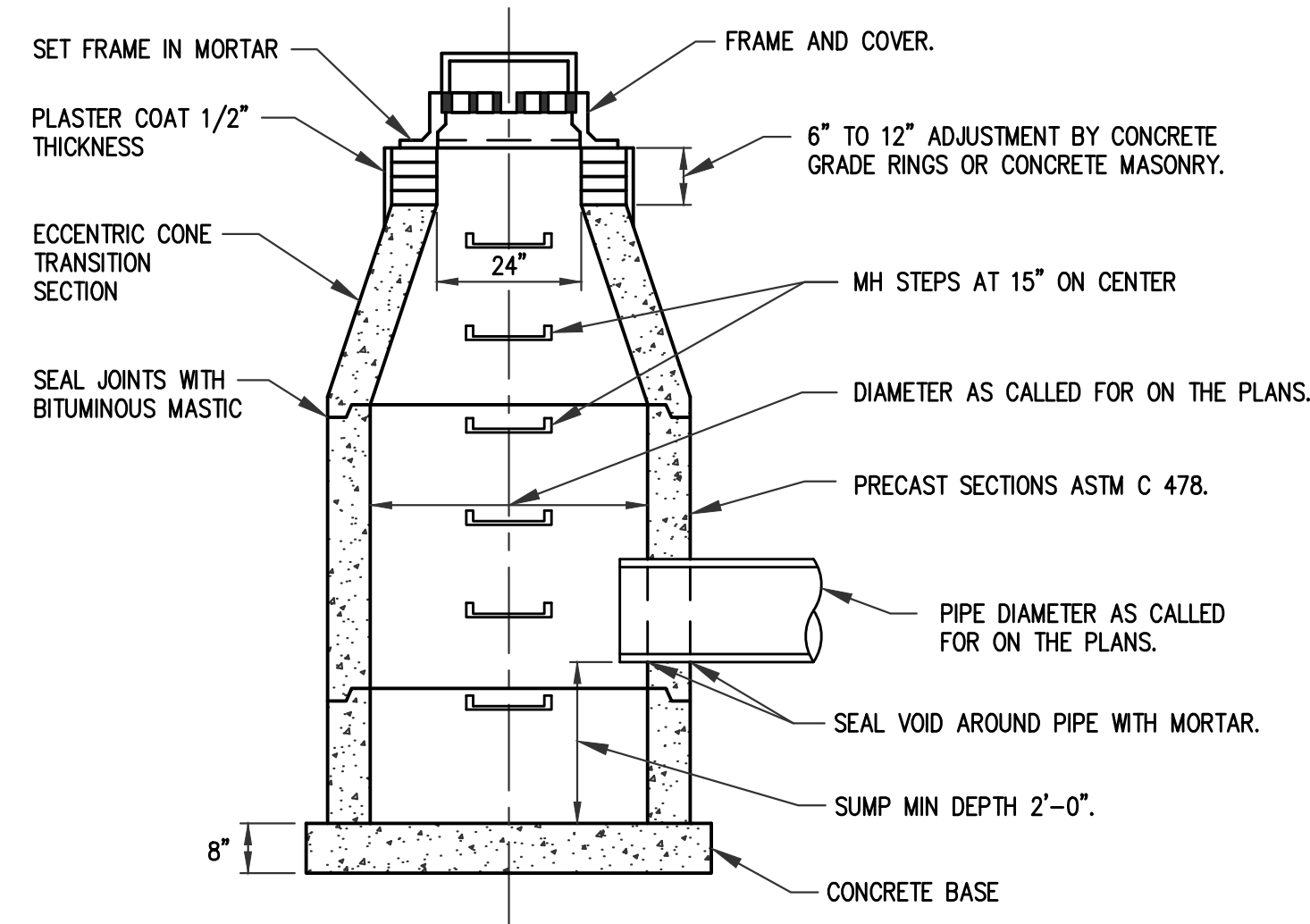
**CHAIN LINK FENCE DETAIL**  
NOT TO SCALE

REVISIONS			
NO.	DATE	DESCRIPTION	BY
-	-	-	-
-	-	-	-
-	-	-	-

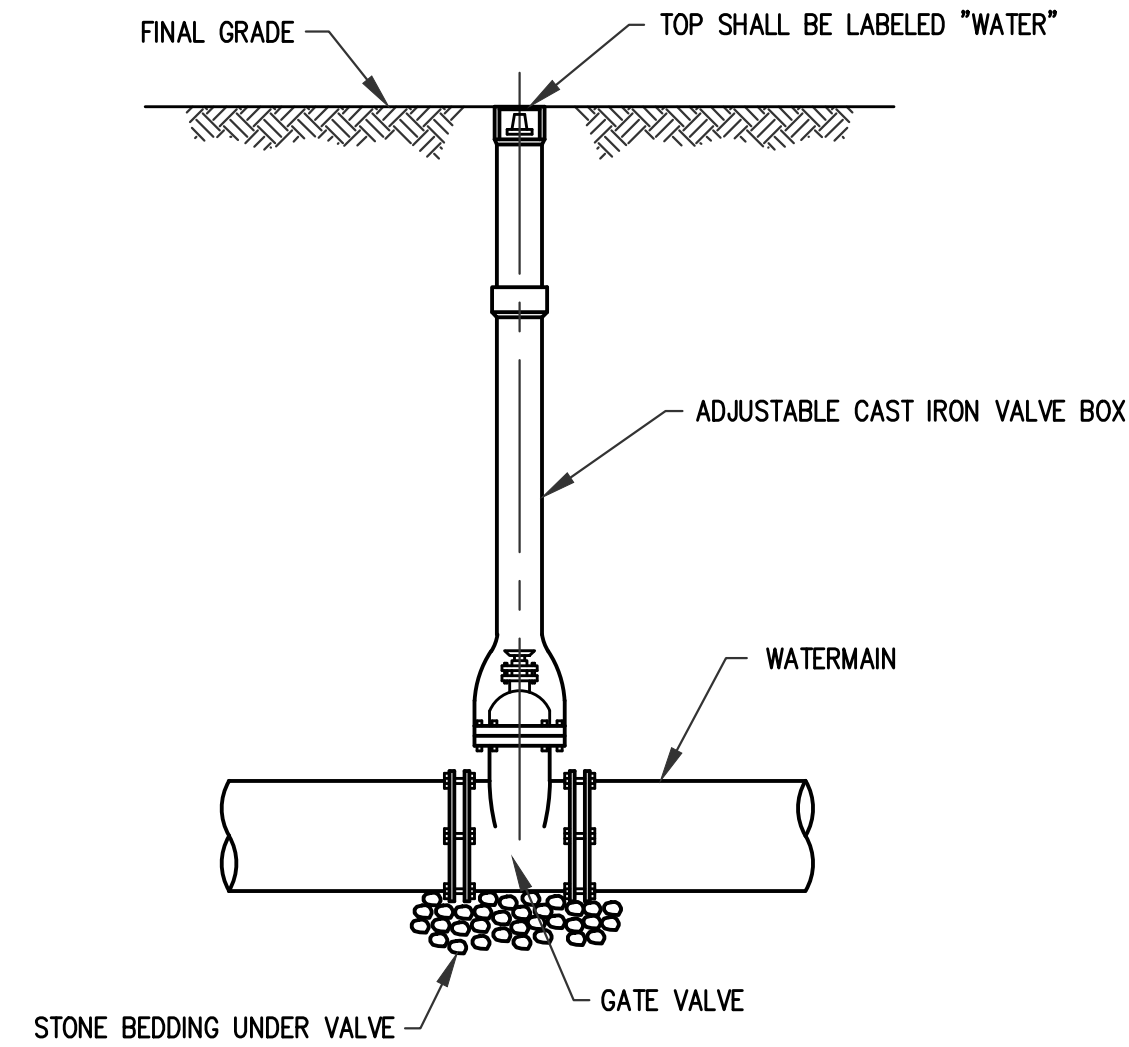
REV: **C4**  
SHT# **4** OF **16**  
JOB No: 15C0179

**ROWE PROFESSIONAL SERVICES COMPANY**  
The ROWE Building  
540 S. Saginaw St., Ste. 200  
Flint, MI 48502  
C: (810) 341-7500  
F: (810) 341-7573  
www.roweps.com

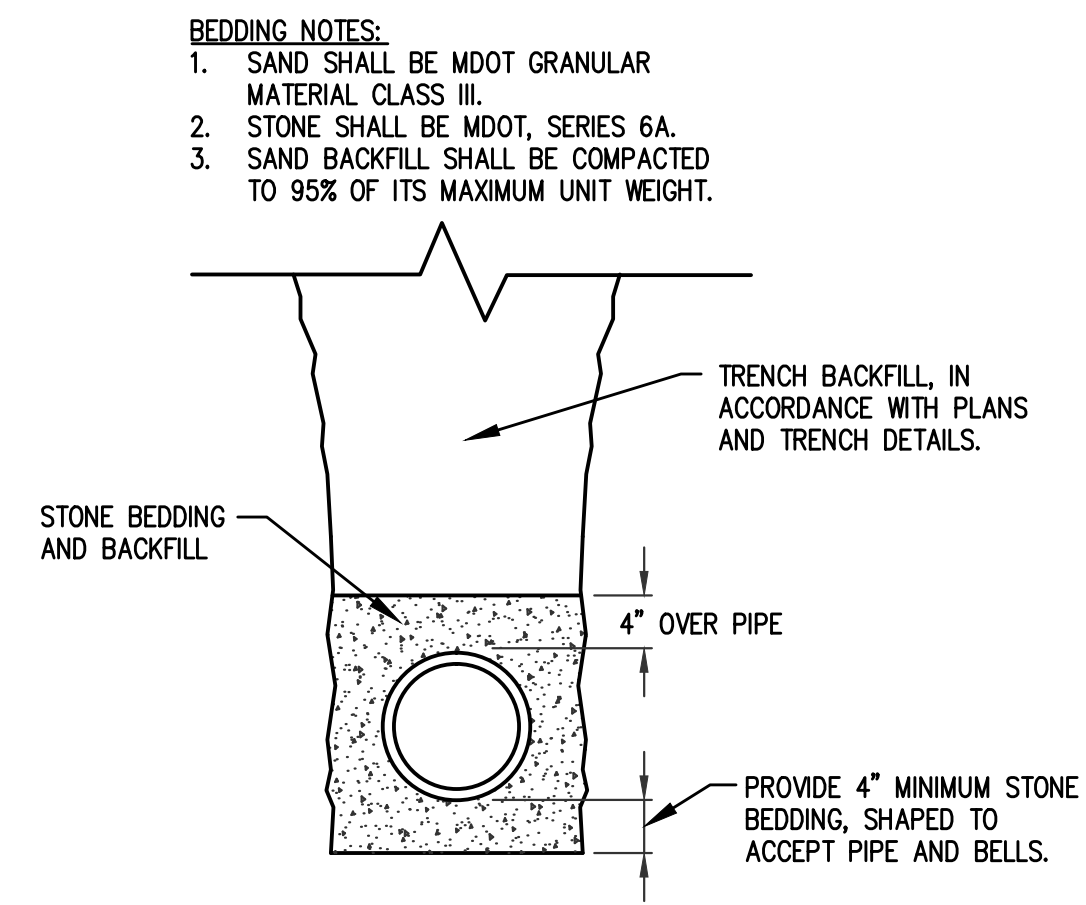
PREPARED FOR  
**CARGILL ANIMAL NUTRITION PROJECT SPARTAN**  
SITE PLAN  
DETAILS 1 OF 3



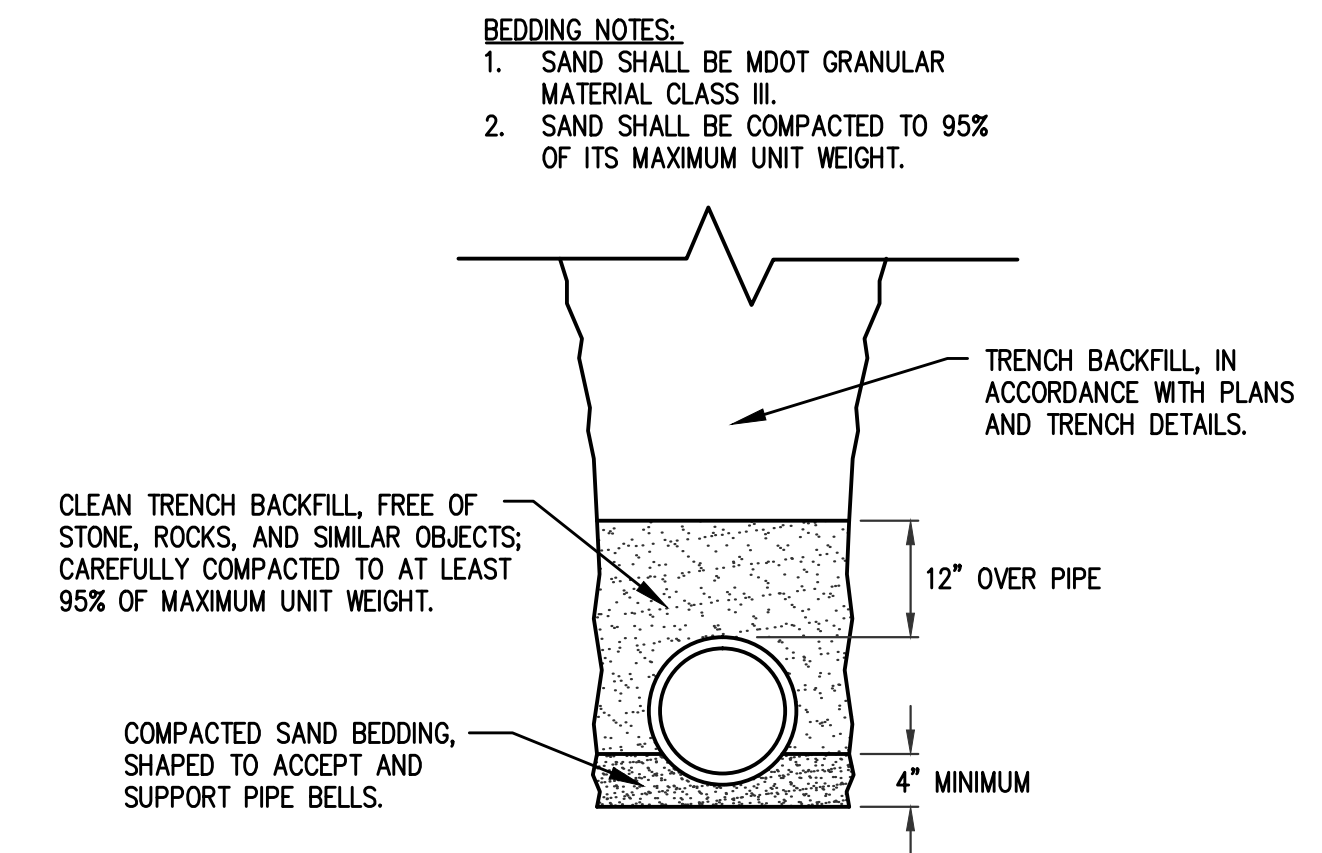
**STANDARD DRAINAGE STRUCTURE WITH 2' SUMP**  
NOT TO SCALE



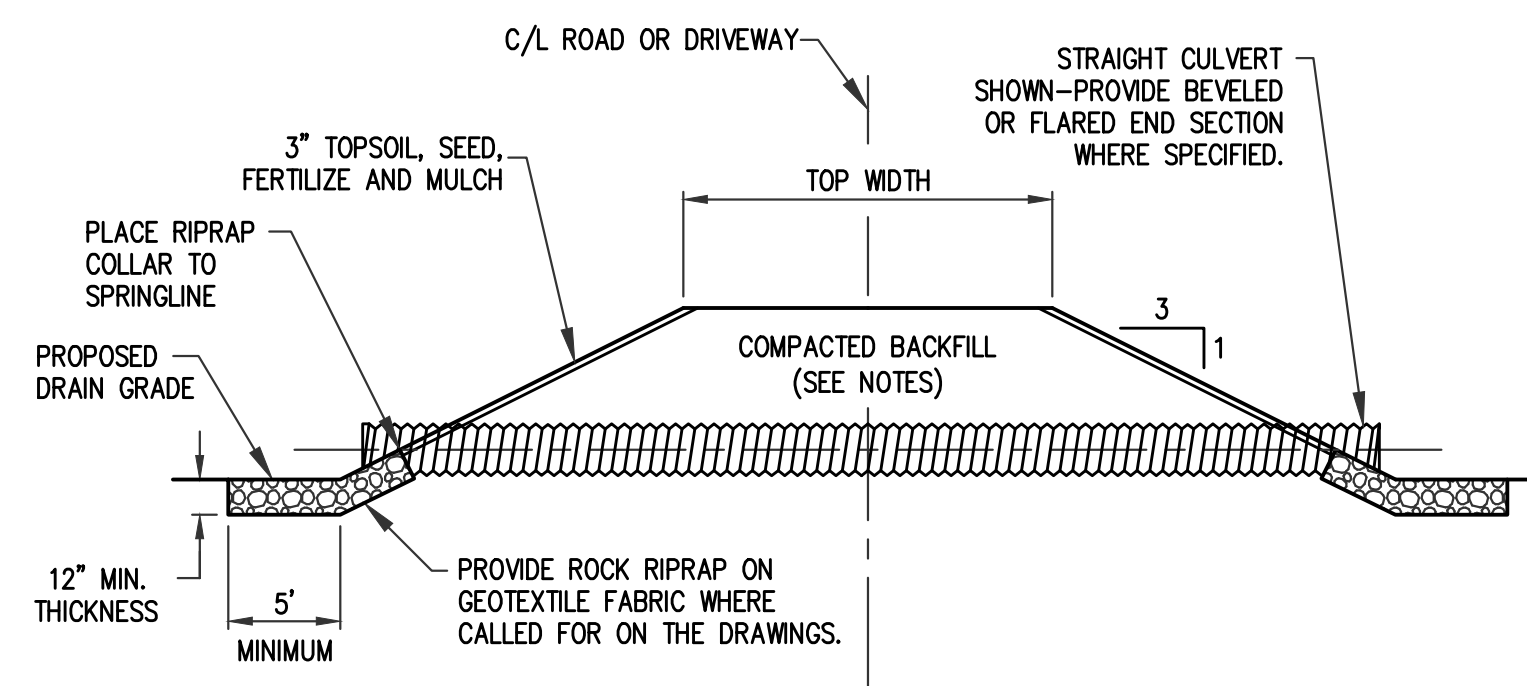
**WATER VALVE AND BOX DETAIL**  
NOT TO SCALE



**PLASTIC PIPE BEDDING DETAIL**  
NOT TO SCALE



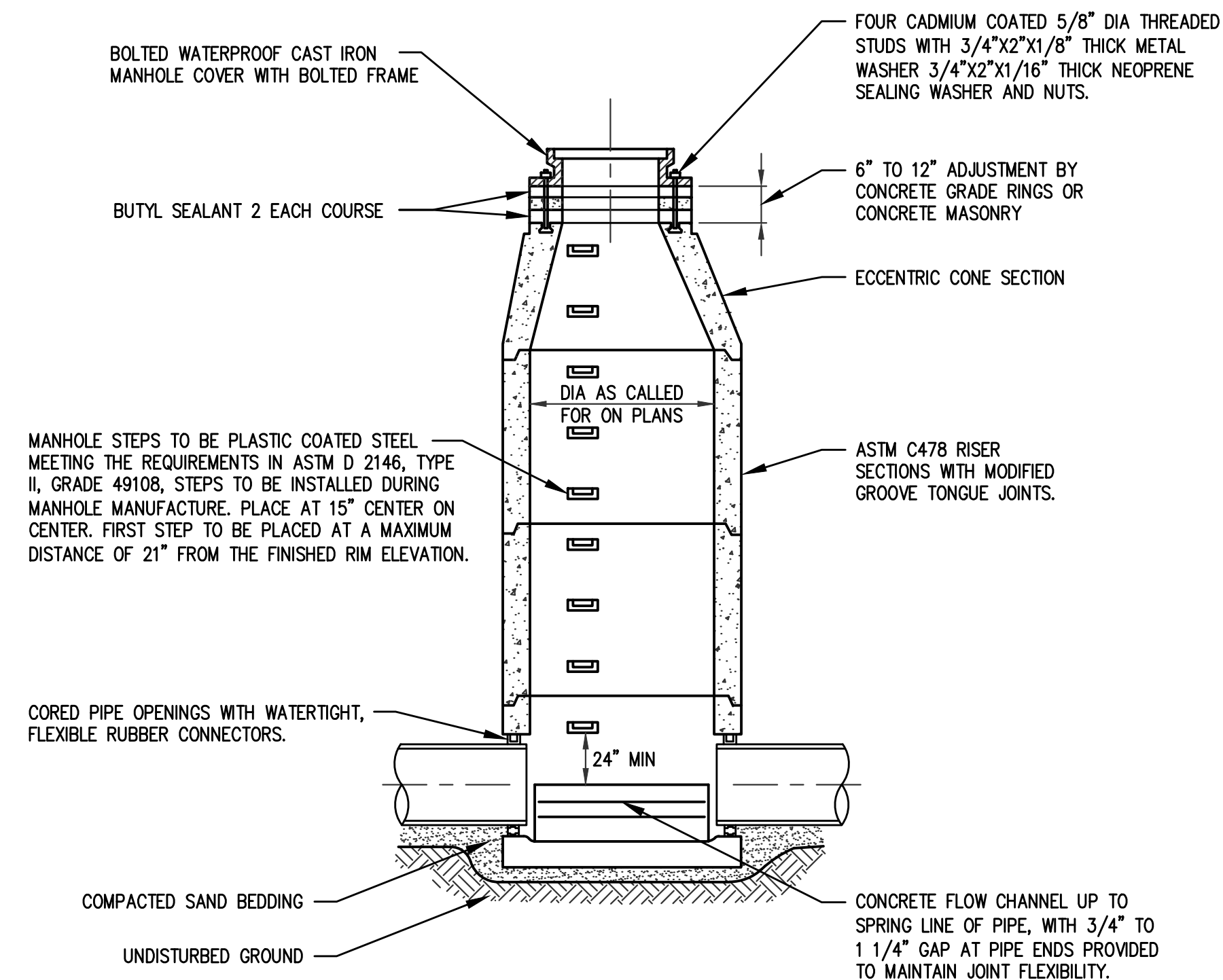
**CONCRETE PIPE BEDDING DETAIL**  
NOT TO SCALE



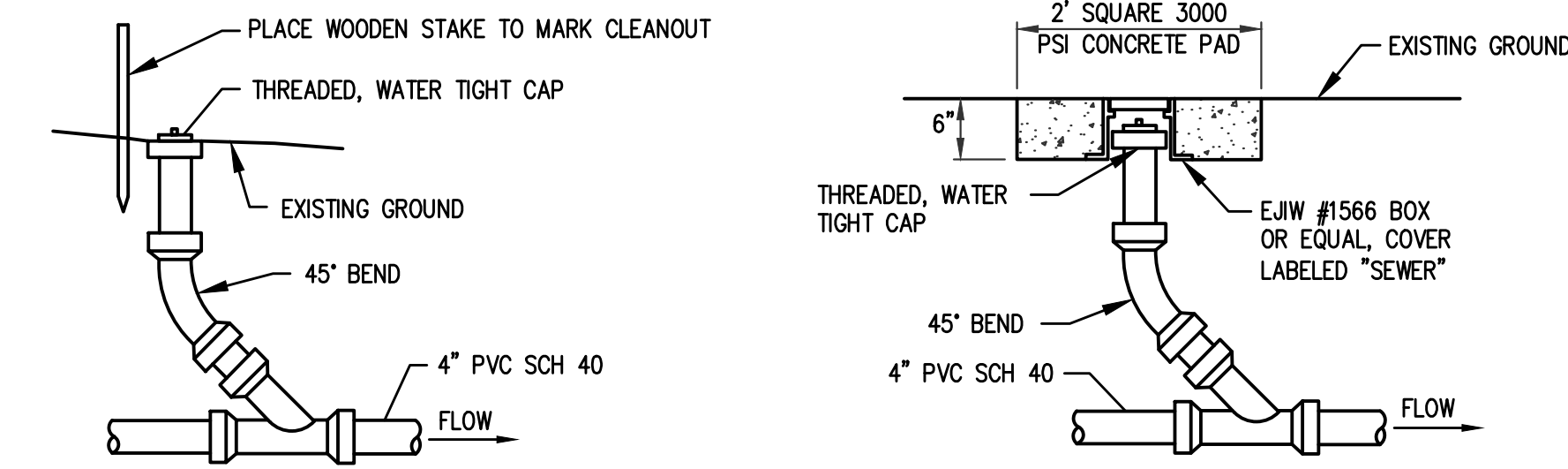
**SECTIONAL VIEW**

- NOTES:
- METAL SHOWN. DETAILS ARE ALSO TYPICAL OF CONCRETE PIPE.
  - BACK FILL FOR CULVERTS UNDER PAVED AND GRAVEL SURFACE SHALL BE SAND MEETING THE REQUIREMENTS OF M.D.O.T. GRANULAR MATERIAL CLASS III COMPACTED TO 95% MAXIMUM UNIT WEIGHT.
  - BACKFILL FOR CULVERTS AT FARM CROSSINGS OR NOT UNDER PAVED OR GRAVEL SURFACES SHALL BE COMPACTED SELECT MATERIAL, SUBJECT TO OWNER/ENGINEER APPROVAL.
  - BACKFILL FOR ALL CULVERTS UNDER ROADS SHALL CONFORM TO THE REQUIREMENTS OF THE AGENCY HAVING JURISDICTION OVER ROADWAY OR MEET THE REQUIREMENTS OF NOTE 2, WHICHEVER IS STRICTER.
  - ROAD AND DRIVE SURFACES, AND SHOULDER REPLACEMENT MATERIALS, THICKNESSES AND DIMENSIONS SHALL MEET THE EXISTING CONDITIONS, EXCEPT WHERE SPECIFIC REQUIREMENTS ARE SHOWN ON THE PLANS OR ESTABLISHED BY THE ROAD AGENCY. HARD SURFACES SHALL BE SAWCUT FOR REMOVAL PURPOSE.
  - ROAD MATERIALS AND TOP WIDTHS SHALL CONFORM TO THE REQUIREMENTS OF THE ROAD AGENCIES HAVING JURISDICTION OVER ROADWAY.
  - FARM AND DRIVE CROSSING TOP WIDTHS SHALL BE 16' MINIMUM.

**STANDARD PIPE CULVERT DETAILS**  
NOT TO SCALE

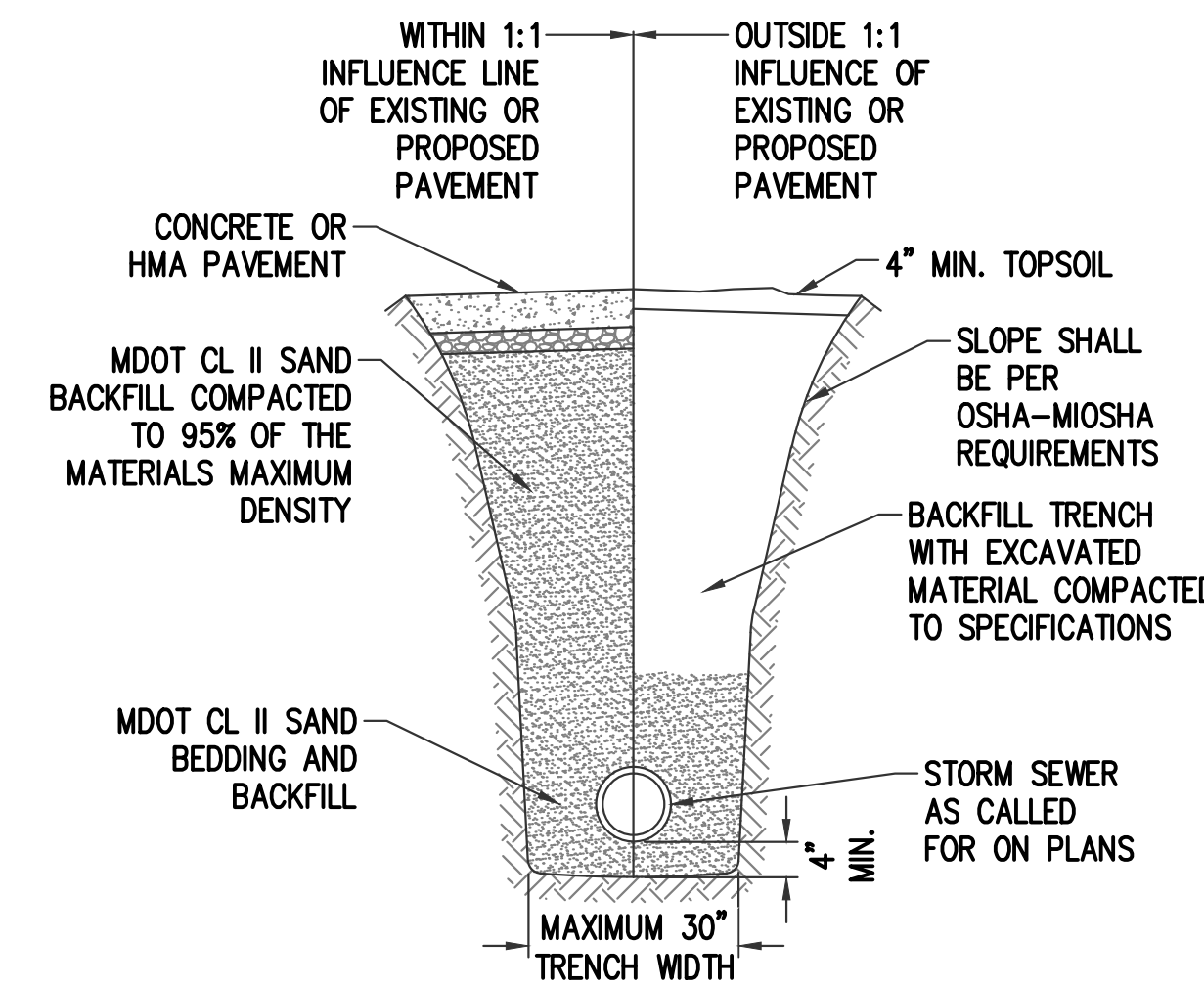


**STANDARD SANITARY MANHOLE**  
NOT TO SCALE



**FOR GRASS AREAS CLEANOUT RISER DETAIL**  
NOT TO SCALE

**FOR PAVEMENT AREAS CLEANOUT RISER DETAIL**  
NOT TO SCALE



**STORM SEWER TRENCH DETAIL**  
NOT TO SCALE

PLAN DATE: JANUARY 2016  
PROJECT MGR: DAS  
REVIEWER: JBM  
SCALE: NOT TO SCALE

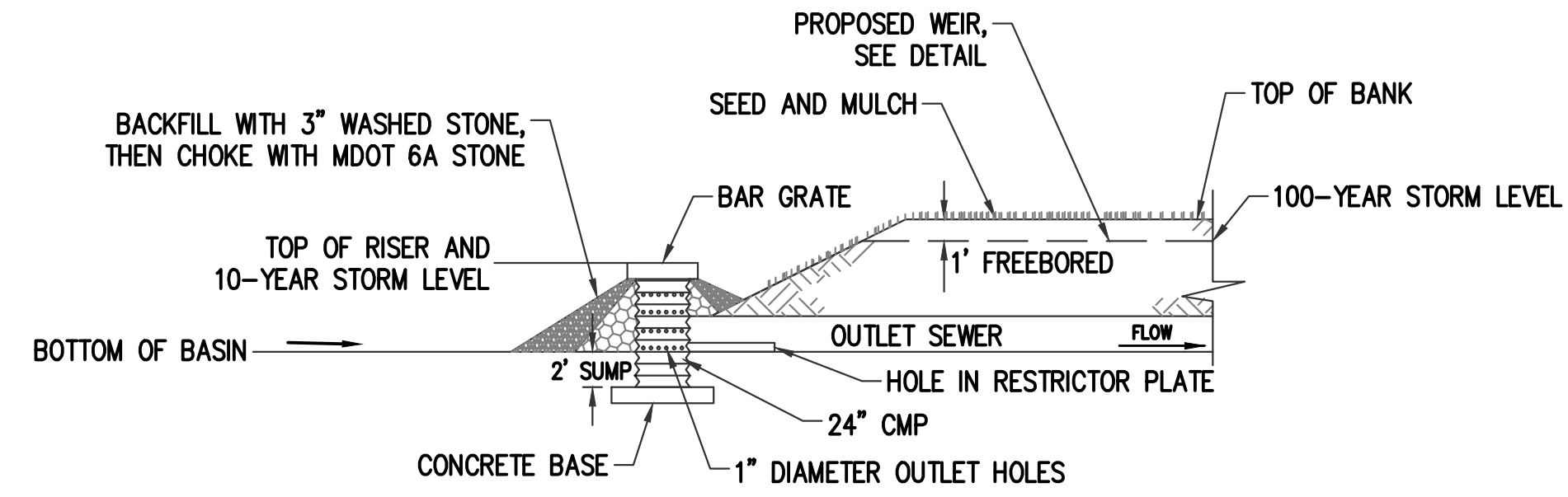
**ROWE PROFESSIONAL SERVICES COMPANY**  
C: (810) 341-7500  
F: (810) 341-7573  
www.rowepsc.com  
The ROWE Building  
540 S. Saginaw St., Ste. 200  
Flint, MI 48502

PREPARED FOR  
**CARGILL ANIMAL NUTRITION PROJECT SPARTAN**  
SITE PLAN  
DETAILS 2 OF 3

REVISIONS			
NO.	DATE	DESCRIPTION	BY
-	-	-	-

REV: **C5**  
SHT# **5** OF **16**  
JOB No: 15C0179



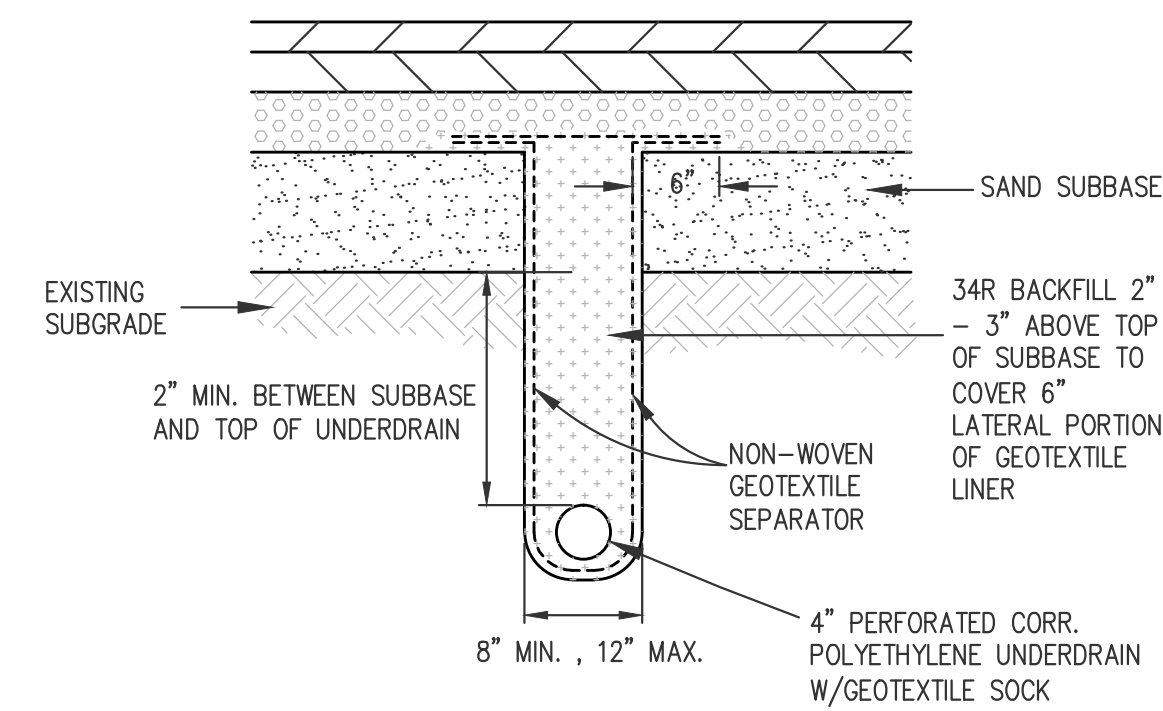


NOTE:  
BAR GRATE SHALL CONSIST OF #4 BARS O.C. IN BOTH DIRECTIONS SECURED TO CMP W/ 1\"/>

PROPOSED OUTLET STRUCTURE	BOTTOM OF BASIN ELEVATION	BOTTOM OF RISER HOLES ELEVATION	TOP OF RISER ELEVATION	TOP OF BANK ELEVATION	BOTTOM OF WEIR ELEVATION	OUTLET HOLE SIZE INFORMATION	RESTRICTOR PLATE HOLE SIZE
#1	744.00'	744.00'	TBD	750.00'	749.00'	66 HOLES (4 ROWS), 1\"/>	

**BASIN OUTLET CONTROL STRUCTURE**

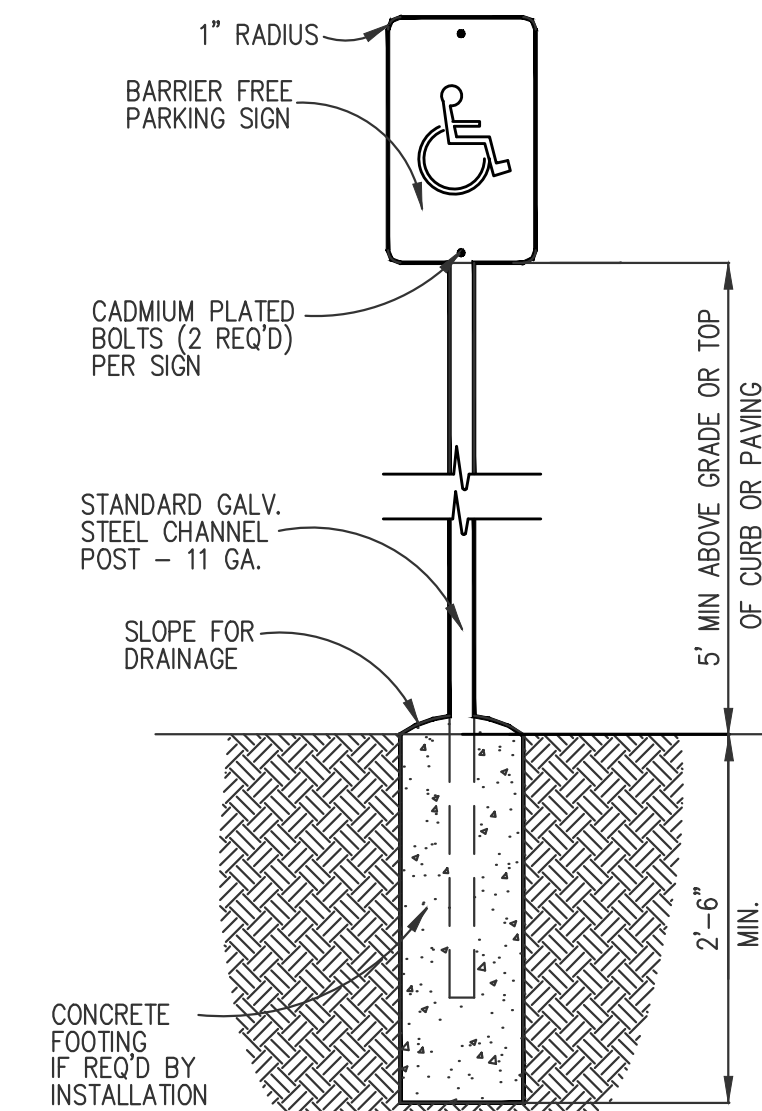
NOT TO SCALE



NOTE: FOUR 20' LONG FINGER DRAINS SHALL BE INSTALLED AT ALL CATCHBASINS AND MANHOLES WITHIN THE PAVEMENT AREAS.

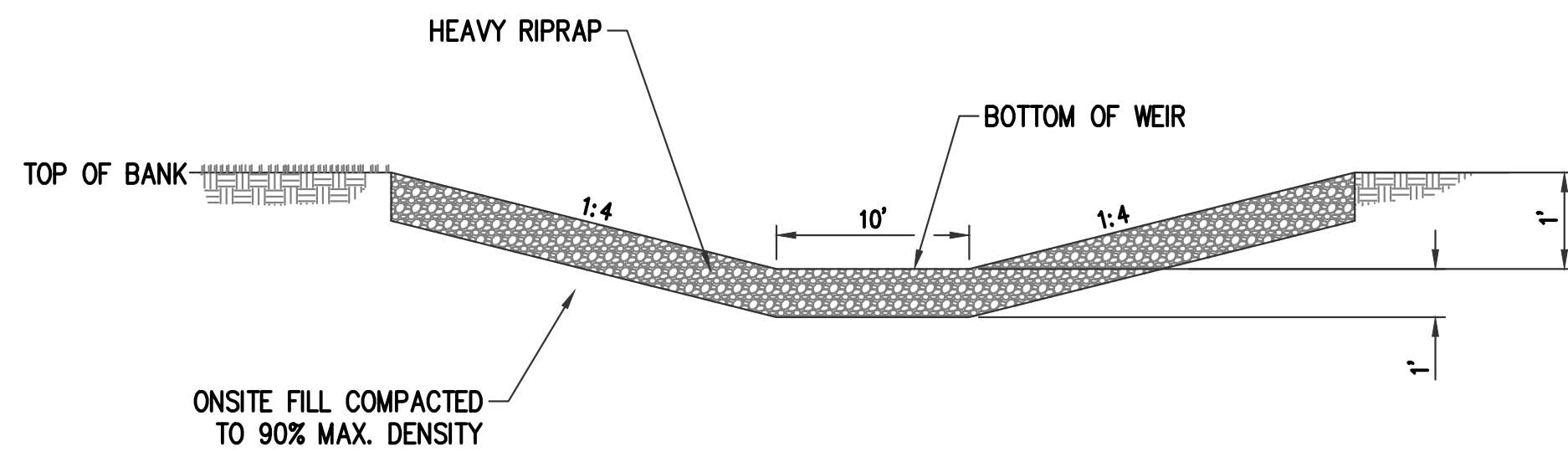
**PAVEMENT UNDERDRAIN TRENCH DETAIL**

NOT TO SCALE



**BARRIER FREE SIGN DETAIL**

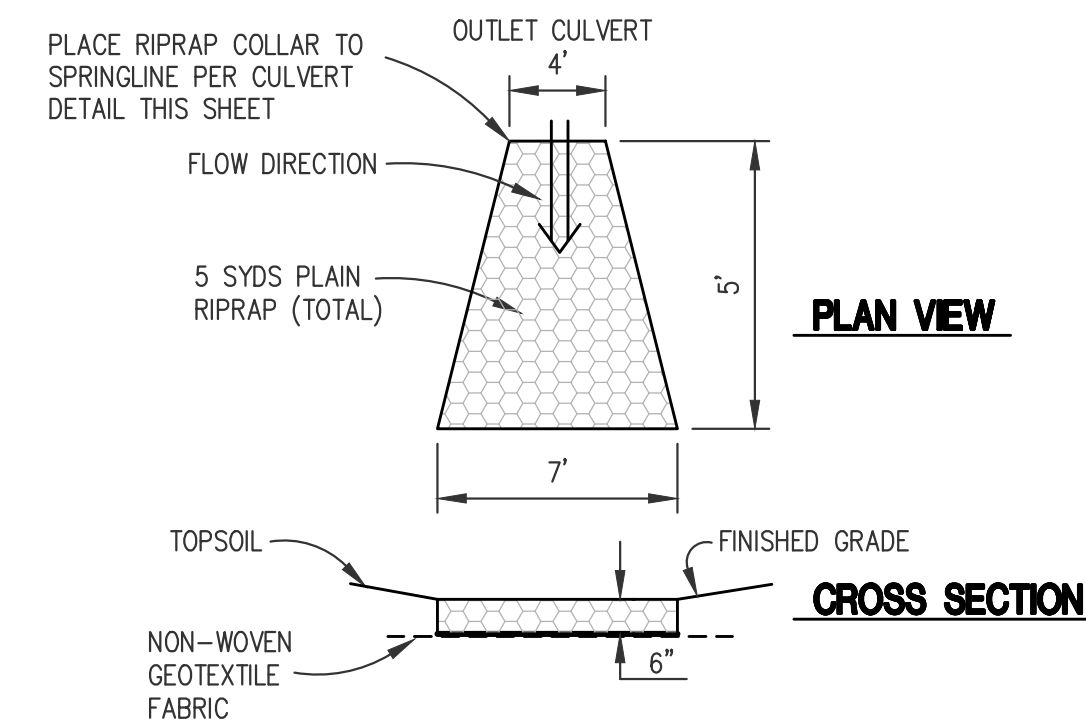
NOT TO SCALE



NOTE:  
WEIR SHALL BE LOCATED ON THE SOUTH SIDE OF THE DETENTION BASIN, SOUTH OF OUTLET STRUCTURE, IN A MANNER THAT FACILITATES POSITIVE DRAINAGE TO THE STORM WATER DRAINAGE SYSTEM OF THE PROPOSED CITY STREET.

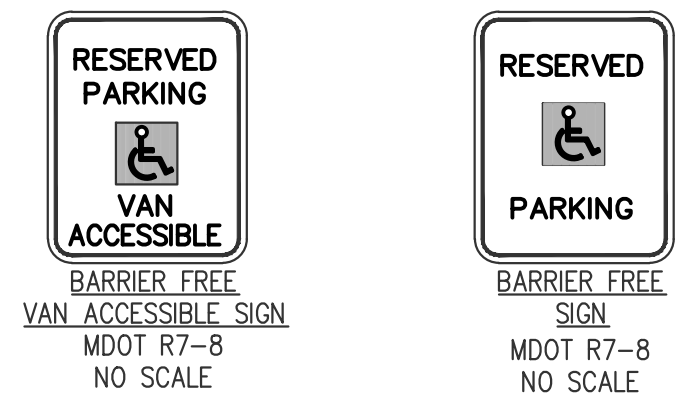
**WEIR DETAIL**

NOT TO SCALE



**RIPRAP OUTLET DETAIL**

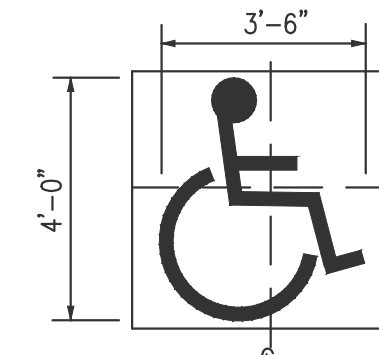
NOT TO SCALE



NOTE:  
1. ALL SIGNS SHALL BE PROVIDED AND INSTALLED ACCORDING TO THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.  
2. SIGNS SHALL INCLUDE FURNISHING THE SIGN, WITH POST AND INSTALLATION BY THE CONTRACTOR.  
3. SIGN SHALL BE MOUNTED IN A MANNER SO THAT THE BOTTOM OF THE SIGN IS 5' MINIMUM ABOVE FINISHED GRADE.

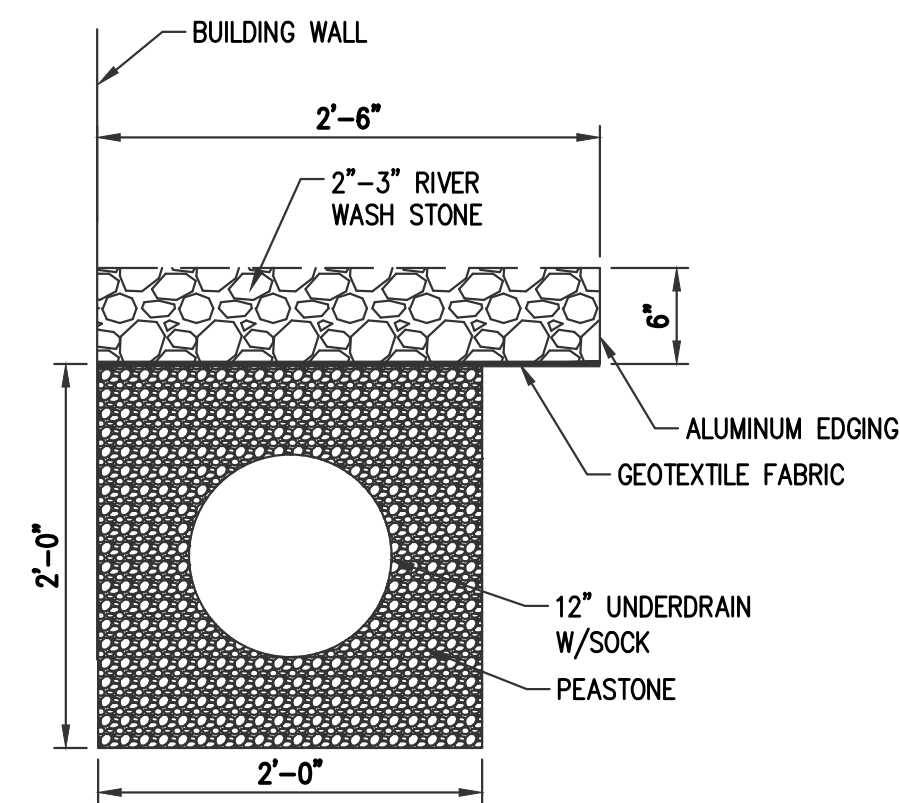
**BARRIER FREE PARKING SIGNAGE**

NOT TO SCALE



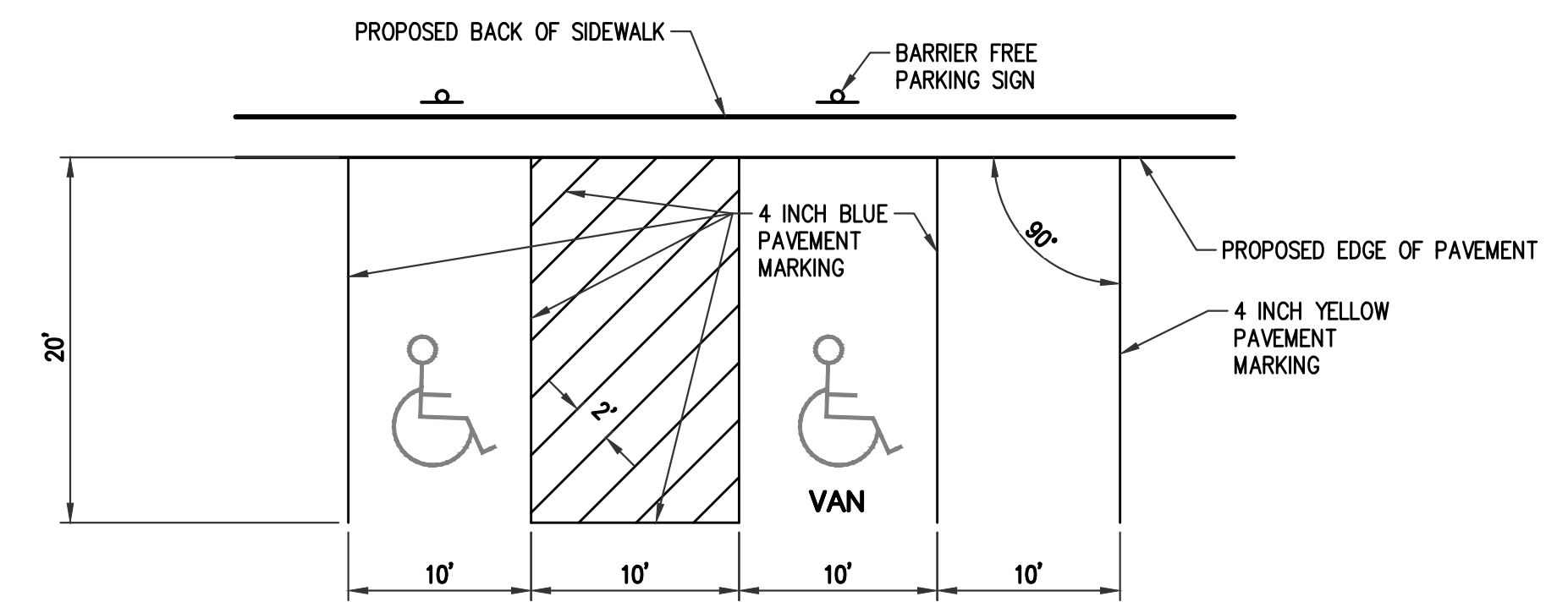
**BARRIER FREE PARKING PAINTING**

NOT TO SCALE



**BUILDING MAINTENANCE STRIP DETAIL**

NOT TO SCALE



**PERPENDICULAR PARKING SPACE DETAIL**

NOT TO SCALE

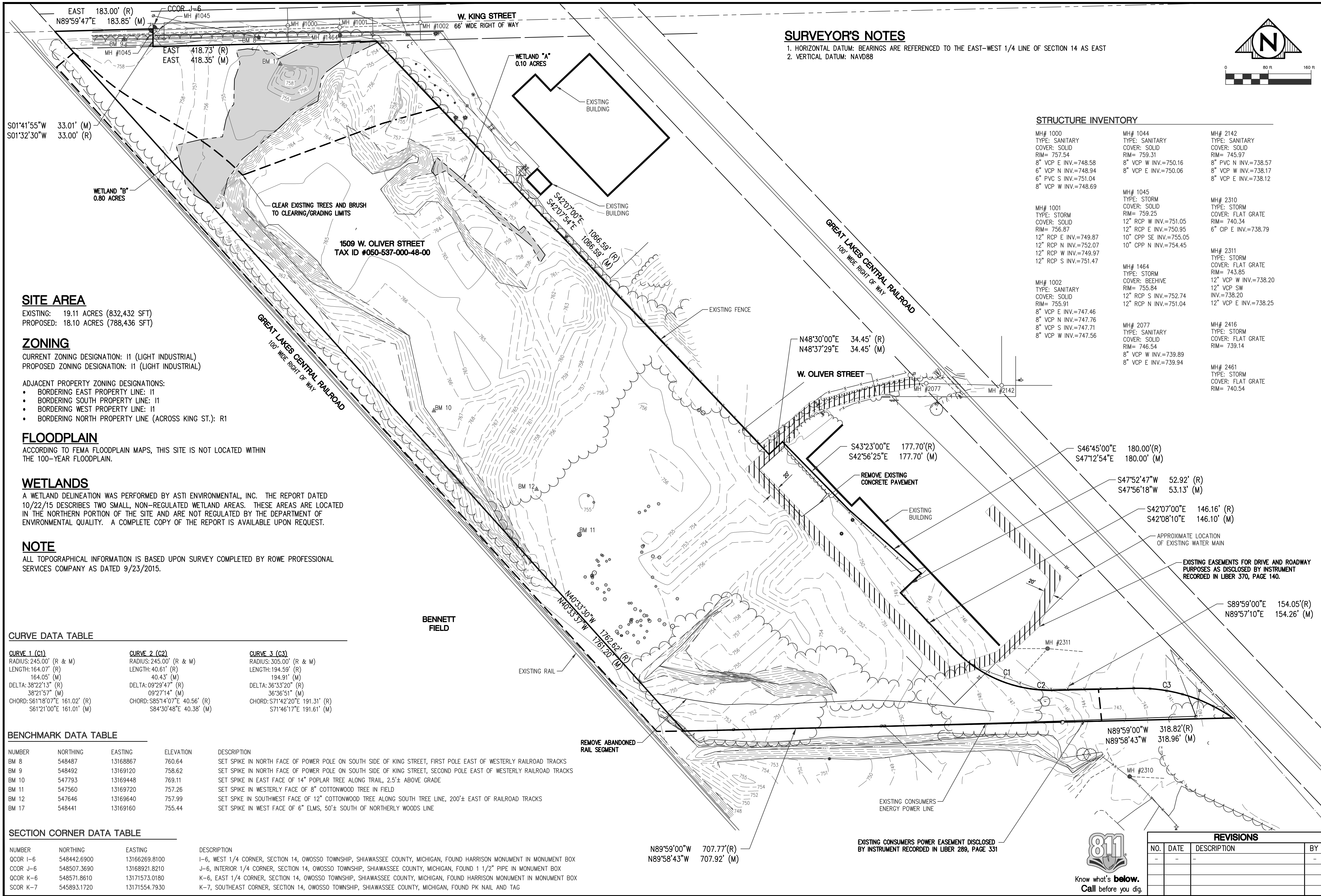
REVISIONS			
NO.	DATE	DESCRIPTION	BY
-	-	-	-
-	-	-	-
-	-	-	-

REV: **C6**  
SHT# **6** OF **16**  
JOB No: 15C0179

PLAN DATE: JANUARY 2016  
PROJECT MGR: DAS  
REVIEWER: JBM  
SCALE: NOT TO SCALE

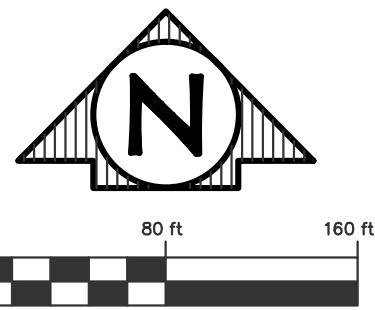
**ROWE PROFESSIONAL SERVICES COMPANY**  
C: (810) 341-7500  
F: (810) 341-7573  
www.rowepsc.com  
The ROWE Building  
540 S. Saginaw St., Ste. 200  
Flint, MI 48502

PREPARED FOR  
**CARGILL ANIMAL NUTRITION PROJECT SPARTAN**  
SITE PLAN  
DETAILS 3 OF 3



**SURVEYOR'S NOTES**

- HORIZONTAL DATUM: BEARINGS ARE REFERENCED TO THE EAST-WEST 1/4 LINE OF SECTION 14 AS EAST
- VERTICAL DATUM: NAVD88



**STRUCTURE INVENTORY**

MH# 1000 TYPE: SANITARY COVER: SOLID RIM= 757.54 8" VCP E INV.=748.58 6" VCP N INV.=748.94 6" PVC S INV.=751.04 8" VCP W INV.=748.69	MH# 1044 TYPE: SANITARY COVER: SOLID RIM= 759.31 8" VCP W INV.=750.16 8" VCP E INV.=750.06	MH# 2142 TYPE: SANITARY COVER: SOLID RIM= 745.97 8" PVC N INV.=738.57 8" VCP W INV.=738.17 8" VCP E INV.=738.12
MH# 1001 TYPE: STORM COVER: SOLID RIM= 756.87 12" RCP E INV.=749.87 12" RCP N INV.=752.07 12" RCP W INV.=749.97 12" RCP S INV.=751.47	MH# 1045 TYPE: STORM COVER: SOLID RIM= 759.25 12" RCP W INV.=751.05 12" RCP E INV.=750.95 10" CPP SE INV.=755.05 10" CPP N INV.=754.45	MH# 2310 TYPE: STORM COVER: FLAT GRATE RIM= 740.34 6" CIP E INV.=738.79
MH# 1002 TYPE: SANITARY COVER: SOLID RIM= 755.91 8" VCP E INV.=747.46 8" VCP N INV.=747.76 8" VCP S INV.=747.71 8" VCP W INV.=747.56	MH# 1464 TYPE: STORM COVER: BEEHIVE RIM= 755.84 12" RCP S INV.=752.74 12" RCP N INV.=751.04	MH# 2311 TYPE: STORM COVER: FLAT GRATE RIM= 743.85 12" VCP W INV.=738.20 12" VCP SW INV.=738.20 12" VCP E INV.=738.25
	MH# 2077 TYPE: SANITARY COVER: SOLID RIM= 746.54 8" VCP W INV.=739.89 8" VCP E INV.=739.94	MH# 2416 TYPE: STORM COVER: FLAT GRATE RIM= 739.14
		MH# 2461 TYPE: STORM COVER: FLAT GRATE RIM= 740.54

**SITE AREA**  
EXISTING: 19.11 ACRES (832,432 SFT)  
PROPOSED: 18.10 ACRES (788,436 SFT)

**ZONING**  
CURRENT ZONING DESIGNATION: I1 (LIGHT INDUSTRIAL)  
PROPOSED ZONING DESIGNATION: I1 (LIGHT INDUSTRIAL)

- ADJACENT PROPERTY ZONING DESIGNATIONS:
- BORDERING EAST PROPERTY LINE: I1
  - BORDERING SOUTH PROPERTY LINE: I1
  - BORDERING WEST PROPERTY LINE: I1
  - BORDERING NORTH PROPERTY LINE (ACROSS KING ST.): R1

**FLOODPLAIN**  
ACCORDING TO FEMA FLOODPLAIN MAPS, THIS SITE IS NOT LOCATED WITHIN THE 100-YEAR FLOODPLAIN.

**WETLANDS**  
A WETLAND DELINEATION WAS PERFORMED BY ASTI ENVIRONMENTAL, INC. THE REPORT DATED 10/22/15 DESCRIBES TWO SMALL, NON-REGULATED WETLAND AREAS. THESE AREAS ARE LOCATED IN THE NORTHERN PORTION OF THE SITE AND ARE NOT REGULATED BY THE DEPARTMENT OF ENVIRONMENTAL QUALITY. A COMPLETE COPY OF THE REPORT IS AVAILABLE UPON REQUEST.

**NOTE**  
ALL TOPOGRAPHICAL INFORMATION IS BASED UPON SURVEY COMPLETED BY ROWE PROFESSIONAL SERVICES COMPANY AS DATED 9/23/2015.

**CURVE DATA TABLE**

CURVE 1 (C1)	CURVE 2 (C2)	CURVE 3 (C3)
RADIUS: 245.00' (R & M)	RADIUS: 245.00' (R & M)	RADIUS: 305.00' (R & M)
LENGTH: 164.07' (R)	LENGTH: 40.61' (R)	LENGTH: 194.59' (R)
164.05' (M)	40.43' (M)	194.91' (M)
DELTA: 38°22'13" (R)	DELTA: 09°29'47" (R)	DELTA: 36°33'20" (R)
38°21'57" (M)	09°27'14" (M)	36°36'51" (M)
CHORD: S61°18'07"E 161.02' (R)	CHORD: S85°14'07"E 40.56' (R)	CHORD: S71°42'20"E 191.31' (R)
S61°21'00"E 161.01' (M)	S84°30'48"E 40.38' (M)	S71°46'17"E 191.61' (M)

**BENCHMARK DATA TABLE**

NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
BM 8	548487	13168867	760.64	SET SPIKE IN NORTH FACE OF POWER POLE ON SOUTH SIDE OF KING STREET, FIRST POLE EAST OF WESTERLY RAILROAD TRACKS
BM 9	548492	13169120	758.62	SET SPIKE IN NORTH FACE OF POWER POLE ON SOUTH SIDE OF KING STREET, SECOND POLE EAST OF WESTERLY RAILROAD TRACKS
BM 10	547793	13169448	769.11	SET SPIKE IN EAST FACE OF 14" POPLAR TREE ALONG TRAIL, 2.5± ABOVE GRADE
BM 11	547560	13169720	757.26	SET SPIKE IN WESTERLY FACE OF 8" COTTONWOOD TREE IN FIELD
BM 12	547646	13169640	757.99	SET SPIKE IN SOUTHWEST FACE OF 12" COTTONWOOD TREE ALONG SOUTH TREE LINE, 200± EAST OF RAILROAD TRACKS
BM 17	548441	13169160	755.44	SET SPIKE IN WEST FACE OF 6" ELMS, 50± SOUTH OF NORTHERLY WOODS LINE

**SECTION CORNER DATA TABLE**

NUMBER	NORTHING	EASTING	DESCRIPTION
CCOR I-6	548442.6900	13166269.8100	I-6, WEST 1/4 CORNER, SECTION 14, OWOSSO TOWNSHIP, SHIAWASSEE COUNTY, MICHIGAN, FOUND HARRISON MONUMENT IN MONUMENT BOX
CCOR J-6	548507.3690	13168921.8210	J-6, INTERIOR 1/4 CORNER, SECTION 14, OWOSSO TOWNSHIP, SHIAWASSEE COUNTY, MICHIGAN, FOUND 1 1/2" PIPE IN MONUMENT BOX
CCOR K-6	548571.8610	13171573.0180	K-6, EAST 1/4 CORNER, SECTION 14, OWOSSO TOWNSHIP, SHIAWASSEE COUNTY, MICHIGAN, FOUND HARRISON MONUMENT IN MONUMENT BOX
SCOR K-7	545893.1720	13171554.7930	K-7, SOUTHEAST CORNER, SECTION 14, OWOSSO TOWNSHIP, SHIAWASSEE COUNTY, MICHIGAN, FOUND PK NAIL AND TAG

PLAN DATE: JANUARY 2016  
PROJECT MGR: DAS  
REVIEWER: JBM  
SCALE: 1" = 80'

**ROWE PROFESSIONAL SERVICES COMPANY**

The ROWE Building  
540 S. Saginaw St., Ste. 200  
Flint, MI 48502

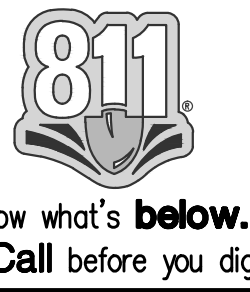
C: (810) 341-7500  
F: (810) 341-7573  
www.rowepscc.com

PREPARED FOR  
**CARGILL ANIMAL NUTRITION PROJECT SPARTAN**  
SITE PLAN  
EXISTING SURVEY & REMOVALS

**REVISIONS**

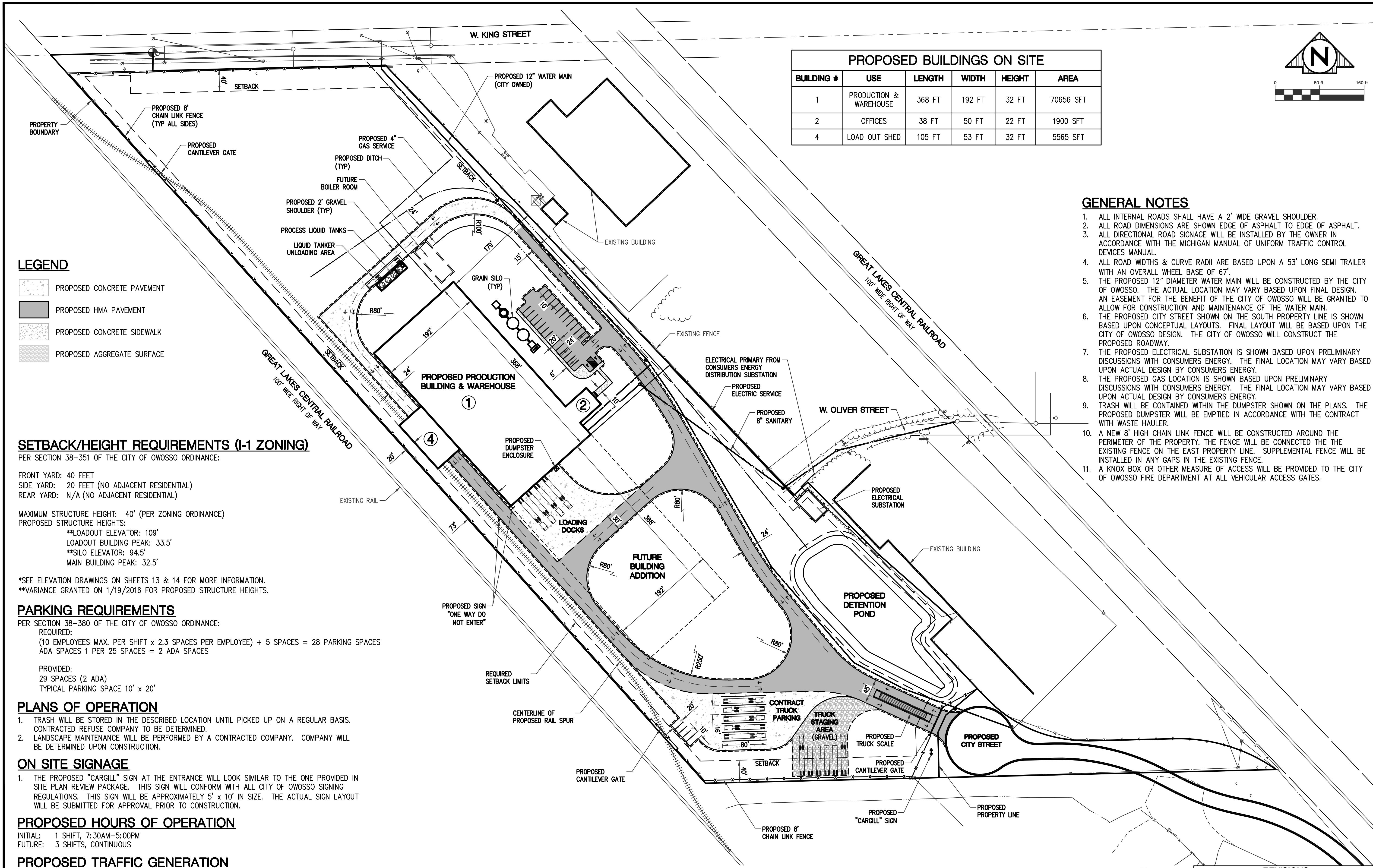
NO.	DATE	DESCRIPTION	BY
-	-	-	-

REV: **C7**  
SHT# **7** OF **16**  
JOB No: 15C0179

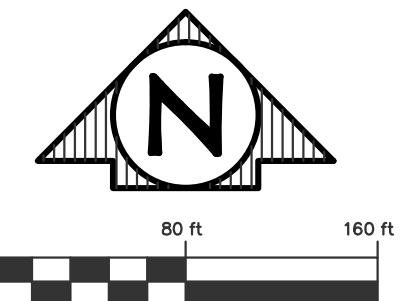


EXISTING CONSUMERS POWER EASEMENT DISCLOSED BY INSTRUMENT RECORDED IN LIBER 289, PAGE 331

N89°59'00"W 707.77'(R)  
N89°58'43"W 707.92'(M)



PROPOSED BUILDINGS ON SITE					
BUILDING #	USE	LENGTH	WIDTH	HEIGHT	AREA
1	PRODUCTION & WAREHOUSE	368 FT	192 FT	32 FT	70656 SFT
2	OFFICES	38 FT	50 FT	22 FT	1900 SFT
4	LOAD OUT SHED	105 FT	53 FT	32 FT	5565 SFT



**LEGEND**

- PROPOSED CONCRETE PAVEMENT
- PROPOSED HMA PAVEMENT
- PROPOSED CONCRETE SIDEWALK
- PROPOSED AGGREGATE SURFACE

**SETBACK/HEIGHT REQUIREMENTS (I-1 ZONING)**

PER SECTION 38-351 OF THE CITY OF OWOSSO ORDINANCE:  
 FRONT YARD: 40 FEET  
 SIDE YARD: 20 FEET (NO ADJACENT RESIDENTIAL)  
 REAR YARD: N/A (NO ADJACENT RESIDENTIAL)  
 MAXIMUM STRUCTURE HEIGHT: 40' (PER ZONING ORDINANCE)  
 PROPOSED STRUCTURE HEIGHTS:  
 \*\*LOADOUT ELEVATOR: 109'  
 LOADOUT BUILDING PEAK: 33.5'  
 \*\*SILO ELEVATOR: 94.5'  
 MAIN BUILDING PEAK: 32.5'  
 \*SEE ELEVATION DRAWINGS ON SHEETS 13 & 14 FOR MORE INFORMATION.  
 \*\*VARIANCE GRANTED ON 1/19/2016 FOR PROPOSED STRUCTURE HEIGHTS.

**PARKING REQUIREMENTS**

PER SECTION 38-380 OF THE CITY OF OWOSSO ORDINANCE:  
 REQUIRED:  
 (10 EMPLOYEES MAX. PER SHIFT x 2.3 SPACES PER EMPLOYEE) + 5 SPACES = 28 PARKING SPACES  
 ADA SPACES 1 PER 25 SPACES = 2 ADA SPACES  
 PROVIDED:  
 29 SPACES (2 ADA)  
 TYPICAL PARKING SPACE 10' x 20'

**PLANS OF OPERATION**

- TRASH WILL BE STORED IN THE DESCRIBED LOCATION UNTIL PICKED UP ON A REGULAR BASIS. CONTRACTED REFUSE COMPANY TO BE DETERMINED.
- LANDSCAPE MAINTENANCE WILL BE PERFORMED BY A CONTRACTED COMPANY. COMPANY WILL BE DETERMINED UPON CONSTRUCTION.

**ON SITE SIGNAGE**

- THE PROPOSED "CARGILL" SIGN AT THE ENTRANCE WILL LOOK SIMILAR TO THE ONE PROVIDED IN SITE PLAN REVIEW PACKAGE. THIS SIGN WILL CONFORM WITH ALL CITY OF OWOSSO SIGNING REGULATIONS. THIS SIGN WILL BE APPROXIMATELY 5' x 10' IN SIZE. THE ACTUAL SIGN LAYOUT WILL BE SUBMITTED FOR APPROVAL PRIOR TO CONSTRUCTION.

**PROPOSED HOURS OF OPERATION**

INITIAL: 1 SHIFT, 7:30AM-5:00PM  
 FUTURE: 3 SHIFTS, CONTINUOUS

**PROPOSED TRAFFIC GENERATION**

TRUCKS  
 INITIAL: 18 TRUCKS/DAY  
 FUTURE: 45 TRUCKS/DAY

**GENERAL NOTES**

- ALL INTERNAL ROADS SHALL HAVE A 2' WIDE GRAVEL SHOULDER.
- ALL ROAD DIMENSIONS ARE SHOWN EDGE OF ASPHALT TO EDGE OF ASPHALT.
- ALL DIRECTIONAL ROAD SIGNAGE WILL BE INSTALLED BY THE OWNER IN ACCORDANCE WITH THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES MANUAL.
- ALL ROAD WIDTHS & CURVE RADII ARE BASED UPON A 53' LONG SEMI TRAILER WITH AN OVERALL WHEEL BASE OF 67'.
- THE PROPOSED 12" DIAMETER WATER MAIN WILL BE CONSTRUCTED BY THE CITY OF OWOSSO. THE ACTUAL LOCATION MAY VARY BASED UPON FINAL DESIGN. AN EASEMENT FOR THE BENEFIT OF THE CITY OF OWOSSO WILL BE GRANTED TO ALLOW FOR CONSTRUCTION AND MAINTENANCE OF THE WATER MAIN.
- THE PROPOSED CITY STREET SHOWN ON THE SOUTH PROPERTY LINE IS SHOWN BASED UPON CONCEPTUAL LAYOUTS. FINAL LAYOUT WILL BE BASED UPON THE CITY OF OWOSSO DESIGN. THE CITY OF OWOSSO WILL CONSTRUCT THE PROPOSED ROADWAY.
- THE PROPOSED ELECTRICAL SUBSTATION IS SHOWN BASED UPON PRELIMINARY DISCUSSIONS WITH CONSUMERS ENERGY. THE FINAL LOCATION MAY VARY BASED UPON ACTUAL DESIGN BY CONSUMERS ENERGY.
- THE PROPOSED GAS LOCATION IS SHOWN BASED UPON PRELIMINARY DISCUSSIONS WITH CONSUMERS ENERGY. THE FINAL LOCATION MAY VARY BASED UPON ACTUAL DESIGN BY CONSUMERS ENERGY.
- TRASH WILL BE CONTAINED WITHIN THE DUMPSTER SHOWN ON THE PLANS. THE PROPOSED DUMPSTER WILL BE EMPTIED IN ACCORDANCE WITH THE CONTRACT WITH WASTE HAULER.
- A NEW 8' HIGH CHAIN LINK FENCE WILL BE CONSTRUCTED AROUND THE PERIMETER OF THE PROPERTY. THE FENCE WILL BE CONNECTED TO THE EXISTING FENCE ON THE EAST PROPERTY LINE. SUPPLEMENTAL FENCE WILL BE INSTALLED IN ANY GAPS IN THE EXISTING FENCE.
- A KNOX BOX OR OTHER MEASURE OF ACCESS WILL BE PROVIDED TO THE CITY OF OWOSSO FIRE DEPARTMENT AT ALL VEHICULAR ACCESS GATES.

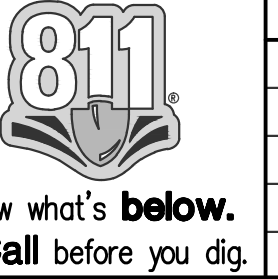
PLAN DATE: JANUARY 2016  
 PROJECT MGR: DAS  
 REVIEWER: JBM  
 SCALE: 1" = 80'

**ROWE PROFESSIONAL SERVICES COMPANY**

The ROWE Building  
 540 S. Saginaw St., Ste. 200  
 Flint, MI 48502

C: (810) 341-7500  
 F: (810) 341-7573  
 www.rowepsc.com

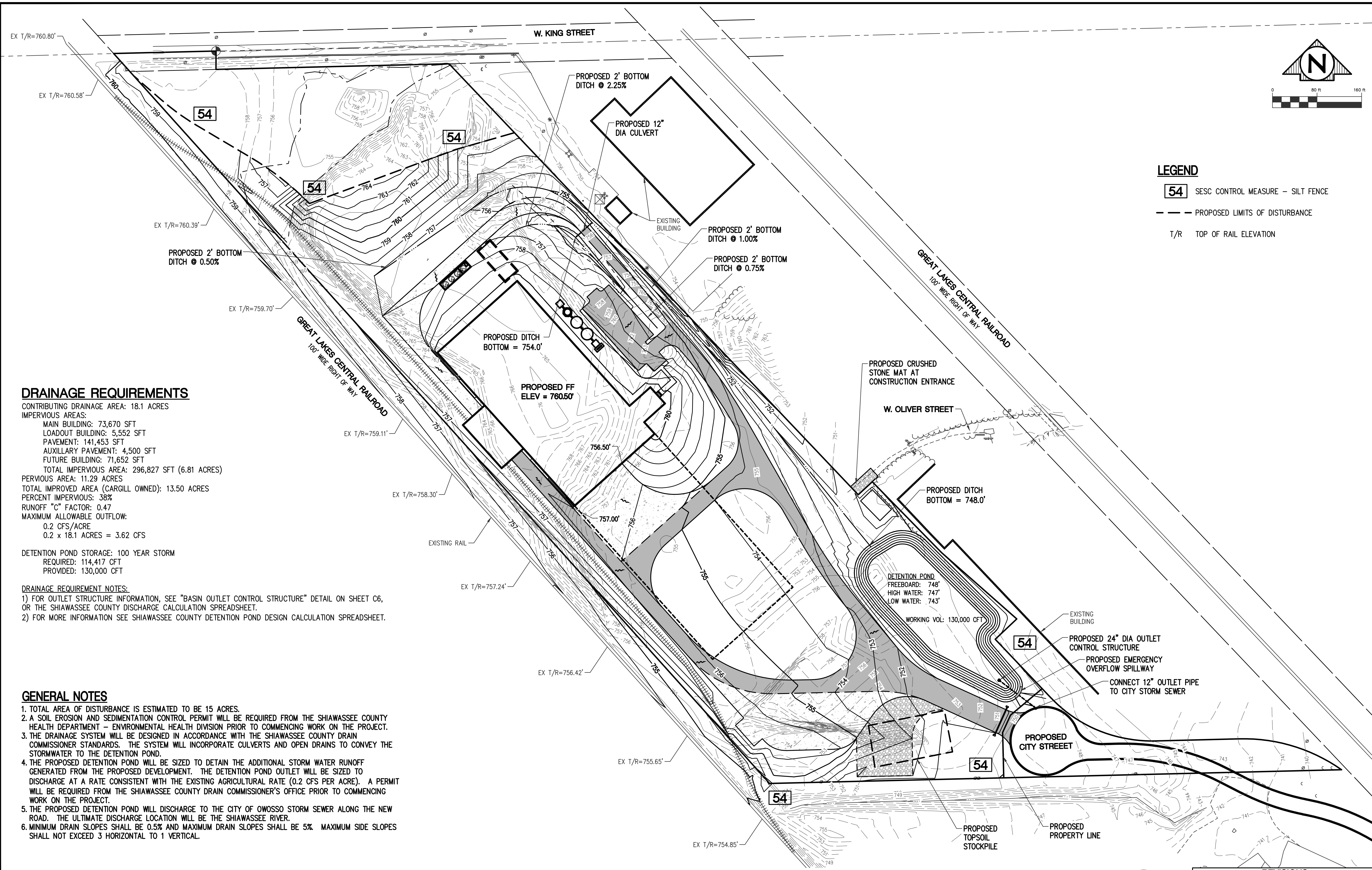
PREPARED FOR  
**CARGILL ANIMAL NUTRITION PROJECT SPARTAN**  
 SITE PLAN  
 PROPOSED PLAN



REVISIONS			
NO.	DATE	DESCRIPTION	BY

REV: **C8**  
 SHT# **8** OF **16**  
 JOB No: 15C0179

R:\Projects\15C0179\09\_Site\_Plan\_Drawings\15C-150079-SP-PLAN-OVERALL\_LAYOUT.dwg PLOTED: 1/21/2016 12:24 PM



**LEGEND**

**54** SESC CONTROL MEASURE - SILT FENCE

--- PROPOSED LIMITS OF DISTURBANCE

T/R TOP OF RAIL ELEVATION

**DRAINAGE REQUIREMENTS**

CONTRIBUTING DRAINAGE AREA: 18.1 ACRES

IMPERVIOUS AREAS:

- MAIN BUILDING: 73,670 SFT
- LOADOUT BUILDING: 5,552 SFT
- PAVEMENT: 141,453 SFT
- AUXILIARY PAVEMENT: 4,500 SFT
- FUTURE BUILDING: 71,652 SFT
- TOTAL IMPERVIOUS AREA: 296,827 SFT (6.81 ACRES)

PERVIOUS AREA: 11.29 ACRES

TOTAL IMPROVED AREA (CARGILL OWNED): 13.50 ACRES

PERCENT IMPERVIOUS: 38%

RUNOFF "C" FACTOR: 0.47

MAXIMUM ALLOWABLE OUTFLOW:

- 0.2 CFS/ACRE
- 0.2 x 18.1 ACRES = 3.62 CFS

DETENTION POND STORAGE: 100 YEAR STORM

- REQUIRED: 114,417 CFT
- PROVIDED: 130,000 CFT

**DRAINAGE REQUIREMENT NOTES:**

- 1) FOR OUTLET STRUCTURE INFORMATION, SEE "BASIN OUTLET CONTROL STRUCTURE" DETAIL ON SHEET C6, OR THE SHIAWASSEE COUNTY DISCHARGE CALCULATION SPREADSHEET.
- 2) FOR MORE INFORMATION SEE SHIAWASSEE COUNTY DETENTION POND DESIGN CALCULATION SPREADSHEET.

**GENERAL NOTES**

1. TOTAL AREA OF DISTURBANCE IS ESTIMATED TO BE 15 ACRES.
2. A SOIL EROSION AND SEDIMENTATION CONTROL PERMIT WILL BE REQUIRED FROM THE SHIAWASSEE COUNTY HEALTH DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION PRIOR TO COMMENCING WORK ON THE PROJECT.
3. THE DRAINAGE SYSTEM WILL BE DESIGNED IN ACCORDANCE WITH THE SHIAWASSEE COUNTY DRAIN COMMISSIONER STANDARDS. THE SYSTEM WILL INCORPORATE CULVERTS AND OPEN DRAINS TO CONVEY THE STORMWATER TO THE DETENTION POND.
4. THE PROPOSED DETENTION POND WILL BE SIZED TO DETAIN THE ADDITIONAL STORM WATER RUNOFF GENERATED FROM THE PROPOSED DEVELOPMENT. THE DETENTION POND OUTLET WILL BE SIZED TO DISCHARGE AT A RATE CONSISTENT WITH THE EXISTING AGRICULTURAL RATE (0.2 CFS PER ACRE). A PERMIT WILL BE REQUIRED FROM THE SHIAWASSEE COUNTY DRAIN COMMISSIONER'S OFFICE PRIOR TO COMMENCING WORK ON THE PROJECT.
5. THE PROPOSED DETENTION POND WILL DISCHARGE TO THE CITY OF OWOSO STORM SEWER ALONG THE NEW ROAD. THE ULTIMATE DISCHARGE LOCATION WILL BE THE SHIAWASSEE RIVER.
6. MINIMUM DRAIN SLOPES SHALL BE 0.5% AND MAXIMUM DRAIN SLOPES SHALL BE 5%. MAXIMUM SIDE SLOPES SHALL NOT EXCEED 3 HORIZONTAL TO 1 VERTICAL.



REVISIONS			
NO.	DATE	DESCRIPTION	BY

PLAN DATE: JANUARY 2016  
 PROJECT MGR: DAS  
 REVIEWER: JBM  
 SCALE: 1" = 80'

**ROWE PROFESSIONAL SERVICES COMPANY**

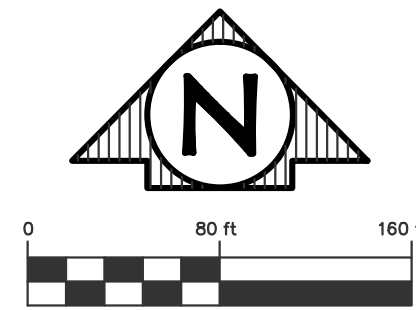
The ROWE Building  
 540 S. Saginaw St., Ste. 200  
 Flint, MI 48502

PREPARED FOR  
**CARGILL ANIMAL NUTRITION PROJECT SPARTAN**

SITE PLAN  
 GRADING & STORM WATER MANAGEMENT

REV: **C9**  
 SHEET# **9** OF **16**  
 JOB No: 15C0179

R:\Projects\15C0179\Qing Site Plan Drawings\15C0179-SITE PLAN-GRADING & STORM



**LANDSCAPE REQUIREMENTS:**

1. PLANT MATERIALS SHALL NOT BE PLACED CLOSER THAN FOUR (4) FEET FROM THE FENCE LINE OR PROPERTY LINE.
2. WHERE PLANT MATERIALS ARE PLACED IN TWO (2) OR MORE ROWS, PLANTINGS SHALL BE STAGGERED IN ROWS.
3. EVERGREEN TREES SHALL BE PLANTED NOT MORE THAN THIRTY (30) FEET ON CENTERS, AND SHALL NOT BE LESS THAN FIVE (5) FEET IN HEIGHT.
4. NARROW EVERGREENS SHALL BE PLANTED NOT MORE THAN SIX (6) FEET ON CENTERS, AND SHALL NOT BE LESS THAN THREE (3) FEET IN HEIGHT.
5. TREE-LIKE SHRUBS SHALL BE PLANTED NOT MORE THAN TEN (10) FEET ON CENTERS, AND SHALL NOT BE LESS THAN FOUR (4) FEET IN HEIGHT.
6. LARGE DECIDUOUS SHRUBS SHALL BE PLANTED NOT MORE THAN FOUR (4) FEET ON CENTERS, AND SHALL NOT BE LESS THAN SIX (6) FEET IN HEIGHT.
7. LARGE DECIDUOUS TREES SHALL BE PLANTED NOT MORE THAN THIRTY (30) FEET ON CENTERS, AND SHALL NOT BE LESS THAN EIGHT (8) FEET IN HEIGHT.

**LANDSCAPE NOTES**

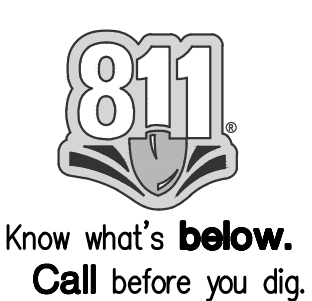
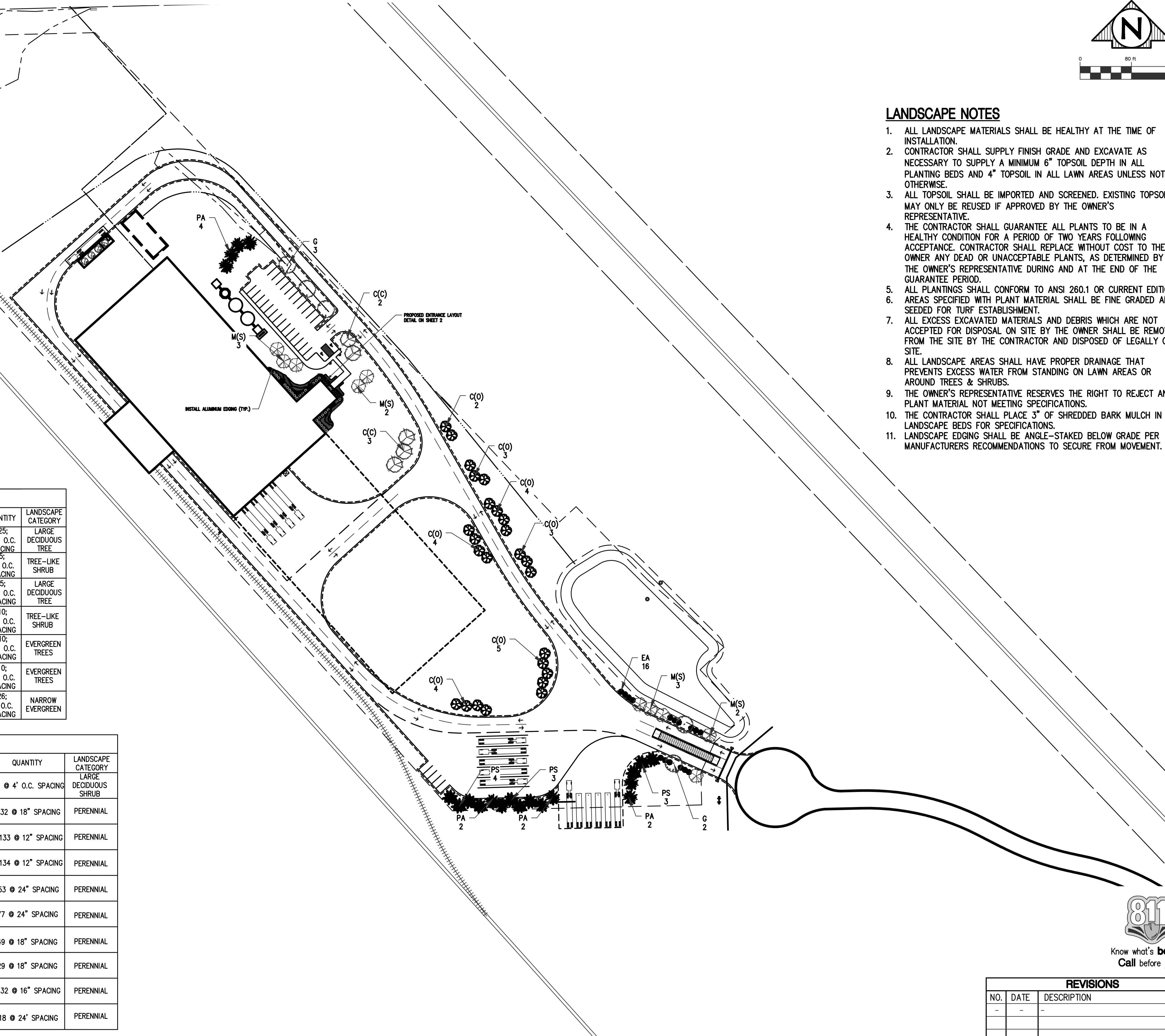
1. ALL LANDSCAPE MATERIALS SHALL BE HEALTHY AT THE TIME OF INSTALLATION.
2. CONTRACTOR SHALL SUPPLY FINISH GRADE AND EXCAVATE AS NECESSARY TO SUPPLY A MINIMUM 6" TOPSOIL DEPTH IN ALL PLANTING BEDS AND 4" TOPSOIL IN ALL LAWN AREAS UNLESS NOTED OTHERWISE.
3. ALL TOPSOIL SHALL BE IMPORTED AND SCREENED. EXISTING TOPSOIL MAY ONLY BE REUSED IF APPROVED BY THE OWNER'S REPRESENTATIVE.
4. THE CONTRACTOR SHALL GUARANTEE ALL PLANTS TO BE IN A HEALTHY CONDITION FOR A PERIOD OF TWO YEARS FOLLOWING ACCEPTANCE. CONTRACTOR SHALL REPLACE WITHOUT COST TO THE OWNER ANY DEAD OR UNACCEPTABLE PLANTS, AS DETERMINED BY THE OWNER'S REPRESENTATIVE DURING AND AT THE END OF THE GUARANTEE PERIOD.
5. ALL PLANTINGS SHALL CONFORM TO ANSI 260.1 OR CURRENT EDITION
6. AREAS SPECIFIED WITH PLANT MATERIAL SHALL BE FINE GRADED AND SEEDED FOR TURF ESTABLISHMENT.
7. ALL EXCESS EXCAVATED MATERIALS AND DEBRIS WHICH ARE NOT ACCEPTED FOR DISPOSAL ON SITE BY THE OWNER SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF LEGALLY OFF SITE.
8. ALL LANDSCAPE AREAS SHALL HAVE PROPER DRAINAGE THAT PREVENTS EXCESS WATER FROM STANDING ON LAWN AREAS OR AROUND TREES & SHRUBS.
9. THE OWNER'S REPRESENTATIVE RESERVES THE RIGHT TO REJECT ANY PLANT MATERIAL NOT MEETING SPECIFICATIONS.
10. THE CONTRACTOR SHALL PLACE 3" OF SHREDDED BARK MULCH IN LANDSCAPE BEDS FOR SPECIFICATIONS.
11. LANDSCAPE EDGING SHALL BE ANGLE-STAKED BELOW GRADE PER MANUFACTURERS RECOMMENDATIONS TO SECURE FROM MOVEMENT.

TREE SCHEDULE

SYM	KEY	SIZE	BOTANICAL NAME	COMMON NAME	NOTES	QUANTITY	LANDSCAPE CATEGORY
	C(O)	2 1/2" CAL.	CELTIS OCCIDENTALIS	COMMON HACKBERRY	B & B; 8' HT.	25; 30' O.C. SPACING	LARGE DECIDUOUS TREE
	C(C)	1 3/4" CAL.	CERCIS CANADENSIS	REDBUD	B & B; 4' HT.	10' O.C. SPACING	TREE-LIKE SHRUB
	G	2 1/2" CAL.	GLEDITSIA TRIACANTHOS INERMIS 'SKYLINE'	SKYLINE HONEYLOCUST	B & B; 8' HT.	5; 30' O.C. SPACING	LARGE DECIDUOUS TREE
	M(S)	2 1/2" CAL.	MALUS 'SNOWDRIFT'	SNOWDRIFT CRABAPPLE	B & B 4' HT.	10; 10' O.C. SPACING	TREE-LIKE SHRUB
	PA	6'	PICEA ABIES	NORWAY SPRUCE	B & B 5' HT.	10; 30' O.C. SPACING	EVERGREEN TREES
	PS	6'	PINUS STROBUS	EASTERN WHITE PINE	B & B 5' HT.	10; 30' O.C. SPACING	EVERGREEN TREES
	T	6'	THUJA OCCIDENTALIS 'EMERALD'	EMERALD ARBORVITAE	B & B 3' HT.	26; 6' O.C. SPACING	NARROW EVERGREEN

PLANT SCHEDULE

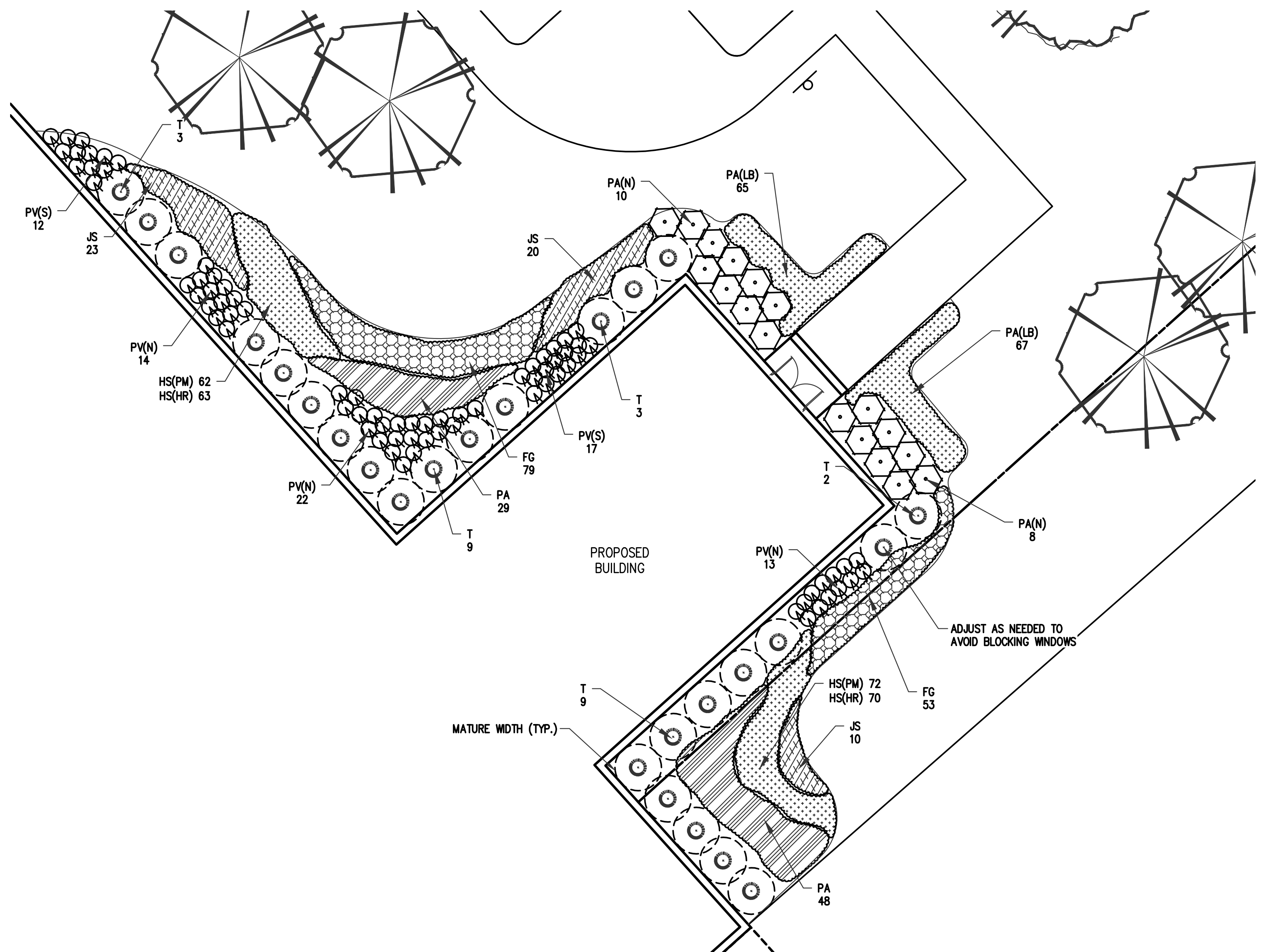
SYM	KEY	BOTANICAL NAME	COMMON NAME	NOTES	QUANTITY	LANDSCAPE CATEGORY
	EA	EUONYMUS ALATA	BURNING BUSH	B & B; 6' HT.	16 @ 4' O.C. SPACING	LARGE DECIDUOUS SHRUB
	FG	FOTHERGILLA GARDENII	DWARF FOTHERGILLA	NO. 3 CONT.; 3' HT.	132 @ 18" SPACING	PERENNIAL
	HS(HR)	HEMEROCALLIS SP. 'HAPPY RETURNS'	HAPPY RETURNS DAYLILY	NO. 2 CONT.; 18" HT.	133 @ 12" SPACING	PERENNIAL
	HS(PM)	HEMEROCALLIS SP. 'PARDON ME'	PARDON ME DAYLILY	NO. 2 CONT.; 18" HT.	134 @ 12" SPACING	PERENNIAL
	JS	JUNIPERUS SABINA	BUFFALO JUNIPER	NO. 5 CONT.; 18" HT.	53 @ 24" SPACING	PERENNIAL
	PA	PEROVSKIA ATRIPLICIFOLIA	RUSSIAN SAGE	NO. 3 CONT.; 3' HT.	77 @ 24" SPACING	PERENNIAL
	PV(N)	PANICUM VIRGATUM 'NORTHWIND'	NORTHWIND SWITCH GRASS	NO. 5 CONT.; 3' HT.	49 @ 18" SPACING	PERENNIAL
	PV(S)	PANICUM VIRGATUM 'SHENANDOAH'	SHENANDOAH SWITCH GRASS	NO. 5 CONT.; 3' HT.	29 @ 18" SPACING	PERENNIAL
	PA(LB)	PENNISETUM ALOPECUROIDES 'LITTLE BUNNY'	"LITTLE BUNNY" FOUNTAIN GRASS	NO. 1 CONT.; 1' HT.	132 @ 16" SPACING	PERENNIAL
	PA(N)	PICEA ABIES 'NIDIFORMIS'	BIRD'S NEST SPRUCE	NO. 5 CONT.; 3' HT.	18 @ 24' SPACING	PERENNIAL



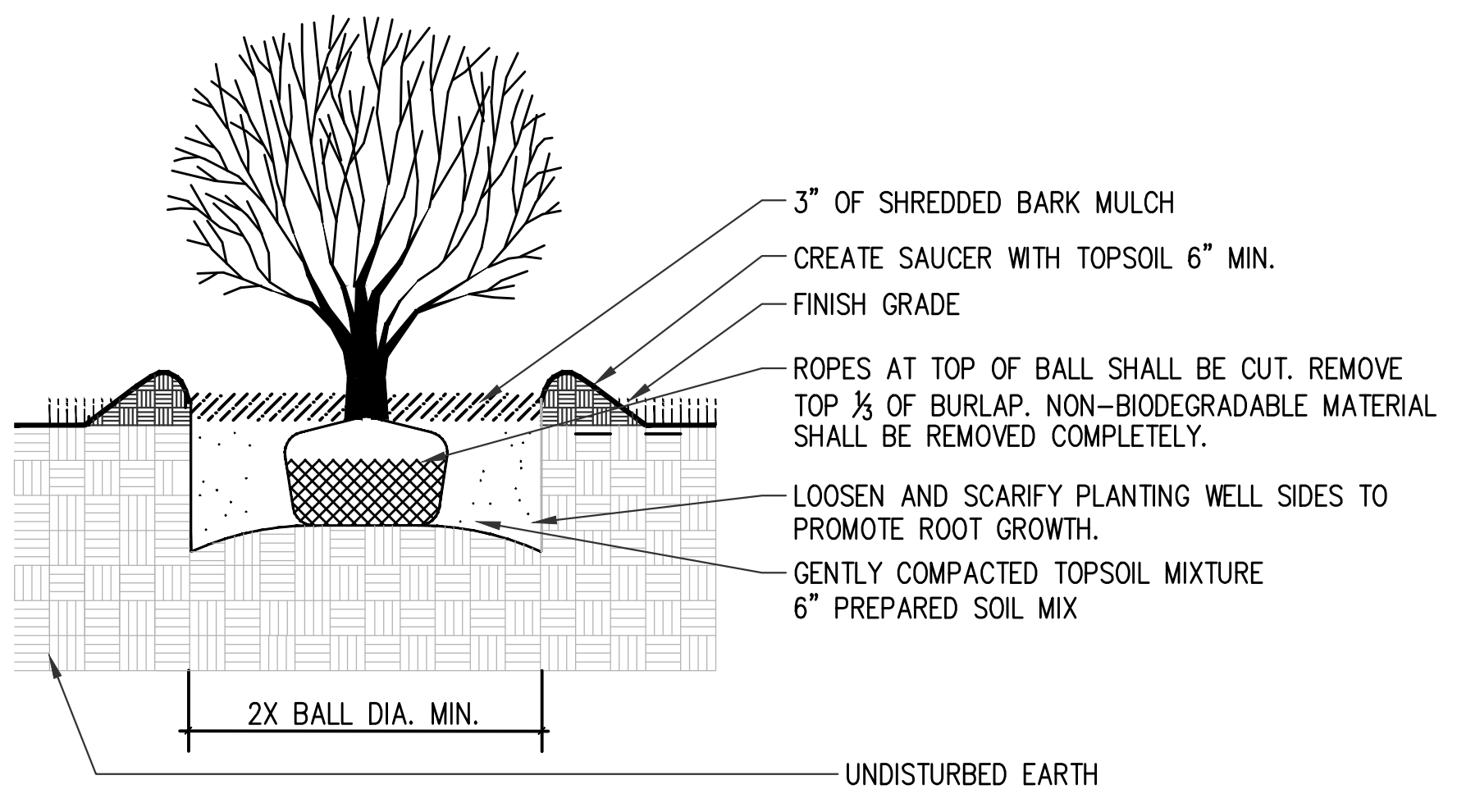
REVISIONS			
NO.	DATE	DESCRIPTION	BY
-	-	-	-
-	-	-	-
-	-	-	-

PLAN DATE: JANUARY 2016  
 PROJECT MGR: DAS  
 REVIEWER: JBM  
 SCALE: 1" = 80'  
**ROWE PROFESSIONAL SERVICES COMPANY**  
 The ROWE Building  
 540 S. Saginaw St., Ste. 200  
 Flint, MI 48502  
 C: (810) 341-7500  
 F: (810) 341-7573  
 www.rowepsc.com  
 PREPARED FOR  
**CARGILL ANIMAL NUTRITION PROJECT SPARTAN**  
 SITE PLAN  
 LANDSCAPING PLAN  
 REV: C10  
 SHT# 10 OF 16  
 JOB No: 15C0179

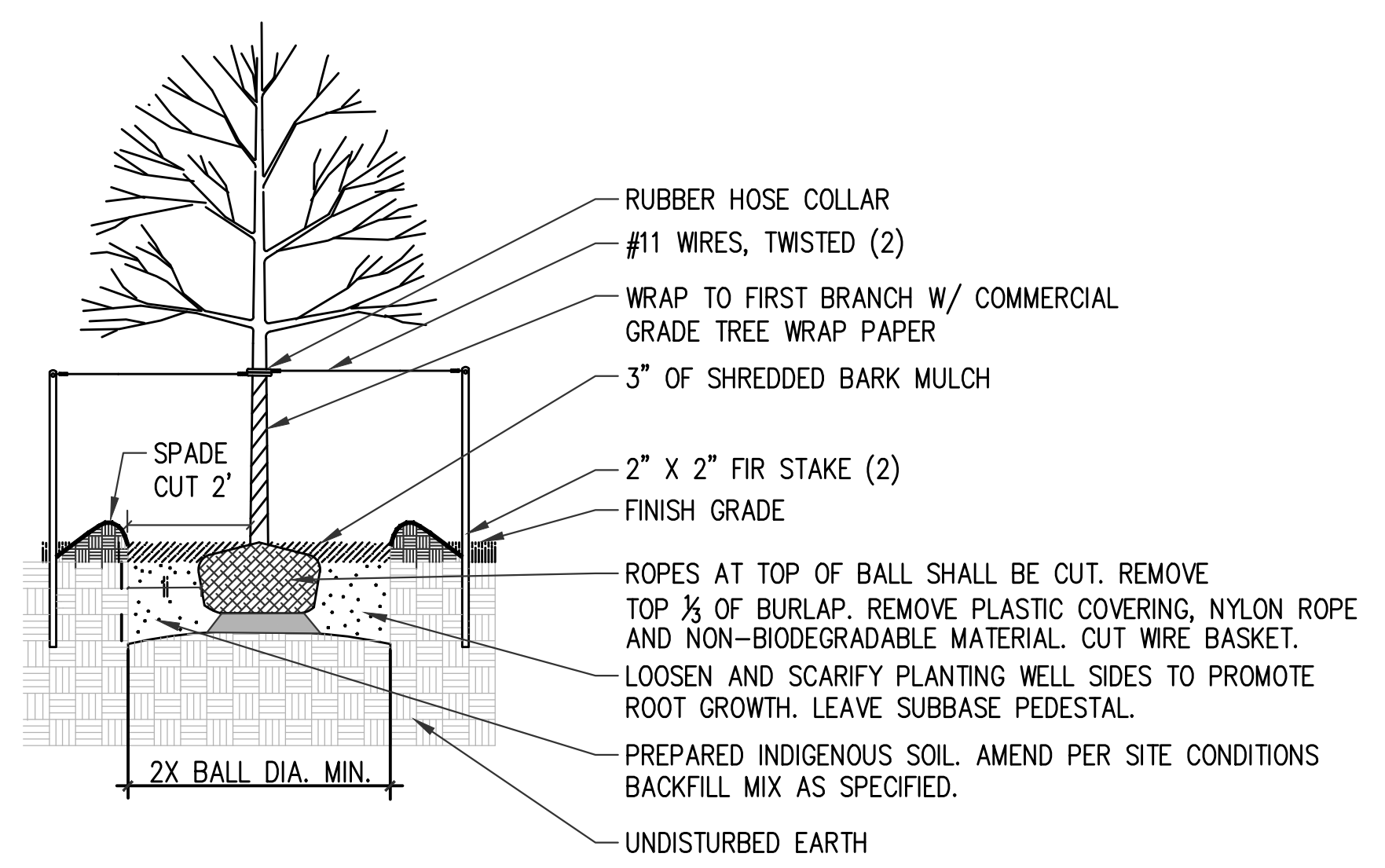
R: \\projects\15C0179\qwg\Site Plan Drawings\15C0179-SITE PLAN-LANDSCAPING.dwg PLOTDATE: 1/21/2016 12:28 PM



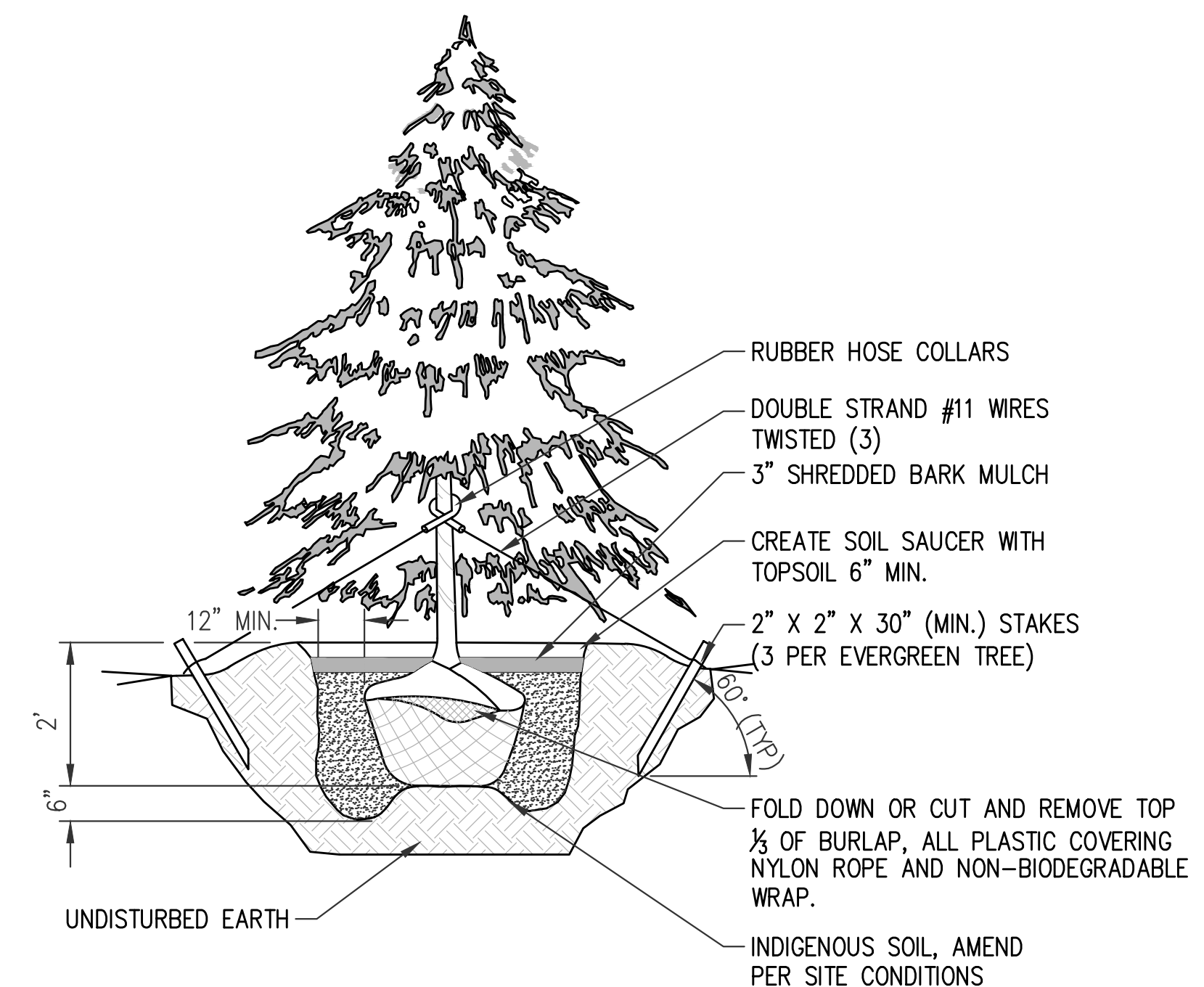
**PROPOSED ENTRANCE LAYOUT**  
1" = 10'



**SHRUB PLANTING DETAIL**  
NOT TO SCALE



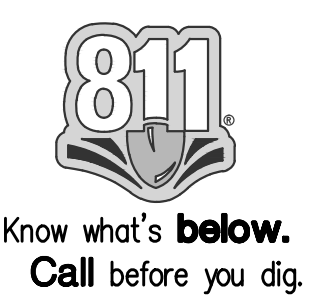
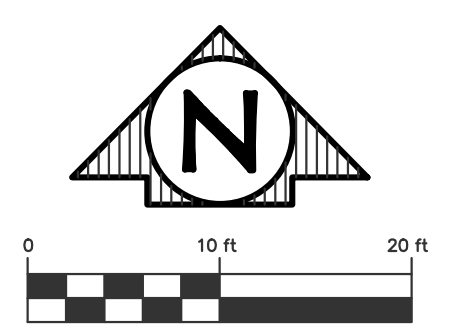
**DECIDUOUS TREE PLANTING DETAIL**  
NOT TO SCALE



**TYPICAL EVERGREEN PLANTING DETAIL**  
NOT TO SCALE

**REVISIONS**

NO.	DATE	DESCRIPTION	BY
-	-	-	-
-	-	-	-
-	-	-	-



PLAN DATE: JANUARY 2016  
PROJECT MGR: DAS  
REVIEWER: JBM  
SCALE: 1" = 10'

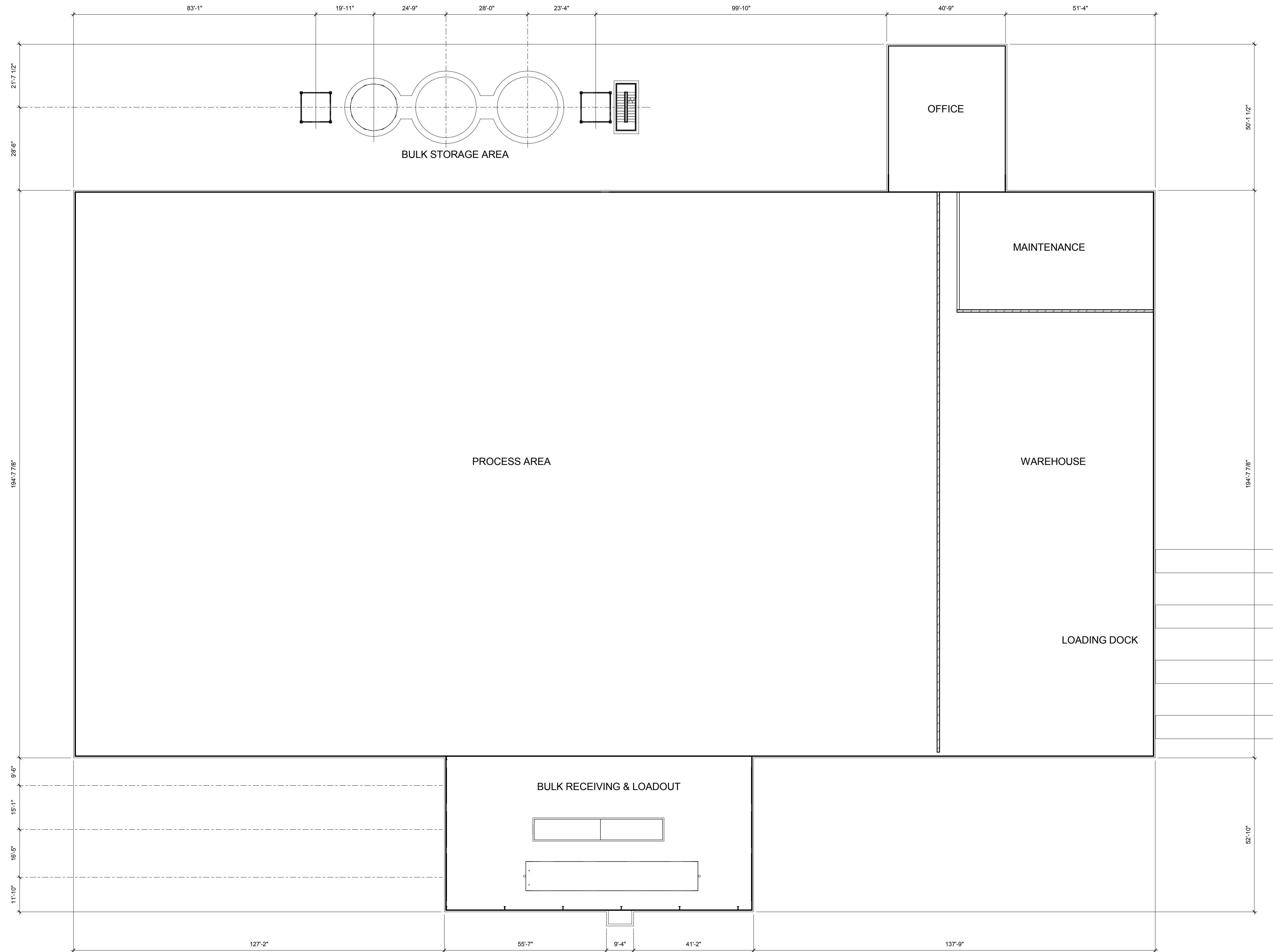
**ROWE PROFESSIONAL SERVICES COMPANY**  
C: (810) 341-7500  
F: (810) 341-7573  
www.rowepsc.com

The ROWE Building  
540 S. Saginaw St., Ste. 200  
Flint, MI 48502

PREPARED FOR  
**CARGILL ANIMAL NUTRITION PROJECT SPARTAN**  
LANDSCAPE DETAILS

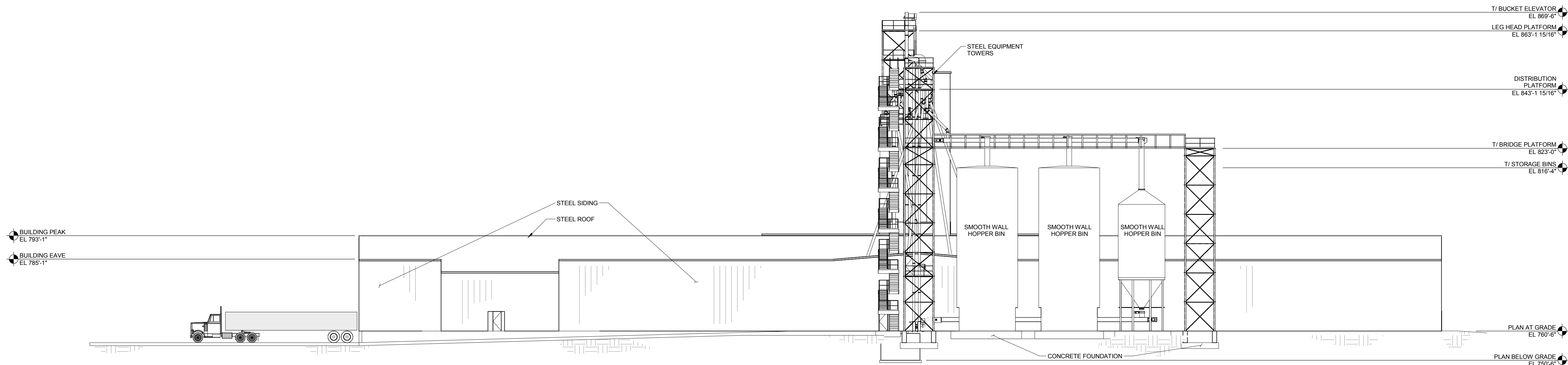
REV: **C11**  
SHT# 11 OF 16  
JOB No: 15C0179

R:\Projects\15C0179\Site Plan Drawings\15C0179-SITE PLAN-LANDSCAPING.dwg PLOTDATE: 1/21/2016 12:25 PM



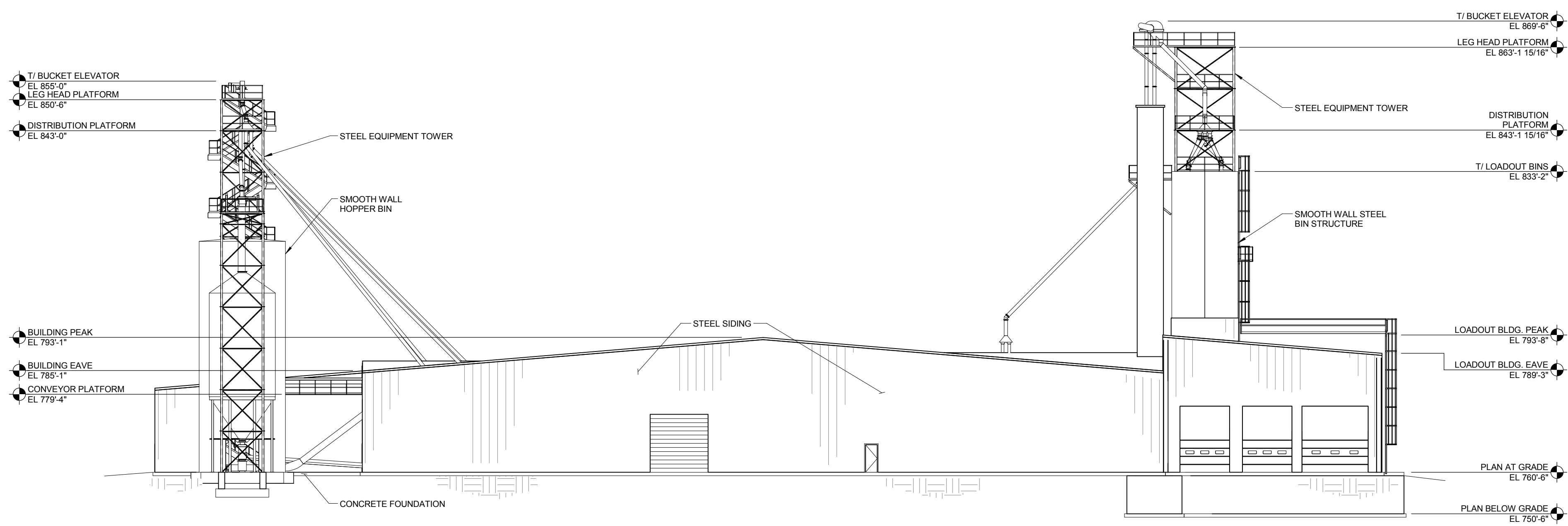
NORTH  
 1 PLAN AT GRADE FOOTPRINT  
 G1.10 1/16" = 1'-0"

					TITLE PLAN AT GRADE FOOTPRINT PROJECT 35 TPH DAIRY FEEDMILL		
ISSUED FOR REVIEW	B	01-20-16	JMM		DIVISION/SUBSIDIARY	DRAWN	DATE
ISSUED FOR REVIEW	A	11-17-15	JMM	CARGILL ANIMAL NUTRITION	JMM	11/17/15	G1.10
DESCRIPTION	REV.	DATE	BY	PLANT	SCALE	AS NOTED	
				OWOSSO, MICHIGAN			



NORTHEAST ELEVATION LOOKING  
SOUTHWEST

1  
G2.1  
1/16" = 1'-0"



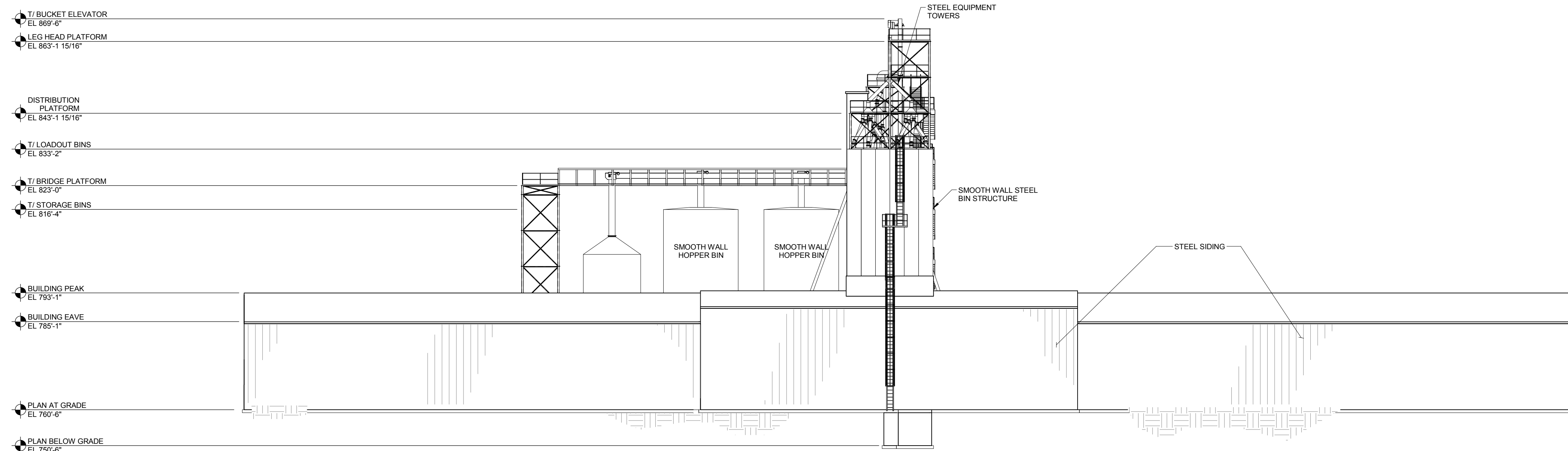
NORTHWEST ELEVATION LOOKING  
SOUTHEAST

2  
G2.1  
1/16" = 1'-0"

**PRELIMINARY**  
**NOT FOR CONSTRUCTION**

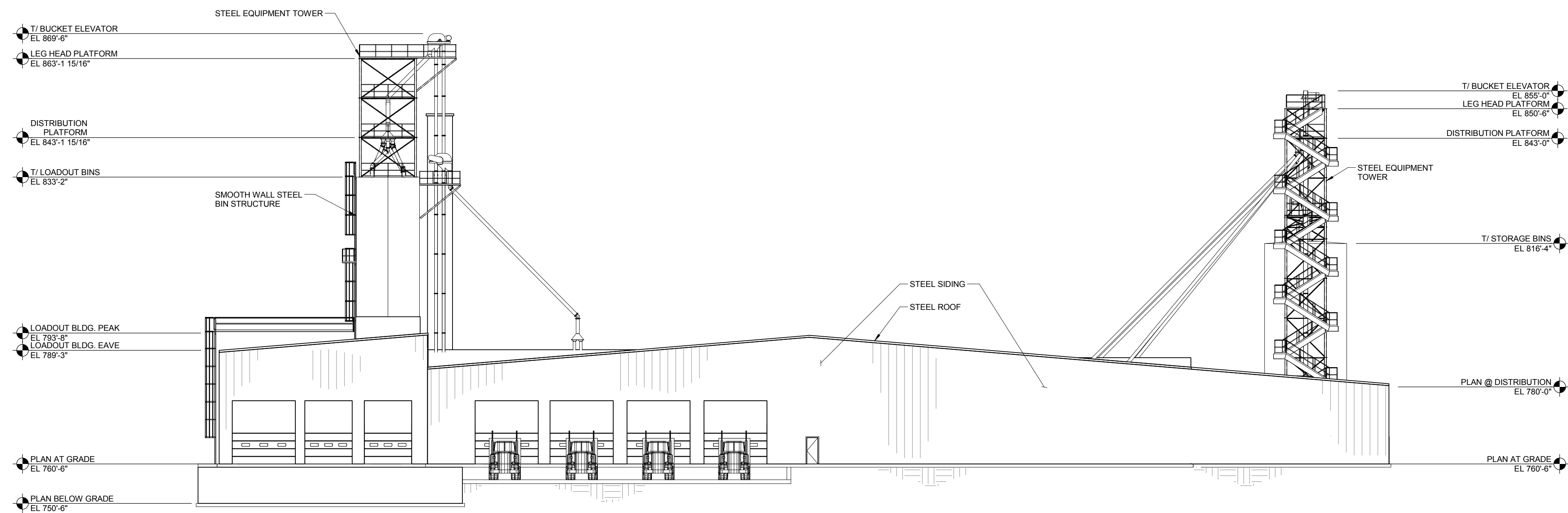
					TITLE ELEVATIONS		
					PROJECT 35 TPH DAIRY FEEDMILL		
ISSUED FOR REVIEW	B	11-19-15	JMM	DIVISION/SUBSIDIARY CARGILL ANIMAL NUTRITION	DRAWN JMM	DATE 11/17/15	DRAWING NO.
ISSUED FOR REVIEW	A	11-17-15	JMM	PLANT OWOSSO, MICHIGAN	SCALE AS NOTED		G2.1
DESCRIPTION	REV.	DATE	BY				





**SOUTHWEST ELEVATION LOOKING  
NORTHEAST**

1  
G2.2 1/16" = 1'-0"

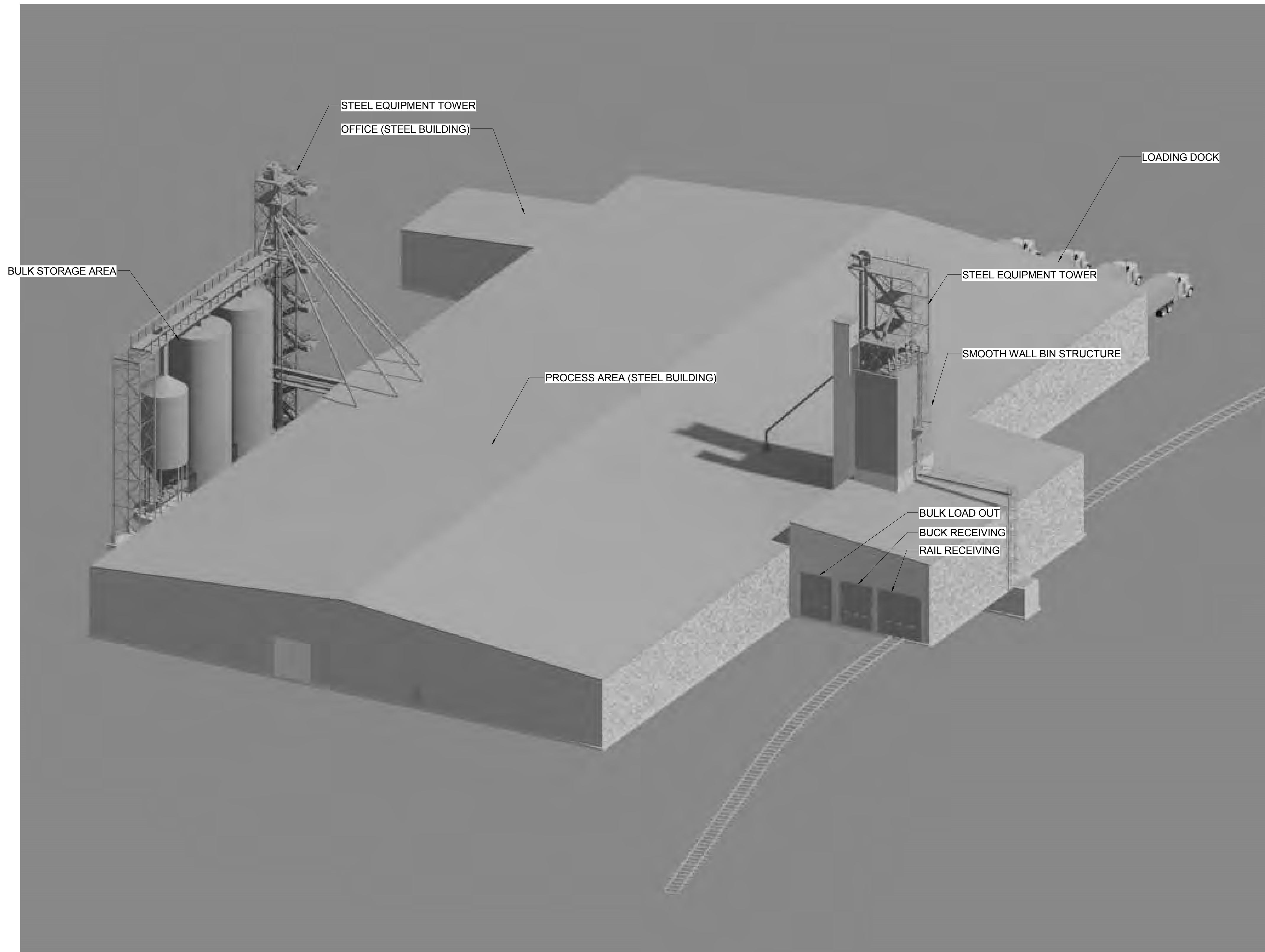


**SOUTHEAST ELEVATION LOOKING  
NORTHWEST**

2  
G2.2 1/16" = 1'-0"

**PRELIMINARY  
NOT FOR CONSTRUCTION**

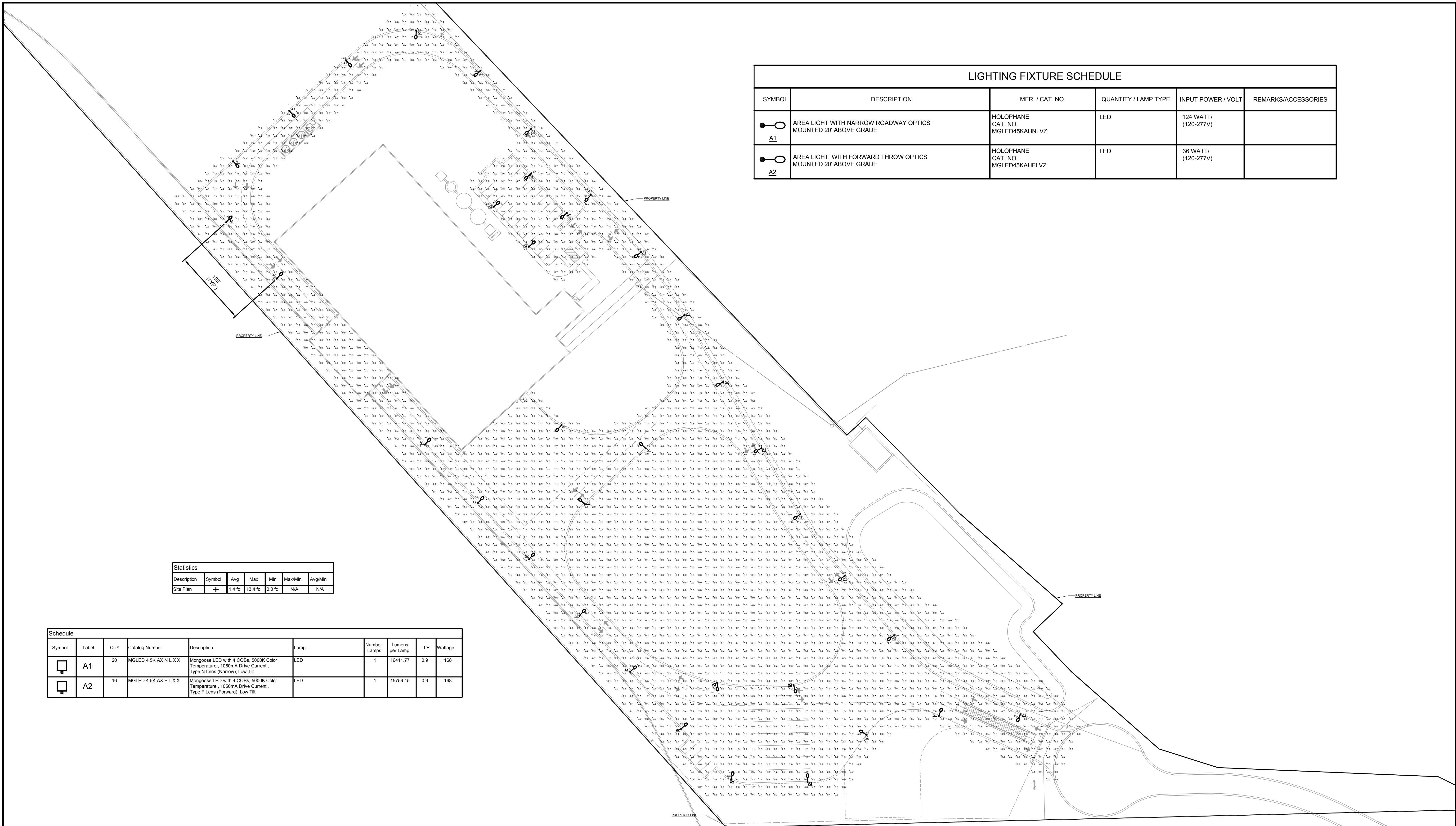
					TITLE ELEVATIONS		
					PROJECT 35 TPH DAIRY FEEDMILL		
ISSUED FOR REVIEW	C	01-15-16	JMM	DIVISION/SUBSIDIARY CARGILL ANIMAL NUTRITION PLANT OWOSSO, MICHIGAN	DRAWN	DATE	DRAWING NO. G2.2
ISSUED FOR REVIEW	B	11-19-15	JMM		JMM	11/17/15	
ISSUED FOR REVIEW	A	11-17-15	JMM		BY	SCALE AS NOTED	
DESCRIPTION	REV.	DATE	BY				



1 3D RENDERING  
G4.1 1/2" = 1'-0"

**PRELIMINARY**  
**NOT FOR CONSTRUCTION**

ISSUED FOR REVIEW	REV.	DATE	BY	 DIVISION/SUBSIDIARY CARGILL ANIMAL NUTRITION PLANT OWOSSO, MICHIGAN	TITLE	ISOMETRIC		
ISSUED FOR REVIEW	C	01-15-16	JMM		PROJECT	35 TPH DAIRY FEEDMILL		
ISSUED FOR REVIEW	B	11-18-15	JMM		DRAWN	JMM	DATE	11/17/15
ISSUED FOR REVIEW	A	11-17-15	JMM		SCALE	AS NOTED	DRAWING NO.	G4.1



LIGHTING FIXTURE SCHEDULE					
SYMBOL	DESCRIPTION	MFR. / CAT. NO.	QUANTITY / LAMP TYPE	INPUT POWER / VOLT	REMARKS/ACCESSORIES
 A1	AREA LIGHT WITH NARROW ROADWAY OPTICS MOUNTED 20' ABOVE GRADE	HOLOPHANE CAT. NO. MGLED45KAHNLVZ	LED	124 WATT/ (120-277V)	
 A2	AREA LIGHT WITH FORWARD THROW OPTICS MOUNTED 20' ABOVE GRADE	HOLOPHANE CAT. NO. MGLED45KAHFLVZ	LED	36 WATT/ (120-277V)	

Statistics						
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Site Plan	+	1.4 fc	13.4 fc	0.0 fc	N/A	N/A

Schedule									
Symbol	Label	QTY	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	LLF	Wattage
	A1	20	MGLED 4 SK AX N L X X	Mongoose LED with 4 COBs, 5000K Color Temperature, 1050mA Drive Current, Type N Lens (Narrow), Low Tilt	LED	1	16411.77	0.9	168
	A2	16	MGLED 4 SK AX F L X X	Mongoose LED with 4 COBs, 5000K Color Temperature, 1050mA Drive Current, Type F Lens (Forward), Low Tilt	LED	1	16759.45	0.9	168

1 SITE LIGHTING PHOTOMETRICS  
ELP1

**PRELIMINARY**  
**NOT FOR CONSTRUCTION**

DESCRIPTION	REV.	DATE	BY
FOR REVIEW	C	01/19/16	CTM
FOR REVIEW	B	11/19/15	CTM
FOR REVIEW	A	11/16/15	CTM

		TITLE	
		SITE LIGHTING PHOTOMETRICS	
DIVISION/SUBSIDIARY CARGILL ANIMAL NUTRITION		PROJECT	DRAWING NO.
		35 TPH DAIRY FEEDMILL	
PLANT	OWOSSO, MICHIGAN	DATE	11/16/15
SCALE	NOTED		

**City of Owosso Planning Commission Staff Report**

**MEETING DATE:** February 2, 2016  
**TO:** Planning commission  
**FROM:** Susan Montenegro, asst. city manager/director of community development  
**SUBJECT:** Site plan approval request for

**PETITIONER’S REQUEST AND BACKGROUND MATERIALS**

**Location** 1509 W. Oliver Street – parcel 050-537-000-048-00

**Surrounding land uses and zoning**

	LAND USE	ZONING
North	Residential	R-1
East	Industrial	I-1
South	Industrial - Sonoco	I-1
West	City Park – Bennett Field	C-OS

**Comparison chart**

	EXISTING	PROPOSED
Zoning	I-1 light industrial	unchanged
Gross lot area	Approximately 19 acres	unchanged
Setbacks- Front Side Rear	Currently is vacant land	40(q) 20(r) (r)(s) see notes below
Height	40'	Obtained variance from ZBA at January 19, 2016 meeting for Grain Silos, Elevator and Legs.
Parking	none	29 of which 2 are ADA

(q) Off-street parking for visitors, over and above the number of spaces required under [section 38-380](#), may be permitted within the required front yard provided that such off-street parking spaces are not located within twenty (20) feet of the front lot line.

(r) No building shall be located closer than fifty (50) feet to the outer perimeter (property line) of such district when said property line abuts any residential district.

(s) All storage shall be in the rear yard and shall be completely screened with an obscuring wall or fence, not less than six (6) feet high, or with a chain link type fence and a greenbelt planting so as to obscure all view from any adjacent residential, office or business district or from a public street. Loading areas shall be provided in accordance with [section 38-382](#).

### **Planning background**

This parcel of land has been unused and vacant for quite some time and used to be the sugar beet factory. The property went through a brownfield cleanup back in 2002 and is ready for development. The city is currently in negotiations with Sonoco to the south regarding building a public roadway to gain access to the property. The exact location of the cul-de-sac will be forthcoming. Funding for the roadway and water main placement will come from remaining TIF money and will most likely require amending the current brownfield plan. Construction access will be off W. Oliver Street during the build. This access will be closed once the public roadway entrance is created off N. Chipman Street adjacent to the Sonoco property.

Site plan meets all zoning requirements for setback and use. Question the need for fencing around detention pond for safety or liability. Gate will be left open during day which could be a potential access point for children, just a consideration, not a requirement at this point.

### **Utilities** (please see attached detail sheet containing construction standards)

#### 1. Sheet C5 – Detail Sheet

- a) Water Valve & Box Detail. Valve boxes shall be Tyler 6860 series, three piece. Valve boxes shall be made of good quality cast iron and shall be of the sectional type. The lower section shall be a minimum of five inches in diameter, enlarged at the base to fit around the bonnet of the valve. The upper section shall be arranged to slide or screw down over the adjoining lower section and shall be full diameter throughout. Valve boxes shall be provided with cast iron lids or covers. Lids or covers shall be marked "WATER". The over-all length of valve boxes shall be sufficient to permit the top to be set flush with the final ground surface grade.
- b) Standard Sanitary Sewer Manhole.
  1. Precast Sections: (See attached Detail Sheet)
    - A. Integral Base - Manholes shall consist of integral cast base and riser sections conforming to ASTM C478.
    - B. Pipe Connections- Manhole pipe connections shall be furnished with an integrally cast seal system, equal to "Press Wedge 11", "Kor-N-Seal" or "Lock Joint Flexible Manhole Sleeve", or equal. Pipes shall generally be flush with the interior manhole wall, but protruding no more than 2 inches.
    - C. Manhole section joints shall be of the O-ring rubber joint type. All pipe openings shall be cast in the precast section or cored in the finished wall. Broken and patched connections will not be accepted.
  2. Manhole Adjusting Rings: All adjustments to manholes shall be made using either LADTech HDPE Adjusting Rings or UGT Adjusting Rings with Veil Wrap. Both of these products come with contoured rings to meet varying road grades. Grade rings shall be provided with a minimum of adjustment of 2 inches and a maximum of 12 inches. For all new projects, the manhole castings will be set at the road base surface, with the final adjustment to be made at the time of construction of the final course of bituminous surfacing. This is to conform to Shiawassee County Road Commission and the City

Standards.

3. Exterior Joint Sealer: All joints between precast manhole sections shall be sealed with Cretex Wrap, Infi-Shield Seal Wrap, Wrapid Seal, or approved equal.

4. Exterior Chimney Seal: The exterior of the casting adjustment shall be sealed with Infi-Shield Uniband, Wrapid Seal, or approved equal. The seal shall extend from the precast cone section to the casting.

5. Manhole Steps: Shall not be supplied.

6. Cast Iron Frames and Covers: Shall be East Jordan Type as follows

Sanitary Manhole Castings - EJIW 1040A

Cover - 104429EJIW

7. Mortar and Grout: The mortar and grout shall be hydrogen sulfide resistant.

8. Concrete: Concrete shall meet the requirements of the Standard Specifications.

9. Flow Channel Concrete: Concrete for poured manhole flow channels shall be designed to resist hydrogen sulfide related corrosion and shall contain Type I Portland Cement (ASTM 150) supplemented with Fly Ash, Type F (ASTM C618). Limit the percentage, by weight, of Fly Ash to 25%. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement. The concrete shall have a minimum compressive strength of 3,000 psi and a maximum water-cement ratio of 0.45. Alternate mix designs shall be approved by the Municipal Engineer.

c) Cleanout Riser Detail: Prefer Detail as attached. Two (2 ft) square concrete pad for pavement areas is acceptable.

2. Sheet C2 – Water Main Construction Notes

a) Water Services. Copper pipe shall be connected to the water main through a lead-free brass corporation stop.

b) Water Main Depth of Bury. Shall be a minimum depth of 5.5 feet from the top of the pipe to the road surface.

c) Disinfection of Water Main. The Contractor shall flush the water main with potable water until discharge from the main runs clear. The main shall be chlorinated in accordance with AWWA C651. After the chlorination procedure is completed, the water main shall be flushed again until the chlorine content is equal to that of the water being supplied. Sixteen hours or longer after the flushing, the Contractor may begin collecting samples for bacteriological analysis. Samples shall be collected at 24 hour intervals until two consecutive satisfactory results are obtained. Samples shall be collected at the end opposite the chlorine injection, except that in long lines or where contamination is suspected, the Engineer may require other sampling points. Sampling shall be performed under the observation of the Engineer and City personnel. Where satisfactory results are not obtained, the main shall be reflushed, re-disinfected, and retested.

d) Pressure Testing. The allowable leakage volume shall not exceed the following:

(1) C-900 PVC Pipe - 14.1 gal/in. dia./mile/24 hours

(2) Ductile Iron Pipe and CML&C Steel Pipe - 15 gal/in. dia./mile/24 hours

The test pressure applied to the water main for the leakage test shall be maintained as constant as possible for not less than two (2) hours. The leakage test shall be held concurrently with the pressure test. For C-900 PVC pipe (Class 150), the test pressure shall be 225 psi and the test duration shall be four (4) hours.

e) Hydrants. Fire Hydrant shall be an East Jordan model 55726D (6 ft bury with Storz nozzle).

## Engineering

### ROAD:

1. Sheet C2, Plan Notes:
  - a. The Maintaining Traffic section: A coordination clause should be added. The city's contractor and own crews will be working in the same area installing water main and a road connection to the site. The developer must ensure their contractor will coordinate with the city and its contractor so all work may be accomplished in a timely manner.
  - b. The Earthwork section: The last paragraph should be discussed and determine whether excavated soils are to remain on site. My memory is the material may have to remain on site and be encapsulated.
  - c. All other notes on this page appear satisfactory.
2. Sheet C3, Legends, etc.
  - a. No Comment.
3. Sheet C4, Detail Sheet:
  - a. Chain-Link Fence: The Chain-Link detail shows a dimension of 3'-0" for the line post, from ground down to an area below the post. The depth of footing should be 3'-6" (minimum). All other dimension notes appear satisfactory.
  - b. All other notes and details on this page appear satisfactory.
4. Sheet C5, Detail Sheet:
  - a. Water Valve and Box: The Water Valve and Box detail calls for stone bedding under the valve. If the valve and box will be privately owned, then I recommend concrete blocking. If the valve and box will be city owned, then the detail must be changed to include concrete blocking.
  - b. Storm Sewer: The Storm Sewer detail calls for Class II sand around the sewer pipe. If the proposed pipe is concrete, then this detail is satisfactory. If the pipe is plastic, then the following comments will apply:
    - i. If the storm sewer is to be under the developer's ownership, then I recommend 6A crushed limestone under and around the pipe.
    - ii. If the storm sewer is to be under the city's ownership, then the detail must be modified to include 6A crushed limestone under, around and up to a point 1-foot above the pipe, then filled with Class II granular (sand) material to ground level. A geotextile separator should be laid to separate the 6A crushed limestone from the sand.
  - c. Standard Pipe Culvert: The Standard Pipe Culvert Detail is satisfactory for all areas outside public right-of-way. Any plastic pipe culvert inside the public right-of-way must be SDR 26.
  - d. All other notes and details on this page appear satisfactory.
5. Sheet C6, Detail Sheet:
  - a. All notes and details on this page appear satisfactory.
  - b. I reviewed the HC Parking layout and it appears to satisfy city code.
6. Sheet C7, Site Plan:
  - a. Easement: Notes describe a 20' easement area for 'Drive and Roadway Purposes as Disclosed by Instrument Recorded in Liber 370, Page 140'. I have not read the easement and will trust the Engineer's review being accurate. The site plan shows a fence

- alongside some of the access area. The developer's engineer should review and lay comment that the developer's equipment may access the property without damage to the fence or encroachment from the 20' easement.
- b. Plan notes discuss wetland identification and information and are satisfactory.
  - c. I reviewed some water utility records with Glenn Chinavare. The records he has are different than what resides in Engineering. Glenn should clarify whether there are additional water utility pipes in the area near the access drive from W. Oliver Street. Pipe size should also be confirmed.
  - d. All other notes and details on this page appear satisfactory.
7. Sheet C8, Site Plan:
- a. Plan note for Parking Requirements appears satisfactory, but should clarify that one of the HC spaces will be Van accessible. I assume the detail note on Sheet C6 applies.
  - b. The proposed city street connection has been recently changed. The developer is aware the change will need to be included in the final plans. Same comment applies to Sheets C9 and C10.
  - c. All my December 3, 2015 comments for the road appear satisfied in these plans.
  - d. All other notes and details on this page appear satisfactory.
8. Sheet C9, Site Plan:
- a. There is much earthwork involved on site. The volume of work is not clear, but it should be noted whether all or some of the excavated earth must remain somewhere on site. The excavated material may have to be encapsulated.
  - b. The site appears graded to ensure all storm runoff remains on site. If not true, this should be addressed with the developer.
  - c. The detention pond calculations appear satisfactory to me. This information satisfies my previous request.
  - d. The detention pond will be open and store up to 5' depth of water. The site's perimeter will be fenced, but the gate may be open for extended times during the daytime. Does the pond need additional fencing to protect the public? This should be addressed by the City Building Department.
  - e. The storm sewer pipe material is not identified. I recommend SDR 26 plastic pipe. Outlet pipe size is satisfactory.
  - f. The plan note states that a Soil Erosion and Sedimentation Control (SESC) permit will be required, but lists the controlling agency as the county rather than the City. Regardless who will be the permitting agency, the City should have the opportunity to review and comment as to the SESC plan.
  - g. All other notes and details on this page appear satisfactory.
9. Sheet C10, Landscaping Plan:
- a. Plan note 7 discusses removal of all excess excavated material. This note should be reviewed as to whether the excavated material must remain on site.
  - b. Tree species is described in the plan. The city's arborist should comment whether the tree species is acceptable.
  - c. All other notes and details on this page appear satisfactory.
10. Sheets G-Series should be reviewed by the City Building Department.
11. Sheet ELP1 Lighting Plan:
- a. The lighting plan calls for a combination of 124 Watt and 36 Watt lights mounted at 20' height above ground, and spaced at 100-feet. This amount of lighting should provide an



abundance of illumination. This amount of lighting is probably necessary for the operation. I do not foresee any negative aspects since the lights will be mounted at 20' height and the surrounding area is mostly commercial.

- b. All other notes and details on this page appear satisfactory.

**WATERMAIN:**

1. The proposed 12" water main (Sheet C8) has been discussed with city administration. The present layout is contingent upon negotiations with Sonoco. The water main will be connected to existing water main at two (minimum) locations. Details for connections and fees will have to be worked out with city administration. Stubs for Internal connection locations are shown with little definition. Details for the connections should be provided in future plans. The water main's size is sufficient for servicing the facility.
2. Wherever the future water main is placed, permanent easement agreements for land, of sufficient area for maintenance and replacement needs, must be secured. The general concept is satisfactory. Future plans should include proposed hydrant location(s).
3. Water pipe material must be either CL 52 ductile iron or C900 PVC. All pipe and appurtenances must be placed in accordance with AWWA standards and/or city standard specifications; whichever apply at time of agreement.

**SANITARY SEWER:**

1. Size and location of the proposed 8" diameter sanitary sewer appears adequate. All pipe material should comply with city standards. All sanitary sewer inside the Cargill property should be treated as a service connection, applicable to all permits and fees.
2. The private portion of the sanitary sewer must extend under the existing railroad crossing. The crossing is private and not public. City records show an existing 8" sanitary sewer inside the property. The site plan does not show that internal system.

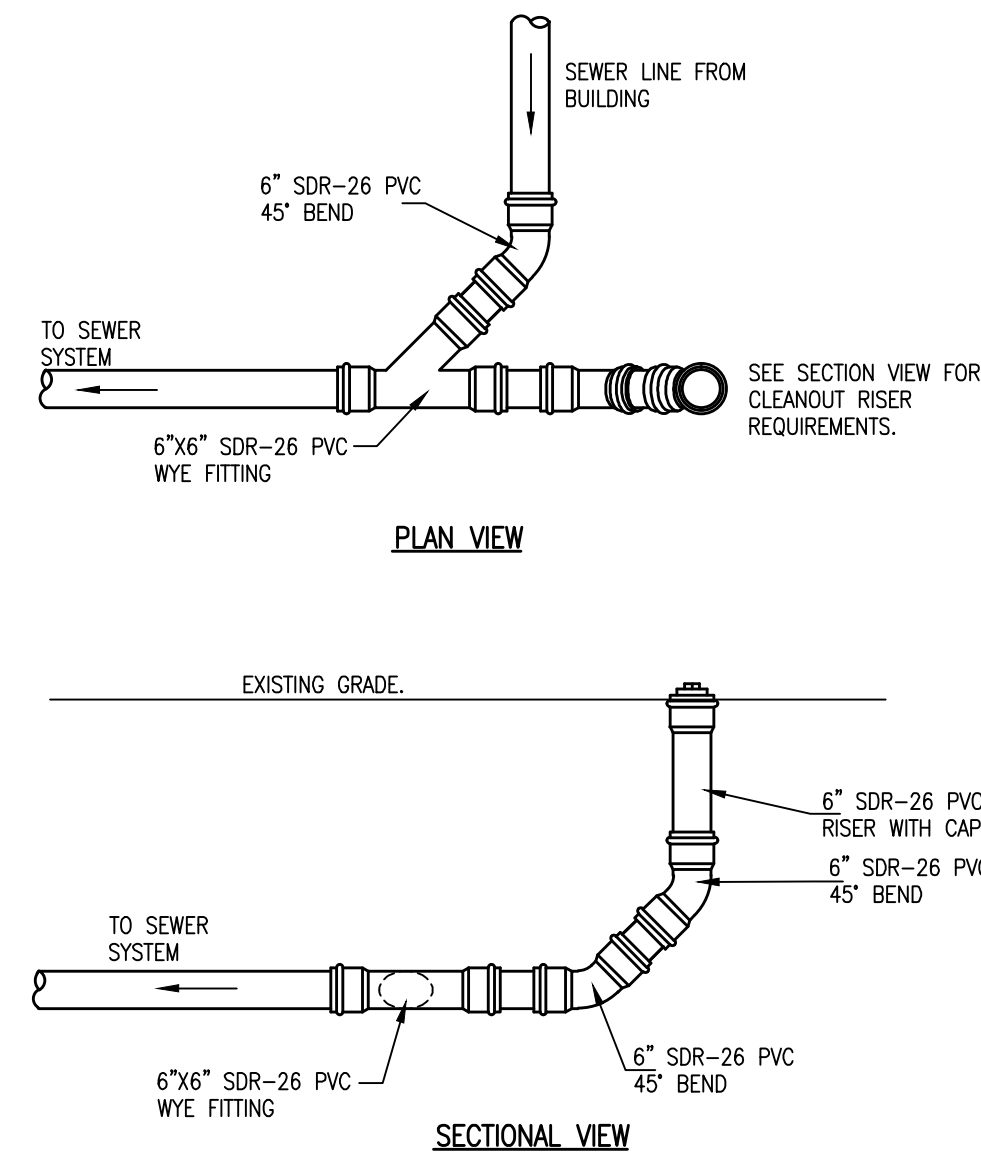
**Building**

No problems noted with placement of buildings or setbacks at this time. A full building review will be done when construction drawings are submitted that will include review of fire suppression.

TRENCH BEDDING AND BACKFILL FOR SANITARY SEWERS SHALL CONFORM TO MDT STANDARD PLAN R-83 SERIES, TRENCH DETAIL F AND G.

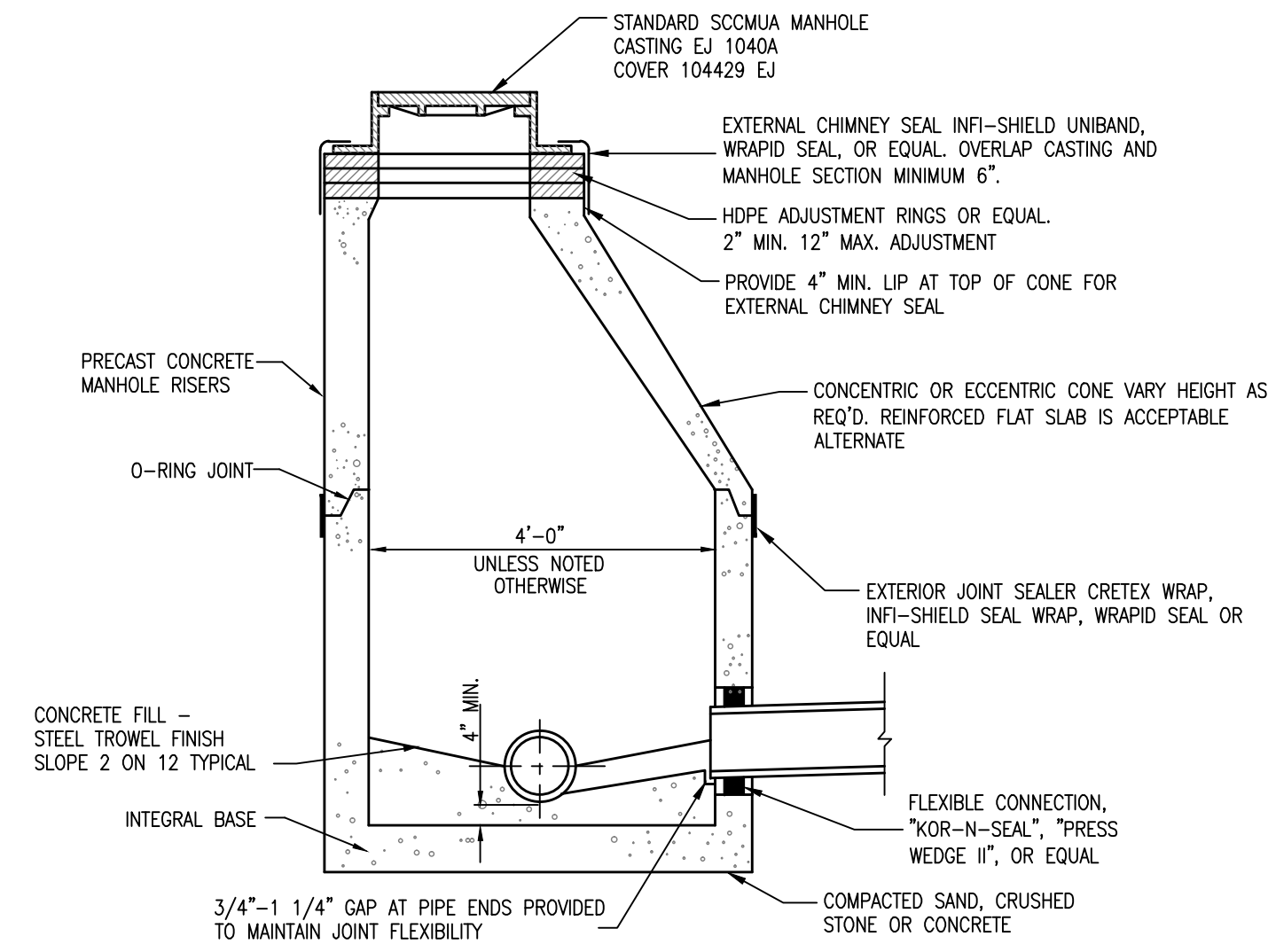
**TRENCH BACKFILL**  
NO SCALE

A-1



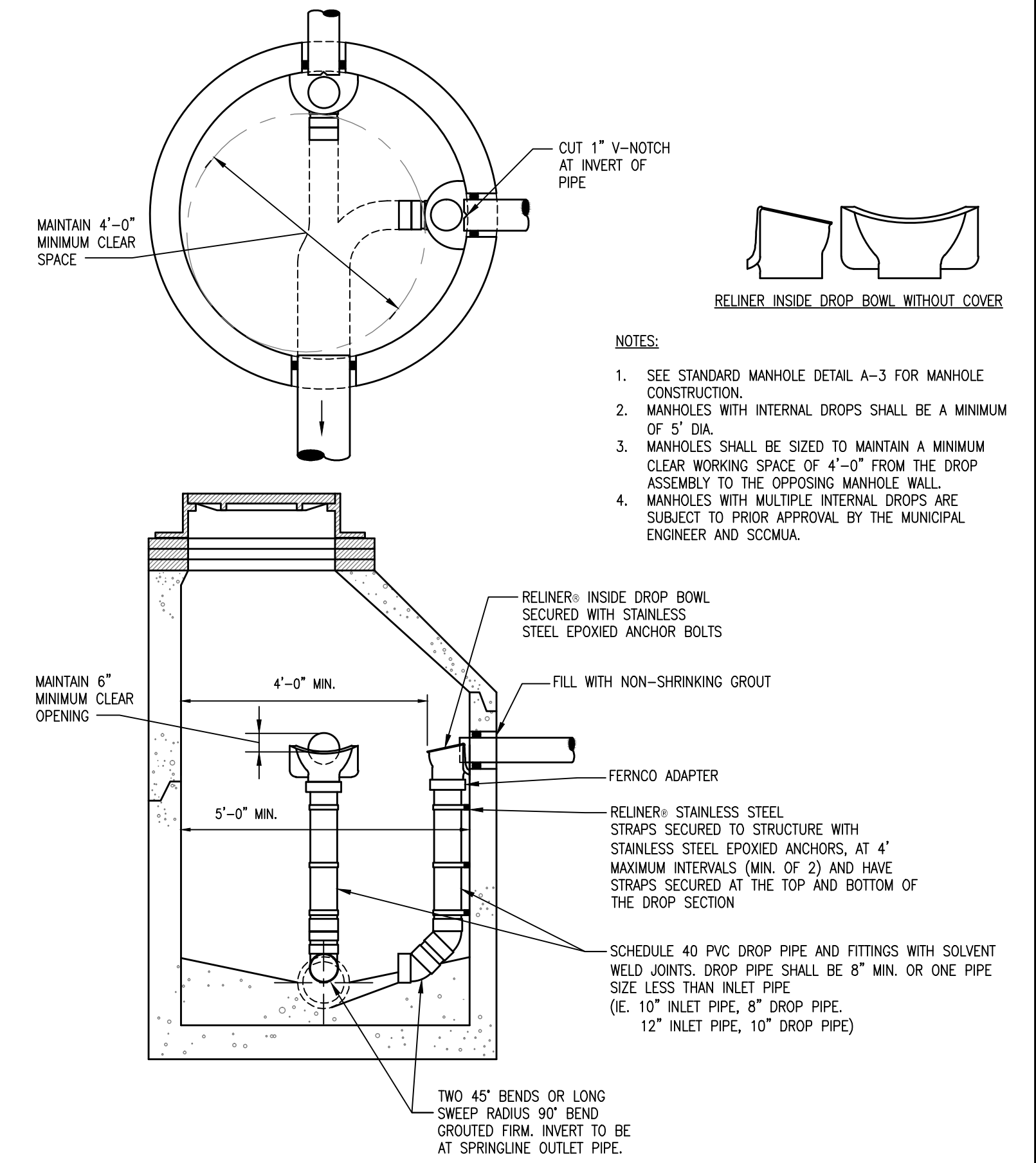
**SANITARY CLEANOUT AT 90° BEND**  
NO SCALE

A-2



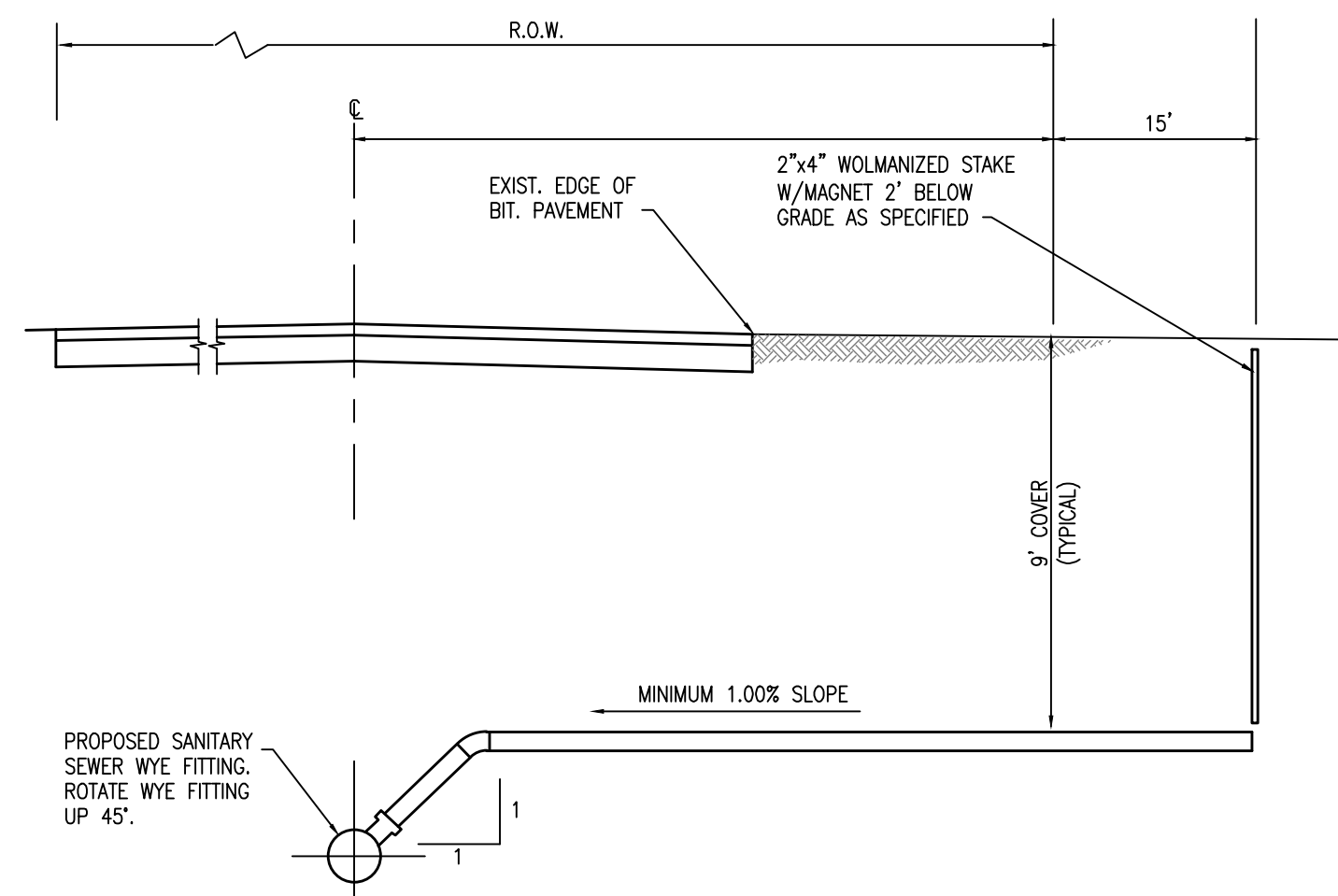
**STANDARD SANITARY MANHOLE**  
NO SCALE

A-3



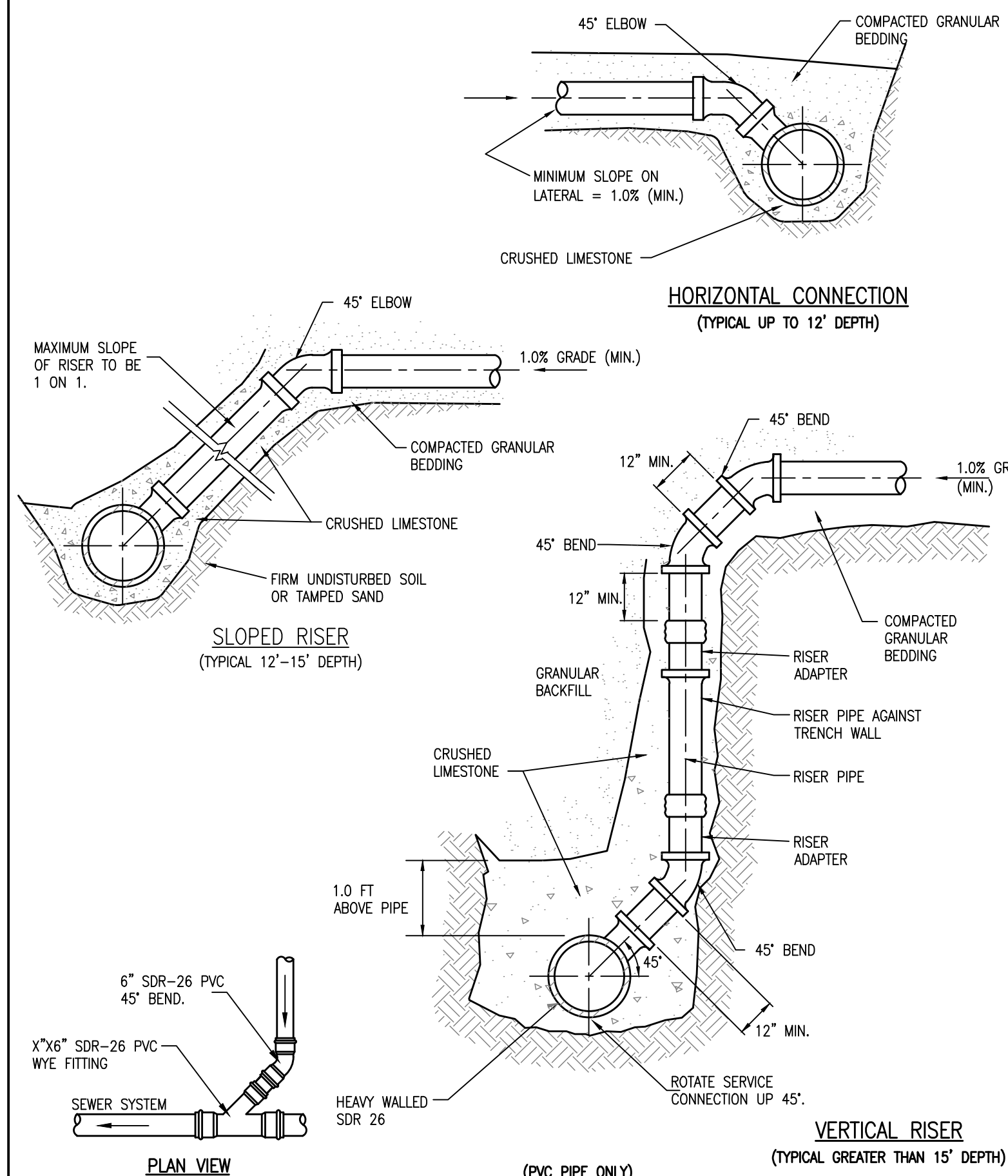
**STANDARD INTERNAL DROP MANHOLE**  
NO SCALE

A-4



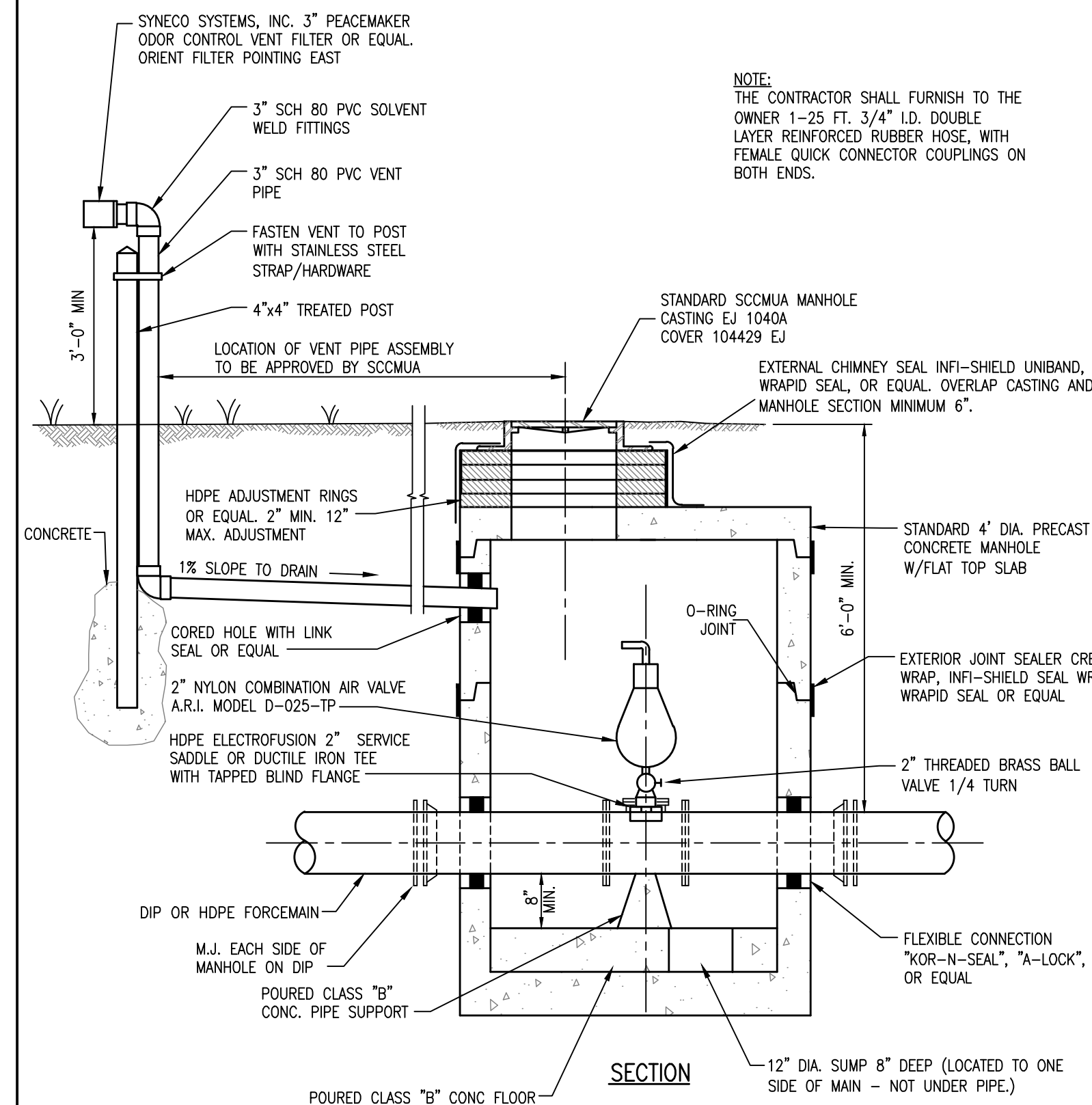
**SERVICE LEAD DETAIL**  
NO SCALE

A-5



**SANITARY SERVICE CONNECTIONS**  
NO SCALE

A-6



**AIR/VACUUM RELEASE MANHOLE DETAIL**  
NO SCALE

A-7

SCCMUA

4/15

SCCMUA

4/15

SCCMUA

4/15

SCCMUA

4/15

**SHIAWASSEE COUNTY DETENTION POND DESIGN CALCULATION SPREADSHEET**

Project Name: **Cargill - Owosso** Proposed Percent Imperviousness: **38%** (K)  
 Project Location: **W. Oliver Street** Proposed Runoff "C" Value: **0.47**  
 Maximum Allowable Outflow (CFS): **3.62** (G)  
 Cont. Drainage Area (Acres): **18.10** (L) Storm Recurrence Interval (Yrs): **100**

A	B	C	D	E	F	G	H	I	J
Duration (Minutes)	Duration (Hours)	100-Year Total Rainfall (Inches)	100-Year Rainfall Intensity (Inch/Hr)	Proposed Runoff Flowrate (CFS)	Proposed Runoff Volume (CFT)	Maximum Allowable Outflow (CFS)	Required Detention Storage (CFT)	Required Forebay Storage (CFT)	Total Required Storage (CFT)
5	0.08	0.62	7.44	62.75	18,826	3.62	18,283	32851.5	51,135
10	0.17	1.09	6.54	55.16	33,097	3.62	32,011	32851.5	64,863
15	0.25	1.40	5.60	47.23	42,510	3.62	40,881	32851.5	73,733
20	0.33	1.63	4.89	41.25	49,494	3.62	47,322	32851.5	80,174
30	0.50	1.92	3.84	32.39	58,300	3.62	55,042	32851.5	87,893
40	0.67	2.19	3.29	27.71	66,498	3.62	62,154	32851.5	95,006
50	0.83	2.37	2.84	23.99	71,964	3.62	66,534	32851.5	99,386
60	1.00	2.44	2.44	20.58	74,090	3.62	67,574	32851.5	100,425
90	1.50	2.84	1.89	15.97	86,235	3.62	76,461	32851.5	109,313
120	2.00	3.02	1.51	12.74	91,701	3.62	78,669	32851.5	111,520
180	3.00	3.33	1.11	9.36	101,114	3.62	81,566	32851.5	114,417
360	6.00	3.90	0.65	5.48	118,422	3.62	79,326	32851.5	112,177
720	12.00	4.52	0.38	3.18	137,248	3.62	59,056	32851.5	91,907
1080	18.00	4.89	0.27	2.29	148,483	3.62	31,195	32851.5	64,046
1440	24.00	5.20	0.22	1.83	157,896	3.62	1,512	32851.5	34,363

Total Storage Detention and Retention Required Storage (CFT): **114,417**

**RETENTION POND DESIGN CALCULATION**

Retain the 100-Year 24-Hour Storm event from the Entire Contributing Area

Volume = 2 x 16,500 x Contributing Drainage Acreage x Composite C value

**278,342 CFT**

- A) Duration of the storm event in minutes.
- B) Duration of the storm event in hours.
- C) Total amount of rainfall during a 100-year recurrence storm event for the given duration in Column A & B (ref.: midwestern climatological center rainfall Atlas-Bulletin 71).
- D) Average rainfall intensity during the 100-year recurrence storm event. Calculated by dividing Column C by Column B.
- E) The unrestricted 100-year recurrence discharge flowrate from the proposed site under fully developed conditions. Calculated by multiplying Intensity (D) and Drainage Area (L).
- F) The unrestricted storm event for the given duration in Column A and B. Calculated by multiplying the Proposed Runoff Flowrate (E) by the Storm Duration (A) and by 60 seconds/minute.
- G) The maximum allowable discharge from the site is determined by multiplying the drainage area by 0.20 cfs per acre or if the proposed outlet is restrictive by determining the sites share of the existing outlets capacity on a contributing area basis.
- H) The required detention storage is determined by multiplying the differention flowrate (Inflow (E) - Outflow (G), by the corresponding duration (A) and by 60 seconds/minute. The calculated maximum release rate only occurs when the pond is full. As the pond dewateres the actual release rate from the pond will decrease from the maximum allowed release rate to 0. Therefore, an average release rate equal to 50% of the maximum rate is used in calculating the required storage volume. The amount of storage required for various storm durations will vary based on rainfall intensity, the size of the drainage area, and the allowable discharge. The maximum volume of storage for the various storm durations will be the required detention storage volume. This volume of storage will be determined above the required retention volume calculated in Column I.
- I) The required retention storage is determined by multiplying the drainage area (L) by 0.5 inches of rain.
- J) Total required storage is the sum of Column H and I.
- K) Proposed percent imperviousness. This assumption will be used to determine the proposed runoff coefficient. Impervious surface will be assumed to have a value of 0.9 and pervious a value of 0.2.
- L) Contributing Drainage to the proposed detention or retention system.

Calculation By: **K. Janes, Rowe PSC**

Date: \_\_\_\_\_

**Impervious Areas**

Main Building	73669.14	sft
Loadout Building	5551.92	sft
Pavement	141452.68	sft
Aux Pavement	4500.00	sft
Future Building	71651.60	sft
<b>Total Impervious Area</b>	<b>296825.34</b>	<b>sft</b>
<b>Total Impervious Area</b>	<b>6.81</b>	<b>acres</b>
<b>Total Drainage Area</b>	<b>18.10</b>	<b>acres</b>
<b>Total Improved Area (Cargill Owned)</b>	<b>13.50</b>	<b>Acres</b>
<b>Total Pervious Area</b>	<b>11.29</b>	<b>acres</b>

**SHIAWASSEE COUNTY DISCHARGE CALCULATION SPREADSHEET**

Project Name: Cargill Animal Nutrition - Spartan Site  
Project Location: City of Owosso

Restrictors are required to regulate the discharge of storm water to the allowable discharge rate established for the site. Restrictors are typically in the form of an orifice. The outlet pipe however should be checked as a metering line to verify that its capacity is not restricting the discharge.

**ORIFICE**

The circular in-line restrictor is sized based on the orifice formula.

**FORMULA**

**a = Qo/[ 0.62 (64.4(h))<sup>1/2</sup> ]**

**a** = area of orifice (sq. ft.)

**Qo** = Maximum Allowable Outflow (cfs)

**h** = head differential from center of orifice to hydraulic grade line of detention facility at maximum capacity (ft).

**CALCULATION**

**Qo =** 3.62 cfs

**h =** 4 ft.

**a =** 0.36 sq. ft.

**Orifice Dia. =** 0.68 ft.

**Orifice Dia. =** 8.17 in.

**METERING LINE**

The metering line calculation is based on the manning's equation.

**FORMULA**

**Qm = a(1.49/N) R<sup>2/3</sup> S<sup>1/2</sup>**

**a** = area of pipe (sq. ft)

**N** = Manning's roughness coefficient

**R** = hydraulic radius = area/wetted perimeter

**S** = hydraulic grade line slope (ft/ft)

**CALCULATION**

**Pipe Dia. =** 12 in.

**Pipe Dia. =** 1 ft.

**a =** 0.79 sq. ft.

**N =** 0.013

**R =** 0.25

**S =** 0.015 ft/ft.

**Qm =** 4.38 cfs

If Qm is less than Qo discharge is limited by outlet pipe and should be re-evaluated

If Qo is less than Qm discharge is limited by orifice

Calculation By: K. Janes, Rowe PSC  
Date: 1/14/2016

**City of Owosso**  
Planning Commission  
1509 W. Oliver

