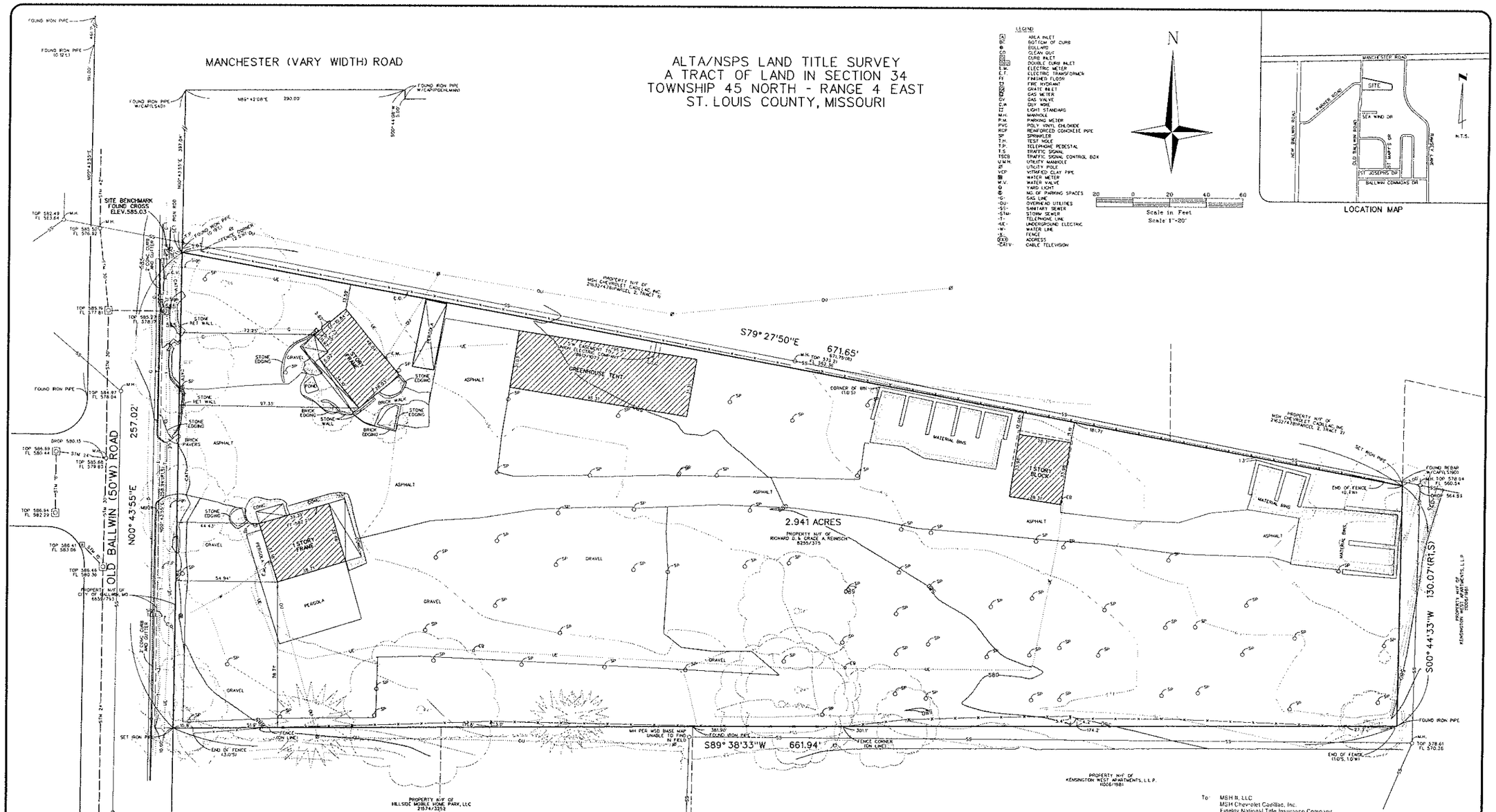
ALTA/NSPS LAND TITLE SURVEY
A TRACT OF LAND IN SECTION 34
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY, MISSOURI



Descriptions based on survey:

A tract of land in Section 34, Township 45 North - Range 4 East, St. Louis County Missouri and being more particularly described as follows

Beginning at the intersection of the North line of "Vlasis Industrial Court Plat One", a subdivision according to the plat thereof recorded in Plat Book 106 page 20 of the St. Louis County Records, with the East line of Old Ballwin Road, 50 feet wide, as widened by instrument recorded in Book 6659 page 793 of the St. Louis County Records; thence Northwardly along said East line of Old Ballwin Road, 50 feet wide, North 00 degrees 43 minutes 55 seconds East 257.02 feet to the North line property described in deed to Richard D. Reinisch and Grace A. Reinisch as recorded in Book 8255 page 375 of the St. Louis County Records, thence Eastwardly along said North line South 79 degrees 27 minutes 50 seconds East 671.65 feet to the East line of property described in deed to Kensington West Apartments, L.L.P. as recorded in Book 11006 page 1981 of the St. Louis County Records; thence Southwardly along said East line South 00 degrees 44 minutes 33 seconds West 130.07 feet to the North line of said Kensington West Apartments L.L.P. property; thence Westwardly along said North line and along the North line of said "Vlasis Industrial Court Plat One" South 89 degrees 38 minutes 33 seconds West 661.94 feet to the point of beginning and containing 2.941 Acres according to survey by Volz Inc., during April 2017.

Descriptions from Title Commitment:

A tract of land in the East 1/2 of the Southeast 1/4 of SECTION 34, TOWNSHIP 45 NORTH, RANGE 4 EAST in the County of St. Louis and described Beginning at a point in the East line of Old Ballwin Road, 30 feet wide distant 409.59 feet South of the South line of Manchester Road, thence South 79 degrees 26 minutes East 681.90 feet to an iron pipe, thence South 0 degrees 43 minutes West 130.07 feet to an iron pipe, thence South 89 degrees 41 minutes West 672.0 feet to an iron pipe in the East line of Old Ballwin Road, 30 feet wide, thence on the East line of Old Ballwin Road, North 0 degrees 43 minutes East 258.94 feet to point of beginning containing 3.00 acres according to survey executed by Elbring Surveying Company during August 1954 EXCEPTING THEREFROM that part conveyed to City of Ballwin for the widening of Old Ballwin Road, by deed dated May 6, 1973 and recorded in Book 6659 Page 793.

Notes:

1. Bearing on the South line adopted from survey by Volz Inc on Kensington West Apartments dated April 29, 2015, Project No 8744-1
2. Property referenced from Fidelity National Title Insurance Company File No 8642STL, with an effective date of April 25, 2017, Revision #: 4, Print Date: July 19, 2017. The above referenced commitment was relied upon to disclose all easements of record.
3. St. Louis County Benchmark 12189 NAVD88 SLC2011a] Elev = 590.27 FEUS RM 198 FEMA PANEL 258: "1" on the south headwall of the concrete box culvert for Fishpot Creek at Manchester Road.

   Site Benchmark - Elevation 585.03 cross cut in the middle of sidewalk, on East side of bridge over Fish Pot Creek. Cross is 16.2 feet East of the centerline of Old Ballwin Road and 7.5 feet North of the South end of the sidewalk.
4. The underground utilities shown hereon were plotted from available information from Missouri American Water Co., The Metropolitan St. Louis Sewer District, and Laclede Gas Company, and by contacting the Missouri One Call System (Dig-Rite) and requesting member utilities mark their facilities and do not necessarily reflect the actual existence, nonexistence, size, type, number, or location of these or other utilities. The general contractor shall be responsible for verifying the actual location of all underground utilities, shown or not shown, and shall be located in the field prior to any grading, excavation, or construction of improvements. These provisions shall in no way absolve any party from complying with the Underground Facility Safety and Damage Prevention Act, Chapter 319, RSMo. AmerenUE no longer releases maps of its electric facilities.
5. Drip line of trees shown is based on the assumed radius of one inch of trunk diameter one foot of drip line radius.
6. Per telephone conversation with Gary Kramer City Engineer of the City of Ballwin there are currently no plans to widen Old Ballwin Road.
7. Per letter from Andy Hixson, Director of Development with the City of Ballwin, this property is zoned C-1 Commercial District.
9. Easement granted to Union Electric Company according to instrument recorded in Book 8812 page 1072. (Shown)

Fidelity National Title Insurance Company
File No: 8642STL
with an effective date of April 25, 2017
Revision #4, Print Date: July 19, 2017
Schedule B Section II
[Note: Surveyor's Comments in Parenthesis]

We have determined the horizontal location of this tract of land in the City of Ballwin Missouri, by scaling the property in reference to the "Flood Insurance Rate Map (FIRM) County of St. Louis, Missouri and Incorporated Areas" Panel 283 of 445, Map Number 29189C0283K with Map Revised date of February 4, 2015. By express reference to the map and its legend this tract is indicated to be within Zone AE and Zone X unshaded area.

The evaluation provided in this note is confined to simply indicating the apparent physical, horizontal location of the property with respect to the features displayed on the map. No field study of the drainage characteristics to which this property may be subject has been conducted or consulted and no representation concerning the desirability of this property or the potential of this property to be susceptible to flooding or subject to any flood hazard has been made.

We make no representation concerning the accuracy of the FIRM which includes a note that "This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size." All related reference material and all specific limitations contained in the FIRM and any inferences upon any reference that can be drawn from the horizontal location of this property in relation to the features of the map are incorporated herein.

This note is not intended for reliance by any party other than the addressee nor for any purpose other than expressly stated herein.

To: MSH II, LLC
MSH Chevrolet Cadillac, Inc.
Fidelity National Title Insurance Company
St. Louis Title, LLC
AMERICREDIT FINANCIAL SERVICES, INC., doing business as GM FINANCIAL,
and to any of their affiliates, successors and assigns.

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2016 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes items 1, 2, 3, 4, 6(a), 7(a), 8, 9, 13, 14, 16, 17 & 20, of Table "A" thereof. The fieldwork was completed on April 12, 2017. This survey was also executed in compliance with the current Missouri Minimum Standards for Property Boundary Surveys adopted by the Missouri Board for Architects, Professional Engineers, Professional Land Surveyors and Landscape Architects and the Missouri Department of Natural Resources and meets the accuracy requirements set forth for Urban Property.

Eric J. Kirby, P.L.S.
Professional Land Surveyor
Mo. PLS No. LS-2005000074
ekirby@volzinc.com

Date of Plat or Map: APRIL 14, 2017

Revised July 26, 2017 to reference revised title and add additional ALTA/NSPS Table "A" items

STATE OF MISSOURI
ERIC J. KIRBY
NUMBER LS-2005000074
LAND SURVEYOR

Eric J. Kirby
Professional Land Surveyor
Mo. PLS #2005000074

VOLZ Incorporated
17863A Ballwin Heart Drive, Ste.
St. Louis, Missouri 63132
314.426.3212 main • 314.890.1290 fax
AWW.VOLZINC.COM

MISSOURI CORPORATE CERTIFICATE OF AUTHORITY
NO. 19 EXPIRES DECEMBER 31, 2017 - LAND SURVEYING
NO. 203 EXPIRES DECEMBER 31, 2017 - ENGINEERING

DATE	04/17/17
SCALE	1"=20'
DRAWN BY	EJK
CHECKED BY	EJK
FIELD BOOK	1/2 CUT
PAGE	1

IMPROVEMENT PLANS: PHASE I

112 OLD BALLWIN ROAD
BALLWIN, MO 63011

MSD STANDARD CONSTRUCTION NOTE:

ALL STORM AND SANITARY SEWER STRUCTURES AND APPURTENCES TO BE DEDICATED TO MSD, OR TO BE PRIVATE UNDER MSD INSPECTION, SHALL CONFORM TO THE METROPOLITAN ST. LOUIS SEWER DISTRICT, STANDARD CONSTRUCTION SPECIFICATIONS FOR SEWERS AND DRAINAGE FACILITIES, 2009. THAT WILL INCLUDE STANDARD DETAILS SHOWN THEREIN, AND SHALL INCLUDE ALL SUBSEQUENT CHANGES MADE THERETO.

SOME RECENT CHANGES CONCERN PIPE FIELD TESTING AND PERFORMANCE, AND INCLUDE THE FOLLOWING:

PART 4 - PIPE SEWER CONSTRUCTION

SECTION B, PIPE FIELD TESTS, PARAPGRAH 2, REACH INTEGRITY TESTING -DELETE THE FIRST SENTENCE AND THE FOLLOWING REPLACEMENT APPLIES:

ALL SANITARY AND COMBINED SEWERS SHALL SUSTAIN A MAXIMUM LEAKAGE LIMIT OF 100 GALLONS/INCH OF PIPE DIAMETER/MILE OF LINE/DAY, AS REQUIRED BY THE MISSOURI DEPARTMENT OF NATURAL RESOURCES SPECIFICATIONS.

SECTION B, PIPE FIELD TESTS PARAGRAPH 2, REACH INTEGRITY TESTING, SUBPARAGRAPH C, INFILTRATION/EXFILTRATION TESTING - DELETE THE SIXTH SENTENCE, CONCERNING LEAKAGE LIMITS, AND THE FOLLOWING REPLACEMENT APPLIES:

THE MEASUREMENT OF LEAKAGE SHALL NOT EXCEED 100 GALLONS/INCH OF PIPE DIAMETER/MILE OF LINE/DAY, AS REQUIRED BY THE MISSOURI DEPARTMENT OF NATURAL RESOURCES SPECIFICATIONS.

SECTION B, PIPE FIELD TESTS, PARAGRAPH 4, MANHOLE TESTOMG, SUBPARAGRAPH A, VACUUM TESTING - AFTER THE FIRST SENTENCE, THE FOLLOWING ADDITION APPLIES:

THE VACUUM TEST MUST BE PERFORMED PRIOR TO BACKFILLING AROUND THE MANHOLE UNLESS THE CONTRACTOR PROVIDES DOCUMENTATION FROM THE PRECAST MANHOLE MANUFACTURER STATING THAT THE MANHOLE MAY BE VACUUM TESTED AFTER BACKFILLING HAS TAKEN PLACE. THE CONTRACTOR MUST SUBMIT THIS DOCUMENTATION PRIOR TO BACKFILLING AROUND ANY MANHOLE.

SECTION B, PIPE FIELD TESTS, PARAGRAPH 4, MANHOLE TESTING, SUBPARAGRAPH B, EXFILTRATION TESTING - DELETE THE SECONF SENTENCE, CONCERNING LEAKAGE LIMITS, AND THE FOLLOWING ADDITION APPLIES:

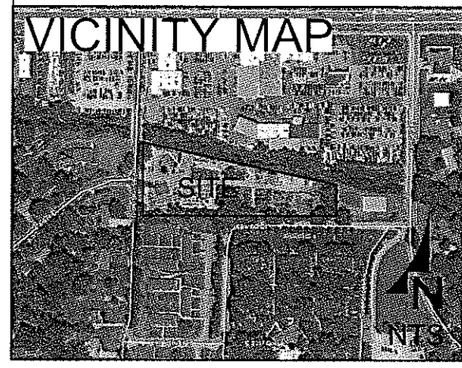
FOR EXFILTRATION TESTING, THE ALLOWABLE LEAKAGE LIMIT IS 100 GALLONS/INCH OF PIPE DIAMETER/MILE OF LINE/DAY WHEN THE AVERAGE HEAD ON THE TEST SECTION IS THREE FEET (3') OR LESS.

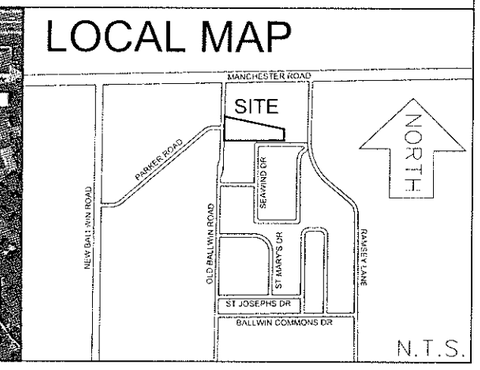
IF REINFORCED CONCRETE PIPE IS USED FOR SANITARY OR COMBINED SEWERS LARGER THAN 27", ALL PIPE AND JOINTS SHALL CONFORM TO ASTM C 361. IN ADDITION, IF THE DIAMETER IS LARGER THAN 48", THE JOINT TYPE MUST INCLUDE A GASKET THAT IS CONFINED IN A GROOVE IN THE SPIGOT OF THE PIPE.

GENERAL NOTES:

1. GENERAL CONTRACTOR TO VERIFY STORM AND SANITARY SEWER LOCATION AND ELEVATIONS PRIOR TO START OF WORK.
2. ALL STORM AND SANITARY SEWER STRUCTURES AND APPURTENCES TO BE DEDICATED TO MSD OR TO BE PRIVATE UNDER MSD INSPECTION, SHALL CONFORM TO THE METROPOLITAN ST. LOUIS SEWER DISTRICT, STANDARD CONSTRUCTION SPECIFICATIONS FOR SEWERS AND DRAINAGE FACILITIES, 2006. THAT WILL INCLUDE STANDARD DETAILS SHOWN THEREIN, AND SHALL INCLUDE ALL SUBSEQUENT CHANGES MADE THERETO.
3. CONTRACTOR TO INSTALL ERSOSION CONTROL BMPS PRIOR TO THE START OF CONSTRUCTION.
4. ALL SILT FENCE EROSION CONTROL SHALL BE MAINTAINED UNTIL CONSTRUCTION IS COMPLETE AND SOD IS IN PLACE.
5. CONTRACTOR SHALL PROTECT NEIGHBORING PROPERTIES AND STREET FROM SILT.
6. CONTRACTOR TO KEEP ALL STREETS AND SIDEWALKS CLEAN OF DEBRIS AND SILT.
7. ALL DISTURBED AREAS SHALL BE RESTORED AS SOON AS PRACTICAL. LAWN AREAS SHALL BE SODDED.
8. CONTRACTOR IS RESPONSIBLE TO SECURE ALL NECESSARY APPROVALS PRIOR TO THE START OF CONSTRUCTION OPERATIONS.
9. CONSULT SOILS ENGINEER FOR SOIL COMPACTION RECOMMENDATIONS.
10. ALL GRADES SHALL BE WITHIN 0.2 FEET, PLUS OR MINUS, OF THOSE SHOWN ON THE GRADING PLAN.
11. NO SLOPE SHALL BE STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL UNLESS APPROVED BY SOILS ENGINEER.
12. CONTRACTOR IS RESPONSIBLE FOR MONITORING GRADING OPERATION AND ACCURACY OF FINAL ROUGH GRADES.
13. CONTRACTOR IS TO REMOVE AND DISPOSE OF (OFF SITE) ALL DEBRIS, RUBBISH, AND OTHER MATERIALS RESULTING FROM DEMOLITION OPERATIONS.
14. CONTRACTOR WILL BE HELD SOLELY RESPONSIBLE AND SHALL TAKE PRECAUTIONS AS NECESSARY TO AVOID DAMAGE TO ADJACENT PROPERTIES.
15. NO CONTRUCTION EQUIPMENT OR MATERIALS ARE TO BE TRANSPORTED OR STORED UNDER THE DRIPLINE OF TREES.
16. CONTRACTOR SHALL COORDINATE THE DISCONNECTION, SEALING AND/OR REMOVAL OF UTILITIES WITH THE RESPECTIVE UTILITY COMPANY.
17. PAVEMENT TO BE CONSTRUCTED PER THE CITY OF BALLWIN SPECIFICATIONS.
18. ALL WORK IN OR ACROSS THE RIGHT-OF-WAY WILL REQUIRE A PERMIT ISSUED BY THE CITY OF BALLWIN PUBLIC WORKS DEPARTMENT.
19. ANY UTILITY CUTS IN THE RIGHT-OF-WAY FOR CONNECTING SERVICES SHALL BE RESTORED PER RIGHT-OF-WAY PERMIT.
20. REFER TO ARCHITECTURAL PLAN FOR ADDITIONAL LAYOUT AND SITE DESIGN INFORMATION. WHERE CIVIL ENGINEERING AND ARCHITECTURAL DRAWINGS CONFLICT, THE ARCHITECTURAL SHALL GOVERN. NOTIFY ARCHITECT OF ANY SUCH CONFLICTS PRIOR TO PROCEEDING WITH THE WORK.
21. BOUNDARY AND TOPOGRAPHIC SURVEY PREPARED BY VOLZ INCORPORATED DURING OCTOBER 2017.

LOCATION MAPS





CONTRACTOR INSURANCE REQUIREMENTS

PRIOR TO OBTAINING A CONSTRUCTION PERMIT FROM THE METROPOLITAN ST LOUIS SEWER DISTRICT, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE THE DISTRICT WITH A COPY OF AN EXECUTED CERTIFICATE OF INSURANCE INDICATING THAT THE PERMITTEE HAS OBTAINED AND WILL CONTNIUE TO CARRY COMMERCIAL GENERAL LIABILITY INSURANCE. THE REQUIREMENTS AND LIMITS SHALL BE AS STATED IN THE "RULES AND REGULATIONS AND ENGINEERING DESIGN REQUIREMENTS FOR SANITARY AND STORMWATER DRAINAGE FACILITY", SECTION 10.090 (ADDENDUM).

CONSTRUCTION DISCLAIMER

VOLZ INC. AND THE UNDERSIGNED ENGINEER HAVE NO RESPONSIBILITY FOR SERVICES PROVIDED BY OTHERS TO IMPLEMENT THE IMPROVEMENTS SHOWN ON THIS PLAN AND ALL OTHER DRAWINGS WHERE THE UNDERSIGNED ENGINEER'S SEAL APPEARS. THE CONSTRUCTION MEANS AND METHODS ARE THE SOLE RESPONSIBILITY OF THE OWNER AND CONTRACTOR. VOLZ INC. HAS NO RESPONSIBILITY TO VERIFY THE FINAL IMPROVEMENTS AS SHOWN ON THIS PLAN UNLESS SPECIFICALLY ENGAGED AND AUTHORIZED TO DO SO BY THE OWNER OR CONTRACTOR.

STORM WATER MANAGEMENT AND LAND DISTURBANCE NOTE:

PROPOSED AREA OF LAND DISTURBANCE = 3.08 ACRES

PROJECT RUNOFF DIFFERENTIAL = 2.87 CFS (SEE SHEET C08)

ANY FUTURE LAND DISTURBANCE AND / OR INCREASE IN IMPERVIOUS AREA ON THIS SITE MAY REQUIRE ADDITIONAL STORM WATER MANAGEMENT PER MSD REGULATIONS IN PLACE AT THAT TIME (INCLUDING TOTAL LAND DISTURBANCE AND/OR IMPERVIOUSNESS ADDED ON THIS PLAN).

UTILITY DISCLAIMER

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DRAWING INDEX

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C02	EXISTING CONDITIONS & NATURAL RESOURCES PLAN
C03	DEMOLITION PLAN
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C05	GRADING PLAN
C06	EXISTING DRAINAGE AREA MAP
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C08	PROPOSED DRAINAGE AREA MAP
C09	STORM SEWER PROFILES
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C15	CONSTRUCTION DETAILS SHEET 1
C16	CONSTRUCTION DETAILS SHEET 2
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L2	LANDSCAPE PLAN SHEET 2 OF 2
SDP 2	LIGHTING PLAN

CALL 1-800-344-7483 TWO WORKING DAYS BEFORE YOU BEGIN DIGGING OR GRADING

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ALSO MISS DIGG NATIONAL 1-800-344-7483

17MSD-00096
MSD BASEMAP 23S2

ELCO CHEVROLET
MSH CHEVROLET CADILLAC INC ET AL
15401 MANCHESTER RD
BALLWIN, MO 63011

VOLZ Incorporated
10849 Indian Head Industrial Boulevard
St. Louis, Missouri 63132
314 426 6212 Main
314 890 1290 Fax
www.volzinc.com
Certificate of Authority #203

RYAN LEE HOLMES P.E.
PROFESSIONAL ENGINEER
E - 2017018988

ELCO CHEVROLET

A TRACT OF LAND IN SECTION 34
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

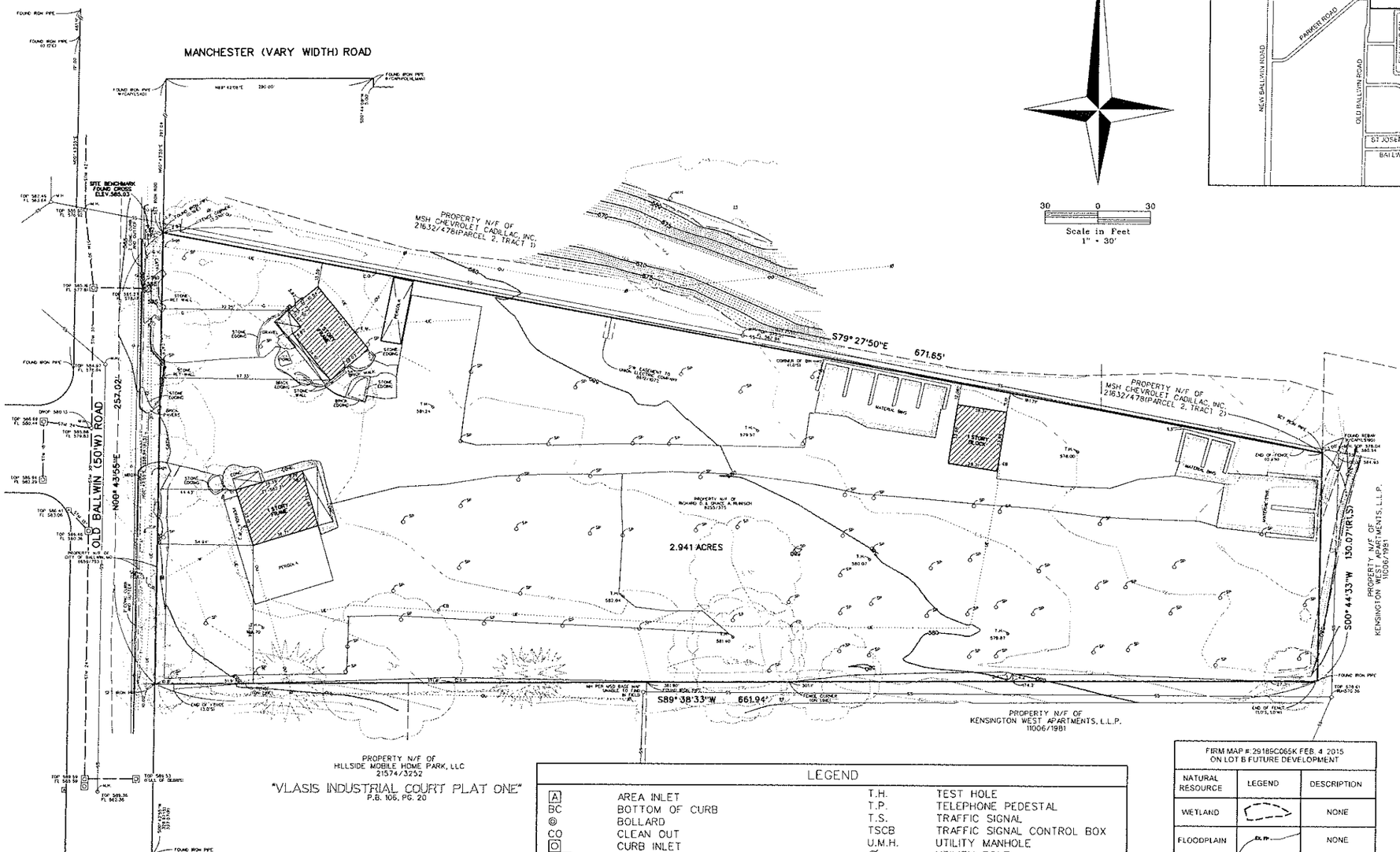
COVER SHEET & NOTES

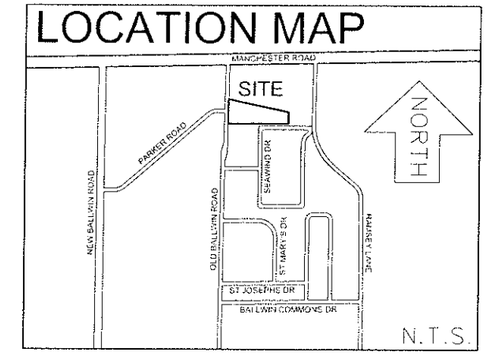
LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

21332

01-22-2018

C01





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WORK MISSOURI
ONE-CALL: 1-800-344-7483

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LEGEND

A	AREA INLET	T.H.	TEST HOLE
BC	BOTTOM OF CURB	T.P.	TELEPHONE PEDESTAL
	BOLLARD	T.S.	TRAFFIC SIGNAL
CO	CLEAN OUT	TSCB	TRAFFIC SIGNAL CONTROL BOX
	CURB INLET	U.M.H.	UTILITY MANHOLE
	DOUBLE CURB INLET		UTILITY POLE
E.M.	ELECTRIC METER	VCP	VITRIFIED CLAY PIPE
E.T.	ELECTRIC TRANSFORMER	W	WATER METER
E.T.R.	EXISTING TO REMAIN	W.V.	WATER VALVE
E.T.R.L.	EXISTING TO BE RELOCATED		YARD LIGHT
E.T.A.	EXISTING TO BE ABANDON IN PLACE	5	NO. OF PARKING SPACES
FF	FINISHED FLOOR	-G-	GAS LINE
	FIRE HYDRANT	-OU-	OVERHEAD UTILITIES
GI	GRATE INLET	-SS-	SANITARY SEWER
G	GAS METER	-STM-	STORM SEWER
GV	GAS VALVE	-T-	TELEPHONE LINE
G.W.	GUY WIRE	T.B.R.	TO BE REMOVED
	LIGHT STANDARD	T.B.R.R.	TO BE REMOVED AND REPLACED
M.H.	MANHOLE	-UE-	UNDERGROUND ELECTRIC
P.M.	PARKING METER	-W-	WATER LINE
PVC	POLY VINYL CHLORIDE	-X-	FENCE
RCP	REINFORCED CONCRETE PIPE	XXX	ADDRESS
SP	SPRINKLER	-CATV-	CABLE TELEVISION

FIRM MAP #: 29189C0065K FEB. 4, 2015
ON LOT B FUTURE DEVELOPMENT

NATURAL RESOURCE	LEGEND	DESCRIPTION
WETLAND		NONE
FLOODPLAIN	FL PL	NONE
KARST		NONE
EXISTING TOPOGRAPHY		1' CONTOURS USGS DATUM
PONDS		NONE
INDIVIDUAL TREES		EXISTING TREES SHOWN
VEGETATED COVER		NONE
EXISTING PROPERTY USE	EXISTING BUILDING & PARKING VACANT	
SURROUNDING PROPERTY USE	WEST - OLD BALLWIN ROAD / SFR RESIDENTIAL EAST - KENSINGTON WEST APARTMENTS NORTH - MANCHESTER ROAD / MSD DETENTION BASIN SOUTH - APARTMENT COMPLEX	
TEST HOLE B-1		NONE

REVISED

17MSD-00096
MSD BASEMAP 23S2

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10849 Indian Head Industrial Boulevard
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RYAN LEE HOLMES P.E.
PROFESSIONAL ENGINEER
E - 2017018986

ELCO CHEVROLET

A TRACT OF LAND IN SECTION 34,
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

EXISTING CONDITIONS & NATURAL RESOURCE PLAN

LOCATOR NUMBER: 23S 63 0365
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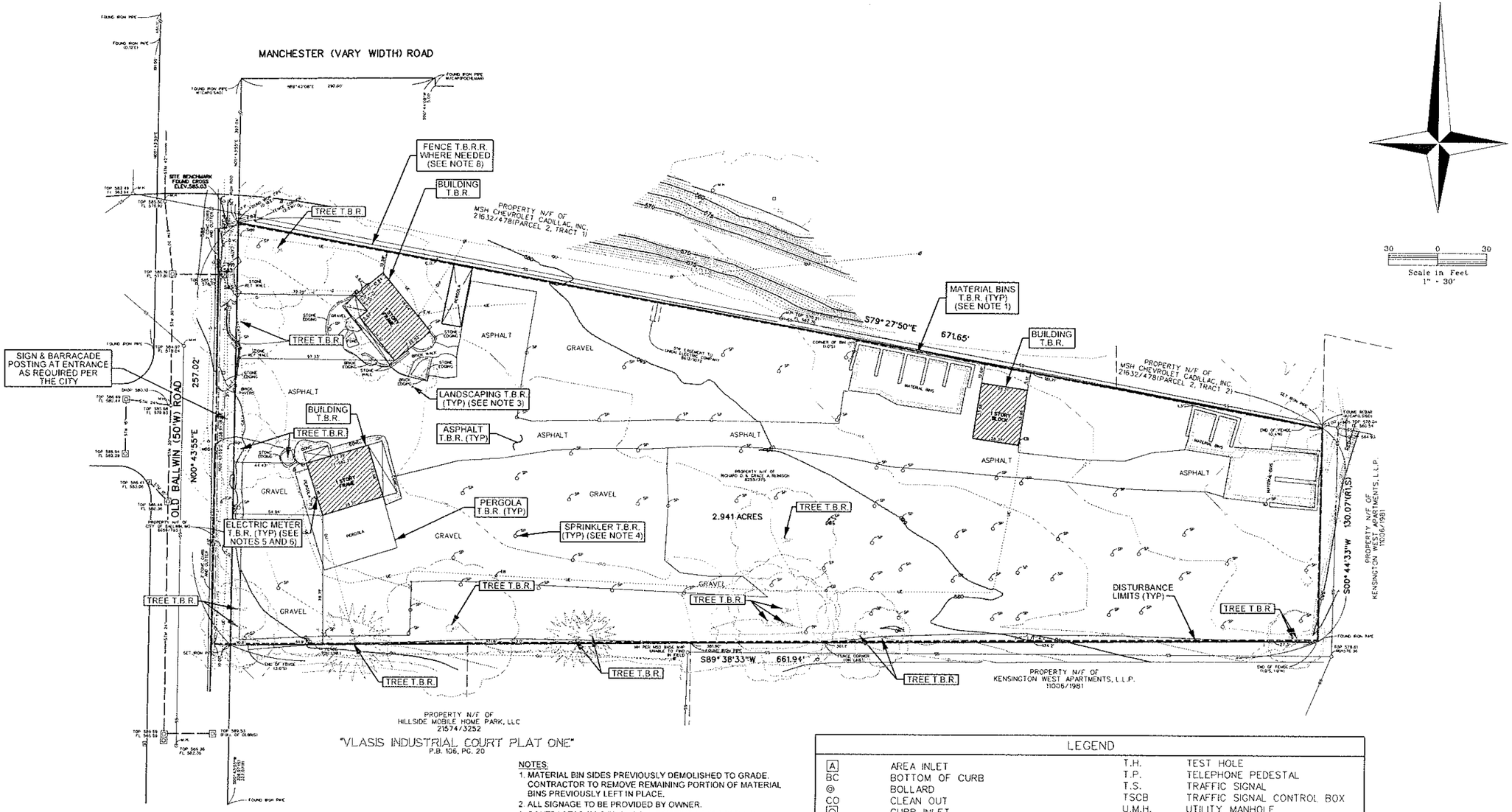
21332

01-22-2018

C02



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NOTES:

1. MATERIAL BIN SIDES PREVIOUSLY DEMOLISHED TO GRADE. CONTRACTOR TO REMOVE REMAINING PORTION OF MATERIAL BINS PREVIOUSLY LEFT IN PLACE.
2. ALL SIGNAGE TO BE PROVIDED BY OWNER.
3. CONTRACTOR TO REMOVE ALL EXISTING LANDSCAPING LEFTOVER FROM PREVIOUS LAND OWNER.
4. IRRIGATION SYSTEM TO BE REMOVED IN IT'S ENTIRETY.
5. CONTRACTOR RESPONSIBLE OF DEMOLITION PORTION OF IMPROVEMENT PROJECT AND TO COORDINATE WITH UTILITY PROVIDERS FOR EXISTING UTILITY SERVICE DISCONNECTS.
6. THE UNDERGROUND UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, OR NON EXISTENCE, SIZE, TYPE, NUMBER, OR LOCATION OF THESE OR OTHER UTILITIES. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UNDERGROUND UTILITIES IN THE FIELD, SHOWN OR NOT SHOWN, PRIOR TO ANY GRADING, EXCAVATION, OR CONSTRUCTION OF IMPROVEMENTS. THE PROVISIONS SHALL IN NO WAY ABSOLVE ANY PARTY FROM COMPLYING WITH THE UNDERGROUND FACILITY SAFETY AND DAMAGE PREVENTION ACT, CHAPTER 319, RSMO.
7. CONTRACTOR TO REMOVE ALL TREES AND FOLIAGE WITHIN PROPERTY BOUNDARIES AND TO TRIM ALL OVERHANGING LIMBS FROM OFFSITE TREES BACK TO PROPERTY LINES.
8. CONTRACTOR TO REMOVE AND REPLACE EXISTING FENCE AS NEEDED WHEN GRADING DURING SITE REDEVELOPMENT. SEE SHEET C05 FOR GRADING PLAN

LEGEND

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E.T.R.	EXISTING TO REMAIN	W.V.	WATER VALVE
E.T.R.L.	EXISTING TO BE RELOCATED		YARD LIGHT
E.T.A.	EXISTING TO BE ABANDON IN PLACE	5○	NO. OF PARKING SPACES
FF	FINISHED FLOOR	-G-	GAS LINE
	FIRE HYDRANT	-OU-	OVERHEAD UTILITIES
GI	GRATE INLET	-SS-	SANITARY SEWER
G	GAS METER	-STM-	STORM SEWER
GV	GAS VALVE	-T-	TELEPHONE LINE
G.W.	GUY WIRE	T.B.R.	TO BE REMOVED
	LIGHT STANDARD	T.B.R.R.	TO BE REMOVED AND REPLACED
M.H.	MANHOLE	-UE-	UNDERGROUND ELECTRIC
P.M.	PARKING METER	-W-	WATER LINE
PVC	POLY VINYL CHLORIDE	-X-	FENCE
RCP	REINFORCED CONCRETE PIPE	(XXX)	ADDRESS
SP	SPRINKLER	-CATV-	CABLE TELEVISION

REVISED

17MSD-00096
MSD BASEMAP 23S2

ELCO
MSH CHEVROLET CADILLAC INC ETAL
15110 MANCHESTER RD
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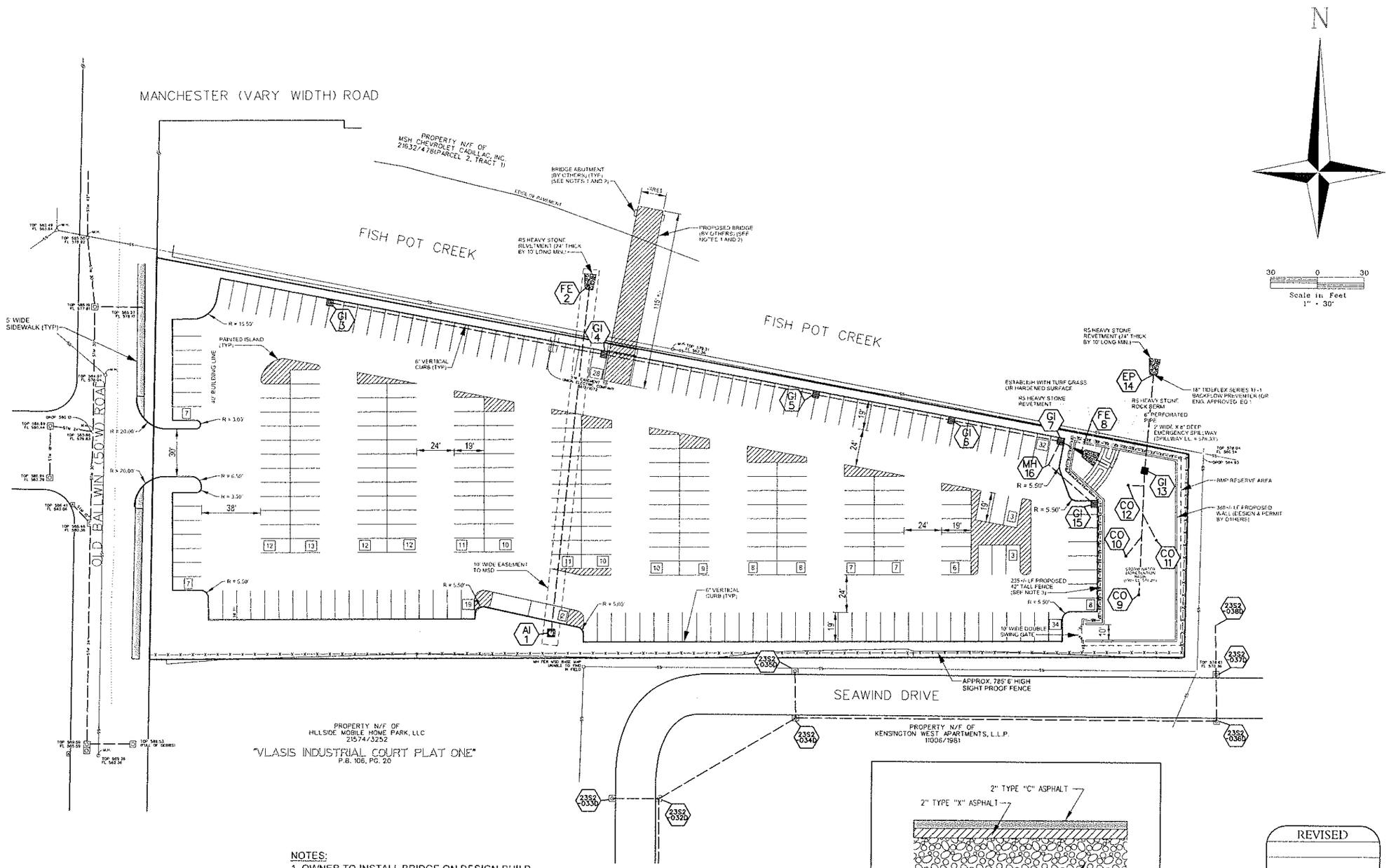
ELCO CHEVROLET
A TRACT OF LAND IN SECTION 34
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

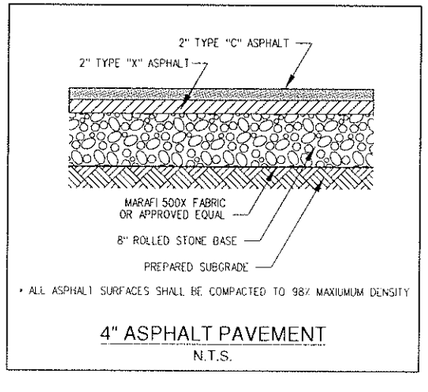
DEMOLITION PLAN

LOCATOR NUMBER: 23S63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
21332
2.941 ACRES

01-22-2018

C03





NOTES:

1. OWNER TO INSTALL BRIDGE ON DESIGN-BUILD BASIS BY OTHERS. DIMENSIONS PROVIDED FOR REFERENCE ONLY, EXACT DIMENSIONS AND DESIGN TO BE COMPLETED BY LICENSED CONTRACTED PROFESSIONAL AT LATER DATE. SEE BELOW FOR BRIDGE TYPES TO BE CONSIDERED FOR CONSTRUCTION:
   - TYPE I - PEDESTRIAN BRIDGE (FOOT TRAFFIC ONLY)
   - TYPE II - EQUIPMENT BRIDGE (CAPABLE OF LAWN EQUIPMENT AND GOLF CART TRAFFIC)
   - TYPE III - SINGLE LANE VEHICLE BRIDGE
2. BRIDGE TO SPAN FLOODWAY LIMITS WITH SUPPORTS CONSTRUCTED ENTIRELY OUTSIDE FLOODWAY.
3. 42" TALL FENCE TO TIE INTO PROPOSED 6' TALL PRIVACY FENCE ON EAST AND SOUTH SIDES OF BASIN.

CALL MISSOURI ONE CALL SYSTEMS INC. TWO FULL WORKING DAYS IN ADVANCE OF STARTING WORK MISSOURI CMC-CALL 1-800-344-7483

THE UNDERGROUND UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, OR NONEXISTENCE, SIZE, TYPE, NUMBER, OR LOCATION OF THESE OR OTHER UTILITIES. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UNDERGROUND UTILITIES IN THE FIELD, SHOWN OR NOT SHOWN, PRIOR TO ANY GRADING, EXCAVATION, OR CONSTRUCTION OF IMPROVEMENTS. THESE PROVISIONS SHALL IN NO WAY ABSOLVE ANY PARTY FROM COMPLYING WITH THE UNDERGROUND FACILITY SAFETY AND DAMAGE PREVENTION ACT, CHAPTER 319, RSMO.

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17MSD-00096
MSD BASEMAP 23S2

ELCO CHEVROLET
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15410 MANCHESTER RD
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ELCO CHEVROLET

A TRACT OF LAND IN SECTION 34
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

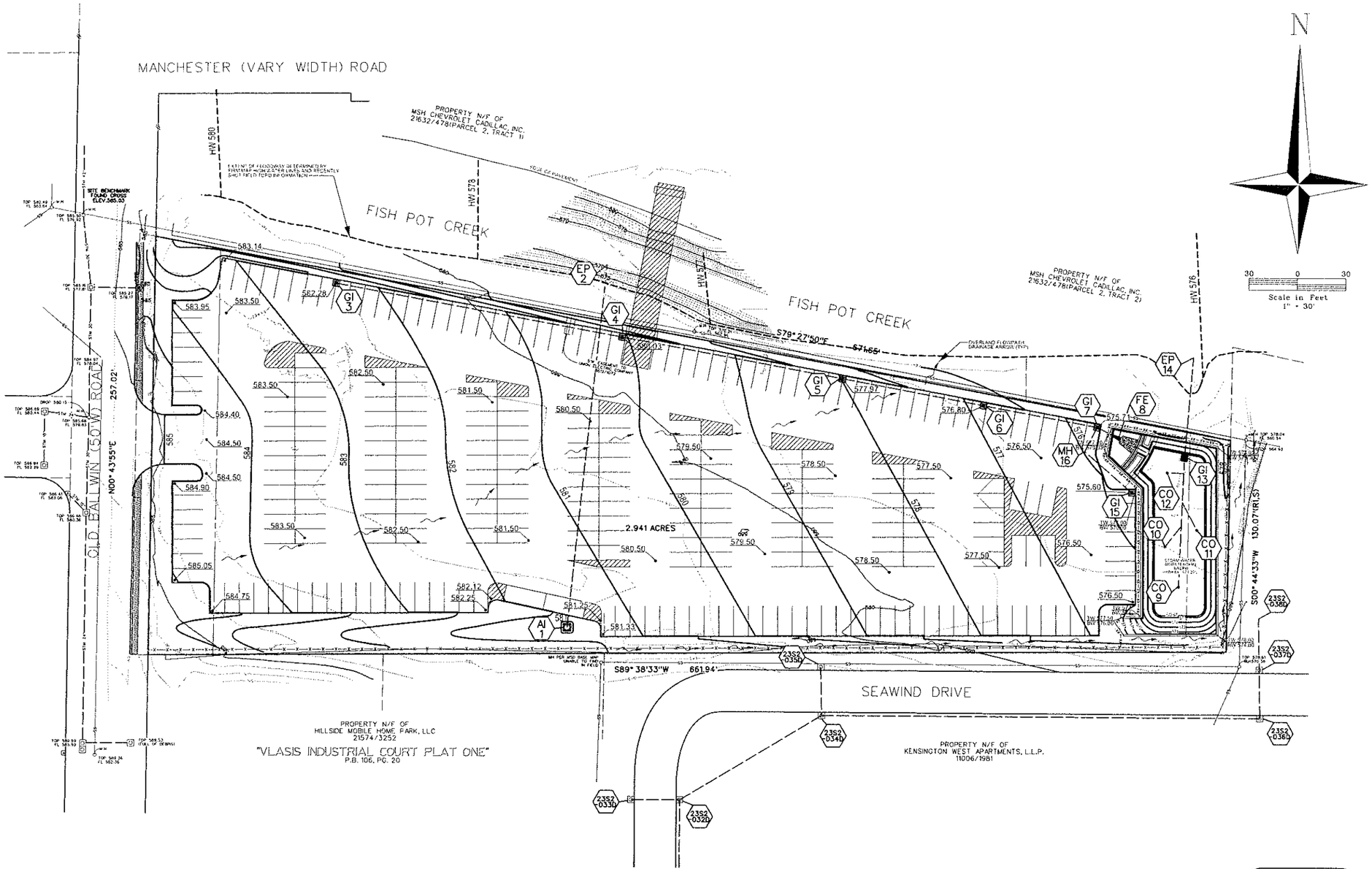
SITE PLAN

LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

21332

01-22-2018

C04



CALL MISSOURI ONE CALL SYSTEMS INC. TWO FULL WORKING DAYS IN ADVANCE OF STARTING

WORK MISSOURI ONE-CALL 1-800-344-7483

THE UNDERGROUND UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, OR NONEXISTENCE, SIZE, TYPE, NUMBER, OR LOCATION OF THESE OR OTHER UTILITIES. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UNDERGROUND UTILITIES IN THE FIELD, SHOWN OR NOT SHOWN, PRIOR TO ANY GRADING, EXCAVATION, OR CONSTRUCTION OF IMPROVEMENTS. THESE PROVISIONS SHALL IN NO WAY ABSOLVE ANY PARTY FROM COMPLYING WITH THE UNDERGROUND FACILITY SAFETY AND DAMAGE PREVENTION ACT, CHAPTER 319 RSMO.

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CHEVROLET

A TRACT OF LAND IN SECTION 34,
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

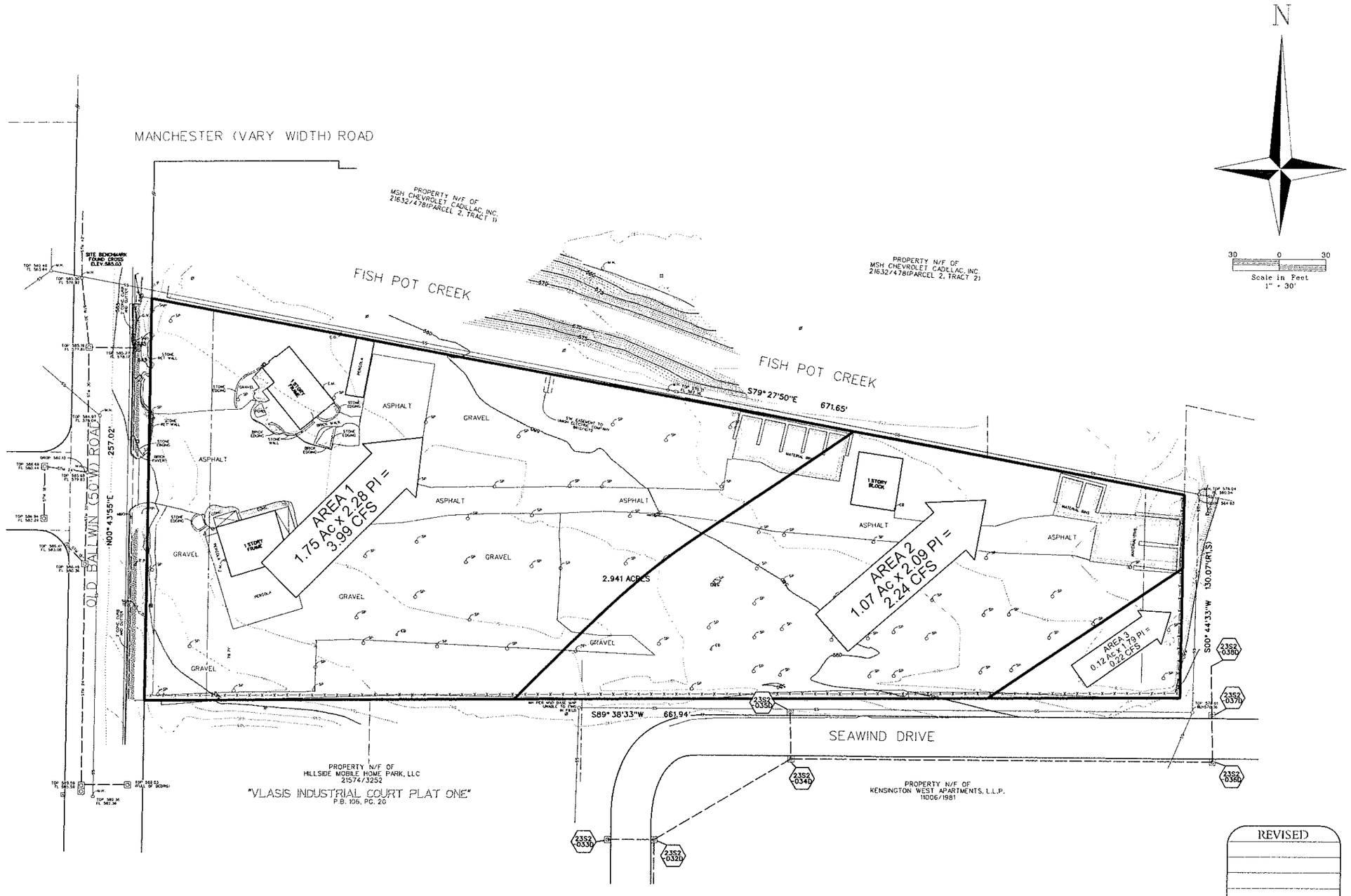
GRADING PLAN

LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

21332

01-22-2018

C05



NOTE: THIS SHEET TO BE USED FOR DRAINAGE AREA PURPOSES ONLY. NOT TO BE USED AS CONSTRUCTION PLANS.

AREA 1

TOTAL ACREAGE = 1.75 ACRES
IMPERVIOUS ACREAGE = 0.57 ACRES
% IMPERVIOUS = 0.57/1.75 = 32.57%
PI (35%) = 2.28
Q = API = 1.75 Ac x 2.28 = 3.99 CFS

AREA 2

TOTAL ACREAGE = 1.07 ACRES
IMPERVIOUS ACREAGE = 0.22 ACRES
% IMPERVIOUS = 0.22/1.07 = 20.56%
PI (25%) = 2.09
Q = API = 1.07 Ac x 2.09 = 2.24 CFS

AREA 3

TOTAL ACREAGE = 0.12 ACRES
IMPERVIOUS ACREAGE = 0.01 ACRES
% IMPERVIOUS = 0.01/0.12 = 8.33%
PI (10%) = 1.79
Q = API = 0.12 Ac x 1.79 = 0.22 CFS

REVISED

17MSD-00096
MSD BASEMAP 23S2

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A TRACT OF LAND IN SECTION 34,
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

EXISTING SITE
DRAINAGE AREA MAP

LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

21332

01-22-2018

C06

NOTE: THIS SHEET TO BE USED FOR DRAINAGE AREA PURPOSES ONLY. NOT TO BE USED AS CONSTRUCTION PLANS.

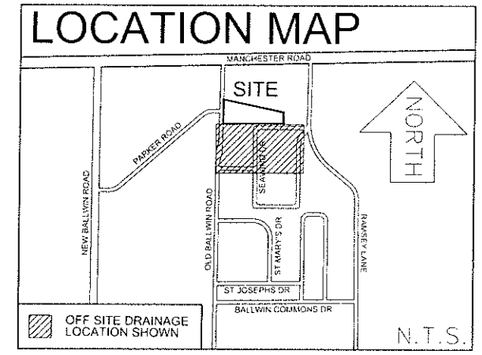
TOTAL ACREAGE = 2.54 ACRES
IMPERVIOUS ACREAGE = 0.57 ACRES
% IMPERVIOUS = 0.57/2.54 = 22.44%
PI (25%) = 2.09
Q = API = 2.54 Ac x 2.09 = 5.31 CFS

NOTE: 5.31 CFS OFF SITE DRAINAGE TO AI1. SEE SHEET C04 FOR AI1 LOCATION.

N

30 0 30
Scale in Feet
1" = 30'

LOCATION MAP



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ELCO CHEVROLET
A TRACT OF LAND IN SECTION 34,
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

EXISTING OFF SITE DRAINAGE AREA MAP

LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES
21332

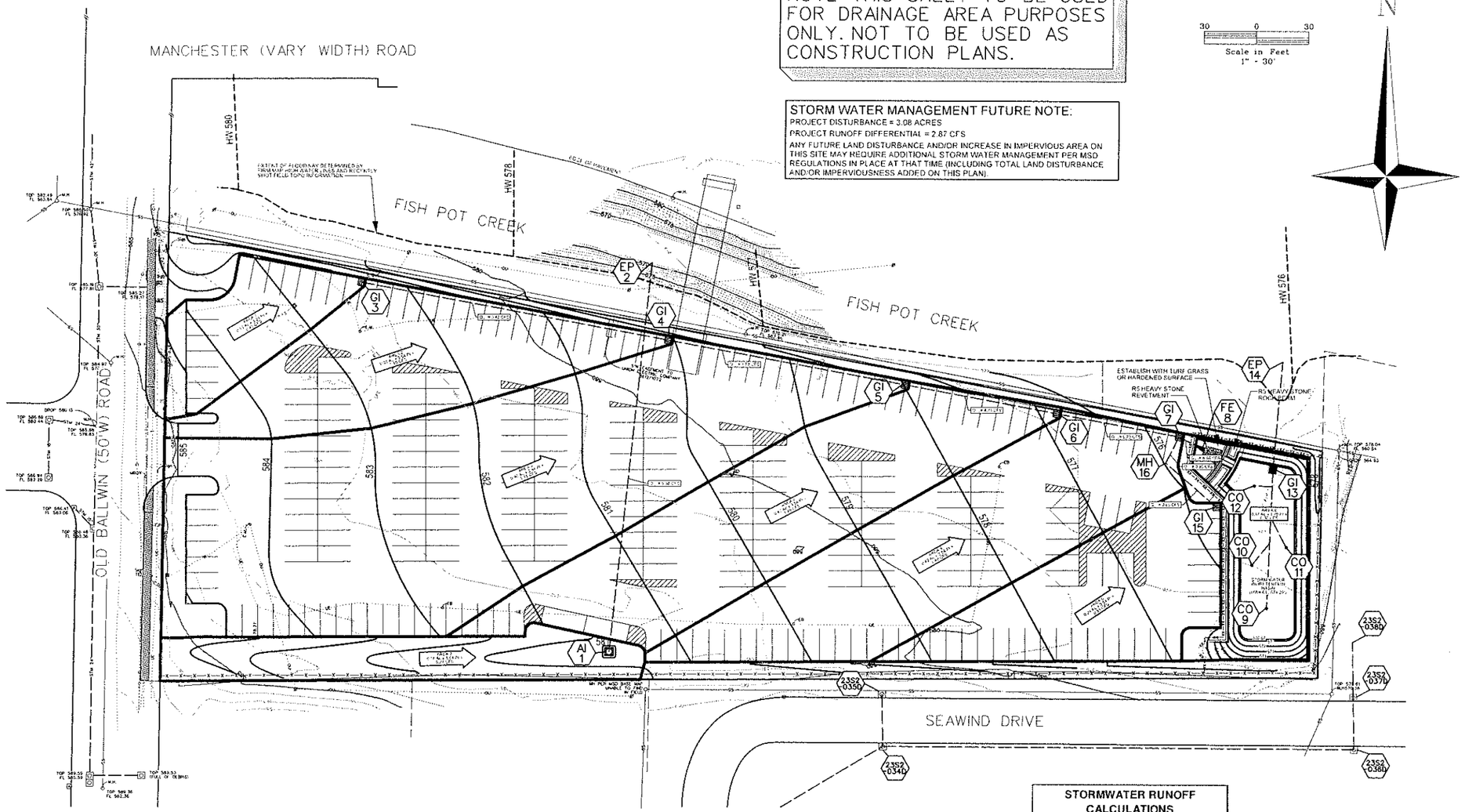
01-22-2018

C07

H:\CAD\21332-21339\21332\ImpPlans\21332 - CD7 Existing Off Site DA Map.dgn

NOTE: THIS SHEET TO BE USED FOR DRAINAGE AREA PURPOSES ONLY. NOT TO BE USED AS CONSTRUCTION PLANS.

STORM WATER MANAGEMENT FUTURE NOTE:
PROJECT DISTURBANCE = 3.08 ACRES
PROJECT RUNOFF DIFFERENTIAL = 2.87 CFS
ANY FUTURE LAND DISTURBANCE AND/OR INCREASE IN IMPERVIOUS AREA ON THIS SITE MAY REQUIRE ADDITIONAL STORM WATER MANAGEMENT PER MSD REGULATIONS IN PLACE AT THAT TIME (INCLUDING TOTAL LAND DISTURBANCE AND/OR IMPERVIOUSNESS ADDED ON THIS PLAN).



BMP CREDIT SUMMARY TABLE

DRAINAGE AREA	TRIBUTARY AREA	IMPERVIOUS AREA	PERVIOUS AREA	WQv REQUIRED	WQv PROVIDED	CP REQUIRED	CP PROVIDED	BMP TYPE
SITE	2.94 Ac	2.36 Ac	0.58 Ac	6.939 CF	7,481 CF	12,451 CF	15,816 CF	NESTED BIORETENTION

AREA 1
TOTAL ACREAGE = 0.13 ACRES
IMPERVIOUS ACREAGE = 0.11 ACRES
% IMPERVIOUS = 0.11/0.13 = 84.62%
PI (85%) = 3.24
Q = API = 0.13 Ac x 3.24 = 0.42 CFS

AREA 2
TOTAL ACREAGE = 0.31 ACRES
IMPERVIOUS ACREAGE = 0.30 ACRES
% IMPERVIOUS = 0.30/0.31 = 96.77%
PI (100%) = 3.54
Q = API = 0.31 Ac x 3.54 = 1.10 CFS

AREA 3
TOTAL ACREAGE = 0.90 ACRES
IMPERVIOUS ACREAGE = 0.86 ACRES
% IMPERVIOUS = 0.86/0.90 = 95.56%
PI (100%) = 3.54
Q = API = 0.90 Ac x 3.54 = 3.19 CFS

AREA 4
TOTAL ACREAGE = 0.42 ACRES
IMPERVIOUS ACREAGE = 0.42 ACRES
% IMPERVIOUS = 0.42/0.42 = 100.00%
PI (100%) = 3.54
Q = API = 0.42 Ac x 3.54 = 1.49 CFS

AREA 5
TOTAL ACREAGE = 0.42 ACRES
IMPERVIOUS ACREAGE = 0.42 ACRES
% IMPERVIOUS = 0.42/0.42 = 100.00%
PI (100%) = 3.54
Q = API = 0.42 Ac x 3.54 = 1.49 CFS

AREA 6
TOTAL ACREAGE = 0.24 ACRES
IMPERVIOUS ACREAGE = 0.24 ACRES
% IMPERVIOUS = 0.24/0.24 = 100.00%
PI (100%) = 3.54
Q = API = 0.24 Ac x 3.54 = 0.85 CFS

AREA 7
TOTAL ACREAGE = 0.17 ACRES
IMPERVIOUS ACREAGE = 0.00 ACRES
% IMPERVIOUS = 0.00 / 0.17 = 0.00%
PI (0%) = 1.61
Q = API = 0.17 Ac x 1.61 = 0.27 CFS

NOTE: 5.31 CFS OFF SITE DRAINAGE TO AI1. SEE SHEET C07 FOR OFFSITE DRAINAGE AREA MAP.

AREA 8
TOTAL ACREAGE = 0.17 ACRES
IMPERVIOUS ACREAGE = 0.01 ACRES
% IMPERVIOUS = 0.01 / 0.17 = 5.88%
PI (10%) = 1.79
Q = API = 0.17 Ac x 1.79 = 0.30 CFS

STORMWATER RUNOFF CALCULATIONS

TOTAL SITE AREA	=	2.94	ac
PRE-DEVELOPED JAN 15, 2000			
GRASSY / 5% IMP AREA	=	2.14	ac
15YR-20MIN PI FACTOR	=	1.70	
PERVIOUS FLOWRATE (Q)	=	3.64	cfs
100% IMPERVIOUS	=	0.80	ac
15YR-20MIN PI FACTOR	=	3.54	
IMPERVIOUS FLOWRATE (Q)	=	2.83	cfs
PRE-DEV FLOWRATE (Q)	=	6.47	cfs
PROPOSED			
GRASSY / 5% IMP AREA	=	0.58	ac
15YR-20MIN PI FACTOR	=	1.70	
PERVIOUS FLOWRATE (Q)	=	0.99	cfs
100% IMPERVIOUS	=	2.36	ac
15YR-20MIN PI FACTOR	=	3.54	
IMPERVIOUS FLOWRATE (Q)	=	8.35	cfs
PROPOSED FLOWRATE (Q)	=	9.34	cfs
15 YR 20 MIN DIFFERENTIAL RUNOFF			
PROP Q - EX Q	=	2.87	cfs

17MSD-00096
MSD BASEMAP 23S2

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ELCO
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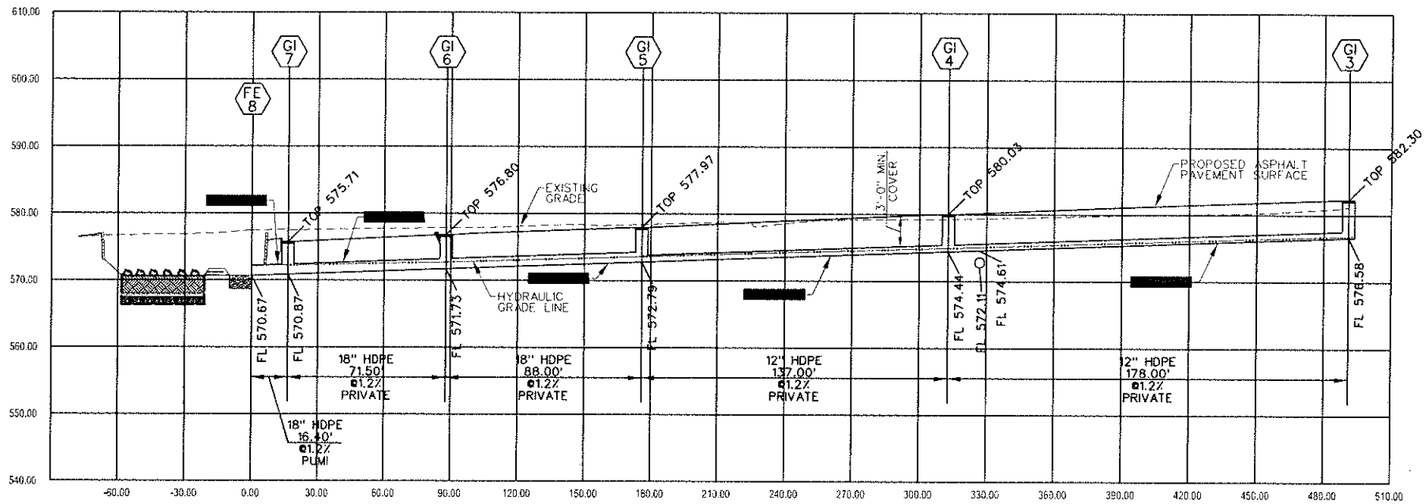
ELCO CHEVROLET
A TRACT OF LAND IN SECTION 34, TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

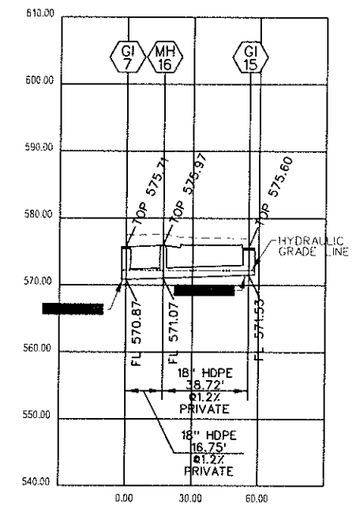
PROPOSED DRAINAGE AREA MAP

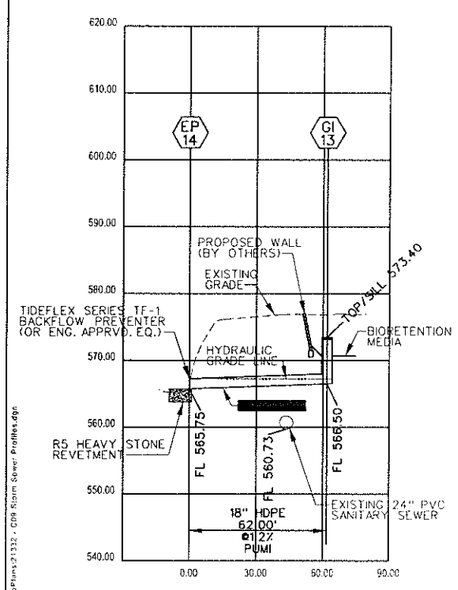
LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES
21332

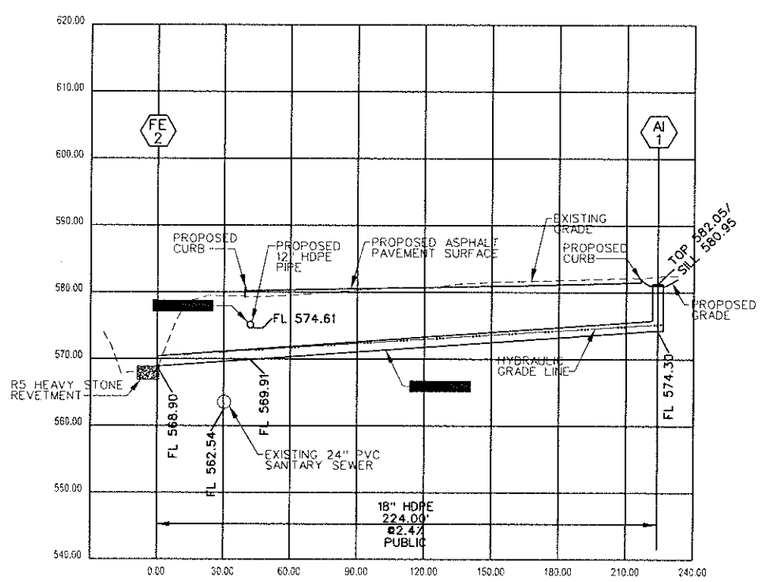
01-22-2018

C08









15 Year-20 Minute Storm Calculations

LineNo	LineID	Pipe Length (ft)	Pipe Size (in)	Invert Down (ft)	Invert Up (ft)	Slope (%)	n Value	Top El Down (ft)	Top El Up (ft)	HGL (Down) (ft)	HGL (Up) (ft)	Junction Loss (ft)	Velocity Average (ft/s)	Deflec Angle (Deg)	Energy Loss (ft)	Known Q (cfs)	Flow Rate (cfs)	Minor Loss (ft)	Capacity (Full) (cfs)	Freeboard (ft)
1	FE8 - GI7	16	18	570.67	570.87	1.25	0.013	572.87	575.71	572.17	572.23	0.06	4.95	153.40	0.20	1.49	8.54	0.00	11.24	3.68
2	GI7 - GI6	71	18	570.87	571.73	1.21	0.013	575.71	576.80	572.23	572.68	0.19	4.46	46.10	0.34	1.49	6.20	0.08	11.56	4.12
3	GI6 - GI5	88	18	571.73	572.79	1.20	0.013	576.80	577.97	572.76	573.62	0.00	4.17	0.00	0.39	3.73	4.73	0.00	11.53	4.35
4	GI5 - GI4	137	12	572.79	574.44	1.20	0.013	577.97	580.03	573.62	574.96	0.00	2.92	0.00	0.55	1.50	1.52	0.00	1.91	5.07
5	GI4 - GI3	178	12	574.44	576.58	1.20	0.013	580.03	582.30	574.96	576.85	0.00	1.70	0.00	0.50	0.42	0.42	0.00	1.96	5.45
6	GI7 - MH16	17	18	570.87	571.07	1.18	0.013	575.71	575.97	572.23	572.23	0.00	0.54	-90.00	0.00	0.00	0.85	0.00	11.39	1.74
7	MH16 - GI15	39	18	571.07	571.53	1.18	0.013	575.97	575.60	572.23	572.24	0.70	0.61	76.30	0.00	0.85	0.85	0.01	11.43	4.37

15 Year-20 Minute Storm Calculations

LineNo	LineID	Pipe Length (ft)	Pipe Size (in)	Invert Down (ft)	Invert Up (ft)	Slope (%)	n Value	Top El Down (ft)	Top El Up (ft)	HGL (Down) (ft)	HGL (Up) (ft)	Junction Loss (ft)	Velocity Average (ft/s)	Deflec Angle (Deg)	Energy Loss (ft)	Known Q (cfs)	Flow Rate (cfs)	Minor Loss (ft)	Capacity (Full) (cfs)	Freeboard (ft)
1	EP2 - AI1	224	18	568.90	574.30	2.41	0.013	570.40	580.95	570.40	575.20	0.00	4.09	95.90	3.01	5.58	5.58	0.00	16.30	5.75

NOTE: TOTAL FLOW (Q_{TOT}) GIVEN FOR 15 YEAR, 20 MIN. RAINFALL.

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MSD BASEMAP 23S2

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ELCO CHEVROLET
A TRACT OF LAND IN SECTION 34
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

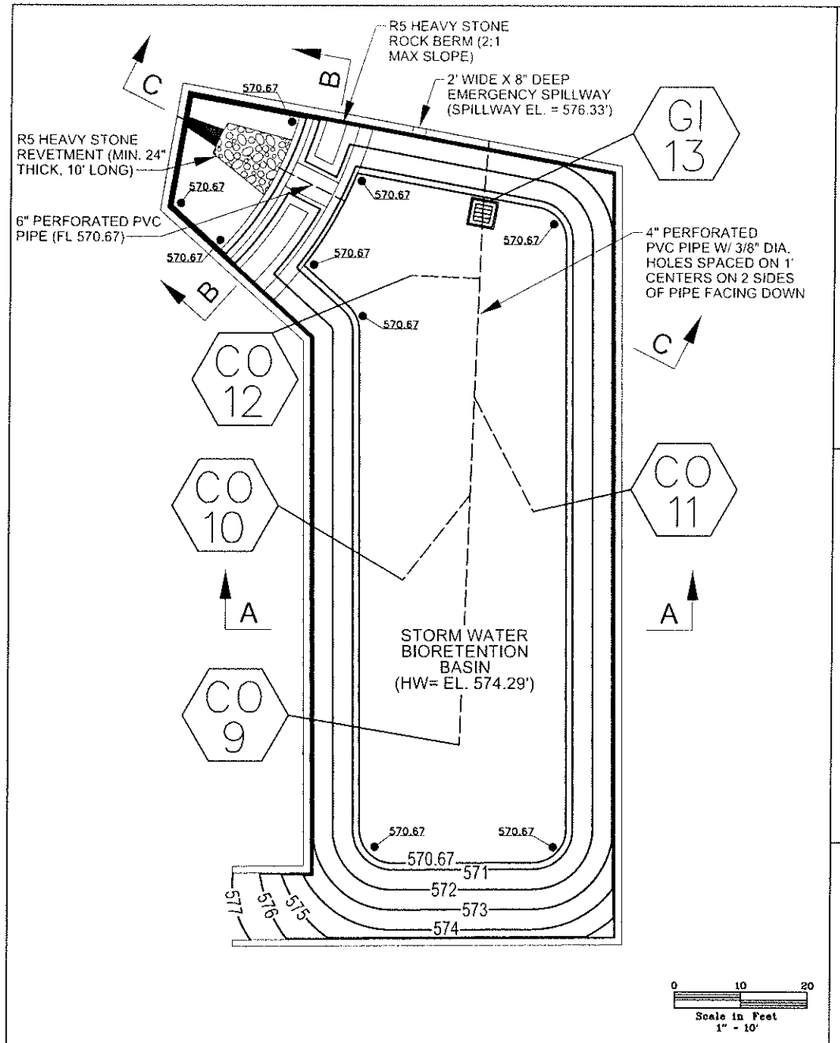
STORM SEWER PROFILES

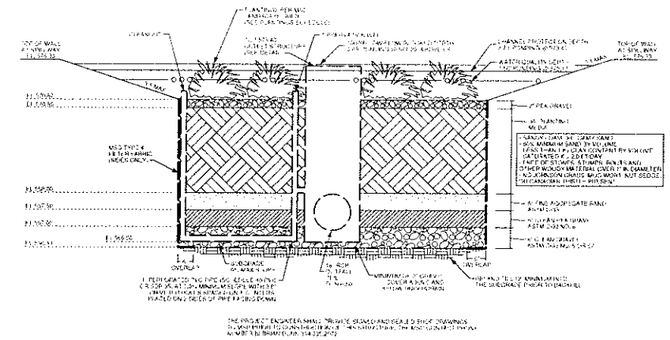
LOCATOR NUMBER: 23S.03.0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

21332

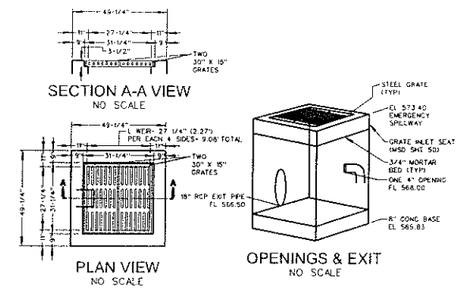
01-22-2018

C09



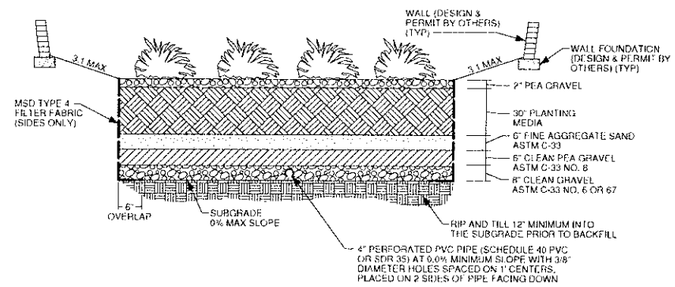


BIORETENTION TYPICAL SECTION
N.T.S.

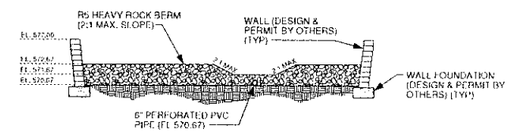


BIORETENTION OUTLET STRUCTURE (AI-13):
SQUARE MSD 2-GRATE INLET

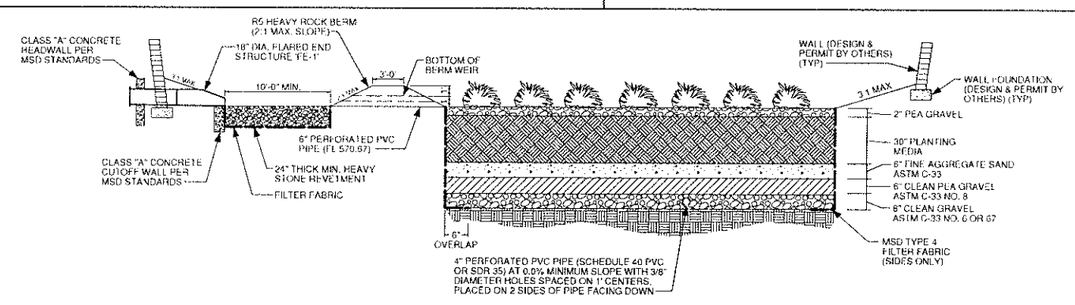
REINFORCEMENT NOT SHOWN FOR CLARITY
BASE, WALLS & REINFORCEMENT SHALL BE
PER TYPICAL SQUARE MSD 2-GRATE INLET



SECTION A-A
BIORETENTION SECTION
N.T.S.



SECTION B-B
HEAVY STONE ROCK BERM SECTION
N.T.S.



SECTION C-C
BIORETENTION SECTION
N.T.S.

Nested Bioretention Basin Design and As-Built Verification Information Table

	Design Filter Surface Area (ft²)	As-built Filter Surface Area (ft²)	Design Filter Surface Elev. (ft)	As-built Filter Surface Elev. (ft)	Design Overflow Sill Elev. (ft)*	As-built Overflow Sill Elev. (ft)*	Design Bypass/ Spill Point Elev. (ft)**	As-built Bypass/ Spill Point Elev. (ft)**	Proposed WQ Volume (ft³)	As-built WQ Volume (ft³)	CP_v Required	CP_v Provided
BASIN	3,175		570.67		573.40		576.33		6,939		12,451	

* Overflow Sill Elevation = Maximum Water Quality Storage Elevation
** Bypass/Spill Point Elevation = lowest adjacent elevation on the basin perimeter where overland flow would be directed.
As-built portion of table to be certified by a Professional Engineer or Professional Land Surveyor licensed in Missouri

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R5 HEAVY STONE SPECIFICATION:

STONE SHALL BE SOUND, DURABLE, AND FREE FROM CRACKS AND OTHER STRUCTURAL DEFECTS THAT WOULD CAUSE THE REVETMENT TO DETERIORATE. STONE SHALL NOT CONTAIN ANY SOAPSTONE, SHALE, OR OTHER MATERIAL EASILY DISINTEGRATED. MORE THAN 10% OF THE STONE SHALL HAVE A DIAMETER GREATER THAN 18 INCHES & WEIGH AT LEAST 300 POUNDS.
MORE THAN 50% OF THE STONE SHALL HAVE A DIAMETER GREATER THAN 15 INCHES & WEIGH AT LEAST 175 POUNDS.
NO MORE THAN 10% OF THE STONE SHALL HAVE A DIAMETER LESS THAN 12 INCHES OR WEIGH LESS THAN 90 POUNDS.
THICKNESS OF THE REVETMENT LAYER SHALL BE NO LESS THAN 24 INCHES ON TOP OF WF200 BLACK WOVEN POLYPROPYLENE STABILIZATION FILTER FABRIC.

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17MSD-00096
MSD BASEMAP 23S2

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RYAN LEE HOLMES P.E.
PROFESSIONAL ENGINEER
E - 2017015988

CHEVROLET
A TRACT OF LAND IN SECTION 34,
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

BIORETENTION BASIN DETAILS SHEET 1

LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
21332
2.341 ACRES

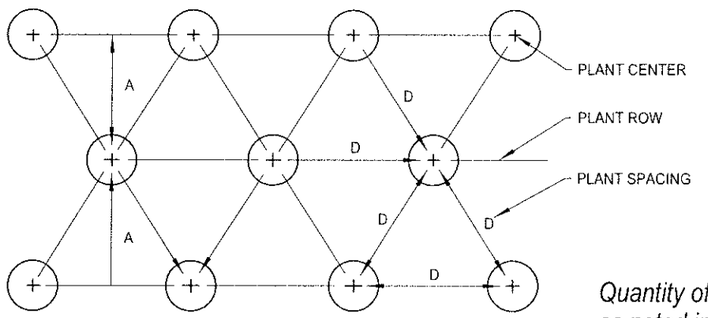
01-22-2018

C10

H:\CAD\21332\21332AimePlans\21332 - C10 Storm Water Details Sheet 1.dgn

SPACING "D"	ROW "A"	NUMBER OF PLANTS/SQ.FT.
30"	26"	.180
24"	20.6"	.25
18"	15.6"	.450
15"	13.0"	.640
12"	10.4"	1.00
10"	8.66"	1.44
8"	6.93"	2.25

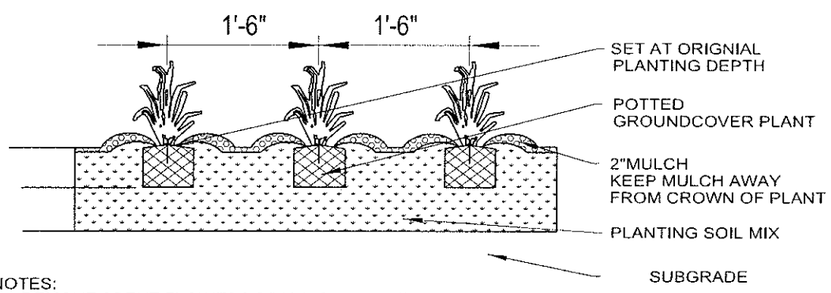
NOTE: PLANT QUANTITIES WERE DETERMINED BY MULTIPLYING AREA (SQ. FT.) BY NUMBER OF PLANTS/SQ. FT. FOR REQUIRED SPACING



GROUNDCOVER SPACING

SEE PLANTING LIST FOR PLANT SPACING

Quantity of plants as noted in planting schedule.



NOTES:
1. REMOVE SPENT FLOWERS PRIOR TO PLANTING.
2. LOOSEN ROOT MASS AT BOTTOM OF ROOTBALL.
3. TOP OF ROOTBALL STRIPPED OF 1/4" SURFACE GROWING MEDIA AND COVEREDWITH 1/4" LANDSCAPE BED MIX PLUS SURFACE MULCH.

Plant Spacing Plan

N.T.S. Figure 9

MSD Landscape Guide for Stormwater Best Management Practices

Planting Detail Courtesy of Ted Spaid
SWT Design, St. Louis, MO

The planting soil should be a sandy loam or loamy sand (should contain a minimum of 60 percent sand, by volume). The clay content for these soils should be less than 10 percent by volume. A saturated hydraulic conductivity of at least 1.0 feet per day (0.5 inches per hour) is required. (Without post-construction verification, a conservative default value of 0.5 feet per day is acceptable. The design rate may be increased to 2 feet/day if field observation, post-construction infiltration testing, or other equivalent testing (as determined by the District) is provided to confirm the design rate is achieved.) The soil should be free of stones, stumps, roots, or other woody material over 1 inch in diameter. For best results, brush or seeds from noxious weeds, such as Johnson grass, mugwort, nutsedge and Canadian thistle should not be present in the soils. Placement of the planting soil should be in lifts of 12 to 18 inches, loosely compacted (rubber wheeled heavy equipment and mechanical tamping devices are not recommended for compaction). The specific characteristics are presented in the following table.

Table 1: Planting Soil Characteristics. Source: Maryland Stormwater Manual

Parameter	Value
pH range	5.2 to 8.00
Organic matter	1.5 to 5.0%
Magnesium	35 lbs. per acre, minimum
Phosphorus (P_2O_5)	75 lbs. per acre, minimum
Potassium (K_2O)	85 lbs. per acre, minimum
Soluble salts	≤ 500 ppm

Table 3: Planting, Water and Mulch Requirements

Water Availability[1]	Required Planting Period	Minimum Container Size	Water Requirement First 3 Weeks*	Water Requirement After 3 Weeks*	Maximum Mulch Depth****
No ability to water after initial planting	Late Feb - April only	2.25"x 3.75" or larger (plug)	Water each plug immediately after planting**		1.5 for plugs
Manual watering with standard sprinkler	Late Feb - Early June Sept - October	4.5"x 5" (quart) or larger in summer & fall	1"(60 min) every 4 days	1"(60 min) every 7 days until plants established***	1.5" for plugs 2.5" for quarts
Automatic irrigation (set to water more frequently than normal during first two months after planting)	Late Feb - Early Oct	2.25"x 3.75" (plug) or larger in spring 4.5"x 5" (quart) or larger in summer & fall	1" (60 min) every 4 days in spring & fall 1" (60 min) every 3 days in summer	1" (60min) every 7 days until plants established***	1.5" for plugs 2.5" for quarts

*This water amount includes natural rainfall. If you get a ¾ inch of natural rain then you will need to add a ¼ inch of water to meet the 1 inch requirement.

[1]Requires transport of water to the planting site in large containers and pouring enough water onto each plant (after planting) to moisten the entire rooting pit.

**Plants are established when roots have grown out of the container soil and into the native soil by 3-5 inches. This normally takes 3-4 months for perennials and grasses and up to 6-7 months for trees and shrubs.

***Shredded leaf compost is recommended for use with perennials and grasses. Shredded bark mulch is recommended for tree and shrub plantings to a depth of 3 inches.

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SHOP DRAWINGS FOR BMP'S:

MSD SHOP DRAWING SUBMITTAL REQUIRED FOR BMP AND ITS COMPONENTS PRIOR TO CONSTRUCTION.

MSD CONTACT: PLEASE CONTACT THE DISTRICT'S CONSTRUCTION MANAGEMENT DIVISION AT (314) 335-2072 FOR QUESTIONS.

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17MSD-00096
MSD BASEMAP 23S2

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ELCO CHEVROLET

A TRACT OF LAND IN SECTION 34
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

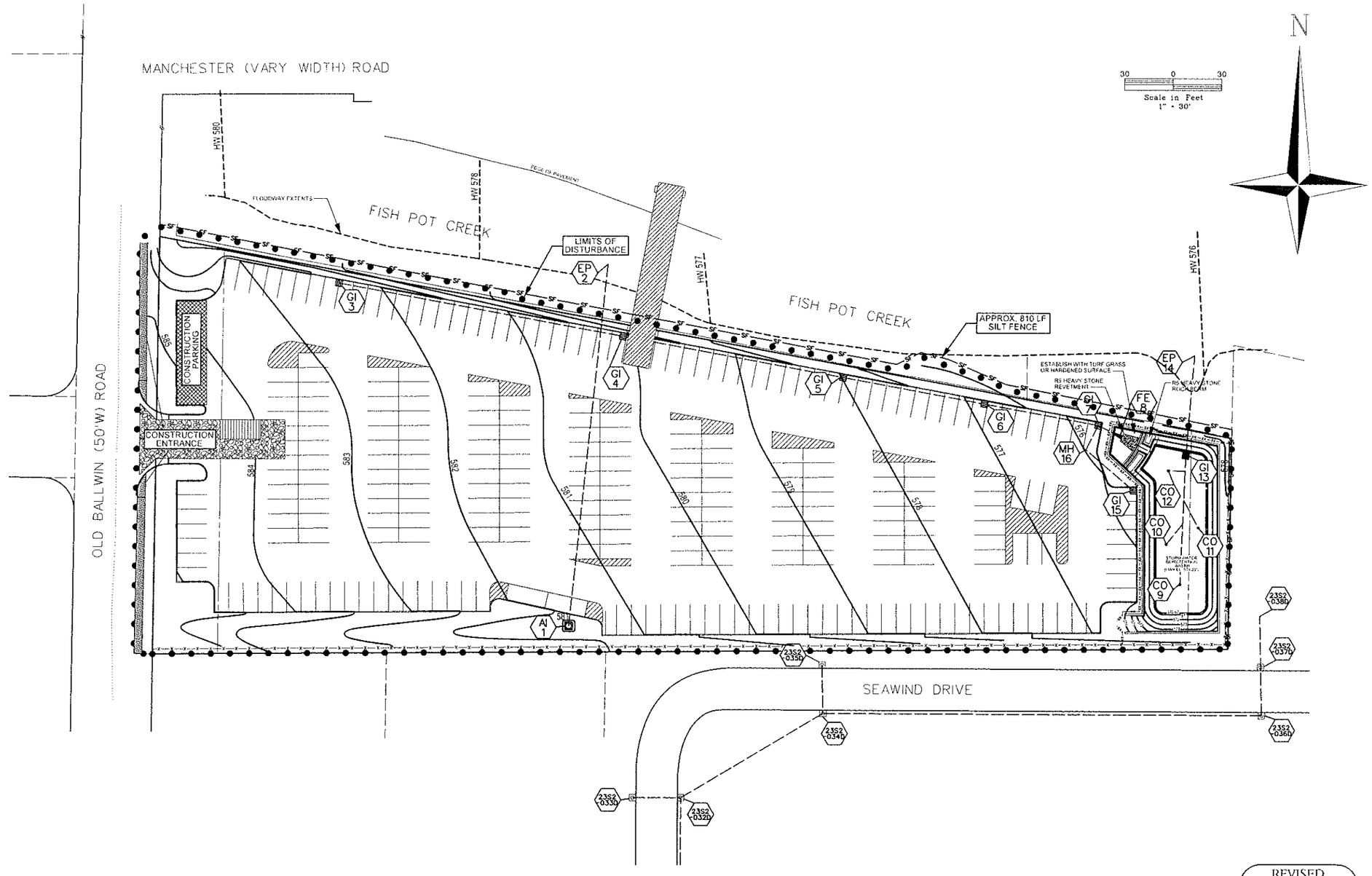
BIORETENTION BASIN DETAILS SHEET 2

LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

21332

01-22-2018

C11



LEGEND:

-SF——SF——SF- SILT FENCE

● ● ● ● ● LIMITS OF DISTURBANCE

NOTES:

1. FOR STANDARD SWPPP DETAILS AND SPECIFICATIONS SEE SHEETS C13 AND C14.

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CHEVROLET

A TRACT OF LAND IN SECTION 34,
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

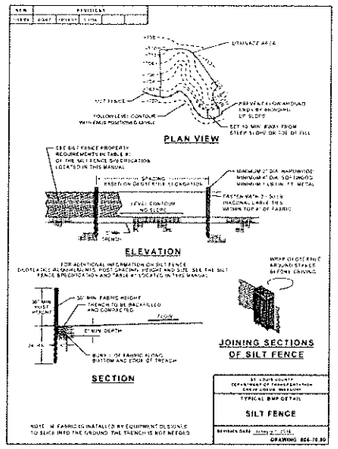
SWPPP PLAN

LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

21332

01-22-2018

C12



SILT FENCE

PHYSICAL DESCRIPTION - Silt fences are used as temporary perimeter controls, appropriate to the BMP at sites where construction activities will disturb the soil. They can also be used on the interior of the site. A silt fence consists of a length of filter fabric stretched between and along posts located at regular intervals along the site at low and down slope areas. The filter fabric should be embedded in the ground. When installed correctly and inspected frequently, silt fence can be an effective barrier to silt leaving the site in storm water runoff.

WHERE BMP IS TO BE INSTALLED - Silt fences apply to construction sites with relatively small drainage areas. They are appropriate in areas where runoff will occur as low-level flow, not exceeding 0.5 cfs. The drainage area for silt fences should not exceed 0.25 acre per 100-foot fence length (100 square feet per foot of fence). The slope length above the fence should not exceed 100 feet (NAHB 1995). The fence should be designed to withstand the runoff from a 10-year peak storm event.

CONDITIONS FOR EFFECTIVE USE OF BMPs - Spacing of parallel lengths of silt fence along slopes is relative to slope steepness as follows:

Type of Flow:	Sheet flow only.
Contributing Slope Length:	30-foot maximum for 3:1 slopes. 50 foot maximum for slopes between 3:1 and 10:1 100 foot maximum for slopes under 10%.

For additional information see Section 806.70 of St. Louis County's Standard Specification for Road and Bridge Construction.

WHEN BMP IS TO BE INSTALLED - Prior to disturbance of natural vegetation and at intervals during construction of fill slopes. Install on the perimeter of the site (where storm water exits the site) prior to disturbance of natural vegetation. Around material stockpiles and mirror to the site along slopes, at the base of slopes and at intervals during construction of slopes.

INSTALLATION / CONSTRUCTION PROCEDURES

- Drive post for fence line.
- Dig trench to required dimensions in front of posts for fabric panel.
- Attach wire mesh to posts.
- Attach fabric to posts, allowing required length below ground level to run fabric along bottom of trench.
- Backfill and compact soil in trench to protect and anchor fabric.

If a standard-strength fabric is used, it can be reinforced with wire mesh behind the filter fabric. This increases the effective life of the fence. The maximum life expectancy for synthetic fabric silt fences is about 6 months, depending on the amount of rainfall and runoff.

The stakes used to anchor the filter fabric should be wood or metal. Wooden stakes should have minimum dimensions of 2 by 2 inches if a hardwood like oak is used. Stakes from soft woods like No 2 Southern Pine, should have minimum dimensions of 4 by 4 inches. When using steel (standard U, T, L, or C shape stakes) posts in place of wooden stakes, they should weigh no less than 1.0 lb/linear foot. If metal posts are used, attachment points are needed for fastening the filter fabric with wire ties. Posts should be about 5 feet long and driven or placed at a slight upstream angle into the ground to a

minimum depth of 18 inches. Depth shall be increased to a minimum of 22 inches if fence is placed on a slope of 3:1 or greater. When the post embedment depth is impossible to obtain, the posts shall be adequately secured to prevent overturning of the fence due to sediment loading.

Erect silt fence in a continuous fashion from a single roll of fabric to eliminate gaps in the fence. If a continuous roll of fabric is not available, overlap the fabric from both directions only at stakes or posts. Overlap at least 6 inches.

The Geosynthetic filter fabric, and wire mesh, (when applicable) shall be no less than 30 inches above ground and are stapled or wired to the upslope side of the post. Staples should be a 17-gauge wire and 1½ inch long. Excavate a trench to bury the bottom of the fabric to an "L" configuration at least 6 inches below the ground surface. The trench shall be backfilled with native soil and the soil compacted over the geotextile. This helps to prevent gaps from forming near the ground surface. Gaps would make the fencing useless as a sediment barrier.

The length of the fence posts should be 36 inches (22-inch embedment) to 42 inches (16-inch embedment) above the original ground surface. If standard-strength fabric is used with 14-gauge steel wire with a mesh spacing of 6 inches by 6 inches (or a prefabricated polymeric mesh of equivalent strength), space the posts no more than 4 feet apart. If extra-strength fabric is used without wire mesh reinforcement, space the posts no more than 4 feet apart with woven or 6 feet apart with non-woven geosynthetic.

Alternate Construction: Install fence by slicing it into ground with specialized equipment. Install posts and extended spacing indicated on detail.

LIMITATIONS - Do not install silt fences along areas where rocks or other hard surfaces will prevent you from uniformly anchoring the fence posts and entrenching the filter fabric. Installing fences in such an area greatly reduces their effectiveness and can create runoff channels leading offsite. Silt fences are not suitable for areas where large amounts of concentrated runoff are likely. Fence shall not be used when slope is 1:1 or greater and water flow rates exceed 2 cubic feet per minute. Open windy areas present a maintenance challenge, too, because high winds can erode the filter fabric and prevent faster. Do not install silt fences across streams, ditches, or waterways (Smolen et al., 1988).

When the poles of the fence fabric become clogged with sediment, pools of water are likely to form on the uphill side of the fence. Setting and design of the silt fence should account for this. Take care to avoid unnecessarily diverting stormwater from these pools, causing further erosion damage.

MAINTENANCE CONSIDERATIONS - Inspect silt fences regularly and frequently, as well as after each rainfall event, to make sure that they are intact and that there are no gaps where the fence meets the ground or tears along the length of the fence. If you find gaps or tears, repair or replace the fabric immediately. Remove accumulated sediments from the fence base when the sediment reaches one-third to one-half the fence height. Remove sediment more frequently if accumulated sediment is creating noticeable strain on the fabric and the fence might fail from a sudden storm event. When you remove the silt fence, remove the accumulated sediment, dress the area disturbed to give it a pleasing appearance and vegetate all bare areas as well.

O&M PROCEDURES

- Inspect every week and after every storm
- Remove sediment buildup deeper than ½ the fence height or 12" whichever is less
- Replace torn or clogged fabric, repair loose fabric.

- Repair installation or broken posts
- Stabilize any areas subjected to undermining
- Extend fence or add additional row(s) of fence if necessary to provide adequate protection.

SILTING AND DESIGN CONSIDERATIONS - The material for silt fences should be a pervious sheet of synthetic fabric such as polypropylene, nylon, and polyester or polyethylene yarn. Choose the material based on the minimum synthetic fabric requirements shown in **Table 1** below.

Table 1 - Temporary Silt Fence Property Requirements

Physical Property	Test Method	Units	MARV Geotextile Requirements		
			Supported Silt Fence [1]	Unsupported Silt Fence Woven Elongation ≤ 20%	Unsupported Silt Fence Nonwoven Elongation ≥ 50%
Post Spacing (Maximum)		feet	8	4	6
Height of Wire / Polymer Fence (Minimum)		inches	30	--	--
Grab Strength (Minimum) Machine Direction Cross Machine Direction	ASTM D 4632	pounds	90 90	125 100	125 100
Permativity (Minimum)	ASTM D 4491	sec⁻¹	0.05	0.05	0.05
Apparent Opening Size (AOS)[2]	ASTM D 4751	Sieve Number	20	30	30
Ultraviolet Stability (Minimum) (retained strength)	ASTM D 4355		70% after 500 h of exposure		

Notes:

MARV - Minimum Average Roll Value

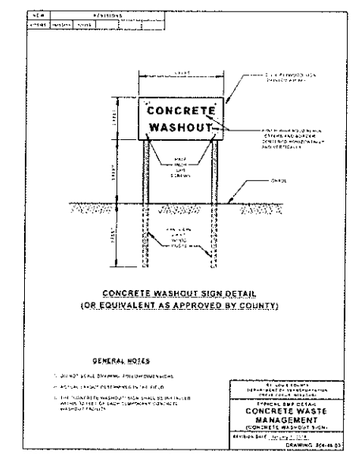
[1] Elongation measured in accordance with ASTM D 4632

[2] Silt Fence Support - 14-gauge steel wire with a mesh spacing of 6 inches by 6 inches (or a prefabricated polymeric mesh of equivalent strength)

[3] Minimum Average Roll Value

SITE CONDITIONS FOR REMOVAL - After permanent vegetation of slope is established. Remove fence and post. Regrade trench area and vegetate.

TYPICAL DETAIL - 806.70.0



CONCRETE WASTE MANAGEMENT

DESCRIPTION - The purpose of this specification is to set forth procedures and practices designed to eliminate the discharge of concrete waste materials to storm drainage systems, drainage areas, streets or environment, which shall be required of the contractor.

APPROPRIATE APPLICATION OF BMP - Concrete waste management procedures and practices will be implemented on construction projects as follows:

- Where concrete is used as a construction material or where concrete dust and debris result from demolition activities
- Where stucco containing Portland cement, concrete (PCC), asphalt concrete (AC), or recycled concrete (RC) are generated, such as from saw cutting, cement grinding, grooving and hydro-concrete demolition.
- Where concrete trucks and other concrete related equipment are washed on-site, when approved by the Resident Engineer or Construction Inspector.
- Where mortar mixing stations exist.

AWARENESS / ENFORCEMENT

- Contractors and / or permit holder's superintendent or representative shall oversee and enforce concrete waste management procedures.
  - Discuss the concrete management techniques described in this BMP such as handling of concrete waste and washouts with the ready mix concrete supplier before any deliveries are made.
- The site superintendent shall make drivers aware of the concrete of this concrete waste management facilities. The site superintendent should post signage indicating the washout and designated area of the concrete waste management areas, and provide overall oversight to respect for violations of improper dumping of concrete waste and wash water.

IMPLEMENTATION

- Contractors, private individuals, public agencies, etc. using concrete material, shall incorporate requirements for concrete waste management into material supplier and subcontractor agreements. Include requirements in contracts with concrete delivery companies that drivers must use designated concrete washout facilities.
- Store dry and wet materials under cover, away from drainage areas.
- Avoid mixing excess amounts of fresh concrete.
- Do not allow excess concrete to be dumped on-site, except in designated areas.
- Cover the structures before predicted storm events to prevent overflows.
- Monitor on-site concrete waste storage and disposal procedures at least weekly or as directed by the Resident Engineer or Construction Inspector.

- In St. Louis County, the contractor is required by Missouri State Law (10 CSR 10-6.170) and County Ordinance (512.340) to clean "tracks" off the roadway from the construction site, signal installation, etc. Dust control, including sweep operations, on the construction site shall be maintained to safety standards and to prevent nuisances. The contractor / permitee shall apply adequate measures to control dust and particulate matter (of any kind or source) due to roadway / construction traffic, grading, cleaning and grubbing, building demolition, saw cutting, etc. from negatively affecting the site or adjacent properties. Operations needed from grinding, saw cutting, etc. should be picked up (continuously) by means of a vacuum device or wet-vac. Compressed or blown air may be used to clean negligible residual dust that the vacuum or cleaning did not clean as long as the above dust control procedures (and laws and ordinances) are met. Saw cutting residue, slurry or grit, should not be allowed to enter storm drains or waterways. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement when traffic is present. When pine pitch is encountered (either naturally or intentionally) in approved locations, pavement slurry may flow into the dirt lawns, if can clean up the growth, adjacent to the saw cutting operation and be covered, on site, 2 inch-inch below finished grade. Drive dust control and clean up procedures may be acceptable as approved by the Engineer or St. Louis County. See additional Concrete Waste Management requirements in this Manual.

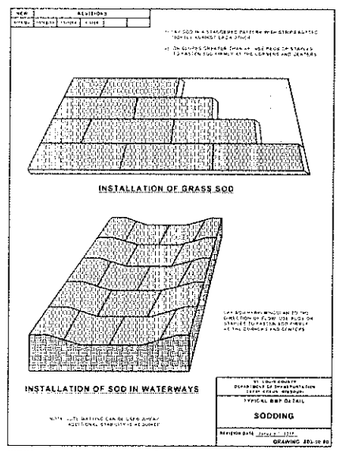
WASH-OUT AREA PROTOCOL

- Contain washed-out concrete or take it offsite for disposal in designated areas only.
- Do not wash out concrete trucks into storm drains, open ditches, streets, or streams.
- For onsite washout:
  - Locate washout area on site at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary dike downslope area large enough to contain liquid and solid waste. Locate it on a dirt area where the liquid portion of the washout can soak into the ground. They are preferably but below grade to prevent splashes and reduce the likelihood of runoff. Discontinue use of the washout once it reaches 75% capacity. Washouts should be used for handle solids and wash water to prevent overflow. In a recommended "L" system of wash areas are used to wash the truck chute and 30 gallons are used to wash out the hopper of a concrete pump. Implement a monthly wash schedule for washout areas.
  - Temporary washout facilities should have pit or formed areas of sufficient volume to completely contain all liquid and waste concrete made as generated during washout procedures.
  - Wash out vehicles into the pit where the concrete can set, be broken up, and used on site, or hauled on site, to disposed of properly.
- Do not wash sweepings from exposed aggregate concrete into the areas of storm drain. Collect and return the pieces to aggregate base stockpile or dispose of in the trash.
- Do not place concrete wash water in a pit that is connected to the storm drain system or that drains to nearby waterways.

TYPICAL DETAIL - BMP-4F.03

- Locate concrete washout facilities in an area that allows convenient access for concrete trucks, preferably near the area where the concrete is being poured. Approaches should be level and paved (gravel base is acceptable) to the washout facility. If the facility will be located on undeveloped property, these areas should be far enough away from street construction traffic to reduce the frequency of accidental damage and spills. The number of washers you install should depend on the expected demand for storage capacity. On large sites with extensive concrete work, place washouts in multiple locations for ease of use. In the dirt or gravel area washout is buried to the side of slope have a 2 foot cover minimum. The 2 foot cover shall meet with surrounding finished grade.
- Concrete washed out in areas other than those designated for such activity, shall be cleaned up by the responsible.
- Install signage adjacent to each washout facility to inform concrete equipment operators to locate the proper location.
- Perform washout of concrete mixers, delivery trucks, and other delivery systems in designated areas only.
- Wash out concrete from concrete pumper lines into the truck hopper trucks, and discharge into designated washout area.
- Equipment that cannot be easily moved, such as concrete pavers, shall only be washed in designated areas that do not drain to waterways or storm drain systems.
- Backfill and repair holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities.
- Wash out concrete on site into a future designated final concrete slab location. This location cannot be within 50 feet of a storm or sanitary sewer or water source, or where it can drain off site. The washout cannot jeopardize the integrity of the final concrete slab. Concrete to be removed from the site shall be disposed of in conformance with the provisions in Standard Specification Manual, Section 202, and as directed by the Engineer. No additional payment will be made for complying with the above specification.
- A self-contained and watertight container may be used to control, capture, and contain concrete wash water and washout material. This container must be portable and temporarily, durably resistant protect against spills and leaks, and sized to handle solids and wash water to prevent overflow. The container should be emptied and cleaned when 75% or its capacity is reached. After all liquids evaporate or are pumped or vacuumed, and the remaining slurry solidifies, the Contractor may fully fill solids on site. On County roadway projects, the solids may be buried on site if approved by the Engineer. In either case, solids must be buried a minimum of 2 feet below finished grade. Disposal of container contents that are removed from the job site, by trucks at an approved landfill. In order to prevent overflows caused by material accumulation and to provide security for safety purposes and special acts of vandalism, the container shall be covered at the end of each workday and remain covered until the beginning of the next workday. The cover shall remain in place with the container at all times. Curbside shall be free of liquids during pick-up or disposal, or transport to disposal site. On County roadway projects, no solids shall be placed on the roadway.

TYPICAL DETAIL - BMP-4F.03



SODDING

PHYSICAL DESCRIPTION - A strip of 1 inch thick mat of vegetation set down in checked areas and swales. Sod prevents damage from excessive flow, stabilizes the channel surface. Sod slows water runoff and acts as a filter when sediment-laden runoff passes over the sodded area.

WHERE BMP IS TO BE INSTALLED - Typically installed in areas requiring immediate erosion protection, such as swales or distinctive points and at inlet drops, around inlets, and adjacent to paths. Also installed in areas requiring immediate aesthetic appearance or function such as entrances to a subdivision and off site construction areas.

CONDITIONS FOR EFFECTIVE USE OF BMPs - Type of flow: Sheet flow and low concentrated flows with velocities less than 5 fps.

WHEN BMP IS TO BE INSTALLED - Immediately after finish grading, installation of inlet inlets and installation of underground services and foundations of new homes.

INSTALLATION / CONSTRUCTION PROCEDURES

- Fresh grade area and remove all debris larger than ½ inch in diameter and concentrated areas of smaller debris.
- Soil preparation: soil shall be sodded shall be determined by tests to determine lime and fertilizer requirements. Soil amendments shall be mixed into top 3 to 6 inches of soil by tilling or other means.
- Level and roll soil lightly to provide an even grade and firm the surface. Soil should not be excessively wet or dry.
- Lay first row of sod perpendicular to the slope or direction of flow. Butt subsequent rows tight against previous rows with ends staggered in brick like pattern. Fill minor gaps with spare soil and roll entire surface to ensure contact.
- Water, stake and / or net corners and sections of sod slope as required.
- Water immediately after installation enough to soak 4 inches into soil without causing runoff.
- For additional information see Section 806 of St. Louis County's Standard Specification for Road and Bridge Construction.
- Type of sod shall be as specified in the contract or on the approved plans.

O&M PROCEDURES:

- Water and daily for 3 weeks - enough to soak 4 inches and without causing runoff.
- Replacement areas of sod that has moved along the slope.
- Remove sediment accumulations - replace sod if necessary.
- Repair any eroded areas, replace sod, and stake as needed.
- Do not mow until 3 inches of new growth occur. During the first 4 months, mow no more than ⅓ the grass height.

SITE CONDITIONS FOR REMOVAL - Not applicable.

TYPICAL DETAIL - 832.10.00

SEEDING

PHYSICAL DESCRIPTION - Establishment of vegetation by spreading grass seed designed to protect exposed soil from erosion by eliminating direct impact of precipitation and slowing overland flow rates. Once established, the vegetative cover will also filter pollutants from the runoff. Use only perennial vegetation for final stabilization.

WHERE BMP IS TO BE INSTALLED - To exposed soil after a phase of rough or finish grading has been completed, or areas where no activity will occur for 30 days.

CONDITIONS FOR EFFECTIVE USE OF BMPs

Type of Flow:	Sheet flow
Contributing Slope Length:	30 foot maximum for 3:1 slopes 50 foot maximum for slope between 3:1 and 10:1 100 foot maximum for slopes under 10%.
Maximum Rates:	See attached charts.
Acceptable Dates:	See attached chart.

WHEN BMP IS TO BE INSTALLED - Immediately after rough or finished grading is completed.

INSTALLATION / CONSTRUCTION PROCEDURES

- Install upstream BMPs to protect area to be seeded.
- Rough grade area and remove all debris larger than 1 inch in diameter and concentrated areas of smaller debris.
- Install stabilization grids, if needed.
- Add soil amendments (note fertilizer, etc.) into top 3 to 6 inches of soil as needed.
- Plant seed ¼ to ½ inch deep.
- Roll lightly to firm surface.
- Cover seeded area with mulch unless seeding concentrated during optimum seeding and weather dates.
- Install additional stabilization (netting, bonded fiber matrix, etc.) as required.
- Water immediately - enough to soak 4 inches into soil without causing runoff.
- If overlapping / partial stages needing to be graded for final stabilization only seed/mulch vegetation needs should be used.
- For additional information see Sections 805 and 806.90 of St. Louis County's Standard Specification for Road and Bridge Construction.

O&M PROCEDURES

- Inspect every week and after every storm.
- Protect area from vehicle and foot traffic.
- Reseed areas that have not sprouted within 21 days of planting.
- Repair damaged or eroded areas and reseed and stake as needed.
- Do not mow until 4 in. high of growth occurs.
- During the first 4 months, mow no more than ⅓ of grass height.
- Re-fertilize during 2nd growing season.

SITE CONDITIONS FOR REMOVAL - Once the required vegetation (not temporary seeding) can be accepted stabilization prior to work resumes to an area.

SEEDING REQUIREMENTS

Dates for Seeding

Permanent Seeding	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Tall Fescue								X	X			
Bermudagrass			X	X	X			X	X			
Kentucky Bluegrass			X	X	X			X	X			
Native Warm Season	X	X			X	X	X			X	X	X

Temporary Seeding	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Rye Annual	X	X	X	X	X	X	X	X	X	X	X	X
Oats	X	X	X	X	X				X	X	X	X

X - Seed in early (dry)
X - Seed in mid (dry)
X - Fertilize in late March and in late August (if need) and mid July (if need) and mid October (if need) (dry)

Minimum Fertilizer and Seeding Rates

Permanent Seeding	Pounds per acre	Pounds Per 1000 sq ft
Tall Fescue	200	4.6
Bermudagrass	100	2.3
Bluegrass	100	2.3
Native Warm Season	20	0.5
Kentucky Bluegrass	100	2.3

Mixture 1 - Tall Fescue (50 percent) and Kentucky Bluegrass (50 percent)
Mixture 2 - Tall Fescue (50 percent) and Native Warm Grass (50 percent)
Mixture 3 - Kentucky Bluegrass (50 percent) and Native Warm Grass (50 percent)
* - Seeding rate is dependent on seed mix, % of pure live seed (PLS) and germination rate

Temporary Seeding	Pounds per acre	Pounds Per 1000 sq ft
Annual Rye	50	1.1
Oats	100	2.3

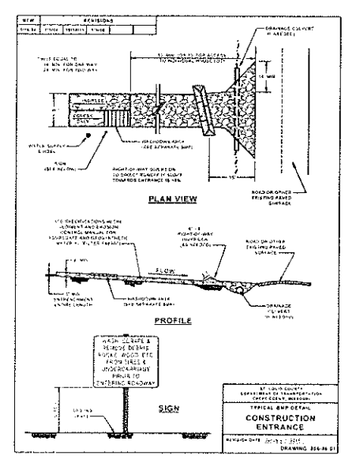
Fertilizer	Permanent Seeding Quantity per acre	Permanent Seeding Quantity per sq ft
10-10-10	1 ton	46 lbs
0-0-60	200 lbs	4.6 lbs
46-0-0	100 lbs	2.3 lbs
0-46-0	100 lbs	2.3 lbs
0-0-0	1 ton	46 lbs

* - Use only when required by soil analysis or test

TYPICAL DETAILS - Minimum seeding rates and acceptable dates for work attached

INSTALLATION / CONSTRUCTION PROCEDURES

- Excavate diversion area except for area of underwater construction.
- Compact as required to place diversion properly.
- Install pipe bedding or channel lining as required.



CONSTRUCTION ENTRANCE

PHYSICAL DESCRIPTION - A stabilized entrance to a construction site designed to minimize the amount of sediment tracked from the job on vehicles and equipment. Stabilization generally consists of aggregate over geogrid and geosynthetic material. Mud and sediment fall off of tires as they travel along the stabilized entrance. However, additional measures in the form of a washdown area should also be included on site. The stabilized entrance also diverts the axle load of vehicles over a larger area, thereby mitigating the rutting impact vehicles normally have on unpaved areas. See additional information in the "Construction Site Access Requirements" section of this manual.

WHERE BMP IS TO BE INSTALLED - At locations where it is safe for construction vehicles and equipment to access existing streets - preferably at location of future streets or drives.

CONDITIONS FOR EFFECTIVE USE OF BMPs

Drainage:	Ditches or pipes, if needed, sized for 15 year, 3 minute storm. NOT to block surface of entrance.

WHEN BMP IS TO BE INSTALLED - First order of work, along with washdown area, prior to vehicles or equipment accessing unpaved areas.

INSTALLATION / CONSTRUCTION PROCEDURES

- Grade and compact area of construction entrance.
- Install culvert under entrance if needed to maintain positive drainage.
- Place geosynthetic material next to compacted soil. Lay geogrid on top of this, and cover with aggregate. Keep aggregate out of the center of the entrance if needed to divert runoff away from roadway.
- See Washdown Station BMP for additional show.

O&M PROCEDURES

- Immediately remove any mud or debris tracked onto paved surfaces.
- Remove sediment and debris off the roadway daily or as otherwise determined by the Engineer.
- Replenish rock if necessary to maintain a level surface.
- Repair damaged areas.

SITE CONDITIONS FOR REMOVAL - Remove when vehicles and equipment no longer access unpaved areas.

TYPICAL DETAIL - A30.46.01

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E - 2017018988

ELCO CHEVROLET

A TRACT OF LAND IN SECTION 34, TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

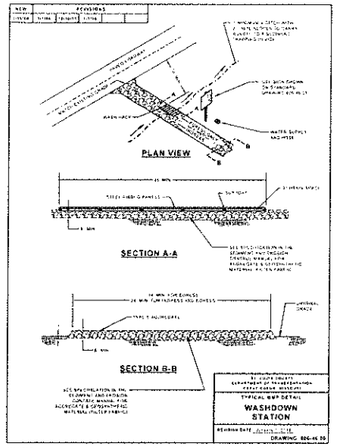
SWPPP DETAILS SHEET 1

LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
21332
2.941 ACRES

01-22-2018

C13

H:\JOB_21300-21399\21332\DwgFiles\21332 - C13 SWPPP Details Sheet 1.dgn



WASHDOWN STATION

PHYSICAL DESCRIPTION - An area located at construction entrance designed to wash equipment that the tires and undercarriage of hauling vehicles and prevent sediment from being tracked onto existing roadways.

WHERE BMP IS TO BE INSTALLED - Adjacent to construction entrance and where other unpaved construction exists.

CONDITIONS FOR EFFECTIVE USE OF BMPs

Drainage: Concentrated BMPs where no break down runoff from washdown station

WHEN BMP IS TO BE INSTALLED - First order of work, along with construction entrance, prior to vehicles or equipment accessing unpaved areas.

INSTALLATION/CONSTRUCTION PROCEDURES

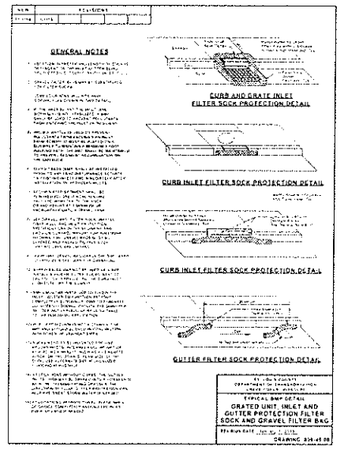
- Grade and compact area for drainage under washdown pad.
- Install well-rotted pine bark mulch or other approved material over a 2" clean space.
- Provide and maintain downstream BMPs (if other shown on details).
- Install water supply and hose.
- Post signs in vicinity of washdown indicating that all equipment and vehicles must pass through washdown station before leaving site.

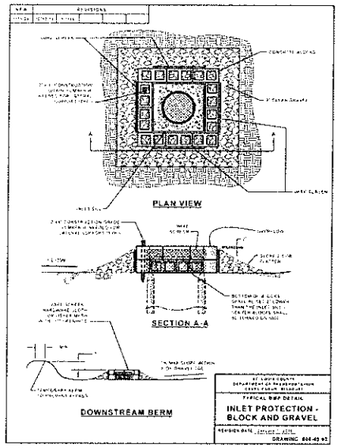
O&M PROCEDURES:

- Remove sediment daily.
- Repair broken aprons.
- Replace mulch if necessary to maintain clean surface.

SITE CONDITIONS FOR REMOVAL - Remove when all tires, and equipment are free of mud and no paved areas.

TYPICAL DETAIL - 806-45.00





FIBER ROLLS AND FILTER ROLLS

PHYSICAL DESCRIPTION - A fiber roll, also known as a wattle, consists of stiffer fiber, such as straw or coir, that stays in rather tubular materials bound in a light photodegradable or biodegradable tubular roll or filter sock. A fiber roll consists of a biodegradable, coarse compound or fiber material bound in a light photodegradable or biodegradable tubular roll or filter sock. They slow and trap surface flow, velocity, remove sediment from the runoff, and release soil moisture. Fiber rolls and filter rolls must be established.

WHERE BMP IS TO BE INSTALLED - Installed on middle slopes, at top of and toe of slopes, around the perimeter of inlets, and around temporary stockpiles, as well as on or adjacent to sediment being carried off site. Placing in rills along slopes is helpful to avoid. Fiber rolls and filter rolls may also be used at drain inlets, around and along established low areas to prevent sediment, oil, and other forms of storm water runoff from entering the storm sewer system. Rolls may also be used as mini check dams in ditches and swales.

CONDITIONS FOR EFFECTIVE USE OF BMPs

Type of Flow: Sheet flow and concentrated flow

Concentrated Flow: For slopes, use the following row spacing

2:1 (H:V) or steeper	10 feet
Between 2:1 and 4:1 (H:V)	15 feet
4:1 (H:V) or flatter	20 feet

WHEN BMP IS TO BE INSTALLED - Prior to establishment of natural vegetation and at countries during construction of the slopes. Fiber rolls and filter rolls must not be used on slopes subject to concentrated flows of flashes. Rolls are not to replace slope stabilization.

INSTALLATION / CONSTRUCTION PROCEDURES

- Determine required roll diameter, length and row spacing based on slope and the manufacturer's recommendations.
- Dig trench to required depth for fiber rolls (fiber rolls do not require trench).
- Place fiber rolls in trench or filter rolls directly on slope.
- Stake the fiber rolls or filter rolls as shown on detail drawings.
- Place excavated soil (fiber rolls or filter rolls material) along the outside of rolls as shown on detail drawings, not to exceed 1/3 of fiber roll diameter.

O&M PROCEDURES

- Inspect every week and after every storm.
- Remove sediment buildup deeper than 1/2 the exposed roll height.
- Replace or repair split, torn, unravelling, damaged or deteriorated rolls.
- Repair or replace installed or broken wood stakes.
- Stabilize any erosion underneath or around rolls.
- Extend rows or add additional rolls if necessary to provide adequate protection.

SITE CONDITIONS FOR REMOVAL - After permanent vegetation of slope is established. Remove rolls, collect and dispose of sediment accumulation. Regrade trench area to blend in adjacent ground, and vegetate. Rolls do not have to be removed if approved construction or grading does not harm rolls or permanently be left in place (must be fully biodegradable).

TYPICAL DETAILS - 806-45.00
806-45.01
806-45.02

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ELCO CHEVROLET

A TRACT OF LAND IN SECTION 34,
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

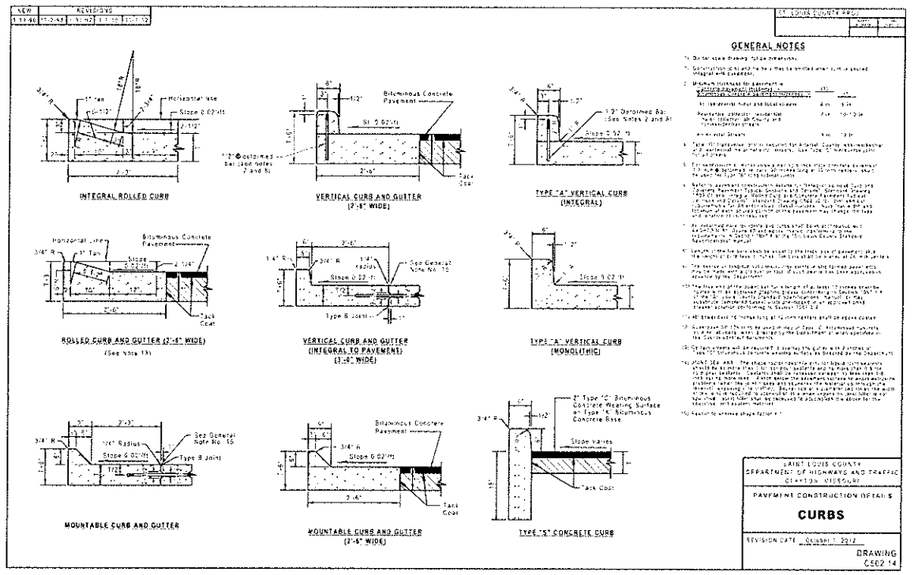
SWPPP DETAILS
SHEET 2

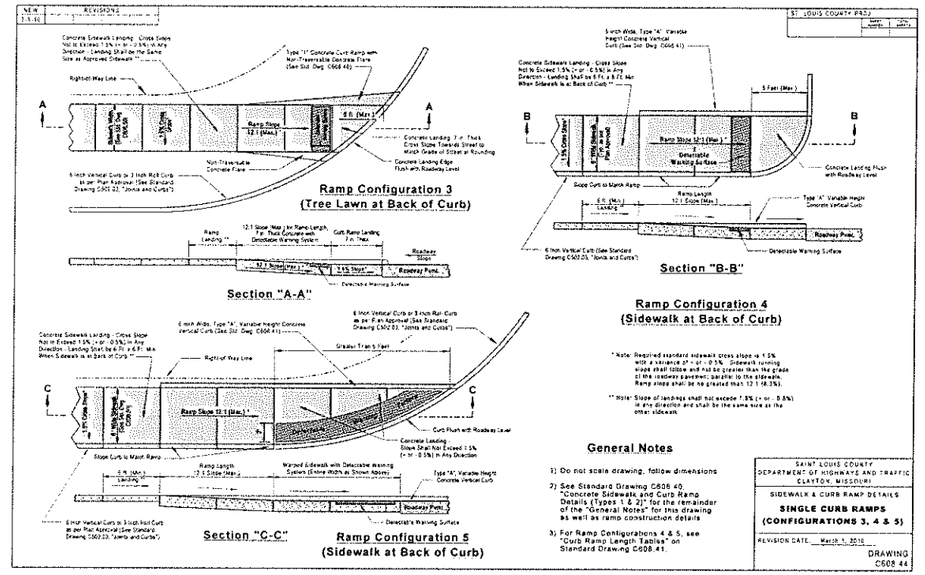
LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

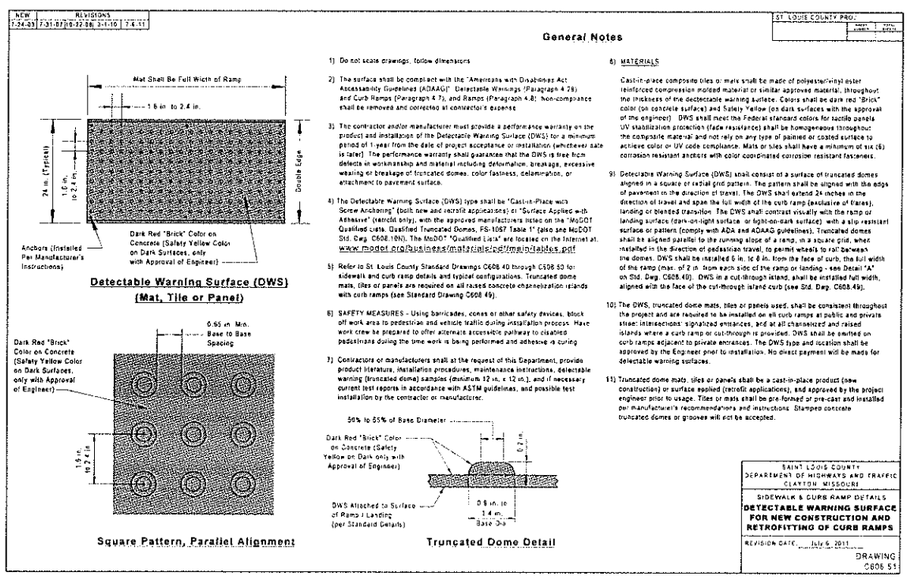
21332

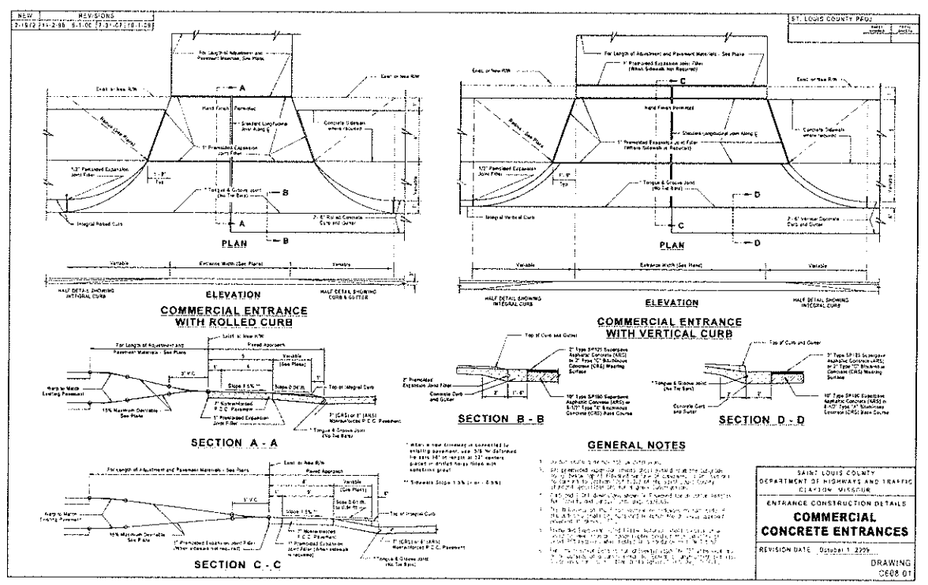
01-22-2018

C14









17MSD-00096
MSD BASEMAP 23S2

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ELCO CHEVROLET

A TRACT OF LAND IN SECTION 34
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

CONSTRUCTION DETAILS
SHEET 1

LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

21332

01-22-2018

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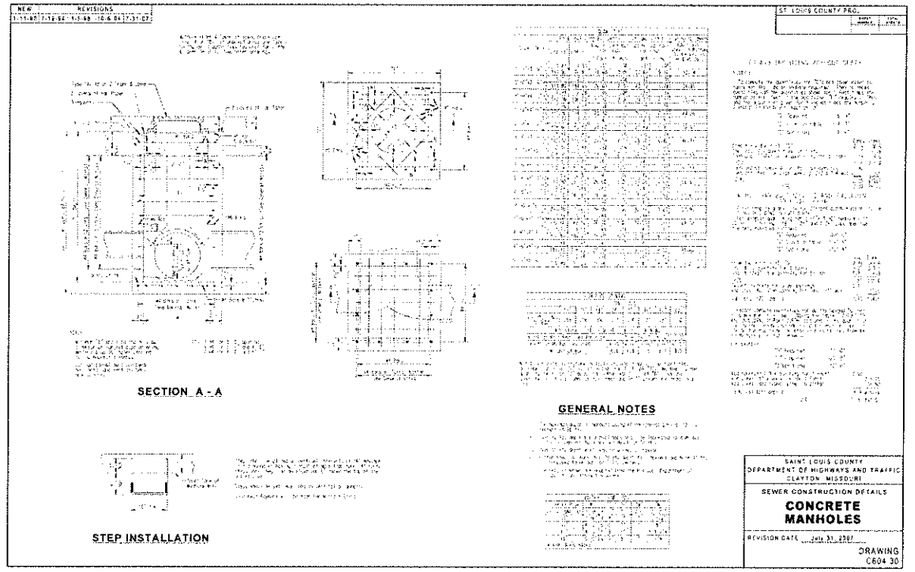
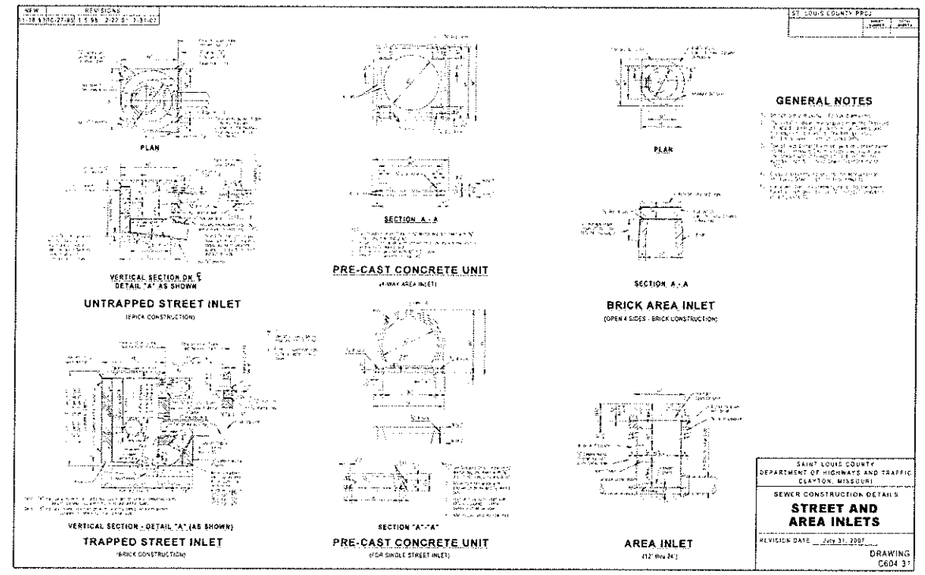
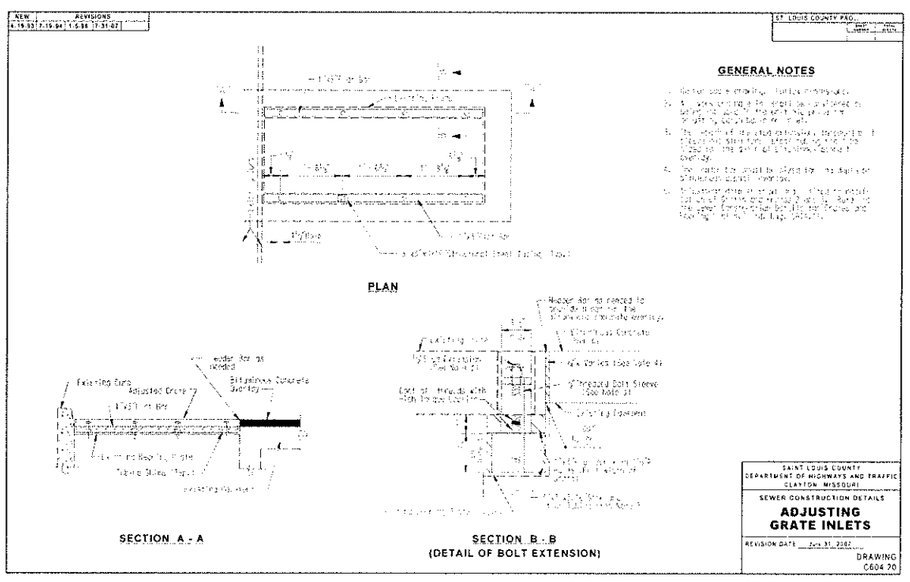




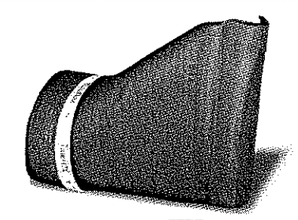


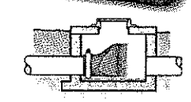
Series TF-1

- Ideal for manhole installations
- Minimal bottom clearance required
- Lightweight, all-elastomer design
- Seals around small solids
- Available in slip-on or flanged design

Materials of Construction
Neoprene, Hypalon®, Buna-N, EPDM, Viton®.

Mounting Bands
304 or 316 Stainless steel.

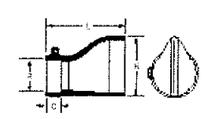




The TF-1 is designed for installation in existing structures such as interceptors, manholes and vaults where the invert of the pipe is close to the floor. The flat-bottom and offset-hill design of the TF-1 allows it to be installed without any modifications to the structure.

The TF-1 offers low cracking pressure to reduce the potential for standing water and very low headloss which is not affected by rust, corrosion or lack of lubrication.

The TF-1 is ideal for sewer systems because it will seal around small debris. The TF-1 design is available with a slip-on or flanged pipe connection. Tide flex® TF-1 valves are constructed with a curved hill as standard.



Pipe D.I.D.	Length	Hill Height	Collar Length
4	10	8	1 1/2
5	10	8	1 1/2
6	16	12	2
8	18	16	2
10	23	19	3
12	27	23	4
14	27	23	4
16	36	30	5
18	36	34	6
20	44	37	6
22	44	37	6
24	48	43	8
26	48	43	8
28	48	43	8
30	56	55	9
33	56	55	9
36	67	69	10
38	67	69	10
40	67	69	10
42	81	71	10
44	81	71	10
48	66	78	10
50	66	78	10
54	66	78	10
58	66	78	10
60	73	91	14
68	73	91	14
72	96	115	16

Numbers indicate maximum dimensions in inches.

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A TRACT OF LAND IN SECTION 34,
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

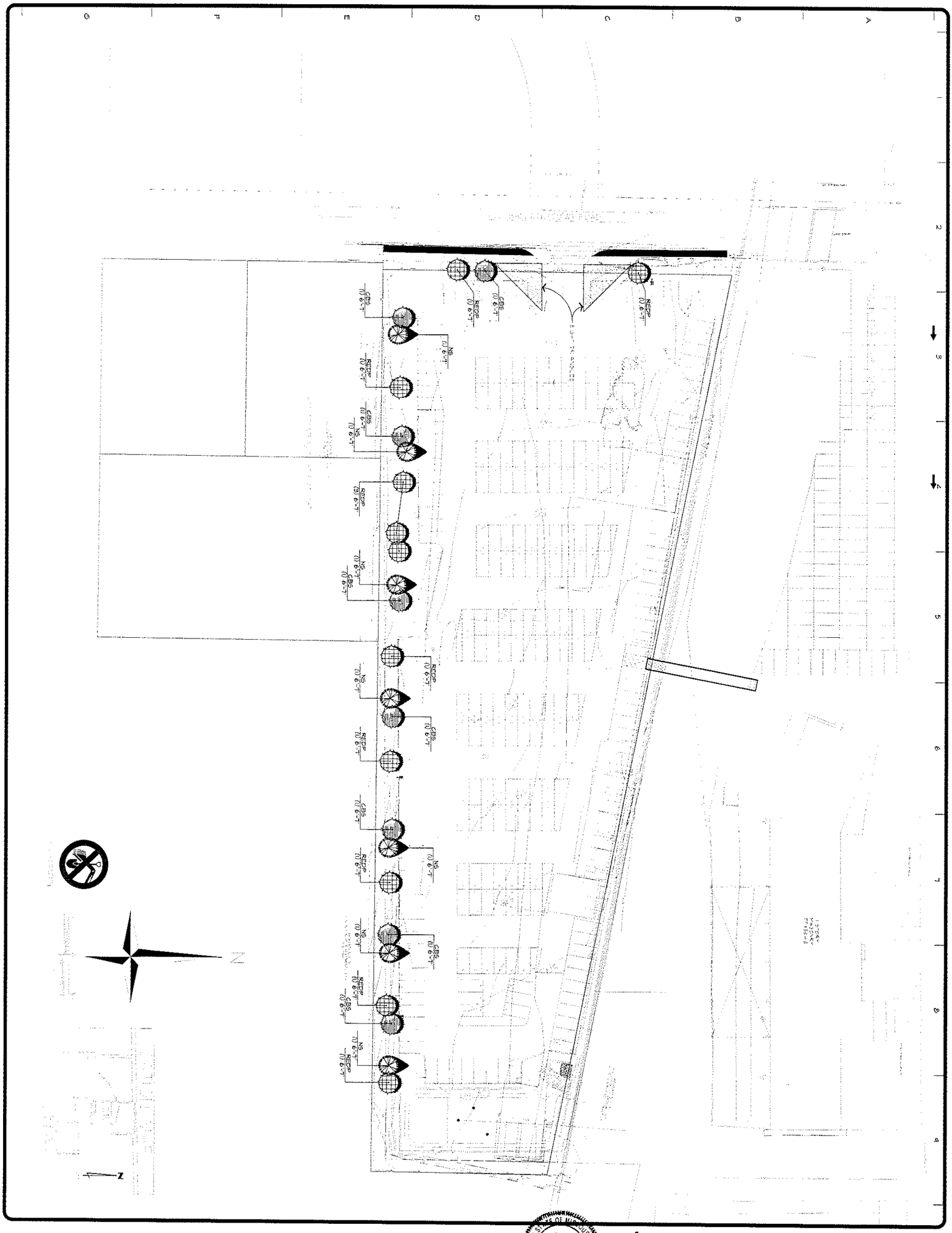
CONSTRUCTION DETAILS
SHEET 2

LOCATOR NUMBER: 23S 03 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

21332

01-22-2018

C16



PLANTING PLAN FOR THE PROPOSED BUFFER PLANTING @

Elco Chevrolet

BALLWIN, MISSOURI

STATE OF MISSOURI
RANDALL H. VALDIS
NUMBER 012
REGISTERED LANDSCAPE ARCHITECT

RANDALL H. VALDIS
MISSOURI LANDSCAPE ARCHITECT #000014
DATE: 11-20-17

landscape TECHNOLOGIES
ST JOHNS GREEN DRIVE
ST. CHARLES, MISSOURI 63304
(636) 928-1250
Fax: (636) 928-1569
MO Landscape Architectural Corporation #2006000162

REVISIONS BY

DRAWN BY: MW
CHECKED BY: RHV
DATE: 11-20-17
SCALE: 1"=20'-0"
JOB NO: 2017-169
SHEET: L-1
OF TOTAL SHEETS

LANDSCAPE GUIDELINE SPECS:

GENERAL:

1.) All natural vegetation shall be maintained where it does not interfere with construction or the permanent plan of operation. Every effort possible shall be made to protect existing structures or vegetation from damage due to equipment usage. Contractor shall at all times protect all materials and work against injury to public.
2.) The landscape contractor shall be responsible for any coordination and sequencing with other site related work being performed by other contractors. Refer to additional drawings for further coordination of work to be done.
3.) Underground facilities, structures and utilities must be considered approximate only. There may be others not presently known or shown. It shall be the landscape contractor's responsibility to determine or verify the existence of and exact location of the above (call utility location services to municipality).
4.) Plant material are to be planted in the same relationship to grade as was grown in nursery conditions. All planting beds shall be cultivated to 6" depth minimum and graded smooth immediately before planting of plants. Plant groundcover to within 12" of trunk of trees or shrubs planted within the area.
5.) It shall be the landscape contractor's responsibility to:
   A.) Verify all existing and proposed features shown on the drawings prior to commencement of work.
   B.) Report all discrepancies found with regard to existing conditions or proposed design to the landscape architect immediately for a decision.
   C.) Stake the locations of all proposed plant material and obtain the approval of the owner's representative or landscape architect ten (10) days prior to installation.
6.) Items shown on this drawing take precedence over the material list. It shall be the landscape contractor's responsibility to verify all quantities and conditions prior to implementation of this plan. No substitutions of types or size of plant materials will be accepted without written approval from the landscape architect.
7.) Provide single-stem trees unless otherwise noted in plant schedule.
8.) All plant material shall comply with the recommendations and requirements of ANSI Z60.1 "American Standards for Nursery Stock".
9.) It shall be the contractor's responsibility to provide for inspection of the plant material by the Landscape Architect (or Owners' Representative) prior to acceptance. Inspections may take place before, during or after installation. Plants not conforming exactly to the plant list will not be accepted and shall be replaced at the landscape contractor's expense.
10.) All bids are to have unit prices listed. The Owner has the option to delete any portion of the contract prior to signing the contract or beginning work. This will be a unit price contract; quotes shall be valid for 12 months.
11.) Should auger equipment be utilized in excavating any plant pits, vertical sides of plant pits shall be thoroughly scarified to avoid creation of "polished side walls" prior to plant material installation.
12.) All excess topsoil, rocks, debris and/or tainted soils shall be removed by the general contractor prior to point project is turned over to the landscape contractor to commence landscape installation.
13.) Keep all plant material (except turf) a minimum of 36" clear of fire hydrants.
14.) Landscape contractor shall kill & remove all existing weeds within the project site.
15.) All tags, nursery stakes, labels, etc. shall be removed by the landscape contractor at completion of all landscape installation.
16.) Landscape contractor shall be in compliance with all Federal, state and local laws / regulations relating to insect infestation and/or plant diseases.
17.) All substitutions of plant material shall be submitted to landscape architect for approval.

PRUNING:

1.) Lightly prune trees at time of planting. Prune only the crossover limbs, intermingled leaders and/or any broken branches. Some interior twigs and lateral branches may be pruned. However, do not remove the terminal buds of branches that extend to the edge of the crown.
2.) All pruning shall comply with ANSI A300 standards.

INSURANCE:

1.) The landscape contractor shall submit certificates of insurance for workman's compensation and general liability.

MULCH:

1.) All mulch to be shredded oak bark mulch at 3" depth (after compaction) unless otherwise noted. Mulch shall be clean and free of all foreign materials, including weeds, mold, deleterious materials, etc.
2.) No plastic sheeting or filter fabric shall be placed beneath shredded bark mulch beds. Mirafi fabric shall be used beneath all gravel mulch beds. Lap fabric 6" over adjacent coverage.
3.) Edge all beds with spade-cut edge unless otherwise noted.

MAINTENANCE:

1.) Landscape Contractor shall provide a separate proposal to maintain all plants, shrubs, groundcover, perennials and annuals for a period of 12 months after acceptance.
2.) Contractor shall ensure that only competent and trained personnel shall provide such services and that such services be provided in a timely manner.
3.) Watering of seeded or sodded lawns shall begin immediately and shall continue to be provided continuously for the following 72 hours. Regardless, the landscape contractor shall be respostble for all landscape maintenance until project turnover.

TOPSOIL:

1.) Topsoil mix for all proposed landscape plantings shall be five (5) parts well-drained screened organic topsoil to one (1) part Canadian sphagnum peat moss as per planting details. Roto-till topsoil mix to a depth of 6" minimum and grade smooth.
2.) Provide a soil analysis, as requested, made by an independent soil-testing agency outlining the % of organic matter, inorganic matter, deleterious material, pH and mineral content.
3.) Any foreign topsoil used shall be free of roots, stumps, weeds, brush, stones (larger than 1"), litter or any other extraneous or toxic material. Landscape contractor shall be fully responsible for correcting all negative soil issues prior to plant installation. Killing and removal of all weeds shall be the responsibility of the landscape contractor as part of this task.
4.) Landscape contractor to apply pre-emergent herbicide to all planting beds upon completion of planting operations and before application of shredded bark mulch.
5.) Install siltation controls prior to commencement of any grading operations. Inspect and maintain all siltation fences on a weekly basis until vegetation is established.

TURF:

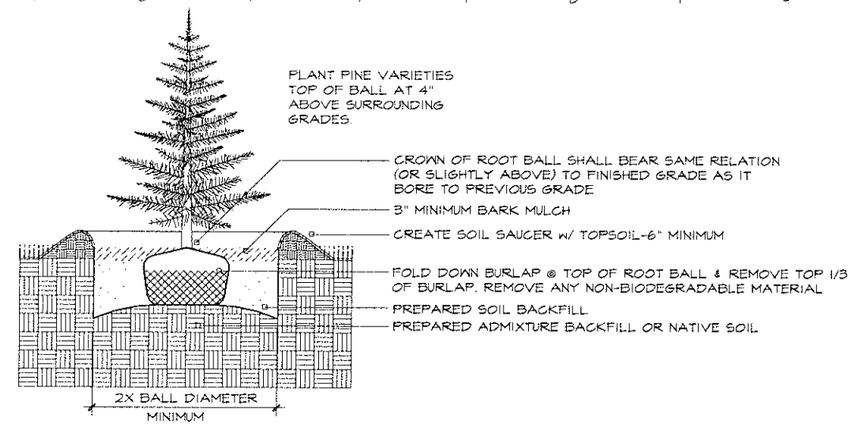
1.) All disturbed lawn areas to be seeded with a mixture of Turf-Type fescue (300# per acre) and bluegrass (18# per acre). Lawn areas shall be unconditionally warranted for a period of 90 days from date of final acceptance. Bare areas more than one square foot per any 50 square feet shall be replaced.
2.) The turf contractor shall be responsible for protection of finished grade; restore and repair any erosion or water damage and obtain owners' approval prior to seeding or sod installation.
3.) Landscape contractor shall offer an alternate price for sod in lieu of seed. Sod shall be cut at a uniform thickness of 3/4". No broken pieces, irregular pieces or torn pieces will be accepted.
4.) Any points carrying concentrated water loads and all slopes of 15% or greater shall be sodded.
5.) All sod shall be placed a maximum of 24 hours after harvesting.
6.) Reconstruct existing lawn areas damaged by Contractor's operations including equipment/material storage and movement of vehicles.
7.) Sod Contractor to ensure sod is placed below sidewalk and all paved area elevations to allow for proper drainage.

PLUG PLANTING NOTES:

1.) All plugs to be 4-1/2" deep X 2" diameter minimum.
2.) Plugs are to be planted in a hole dug with a trowel, spade or planting bar such that the hole is of a minimum diameter and depth to accommodate the plug and its roots, without damage.
3.) Plugs shall be spaced in a triangulated layout approximately 24" on center. Plugs shall be planted through erosion control blanket where appropriate.
4.) Obtain plugs from a reputable nursery.
5.) Water plugs upon completion of planting so that soil is moist but not saturated.
6.) If planting is delayed more than six hours after delivery, store plugs in the shade, protect from weather and mechanical damage and keep them moist and cool. All plugs shall be planted within 24 hours after delivery.

WARRANTY:

1.) All plant material (excluding ground cover, perennials and annuals) are to be warranted for a period of 12 months after complete installation of all landscape material at 100% of the installed price.
2.) Any plant material found to be defective shall be removed and replaced within 30 days of notification or in growth season determined to be best for that plant.
3.) Only one replacement per tree or shrub shall be required at the end of the warranty period, unless loss is due to failure to comply with the warranty.
4.) Lawn establishment period will be in effect once the lawn has been mowed three times. Plant establishment period shall commence on the date of acceptance and 100% completion.
5.) A written guarantee shall be provided to the owner per conditions outlined in #1 above.



EVERGREEN TREE PLANTING

N.T.S.

PLANT SCHEDULE

EVERGREEN TREES	QTY	COMMON NAME / BOTANICAL NAME	SIZE	
CBS	8	Colorado Blue Spruce / Picea pungens 'Glauca'	6'-7'	
NS	7	Norway Spruce / Picea abies	6'-7'	
REDP	11	Red Pine / Pinus resinosa	6'-7'	

REVISIONS	BY

landscape TECHNOLOGIES
5 Corporate Center Drive, Suite 100, Melville, NY 11747
(631) 428-2900 FAX: (631) 428-2902
MO Landscape Architecture Corporation #2006006182

RANDALL J. DAVIS
MISSOURI LANDSCAPE ARCHITECT #000014
DATE: 11-30-17

PLANTING PLAN FOR THE PROPOSED BUFFER PLANTING @

Elco Chevrolet

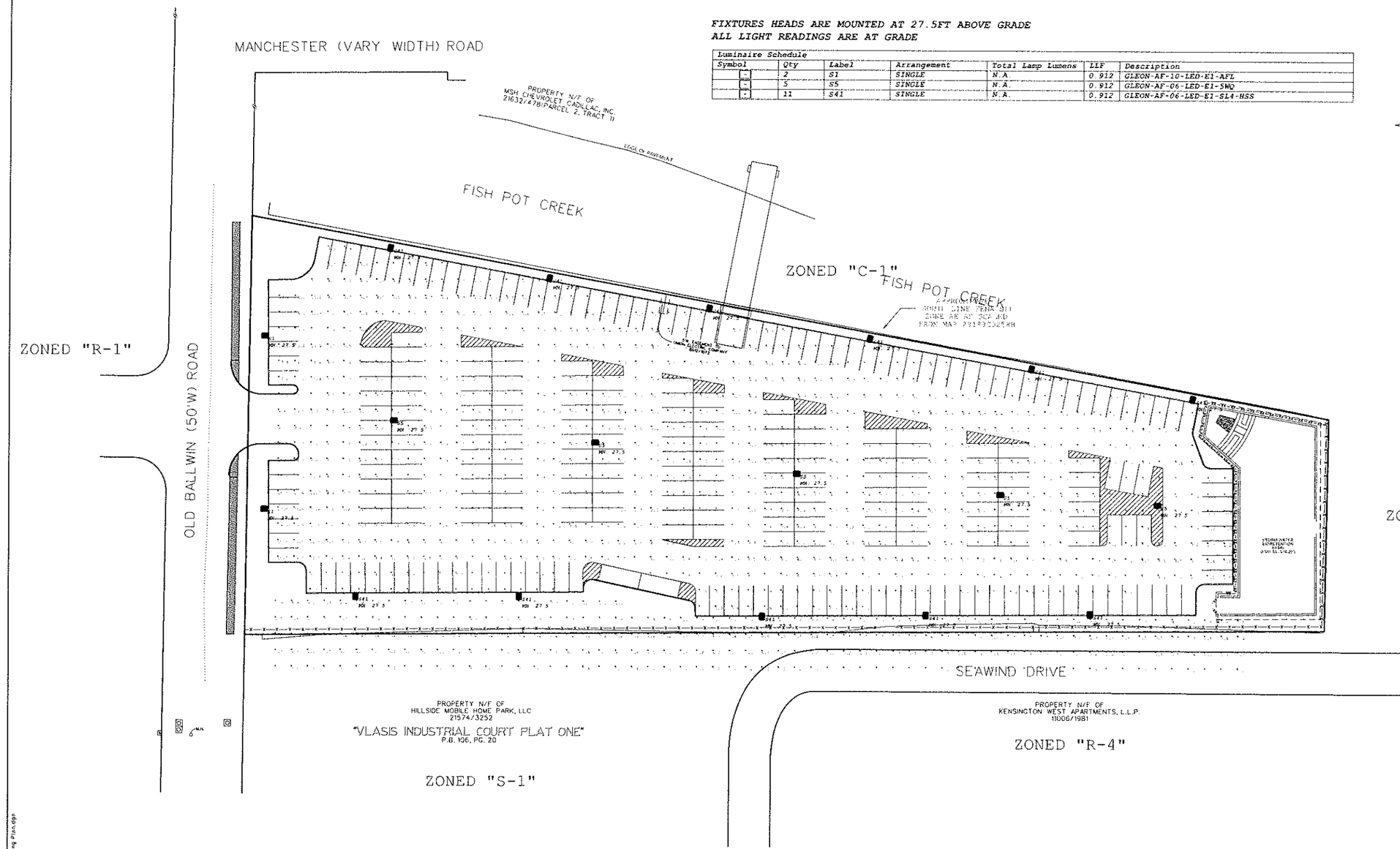
BALLWIN, MISSOURI

DRAWN	RJM
CHECKED	RJM/EL
DATE	11-30-17
SCALE	N.A.
JOB NO.	2017-188
SHEET	L-2

OF TWO SHEETS

FIXTURES HEADS ARE MOUNTED AT 27.5FT ABOVE GRADE
ALL LIGHT READINGS ARE AT GRADE

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description
	2	S1	SINGLE	N.A.	0.912	GLEON-AF-10-LED-E1-AFL
	5	S5	SINGLE	N.A.	0.912	GLEON-AF-06-LED-E1-SWQ
	11	S41	SINGLE	N.A.	0.912	GLEON-AF-06-LED-E1-SL4-HSS



N

30 0 30
Scale in Feet
1" - 30'

REVISED

17MSD-00096
MSD BASEMAP 23S2

ELCO
MSH CHEVROLET CADILLAC INC ETAL
15710 MANCHESTER RD
BALLWIN, MO 63011

VOLZ Incorporated
10649 Indian Head Industrial Boulevard
St. Louis, Missouri 63132
314.426.5212 Main
314.890.1250 Fax
www.volzinc.com
Certificate of Authority #2003

RYAN LEE HOLMES P.E.
PROFESSIONAL ENGINEER
E - 2017018988

ELCO CHEVROLET
A TRACT OF LAND IN SECTION 34,
TOWNSHIP 45 NORTH - RANGE 4 EAST
ST. LOUIS COUNTY MISSOURI

LIGHTING PLAN

LOCATOR NUMBER: 23S 63 0365
SITE ADDRESS: 112 OLD BALLWIN RD
2.941 ACRES

21332

01-22-2018

SDP2

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