HAWTHORN RIDGE
THIRD PLAT
STREET & STORM SEWER PLANS

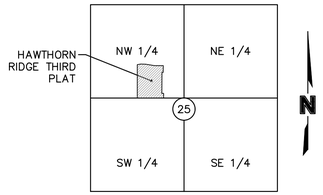
NW 1/4 SECTION 25, TOWNSHIP 47 N, RANGE 32 W
IN LEE'S SUMMIT, JACKSON COUNTY, MO

Gene Williams
Digitally signed by Gene Williams
Reason: I have reviewed this document
Date: 2022.01.25 13:16:35-06'00'

Accepted
Record Drawings

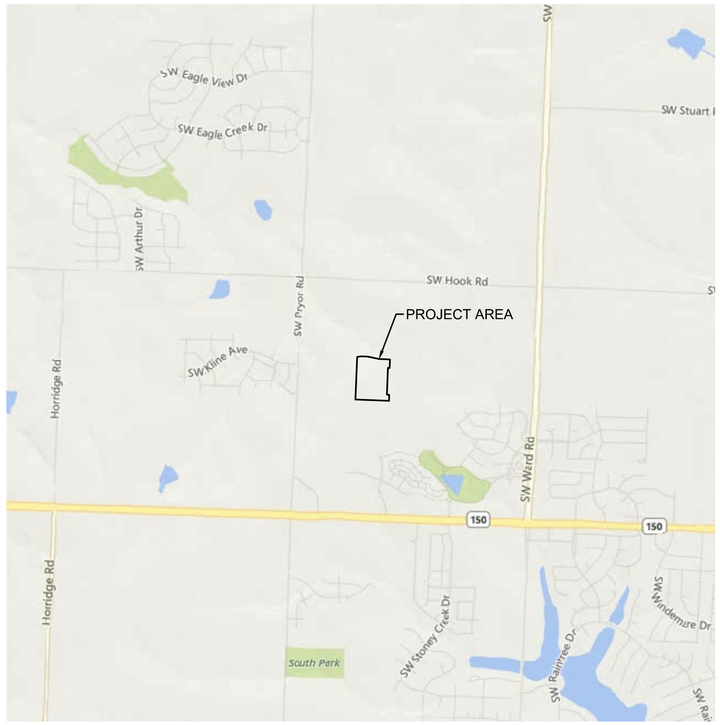
These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

ASBUILT
1/18/2022



LOCATION MAP
Sec. 25, Twp. 47 N., Rge. 32 W.
(N.T.S.)

PROJECT TEAM & UTILITY CONTACT LIST	
OWNER / DEVELOPER CLAYTON PROPERTIES GROUP, INC. D.B.A. SUMMIT HOMES 120 SE 30TH STREET CONTACT: VINCENT WALKER LEE'S SUMMIT, MO 64082 PHONE: 816.246.6700 EMAIL: VINCENT@SUMMITHOMESKC.COM	UTILITY SERVICE NUMBERS NAME: LEE'S SUMMIT PUBLIC WORKS PHONE: 816-969-1800 NAME: LEE'S SUMMIT WATER & SERVICES DEPARTMENT PHONE: 816-969-1940 NAME: SPIRE (MGE) PHONE: 314-342-0500 NAME: AT&T PHONE: 800-286-8313 NAME: KCP&L PHONE: 816-471-5275 NAME: SPECTRUM (TWC) PHONE: 877-772-2253 NAME: GOOGLE FIBER PHONE: 877-454-6959
ENGINEER OLSSON 1301 BURLINGTON ST. SUITE 100 NORTH KANSAS CITY, MO 64116 CONTACT: BROCK M. WORTHLEY PHONE: 816.361.1177 EMAIL: BWORTHLEY@OLSSON.COM	
SURVEYOR OLSSON 1301 BURLINGTON ST. SUITE 100 NORTH KANSAS CITY, MO 64116 CONTACT: JASON ROUDEBUSH PHONE: 816.361.1177 EMAIL: JROUDEBUSH@OLSSON.COM	



PROPERTY DESCRIPTION:

A TRACT OF LAND IN THE NORTHWEST QUARTER OF SECTION 25, TOWNSHIP 47 NORTH, RANGE 32 WEST OF THE 5TH PRINCIPAL MERIDIAN IN LEE'S SUMMIT, JACKSON COUNTY, MISSOURI, AND A PORTION OF TRACT E, OF HAWTHORN RIDGE 1ST PLAT, A SUBDIVISION OF LAND RECORDED AS DOCUMENT 2019E0020897 IN BOOK 182 AT PAGE 83, IN THE OFFICE OF RECORDER OF DEEDS FOR JACKSON COUNTY, MISSOURI ALL BEING BOUNDED AND DESCRIBED AS FOLLOWS: COMMENCING AT THE SOUTHWEST CORNER OF SAID NORTHWEST QUARTER OF SECTION 25; THENCE SOUTH 87°46'49" EAST ON THE SOUTH LINE OF SAID NORTHWEST QUARTER, 2,653.29 FEET TO THE SOUTHEAST CORNER OF SAID NORTHWEST QUARTER, (CENTER OF SECTION) AND THE POINT OF BEGINNING OF THE TRACT OF LAND TO BE HEREIN DESCRIBED; THENCE ON SAID SOUTH LINE OF SAID NORTHWEST QUARTER, NORTH 87°46'49" WEST, 577.00 FEET; THENCE LEAVING SAID SOUTH LINE, NORTH 02°13'11" EAST, 135.00 FEET; THENCE NORTH 87°46'49" WEST, 50.79 FEET; THENCE NORTH 02°18'36" EAST, 596.57 FEET; THENCE SOUTH 87°41'24" EAST, 37.00 FEET; THENCE NORTH 02°18'36" EAST, 192.00 FEET; THENCE NORTH 87°41'24" WEST, 75.58 FEET; THENCE NORTH 02°18'36" EAST, 39.05 FEET; THENCE NORTH 33°13'50" WEST, 218.11 FEET TO THE SOUTHWESTERLY CORNER OF LOT 21 OF SAID HAWTHORN RIDGE 1ST PLAT; THENCE ON THE SOUTHERLY LINE OF SAID HAWTHORN RIDGE 1ST PLAT THE FOLLOWING 9 CALLS, NORTH 54°57'38" EAST, 130.00 FEET; THENCE SOUTH 35°02'22" EAST, 58.00 FEET; THENCE NORTH 54°57'38" EAST, 175.90 FEET; THENCE SOUTH 65°30'07" EAST, 95.33 FEET; THENCE SOUTH 87°41'24" EAST, 121.73 FEET; THENCE NORTH 02°18'36" EAST, 78.00 FEET; THENCE SOUTH 87°41'24" EAST, 175.00 FEET; THENCE NORTH 02°18'36" EAST, 72.00 FEET; THENCE SOUTH 87°41'24" EAST, 130.00 FEET TO THE SOUTHEASTERLY CORNER OF LOT 28 OF SAID HAWTHORN RIDGE 1ST PLAT AND A POINT ON THE EAST LINE OF SAID NORTHWEST QUARTER; THENCE ON SAID EAST LINE, SOUTH 02°18'36" WEST, 1,392.58 FEET TO THE POINT OF BEGINNING. CONTAINING 827,409 SQUARE FEET OR 19.00 ACRES, MORE OR LESS.

BENCHMARK

RR SPIKE IN SOUTH FACE OF POWER POLE ON NORTH SIDE OF SW. HOOK ROAD, IMMEDIATELY WEST OF DRIVEWAY FOR HOUSE#1622. ELEVATION= 1024.63'

Sheet List Table	
Sheet Number	Sheet Title
C100	COVER SHEET
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C105	SWALE PLAN AND PROFILE
C106	SWALE PLAN AND PROFILE (CONT)
C107	ROADWAY PLAN AND PROFILE (BUCKTHORN STREET)
C108	ROADWAY PLAN AND PROFILE (BUCKTHORN STREET CONT)
C109	ROADWAY PLAN AND PROFILE (ARBORWAY TERRACE)
C110	ROADWAY PLAN AND PROFILE (ARBORWAY TERRACE CONT)
C111	ROADWAY PLAN AND PROFILE (ARBORWAY TERRACE CONT)
C112	ROADWAY PLAN AND PROFILE (ARBORIDGE CIRCLE)
C113	TRAFFIC CONTROL PLAN
C114	SPOT ELEVATIONS
C115	SPOT ELEVATIONS
C116	SPOT ELEVATIONS
C117	SPOT ELEVATIONS
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C119	STORM SEWER PLAN & PROFILE (LINE 2)
C120	STORM SEWER PLAN & PROFILE (LINE 3)
C121	STORM SEWER PLAN & PROFILE (LINE 5)
C122	STORM SEWER PLAN & PROFILE (LINE 4 & 6)
C123	DRAINAGE PLAN
C124	DRAINAGE TABLES
C125	MASTER DRAINAGE PLAN
C126	SIGN DETAILS
C127	STORM SEWER DETAILS
C128	STORM SEWER DETAILS
C129	ROADWAY MARKING DETAILS

☐ NOT FOR CONSTRUCTION

☒ REVIEWED FOR CONSTRUCTION

CALL BEFORE YOU DIG 1-800-DIG-RITE MISSOURI ONE CALL SYSTEM

OLSSON HAS BEEN RETAINED TO PROVIDE AS-BUILT DRAWINGS FOR THIS PROJECT.

Brad Worthley 1/18/2022

BROCK M. WORTHLEY, P.E.
CIVIL ENGINEER
MO# PE-2019000237

DATE

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Missouri Certificate of Authority #001592
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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
PROFESSIONAL ENGINEER
1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
1	11/23/2020	REVISED PER CITY COMMENTS	
2	12/10/2020	REVISED PER CITY COMMENTS	

REVISIONS

COVER SHEET
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

2020

LEE'S SUMMIT, MO

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_TTL01_A191605
date: 10/02/2020

SHEET
C100

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_TTL01_A191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:29pm XREFS: C_PBNDY_A191605 C_PTBLK_A191605

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT THE PLANS IN THEIR POSSESSION ARE THE MOST CURRENT VERSION ISSUED, ARE FULLY COORDINATED WITH ALL SUBCONTRACTORS, AND PRESENT ON SITE AT ALL TIMES. CURRENT PLANS PREPARED BY OLSSON MAY BE OBTAINED AT THE DIRECTION OF OLSSON'S CLIENT. DIRECT REQUESTS TO OLSSON MAY REQUIRE ADDITIONAL AUTHORIZATIONS, AGREEMENTS, AND/OR FEES. PLEASE CONTACT THE ENGINEER FOR INFORMATION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DEVIATIONS FROM THESE PLANS UNLESS WRITTEN APPROVAL FROM ENGINEER, OWNER, AND DEVELOPER.
3. ALL WORK AND MATERIALS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE OWNER OR THE OWNER'S REPRESENTATIVE.
4. ALL ESTIMATES OF QUANTITIES ARE FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING QUANTITIES AND ITEMS OF WORK.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL LABOR, MATERIALS, AND EQUIPMENT REQUIRED TO COMPLETE THE WORK SHOWN IN THE PLANS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS, PAYING ALL FEES, AND FOR OTHERWISE COMPLYING WITH ALL APPLICABLE REGULATIONS GOVERNING THE WORK.
7. THE CONTRACTOR SHALL NOT ENGAGE IN ACTIVITIES THAT MAY ENCROACH ON WATERS OF THE U.S., INCLUDING WETLANDS, UNTIL ANY NECESSARY PERMITS MAY BE OBTAINED. THE CONTRACTOR SHALL REVIEW AND COMPLY WITH ALL CONDITIONS DESCRIBED IN THE PERMIT.
8. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, THE SAFETY OF ALL PERSONS INCLUDING VISITORS AND THE GENERAL PUBLIC, AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY THROUGHOUT THE PROJECT AND NOT BE LIMITED BY WORKING HOURS. ANY CONSTRUCTION OBSERVATION BY THE ENGINEER OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES.
9. PRIOR TO COMMENCEMENT OF WORK THE CONTRACTOR SHALL NOTIFY AND COORDINATE WITH ALL UTILITY COMPANIES AND OBTAIN ANY RELEVANT INFORMATION. NOTIFY ENGINEER OF ANY DISCREPANCIES.
10. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL BOUNDARY CORNERS AND SECTION CORNERS. ANY BOUNDARY CORNER AND/OR SECTION CORNER DISTURBED OR DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE RESET BY A LAND SURVEYOR LICENSED IN THE STATE OF MISSOURI, AT THE CONTRACTOR'S EXPENSE.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ADJACENT PROPERTIES AND SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT DAMAGE DURING CONSTRUCTION. THE CONTRACTOR IS ALSO RESPONSIBLE FOR REPAIRING ANY DAMAGE RESULTING FROM CONSTRUCTION ACTIVITIES.
12. PRIOR TO MOVING OFF THE JOB THE CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER TO PERFORM A FINAL WALK-THROUGH OF THE CONSTRUCTION SITE.

REFERENCES

1. UNLESS EXPLICITLY DESCRIBED OTHERWISE WITHIN THESE PLANS THE FOLLOWING SHALL APPLY;
   A. ALL CONSTRUCTION, INCLUDING THOSE LISTED BELOW, SHALL CONFORM TO THE LATEST CODES AND ORDINANCES OF LEE'S SUMMIT, MISSOURI.
   B. ALL CONSTRUCTION IN MODOT RIGHT-OF-WAY SHALL CONFORM TO THE LATEST SPECIFICATIONS ADOPTED BY U.S. DEPARTMENT OF TRANSPORTATION AND MODOT.
   C. ALL TRAFFIC CONTROL SIGNAGE SHALL CONFORM WITH THE CURRENT EDITION OF THE MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
   D. ALL UTILITY EXTENSIONS AND CONSTRUCTION SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE UTILITY COMPANIES..
   E. ALL EXTERIOR PAVEMENT (PCC, ASPHALT, ETC.) SHALL BE IN CONFORMANCE WITH THE SPECIFICATIONS OF LEE'S SUMMIT, MISSOURI AND THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT.
4. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE DELIVERY MANAGER AND COORDINATING ANY MAILBOXES THAT MAY BE DISTURBED. FAILURE TO DO SO MAY SUBJECT THE CONTRACTOR TO PROSECUTION BY THE FEDERAL GOVERNMENT.

EXISTING CONDITIONS

1. THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS OF THE PROJECT AREA.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PERFORMING THEIR OWN INVESTIGATIONS AND MAKING THEIR OWN ASSUMPTIONS REGARDING SITE SURFACE AND SUBSURFACE CONDITIONS. THIS INCLUDES THE LOCATION AND CONSISTENCY OF ANY EXISTING ROCK LAYERS UNDERLYING THE PROJECT SITE. CONTACT THE ENGINEER REGARDING ANY DISCREPANCIES THAT MAY AFFECT THE ABILITY TO CONSTRUCT FROM THESE PLANS AS DESIGNED.
3. EXISTING CONDITIONS WERE DETERMINED THROUGH A VARIETY OF METHODS THAT MAY INCLUDE SURVEY, AERIAL IMAGERY, AVAILABLE RECORDS, GIS DATA, ETC. SUBSURFACE CONDITIONS ARE APPROXIMATE AND MAY NOT INCLUDE ALL UTILITIES AND OTHER SITE IMPROVEMENTS PRESENT ON SITE. THE CONTRACTOR SHALL MAKE EXPLORATION EXCAVATIONS AND LOCATE EXISTING UNDERGROUND UTILITIES SUFFICIENTLY AHEAD OF CONSTRUCTION TO PERMIT REVISIONS TO PLANS WHEN CONFLICTS AND DISCREPANCIES ARE FOUND.

CONSTRUCTION

1. THE CONTRACTOR SHALL INSTALL TRAFFIC CONTROL WHILE WORKING IN THE PUBLIC RIGHT-OF-WAY AS SHOWN IN THESE PLANS. IF PLANS ARE NOT PROVIDED, CONTRACTOR SHALL COORDINATE AND PROVIDE CONTROLS TO THE SATISFACTION OF THE RIGHT-OF-WAY OWNER.
2. THE CONTRACTOR SHALL PROTECT ALL TREES OVER 3" CALIPER FROM DAMAGE. NO TREE SHALL BE REMOVED WITHOUT PERMISSION OF THE OWNER, UNLESS SHOWN OTHERWISE ON THESE PLANS.
3. THE CONTRACTOR SHALL DISPOSE ALL WASTE MATERIAL RESULTING FROM THE PROJECT OFF-SITE AND IN STRICT CONFORMANCE WITH ALL LOCAL CODES AND ORDINANCES.
4. ALL MANHOLES, CATCH BASINS, UTILITY VALVES AND METER PITS ARE TO BE ADJUSTED OR REBUILT TO GRADE AS REQUIRED. NOT ALL ADJUSTMENTS ARE INDICATED IN THE PLANS.
5. THE CONTRACTOR SHALL STREET SWEEP OR OTHERWISE CLEAN ALL ACCESS ROUTES TO THE SITE AT CONCLUSION OF THE PROJECT.

SHOP DRAWINGS

1. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS A MINIMUM OF 7 DAYS PRIOR TO THE REQUESTED DATE OF APPROVAL. ENGINEER SHALL REVIEW SHOP DRAWINGS OR SAMPLES IN CONFORMANCE WITH THE DESIGN FOR THIS PROJECT AS DESCRIBED IN THE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ERRORS OR OMISSIONS IN SHOP DRAWINGS. THE ENGINEER'S REVIEW SHALL NOT EXTEND TO MEANS OR METHODS OF CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY VARIATION FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS UNLESS CONTRACTOR HAS NOTIFIED ENGINEER OF EACH SUCH VARIATION AT THE TIME OF SUBMISSION, AND OBTAINED ENGINEER'S WRITTEN APPROVAL OF EACH SUCH VARIATION. PRIOR TO SUBMITTING EACH SHOP DRAWING OR SAMPLE, CONTRACTOR SHALL HAVE REVIEWED AND VERIFIED:
   A. ALL FIELD MEASUREMENTS, QUANTITIES, DIMENSIONS, SPECIFIED PERFORMANCE CRITERIA, INSTALLATION REQUIREMENTS, MATERIALS, CATALOG NUMBERS AND SIMILAR INFORMATION WITH RESPECT THERETO;
   B. ALL MATERIALS WITH RESPECT TO INTENDED USE, FABRICATION, SHIPPING, HANDLING, STORAGE, ASSEMBLY AND INSTALLATION PERTAINING TO THE PERFORMANCE OF THE WORK;
   C. ALL INFORMATION RELATIVE TO MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES OF CONSTRUCTION AND SAFETY PRECAUTIONS AND PROGRAMS INCIDENT THERETO;
   D. CONTRACTOR SHALL ALSO HAVE REVIEWED AND COORDINATED EACH SHOP DRAWING OR SAMPLE WITH OTHER SHOP DRAWINGS AND SAMPLES, AND WITH THE REQUIREMENTS OF THE WORK AND THE CONTRACT DOCUMENTS.
   E. ALL SUBMITTED SHOP DRAWINGS SHALL BEAR A STAMP OR SPECIFIC WRITTEN INDICATION AND SIGNATURE THAT CONTRACTOR HAS FULLY COMPLETED THE ABOVE TASKS.
2. SHOP DRAWINGS AS DESCRIBED ABOVE ARE REQUIRED FOR, BUT NOT LIMITED TO, THE FOLLOWING:
   A. ALL STORM SEWER STRUCTURES TO BE INSTALLED WITH THIS PROJECT.
   B. ANY ITEMS IN THESE PLANS THAT ALLOW FOR AN "APPROVED EQUAL" ALTERNATIVE.

STORM SEWER GENERAL NOTES:

1. STORM STRUCTURES SHALL BE PER CURRENT CITY DETAILS. IF CITY DOES NOT HAVE PUBLISHED DETAILS STRUCTURES SHALL BE PER CURRENT APWA SPECIFICATIONS.
2. PRIOR TO COMMENCEMENT OF WORK THE CONTRACTOR SHALL NOTIFY AND COORDINATE CONSTRUCTION WITH CITY OF LEE'S SUMMIT, MISSOURI.
3. ALL PIPE LENGTHS AND ELEVATIONS ARE CALCULATED LINEARLY FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.
4. ALL STRUCTURE DIMENSIONS ARE TO INSIDE FACE OF STRUCTURE.
5. COORDINATES ARE PROVIDED AT THE CENTER OF STRUCTURE. ADDITIONAL COORDINATES PROVIDED ARE PER LOCAL CODES AND ORDINANCES OR AS AN AID WHEN ORIENTING THE BOX DURING INSTALLATION.
6. THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICT AND POINTS OF CONNECTION PRIOR TO ANY CONSTRUCTION OF STORM SEWER.
7. STORM SEWER TRENCHES SHALL BE CONSTRUCTED SUCH THAT UNDISTURBED EXISTING SOIL OR FILL COMPACTED TO 95% PROCTOR DENSITY IS AT A DEPTH THAT IS 18" ABOVE TOP OF PROPOSED PIPE.
8. STRUCTURE INVERT CHANNELS SHALL BE SMOOTH, CIRCULAR, AND CONFORMING TO ½ THE ADJACENT PIPE SECTION (INVERT TO CENTER). CHANGES IN DIRECTION OF FLOW SHALL BE MADE WITH A SMOOTH CURVE AND MAINTAIN SHAPE THROUGHOUT. CHANGES IN GRADE OF ADJACENT PIPES SHALL BE TRANSITIONED SMOOTHLY AND EVENLY THROUGH THE STRUCTURE.
9. PIPE PENETRATIONS SHALL BE GROUTED TO ENSURE WATERTIGHT SEALS.
10. MAINTAIN MINIMUM DEPTH OF COVER PER APWA 5606.06

CONTROL POINT TABLE

Point Number	Northing	Easting	Point Elevation	Raw Description
90009	981383.7330'	2813865.4520'	1064.23'	CP 60D
90012	981431.6120'	2813832.1000'	1062.71'	CP 60D
90033	981440.4750'	2814063.8700'	1047.98'	CP 60D
90044	981710.8560'	2814198.8050'	1027.00'	CP 60D
90052	981859.5430'	2814200.2150'	1017.51'	CP 60D
90056	981975.4580'	2814144.8570'	1011.69'	CP 60D
90080	981971.2190'	2814027.5570'	1016.72'	CP 60D

VERTICAL CONTROL IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). THE DEVELOPER IS ADVISED TO USE BENCHMARK INFORMATION FOR VERTICAL CONTROL.
HORIZONTAL CONTROL (CONTROL POINT INFORMATION) IS BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAVD83). THE DEVELOPER IS ADVISED TO USE CONTROL POINT INFORMATION FOR HORIZONTAL CONTROL.

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	AS-BUILT
	STREET			
	EXCAVATION	C.Y.	5712	
	EMBANKMENT	C.Y.	12363	
	SUBGRADE STABILIZATION (6" FLYASH TREATMENT)	S.Y.	5481	
	SUBGRADE STABILIZATION (9" FLYASH TREATMENT)	S.Y.	2962	
	6" ASPHALT PAVEMENT	S.Y.	4540	
	7.5" ASPHALT PAVEMENT	S.Y.	2625	
	CONCRETE CURB & GUTTER (CG-1)	L.F.	1371	
	CONCRETE CURB & GUTTER (CG-2)	L.F.	2771	
	MILL & OVERLAY	S.Y.	31	
	ADA RAMP	EA.	4	
	STOP SIGNS	EA.	2	
	STREET NAME SIGNS	EA.	6	
	END OF ROAD TREATMENT	EA.	1	
	STORM			
	STD. CURB INLET (5'x3' INSIDE)	EA.	~~11~~	11
	STD. CURB INLET (5'x4' INSIDE)	EA.	~~1~~	1
	STD. FIELD INLET (4'x4' INSIDE)	EA.	~~1~~	1
	RAISE EXISTING JUNCTION BOX (6'x6' INSIDE)	V.F.	~~5.06~~	5.0
	15" RCP	L.F.	~~103.17~~	103.79
	15" HDPE	L.F.	~~1295.35~~	1296.05
	24" HDPE	L.F.	~~85.23~~	85.20
	48" HDPE	L.F.	~~122.83~~	123.79
	60" HDPE	L.F.	~~197.33~~	186.95
	15" HDPE END SECTION	EA.	~~1~~	1
	60" CMP END SECTION	EA.	~~1~~	1
	RIPRAP	S.Y.	~~88.5~~	147.98
	CONNECTION TO EXISTING STRUCTURE	EA.	~~1~~	1
	CONNECTION TO EXISTING PIPE	EA.	~~2~~	1

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

ASBUILT
1/18/2022

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
1/18/2022
PROFESSIONAL ENGINEER

REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

GENERAL NOTES
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

2020

LEE'S SUMMIT, MO

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_TTL01_A191605
date: 10/02/2020

SHEET
C101

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_TTL01_A191605.dwg
DATE: Jan 18, 2022 3:29pm
XREFS: C_PBNDY_A191605 C_PTBLK_A191605
USER: bworthley

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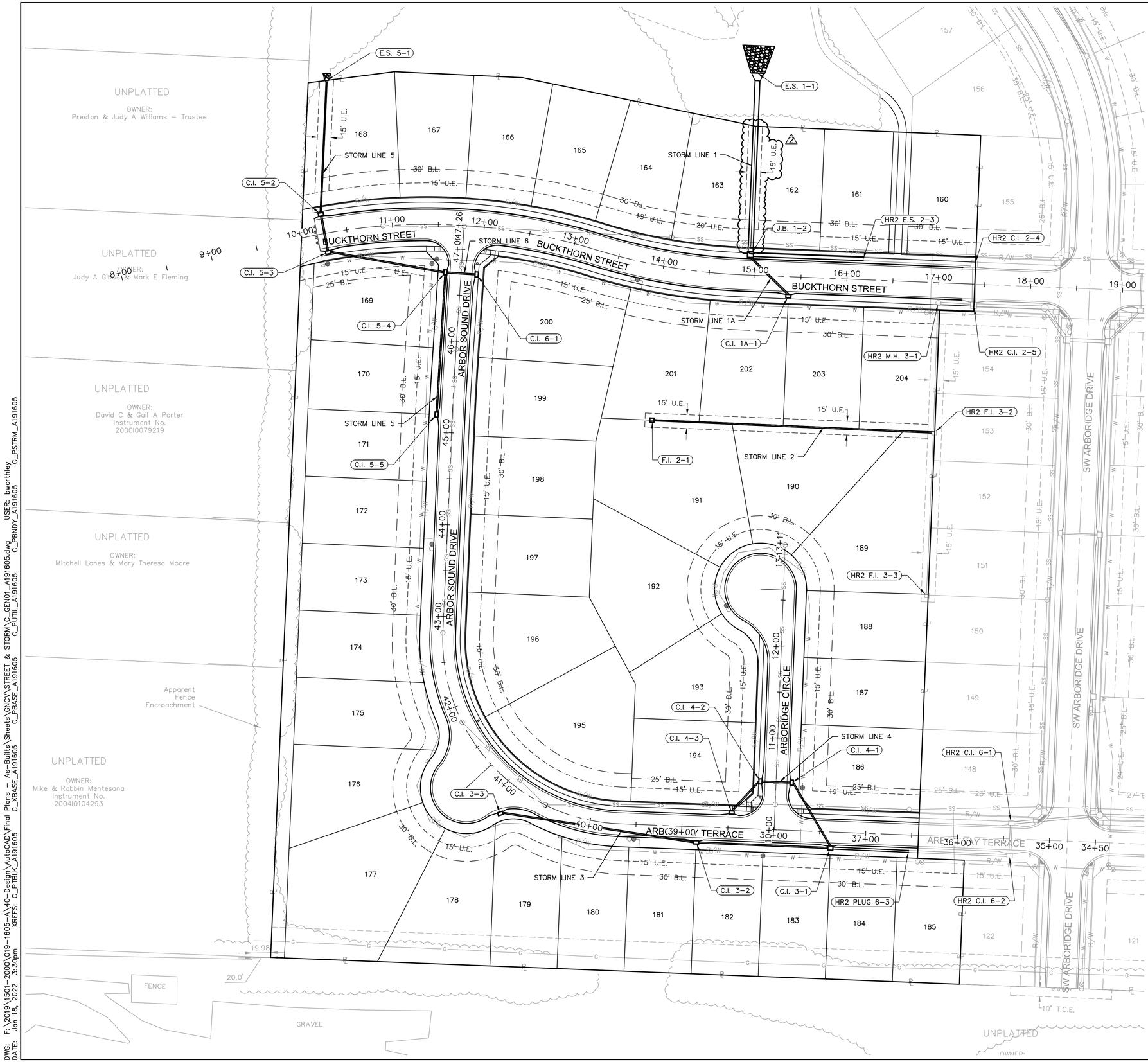

NOT ASBUILT

N

0' 25' 50' 100'
SCALE IN FEET

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
1/18/2022
PROFESSIONAL ENGINEER

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
2	12/10/2020	REVISED PER CITY COMMENTS	

REVISIONS

GENERAL LAYOUT
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

2020

LEE'S SUMMIT, MO

drawn by:	OLS
checked by:	BMW
approved by:	BMW
QA/QC by:	JES
project no.:	A19-1605
drawing no.:	C_GEN01_A191605
date:	10/02/2020

SHEET
C102

Accepted
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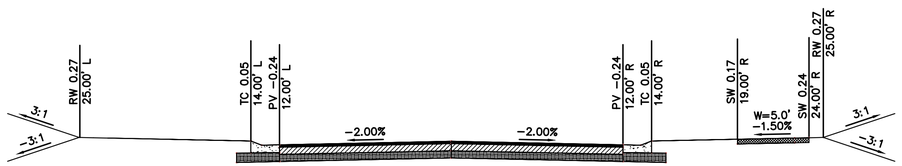
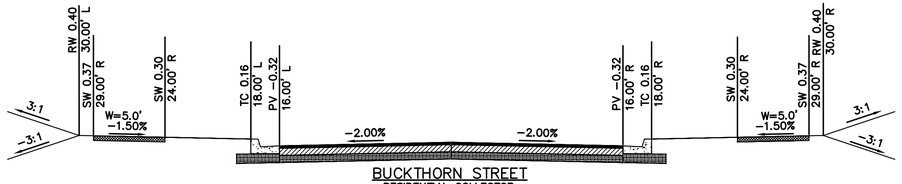


ARBOR SOUND DRIVE, ARBORIDGE CIRCLE & ARBORWAY TERRACE
RESIDENTIAL LOCAL
N.T.S.

2" TYPE 6 ASPHALTIC CONCRETE SURFACE
4" TYPE 5 ASPHALTIC CONCRETE BASE COURSE
6" MIN. MODOT TYPE 5 STONE BASE
6" FLYASH STABILIZED SUBGRADE
CG-2 CURB & GUTTER

1 Scale: N.T.S.
RESIDENTIAL LOCAL STREET



BUCKTHORN STREET
RESIDENTIAL COLLECTOR
N.T.S.

2" TYPE 6 ASPHALTIC CONCRETE SURFACE
5.5" TYPE 5 ASPHALTIC CONCRETE BASE COURSE
6" MIN. MODOT TYPE 5 STONE BASE
9" FLYASH STABILIZED SUBGRADE
CG -1 CURB & GUTTER

2 Scale: N.T.S.
RESIDENTIAL COLLECTOR STREET

NOT ASBUILT

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
PROFESSIONAL ENGINEER
1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

TYPICAL SECTIONS
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

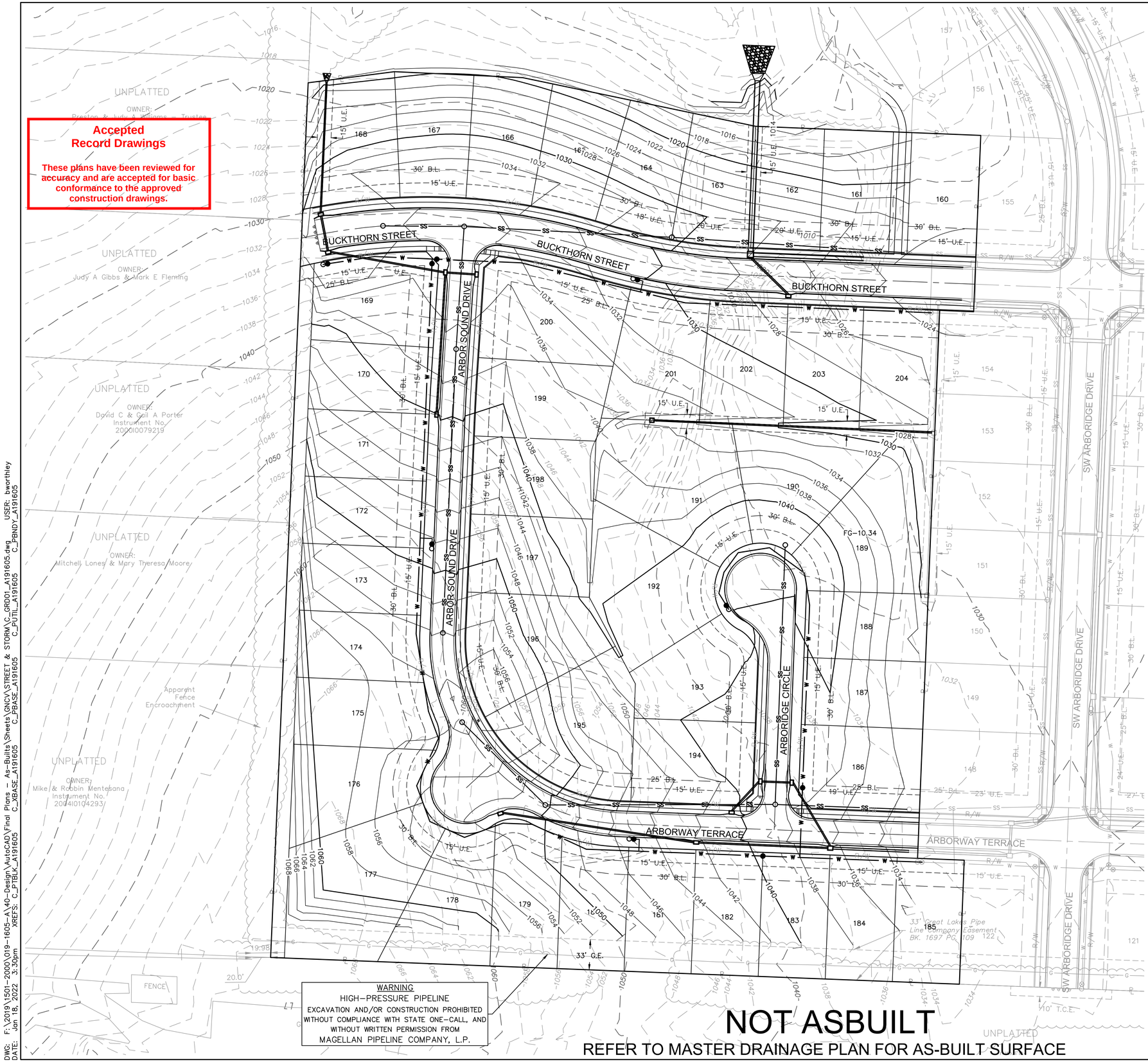
drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_TYP01_0191605
date: 10/02/2020

SHEET
C103

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_TYP01_0191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:30pm XREFS: C_PTBLK_A191605

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.



NOT ASBUILT

REFER TO MASTER DRAINAGE PLAN FOR AS-BUILT SURFACE

GENERAL NOTES:

1. CONTRACTOR SHALL ADHERE TO THE "DESIGN AND CONSTRUCTION MANUAL" SECTION 2100 AS ADOPTED BY THE CITY OF LEE'S SUMMIT (LATEST EDITION), FOR EXCAVATION AND EMBANKMENT WORK WITHIN THE PROPOSED RIGHT–OF–WAY.

2. AREAS OF CONSTRUCTION SHALL BE STRIPPED OF ALL VEGETATION, ORGANIC MATTER AND TOPSOIL TO A DEPTH AS RECOMMENDED BY GEOTECHNICAL ENGINEER AND OR TESTING AGENCY. SOILS REMOVED DURING SITE STRIPPING SHOULD BE EVALUATED TO DETERMINE IF PORTIONS OF THE TOPSOIL STRATUM MAY BE UTILIZED AS STRUCTURAL FILL WITHIN PAVEMENT AREAS. ANY MATERIAL NOT DEEMED AS SUITABLE FILL MATERIAL BY THE GEOTECHNICAL ENGINEER AND OR TESTING AGENCY SHALL BE REMOVED FROM THE JOB SITE BY THE CONTRACTOR AT HIS EXPENSE.

3. ALL EMBANKMENT OUTSIDE OF RIGHT–OF–WAY SHOULD BE PLACED IN CONTROLLED LIFTS HAVING A MAXIMUM LOOSE LIFT THICKNESS OF 8". EMBANKMENT SHOULD BE COMPACTED TO A MINIMUM OF 95% OF THE MATERIALS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D–698 (STANDARD PROCTOR COMPACTION). MOISTURE CONTENT OF THE FILL AT THE TIME OF COMPACTION SHALL BE WITHIN A RANGE OF –0 TO +4 PERCENT OF OPTIMUM MOISTURE CONTENT.

LOT FILL INFORMATION

LOT NUMBER	MAX DEPTH OF FILL (OVER 2' PLACED)	FILL PLACED ON EXISTING SLOPES > 5:1	PROPOSED SLOPES > 3:1
160			
161	17.3	X	
162	19.5	X	
163	20.4	X	
164	12.5	X	
165	10.2		
166	10.3		
167	10.1		
168	9.1		
169			
170			
171			
172			
173			
174			
175			
176			
177			
178			
179			
180			
181			
182			
183			
184			
185			
186	3.9	X	
187	7.3	X	
188	10.8	X	
189	12.9	X	
190	13.4		
191	11.0		
192	6.1		
193	4.9		
194			
195	3.6		
196	3.6		
197			
198			
199			
200			
201		X	
202	6.8	X	
203	6.8	X	
204	5.8	X	

X Indicates condition applies to lot

N

0' 25' 50' 100'
SCALE IN FEET

LEGEND	
100	EXISTING INDEX CONTOURS
100	EXISTING INTERMEDIATE CONTOURS
100	PROPOSED INDEX CONTOURS
100	PROPOSED INTERMEDIATE CONTOURS

EARTHWORK QUANTITIES

LOCATION	CUT (C.Y.)	FILL (C.Y.)
STREET	10,423	8,630
SITE	50,641	44,871
TOTAL	61,064	53,501

EARTHWORK QUANTITIES NOTES:
1. EARTHWORK QUANTITIES BASED ON FINISHED GRADE SURFACE AND DO NOT INCLUDE ADJUSTMENTS FOR TOPSOIL AND SHRINKAGE.

2. EARTHWORK QUANTITIES DO NOT TAKE INTO CONSIDERATION EXCAVATION, REMOVAL AND DISPOSAL OF MATERIAL DEEMED UNSUITABLE BY A GEOTECHNICAL ENGINEER. THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR EXCAVATION, REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL AND FOR REPLACING IT WITH SUITABLE MATERIAL.

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
1/18/2021

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
		REVISIONS	

GRADING PLAN (FOR REFERENCE ONLY)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_GRD01_A191605
date: 10/02/2020

SHEET
C104

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_GRD01_A191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:30pm XREFS: C_PTBLK_A191605 C_XBASE_A191605 C_PBASE_A191605 C_PUTIL_A191605 C_PBNDY_A191605

Accepted
Record Drawings

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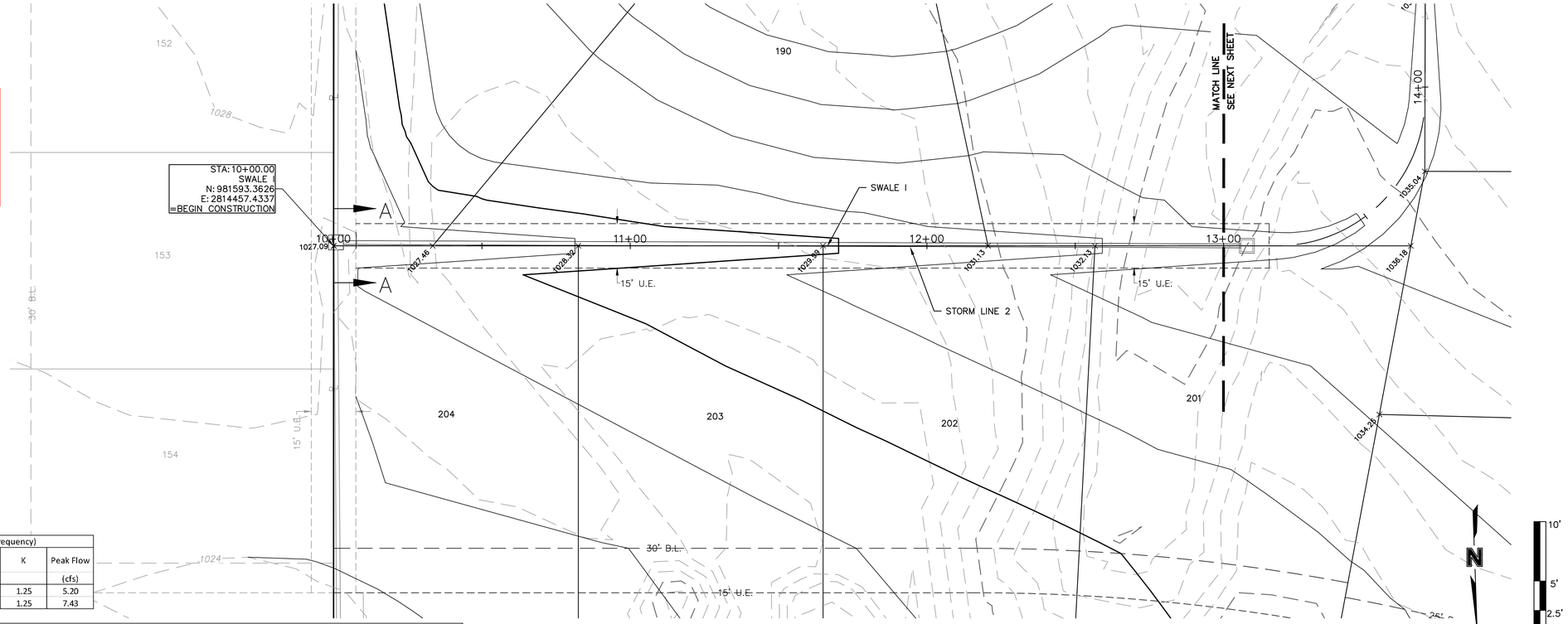
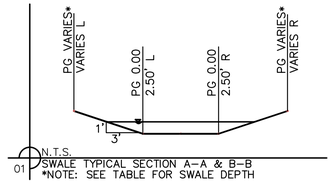


Swale Drainage Area Table (100 year Return Frequency)

Section	Drainage Area (ac.)	C	Tc (min)	i (in/hr)	K	Peak Flow (cfs)
A-A	0.79	0.51	5	10.32	1.25	5.20
B-B	1.13	0.51	5	10.32	1.25	7.43

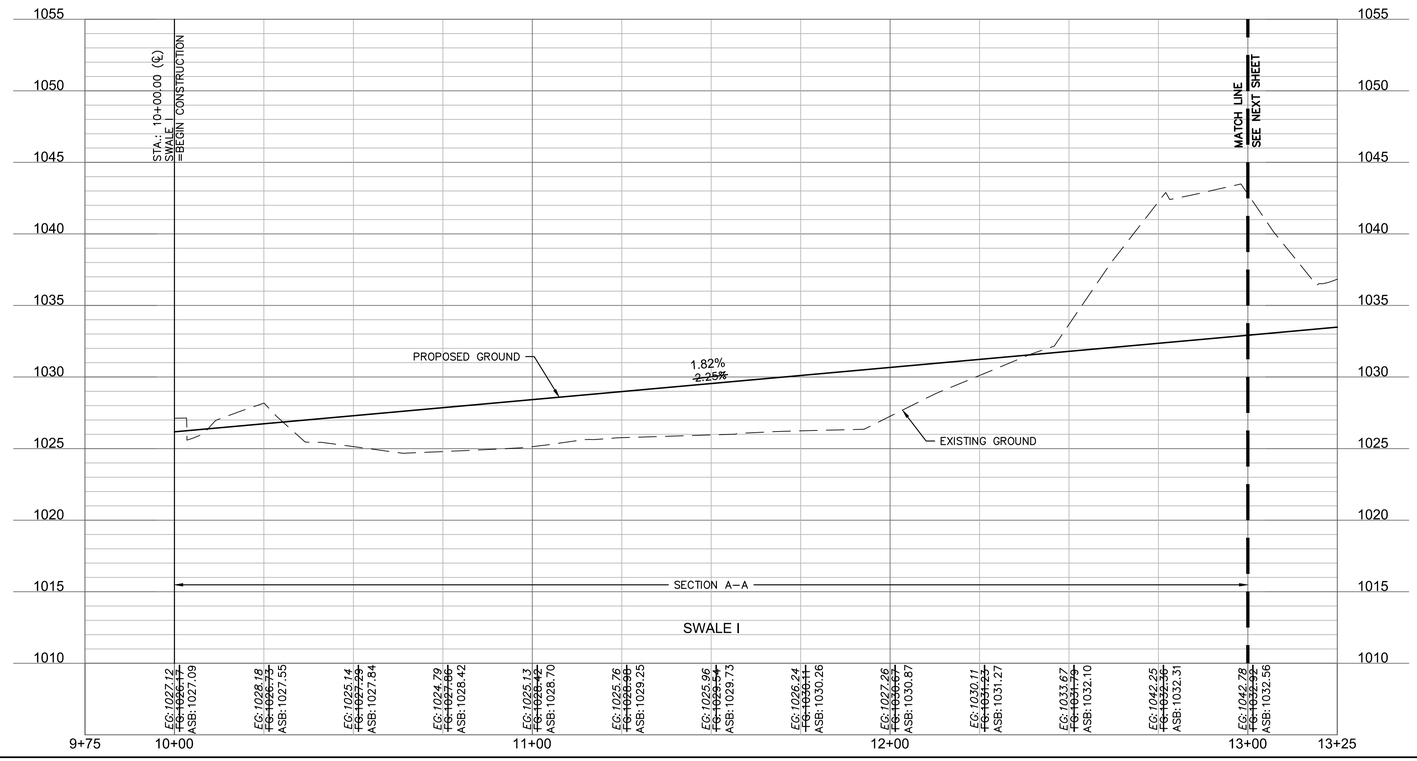
Swale Design Table (100 Year Return Frequency)

Section Data							Flow Data							
SECTION	Mannings Coefficient	Channel Slope (%)	Min. Swale Depth (ft)	Left Side Slope (H:V)	Right Side Slope (H:V)	Bottom Width (ft)	Discharge (cfs)	Water Depth (ft)	Flow Area (ft^2)	Velocity (ft/sec)	Wetted Perimeter (ft)	Top Width (ft)	Specific Energy (ft)	Shear Stress (lbs/ft^3)
A-A	0.03	1.82%	1.32	3:1	3:1	5.00	5.20	0.32	1.91	2.73	7.02	6.92	0.44	0.31
B-B	0.03	2.23%	1.39	3:1	3:1	5.00	7.43	0.39	2.41	3.09	7.47	7.34	0.54	0.45



SWALE GRADING NOTES:

1. CONTRACTOR SHALL CONSTRUCT SWALES WITH MINIMUM SLOPE, WIDTH AND DEPTH AS SHOWN IN THE SWALE DESIGN TABLES.
2. AS-BUILT SURVEY IS REQUIRED/APPROVED BY CITY FOR ALL SWALES AND PRIOR TO APPROVAL FOR ANY BUILDING FOUNDATION PERMIT. CONTRACTOR SHALL BE REQUIRED TO REGRADE SWALES AT CONTRACTOR'S EXPENSE IF ABOVE REQUIREMENTS ARE NOT MET.



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1/18/2022

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
PROFESSIONAL ENGINEER
1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

SWALE PLAN AND PROFILE
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

2020

LEE'S SUMMIT, MO

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_SWL01_A191605
date: 10/02/2020

SHEET
C105

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_SWL01_A191605.dwg
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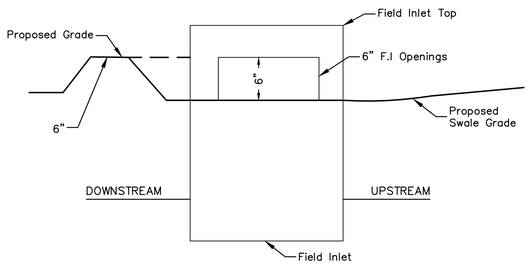
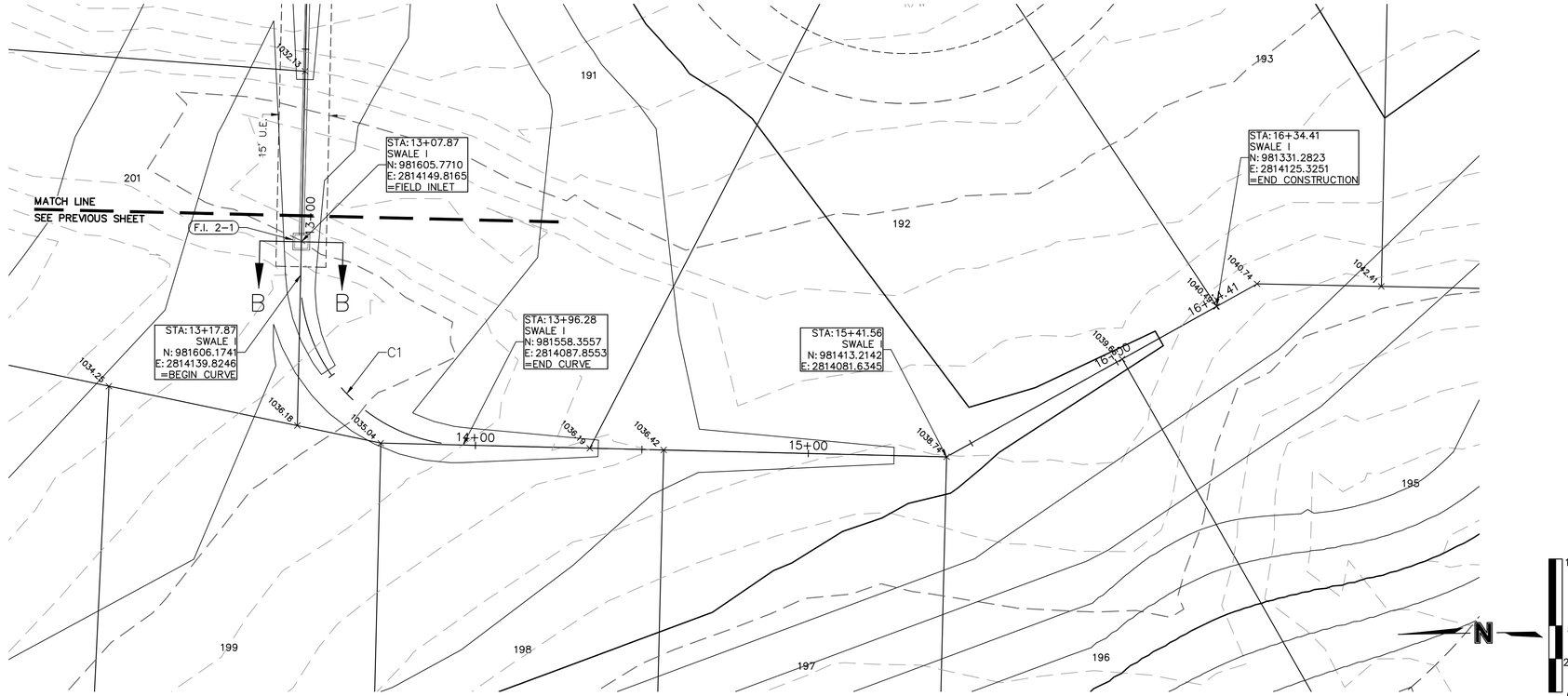
USER: bworthley



NOTE: INCLUDE SUMP PER ABOVE DETAIL WHERE FIELD INLETS ARE LOCATED WITHIN SWALES.

SUMP DETAIL
N.T.S.



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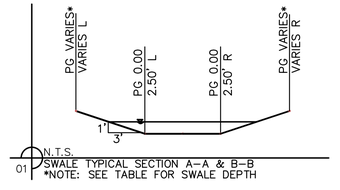
ALIGNMENT CURVES								
CURVE ID #	STATION RANGE	START COORD.	END COORD.	RADIUS (FT)	LENGTH (FT)	DELTA	CHORD BEARING	CHORD LENGTH (FT)
C1	13+17.87 13+96.28	N: 981606.17 E: 2814139.82	N: 981558.36 E: 2814087.86	50.00	78.41	089°51'21"	S47°22'55"W	70.62



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Record Drawings

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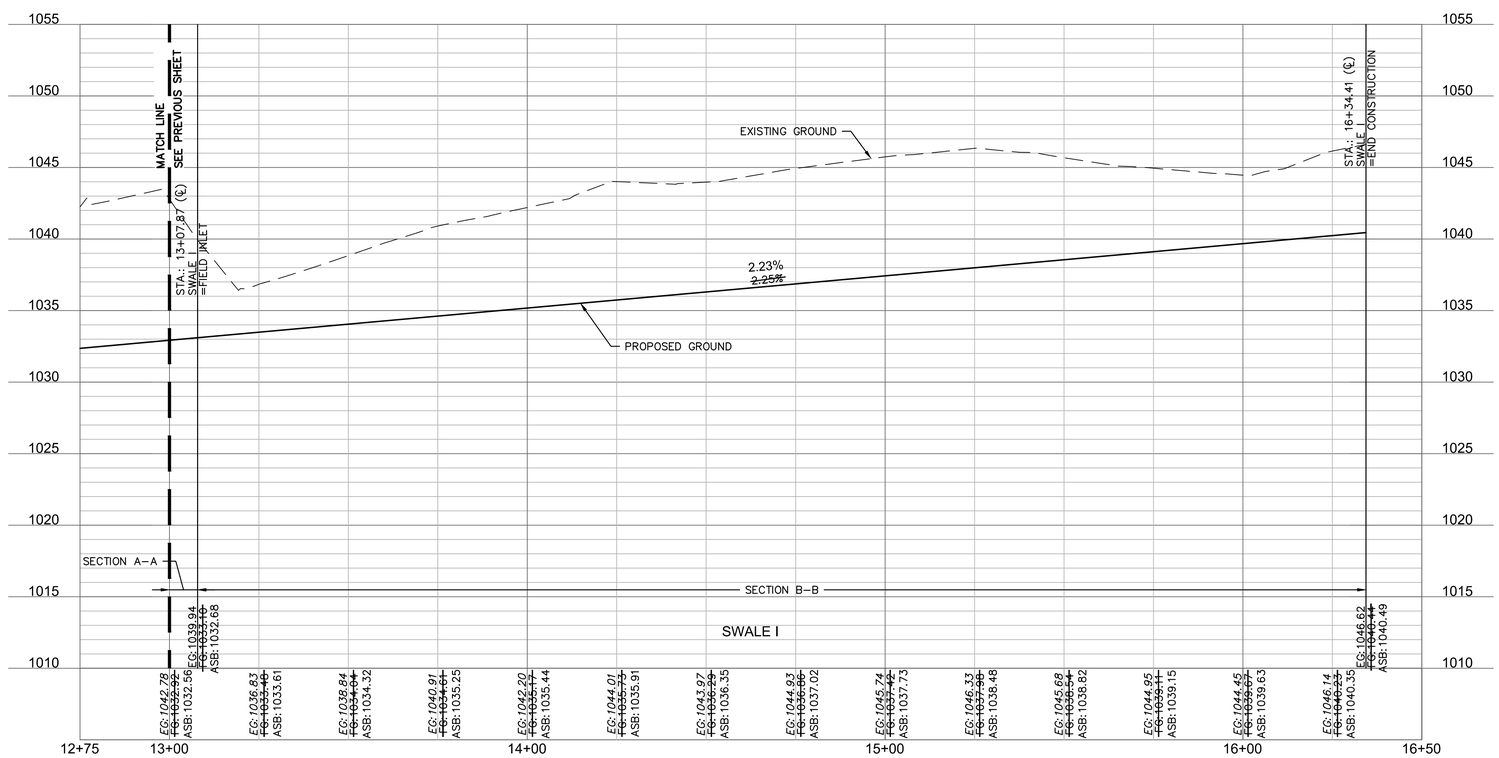

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

SWALE PLAN AND PROFILE (CONT)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

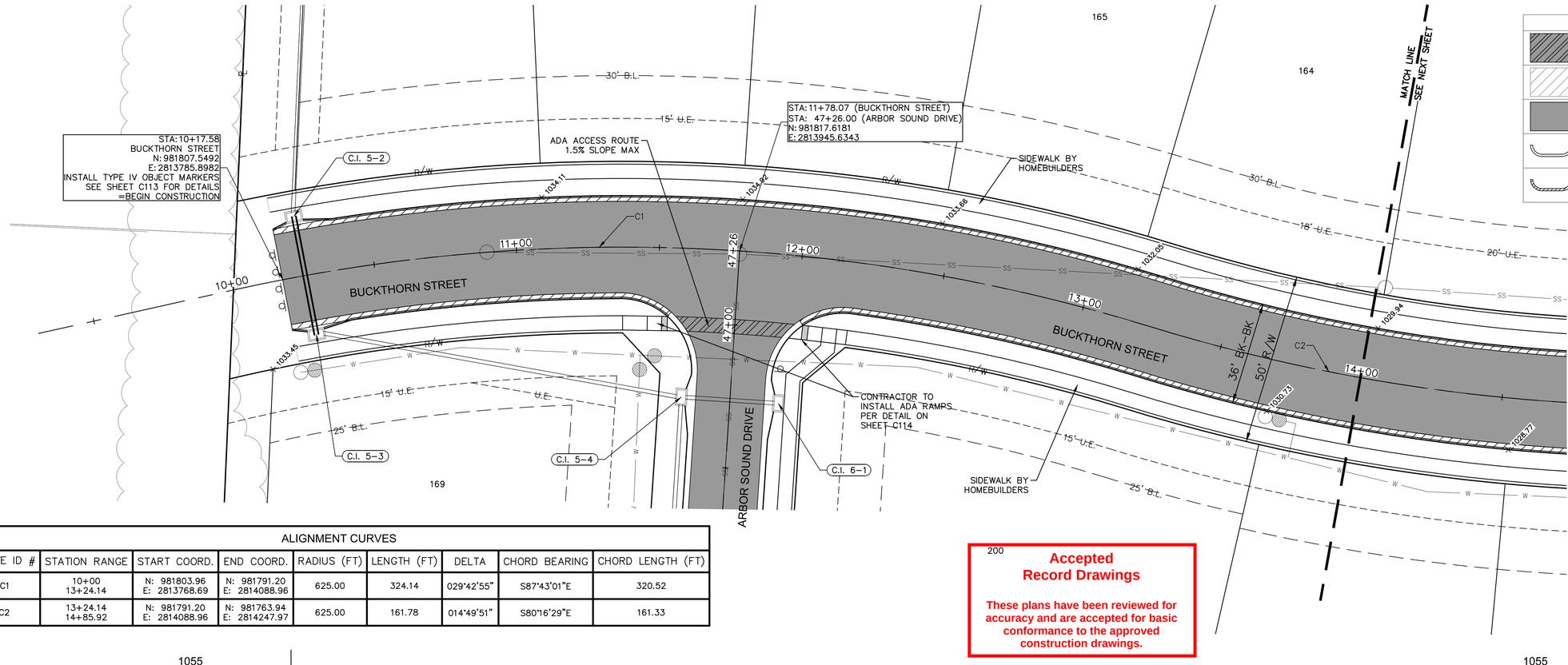
2020

LEE'S SUMMIT, MO

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_SWL01_A191605
date: 10/02/2020

SHEET
C106

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_SWL01_A191605.dwg
DATE: Jan 18, 2022 3:31pm
XREFS: C_PTBLK_A191605 C_XBASE_A191605 C_PBASE_A191605 C_PUTIL_A191605 C_PBNDY_A191605 C_PSURF_A191605 C_PSTRM_A191605
USER: bworthley



ALIGNMENT CURVES								
CURVE ID #	STATION RANGE	START COORD.	END COORD.	RADIUS (FT)	LENGTH (FT)	DELTA	CHORD BEARING	CHORD LENGTH (FT)
C1	10+00 13+24.14	N: 981803.96 E: 2813768.69	N: 981791.20 E: 2814088.96	625.00	324.14	029°42'55"	S87°43'01"E	320.52
C2	13+24.14 14+85.92	N: 981791.20 E: 2814088.96	N: 981763.94 E: 2814247.97	625.00	161.78	014°49'51"	S80°16'29"E	161.33

200

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Record Drawings

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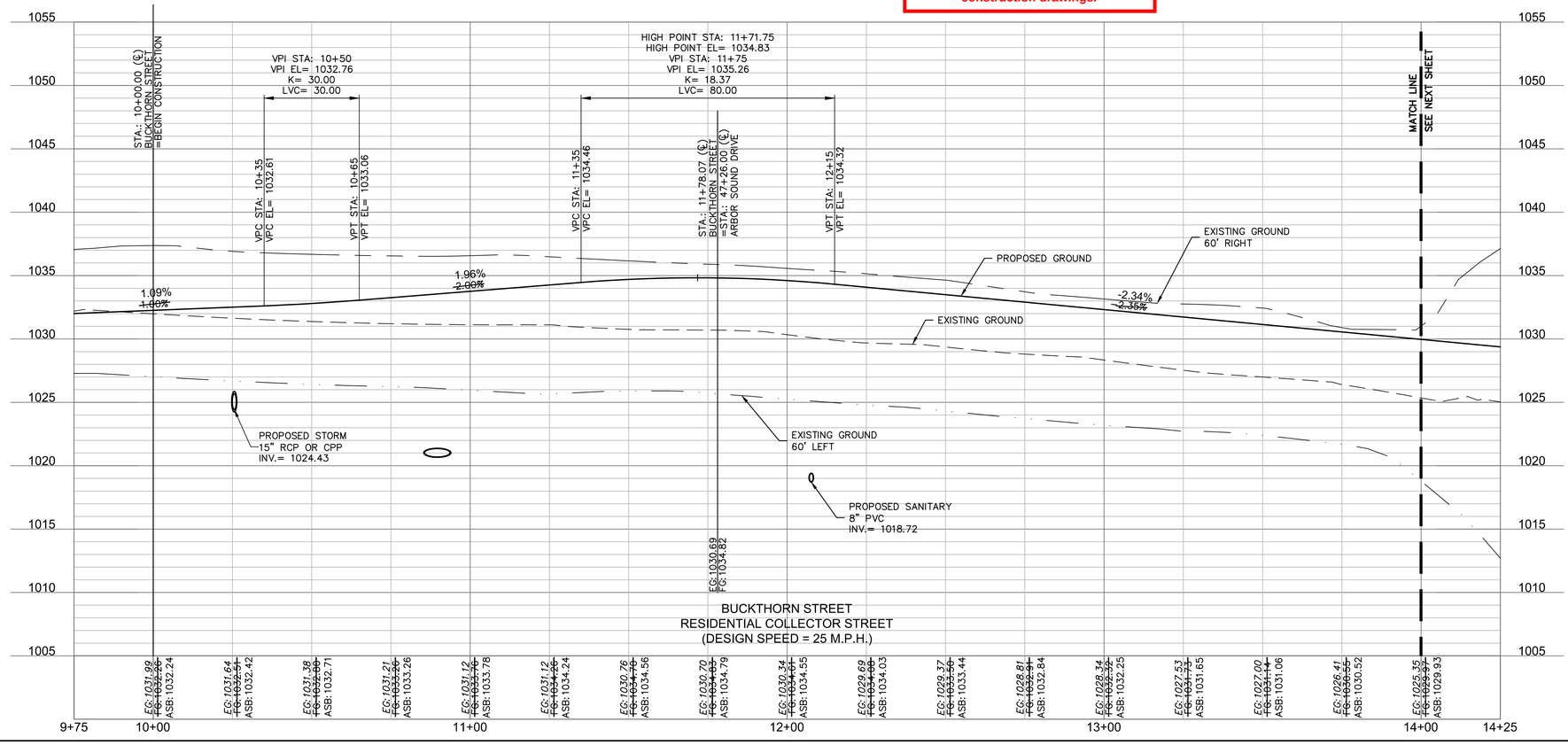

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
	11/23/2020	REVISED PER CITY COMMENTS	

REVISIONS

ROADWAY PLAN AND PROFILE (BUCKTHORN STREET)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

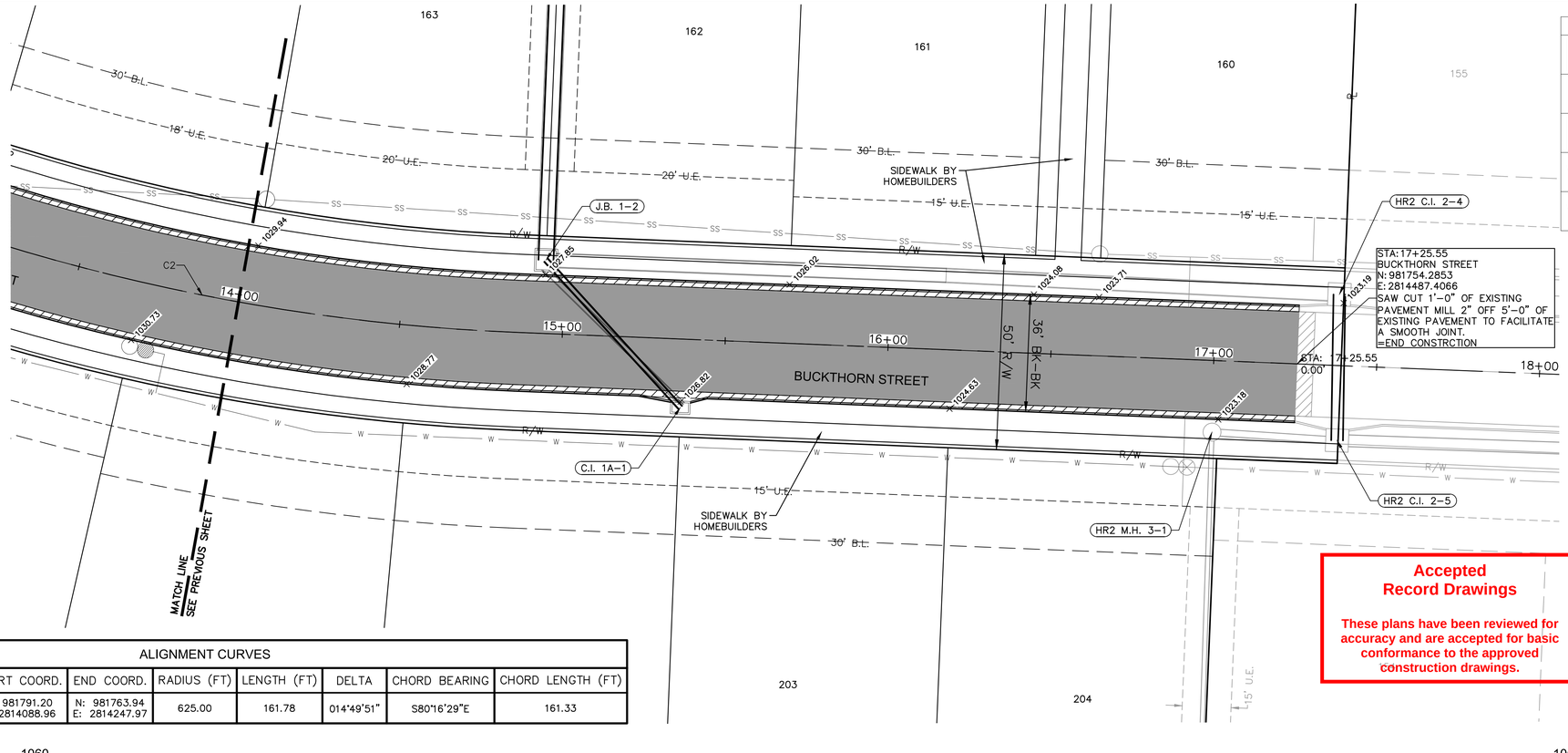
LEE'S SUMMIT, MO

2020

drawn by:	OLS
checked by:	BMW
approved by:	BMW
QA/QC by:	JES
project no.:	A19-1605
drawing no.:	C_RPP01_A191605
date:	10/02/2020

SHEET
C107

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_RPP01_A191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:32pm XREFS: C_PTBLK_A191605 C_XBASE_A191605 C_PBASE_A191605 C_PUTIL_A191605 C_PPATT_A191605 C_PSURF_A191605 C_PBNDY_A191605



ALIGNMENT CURVES								
CURVE ID #	STATION RANGE	START COORD.	END COORD.	RADIUS (FT)	LENGTH (FT)	DELTA	CHORD BEARING	CHORD LENGTH (FT)
C2	13+24.14 14+85.92	N: 981791.20 E: 2814088.96	N: 981763.94 E: 2814247.97	625.00	161.78	014°49'51"	S80°16'29"E	161.33

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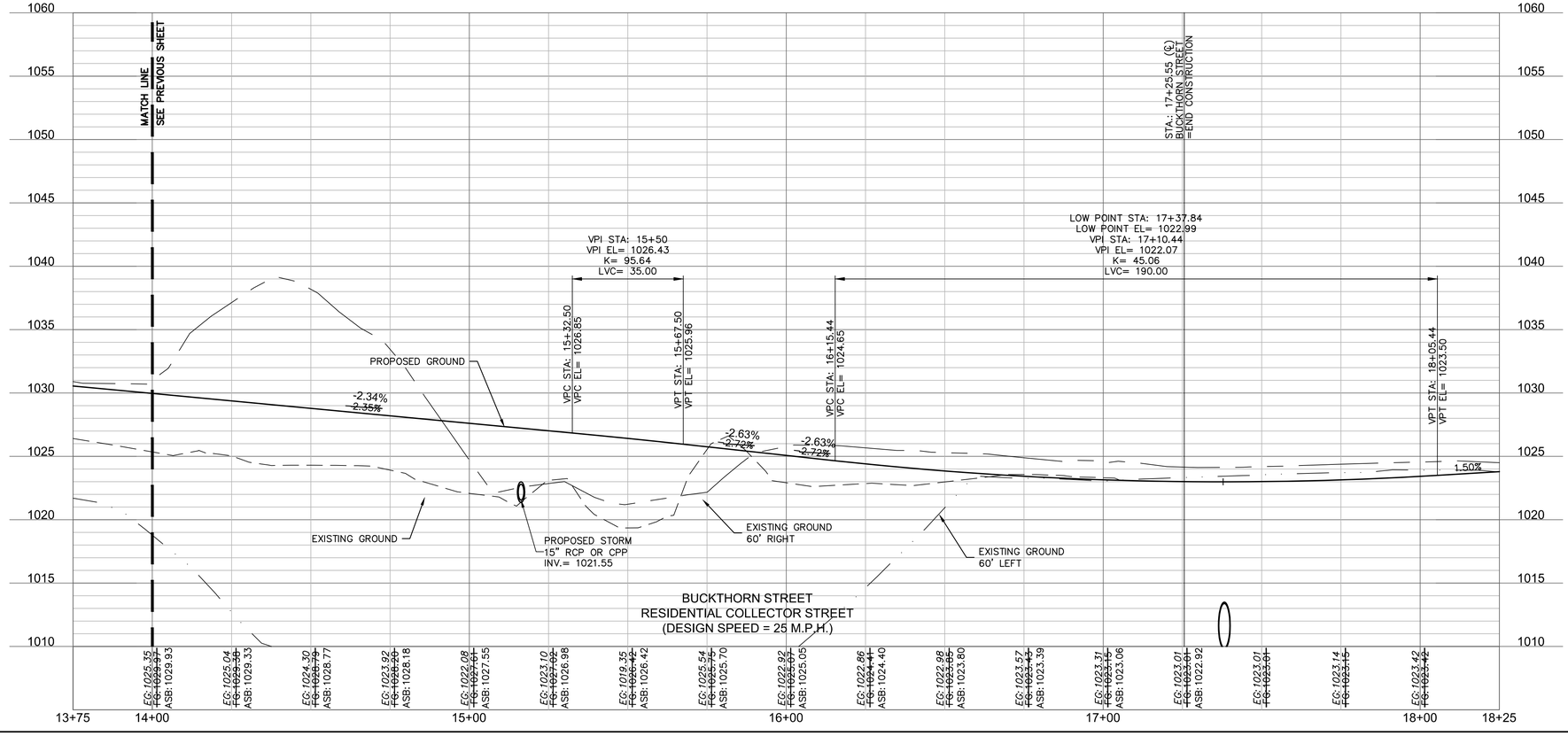

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1/18/2022

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
	11/23/2020	REVISED PER CITY COMMENTS	

REVISIONS

ROADWAY PLAN AND PROFILE (BUCKTHORN STREET CONT)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

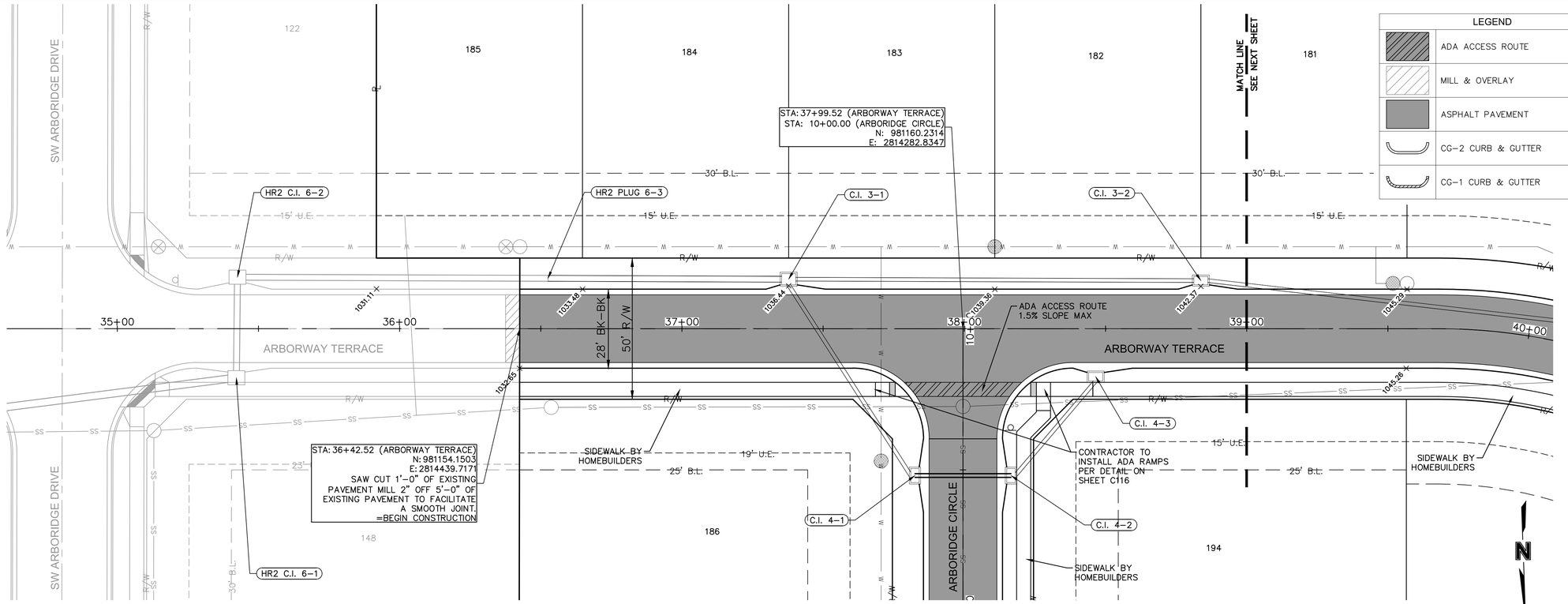
LEE'S SUMMIT, MO

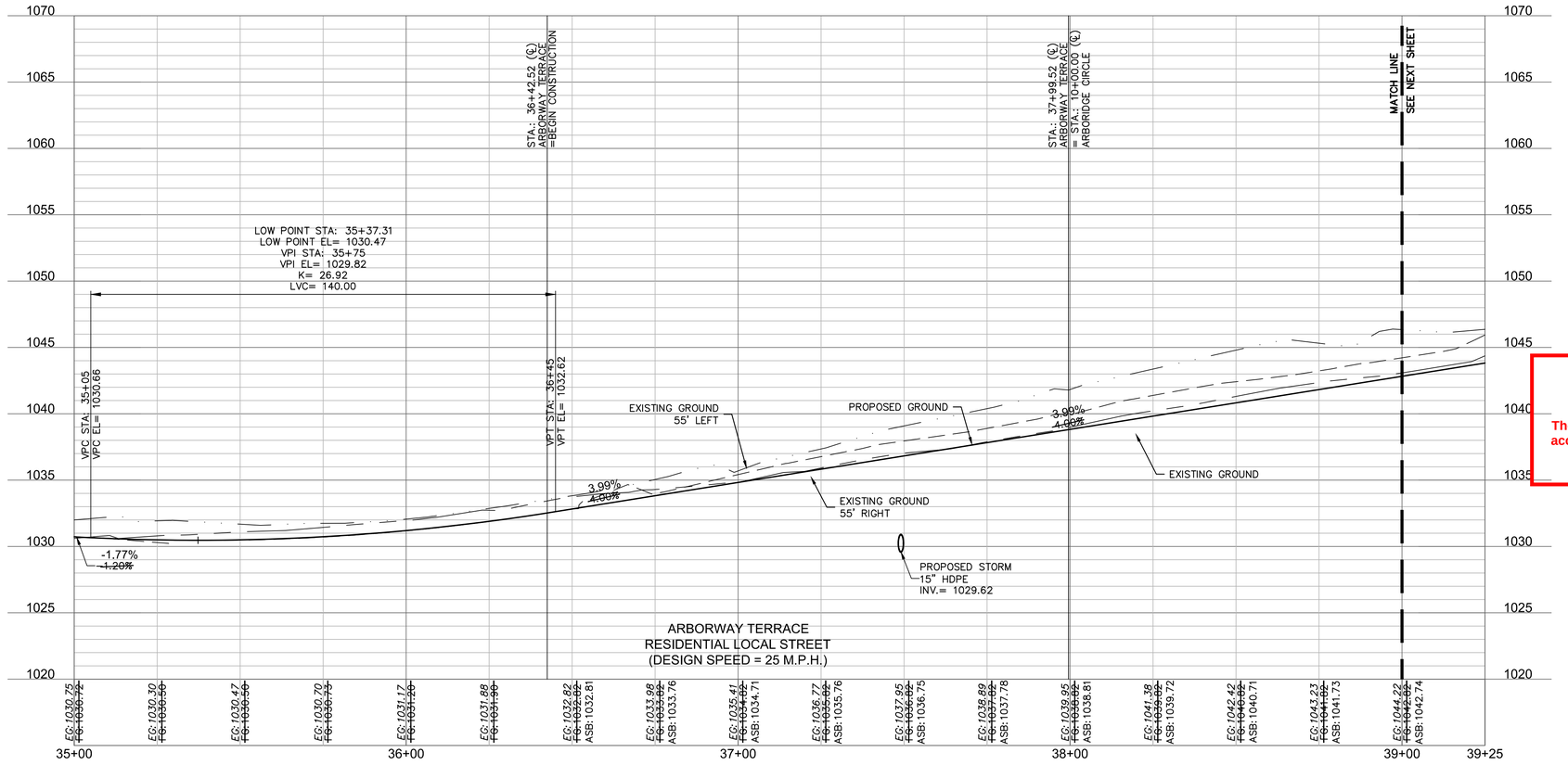
2020

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_RPP01_A191605
date: 10/02/2020

SHEET
C108

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_RPP01_A191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:32pm XREFS: C_PTBLK_A191605 C_XBASE_A191605 C_PBASE_A191605 C_PUTIL_A191605 C_PPATT_A191605 C_PSURF_A191605 C_PBNDY_A191605





Accepted
Record Drawings

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ASBUILT
1/18/2022

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PROFESSIONAL ENGINEER
1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
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REVISIONS

ROADWAY PLAN AND PROFILE (ARBORWAY TERRACE)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

2020

LEE'S SUMMIT, MO

drawn by:	OLS
checked by:	BMW
approved by:	BMW
QA/QC by:	JES
project no.:	A19-1605
drawing no.:	C_RPP02_A191605
date:	10/02/2020

SHEET
C109

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_RPP02_A191605.dwg USER: bworthley
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ALIGNMENT CURVES								
CURVE ID #	STATION RANGE	START COORD.	END COORD.	RADIUS (FT)	LENGTH (FT)	DELTA	CHORD BEARING	CHORD LENGTH (FT)
C1	39+67.94 42+82.92	N: 981166.75 E: 2814114.54	N: 981375.17 E: 2813922.47	200.00	314.98	090°14'04"	N42°39'47"W	283.42

LEGEND	
	ADA ACCESS ROUTE
	MILL & OVERLAY
	ASPHALT PAVEMENT
	CG–2 CURB & GUTTER
	CG–1 CURB & GUTTER

Accepted Record Drawings

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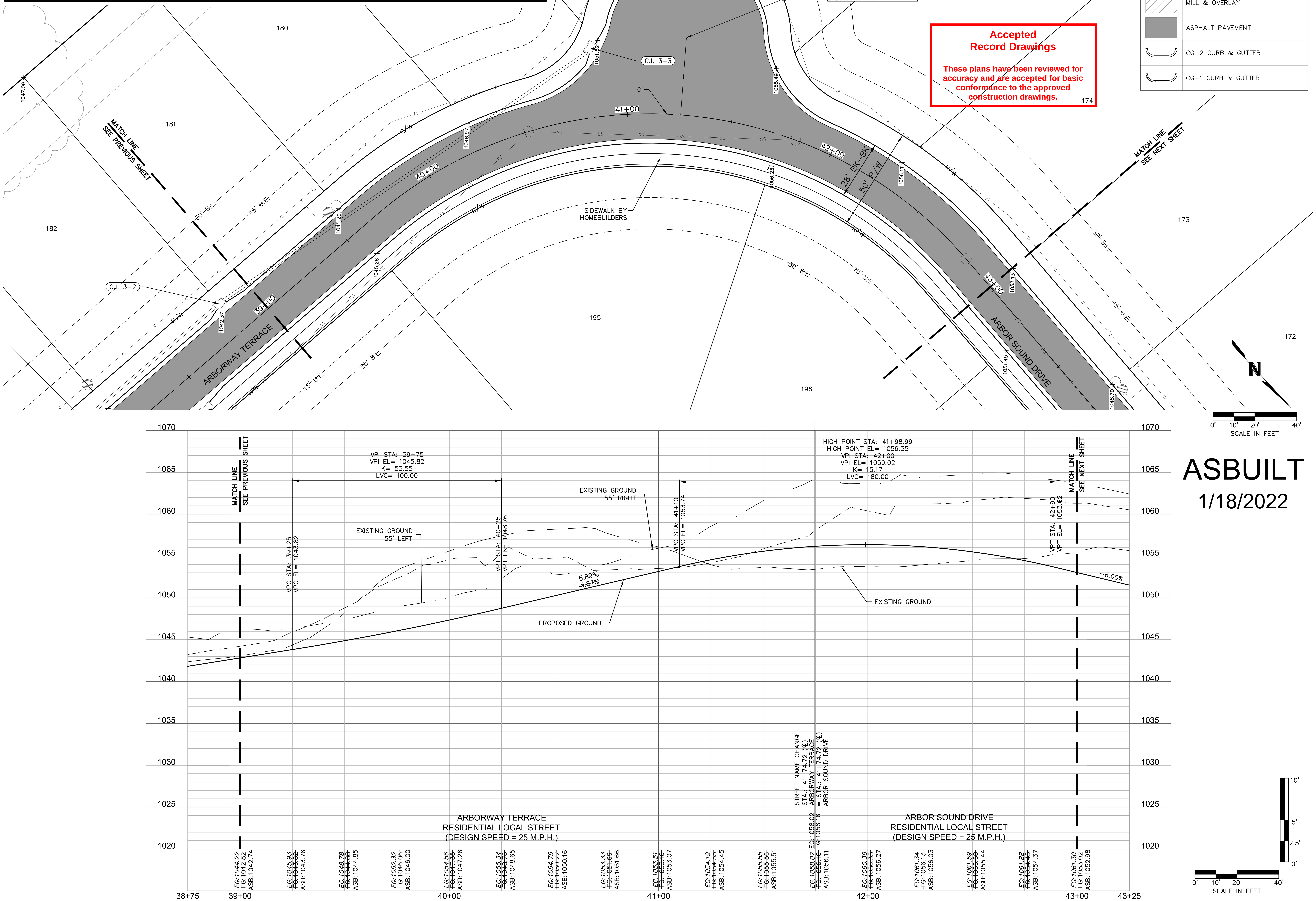

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1/18/2022

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STATE OF MISSOURI — BROCK M. WORTHLEY — NUMBER PE-2019000237 — PROFESSIONAL ENGINEER — 1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

ROADWAY PLAN AND PROFILE (ARBORWAY TERRACE CONT)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

drawn by:	OLS
checked by:	BMW
approved by:	BMW
QA/QC by:	JES
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drawing no.:	C_RPP02_A191605
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SHEET
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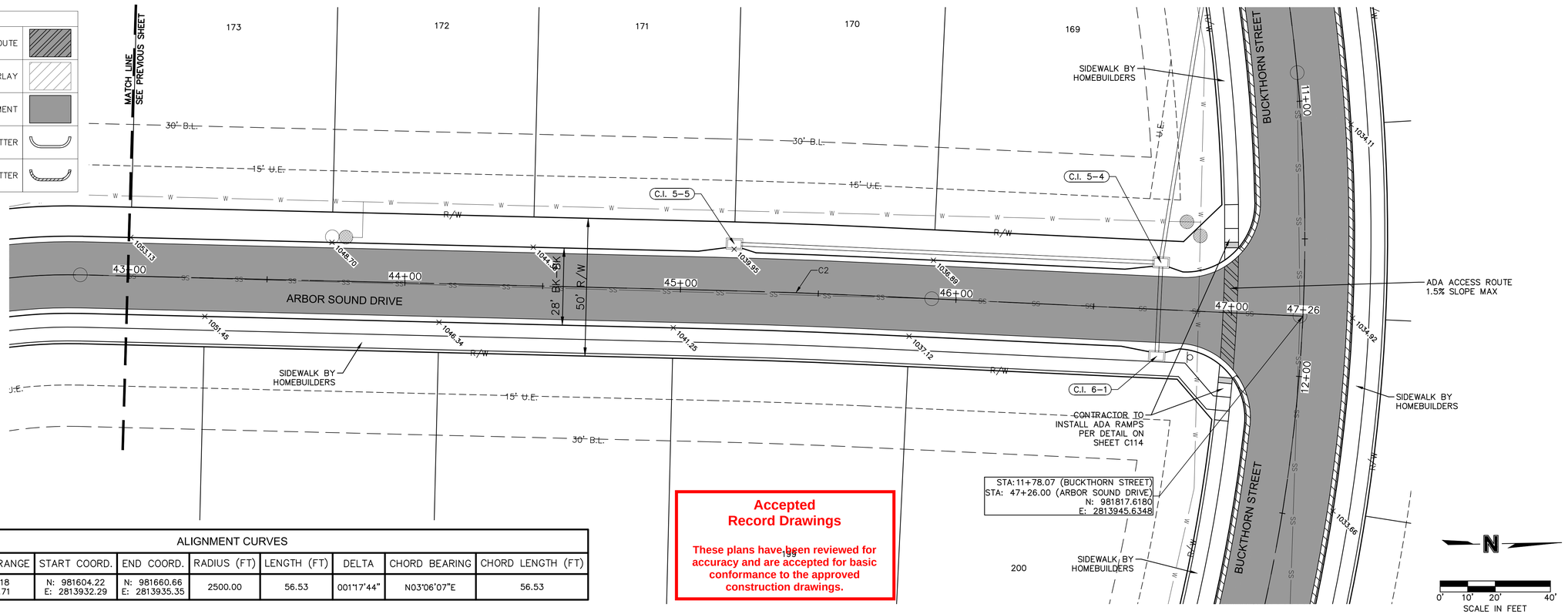
LEGEND
ADA ACCESS ROUTE
MILL & OVERLAY
ASPHALT PAVEMENT
CG-2 CURB & GUTTER
CG-1 CURB & GUTTER



ALIGNMENT CURVES								
CURVE ID #	STATION RANGE	START COORD.	END COORD.	RADIUS (FT)	LENGTH (FT)	DELTA	CHORD BEARING	CHORD LENGTH (FT)
C2	45+12.18 45+68.71	N: 981604.22 E: 2813932.29	N: 981660.66 E: 2813935.35	2500.00	56.53	001°17'44"	N03°06'07"E	56.53

Accepted
Record Drawings

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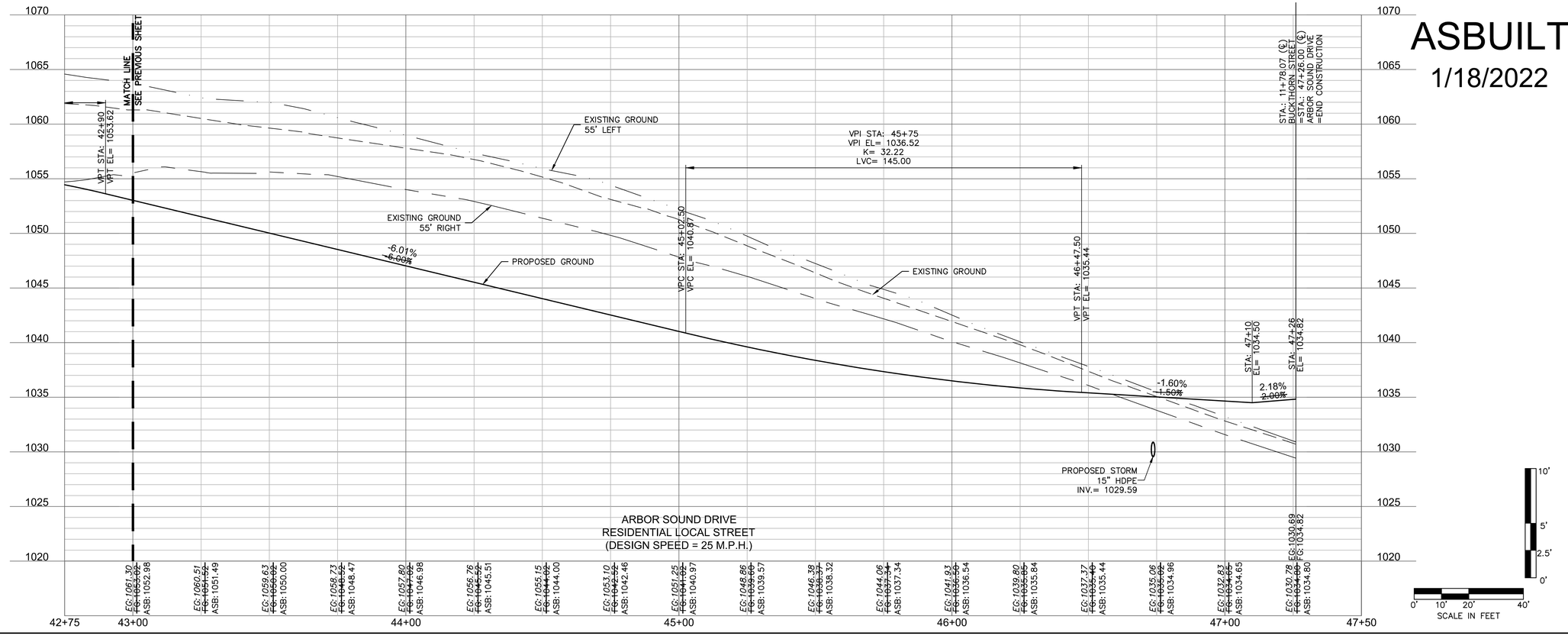

ASBUILT
1/18/2022

olsson
Olsson - Civil Engineering
Missouri Certificate of Authority #001592
1301 Burlington Street
North Kansas City, MO 64116
TEL 816.361.1177
www.olsson.com

STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
1/18/2022
PROFESSIONAL ENGINEER

REV./ NO.	DATE	REVISIONS DESCRIPTION	BY
	11/23/2020	REVISED PER CITY COMMENTS	

REVISIONS

ROADWAY PLAN AND PROFILE (ARBORWAY TERRACE CONT)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

drawn by:	OLS
checked by:	BMW
approved by:	BMW
QA/QC by:	JES
project no.:	A19-1605
drawing no.:	C_RPP02_A191605
date:	10/02/2020

SHEET
C111

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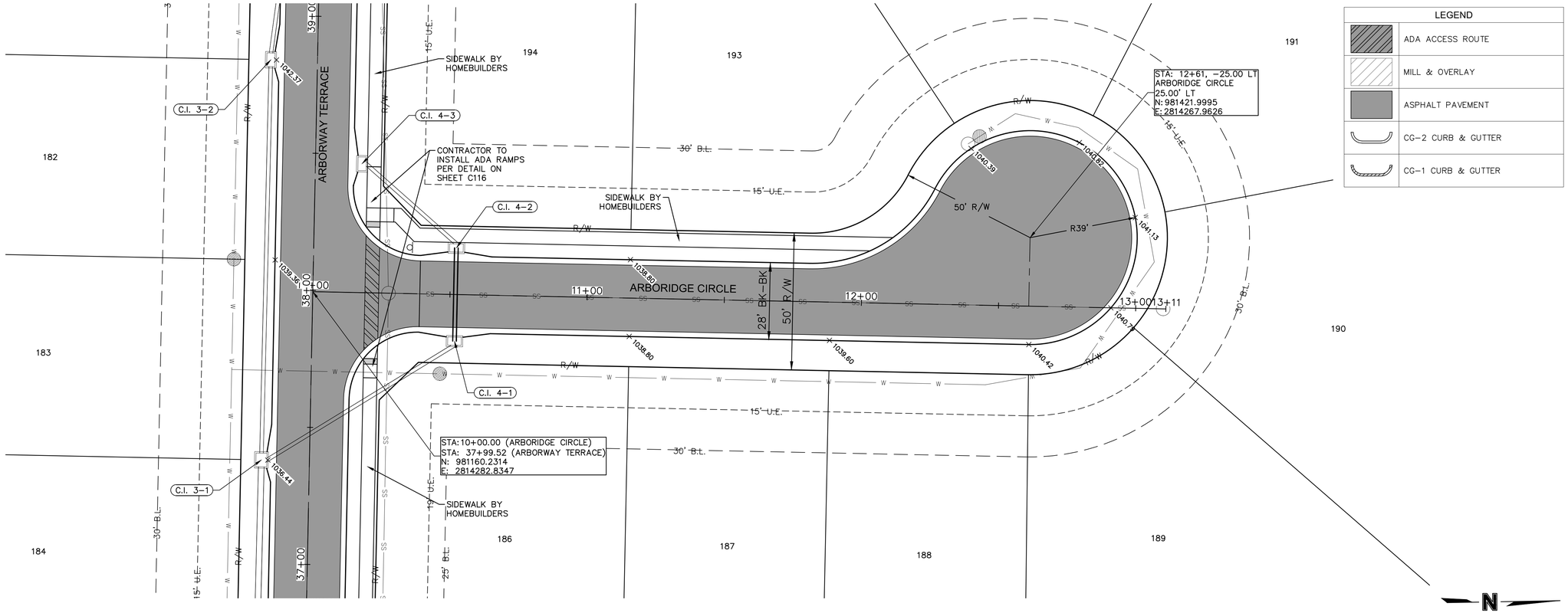

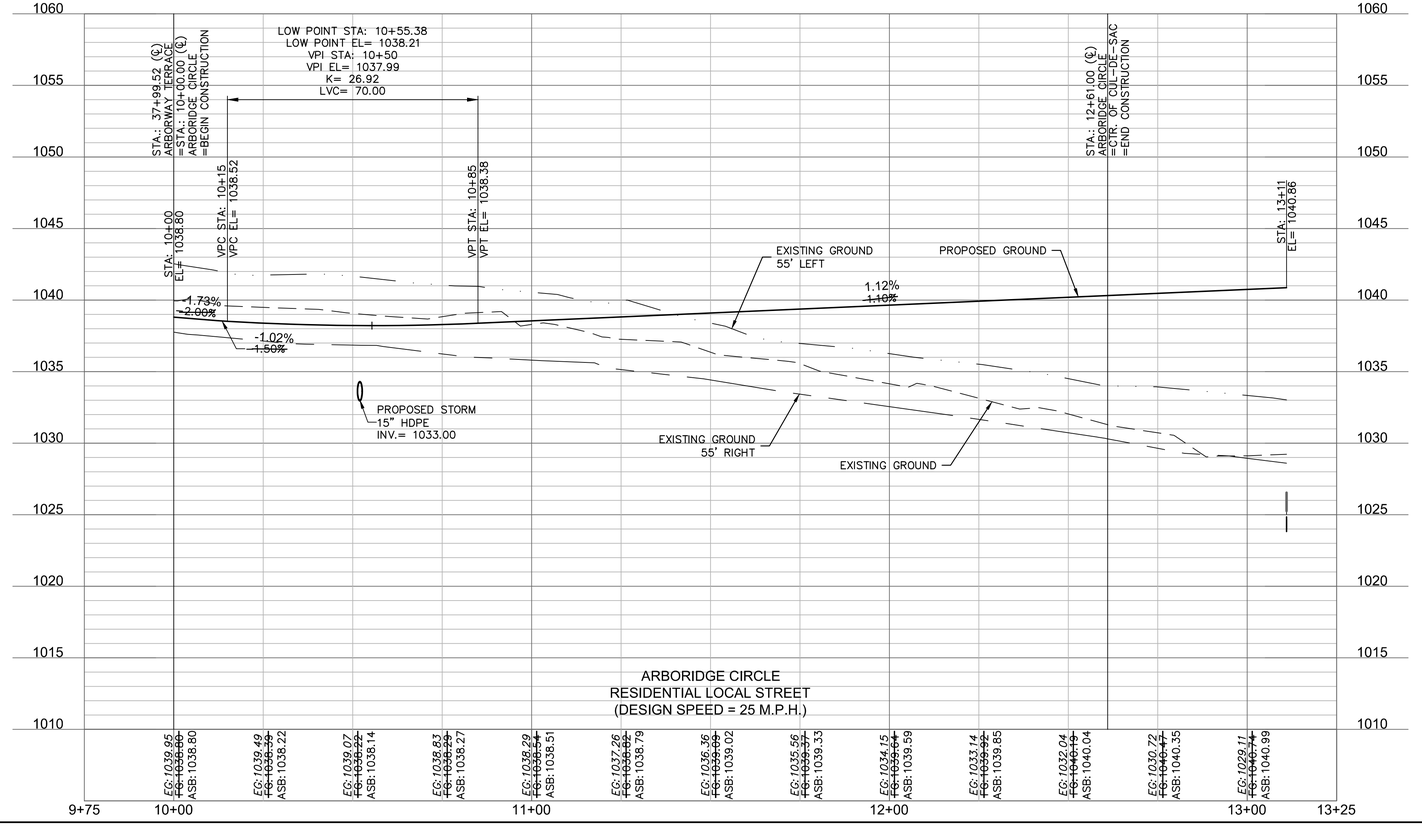

ASBUILT
1/18/2022

Accepted
Record Drawings

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olsson
Olsson - Civil Engineering
Missouri Certificate of Authority #001592
1301 Burlington Street, Suite 100
North Kansas City, MO 64116
TEL 816.361.1177
www.olsson.com

BROCK M. WORTHLEY NUMBER PE-2019000237 1/18/2022 PROFESSIONAL ENGINEER STATE OF MISSOURI

REV./ NO.	DATE	REVISIONS DESCRIPTION	BY
1	11/23/2020	REVISED PER CITY COMMENTS	

REVISIONS

ROADWAY PLAN AND PROFILE (ARBORIDGE CIRCLE)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_RPP03_A191605
date: 10/02/2020

SHEET
C112

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_RPP03_A191605.dwg USER: bworthley
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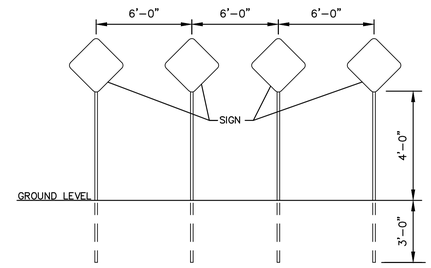


END OF ROAD TREATMENT
N.T.S.

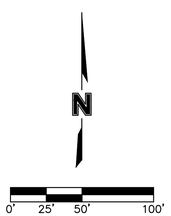
OBJECT MARKERS (TYPE OM4-3, 18"X18") ARE TO BE INSTALLED 2' FROM END OF PROPOSED PAVEMENT.

ARBOR SOUND DRIVE & ARBORWAY TERRACE SIGN DETAILS
N.T.S.

NOT ASBUILT

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.



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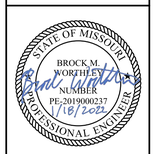

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

TRAFFIC CONTROL PLAN
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

2020

LEE'S SUMMIT, MO

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_TCP01_A191605
date: 10/02/2020

SHEET
C113

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_TCP01_A191605.dwg USER: bworthley
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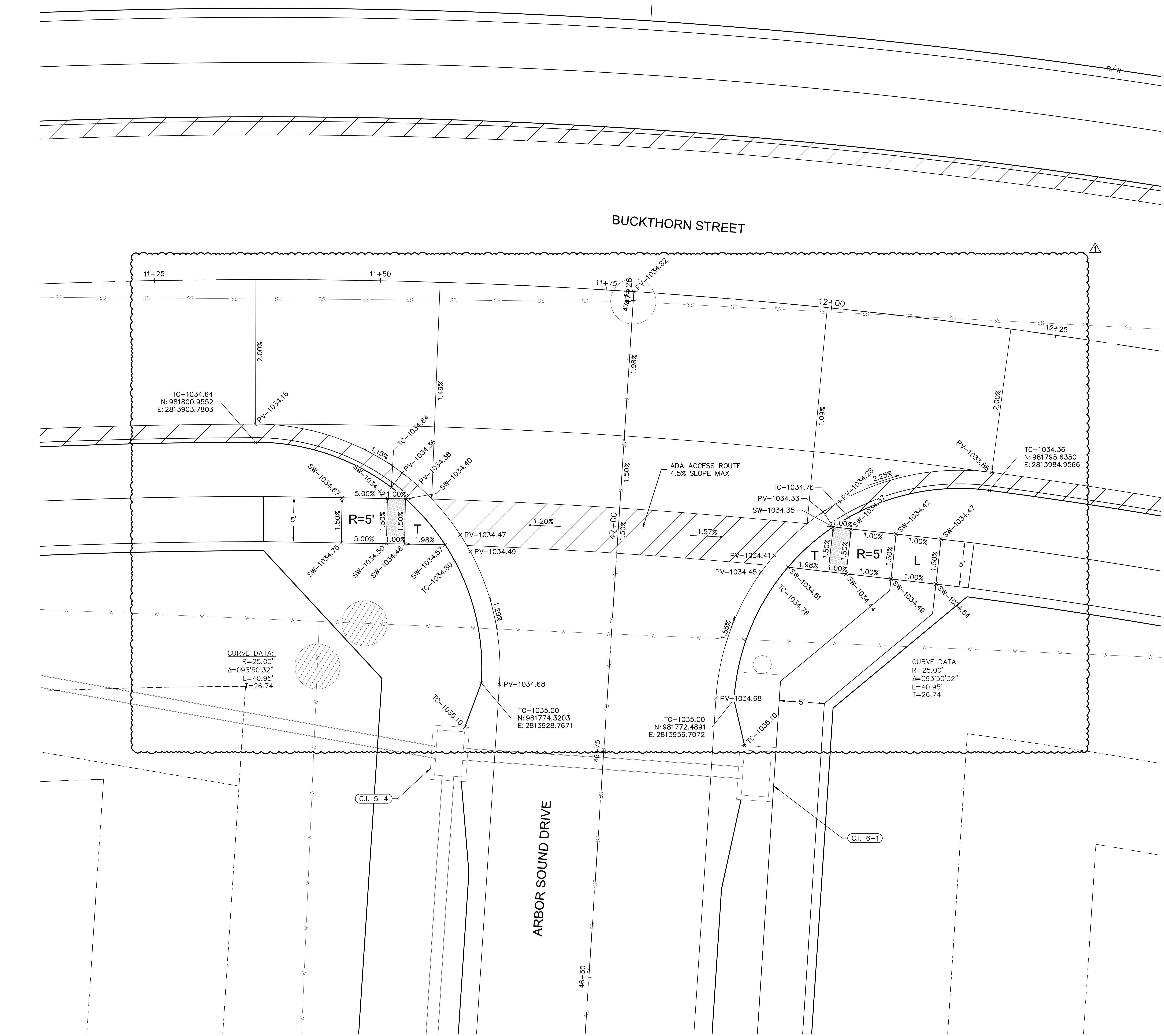

INTERSECTION AND ADA DETAIL NOTES:

1. ALL ADA CURB RAMPS SHALL BE BUILT PER CURRENT MUNICIPALITY ADOPTED ADA STANDARDS.
2. CURB RAMP FLARES SHALL NOT BE STEEPER THAN 1:10 MAX SLOPES.
3. LANDING SHALL BE PROVIDED WHERE INDICATED ON PLAN SHEET OR BY PROWAG STANDARDS. LANDING SHALL BE 4'X4' MINIMUM.
4. RAMP RUNS SHALL HAVE A MAXIMUM RUNNING SLOPE OF 1:12 UNLESS THE RAMP LENGTH IS OVER 15 FEET, THEN THE SLOPE CAN BE GREATER AS INDICATED IN DETAILS TO REACH STREET GRADES.
5. LANDINGS SHALL HAVE A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
6. CROSS SLOPE FOR RAMPS AND SIDEWALK SHALL NOT EXCEED 2%.
7. AFTER CURBS HAVE BEEN CONSTRUCTED, AND BEFORE ASPHALT OR CONCRETE PAVEMENT IS POURED, CURBS SHOULD BE MEASURED WITH A LEVEL TO ENSURE CURB ALONG ADA RAMPS AND LANDINGS WILL MEET ADA REQUIREMENTS.
8. ADA RAMP CONSTRUCTION WILL BE INSPECTED THOROUGHLY BY THE CITY INSPECTOR. CONTRACTOR SHALL BE REQUIRED TO RECONSTRUCT RAMPS, CURBS AND/OR PAVEMENT AT CONTRACTOR'S EXPENSE IF ADA RAMPS AND LANDINGS CANNOT MEET THE ADA REQUIREMENTS, PER APPROVED PLAN OR APPROVED ALTERNATIVE.
9. CURVE DATA IS FOR BACK OF CURB.

LEGEND

TC–	TOP OF CURB
PV–	TOP OF PAVEMENT
SW–	SIDEWALK
L	LANDING AREA
R	RAMP AREA
T	TRANSITION AREA
	ADA ACCESS ROUTE
	CG–2 CURB & GUTTER
	CG–1 CURB & GUTTER

NOT ASBUILT

Accepted Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

olsson
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North Kansas City, MO 64116
TEL 816.361.1177 www.olsson.com

STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
1/18/2022
PROFESSIONAL ENGINEER

REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
1	07/29/2021	REVISED PER CITY COMMENTS	

2020

SPOT ELEVATIONS
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

drawn by:	OLS
checked by:	BMW
approved by:	BMW
QA/QC by:	JES
project no.:	A19-1605
drawing no.:	C_SPT01_A191605
date:	10/02/2020

SHEET
C114

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_SPT01_A191605.dwg USER: bworthley
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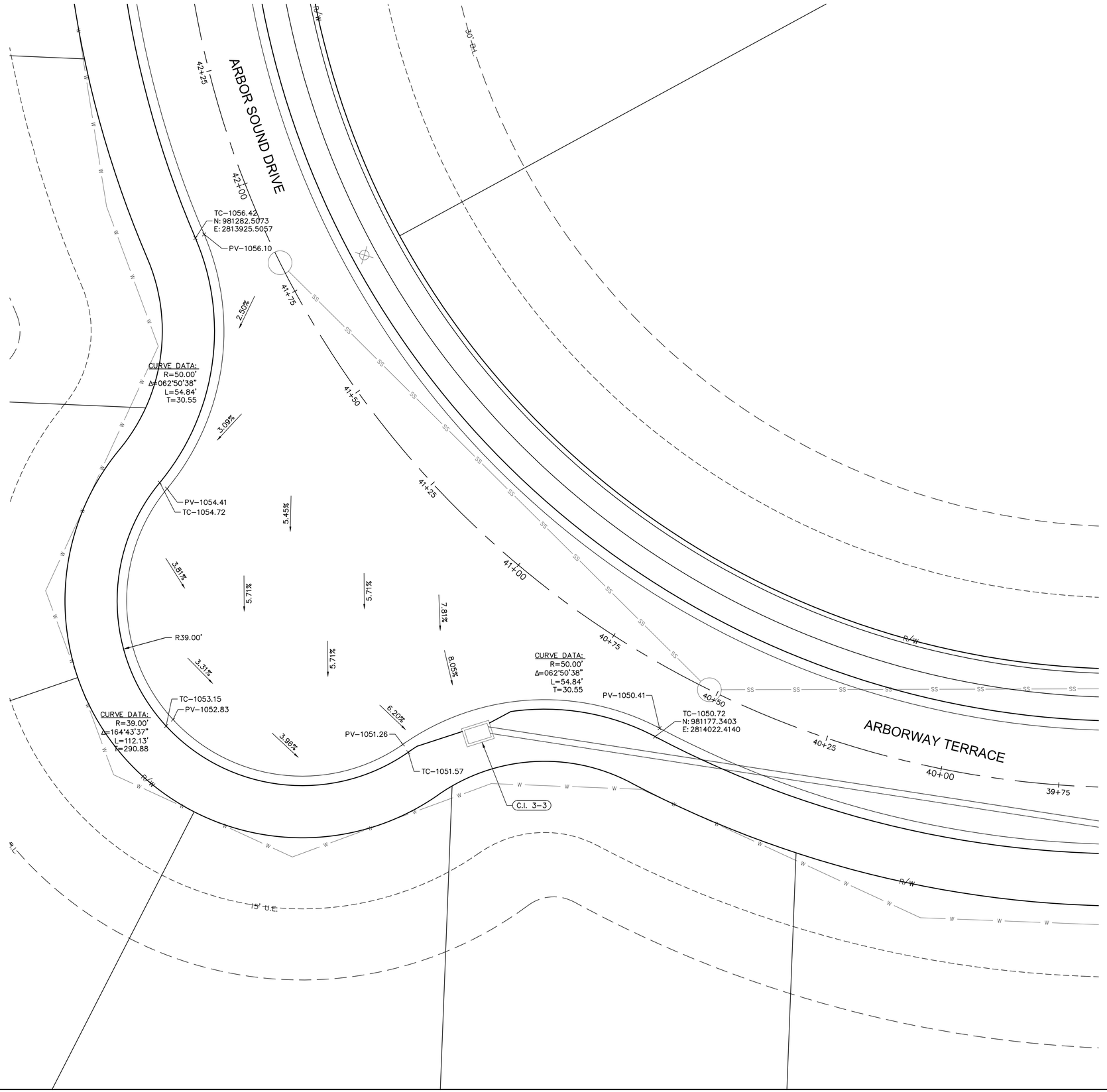

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LEGEND	
TC–	TOP OF CURB
PV–	TOP OF PAVEMENT
SW–	SIDEWALK
L	LANDING AREA
R	RAMP AREA
T	TRANSITION AREA
	ADA ACCESS ROUTE
	CG–2 CURB & GUTTER
	CG–1 CURB & GUTTER

NOT ASBUILT

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

0' 5' 10' 20'
SCALE IN FEET

olsson
Olsson - Civil Engineering
Missouri Certificate of Authority #001592
1301 Burlington Street
North Kansas City, MO 64116
TEL 816.361.1177
www.olsson.com

STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER
PE-2019000237
PROFESSIONAL ENGINEER
1/18/2022

REV./ NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

SPOT ELEVATIONS
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_SPT01_A191605
date: 10/02/2020

SHEET
C114

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_SPT01_A191605.dwg USER: bworthley
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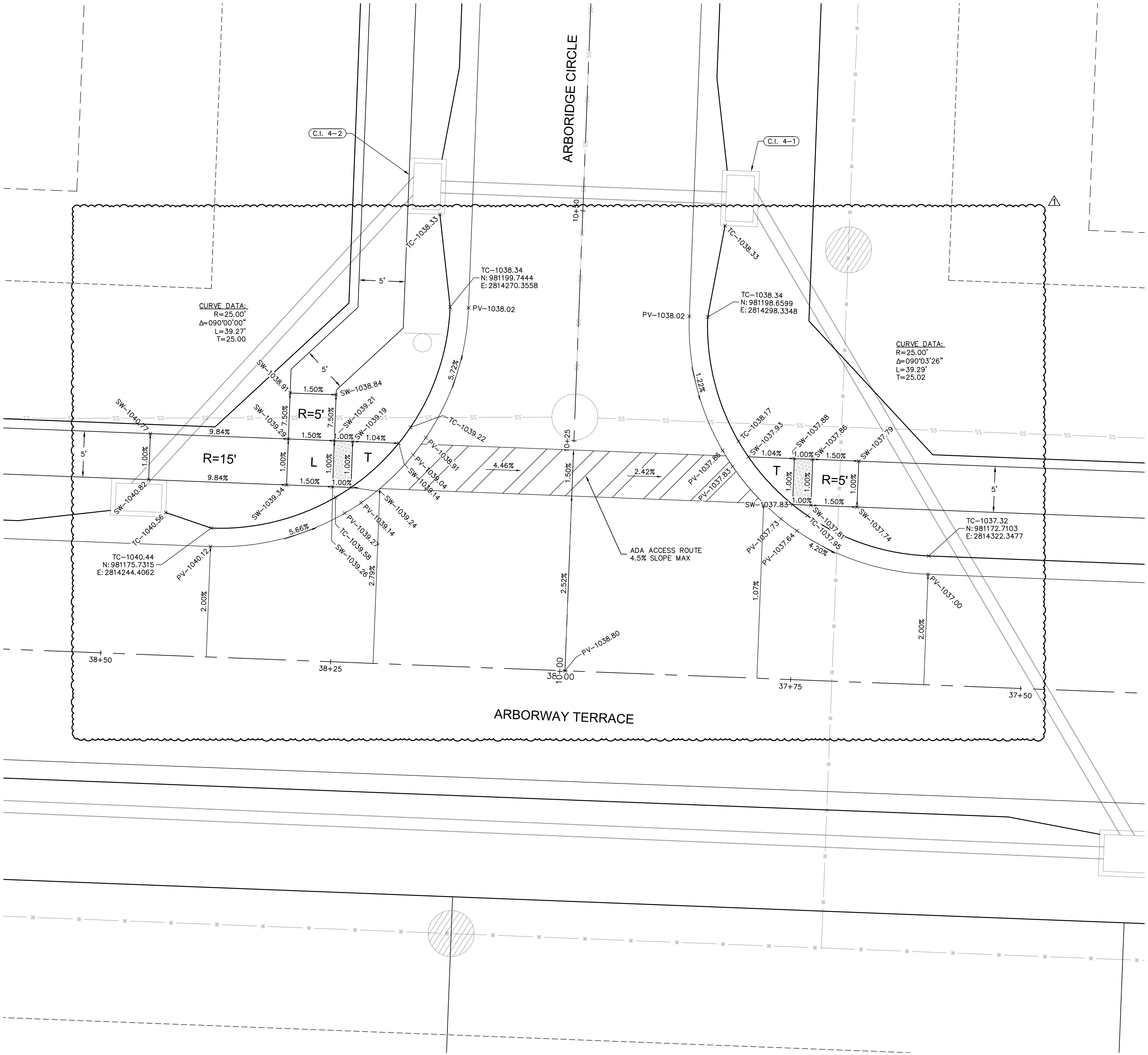

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LEGEND

TC-	TOP OF CURB
PV-	TOP OF PAVEMENT
SW-	SIDEWALK
L	LANDING AREA
R	RAMP AREA
T	TRANSITION AREA
[hatch]	ADA ACCESS ROUTE
[symbol]	CG-2 CURB & GUTTER
[symbol]	CG-1 CURB & GUTTER

NOT ASBUILT

Accepted Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

N

0' 2.5' 5' 10'
SCALE IN FEET

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Olsson - Civil Engineering
Missouri Certificate of Authority #001592
1301 Burlington Street
North Kansas City, MO 64116
TEL 816.361.1177 www.olsson.com

STATE OF MISSOURI — BROCK M. WORTHLEY — NUMBER PE-2019000237 — PROFESSIONAL ENGINEER — 1/18/2022

REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
1	07/29/2021	REVISED PER CITY COMMENTS	

SPOT ELEVATIONS
STREET & STORM SEWER PLANS

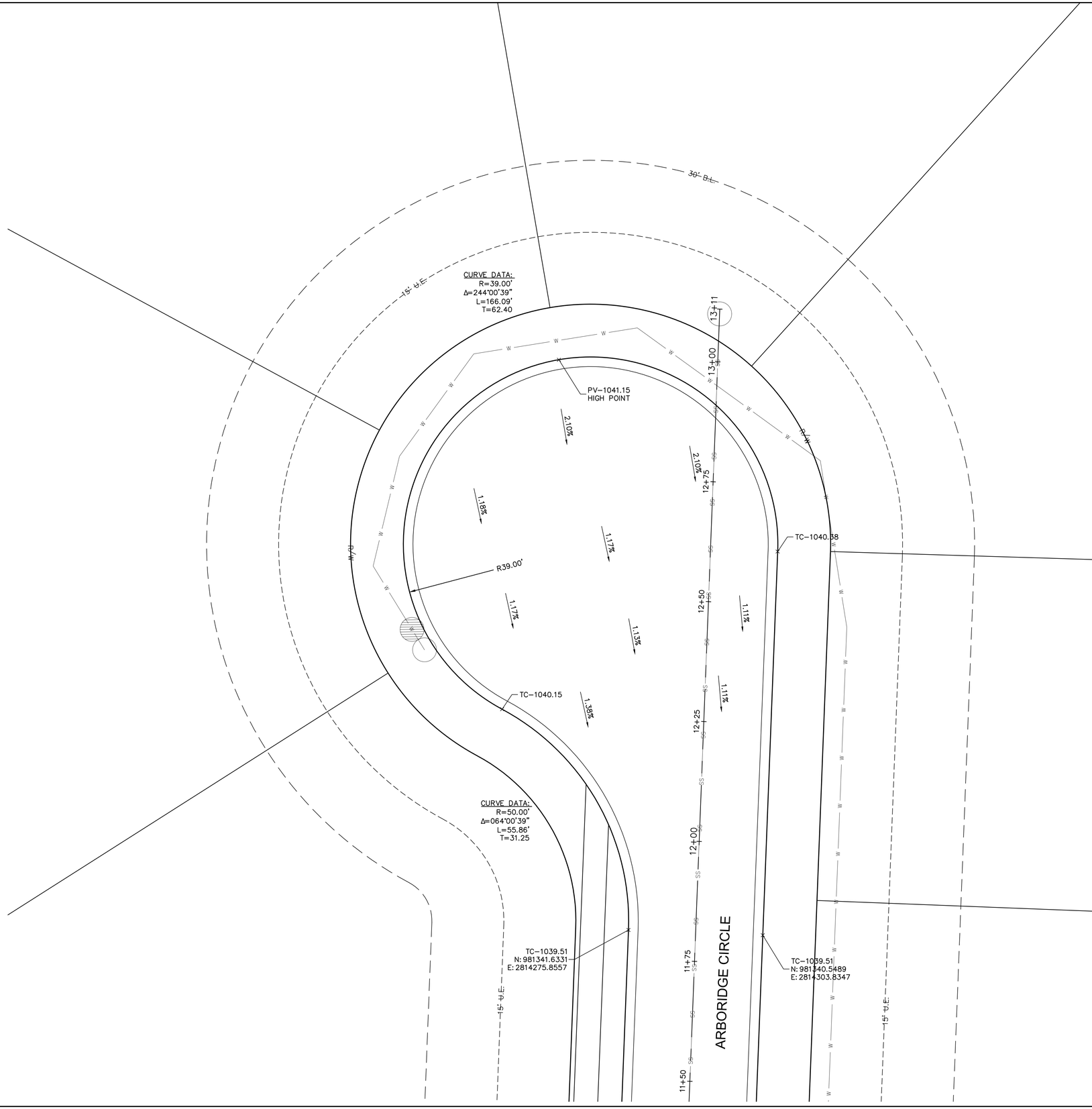
HAWTHORN RIDGE
THIRD PLAT

2020

LEE'S SUMMIT, MO

drawn by:	OLS
checked by:	BMW
approved by:	BMW
QA/QC by:	JES
project no.:	A19-1605
drawing no.:	C_SPT01_A191605
date:	10/02/2020

SHEET
C116



INTERSECTION AND ADA DETAIL NOTES:

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TC–	TOP OF CURB
PV–	TOP OF PAVEMENT
SW–	SIDEWALK
L	LANDING AREA
R	RAMP AREA
T	TRANSITION AREA
	ADA ACCESS ROUTE
	CG-2 CURB & GUTTER
	CG-1 CURB & GUTTER

NOT ASBUILT

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

0' 5' 10' 20'
SCALE IN FEET

olsson

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Missouri Certificate of Authority #001592
1301 Burlington Street
North Kansas City, MO 64116

TEL 816.361.1177
www.olsson.com

STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
1/18/2022

REV./ NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

SPOT ELEVATIONS
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_SPT01_A191605
date: 10/02/2020

SHEET
C117

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_SPT01_A191605.dwg USER: bworthley
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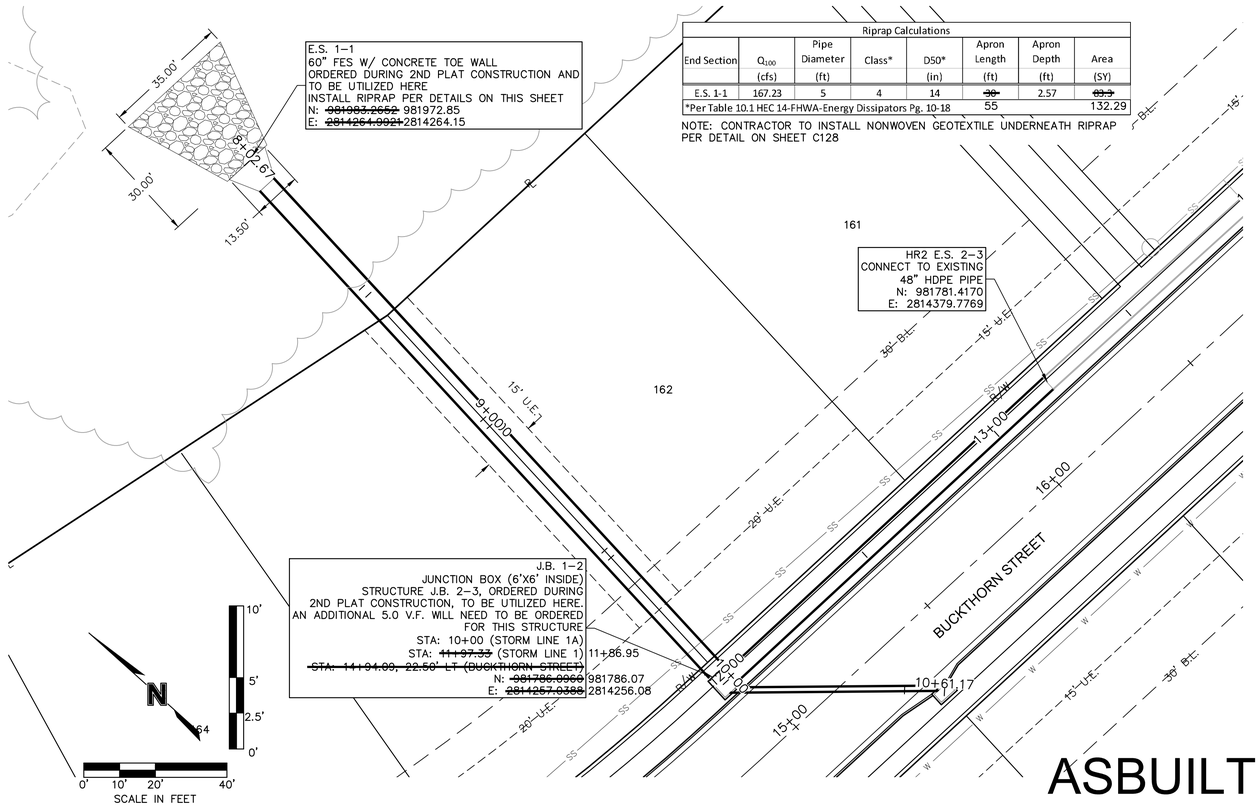
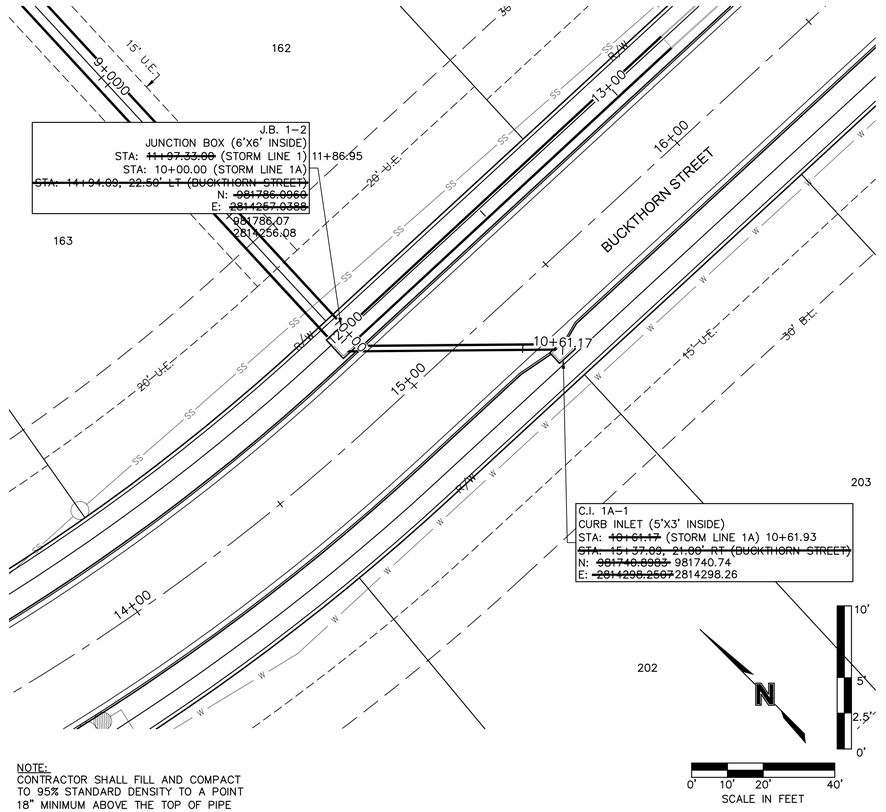
C_PSTRM_A191605 C_PPATT_A191605



STORM LINE 1 (9+75 - 13+50)



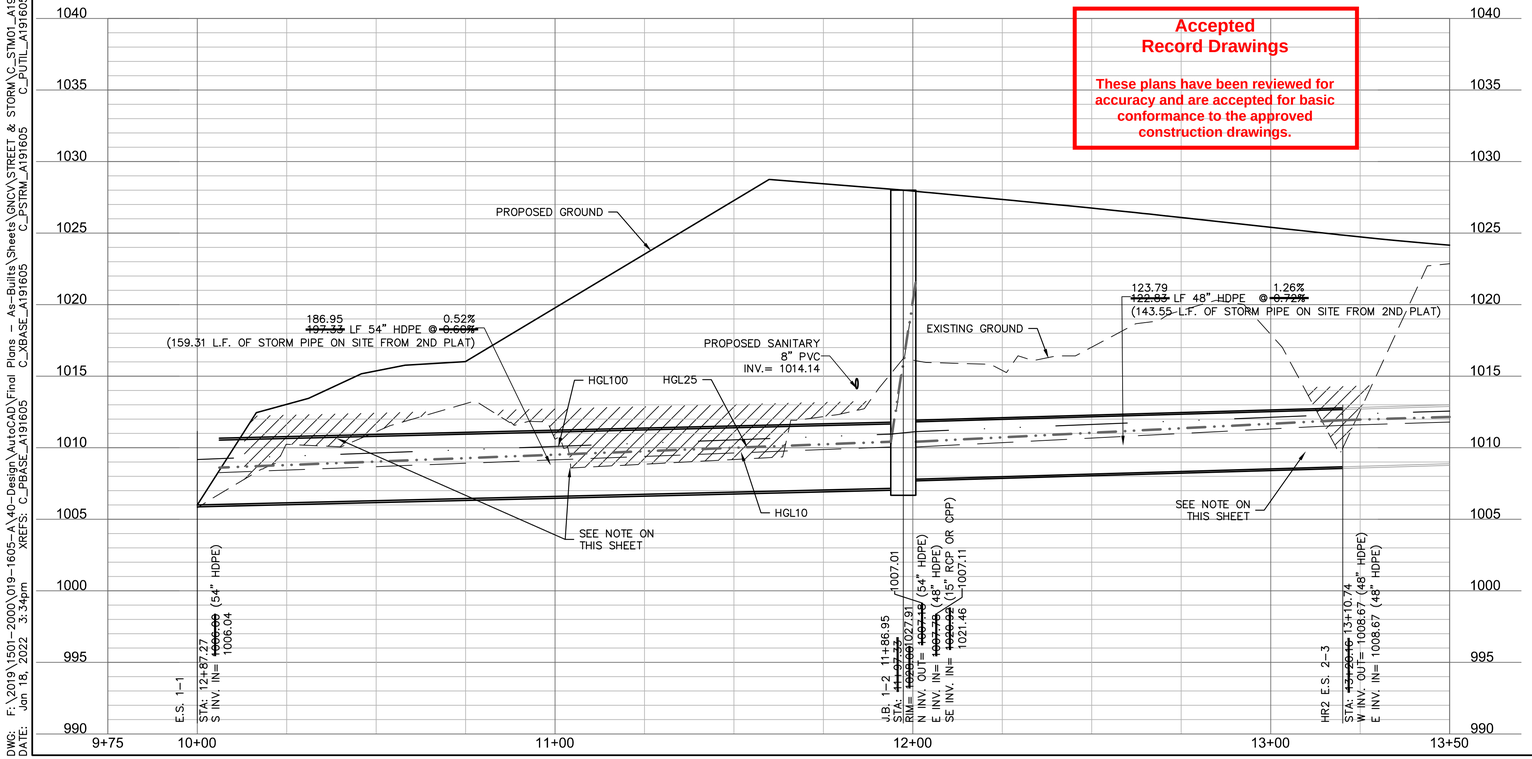
NOTE:
CONTRACTOR SHALL FILL AND COMPACT TO 95% STANDARD DENSITY TO A POINT 18" MINIMUM ABOVE THE TOP OF PIPE PRIOR TO EXCAVATION FOR THE PIPE.

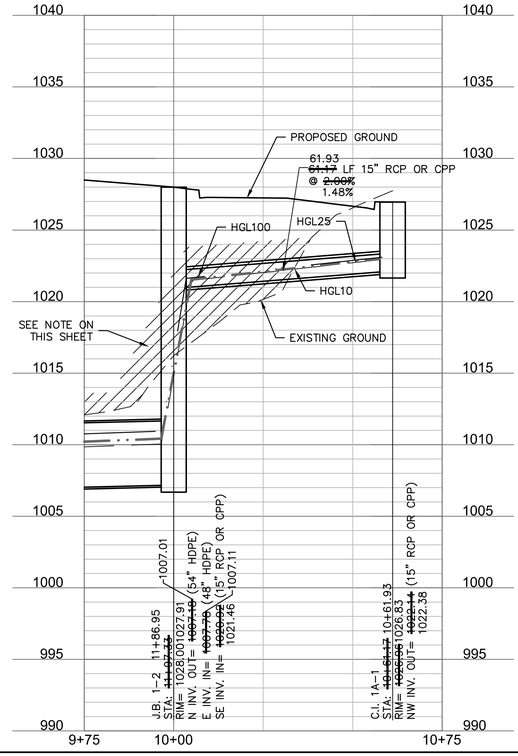
STORM LINE 1A (9+75 - 10+75)

ASBUILT
1/18/2022

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.





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TEL 816.361.1177
www.olsson.com

BROCK M. WORTHLEY
NUMBER PE-2010000237
STATE OF MISSOURI
PROFESSIONAL ENGINEER
1/18/2022

REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
1	11/20/2020	REVISED PER CITY COMMENTS	

STORM SEWER PLAN & PROFILE (LINE 1 & 1A)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

2020

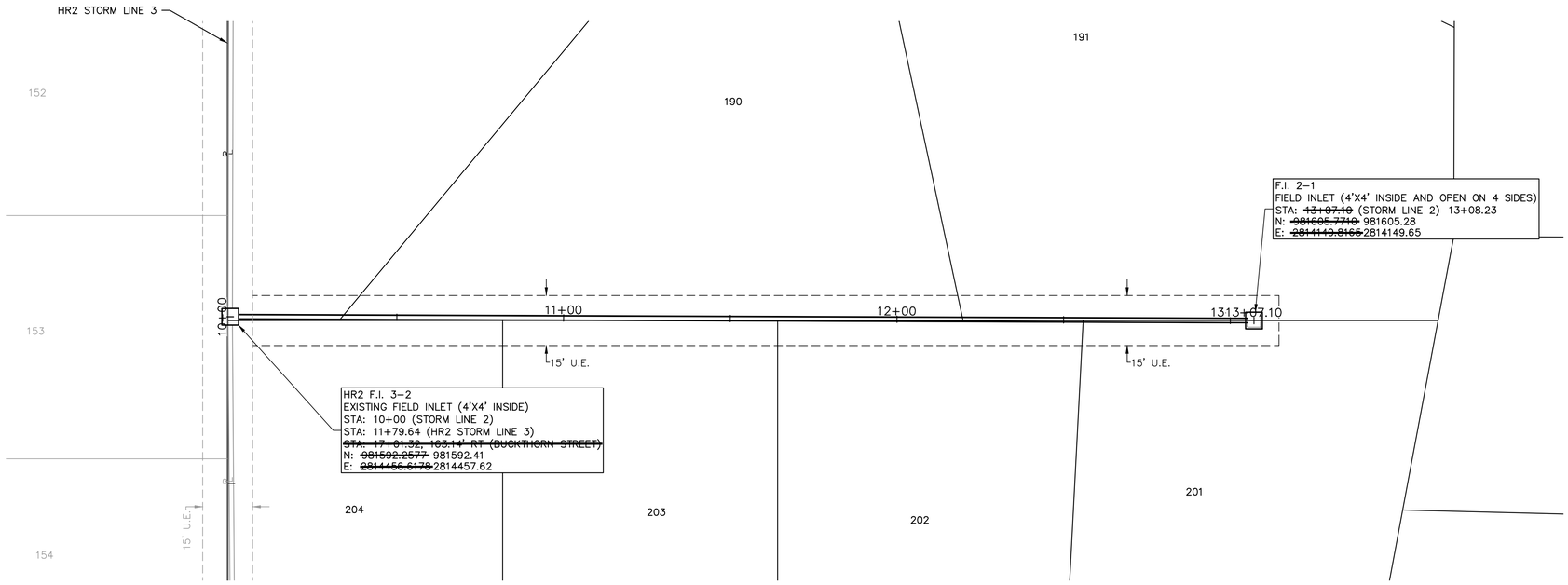
LEE'S SUMMIT, MO

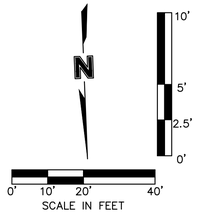
drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_STM01_A191605
date: 10/02/2020

SHEET
C118

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_STM01_A191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:34pm XREFS: C_PBASE_A191605 C_XBASE_A191605 C_PSTRM_A191605 C_PUTIL_A191605 C_PTBLK_A191605 C_PBNDY_A191605

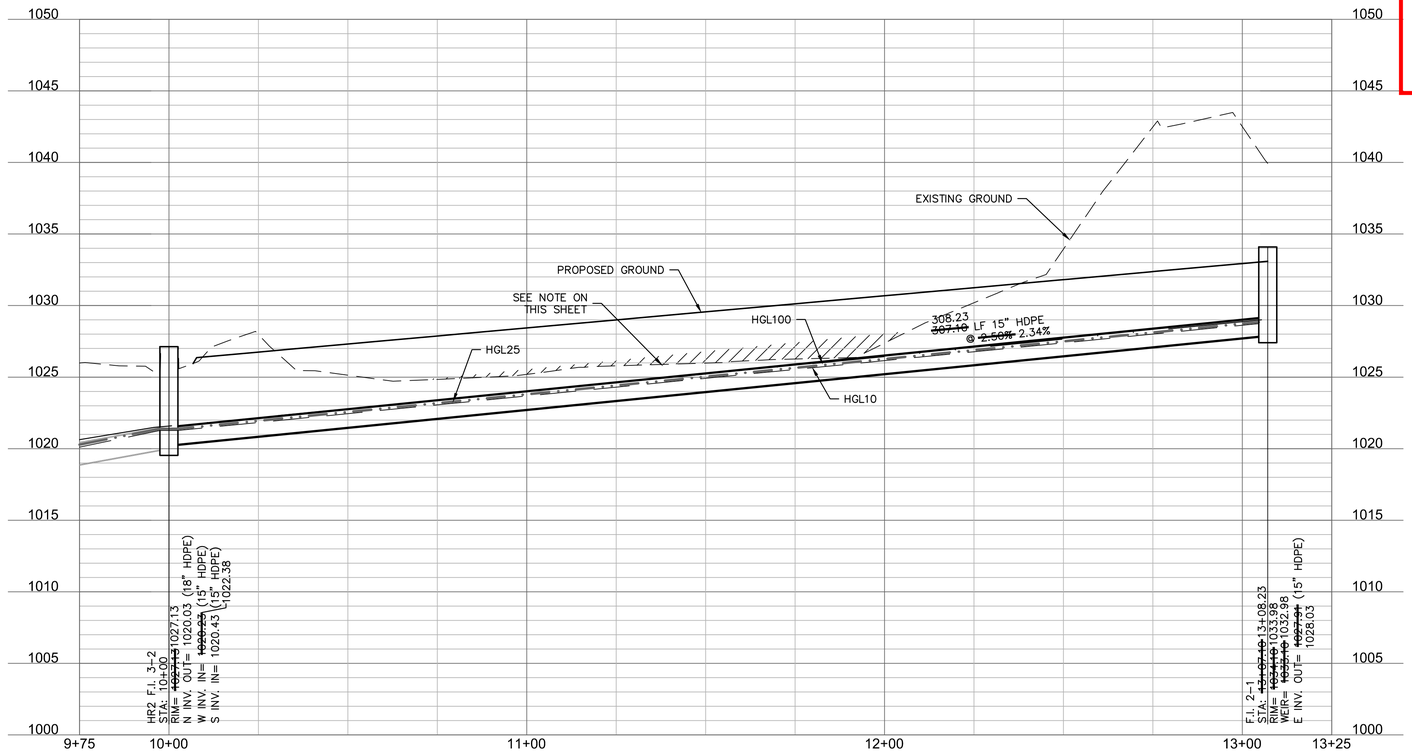
ASBUILT
1/18/2022





NOTE:
CONTRACTOR SHALL FILL AND COMPACT TO 95% STANDARD DENSITY TO A POINT 18" MINIMUM ABOVE THE TOP OF PIPE PRIOR TO EXCAVATION FOR THE PIPE.

STORM LINE 2 (9+75 - 13+25)



Accepted
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TEL 816.361.1177
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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
PROFESSIONAL ENGINEER
1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
1	11/23/2020	REVISED PER CITY COMMENTS	

REVISIONS

STORM SEWER PLAN & PROFILE (LINE 2)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

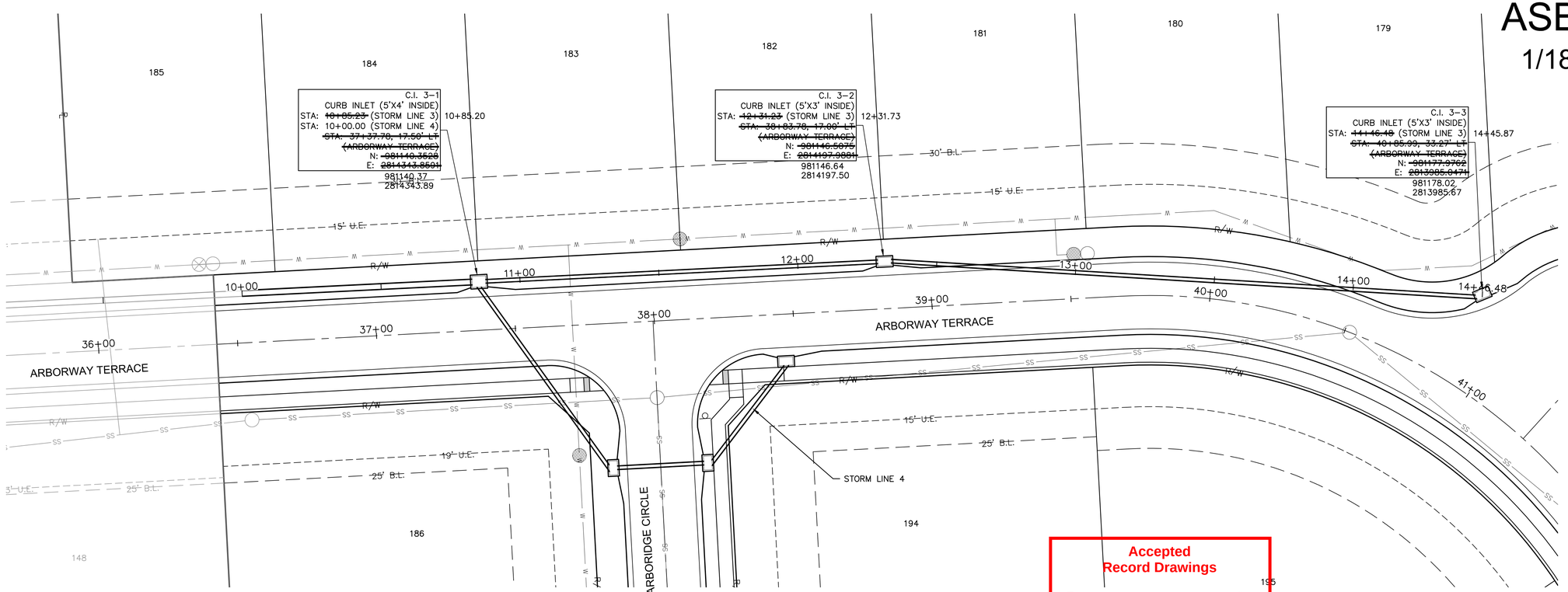
2020

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_STM01_A191605
date: 10/02/2020

SHEET
C119

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_STM01_A191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:34pm XREFS: C_PBASE_A191605 C_XBASE_A191605 C_PSTRM_A191605 C_PUTIL_A191605 C_PTBLK_A191605 C_PBNDY_A191605

ASBUILT
1/18/2022

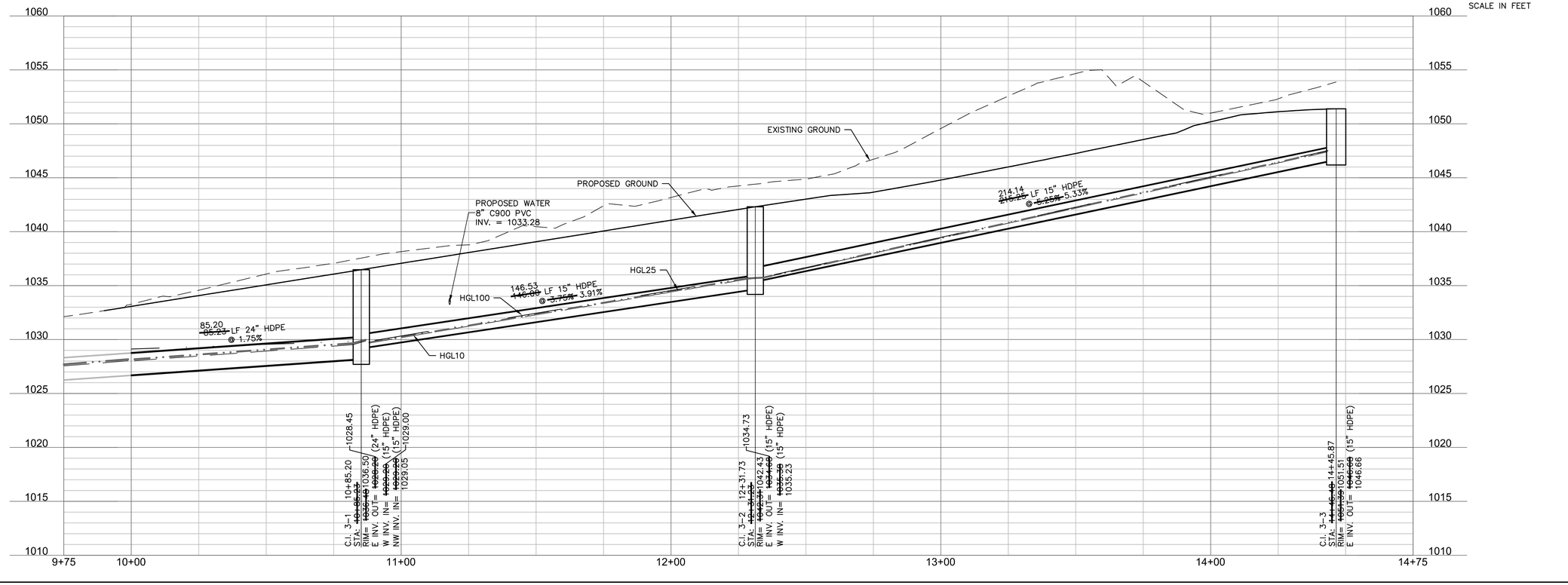


Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

SCALE IN FEET
0' 10' 20' 40'
10' 5' 2.5' 0'

STORM LINE 3 (9+75 - 14+75)



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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
	11/23/2020	REVISED PER CITY COMMENTS	

REVISIONS

STORM SEWER PLAN & PROFILE (LINE 3)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_STM01_A191605
date: 10/02/2020

SHEET
C120

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_STM01_A191605.dwg USER: bworthley
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ASBUILT
1/18/2022

E.S. 5–1
END SECTION (18" HDPE)
W/ CONCRETE TOE WALL
INSTALL RIPRAP PER DETAILS ON THIS SHEET
STA: 10+00 (STORM LINE 5)
N: ~~981975.4090~~
E: ~~2813796.0591~~
981973.59
2813796.91

C.I. 5–2
CURB INLET (5'X3' INSIDE)
STA: ~~11+15.90~~ (STORM LINE 5) 11+45.27
~~STA: 10+25.35, 21.00' LT (BUCKTHORN STREET)~~
N: ~~981829.6454~~
E: ~~2813789.8046~~
981829.53
2813789.99

C.I. 5–4
CURB INLET (5'X3' INSIDE)
STA: ~~13+17.29~~ (STORM LINE 5) 13+17.27
STA: 10+00.00 (STORM LINE 6)
~~STA: 46+73.69, 17.00' LT (ARBOR SOUND DRIVE)~~
N: ~~981766.5336~~ 981766.84
E: ~~2813925.2504~~ 2813925.81

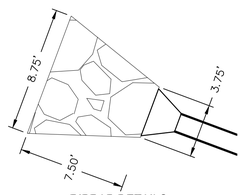
C.I. 5–3
CURB INLET (5'X3' INSIDE)
STA: ~~11+87.00~~ (STORM LINE 5) 11+87.13
~~STA: 10+25.81, 21.00' RT (BUCKTHORN STREET)~~
N: ~~981788.3949~~ 981788.34
E: ~~2813797.7171~~ 2813797.46

C.I. 5–5
CURB INLET (5'X3' INSIDE)
STA: ~~14+72.24~~ (STORM LINE 5) 14+72.72
~~STA: 45+13.08, 17.00' LT (ARBOR SOUND DRIVE)~~
N: ~~981611.8853~~ 981611.74
E: ~~2813915.6120~~ 2813915.51

STORM LINE 6

BUCKTHORN STREET

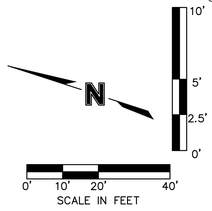
ARBOR SOUND DRIVE



RIPRAP DETAILS
SCALE=1"=5'

Riprap Calculations							
End Section	Q_{100} (cfs)	Pipe Diameter (ft)	Class*	D50* (in)	Apron Length (ft)	Apron Depth (ft)	Area (SY)
E.S. 5-1	16.13	1.25	4	14	~~7.5~~	2.57	~~5.2~~
*Per Table 10.1 HEC 14-FHWA-Energy Dissipators Pg. 10-18				14			15.69

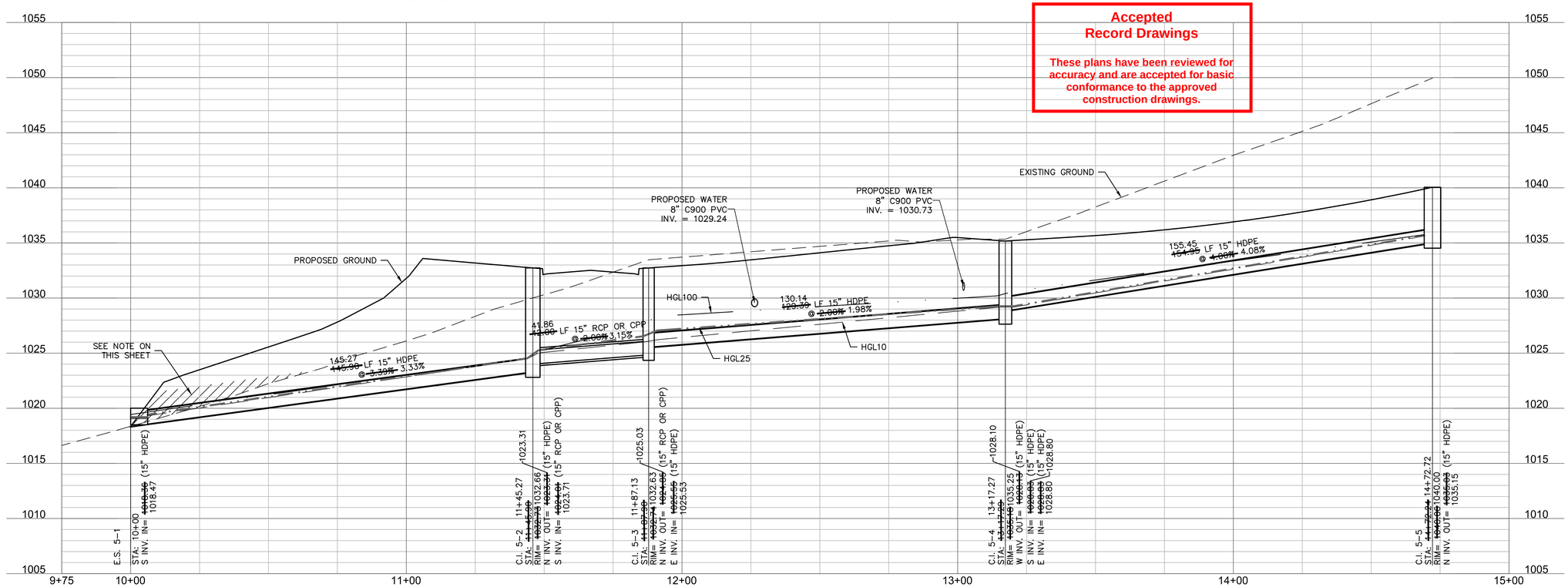
NOTE:
CONTRACTOR SHALL FILL AND COMPACT TO 95% STANDARD DENSITY TO A POINT 18" MINIMUM ABOVE THE TOP OF PIPE PRIOR TO EXCAVATION FOR THE PIPE.



STORM LINE 5 (9+75 - 15+00)

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.



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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
1/18/2022

REVISIONS		
REV. NO.	DATE	REVISIONS DESCRIPTION
1	11/20/2020	REVISED PER CITY COMMENTS
2	11/8/2022	REVISED PER CITY COMMENTS

STORM SEWER PLAN & PROFILE (LINE 5)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

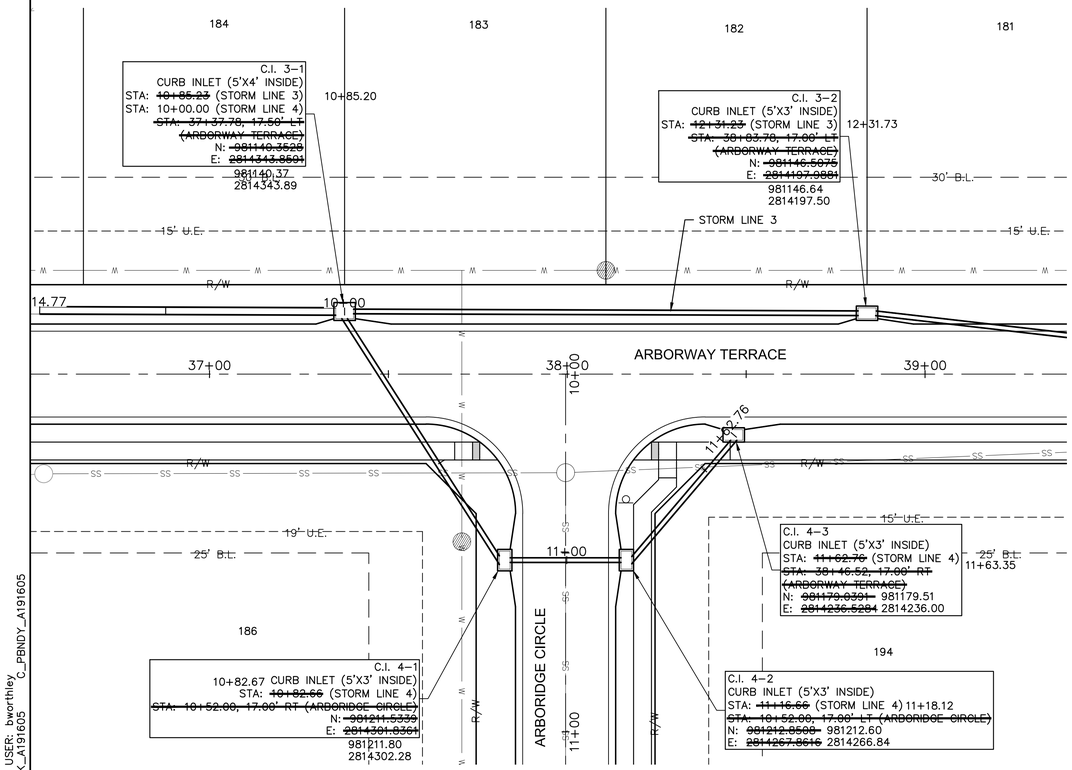
drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_STM01_A191605
date: 10/02/2020

SHEET
C121

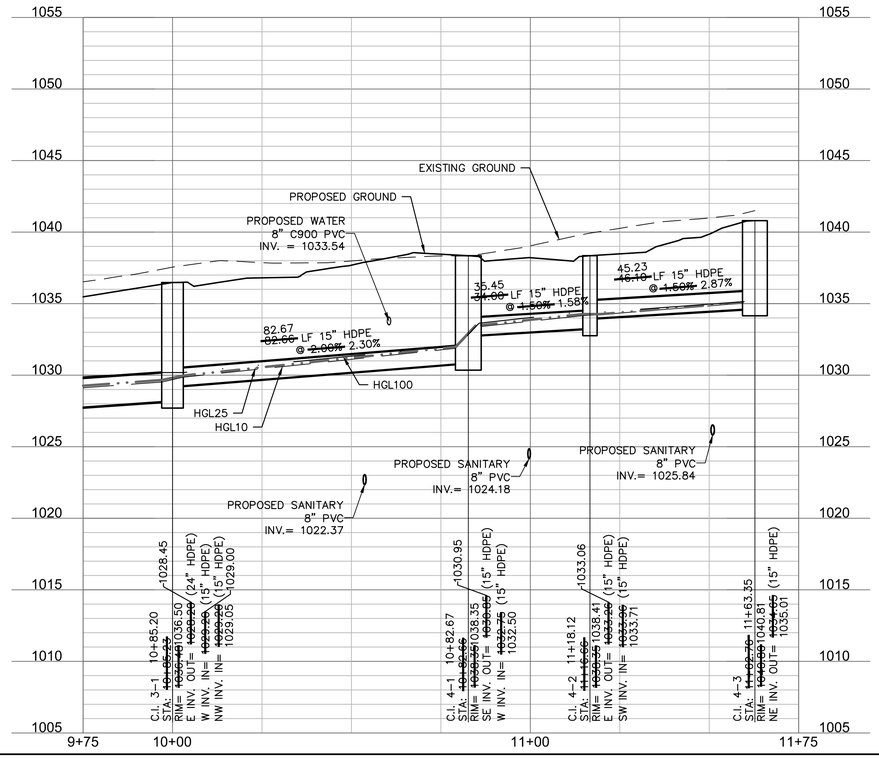
DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_STM01_A191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:34pm XREFS: C_PBASE_A191605 C_XBASE_A191605 C_PSTRM_A191605 C_PUTIL_A191605 C_PTBLK_A191605 C_PBNDY_A191605

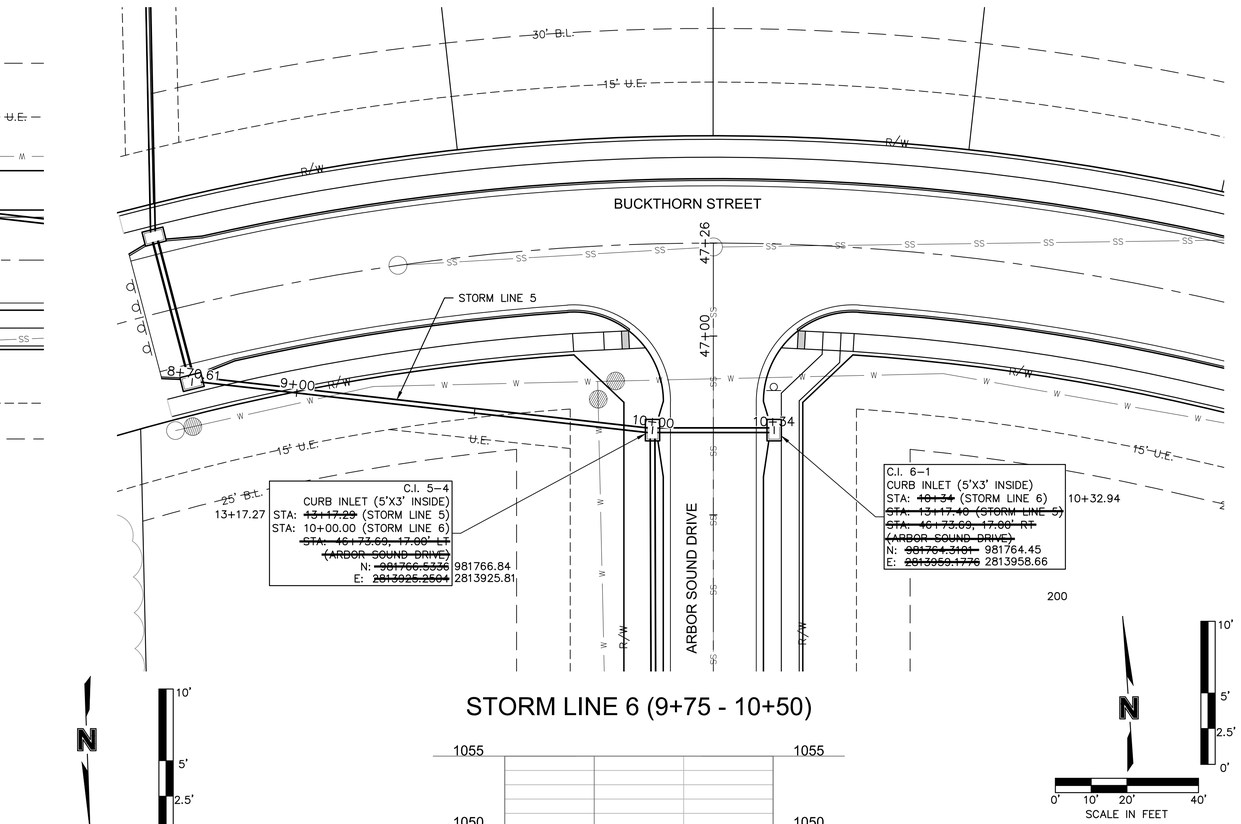
Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

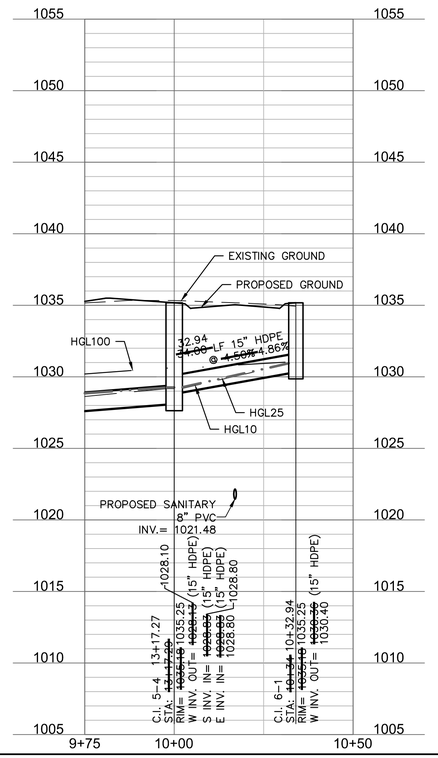


STORM LINE 4 (9+75 - 11+75)





STORM LINE 6 (9+75 - 10+50)



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1/18/2022

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
1/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

STORM SEWER PLAN & PROFILE (LINE 4 & 6)
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

drawn by:	OLS
checked by:	BMW
approved by:	BMW
QA/QC by:	JES
project no.:	A19-1605
drawing no.:	C_STM01_A191605
date:	10/02/2020

SHEET
C122

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DATE: Jan 18, 2022 3:34pm XREFS: C_PBASE_A191605 C_PTBLK_A191605 C_PNDY_A191605 C_PUTIL_A191605 C_PSTRM_A191605 C_XBASE_A191605

LEGEND	
100	FINISHED INDEX CONTOURS
100	FINISHED INTERMEDIATE CONTOURS
	RIDGE LINE
A	DRAINAGE AREA
C	RUNOFF COEFFICIENT
C.I. 0–0	STORM STRUCTURE NUMBER

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

NOT ASBUILT

N

0' 25' 50' 100'
SCALE IN FEET

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
10/8/2020

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

DRAINAGE PLAN
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_DRN01_A191605
date: 10/02/2020

SHEET
C123

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_DRN01_A191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:34pm XREFS: C_PTBLK_A191605 C_XBASE_A191605 C_PBASE_A191605 C_PUTIL_A191605 C_PBNDY_A191605

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_DRN01_A191605.dwg USER: bworthley
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Drainage Area Design Table

10 Year Return Frequency

Inlet ID	Drainage Area (ac)	C	Tc (min)	i (in/hr)	K	Peak Flow (cfs)
C.I. 1A-1	1.21	0.51	5.00	7.35	1.00	4.54
F.I. 2-1	1.13	0.51	5.00	7.35	1.00	4.24
C.I. 3-1	0.43	0.51	5.00	7.35	1.00	1.61
C.I. 3-2	0.56	0.51	5.00	7.35	1.00	2.10
C.I. 3-3	1.16	0.51	5.00	7.35	1.00	4.35
C.I. 4-1(L)	0.32	0.51	5.00	7.35	1.00	1.20
C.I. 4-1(R)	0.00	0.51	5.00	7.35	1.00	0.00
C.I. 4-1(B)	0.09	0.51	5.00	7.35	1.00	0.34
C.I. 4-1	0.41	0.51	5.00	7.35	1.00	1.54
C.I. 4-2(L)	0.00	0.51	5.00	7.35	1.00	0.00
C.I. 4-2(R)	0.38	0.51	5.00	7.35	1.00	1.43
C.I. 4-2(B)	0.57	0.51	5.00	7.35	1.00	2.14
C.I. 4-2	0.95	0.51	5.00	7.35	1.00	3.56
C.I. 4-3	0.37	0.51	5.00	7.35	1.00	1.39
C.I. 5-2	0.21	0.51	5.00	7.35	1.00	0.79
C.I. 5-3	0.42	0.51	5.00	7.35	1.00	1.58
C.I. 5-4	0.81	0.51	5.00	7.35	1.00	3.04
C.I. 5-5	0.72	0.51	5.00	7.35	1.00	2.70
C.I. 6-1	0.58	0.51	5.00	7.35	1.00	2.18
HR2 F.I. 3-2	1.15	0.51	5.00	7.35	1.00	4.31
HR2 F.I. 3-3	0.52	0.51	5.00	7.35	1.00	1.95

Inlet Design Table

10 Year Return Frequency

Inlet ID	Inlet Location	Peak Flow (cfs)	Upstream Bypass (cfs)	Total Flow (cfs)	Clogging Factor	Inlet Capacity (cfs)	Sag Inlet Capacity (Note 1) (cfs)	Captured Flow (cfs)	Bypass Flow (cfs)	Inlet Efficiency (Note 2) (%)	Gutter Depth (ft)	Gutter Spread (ft)	Ponding Depth (ft)
C.I. 1A-1	GRADE	4.54	0.35	4.89	1.00	3.82	3.82	3.82	1.07	78.16%	0.21	9.77	...
F.I. 2-1	SAG	4.24	0.00	4.24	0.80	18.67	14.93	4.24	0.00	100.00%	...	...	0.19
C.I. 3-1	GRADE	1.61	1.41	3.02	1.00	1.87	1.87	1.87	1.15	62.03%	0.16	7.78	...
C.I. 3-2	GRADE	2.10	1.31	3.41	1.00	2.00	2.00	2.00	1.41	58.64%	0.16	8.14	...
C.I. 3-3	GRADE	4.35	0.00	4.35	1.00	3.04	3.04	3.04	1.31	69.90%	0.21	10.67	...
C.I. 4-1(L)	SAG	1.20	...	...	...	...	...	...	...	...	0.14	7.01	...
C.I. 4-1(R)	SAG	0.00	...	...	...	...	...	...	...	...	0.00	0.00	...
C.I. 4-1(B)	SAG	0.34	...	...	...	...	...	...	...	...	...	...	...
C.I. 4-1	SAG	1.54	0.00	1.54	0.80	19.40	15.52	1.54	0.00	100.00%	...	...	...
C.I. 4-2(L)	SAG	0.00	...	...	...	...	...	...	...	...	0.09	4.34	...
C.I. 4-2(R)	SAG	1.43	...	...	...	...	...	...	...	...	0.15	7.48	...
C.I. 4-2(B)	SAG	2.14	...	...	...	...	...	...	...	...	...	...	...
C.I. 4-2	SAG	3.56	0.33	3.90	0.80	19.40	15.52	3.90	0.00	100.00%	...	...	...
C.I. 4-3	GRADE	1.39	0.00	1.39	1.00	1.05	1.05	1.05	0.33	76.01%	0.11	5.51	...
C.I. 5-2	GRADE	0.79	0.00	0.79	1.00	0.79	0.79	0.79	0.00	99.69%	0.13	5.83	...
C.I. 5-3	GRADE	1.58	0.90	2.47	1.00	2.37	2.37	2.37	0.10	95.95%	0.19	8.86	...
C.I. 5-4	GRADE	3.04	0.53	3.57	1.00	2.67	2.67	2.67	0.90	74.83%	0.20	9.96	...
C.I. 5-5	GRADE	2.70	0.00	2.70	1.00	2.17	2.17	2.17	0.53	80.31%	0.18	8.97	...
C.I. 6-1	GRADE	2.18	0.00	2.18	1.00	1.82	1.82	1.82	0.35	83.89%	0.17	8.27	...
HR2 F.I. 3-2	SAG	4.31	0.00	4.31	0.80	18.67	14.93	4.31	0.00	100.00%	...	...	0.19
HR2 F.I. 3-3	SAG	1.95	0.00	1.95	0.80	18.67	14.93	1.95	0.00	100.00%	...	...	0.11

Notes:
1. Inlet capacity at sag location has been reduced by a clogging factor of 0.80, reducing theoretical capacity to 80% capacity, as required per APWA Section 5600.
Both theoretical capacity and reduced capacity are shown.
2. Inlet efficiency shown in the tables is Captured Flow/Total Flow, denoting the actual percentage of flow captured after the capacity has been reduced to 80% of theoretical capacity.

Storm Sewer Design Calculation Table

10 Year Return Frequency

Upstream Structure	Downstream Structure	Length (ft)	Upstream Invert (ft)	Downstream Invert (ft)	Slope (%)	Diameter (in)	Manning's n	Total Flow (cfs)	Velocity (ft/s)	Capacity (cfs)	Flow Depth (ft)	Upstream Struct. HGL (ft)	Upstream Top Elev. (ft)
J.B. 1-2	E.S. 1-1	197.33	1007.18	1006.00	0.60	54	0.010	95.43	10.62	197.70	2.20	1010.05	1028.00
HR2 E.S. 2-3	J.B. 1-2	122.83	1008.67	1007.78	0.72	48	0.010	91.61	10.93	158.96	2.27	1011.57	1013.00
C.I. 1A-1	J.B. 1-2	61.17	1022.15	1020.92	2.01	15	0.013	3.82	5.90	9.16	0.56	1022.94	1026.96
HR2 F.I. 3-2	HR2 M.H. 3-1	141.17	1020.03	1013.60	4.55	18	0.010	10.50	10.92	29.14	0.62	1021.27	1027.13
HR2 F.I. 3-3	HR2 F.I. 3-2	177.37	1024.49	1020.43	2.29	15	0.010	1.95	2.96	12.70	0.84	1025.05	1030.59
F.I. 2-1	HR2 F.I. 3-2	307.10	1027.91	1020.23	2.50	15	0.010	4.24	4.38	13.28	1.04	1028.74	1034.10
HR2 PLUG 6-3	HR2 C.I. 6-2	109.97	1026.71	1024.79	1.75	24	0.010	13.40	6.75	38.85	1.12	1028.03	1029.09
C.I. 3-1	HR2 PLUG 6-3	85.23	1028.20	1026.71	1.75	24	0.010	13.40	6.11	38.88	1.32	1029.52	1036.48
C.I. 3-2	C.I. 3-1	146.00	1034.68	1029.20	3.75	15	0.010	5.04	8.48	16.26	0.48	1035.59	1042.31
C.I. 3-3	C.I. 3-2	215.25	1046.68	1035.38	5.25	15	0.010	3.04	7.86	19.23	0.34	1047.38	1051.39
C.I. 4-1	C.I. 3-1	82.66	1030.85	1029.20	2.00	15	0.010	6.49	7.95	11.86	0.66	1031.88	1038.35
C.I. 4-2	C.I. 4-1	34.00	1033.26	1032.75	1.50	15	0.010	4.95	6.76	10.28	0.61	1034.16	1038.35
C.I. 4-3	C.I. 4-2	46.10	1034.65	1033.96	1.50	15	0.010	1.05	4.23	10.27	0.27	1035.05	1040.82
C.I. 5-2	E.S. 5-1	145.90	1023.31	1018.36	3.39	15	0.010	9.82	10.76	15.46	0.72	1024.49	1032.73
C.I. 5-3	C.I. 5-2	42.00	1024.85	1024.01	2.00	15	0.013	9.03	8.05	9.13	1.01	1026.01	1032.74
C.I. 5-4	C.I. 5-3	129.39	1028.14	1025.55	2.00	15	0.010	6.66	8.04	11.88	0.67	1029.18	1035.18
C.I. 5-5	C.I. 5-4	154.95	1035.03	1028.83	4.00	15	0.010	2.17	5.81	16.79	0.35	1035.62	1040.06
C.I. 6-1	C.I. 5-4	34.00	1030.36	1028.83	4.50	15	0.010	1.82	5.08	17.81	0.35	1030.90	1035.18

NOTE:
SW ARBOR SOUND DRIVE AND ARBORWAY TERRACE ARE RESIDENTIAL LOCAL ROADS REQUIRING INLET AND GUTTER CAPACITY FOR THE 10–YEAR STORM EVENT, THEREFORE, INLET DESIGN, PIPE DESIGN, AND DRAINAGE AREA DESIGN TABLES HAVE BEEN INCLUDED FOR THE 10–YEAR STORM EVENT. ALL STORM SEWER PIPES HAVE BEEN DESIGNED TO CONVEY THE 25–YEAR STORM EVENT, PER RESIDENTIAL COLLECTOR STANDARDS FOR BUCKTHORN STREET.

Drainage Area Design Table

25 Year Return Frequency

Inlet ID	Drainage Area (ac)	C	Tc (min)	i (in/hr)	K	Peak Flow (cfs)
C.I. 1A-1	1.21	0.51	5.00	8.53	1.10	5.79
F.I. 2-1	1.13	0.51	5.00	8.53	1.10	5.41
C.I. 3-1	0.43	0.51	5.00	8.53	1.10	2.06
C.I. 3-2	0.56	0.51	5.00	8.53	1.10	2.68
C.I. 3-3	1.16	0.51	5.00	8.53	1.10	5.55
C.I. 4-1(L)	0.32	0.51	5.00	8.53	1.10	1.53
C.I. 4-1(R)	0.00	0.51	5.00	8.53	1.10	0.00
C.I. 4-1(B)	0.09	0.51	5.00	8.53	1.10	0.43
C.I. 4-1	0.41	0.51	5.00	8.53	1.10	1.96
C.I. 4-2(L)	0.00	0.51	5.00	8.53	1.10	0.00
C.I. 4-2(R)	0.38	0.51	5.00	8.53	1.10	1.82
C.I. 4-2(B)	0.57	0.51	5.00	8.53	1.10	2.73
C.I. 4-2	0.95	0.51	5.00	8.53	1.10	4.55
C.I. 4-3	0.37	0.51	5.00	8.53	1.10	1.77
C.I. 5-2	0.21	0.51	5.00	8.53	1.10	1.00
C.I. 5-3	0.42	0.51	5.00	8.53	1.10	2.01
C.I. 5-4	0.81	0.51	5.00	8.53	1.10	3.88
C.I. 5-5	0.72	0.51	5.00	8.53	1.10	3.45
C.I. 6-1	0.58	0.51	5.00	8.53	1.10	2.78
HR2 F.I. 3-2	1.15	0.51	5.00	8.53	1.10	5.50
HR2 F.I. 3-3	0.52	0.51	5.00	8.53	1.10	2.49

Inlet Design Table

25 Year Return Frequency

Inlet ID	Inlet Location	Peak Flow (cfs)	Upstream Bypass (cfs)	Total Flow (cfs)	Clogging Factor	Inlet Capacity (cfs)	Sag Inlet Capacity (Note 1) (cfs)	Captured Flow (cfs)	Bypass Flow (cfs)	Inlet Efficiency (Note 2) (%)	Gutter Depth (ft)	Gutter Spread (ft)	Ponding Depth (ft)
C.I. 1A-1	GRADE	5.79	0.56	6.35	1.00	4.54	4.54	4.54	1.81	71.43%	0.23	10.78	...
F.I. 2-1	SAG	5.41	0.00	5.41	0.80	18.67	14.93	5.41	0.00	100.00%	...	...	0.22
C.I. 3-1	GRADE	2.06	2.39	4.44	1.00	2.26	2.26	2.26	2.18	50.84%	0.18	8.99	...
C.I. 3-2	GRADE	2.68	2.02	4.70	1.00	2.31	2.31	2.31	2.39	49.18%	0.18	9.18	...
C.I. 3-3	GRADE	5.55	0.00	5.55	1.00	3.53	3.53	3.53	2.02	63.67%	0.23	11.69	...
C.I. 4-1(L)	SAG	1.53	...	...	...	...	...	...	...	...	0.15	7.68	...
C.I. 4-1(R)	SAG	0.00	...	...	...	...	...	...	...	...	0.00	0.00	...
C.I. 4-1(B)	SAG	0.43	...	...	...	...	...	...	...	...	...	...	...
C.I. 4-1	SAG	1.96	0.00	1.96	0.80	19.40	15.52	1.96	0.00	100.00%	...	...	...
C.I. 4-2(L)	SAG	0.00	...	...	...	...	...	...	...	...	0.10	5.13	...
C.I. 4-2(R)	SAG	1.82	...	...	...	...	...	...	...	...	0.16	8.19	...
C.I. 4-2(B)	SAG	2.73	...	...	...	...	...	...	...	...	...	...	...
C.I. 4-2	SAG	4.55	0.52	5.07	0.80	19.40	15.52	5.07	0.00	100.00%	...	...	...
C.I. 4-3	GRADE	1.77	0.00	1.77	1.00	1.25	1.25	1.25	0.52	70.59%	0.12	6.03	...
C.I. 5-2	GRADE	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	100.00%	0.14	6.39	...
C.I. 5-3	GRADE	2.01	1.49	3.50	1.00	3.22	3.22	3.22	0.28	92.07%	0.22	10.09	...
C.I. 5-4	GRADE	3.88	0.84	4.72	1.00	3.22	3.22	3.22	1.49	68.37%	0.22	11.05	...
C.I. 5-5	GRADE	3.45	0.00	3.45	1.00	2.60	2.60	2.60	0.84	75.58%	0.20	9.83	...
C.I. 6-1	GRADE	2.78	0.00	2.78	1.00	2.22	2.22	2.22	0.56	79.81%	0.18	9.06	...
HR2 F.I. 3-2	SAG	5.50	0.00	5.50	0.80	18.67	14.93	5.50	0.00	100.00%	...	...	0.22
HR2 F.I. 3-3	SAG	2.49	0.00	2.49	0.80	18.67	14.93	2.49	0.00	100.00%	...	...	0.13

Notes:
1. Inlet capacity at sag location has been reduced by a clogging factor of 0.80, reducing theoretical capacity to 80% capacity, as required per APWA Section 5600.
Both theoretical capacity and reduced capacity are shown.
2. Inlet efficiency shown in the tables is Captured Flow/Total Flow, denoting the actual percentage of flow captured after the capacity has been reduced to 80% of theoretical capacity.

Storm Sewer Design Calculation Table

25 Year Return Frequency

Upstream Structure	Downstream Structure	Length (ft)	Upstream Invert (ft)	Downstream Invert (ft)	Slope (%)	Diameter (in)	Manning's n	Total Flow (cfs)	Velocity (ft/s)	Capacity (cfs)	Flow Depth (ft)	Upstream Struct. HGL (ft)	Upstream Top Elev. (ft)
J.B. 1-2	E.S. 1-1	197.33	1007.18	1006.00	0.60	54	0.010	121.64	11.49	197.70	2.55	1010.42	1028.00
HR2 E.S. 2-3	J.B. 1-2	122.83	1008.67	1007.78	0.72	48	0.010	117.10	11.98	158.96	2.64	1011.93	1013.00
C.I. 1A-1	J.B. 1-2	61.17	1022.15	1020.92	2.01	15	0.013	4.54	6.23	9.16	0.62	1023.01	1026.96
HR2 F.I. 3-2	HR2 M.H. 3-1	141.17	1020.03	1013.60	4.55	18	0.010	13.40	8.97	29.14	1.06	1021.39	1027.13
HR2 F.I. 3-3	HR2 F.I. 3-2	177.37	1024.49	1020.43	2.29	15	0.010	2.49	3.23	12.70	0.96	1025.12	1030.59
F.I. 2-1	HR2 F.I. 3-2	307.10	1027.91	1020.23	2.50	15	0.010	5.41	5.00	13.28	1.16	1028.85	1034.10
HR2 PLUG 6-3	HR2 C.I. 6-2	109.97	1026.71	1024.79	1.75	24	0.010	16.38	7.15	38.85	1.29	1028.17	1029.09
C.I. 3-1	HR2 PLUG 6-3	85.23	1028.20	1026.71	1.75	24	0.010	16.38	6.68	38.88	1.46	1029.66	1036.48
C.I. 3-2	C.I. 3-1	146.00	1034.68	1029.20	3.75	15	0.010	5.84	8.92	16.26	0.52	1035.66	1042.31
C.I. 3-3	C.I. 3-2	215.25	1046.68	1035.38	5.25	15	0.010	3.53	8.23	19.23	0.36	1047.44	1051.39
C.I. 4-1	C.I. 3-1	82.66	1030.85	1029.20	2.00	15	0.010	8.28	8.78	11.86	0.77	1031.98	1038.35
C.I. 4-2	C.I. 4-1	34.00	1033.26	1032.75	1.50	15	0.010	6.32	7.37	10.28	0.71	1034.27	1038.35
C.I. 4-3	C.I. 4-2	46.10	1034.65	1033.96	1.50	15	0.010	1.25	4.21	10.27	0.31	1035.09	1040.82
C.I. 5-2	E.S. 5-1	145.90	1023.31	1018.36	3.39	15	0.010	12.26	12.02	15.46	0.84	1024.53	1032.73
C.I. 5-3	C.I. 5-2	42.00	1024.85	1024.01	2.00	15	0.013	11.26	9.18	9.13	1.25	1026.54	1032.74
C.I. 5-4	C.I. 5-3	129.39	1028.14	1025.55	2.00	15	0.010	8.04	6.75	11.88	1.25	1029.26	1035.18
C.I. 5-5	C.I. 5-4	154.95	1035.03	1028.83	4.00	15	0.010	2.60	5.55	16.79	0.43	1035.68	1040.06
C.I. 6-1	C.I. 5-4	34.00	1030.36	1028.83	4.50	15	0.010	2.22	4.93	17.81	0.43	1030.95	1035.18

NOT ASBUILT

Accepted Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

Drainage Area Design Table

100 Year Return Frequency

Inlet ID	Drainage Area (ac)	C	Tc (min)	i (in/hr)	K	Peak Flow (cfs)
C.I. 1A-1	1.21	0.51	5.00	10.32	1.25	7.96
F.I. 2-1	1.13	0.51	5.00	10.32	1.25	7.44
C.I. 3-1	0.43	0.51	5.00	10.32	1.25	2.83
C.I. 3-2	0.56	0.51	5.00	10.32	1.25	3.69
C.I. 3-3	1.16	0.51	5.00	10.32	1.25	7.63
C.I. 4-1(L)	0.32	0.51	5.00	10.32	1.25	2.11
C.I. 4-1(R)	0.00	0.51	5.00	10.32	1.25	0.00
C.I. 4-1(B)	0.09	0.51	5.00	10.32	1.25	0.59
C.I. 4-1	0.41	0.51	5.00	10.32	1.25	2.70
C.I. 4-2(L)	0.00	0.51	5.00	10.32	1.25	0.00
C.I. 4-2(R)	0.38	0.51	5.00	10.32	1.25	2.50
C.I. 4-2(B)	0.57	0.51	5.00	10.32	1.25	3.75
C.I. 4-2	0.95	0.51	5.00	10.32	1.25	6.25
C.I. 4-3	0.37	0.51	5.00	10.32	1.25	2.43
C.I. 5-2	0.21	0.51	5.00	10.32	1.25	1.38
C.I. 5-3	0.42	0.51	5.00	10.32	1.25	2.76
C.I. 5-4	0.81	0.51	5.00	10.32	1.25	5.33
C.I. 5-5	0.72	0.51	5.00	10.32	1.25	4.74
C.I. 6-1	0.58	0.51	5.00	10.32	1.25	3.82
HR2 F.I. 3-2	1.15	0.51	5.00	10.32	1.25	7.57
HR2 F.I. 3-3	0.52	0.51	5.00	10.32	1.25	3.42

Inlet Design Table

100 Year Return Frequency

Inlet ID	Inlet Location	Peak Flow (cfs)	Upstream Bypass (cfs)	Total Flow (cfs)	Clogging Factor	Inlet Capacity (cfs)	Sag Inlet Capacity (Note 1) (cfs)	Captured Flow (cfs)	Bypass Flow (cfs)	Inlet Efficiency (Note 2) (%)	Gutter Depth (ft)	Gutter Spread (ft)	Ponding Depth (ft)
C.I. 1A-1	GRADE	7.96	1.02	8.98	1.00	5.50	5.50	5.50	3.48	61.22%	0.27	12.28	...
F.I. 2-1	SAG	7.44	0.00	7.44	0.80	18.67	14.93	7.44	0.00	100.00%	...	...	0.27
C.I. 3-1	GRADE	2.83	4.53	7.36	1.00	2.64	2.64	2.64	4.72	35.82%	0.22	10.87	...
C.I. 3-2	GRADE	3.69	3.46	7.15	1.00	2.62	2.62	2.62	4.53	36.65%	0.22	10.75	...
C.I. 3-3	GRADE	7.63	0.00	7.63	1.00	4.17	4.17	4.17	3.46	54.63%	0.26	13.18	...
C.I. 4-1(L)	SAG	2.11	...	...	...	...	...	...	...	...	0.17	8.66	...
C.I. 4-1(R)	SAG	0.00	...	...	...	...	...	...	...	...	0.00	0.00	...
C.I. 4-1(B)	SAG	0.59	...	...	...	...	...	...	...	...	...	...	...
C.I. 4-1	SAG	2.70	0.00	2.70	0.80	19.40	15.52	2.70	0.00	100.00%	...	...	...
C.I. 4-2(L)	SAG	0.00	...	...	...	...	...	...	...	...	0.13	6.34	...
C.I. 4-2(R)	SAG	2.50	...	...	...	...	...	...	...	...	0.18	9.23	...
C.I. 4-2(B)	SAG	3.75	...	...	...	...	...	...	...	...	...	...	...
C.I. 4-2	SAG	6.25	0.92	7.17	0.80	19.40	15.52	7.17	0.00	100.00%	...	...	...
C.I. 4-3	GRADE	2.43	0.00	2.43	1.00	1.52	1.52	1.52	0.92	62.41%	0.14	6.80	...
C.I. 5-2	GRADE	1.38	0.00	1.38	1.00	1.38	1.38	1.38	0.01	99.56%	0.16	7.20	...
C.I. 5-3	GRADE	2.76	2.84	5.61	1.00	4.73	4.73	4.73	0.88	84.31%	0.26	12.04	...
C.I. 5-4	GRADE	5.33	1.50	6.83	1.00	3.99	3.99	3.99	2.84	58.39%	0.25	12.70	...
C.I. 5-5	GRADE	4.74	0.00	4.74	1.00	3.23	3.23	3.23	1.50	68.26%	0.22	11.07	...
C.I. 6-1	GRADE	3.82	0.00	3.82	1.00	2.80	2.80	2.80	1.02	73.37%	0.20	10.21	...
HR2 F.I. 3-2	SAG	7.57	0.00	7.57	0.80	18.67	14.93	7.57	0.00	100.00%	...	...	0.27
HR2 F.I. 3-3	SAG	3.42	0.00	3.42	0.80	18.67	14.93	3.42	0.00	100.00%	...	...	0.16

Notes:
1. Inlet capacity at sag location has been reduced by a clogging factor of 0.80, reducing theoretical capacity to 80% capacity, as required per APWA Section 5600.
Both theoretical capacity and reduced capacity are shown.
2. Inlet efficiency shown in the tables is Captured Flow/Total Flow, denoting the actual percentage of flow captured after the capacity has been reduced to 80% of theoretical capacity.

Storm Sewer Design Calculation Table

100 Year Return Frequency

Upstream Structure	Downstream Structure	Length (ft)	Upstream Invert (ft)	Downstream Invert (ft)	Slope (%)	Diameter (in)	Manning's n	Total Flow (cfs)	Velocity (ft/s)	Capacity (cfs)	Flow Depth (ft)	Upstream Struct. HGL (ft)	Upstream Top Elev. (ft)
J.B. 1-2	E.S. 1-1	197.33	1007.18	1006.00	0.60	54	0.010	167.23	12.84	197.70	3.18	1010.95	1028.00
HR2 E.S. 2-3	J.B. 1-2	122.83	1008.67	1007.78	0.72	48	0.010	161.73	13.89	158.96	3.35	1012.35	1013.00
C.I. 1A-1	J.B. 1-2	61.17	1022.15	1020.92	2.01	15	0.013	5.50	6.65	9.16	0.70	1023.10	1026.96
HR2 F.I. 3-2	HR2 M.H. 3-1	141.17	1020.03	1013.60	4.55	18	0.010	18.43	10.48	29.14	1.50	1021.49	1027.13
HR2 F.I. 3-3	HR2 F.I. 3-2	177.37	1024.49	1020.43	2.29	15	0.010	3.42	3.79	12.70	1.06	1025.24	1030.59
F.I. 2-1	HR2 F.I. 3-2	307.10	1027.91	1020.23	2.50	15	0.010	7.44	6.32	13.28	1.25	1029.00	1034.10
HR2 PLUG 6-3	HR2 C.I. 6-2	109.97	1026.71	1024.79	1.75	24	0.010	20.82	6.63	38.85	2.00	1029.12	1029.09
C.I. 3-1	HR2 PLUG 6-3	85.23	1028.20	1026.71	1.75	24	0.010	20.82	7.10	38.88	2.00	1029.83	1036.48
C.I. 3-2	C.I. 3-1	146.00	1034.68	1029.20	3.75	15	0.010	6.79	8.53	16.26	0.63	1035.73	1042.31
C.I. 3-3	C.I. 3-2	215.25	1046.68	1035.38	5.25	15	0.010	4.17	8.68	19.23	0.40	1047.51	1051.39
C.I. 4-1	C.I. 3-1	82.66	1030.85	1029.20	2.00	15	0.010	11.39	10.19	11.86	0.98	1032.06	1038.35
C.I. 4-2	C.I. 4-1	34.00	1033.26	1032.75	1.50	15	0.010	8.69	8.39	10.28	0.88	1034.40	1038.35
C.I. 4-3	C.I. 4-2	46.10	1034.65	1033.96	1.50	15	0.010	1.52	3.66	10.27	0.44	1035.14	1040.82
C.I. 5-2	E.S. 5-1	145.90	1023.31	1018.36	3.39	15	0.010	16.13	13.73	15.46	1.08	1024.55	1032.73
C.I. 5-3	C.I. 5-2	42.00	1024.85	1024.01	2.00	15	0.013	14.75	12.02	9.13	1.25	1027.45	1032.74
C.I. 5-4	C.I. 5-3	129.39	1028.14	1025.55	2.00	15	0.010	10.02	8.17	11.88	1.25	1030.20	1035.18
C.I. 5-5	C.I. 5-4	154.95	1035.03	1028.83	4.00	15	0.010	3.23	3.51	16.79	1.25	1035.75	1040.06
C.I. 6-1	C.I. 5-4	34.00	1030.36	1028.83	4.50	15	0.010	2.80	3.23	17.81	1.25	1031.03	1035.18

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
1/18/2022
PROFESSIONAL ENGINEER

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

2020

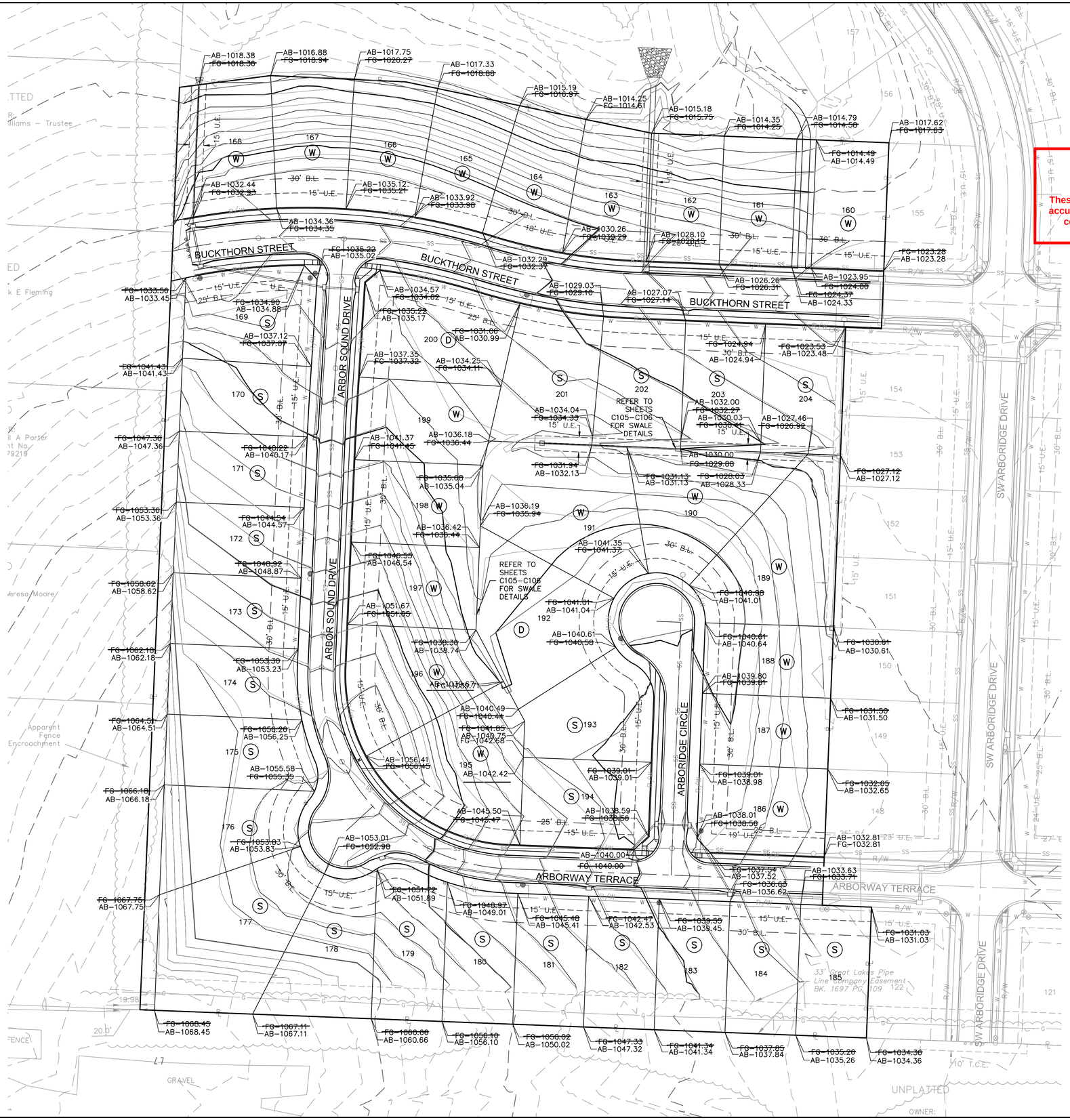
DRAINAGE TABLES
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_DRN01_A191605
date: 10/02/2020

SHEET
C124



LEGEND	
100	FINISHED INDEX CONTOURS
100	FINISHED INTERMEDIATE CONTOURS

NOTES:

MBOE – MINIMUM BUILDING OPENING ELEVATION
FG – FINISHED GRADE

NOTES:
1. INDIVIDUAL LOT OWNERS SHALL NOT CHANGE OR OBSTRUCT THE DRAINAGE FLOW LINES OR PATHS ON THE LOTS, AS SHOWN ON THE MATER DRAINAGE PLAN, UNLESS SPECIFIC APPLICATION IS MADE AND APPROVED BY THE CITY ENGINEER.

2. PLAT IS LOCATION IN ZONE X, "AREAS OUTSIDE THE 1–PERCENT ANNUAL CHANCE FLOODPLAINS, AREAS OF 1–PERCENT ANNUAL CHANCE SHEET FLOW FLOODING WHERE THE AVERAGE DEPTHS ARE LESS THAN 1 FOOT, AREAS OF 1–PERCENT ANNUAL CHANCE STREAM FLOODING WHERE THE CONTRIBUTING DRAINAGE AREA IS LESS THAN 1 SQUARE MILE, OR AREAS PROTECTED FROM THE 1–PERCENT ANNUAL CHANCE FLOOD BY LEVEES. NO BASE FLOOD ELEVATIONS OR DEPTHS ARE SHOWN WITHIN THIS ZONE"

3. PLAT IS LOCATED OUTSIDE OF ANY REQUIRED BUFFER ZONES FOR NATURAL STREAMS.

4. MBOE ELEVATIONS HAVE BEEN PROVIDED AT EACH LOT CORNER. INTERPOLATION WILL BE ALLOWED BETWEEN THE RIGHT AND LEFT SIDE MBOE'S SHOWN ON THE MASTER DRAINAGE PLAN, DEPENDING ON THE LOCATION OF THE LOWEST OPENING ON THE PROPOSED STRUCTURE.

5. REFER TO SHEET C105–C106 FOR SWALE GRADING DETAILS.

6. DRAINAGE PATHS TO BE CONSTRUCTED BETWEEN EACH OF THE LOTS LABELED AS STANDARD LOTS TO DRAIN WEST.

7. NO BUILDING PERMITS WILL BE ISSUED UNTIL AN AS–GRADED MASTER DRAINAGE PLAN HAS BEEN SUBMITTED TO THE CITY AND APPROVED BY THE CITY.

BASEMENT TYPES

- (S) STANDARD
- (W) WALKOUT
- (D) DAYLIGHT

ASBUILT
1/18/2022

Hawthorn Ridge Third Plat
Minimum Building Opening Elevation

Lot	Rear Left MBOE	Rear Right MBOE	Front Left MBOE	Front Right MBOE	As-Built Grading Plan Required
160					
161					
162					
163					
164					
165					
166					
167					
168					
169					
170					
171					
172					
173					
174					
175					
176					
177					
178					
179					
180					
181					
182					
183					
184					
185					
186					
187	1032.64	1033.55	-	-	X
188	1031.75	1032.64	-	-	X
189	1028.66	1031.75	-	-	X
190	1032.33	1028.66	-	-	X
191	1037.46	1032.33	-	-	X
192	1041.76	1037.46	-	-	X
193					X
194					
195	1040.94	1041.65	-	-	X
196	1040.01	1040.94	-	-	X
197	1037.69	1040.01	-	-	X
198	1036.31	1037.69	-	-	X
199	1035.32	1037.20	-	-	X
200	1032.73	1035.32	-	-	X
201					X
202					X
203					X
204					X

X indicates condition applies to the lot.
MBOE's have been provided per lot lines, facing the lot from the street. Interpolation will be allowed between the right and left side MBOE's provided, depending on the location of the lowest opening on the proposed structure.

N

0' 25' 50' 100'
SCALE IN FEET

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Olsson - Civil Engineering
Missouri Certificate of Authority #001592
1301 Burlington Street
North Kansas City, MO 64116
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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
1/18/2022
PROFESSIONAL ENGINEER

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
	11/23/2020	REVISED PER CITY COMMENTS	

REVISIONS

MASTER DRAINAGE PLAN
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

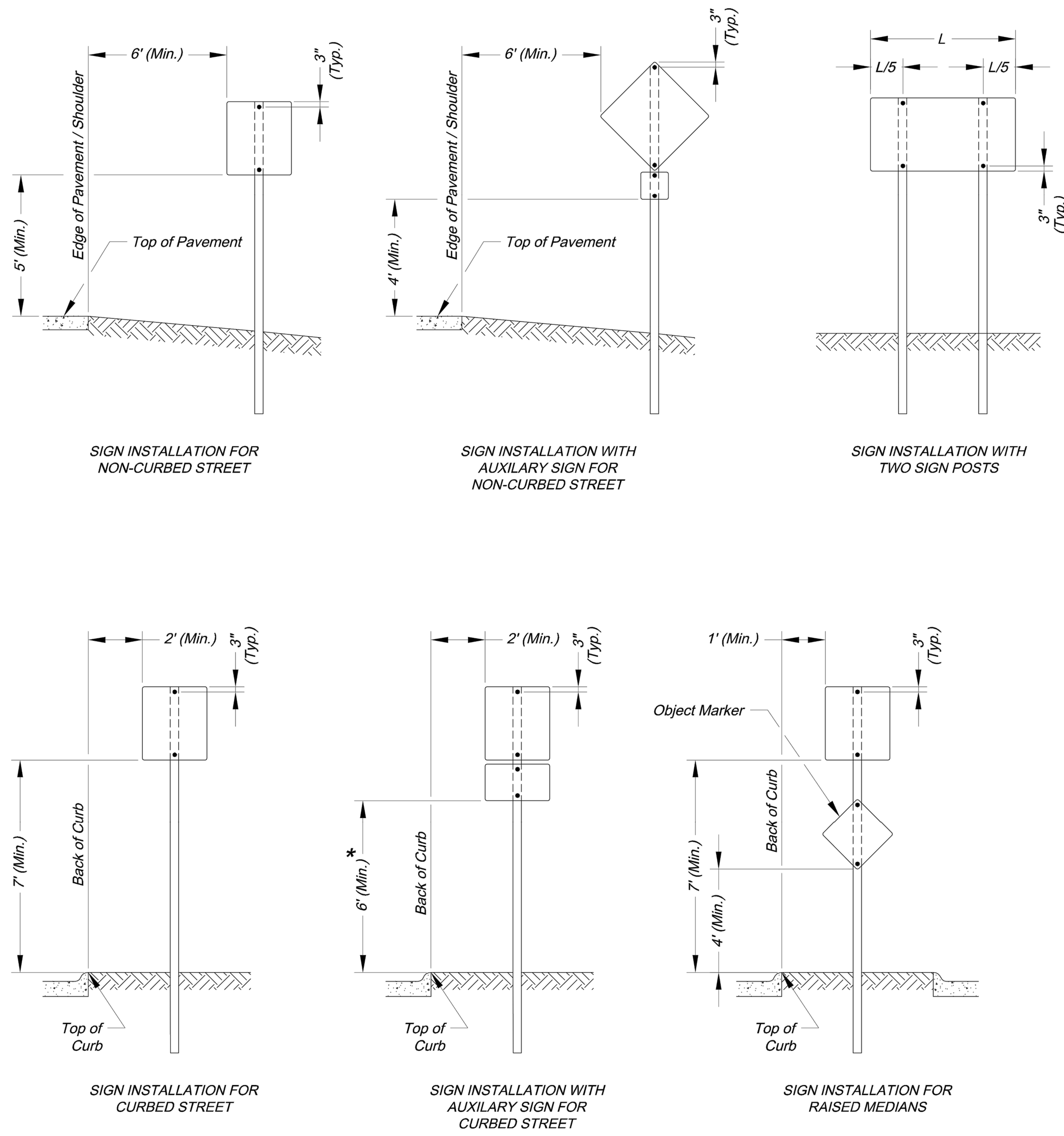
LEE'S SUMMIT, MO

2020

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_MDR01_A191605
date: 10/02/2020

SHEET
C125

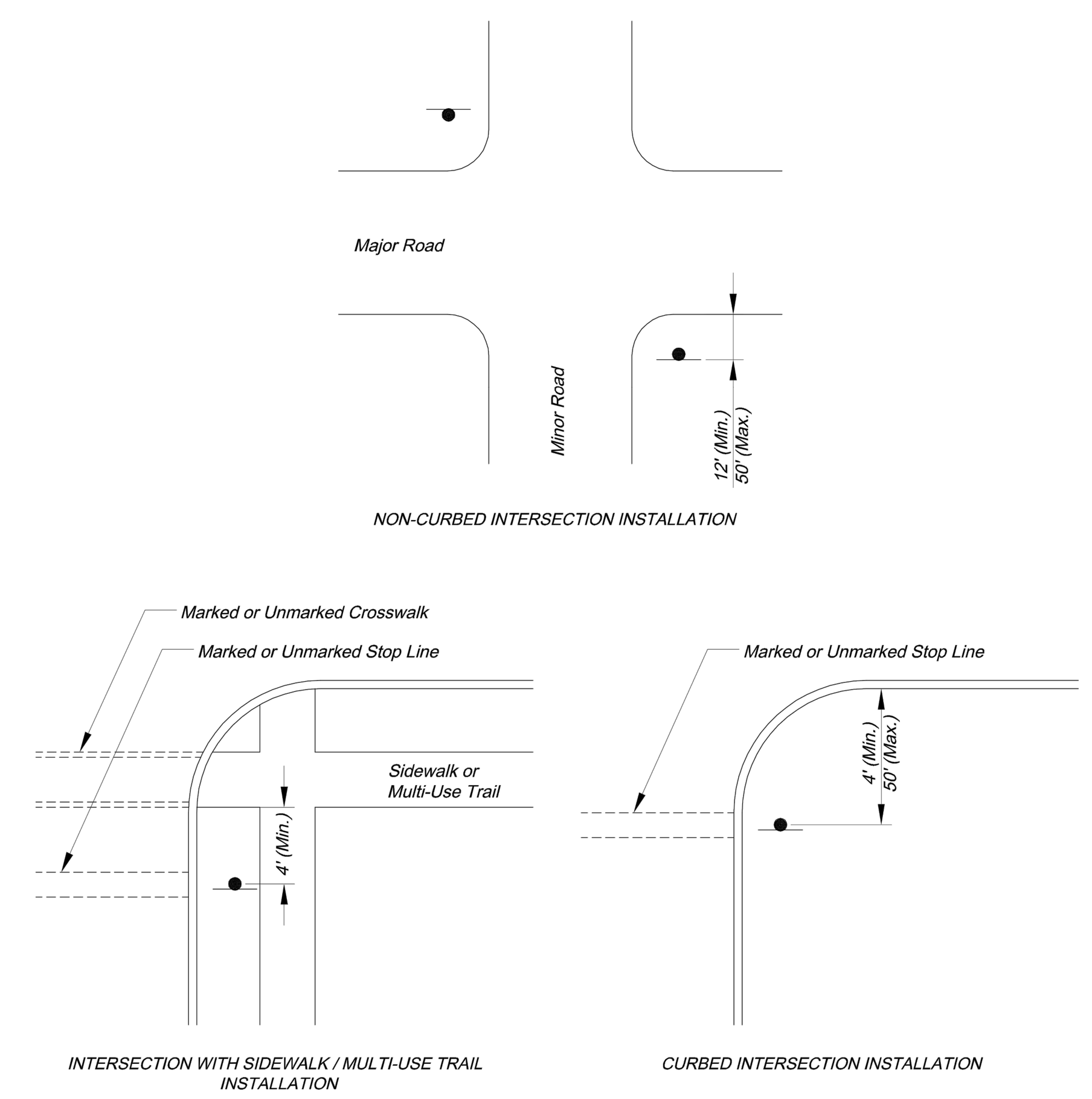
DWG: F:\2019\1501–2000\019–1605–A\40–Design\AutoCAD\Final Plans – As–Builts\Sheets\GNCV\STREET & STORM\C_MDR01_A191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:35pm XREFS: C_PTBLK_A191605 C_XBASE_A191605 C_PBASE_A191605 C_PUTIL_A191605 C_PBNDY_A191605



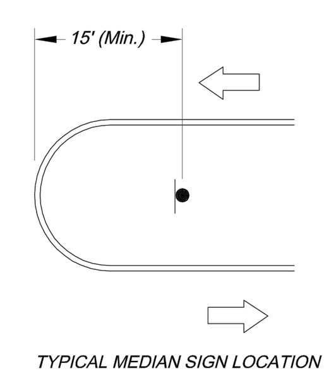
SIGN MOUNTING DETAILS

* The height to the bottom of a sign when it is located in a pedestrian walkway or extends into a walkway shall be a minimum of 80 inches above the walkway.

NOTE:
1. Generally, the sign mounting height should not be more than 1' greater than the minimum mounting height.

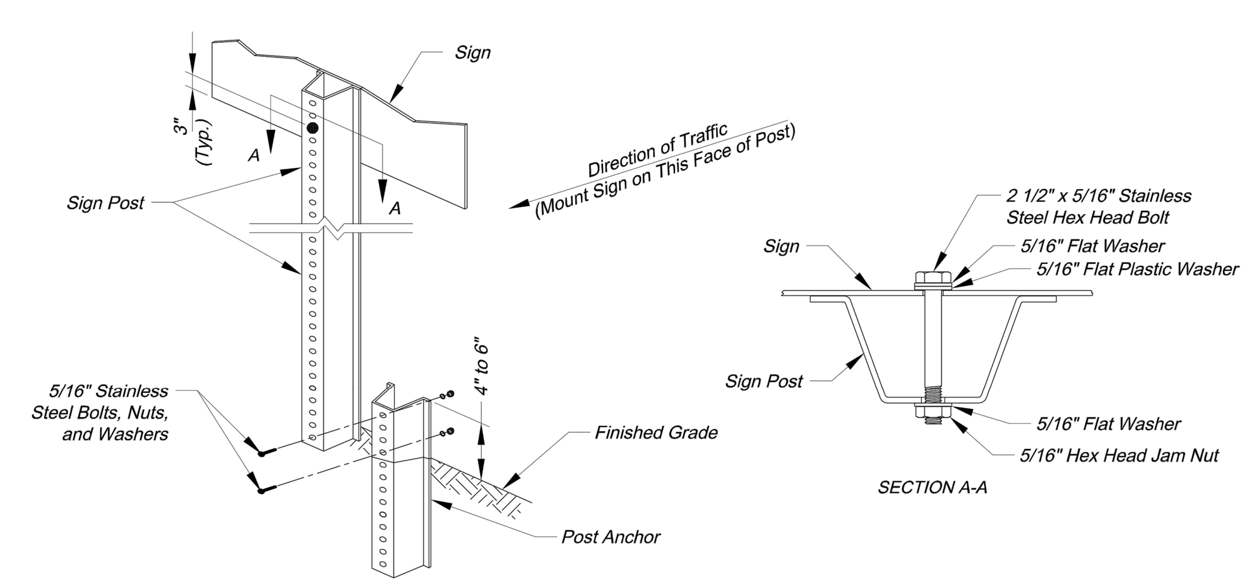


CONTROL SIGN LOCATION



MEDIAN SIGN LOCATION

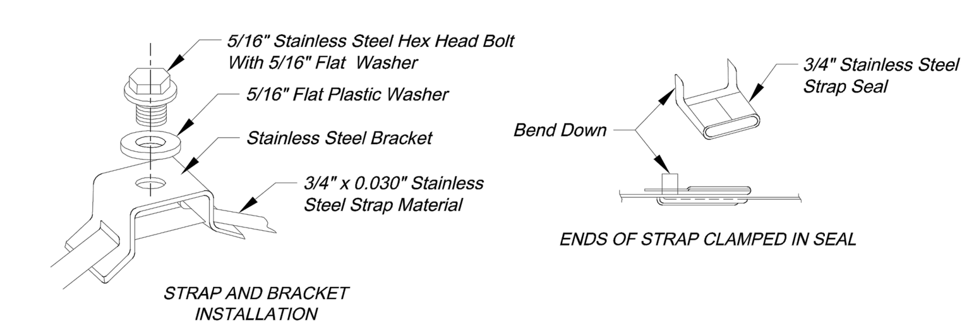
NOTES:
1. A 4" P.V.C. sleeve shall be installed in new concrete medians at each location where a sign is to be installed.
2. For existing concrete medians, a 4" hole shall be cored into the concrete.



U-STEEL POST DETAILS

U-STEEL POST NOTES:
1. Splice shall be positioned entirely between finished grade line and 18" above finished grade line. Only one splice will be allowed per post.
2. U-Steel post shall be 3 lb./ft., galvanized according to ASTM A123.
3. U-Steel post can be used for installation of signs with an area of less than 2.5 square feet.
4. All posts shall be embedded a minimum of 3 feet.

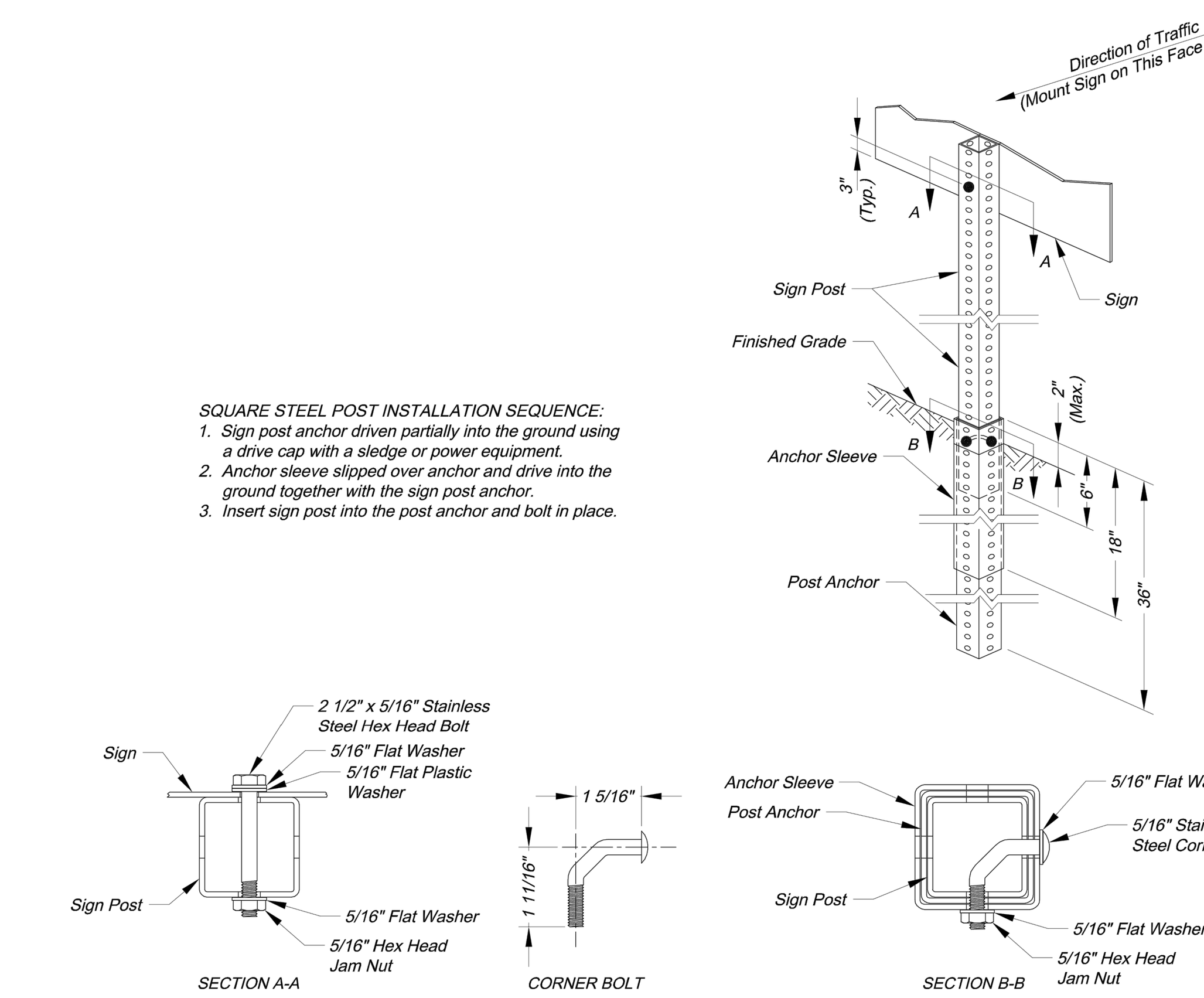
PERMANENT SIGNING GENERAL NOTES:
1. All signing shall be in accordance with the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD).
2. The Contractor is responsible for avoiding any and all utilities when installing sign posts, whether the utility is indicated on the plans or not.
3. All workmanship and materials shall be subject to the inspection and approval of the Public Works Department of the City of Lee's Summit.
4. The Contractor shall stake the location of all sign posts to be installed. The City Inspector shall inspect the staking prior to installation. Minor relocation to avoid conflicts may be allowed with the approval of the City Traffic Engineer or designee.
5. Signs shown to be installed on the side of metal poles shall be mounted with stainless steel straps or wing brackets as detailed. No signs are to be installed on wood poles. See Traffic Signal Standard Drawings for the installation of signs on mast arms.
6. All post mounted signs shall be installed with breakaway anchors according to the Standard Drawings.
7. All existing signs will be used in place during construction and protected from damage unless otherwise indicated in the plans. If the Contractor damages any existing sign or posts during construction, the Contractor will be required to replace the damaged materials with new signs or posts of the same type and size at the Contractor's expense. The Contractor shall be responsible for removing and storing any signs that are to be reinstalled on the project. All equipment shall be reinstalled in good condition.
8. Existing permanent signs and posts removed by the Contractor for construction purposes which are not to be reinstalled shall be delivered to the City's Public Works Maintenance Facility (1971 SE Hamblen Road). The Contractor shall be responsible for removing and storing equipment in good condition and is fully responsible for the equipment until it is delivered.
9. All Stop, Yield, or street name signs shall be maintained in a conspicuous location for the driving public. All Stop and Yield signs removed for construction purposes can be temporarily erected in reflectorized drums (no less than 7 feet above the pavement surface) until they can be reinstalled. Any temporary Stop or Yield sign installation to be left in place overnight will require prior approval from the City Inspector.



STRAP TYPE SIGN SUPPORT DETAILS

METAL POLE SIGN MOUNTING NOTES:
1. Signs on metal poles shall be attached with two brackets and stainless steel bands.
2. Holes in sign for attachment to the mounting brackets shall be offset a minimum of 2 inches from the edge of the sign.
3. Holes in sign shall be located such that the sign is level.
4. All strap, bracket, and seal materials should be Type 201 stainless steel.

SQUARE STEEL POST INSTALLATION SEQUENCE:
1. Sign post anchor driven partially into the ground using a drive cap with a sledge or power equipment.
2. Anchor sleeve slipped over anchor and drive into the ground together with the sign post anchor.
3. Insert sign post into the post anchor and bolt in place.



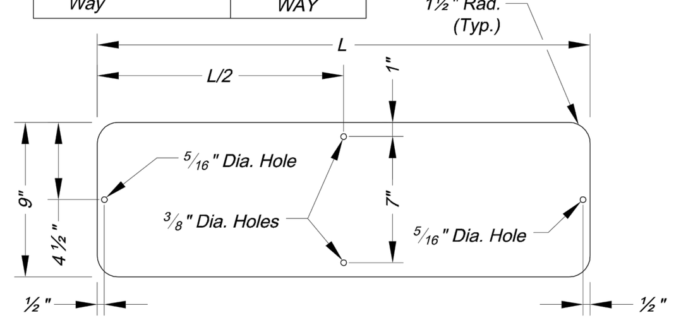
SQUARE STEEL POST DETAILS

SQUARE STEEL POST NOTES:
1. Square steel sign posts and break-away anchor shall consist of the following materials:
   - Sign Post - 14 Ga. 2" x 2" Square Steel Post
   - Post Anchor - 12 Ga. 2 1/4" x 2 1/4" x 36" Square Steel Post
   - Anchor Sleeve - 12 Ga. 2 1/2" x 2 1/2" x 18" Square Steel Post
2. 14 Gauge posts must meet a certified minimum yield strength of 60,000 psi.
3. In all installations the first hole above the finished grade line on the sign post, anchor, and anchor sleeve must be in line for the insertion of the corner bolt.
4. The maximum area for one sign post is 9.0 square feet. A sign or combination of signs with an area greater than 9.0 square feet will require two posts. Also, signs with a width greater than 36" (not including 36" x 36" diamond shaped signs) will require two posts.

STANDARD ABBREVIATION LISTS

Named Streets	
Avenue	AVE
Boulevard	BLVD
Circle	CIR
Creek	CR
Court	CT
Crossing	XING
Drive	DR
Highway	HWY
Lane	LN
Parkway	PKWY
Place	PL
Road	RD
Street	ST
Terrace	TER
Trail	TRL
Way	WAY

Numbered Streets	
First	ST
Second	ND
Third	RD
Fourth to Tenth	TH

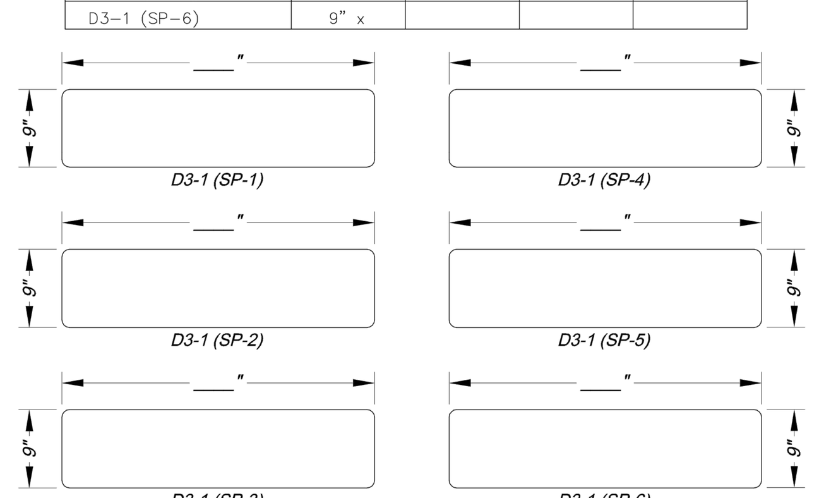


STREET NAME SIGN BLANK DETAILS

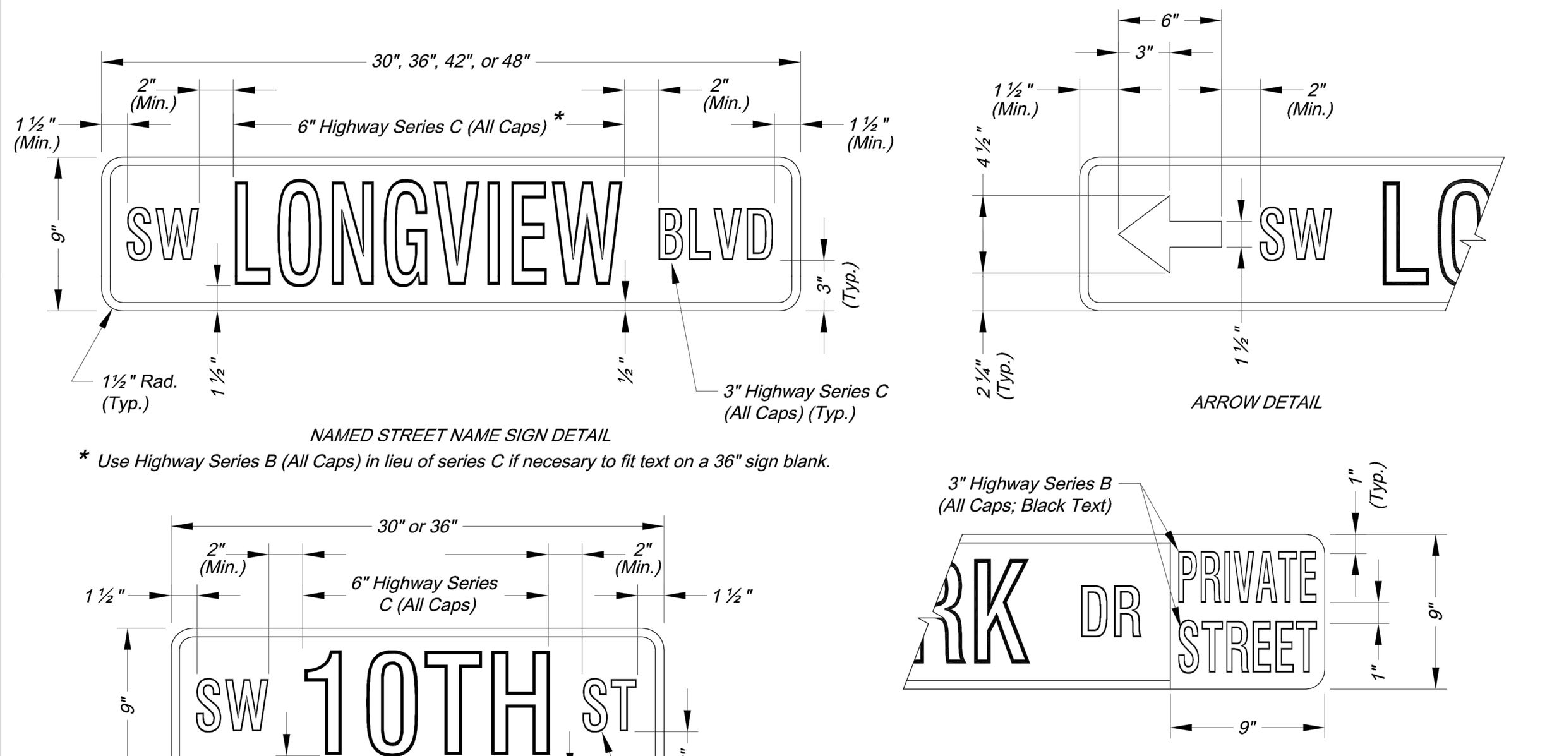
For Mounting on Square Steel Posts

STREET NAME SIGN QUANTITIES

Sign Designation	Sign Size	Sign Area (Sq. Ft.)	Number	Quantity (Sq. Ft.)
D3–1 (SP–1)	9" x	Sq. Ft.	1	1
D3–1 (SP–2)	9" x			
D3–1 (SP–3)	9" x			
D3–1 (SP–4)	9" x			
D3–1 (SP–5)	9" x			
D3–1 (SP–6)	9" x			



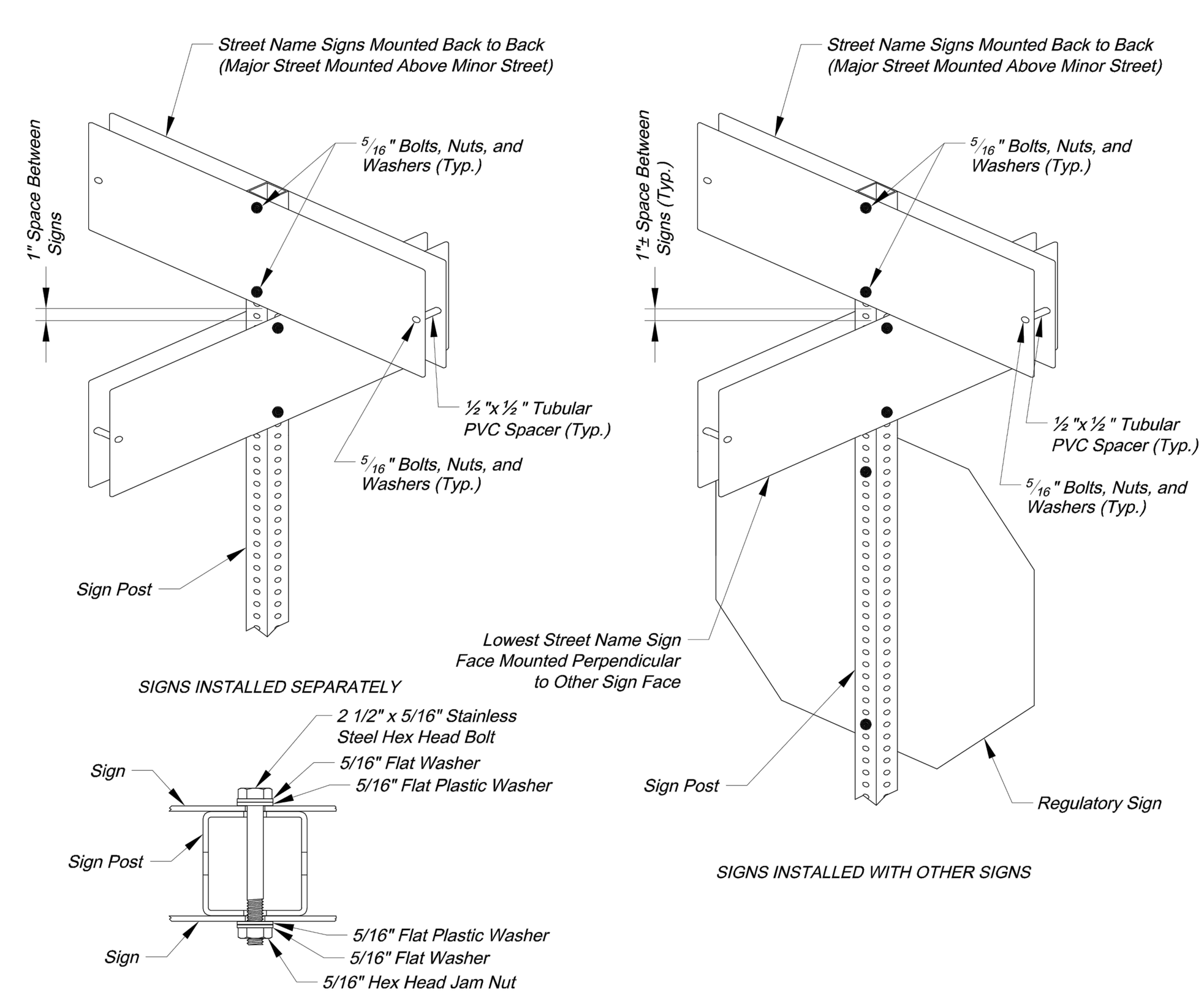
PROJECT SIGN DETAILS



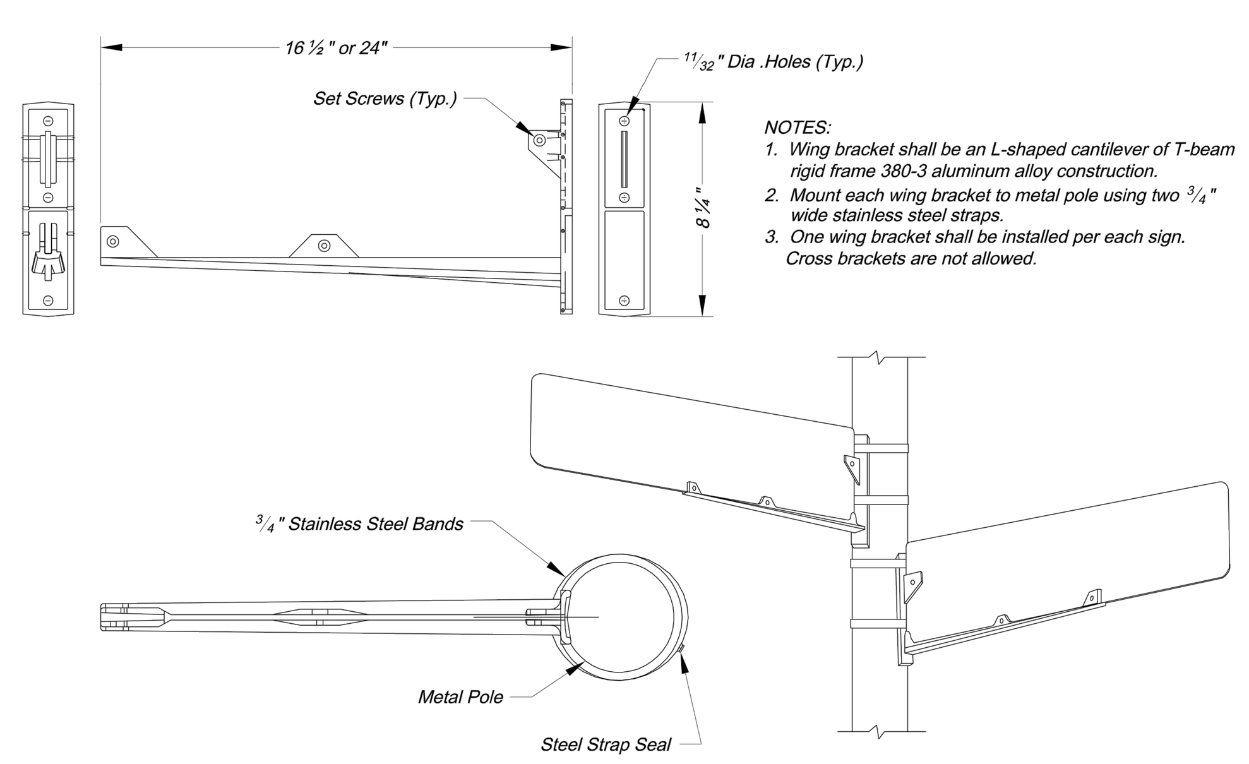
* Use Highway Series B (All Caps) in lieu of series C if necessary to fit text on a 36" sign blank.

NOTES:
1. For all street name signs, the legend shall be white and the background shall be green.
2. Arrows shall be added to street name signs where the name of a street changes at an intersection. Street name signs with arrows are to be installed on each side of the intersection to indicate the change in names. Arrows shall be white.
3. The "PRIVATE STREET" tag should be added to the end of street name signs to indicate where a street that is outside the right-of-way intersects a public street. The background for the "PRIVATE STREET" tag shall be yellow.

STREET NAME SIGN FACE DETAILS



SQUARE STEEL POST MOUNTING DETAILS



NOTES:
1. Wing bracket shall be an L-shaped cantilever of T-beam rigid frame 380-3 aluminum alloy construction.
2. Mount each wing bracket to metal pole using two 3/4" wide stainless steel straps.
3. One wing bracket shall be installed per each sign. Cross brackets are not allowed.

WING BRACKET MOUNTING DETAILS

Accepted Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

NOT ASBUILT

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2019000237
1/18/2022
PROFESSIONAL ENGINEER

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

SIGN DETAILS
STREET & STORM SEWER PLANS

HAWTHORN RIDGE THIRD PLAT

2020

LEE'S SUMMIT, MO

drawn by:	OLS
checked by:	BMW
approved by:	BMW
QA/QC by:	JES
project no.:	A19-1605
drawing no.:	C_DTL01_A191605
date:	10/02/2020

SHEET
C126

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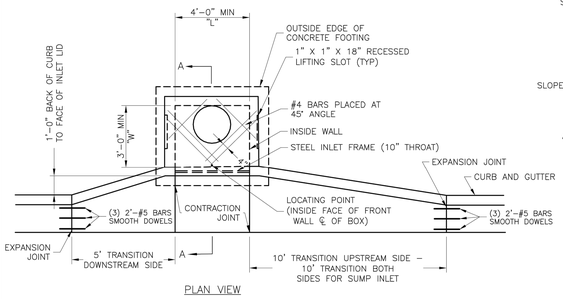
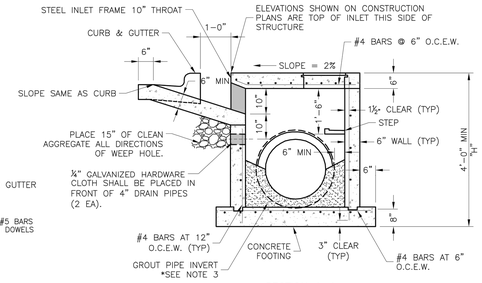
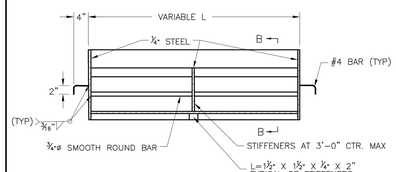


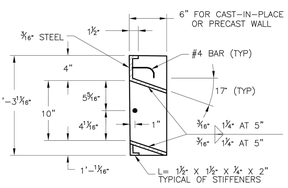
PLAN VIEW



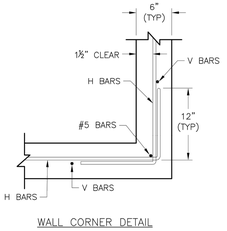
SECTION A–A



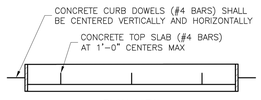
FRONT ELEVATION



SECTION B–B



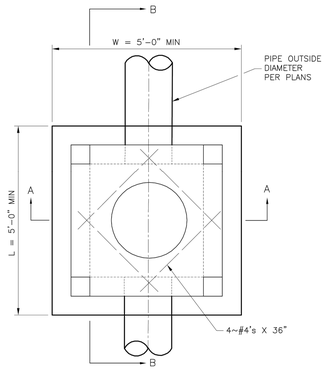
WALL CORNER DETAIL



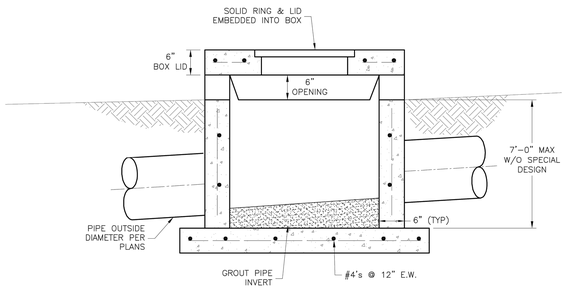
PLAN VIEW

STEEL FRAME NOTES:
1. ALL WELDS SHALL BE PERFORMED IN ACCORDANCE WITH APPROPRIATE AWS SPECIFICATIONS AND PROCEDURES.
2. ALL WELDS ON EXPOSED SURFACES SHALL BE DRESSED SO AS TO PROVIDE A PLEASING FINISHED APPEARANCE.
3. THE ENTIRE FRAME SHALL BE PAINTED A SINGLE COAT OF CHEM–PRIME #37H–78 PRIMER (GRAY) OR EQUAL.

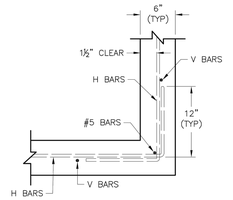
GENERAL NOTES:
1. THE FIRST DIMENSION LISTED IN THE CONSTRUCTION NOTES IS THE "L" DIMENSION. THE SECOND DIMENSION IS THE "W" DIMENSION.
2. FLOW LINES LISTED ON THE PROJECT PLANS ARE LISTED AT THE INSIDE FACE OF THE WALL.
3. FLOOR OF INLET GROUTED AND SHAPED TO MATCH PIPE INVERT TO PROVIDE SMOOTH FLOW.
4. LOCATE MH RING AND COVER ON BLANK WALL IF POSSIBLE.
5. STEPS SHALL BE SPACED AT 1'–4" O.C. VERTICALLY ON BLANK WALL IF POSSIBLE.
6. BEVEL ALL EXPOSED EDGES WITH ¾"CHAMFER OR ¾" TOOLED EDGE.
7. ON–GRADE INLETS SHALL CONFORM TO THE STREET GRADE AND SUMP INLETS SHALL BE LEVEL.
8. PRECAST LIDS SHALL BE PINNED, SEALED WITH NON–SHRINKABLE GROUT AND REMOVABLE FOR FUTURE MAINTENANCE.
9. LIFTING RINGS SHALL BE REMOVED AND SEALED WITH NON–SHRINKABLE GROUT
10. FOR RING AND COVER SEE THE STORMWATER APPROVED PRODUCT LIST.



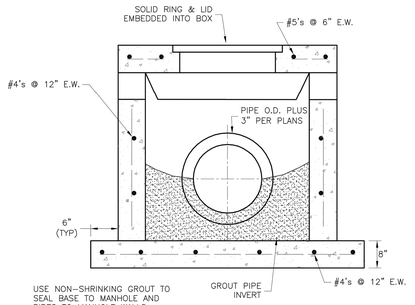
PLAN VIEW



SECTION B–B

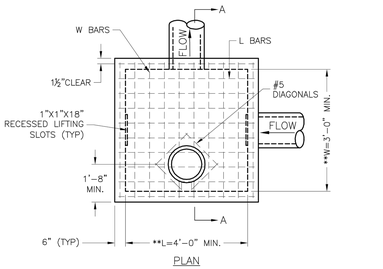


WALL CORNER DETAIL

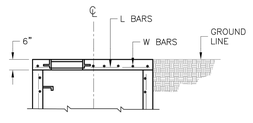


SECTION A–A

GENERAL NOTES:
1. LOCATE RING AND COVER OVER OUTLET ON BLANK WALL.
2. USE ¾" CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
3. FLOOR OF INLET GROUTED AND SHAPED TO MATCH PIPE INVERT TO PROVIDE SMOOTH FLOW.
4. STEPS REQUIRED AT 16" O.C. WHEN DEPTH FROM TOP OF CASTING TO INVERT EXCEEDS 3' ON BLANK WALL IF POSSIBLE.
5. BOXOUTS WILL NOT BE ALLOWED TO PROJECT THROUGH THE CORNERS OF THE STRUCTURE.
6. THE MINIMUM REINFORCING SHALL BE 1 H–BAR OVER A CAST–IN–PLACE PIPE AND 2 H–BARS OVER A PRECAST BOXOUT.
7. SHOW FIELD INLET ORIENTATION ON PLANS PLUS NUMBER AND SIDE OF OPENINGS.
8. PRECAST LIDS SHALL BE PINNED, SEALED WITH NON–SHRINKABLE GROUT AND REMOVABLE FOR FUTURE MAINTENANCE.
9. FOR RING AND COVER SEE THE STORMWATER APPROVED PRODUCT LIST.



PLAN

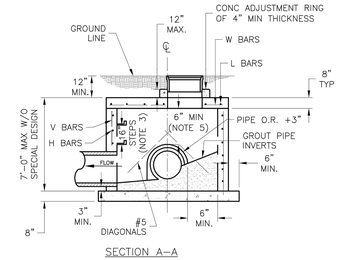


SLAB TOP ALTERNATE FOR JUNCTION BOX (SHALLOW)

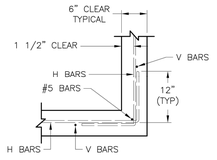
** INCREASE IN MULTIPLES OF 6" (7'–0") MAX WITHOUT SPECIAL DESIGN. (SEE PROJECT PLANS FOR DETAILS)

REINFORCING

BARS	BAR SIZE	SPACING (IN.)
H	4	12
V	4	12
L	5	6
W	5	6



SECTION A–A

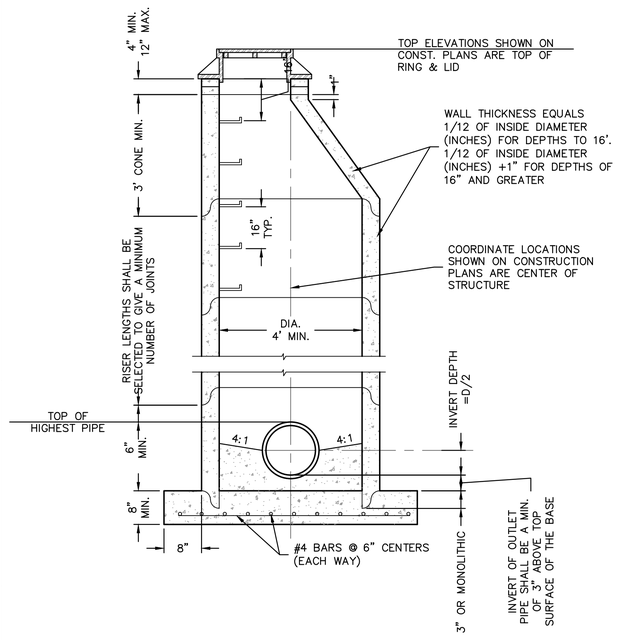


WALL CORNER DETAIL

GENERAL NOTES:
1. LOCATE RING AND COVER ON BLANK WALL.
2. USE ¾" CHAMFER STRIP OR ½" R EDGER TOOL ON ALL EXPOSED CONCRETE CORNERS.
3. STEPS REQUIRED AT 16" O.C. WHEN DEPTH FROM TOP OF CASTING TO INVERT EXCEEDS 4' ON BLANK WALL IF POSSIBLE.
4. BOXOUTS WILL NOT BE ALLOWED TO PROJECT THROUGH THE CORNERS OF THE STRUCTURE AND THE MINIMUM DISTANCE BETWEEN BOXOUTS IS 6".
5. THE MINIMUM REINFORCING SHALL BE 1 H–BAR OVER A CAST–IN–PLACE PIPE AND 2 H–BARS OVER A PRECAST BOXOUT.
8. PRECAST LIDS SHALL BE PINNED, SEALED WITH NON–SHRINKABLE GROUT AND REMOVABLE FOR FUTURE MAINTENANCE.
9. REINFORCING OF COVERS IN STREETS REQUIRE SPECIAL DESIGN.
10. FOR RING AND COVER SEE THE STORMWATER APPROVED PRODUCT LIST.

STORM MANHOLE NOTES

1. ALL MANHOLES ARE TO BE PRECAST CONCRETE AND OF ECCENTRIC CONE TYPE UNLESS OTHERWISE SPECIFIED.
2. MANHOLE TOP ADJUSTMENTS SHALL BE ACCOMPLISHED BY THE USE OF CONCRETE ADJUSTMENT RINGS.
3. TOP OF MANHOLE CASTING SHALL BE SET FLUSH AND ON SAME SLOPE AS FINISHED SURFACE OR AS DIRECTED BY THE ENGINEER.
4. REINFORCEMENT IN ALL SECTIONS SHALL EQUAL OR EXCEED A.S.T.M. C–478 SPECIFICATIONS.
5. THE ENGINEER SHALL DESIGNATE MODIFICATIONS FOR MANHOLES WITH SPECIAL DESIGNS.
6. THE INSIDE DIAMETER OF THE MANHOLE SHALL BE 4'–0" FOR PIPE DIAMETERS FROM 12" THRU 24", 5'–0" FOR PIPE DIAMETERS FROM 27" THRU 36", AND 6'–0" FOR PIPE DIAMETERS 42" THRU 48".
7. CLEARANCE TOLERANCE OF PIPE OPENINGS: THE MAXIMUM ALLOWABLE PIPE OPENING ON A HORIZONTAL AXIS SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 12". THE MAXIMUM ALLOWABLE PIPE OPENING ON VERTICAL AXIS SHALL BE THE OUTSIDE DIAMETER PLUS 8". THE MAXIMUM CLEARANCE BETWEEN THE OUTSIDE SURFACE OF AN INSTALLED PIPE AND THE CONCRETE OF THE MANHOLE SHALL BE 2".
8. INSTALLATION OF PIPE OPENINGS: ALL REQUIRED PIPE OPENINGS SHALL BE PLANT CAST IN MANHOLE UNITS. FIELD ALTERATIONS OF OPENINGS WILL BE PERMITTED PROVIDED WALLS ARE SCORED WITH A MASONRY SAW TO A DEPTH SUFFICIENT TO SEVER REINFOECING STEEL. A CHIPPING HAMMER MAY THEN BE USED TO REMOVE THE CONCRETE. MINIMUM DISTANCE BETWEEN ANY TWO ADJACENT PIPES SHALL BE 2".
9. NO DIRECT PAYMENT FOR SHAPING FLOOR OR CONNECTING PIPES AS SHOWN ON PLANS.
10. RING AND COVER TO BE NEENAH R–1736, CLAY & BAILEY #2008, DEETER # 1316, OR APPROVED EQUAL. (CASTING MAY VARY BY MUNICIPALITY, REFER TO PLANS & CONTRACT DOCUMENTS.)



STANDARD PRECAST STORM SEWER MANHOLE

NOT TO SCALE

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

NOT ASBUILT

olsson
Olsson - Civil Engineering
Missouri Certificate of Authority #001592
1301 Burlington Street Suite 400
North Kansas City, MO 64116
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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
10/18/2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

STORM SEWER DETAILS
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

2020

LEE'S SUMMIT, MO

drawn by: OLS
checked by: BMW
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QA/QC by: JES
project no.: A19-1605
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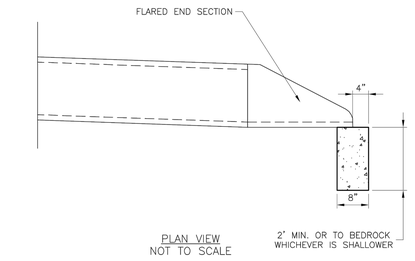
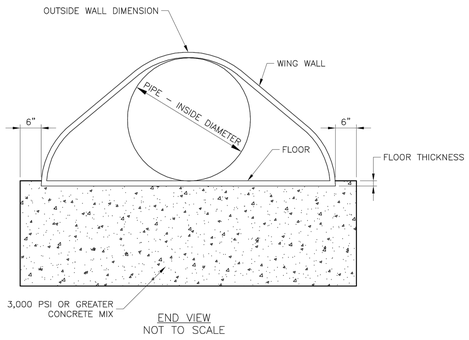
date: 10/02/2020

SHEET
C127

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_DTL01_A191605.dwg USER: bworthley
DATE: Jan 18, 2022 3:35pm XREFS: C_PTBLK_A191605



PLAN VIEW
NOT TO SCALE



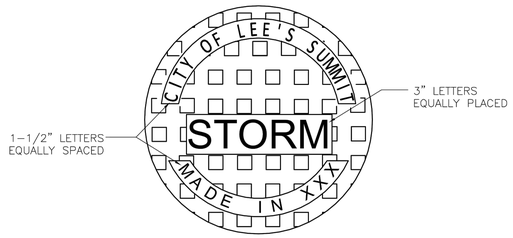
END VIEW
NOT TO SCALE

LEE'S SUMMIT
MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

FLARED END SECTION SUPPORT DETAIL

Date: 04/17
Drawn By: MJF
Checked By: DL

STM-5



STANDARD 24" MANHOLE COVER
MINIMUM WEIGHT = 160 LB
NOTE: PICK HOLES NOT SHOWN

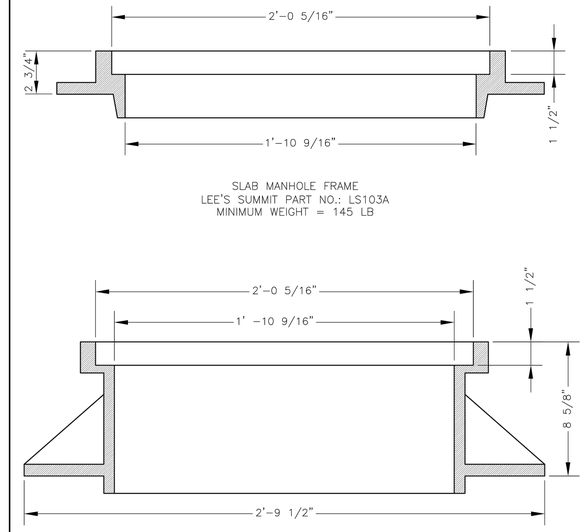
*COVER AND FRAME MODEL INFORMATION REFER TO THE STORMWATER APPROVED PRODUCT LIST.

LEE'S SUMMIT
MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

STORM MANHOLE COVER DETAIL

Date: 04/17
Drawn By: MJF
Checked By: DL

STM-6



SLAB MANHOLE FRAME
LEE'S SUMMIT PART NO.: LS103A
MINIMUM WEIGHT = 145 LB

STANDARD 24" MANHOLE FRAME
LEE'S SUMMIT PART NO.: LS101A
MINIMUM WEIGHT = 250 LB

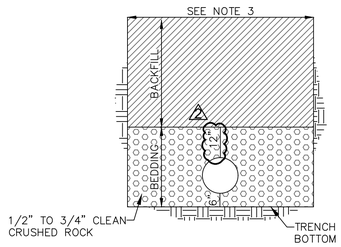
*COVER AND FRAME MODEL INFORMATION REFER TO THE STORMWATER APPROVED PRODUCTS LIST.

LEE'S SUMMIT
MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

STORM MANHOLE FRAME DETAIL

Date: 04/17
Drawn By: MJF
Checked By: DL

STM-7



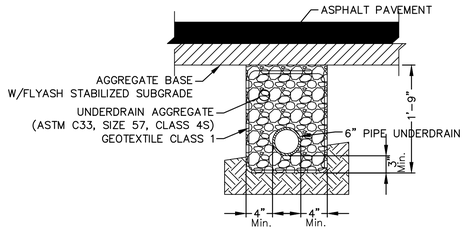
TYPICAL SECTION FOR PLASTIC PIPE
(IN ROCK OR SOIL)

UNDERGROUND PIPE INSTALLATION FOR STORM SEWER LINES
N.T.S.

1. BACKFILL SHALL BE JOB EXECAVATED MATERIAL FREE FROM DEBRIS AND STONES COMPACTED TO 90% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D698. BACKFILL UNDER PAVEMENT (EXISTING OR PROPOSED), SHALL BE FLOWABLE FILL.

2. TRENCH BANKS MAY BE CUT BACK ON SLOPES IN ACCORDANCE WITH CURRENT OSHA REGULATIONS, BUT ONLY IN AREAS WHERE THE INCREASED TRENCH WIDTH WILL NOT INTERFERE WITH SURFACE FEATURES. SLOPES MUST NOT EXTEND BELOW TOP OF BEDDING.

3. MINIMUM AND MAXIMUM WIDTHS SHALL BE IN ACCORDANCE WITH PIPE MANUFACTURER'S RECOMMENDATION AS APPROVED ON ENGINEERING PLANS.

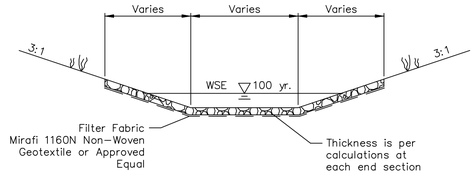


PIPE UNDERDRAIN LATERAL
N.T.S.

NOTES:
1. Where Pipe Underdrains are used, all Underdrain Outlet Pipes shall be solid wall with watertight joints. All Outlets Pipes shall be tied into the nearest storm sewer inlets at roadway sag locations as indicated in the street profile.
2. All Underdrain Pipes shall be installed at a minimum slope of 1%.
3. Underdrain Pipe shall be installed with the perforations placed down.
4. Blanket Underdrain Aggregate, Pipe Underdrain Aggregate, Pipe Underdrain, Edge Underdrain and Outlet Pipe shall conform to City of Lee's Summit Specifications.
5. Overlap geotextile at top of trench a minimum of 12".

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.



NOTE: DIMENSIONS ARE PER
CALCULATIONS AT EACH END SECTION

RIPRAP DETAIL
N.T.S.

NOT ASBUILT

olsson
Olsson - Civil Engineering
Missouri Certificate of Authority #001592
1301 Burlington Street, Suite 100
North Kansas City, MO 64116
TEL 816.361.1177
www.olsson.com

BROCK M. WORTHLEY
NUMBER
PE-2019000237
1/18/2022
STATE OF MISSOURI
PROFESSIONAL ENGINEER

REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
2	12/10/2020	REVISED PER CITY COMMENTS	

STORM SEWER DETAILS
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

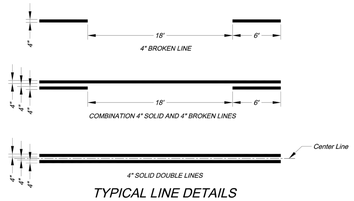
2020

LEE'S SUMMIT, MO

drawn by: OLS
checked by: BMW
approved by: BMW
QA/QC by: JES
project no.: A19-1605
drawing no.: C_DTL01_A191605
date: 10/02/2020

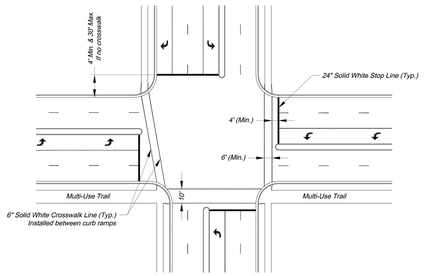
SHEET
C128

DWG: F:\2019\1501-2000\019-1605-A\40-Design\AutoCAD\Final Plans - As-Builts\Sheets\GNCV\STREET & STORM\C_DTL01_A191605.dwg
DATE: Jan 18, 2022 3:35pm XREFS: C_PTBLK_A191605 USER: bworthley



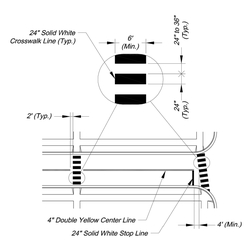
TYPICAL LINE DETAILS

NOTES:
1. All edge line, center line, and lane line pavement markings shall be 4" wide unless otherwise noted.
2. Edge lines shall be continuous solid white or yellow lines. Right side edge lines shall be solid white. Median or left side edge lines on divided roadways are to be solid yellow. Edge lines and center lines shall be continuous across driveways.

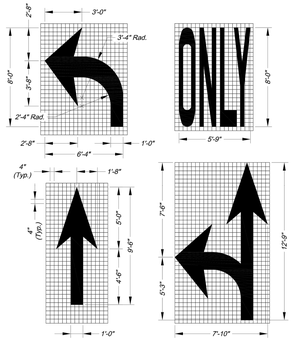


TYPICAL INTERSECTION MARKINGS

NOTES:
1. Transverse crosswalk lines shall be installed such that the distance between lines is at least 6 or 10 feet.
2. Stop lines are required at signalized intersections, on multi-lane stop controlled approaches, or in front of crosswalks at controlled intersections.

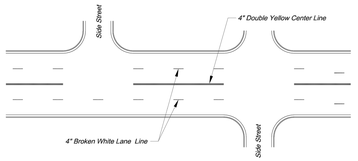


TYPICAL MIDBLOCK OR SCHOOL CROSS WALK

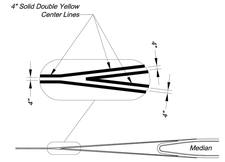


ARROW AND SYMBOL DETAILS

NOTES:
1. All arrow and symbol markings shall be white, and shall be centered in their respective traffic lanes.
2. Right-turn and combination right-turn/straight arrows are reverse of arrows shown.



TYPICAL MARKINGS FOR FOUR-LANE UNDIVIDED ROADWAY



TYPICAL MEDIAN NOSE CENTER LINE DETAIL

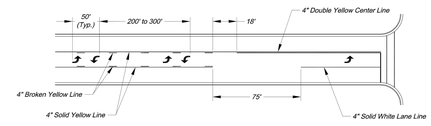
PAVEMENT MARKING GENERAL NOTES:
1. All pavement markings shall be in accordance with the latest edition of the *Manual on Uniform Traffic Control Devices (MUTCD)*.
2. All words and symbols shall conform to the latest edition of *Standard Alphabets for Highway Signs and Pavement Markings* printed by the U.S. Department of Transportation, Federal Highway Administration.
3. Pavement markings, either temporary or permanent are required at all times if the roadway is open to traffic.
4. All pavement markings that conflict with the desired markings shall be completely removed. Removals shall not leave the road surface scarred with an image that misleads traffic. Any excess damage or scarring of pavement shall be repaired at the Contractor's expense.
5. The proposed permanent markings shall be laid out by the Contractor in advance of the marking installation. Markings shall not be applied until the layout has been approved by the City Traffic Engineer.
6. Center lines shall be marked on all undivided arterial streets, and any other undivided street with more than two lanes and/or a speed limit of 30 mph or more.
7. Edge lines shall be marked on all non-curbed streets.

CITY OF LEE'S SUMMIT
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
220 SE GREEN STREET
LEE'S SUMMIT, MISSOURI 64063
PHONE: (816) 969-1800 FAX: (816) 969-1809

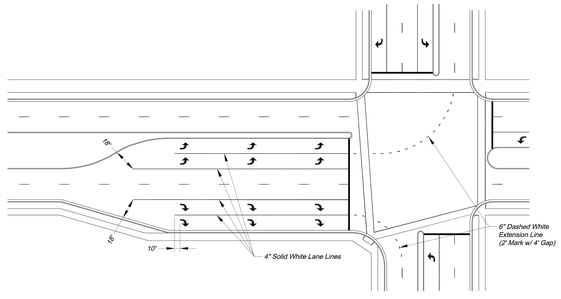
Project:
ROADWAY MARKING DETAILS
Sheet Name: STANDARD DRAWING PM-1

Drawn By: AS
Checked By: JW
Date: 09/09/2009
Project#

1 OF 2
1

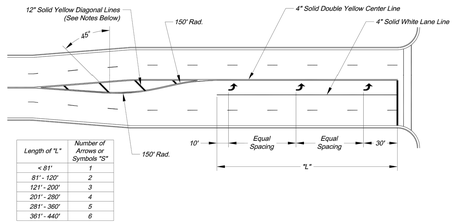


TYPICAL MARKINGS FOR TWO-WAY LEFT-TURN LANE



TYPICAL DUAL TURN LANE MARKINGS

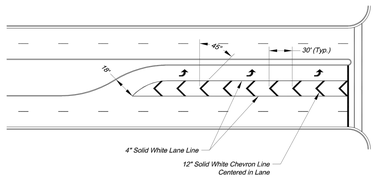
NOTE:
1. Dashed extension lines shall not extend through crosswalks.



Length of "L"	Number of Arrows or Symbols "S"
< 81'	1
81' - 120'	2
121' - 200'	3
201' - 280'	4
281' - 360'	5
361' - 440'	6

TYPICAL TURN LANE MARKINGS

NOTES:
1. Diagonal lines are required between centerlines if the width of the area between the center lines is greater than 12' and/or the length of the area between center lines is greater than 250'.
2. Diagonal lines should be spaced at 5' increments, equal to the posted speed limit.
3. Equal Spacing is calculated as (L - 40) / (S - 1).
4. When a through lane of traffic terminates as a mandatory turn lane, Arrow and "ONLY" symbols should be marked in the turn lane, in alternating order. The first and last symbols should be Arrows.



TYPICAL STRIPED OUT TURN LANE MARKINGS

CITY OF LEE'S SUMMIT
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
220 SE GREEN STREET
LEE'S SUMMIT, MISSOURI 64063
PHONE: (816) 969-1800 FAX: (816) 969-1809

Project:
INTERSECTION MARKING DETAILS
Sheet Name: STANDARD DRAWING PM-2

Drawn By: AS
Checked By: JW
Date: 09/09/2009
Project#

2 OF 2
2

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STATE OF MISSOURI
BROCK M. WORTHLEY
NUMBER PE-2010000237
PROFESSIONAL ENGINEER
10/8/2020

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

ROADWAY MARKING DETAILS
STREET & STORM SEWER PLANS

HAWTHORN RIDGE
THIRD PLAT

LEE'S SUMMIT, MO

2020

drawn by: OLS
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SHEET
C129

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