Mcnett Flats Subdivision

Major Subdivision Application

Section 12: Sanitary Sewer Design Report

Revision	*Date*
1st Element Review Copy	August 25, 2020
1st Sufficiency Review Copy	September 1, 2020
2nd Sufficiency Review Copy	October 16, 2020
Governing Body Review	December 4, 2020

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TABLE OF CONTENTS

ENGINEER'S REPORT 1
INTRODUCTION 1
11.11 PROBLEM DEFINED 2
11.12 DESIGN CONDITIONS 2
11.13 IMPACT ON EXISTING WASTEWATER FACILITIES 4
11.14 PROJECT DESCRIPTION 5
11.15 DRAWINGS 5
11.16 DESIGN CRITERIA 5
11.17 SITE INFORMATION 5
11.18 ALTERNATIVE SELECTION/ANALYSIS 6
11.19 ENVIRONMENTAL IMPACTS 6
OPERATION AND MAINTENANCE 6
REFERENCES 6

ATTACHMENTS

EXISTING AS BUILT DRAWINGS

ENGINEER'S REPORT

Introduction

This design report provides the criteria used as a basis of design for the proposed subdivision that will include a mixed-use commercial development located in Missoula, Montana. This report is submitted in conjunction with the Preliminary Plat and preliminary construction plans. This report is organized following the outline recommended in DEQ-2, Chapter 10, Section 11.1

The proposed subdivision is to consist of seven mixed-use commercial lots located on a 20.21-acre parcel at the northern terminus of George Elmer Drive. The subject parcel does not currently have an assigned address; it is legally described as Parcel 8A of Certificate of Survey 6109 located in Section 12, Township 13 North, Range 20 West, P.M.M., Missoula County, Montana. Adjacent developments include the 44 Ranch and Flynn Ranch residential subdivisions, as well as the proposed Remington Flats Subdivision.

The proposed sanitary sewer extension will connect to an existing sanitary sewer manhole (MH-2) of record drawing P-07-019 located at the terminus of George Elmer Drive, south of the development. The proposed sewer main will also connect to the manhole (MH-4) of record drawing P-07-019 located at the terminus of Old Ranch Road. Please refer to the attached record drawings for more information regarding the existing sanitary sewer system in the project areas and tie-in locations. The sewer main is also anticipated to tie into the proposed 18" main of the Remington Flats Subdivision near the southwest corner of the property and continue to the north end of the George Elmer Drive extension. All other sanitary sewer main extensions will be 8". The sanitary sewer extensions will include approximately 1,191 lineal feet of 18" SDR-35 PVC sanitary sewer main pipe, 1,719 lineal feet of 8" SDR-35 PVC sanitary sewer main pipe, and eleven 48" concrete sanitary sewer manholes at full build out.

The proposed sanitary sewer improvements are an extension of the City of Missoula sanitary sewer collection system. The owner and developer contact information are as follows:

System Owner contact information:	**City of Missoula** **435 Ryman Street** **Missoula, MT 59802**
Developer contact information:	**Tollefson Properties, LLC.** **15311 Tyson Way** **Frenchtown, MT 59834** **(406) 360-4153**

11.11 Problem Defined

The proposed mixed-use commercial developments will occur on seven separate lots to be subdivided through the division of the parent parcel by the public roads proposed to be constructed on the site. The proposed development will include the extension of the 80' George Elmer Drive right-of-way through the middle of the subject parcel to the north. There will be two 64' rights-of-way coming onto the subject parcel from the proposed adjacent development to the west, Remington Flats, which is currently undergoing subdivision review. The two roads continuing onto the subject parcel from Remington Flats will be in a tuning fork configuration with the northern road named Winchester Drive and the southern road named Remington Drive. The two roads will merge into one 64' right of way that continues to the east through the subject parcel named Abby Lane. Lastly, the 64' right of way of Old Ranch Road that parallels George Elmer to the east will be continued through the proposed development to the north. George Elmer is classified as a Minor Arterial with parking, and the rest of the roadways will be classified as Urban Local Streets.

At full build-out, with the highest density permitted by the proposed zoning, the development could contain approximately 650 living units. The adjacent developments, 44 ranch and Flynn Ranch, are currently served by the City of Missoula's collection system. The proposed subdivision located to the west of the subject parcel, Remington Flats, is also expected to connect to the City of Missoula's collection system and is currently undergoing subdivision review. Existing sanitary sewer infrastructure in the vicinity includes an 8" PVC gravity main in the George Elmer Drive right-of-way (Record Drawing P-07-019), along with 8" PVC mains located in the Old Ranch Road and Pius Road rights-of-way. The existing system is owned and operated by the City of Missoula and was constructed in 2010 in the subject area. Record drawings of the existing sanitary sewer infrastructure are included within this submittal. Please refer to the included record drawings for more detailed information regarding the existing sanitary system in the project area.

11.12 Design Conditions

Peak Design Flow:

The peak sanitary sewer design flow for the proposed subdivision was estimated using the wastewater flow rates outlined in Section 3.1 of Montana Department of Environmental Quality Circular 4. An average of 2.3 persons per living unit was used to calculate the total design flow for the proposed residential units. The total daily design flow for the entire development at full build-out, assuming the maximum density permitted by the proposed zoning, is calculated in Table 1.

TABLE 1. PEAK DAILY FLOW RATE FOR FIRST DEVELOPMENT PHASE.

WASTEWATER SOURCE	UNIT	QUANTITY	UNIT FLOW (GPD)	TOTAL FLOW (GPD)
Residential	Person	1495	100	149500
			TOTAL (GPD):	**149500**

A peaking factor is applied to the total daily flow to determine the design flow rate:

$$\text{Peaking Factor} = \frac{18 + \sqrt{\text{P}}}{4 + \sqrt{\text{P}}} = \frac{18 + \sqrt{1.495}}{4 + \sqrt{1.495}} = 3.68$$

Using only the total number of residents as the population in the peaking factor determination results in a more severe, therefore conservative, peaking factor. Thus, the peak design flow rate for the development is calculated as follows:

$$\text{Q}_{\text{max}} = 149{,}500 \text{ gpd} * \left(\frac{0.13 \text{ cf}}{\text{gal}}\right) * \left(\frac{\text{day}}{86{,}400 \text{ sec.}}\right) * 3.68 = 0.828 \text{ cfs}$$

Approximately half of the peak design flow for the development will flow through the existing 8” sanitary sewer main in the George Elmer Drive right-of-way after traveling through the proposed system. The flows from the remaining half of the development to the west will flow through the proposed 18” main that will connect to the adjacent subdivision, Remington Flats. The existing 8” main then turns to the west into the 44 Ranch residential subdivision where it increases diameter to a 12” main and travels along Horn Rd before making its way south to the City of Missoula Wastewater Treatment Facility. The capacities of the proposed new 8” and 18” sanitary sewer mains and the existing 8” and 18” sanitary sewer mains are calculated in the following section.

Capacity of Sewer Mains:

The capacities of the proposed and existing sanitary sewer mains were calculated using the Chezy-Manning formula:

$$\text{Q}_\text{C} = \left(\frac{1.49}{\text{n}}\right) \text{AR}^{\frac{2}{3}} \sqrt{\text{s}}$$

Where s = pipe slope (ft/ft)
n = manning’s coefficient for PVC pipe
R = A/P
A = cross-sectional area of pipe

The existing 8” sanitary sewer main in the George Elmer Drive right-of-way has a minimum slope of 0.4%. Thus, its capacity is calculated as follows:

$$Q_C = \left(\frac{1.49}{n}\right) AR^{\frac{2}{3}}\sqrt{s} = \left(\frac{1.49}{0.009}\right)(0.349)(0.167)^{\frac{2}{3}}\sqrt{0.004} = 1.108 \text{ cfs}$$

The capacity of the existing main is over 1.34 times greater than the peak design flow for the development. Considering that the existing 8" sanitary sewer mains will only be seeing about half of the total peak design flow of the development; they will have a capacity closer to 2.67 times greater than the peak design flow.

The proposed 8" sanitary sewer main will have a minimum slope of 0.4%. Thus, its capacity is calculated the same as the existing 8" pipe. The minimum slope of 0.4% is considered the worst-case scenario for the proposed sanitary sewer mains. The proposed 8" mains will only see approximately half of the overall peak design flow rate because they only serve the portion of the development to the east of George Elmer Drive.

The capacity of the 18" sanitary sewer main is calculated below; it is expected to have a minimum design slope of 0.12%:

$$Q_C = \left(\frac{1.49}{n}\right) AR^{\frac{2}{3}}\sqrt{s} = \left(\frac{1.49}{0.009}\right)(1.77)(0.375)^{\frac{2}{3}}\sqrt{0.0012} = 5.28 \text{ cfs}$$

The proposed 18" mains will have a capacity that is 6.37 times greater than the total peak design flow for the development.

Future Wastewater Flows:

a. At the time of this report, the wastewater flows were only analyzed for the entire proposed mixed-use subdivision development. There is no detailed information at this time about the future developments located to the north and east of the subject parcel and the corresponding wastewater flows. The proposed sanitary sewer main extensions will have manholes placed at the terminus of the two mains that run north and south in the George Elmer Drive and Old Ranch Road rights-of-way along the northern property boundary, with capped stubs installed into the adjacent parcels to facilitate future extension. A manhole with a capped stub will also be installed on the main that runs east to west at the terminus located along the eastern boundary in order to facilitate future extension.

11.13 IMPACT ON EXISTING WASTEWATER FACILITIES

The capacities of the existing 8" sanitary sewer mains are discussed in previous sections. It is anticipated that there should be more than sufficient capacity in the proposed 18" mains included in the Remington Flats Subdivision and this proposed subdivision to serve both developments. The proposed sewer mains to be installed as part of the development will maintain a minimum 10-foot horizontal and 18-inch vertical edge-to-edge separation from all existing and proposed water transmission mains.

11.14 Project Description

The sanitary sewer extensions will include approximately 1,191 lineal feet of 18" SDR-35 PVC sanitary sewer main pipe, 1,719 lineal feet of 8" SDR-35 PVC sanitary sewer main pipe, and eleven 48" concrete sanitary sewer manholes at full build out.. At full build-out, the development could contain approximately 650 living units if the maximum density permitted by the proposed zoning were realized.

11.15 Drawings

Attached.

11.16 Design Criteria

The design criteria for this project follows the guidelines set out by the City of Missoula and the Montana Department of Environmental Quality Circular 2. For Sewer main criteria used, refer to the sanitary sewer construction plan sheets.

The proposed conventional gravity sewer collection system is to be constructed to the 6th Edition of Montana Public Works Standard Specifications (MPWSS). In particular, the sewer main shall be both 8-inch and 18-inch SDR-35 PVC pipe. The manholes shall be a standard 48" diameter eccentric-type precast concrete manhole.

11.17 Site Information

The project site is currently a vacant lot with non-qualified agricultural use. According to the Missoula Urban Area Future Land Use Map, amended on February 13, 2017, the future land use of the subject property is Neighborhood Mixed-Use. In addition, the subject property falls within a future node development. The 2019 Missoula Area Land Use Element comprehensive plan recommends a land use of Community Mixed-Use. An irrigation ditch runs along the eastern property boundary and is a branch of the Flynn-Lowney Ditch. Existing slopes on the site are generally less than 5%.

Geologically, this area is mapped on the Missoula West 30' x 60' Quadrangle Geologic Map (MBMG Open File Report 373) as Quaternary period Alluvium of Alluvial Terrace Deposits (Qat). These deposits are characterized as well-rounded cobbles, gravel, and sand in deposits with flat topped surfaces that are 10 to 30 feet above the present flood plain. Three nearby water wells located southwest of the site and data-based at the Montana Bureau of Mines and Geology, indicate a groundwater table depth ranging from 27 to 50 feet. One of the well-logs includes a lithology of 10 feet of clay overlying gravel, cobbles, and sand with a few varying layers of clay that extended to 112 feet in depth. This was the deepest of the three wells. No bedrock was noted. Please refer to the project Geotechnical Report for more information on the test pit locations. The groundwater table was not encountered in any of the test pits during the subsurface investigation.

11.18 Alternative Selection/Analysis

The proposed sewer main extensions connect to existing gravity sewer mains directly adjacent to the proposed development. No other alternate plans were considered due to the proximity of the available City of Missoula sewer collection system.

11.19 Environmental Impacts

Environmental impacts will be negligible since the sewer main is a closed piping system that has eliminated any path for water mitigation. There are no known potential sources of adverse environmental impact on the project site.

Operation and Maintenance

These sewer lines will be owned, operated, and maintained by the City of Missoula.

References

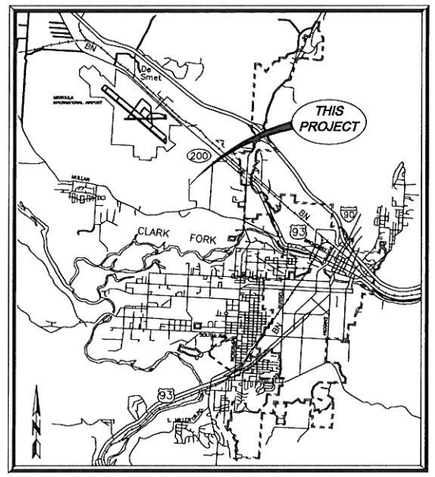
Montana Department of Environmental Quality, “Design Standards for Public Sewage Systems”, Circular DEQ-2.

FLYNN RANCH

SANITARY SEWER SYSTEM AND STORM WATER IMPROVEMENTS

MISSOULA COUNTY, MONTANA

SEC. 12, T. 13 N., R. 20 W., P.M.M.



VICINITY MAP

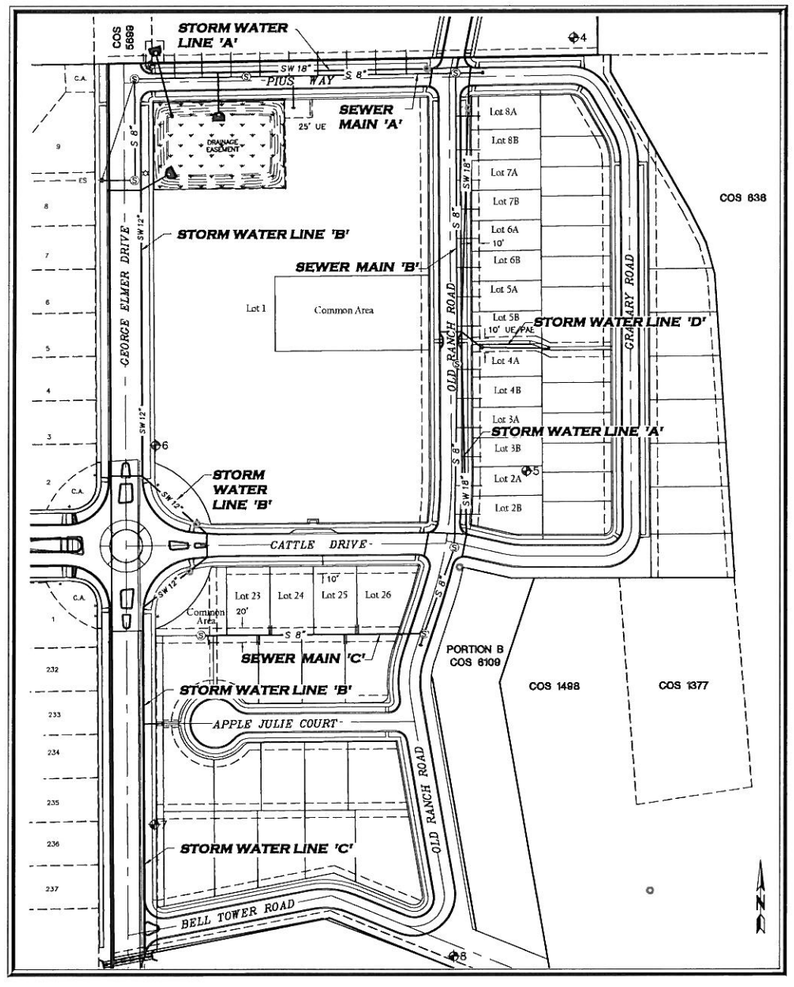
NO SCALE

PLANS PREPARED FOR:

STOCKYARD ROAD INVESTMENTS, LLC

P.O. BOX 2060

SUN VALLEY, IDAHO 83353



SITE MAP

NO SCALE

INDEX TO SHEETS	
SHEET NO.	DESCRIPTION
1	COVER SHEET
2	SEWER MAIN 'A' PLAN AND PROFILE – STA 8+59 TO 13+60
3	SEWER MAIN 'A' PLAN AND PROFILE – STA 13+60 TO 14+58
	SEWER MAIN 'D' PLAN AND PROFILE – STA 1+00 TO 1+44.50
4	SEWER MAIN 'B' PLAN AND PROFILE – STA 18+25 TO 24+00
5	SEWER MAIN 'B' PLAN AND PROFILE – STA 24+00 TO 26+50
6	SEWER MAIN 'C' PLAN AND PROFILE – STA 10+00 TO 13+10
7	STORM WATER LINE 'A' PLAN AND PROFILE STA 19+50 TO 25+50
8	STORM WATER LINE 'A' PLAN AND PROFILE STA 25+50 TO 30+00
9	STORM WATER LINE 'C', 'H', & 'I'
10	STORM WATER LINE 'B' PLAN AND PROFILE STA 13+30 TO 18+50
11	STORM WATER LINE 'B' PLAN AND PROFILE STA 18+50 TO 24+10
12	STORM WATER LINES 'D', 'E', 'F' & 'G' PLAN AND PROFILE
13	SANITARY SEWER & STORM WATER CONSTRUCTION DETAILS
14	SANITARY SEWER & STORM WATER CONSTRUCTION DETAILS
15	SANITARY SEWER & STORM WATER CONSTRUCTION DETAILS

PROJECT STATUS	
STATUS	DATE
PRELIMINARY – NOT FOR CONSTRUCTION	10/2008
FINAL – APPROVED FOR CONSTRUCTION	3/2009

ENGINEERING CONTACT:

TERRY FOREST, P.E. – VICE PRESIDENT MUNICIPAL
(406) 721-4320

PAUL DRUYVESTEIN, P.E. – PROJECT ENGINEER
(406) 721-4320

PROJECT CONTROL POINTS

PT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP-1	97876.41	27633.28	3156.11	RED PLASTIC CAP
CP-4	97914.38	28217.11	3158.08	RED PLASTIC CAP
CP-5	97318.82	28153.09	3158.21	RED PLASTIC CAP
CP-6	97354.39	27642.08	3156.51	RED PLASTIC CAP
CP-7	96832.38	27641.24	3158.74	RED PLASTIC CAP
CP-8	96650.29	28054.29	3161.72	RED PLASTIC CAP

PROJECT BENCHMARK

CONTROL POINT 13, LOCATED NORTH OF INTERSTATE 90 AND THE BURLINGTON NORTHERN RAILROAD NEAR TIMBER EDGE DRIVE. ELEVATION = 3319.74

UTILITY LOCATION:

CALL
TWO WORKING DAYS
BEFORE YOU DIG
(ID, MT, ND, OR, WA, WY)

CALL 1-800-424-5555
UNDERGROUND UTILITIES LOCATION CENTER

WITH THE FOLLOWING:
COUNTY MISSOULA CITY MISSOULA
STREET ADDRESS GEORGE ELMER DRIVE
SEC. & 1/4 SEC. NO.# 12, SE 1/4
TOWNSHIP & RANGE T 13 N, R 20 W

MONTANA
PAUL DRUYVESTEIN
9835PE
REGISTERED PROF. ENGINEER

07-019-1

RECORD DOCUMENT
BY: _____ DATE: 7-21-10

PAUL DRUYVESTEIN, P.E.
DATE: 7-20-2010
EXPIRES: 7-20-2012

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FLYNN RANCH
MISSOULA, MONTANA
SANITARY SEWER SYSTEM AND STORM WATER IMPROVEMENTS
COVER SHEET

REVISIONS			DWN BY:	DATE:	PROJECT NO.
1.	DJL	8/2009	ML	6/2008	5109
2.			DSN BY:	CHK BY:	SHEET NO.
3.			PD	TLF	1 OF 15
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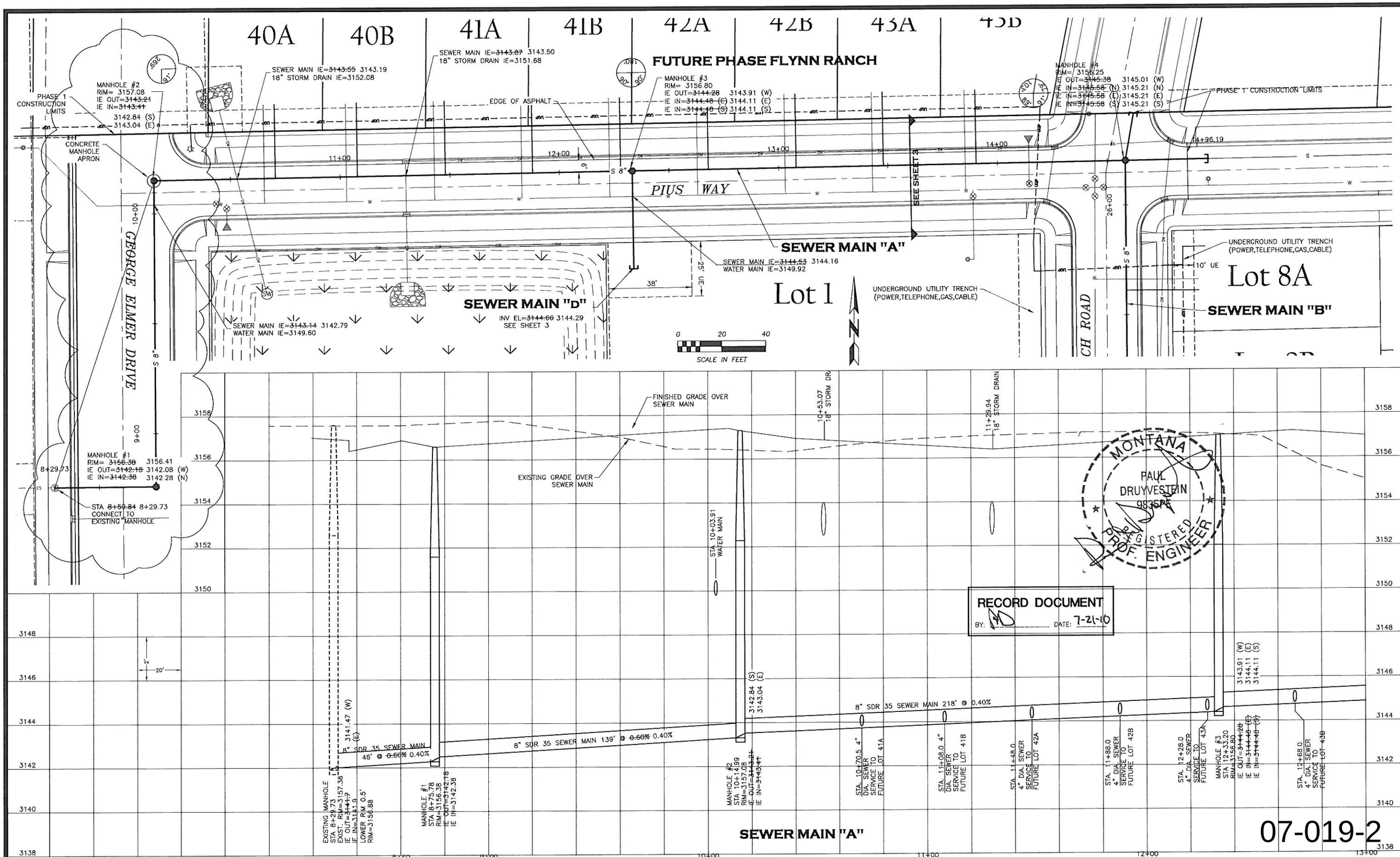

BY	DATE	REVISION DESCRIPTION
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PJD	7/2010	RECORD DRAWINGS

DESIGN PD PROJ. NO. 5109
DRAWN ML DATE 6/08
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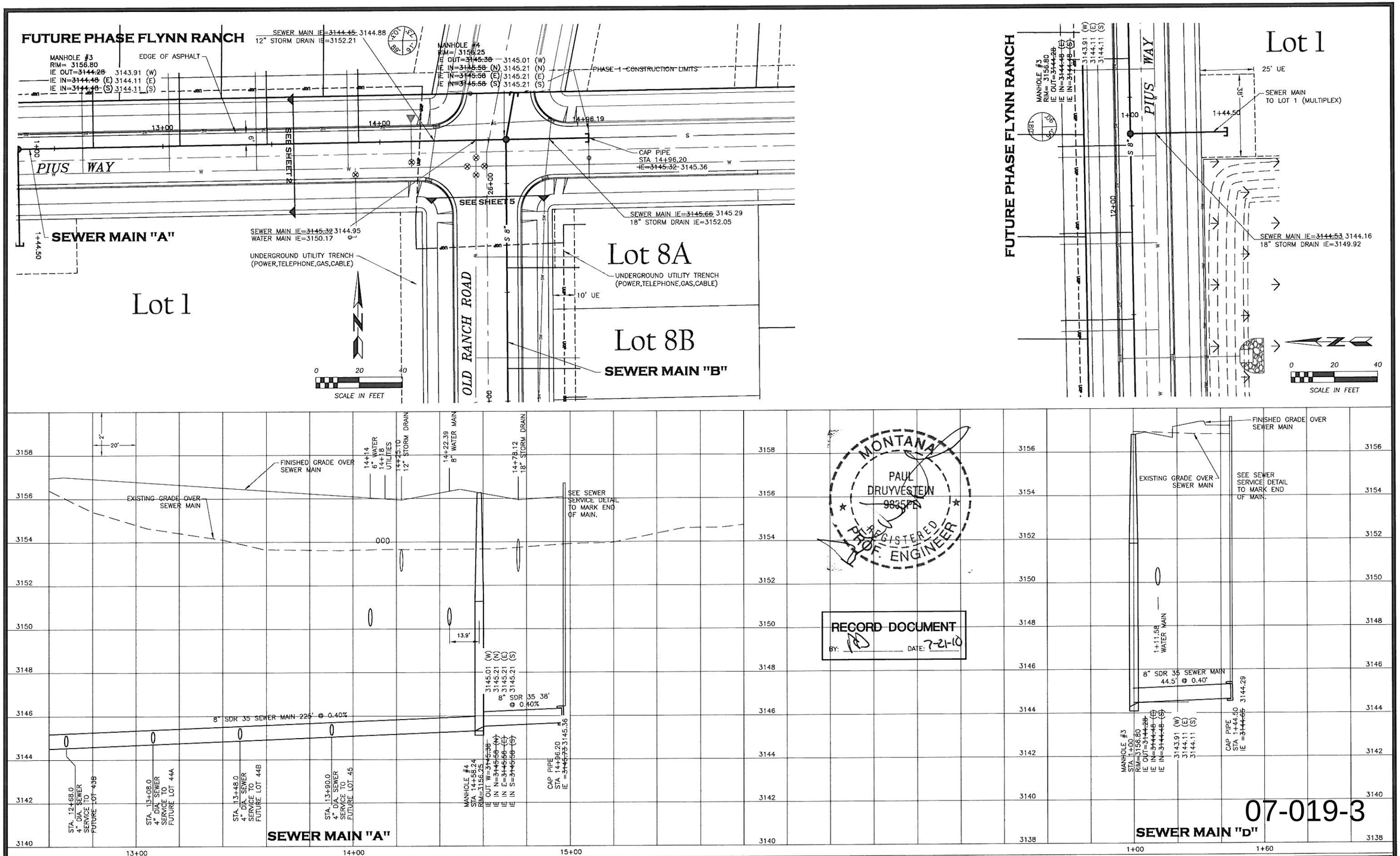
FLYNN RANCH
PHASE 1

PIUS WAY - PLAN AND PROFILE
SEWER MAIN 'A' - STA. 8+59 TO STA. 13+60

SHEET 2 OF 15



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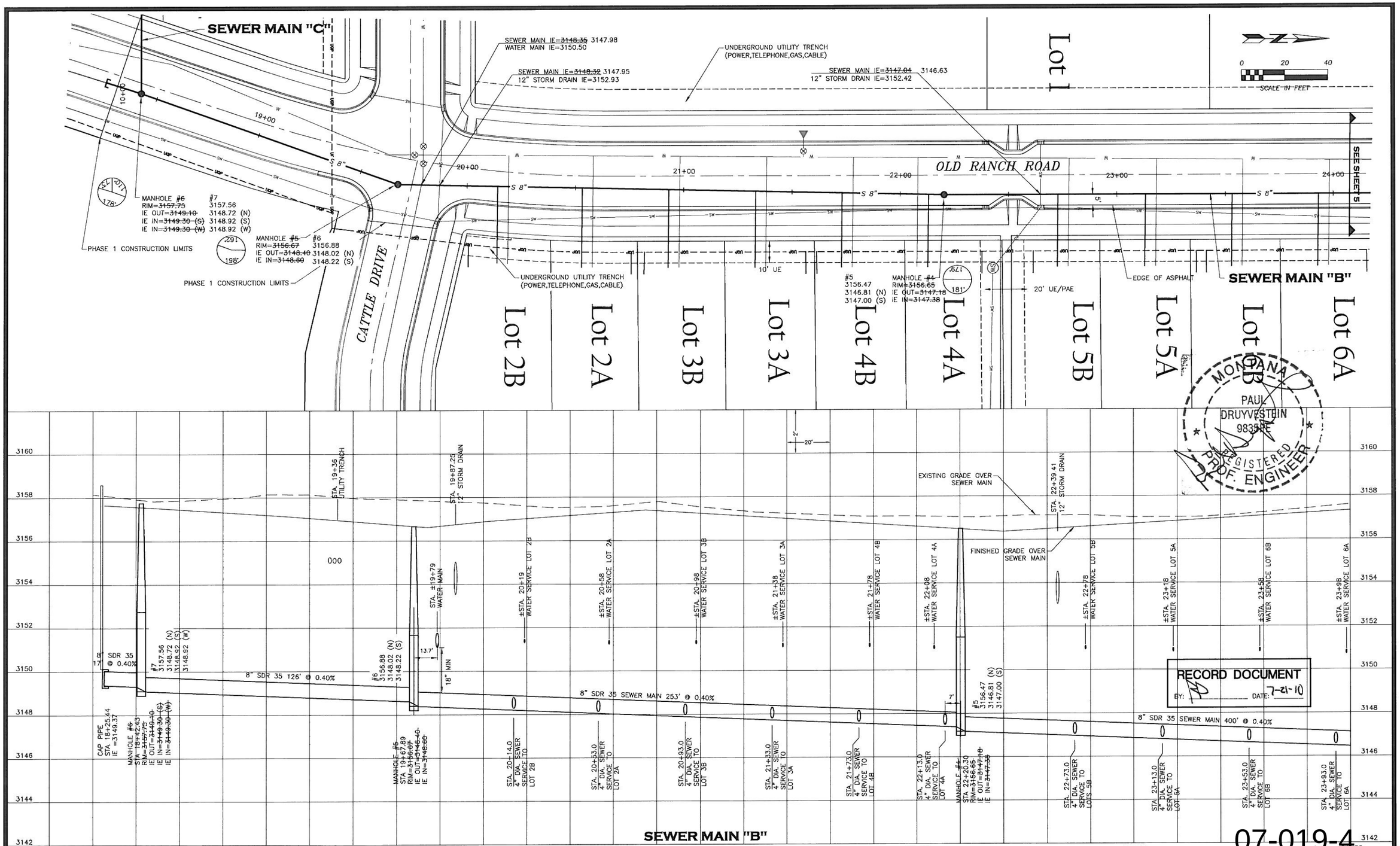
PHASE 1

PIUS WAY - PLAN AND PROFILE
SEWER MAIN 'A' - STA. 13+60 TO STA. 15+00
SEWER MAIN 'D'

SHEET 3 OF 15



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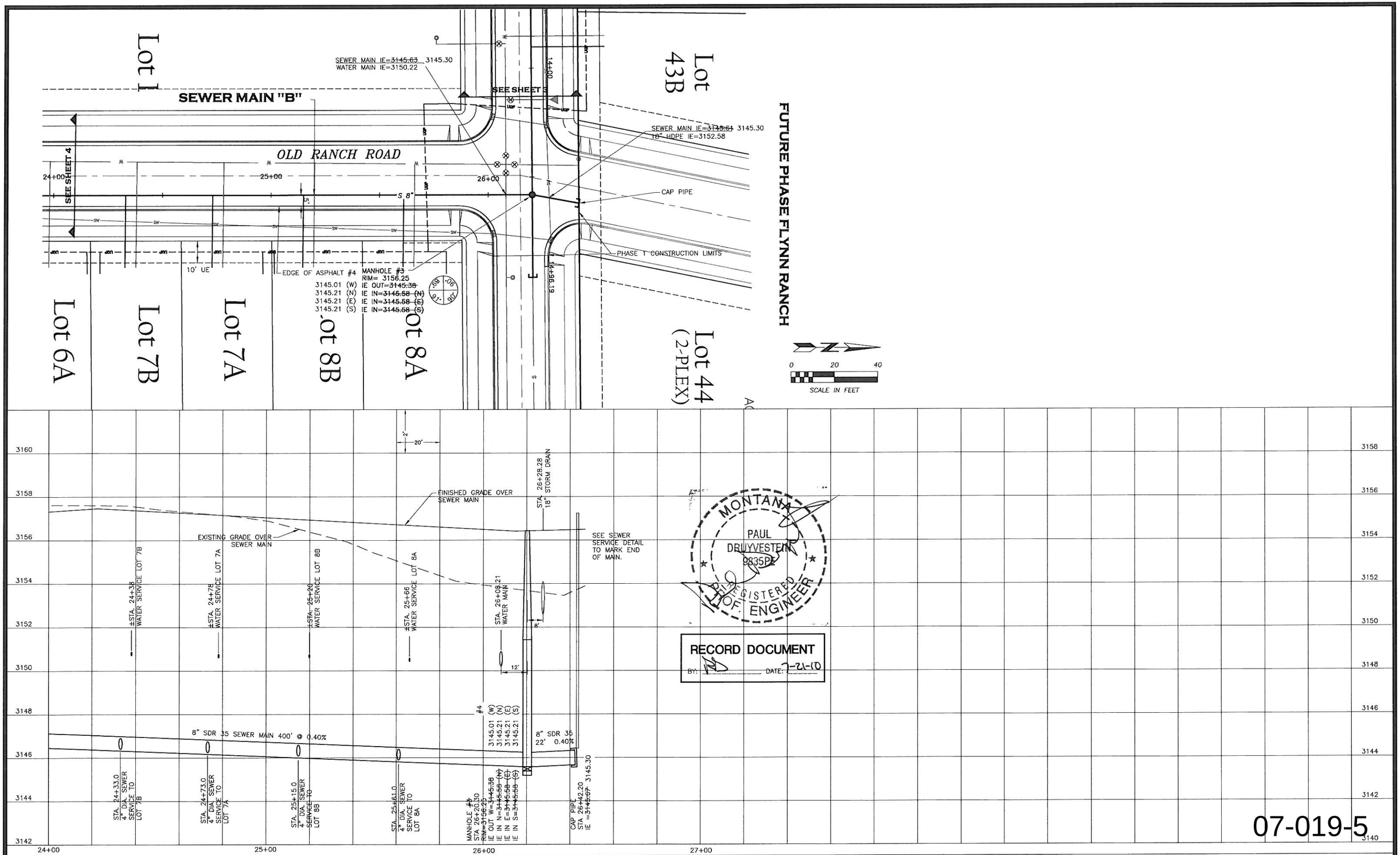
FLYNN RANCH
PHASE 1

OLD RANCH ROAD - PLAN AND PROFILE
SEWER MAIN 'B' - STA. 18+25 TO STA. 24+00

SHEET 4 OF 15



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DESIGN	PD	PROJ. NO.	5109
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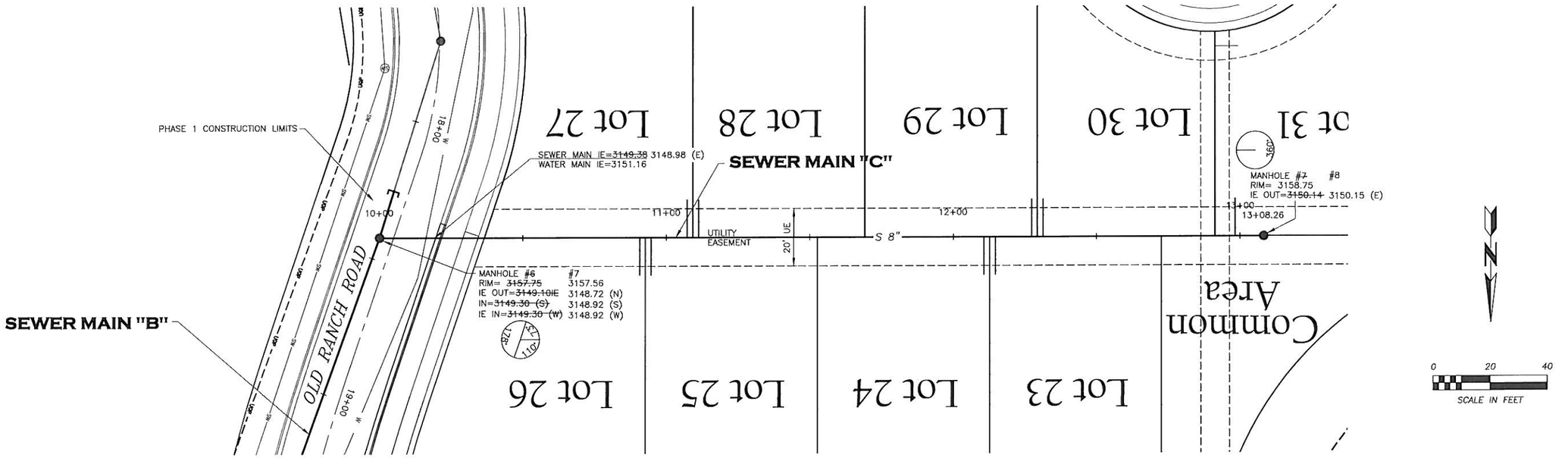
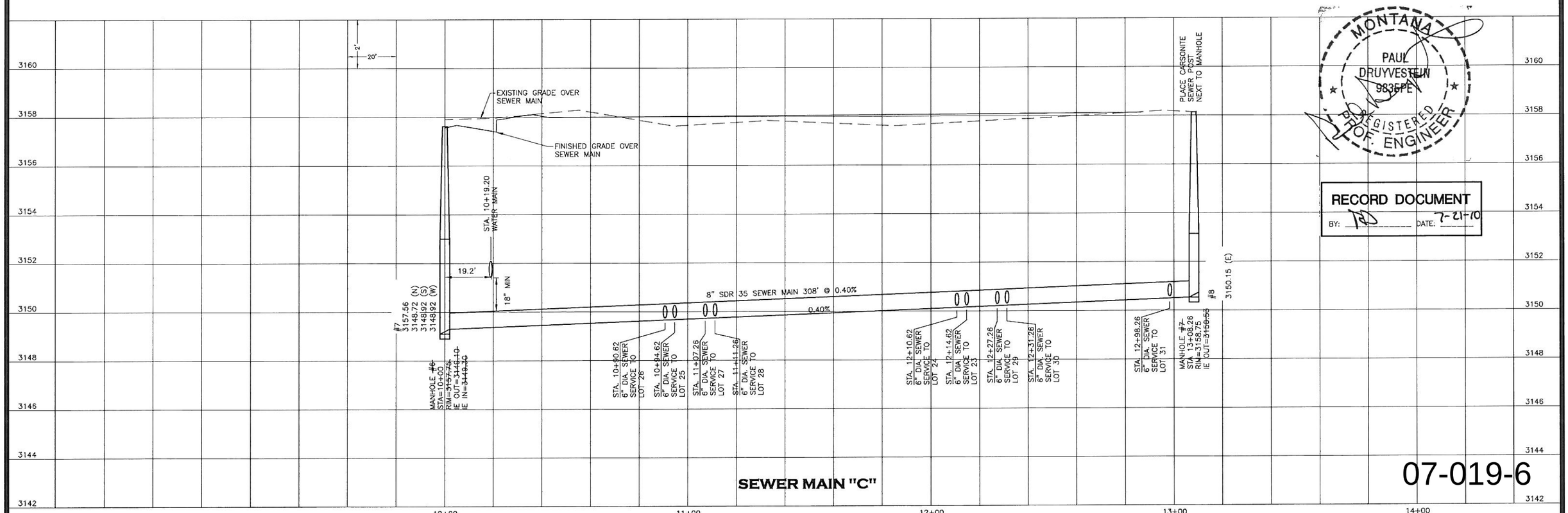
FLYNN RANCH
PHASE 1

OLD RANCH ROAD - PLAN AND PROFILE
SEWER MAIN 'B' - STA. 24+00 TO STA. 26+50

SHEET 5 OF 15





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BY: PD DATE: 7-21-10

07-019-6

BY	DATE	REVISION DESCRIPTION
DJL	2/2009	REVIEWING AGENCY REVISIONS
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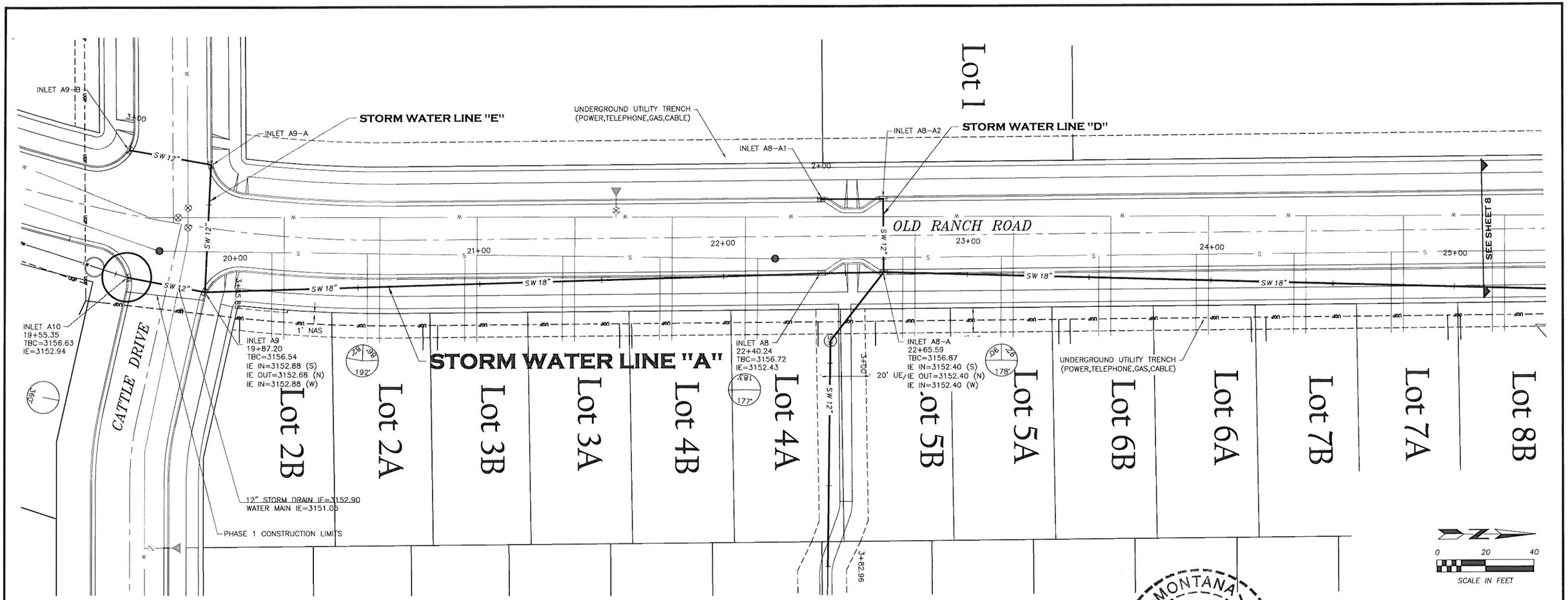
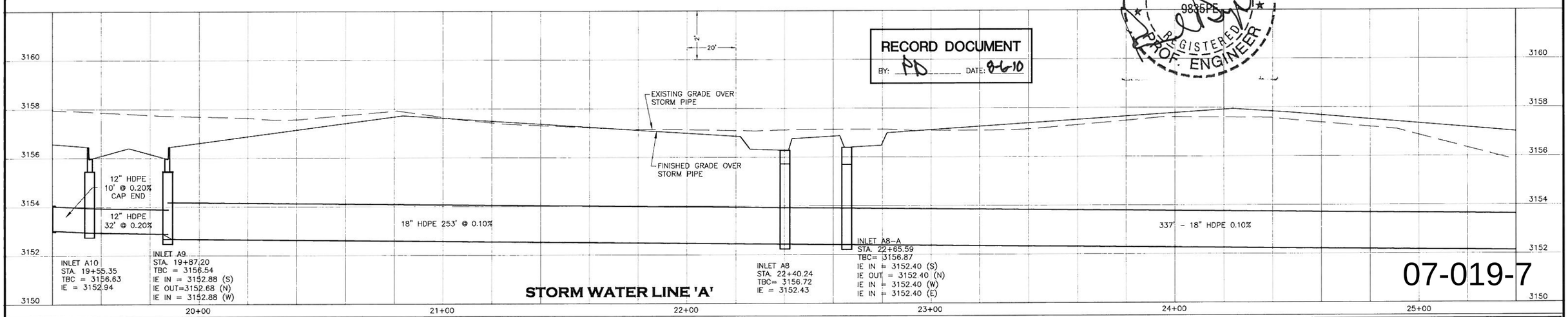
FLYNN RANCH
PHASE 1

SEWER MAIN C - PLAN AND PROFILE
STA. 10+00 TO STA. 13+10

SHEET 6 OF 15





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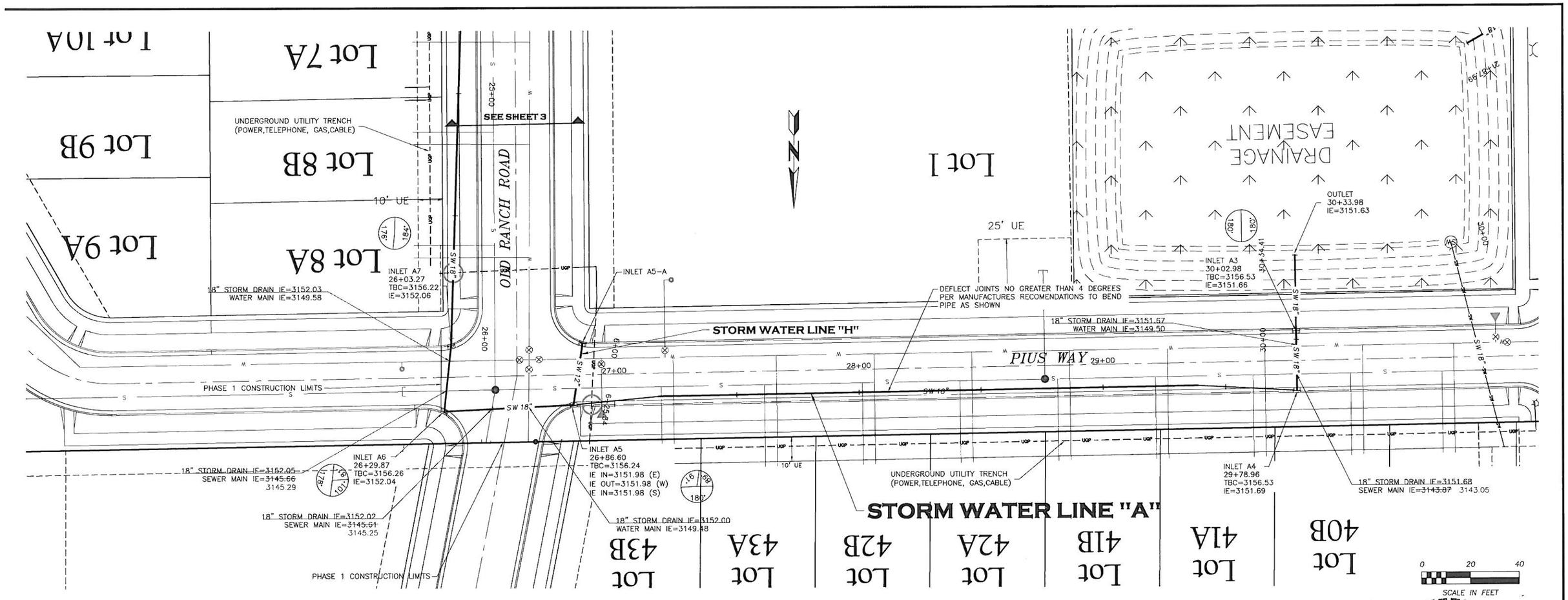
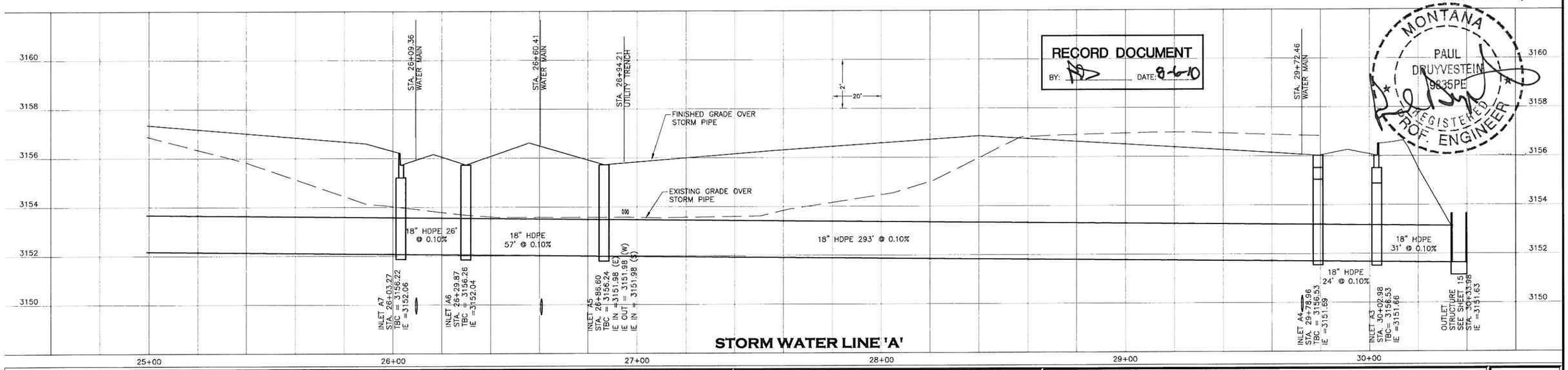
FLYNN RANCH
PHASE 1

STORM WATER IMPROVEMENTS
LINE 'A' 19+50 - 25+50
PLAN AND PROFILE

SHEET 7 OF 15





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BY: AD DATE: 8-6-10

MONTANA PAUL DRUYVESTEIN 9835PE REGISTERED PROF. ENGINEER

BY	DATE	REVISION DESCRIPTION
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PJD	8/2010	RECORD DRAWINGS

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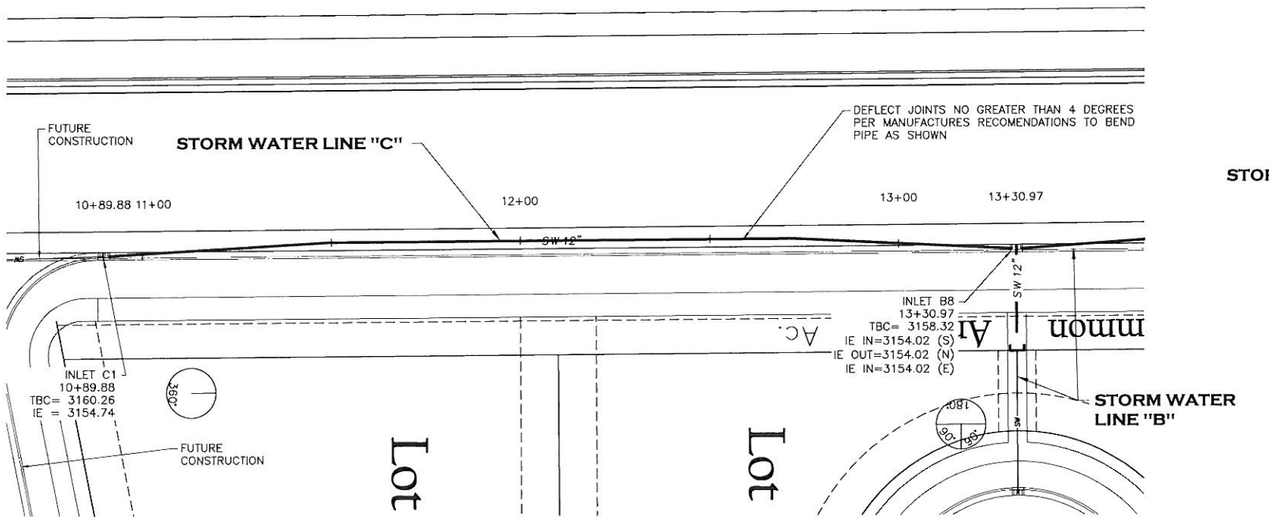
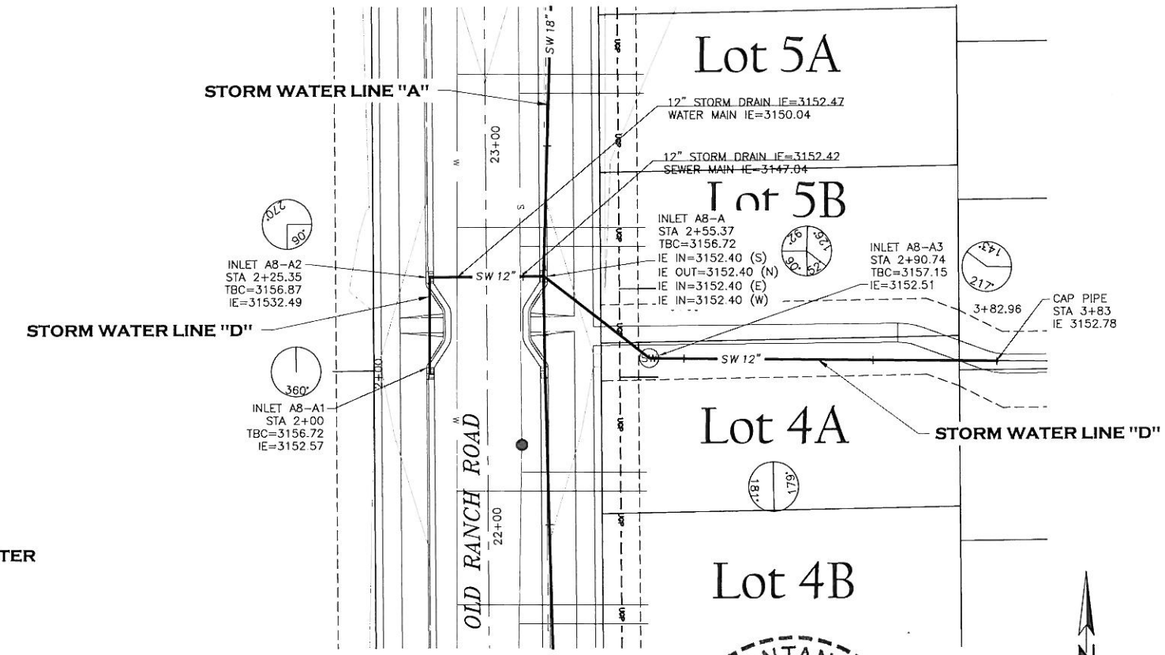
FLYNN RANCH
PHASE 1

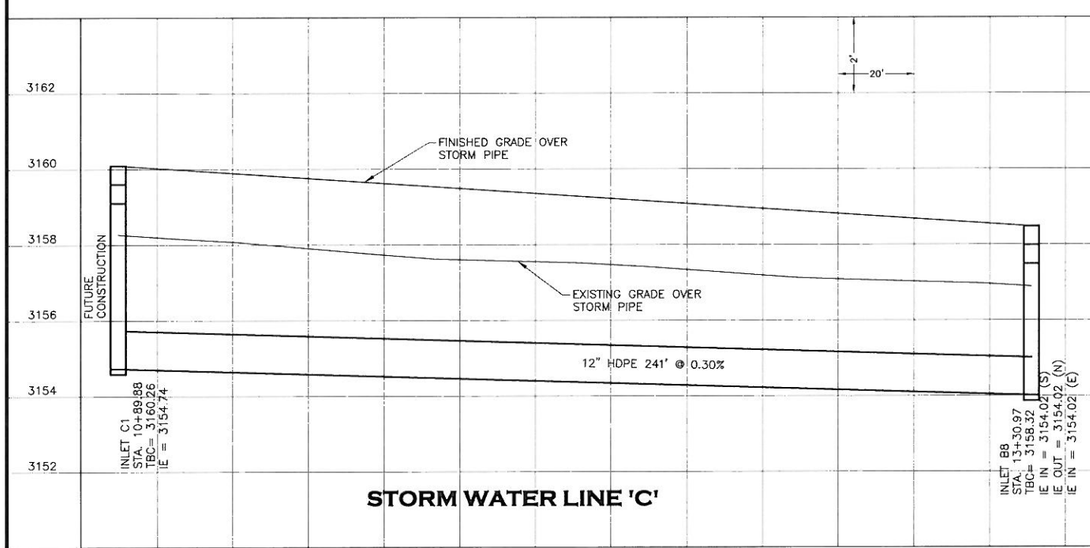
STORM WATER IMPROVEMENTS
LINE 'A' 25+50 - 30+00
PLAN AND PROFILE

07-019-8

SHEET 8 OF 15







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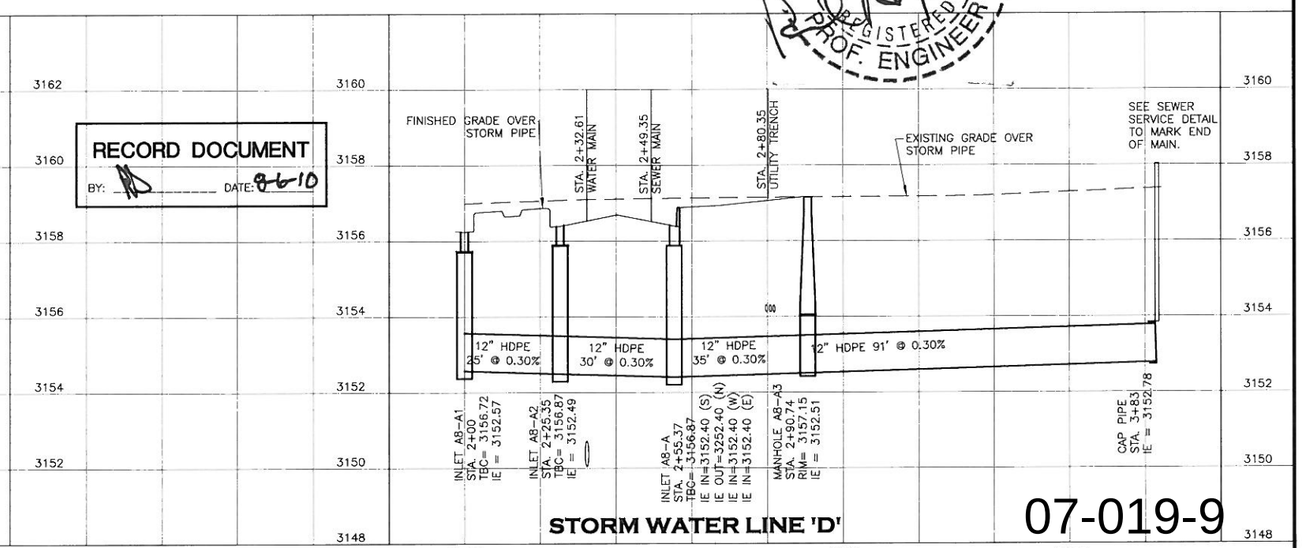
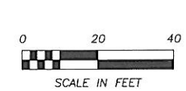
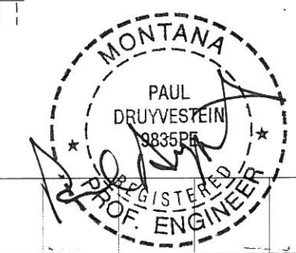
BY: _____ DATE: 8-6-10



07-019-9





BY	DATE	REVISION DESCRIPTION
DJL	2/2009	REVIEWING AGENCY REVISIONS
PJD	8/2010	RECORD DRAWINGS

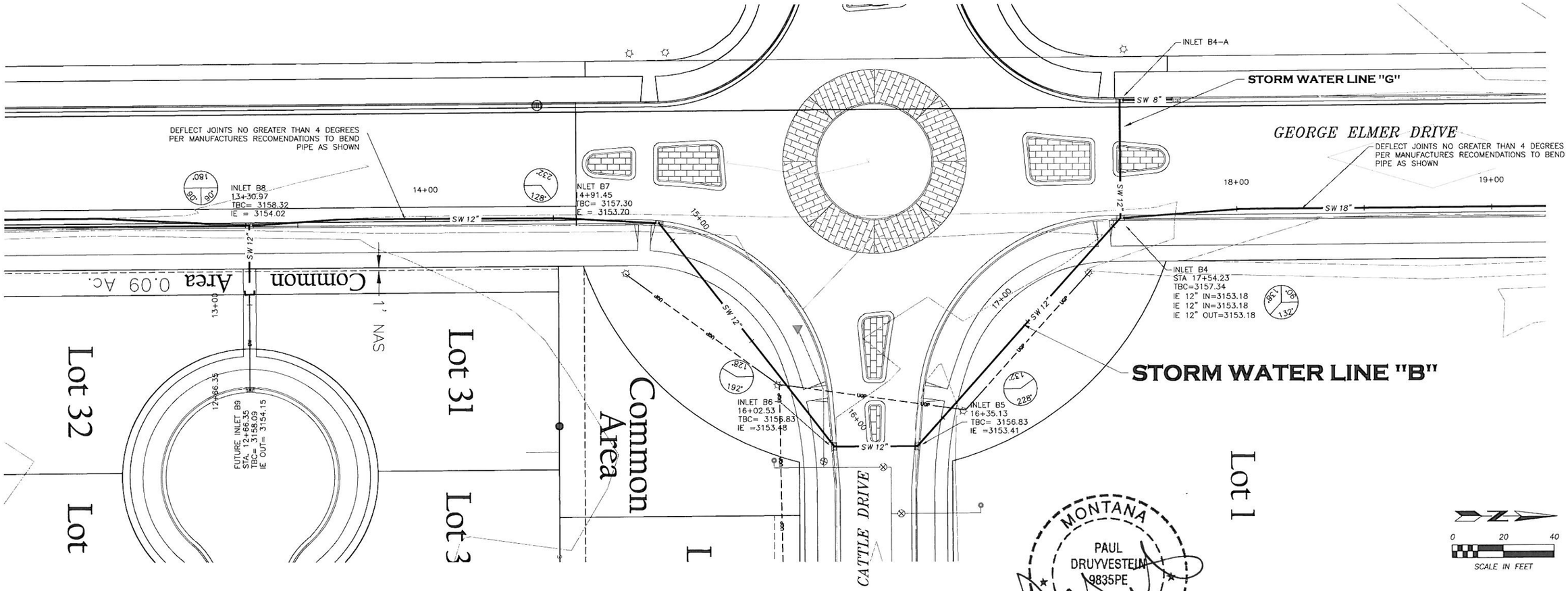
DESIGN PD PROJ. NO 4990
DRAWN DL DATE 9/2008
CHECKED _____ SURVEYED DJA

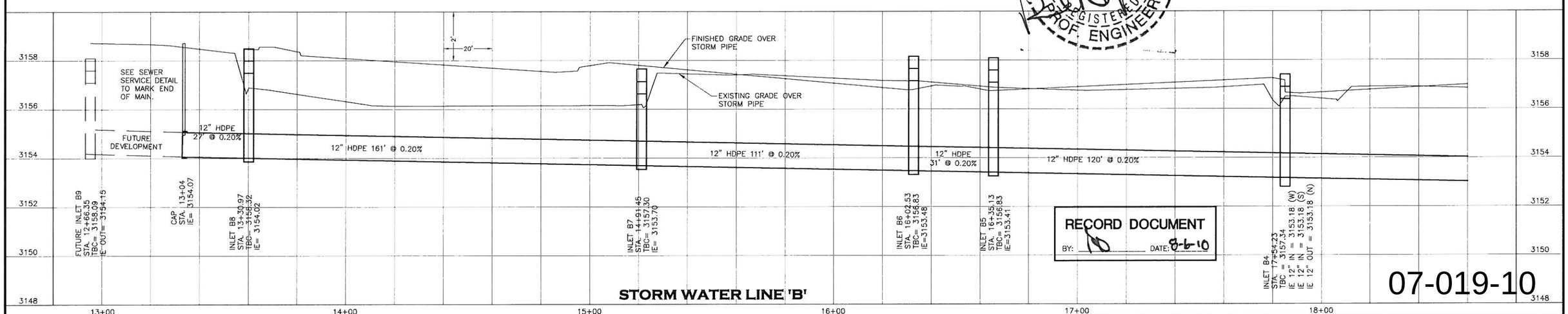
DJ&A, P.C.
CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-6931
Phone 406/721-4320 Fax 406/549-6371

FLYNN RANCH
PHASE 1

STORM WATER IMPROVEMENTS
LINES "C" & "D"
PLAN AND PROFILE

SHEET 9 OF 15





RECORD DOCUMENT
BY: 10 DATE: 8-6-10

07-019-10

BY	DATE	REVISION DESCRIPTION
DJL	2/2009	REVIEWING AGENCY REVISIONS
PJD	8/2010	RECORD DRAWINGS

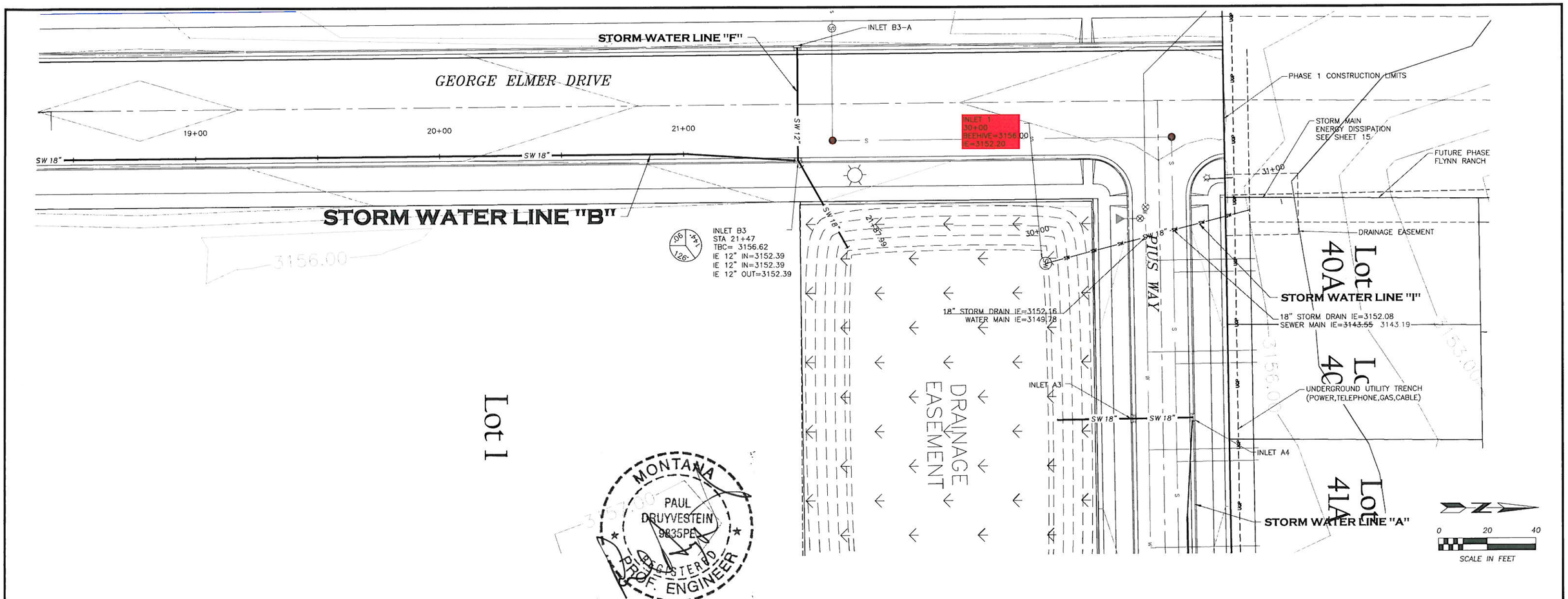
DESIGN PD PROJ. NO. 4990
DRAWN DJL DATE 9/2008
CHECKED ____ SURVEYED DJA

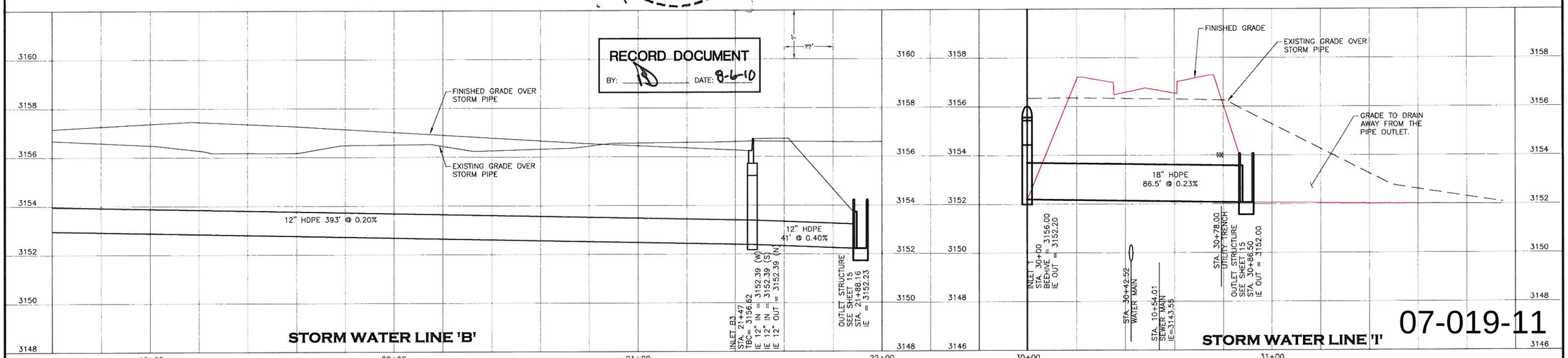
DJ&A, P.C.
CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-8591
Phone 406/721-4325 Fax 406/549-6371

FLYNN RANCH
PHASE 1

STORM WATER IMPROVEMENTS
LINE 'B' 13+30 - 18+50
PLAN AND PROFILE

SHEET 10 OF 15





07-019-11

BY	DATE	REVISION DESCRIPTION
DJL	2/2009	REVIEWING AGENCY REVISIONS
PJD	8/2010	RECORD DRAWINGS

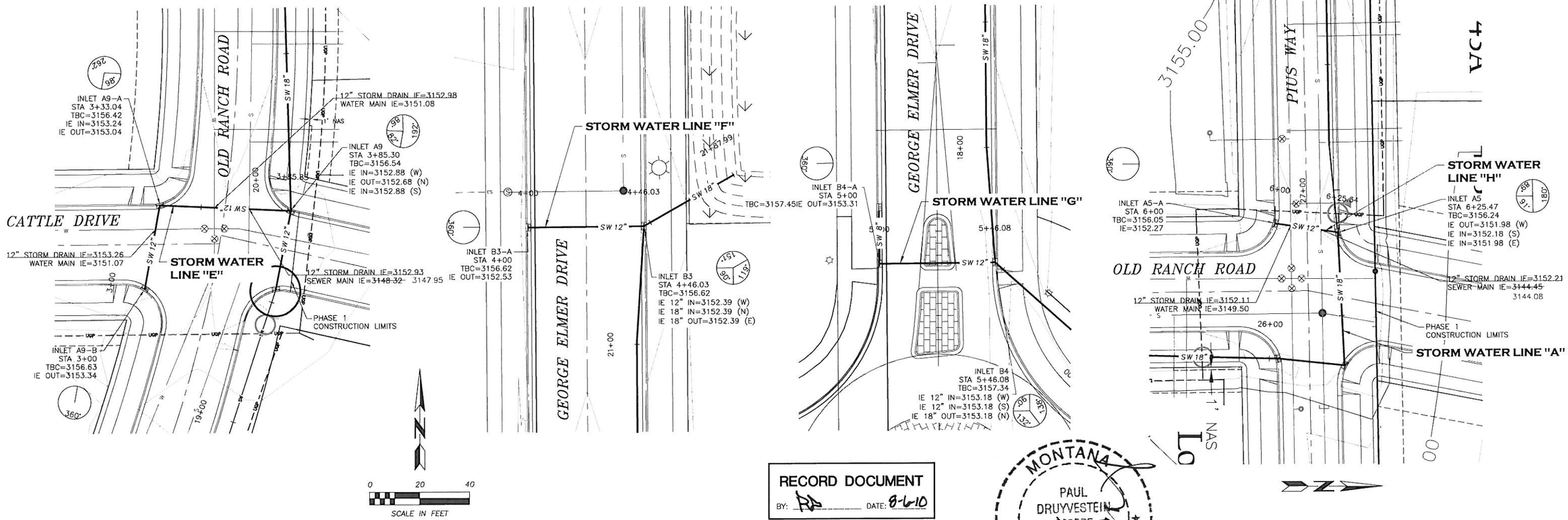
DESIGN PD PROJ. NO. 4990
DRAWN DJL DATE 9/2008
CHECKED ____ SURVEYED DJA

DJ&A, P.C.
CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-8591
Phone 406721-4320 Fax 406549-6371

FLYNN RANCH
PHASE 1

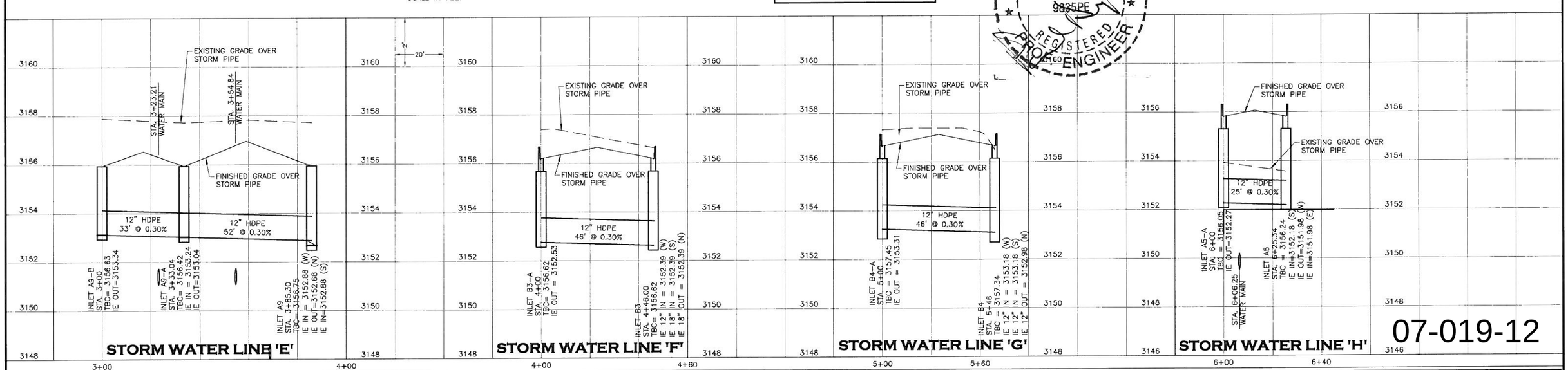
STORM DRAIN IMPROVEMENTS
LINE 'B' 18+50 - 24+10
PLAN AND PROFILE

SHEET 11 OF 15



RECORD DOCUMENT
BY: PD DATE: 8-6-10

MONTANA PAUL DRUYVESTEIN 9835PE REGISTERED PROFESSIONAL ENGINEER



07-019-12

BY	DATE	REVISION DESCRIPTION
DJL	2/2009	REVIEWING AGENCY REVISIONS
PJD	8/2010	RECORD DRAWINGS

DESIGN PD PROJ. NO. 4990
DRAWN DJL DATE 9/2008
CHECKED ____ SURVEYED DJA

D&A, P.C.
CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-5591
Phone 406/721-4320 Fax 406/549-6371

FLYNN RANCH
PHASE 1

STORM DRAIN IMPROVEMENTS
LINES "E", "F", "G", AND "H"
PLAN AND PROFILE

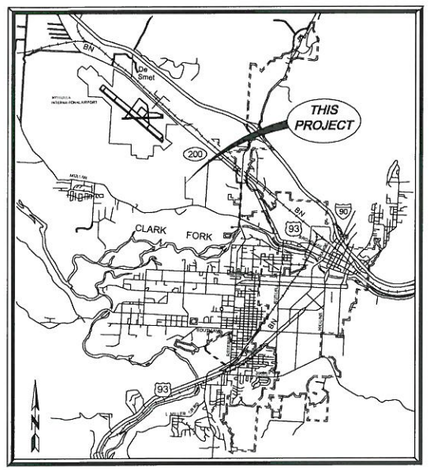
SHEET 12 OF 15

FLYNN RANCH - PHASE 2
SANITARY SEWER SYSTEM IMPROVEMENTS

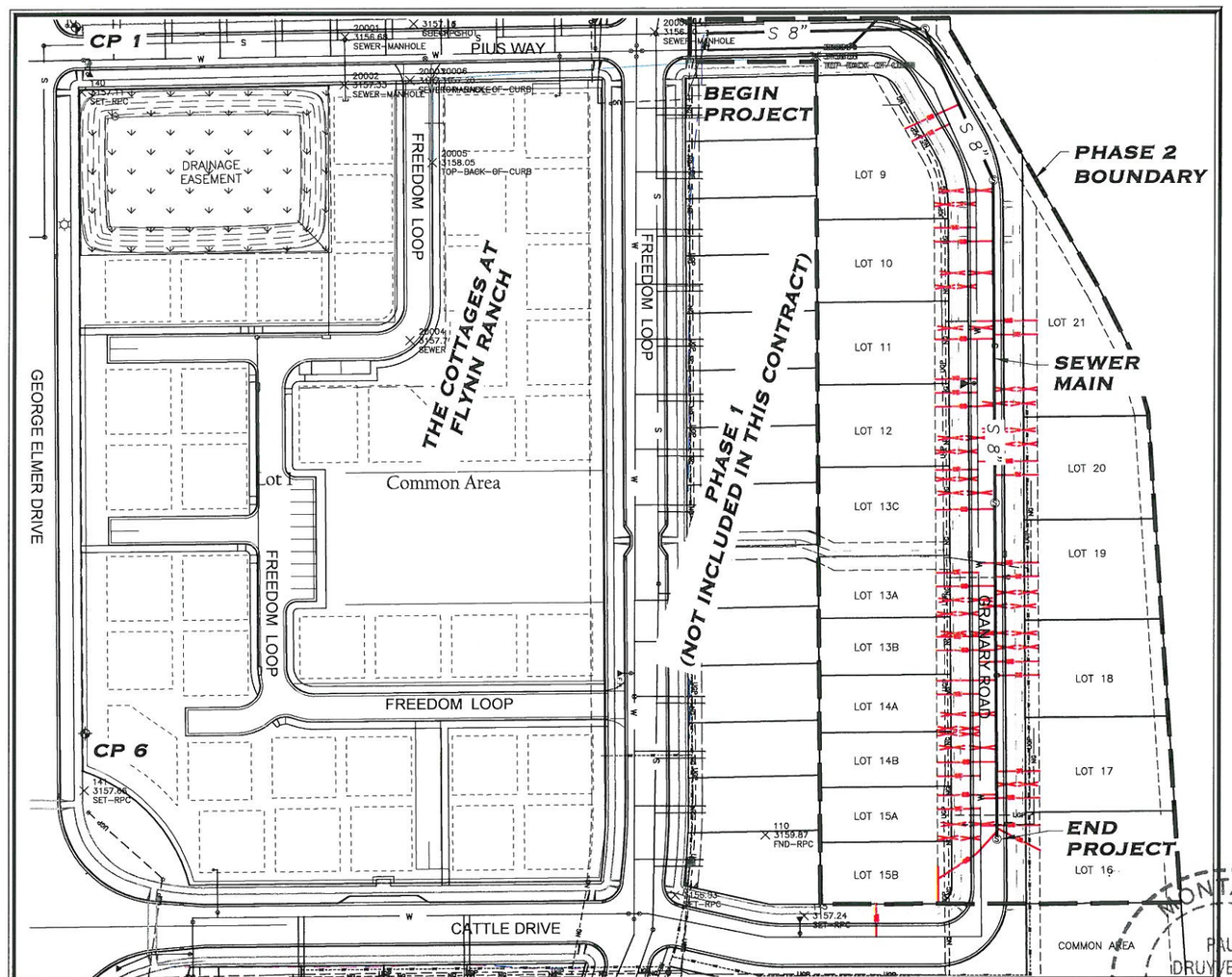
City of Missoula, Montana
Sec. 12, T. 13 N., R. 20 W., P.M.M.

Plans Prepared For:

STOCKYARD ROAD INVESTMENTS, LLC
P.O. BOX 2060
SUN VALLEY, IDAHO 83353



VICINITY MAP
NO SCALE



SITE MAP
NO SCALE

INDEX TO SHEETS	
SHEET NO.	DESCRIPTION
1	COVER SHEET
2–3	SEWER MAIN PLAN AND PROFILE
4–6	SEWER DETAILS

PROJECT STATUS	
STATUS	DATE
PRELIMINARY – NOT FOR CONSTRUCTION	
FINAL – APPROVED FOR CONSTRUCTION	

ENGINEERING CONTACT:

PAUL DRUYVESTEIN, P.E. – PROJECT MANAGER
(406) 721–4320

KYLE GAUTHIER, E.I. – PROJECT ENGINEER
(406) 721–4320

PROJECT CONTROL POINTS

PT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP–1	97876.41	27633.28	3156.11	RED PLASTIC CAP
CP–6	97354.39	27642.08	3156.51	RED PLASTIC CAP

PROJECT BENCHMARK
CONTROL POINT 6 ELEVATION = 3156.51

UTILITY LOCATION :

CALL
TWO WORKING DAYS
BEFORE YOU DIG
(ID, MT, ND, OR, WA, WY)

CALL 1–800–424–5555
UNDERGROUND UTILITIES LOCATION CENTER

WITH THE FOLLOWING:
COUNTY MISSOULA CITY MISSOULA
STREET ADDRESS GEORGE ELMER DRIVE
SEC. & 1/4 SEC. NO.# 12, SE 1/4
TOWNSHIP & RANGE T 13 N, R 20 W

RECORD DOCUMENT
BY: RD DATE: 3-27-13

07-019(D)-1

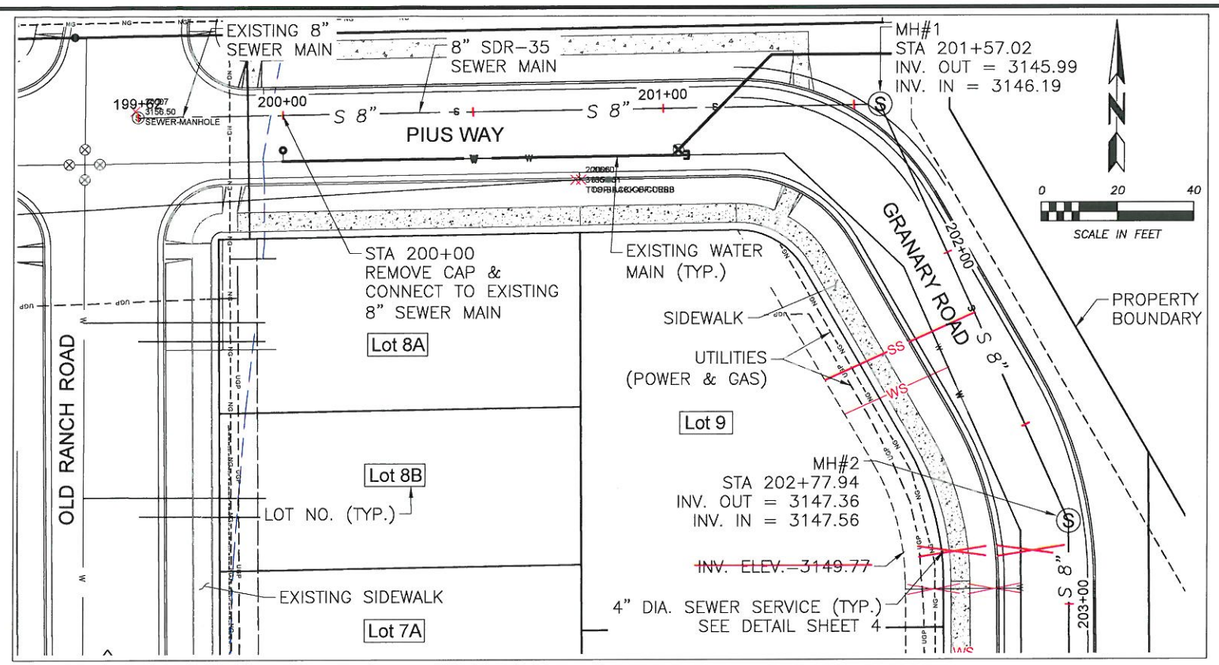
D&A, P.C.
CONSULTING ENGINEERS & LAND SURVEYORS
2303 RUSSELL STREET, MISSOULA, MONTANA 59801-5921
PHONE 406/721-4301 FAX 406/549-6271

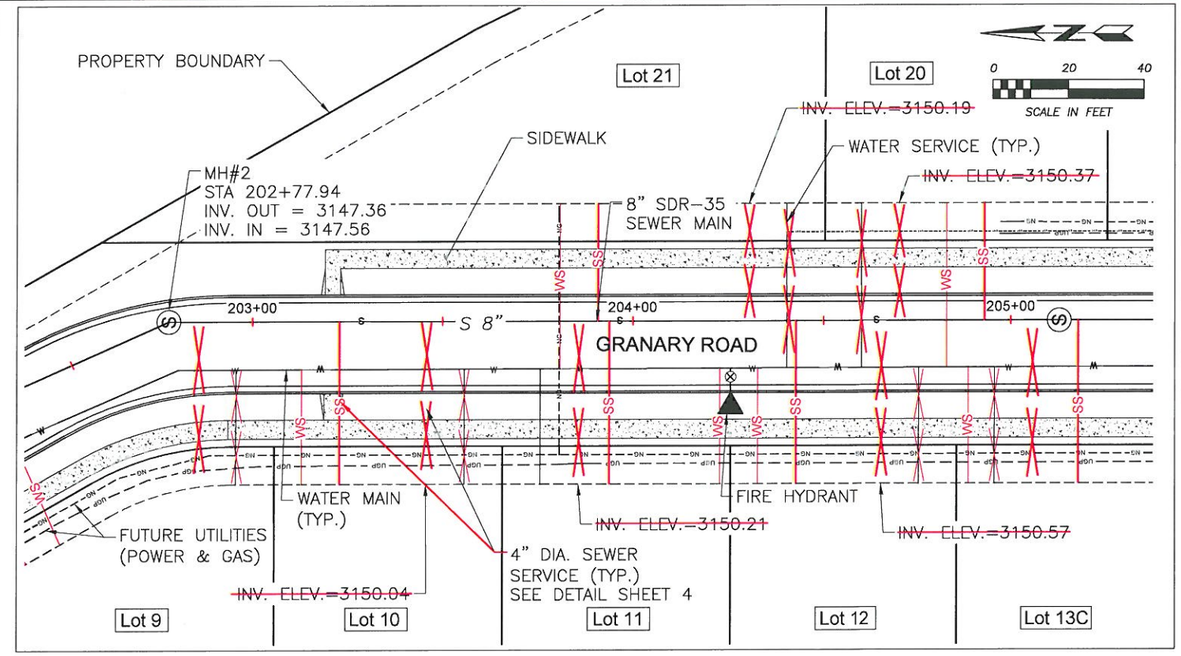
PAUL DRUYVESTEIN, P.E.
DATE: 3-27-13
EXPIRES: 6-31-13

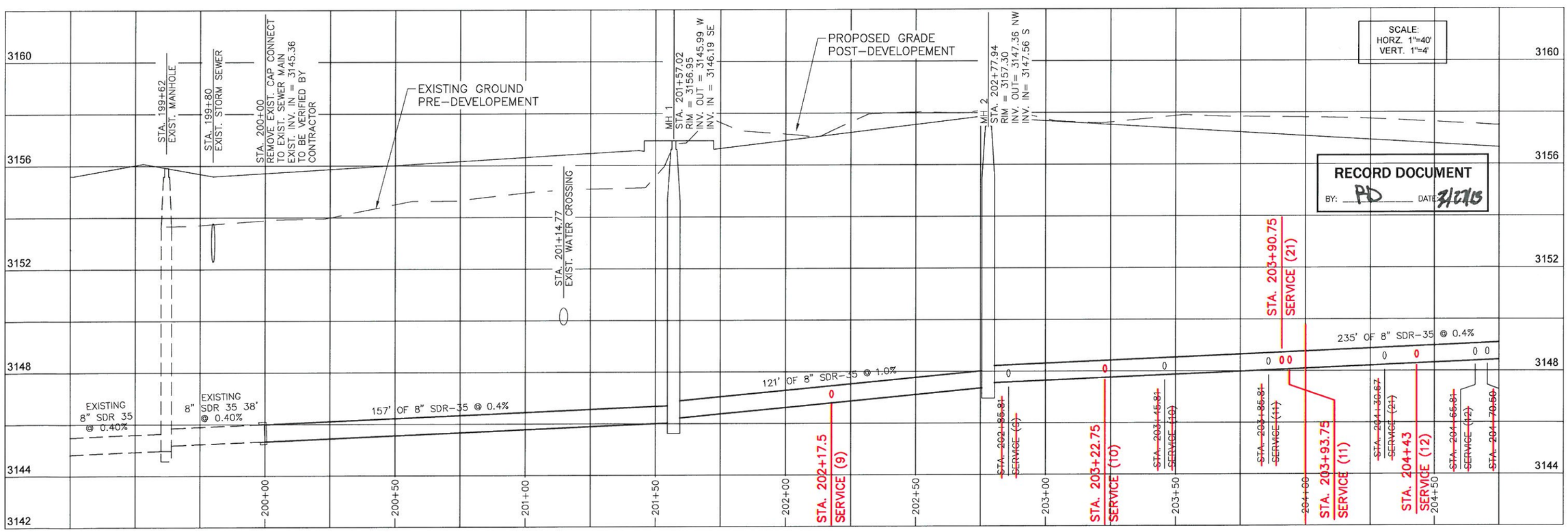
MONTANA PAUL DRUYVESTEIN 9835PE REGISTERED PROF. ENGINEER

FLYNN RANCH - PHASE 2
Missoula, Montana
Sanitary Sewer System Improvements
Cover Sheet

REVISIONS	DWN BY:	DATE:	PROJECT NO.
1.	K. GAUTHIER	Jan–2013	6157.03
2.	DSN BY:	CHK BY:	SHEET NO.
3.	K. GAUTHIER	P. DRUYVESTEIN	1 OF 6
4.			
5.			





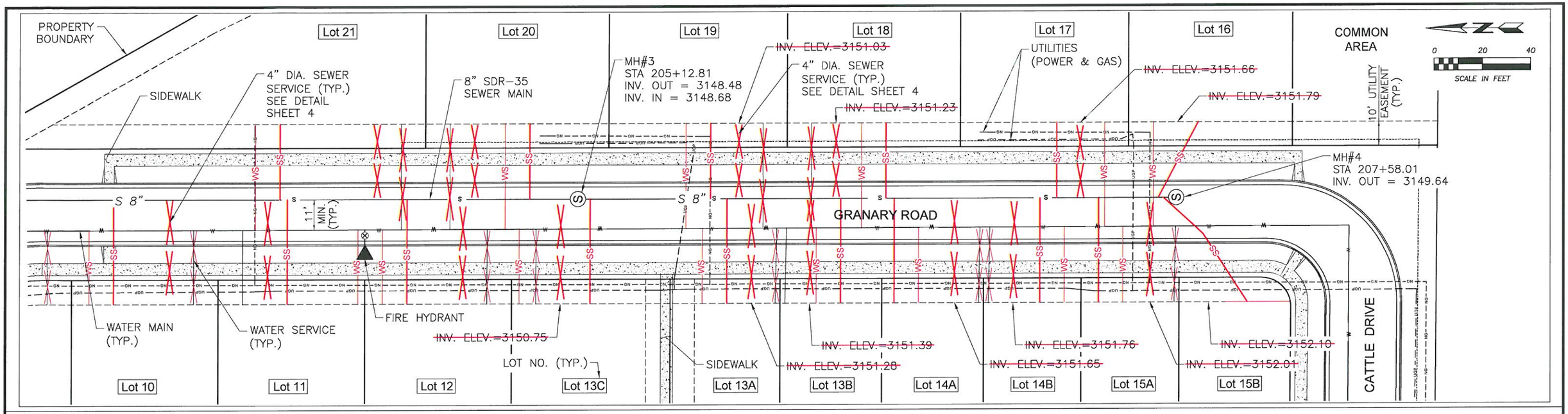


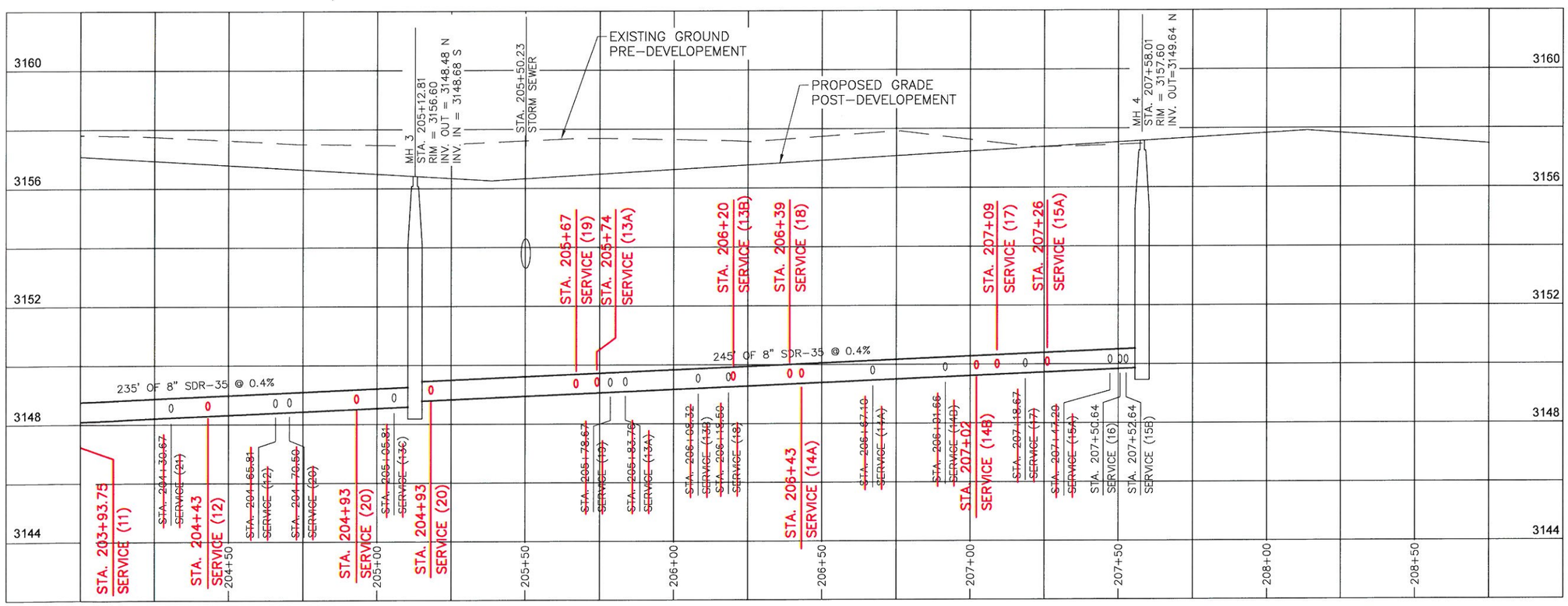
DESIGN KG	PROJ. NO. 6157.03	DJ&A, P.C. CONSULTING ENGINEERS & LAND SURVEYORS 3203 Russell Street, Missoula, Montana 59801-6591 Phone 406/721-4320 Fax 406/549-6371	FLYNN RANCH PHASE 2
DRAWN KG	DATE Jan-2013		
CHECKED PD	SURVEYED DJ&A		

SEWER MAIN PLAN & PROFILE

07-019(D)-2

SHEET 2 OF 6





RECORD DOCUMENT
BY: PD DATE: 3/27/13

SCALE:
HORZ. 1"=40'
VERT. 1"=4'

GENERAL NOTES:

1. CONTRACTOR TO REPAIR AND RESTORE SURFACE PER EXISTING CONDITION. ALL TRENCHES WILL BE COMPACTED TO 95% OF NATIVE MATERIAL OR GRAVELS PLACED.
2. SERVICE LINES WILL BE 4" AS SHOWN ON STANDARD SEWER SERVICE DETAIL ON SHEET 4.
3. THE EXISTING SITE IS BARE GROUND. WATER MAINS, SERVICES, AND DRY UTILITIES ARE SCHEDULED TO BE CONSTRUCTED AFTER SEWER INSTALLATION.

DESIGN KG	PROJ. NO. 6157.03		
DRAWN KG	DATE Jan-2013		
CHECKED PD	SURVEYED DJ&A		

DJ&A, P.C.
CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-8591
Phone 406/721-4320 Fax 406/549-8371

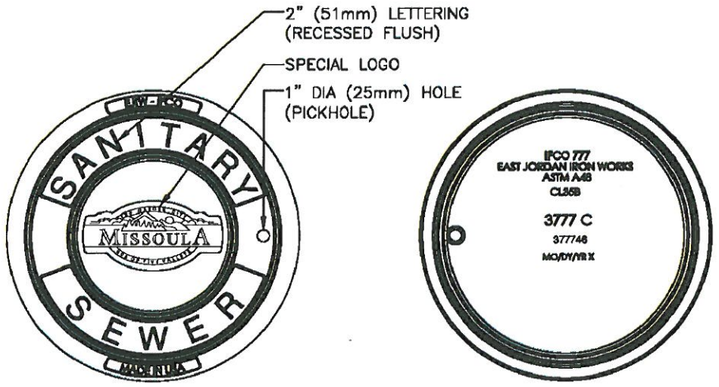
FLYNN RANCH
PHASE 2

SEWER MAIN
PLAN & PROFILE

07-019(D)-3

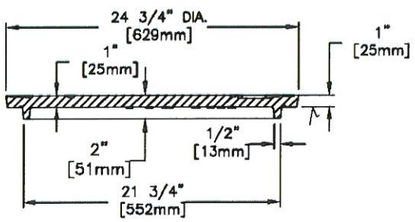
3 | 6

EJIW / IFCO 3777-M
OR APPROVED EQUIVALENT



TOP VIEW

BOTTOM VIEW



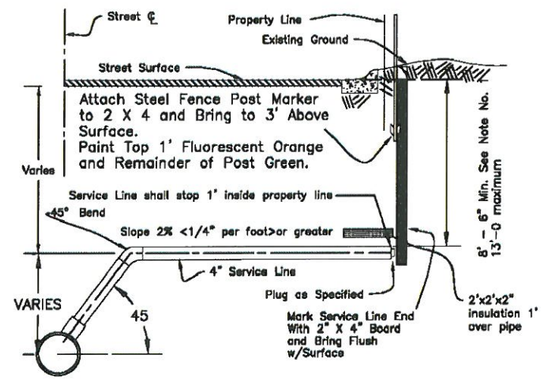
SECTION

√ MACHINED SURFACE

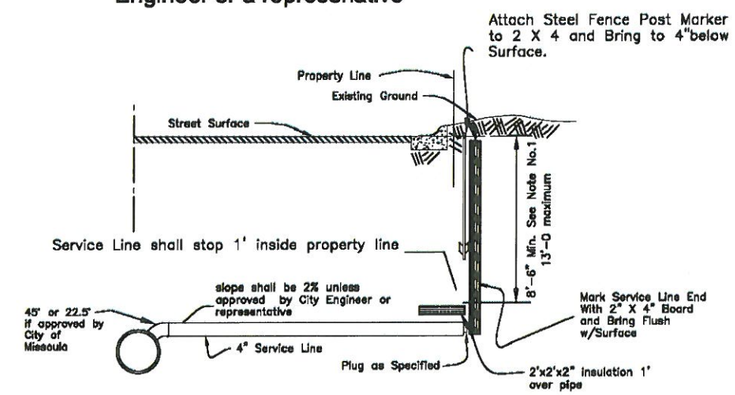
SEE STD-300D FOR STANDARD MANHOLE RING AND DUSTPAN SPECIFICATIONS

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Sanitary Sewer Manhole Cover | Approved By City Engineer Kevin J. Slovarp | Adopted: 01/05/2006 Revised: 01/08/2007 | STD -300A



ALTERNATE SEWER SERVICE requires prior approval by the City Engineer or a represenative



Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Standard Sewer Service Line (all commercial services shall be 6" only) (Sheet 1 of 2) | Approved By City Engineer R. Steven King | Adopted: 03/1983 Revised: 01/2002 | STD - 307

Notes for Sewer Service Lines

1. Minimum cover below ground elevation at the end of the stub-out shall be 8'-6". The maximum depth shall be 13'. Deviations will be allowed on plans or by the Engineer or their representative.
2. Connections to existing sewer mains shall be tapped by the City at the Contractor's expense, and Predco Fast Fit Saddles or approved equal shall be used. When the sewer main and sewer service are installed under one contract, in-line tees only shall be provided for the service lines. Tees shall be rolled to a 45 degree angle.
3. A City permit is required for each sewer service line connection to main sewer.
4. Service lines installed before exfiltration testing of the main sewer shall pass exfiltration tests.
5. Sewer service lines shall be installed where shown on the drawings or as specified by the Engineer or his representative.
6. In order to keep service lines deep enough to serve each home and also pass under water mains, it may be necessary to use the alternate service line.
7. All commercial service stub-outs shall be 6" diameter.
8. All service lines shall be Schedule 40 P.V.C.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Standard Sewer Service Line (all commercial services shall be 6" only) (Sheet 2 of 2) | Approved By City Engineer R. Steven King | Adopted: 03/1983 Revised: 01/2002 | STD - 307

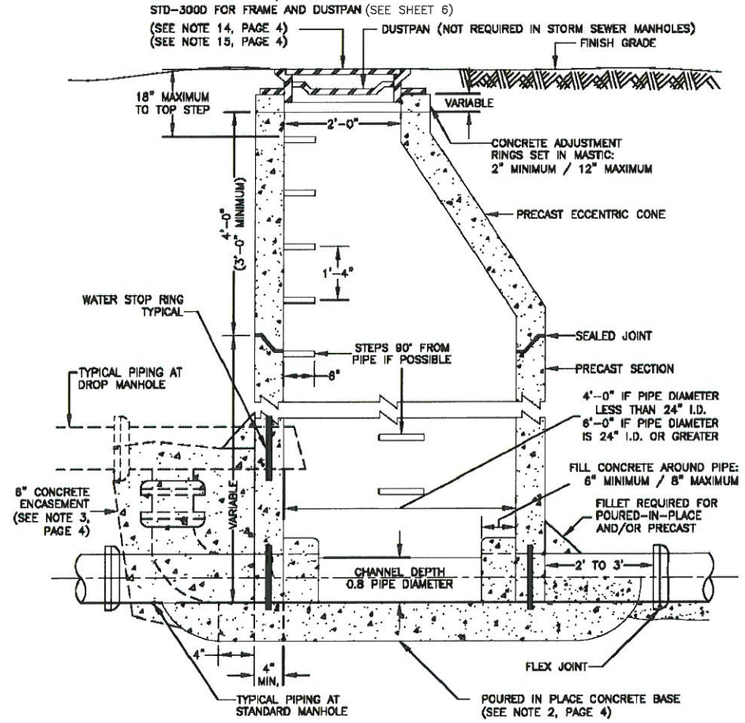
RECORD DOCUMENT
BY: AD DATE: 12/7/13

DESIGN KG	PROJ. NO. 6157.03	D&A, P.C. CONSULTING ENGINEERS & LAND SURVEYORS 3203 Russell Street, Missoula, Montana 59801-8591 Phone 406/721-4320 Fax 406/549-6371	FLYNN RANCH PHASE 2
DRAWN KG	DATE Jan-2013		
CHECKED PD	SURVEYED DJ&A		

SEWER DETAILS 07-019(D)-4

SHEET 4 OF 6

USE ONLY APPROVED COMPONENTS:
STD-300A SANITARY SEWER COVER
STD-300B STORM SEWER COVER
STD-300C DRY WELL / SUMP COVER
STD-300D FOR FRAME AND DUSTPAN (SEE SHEET 6)

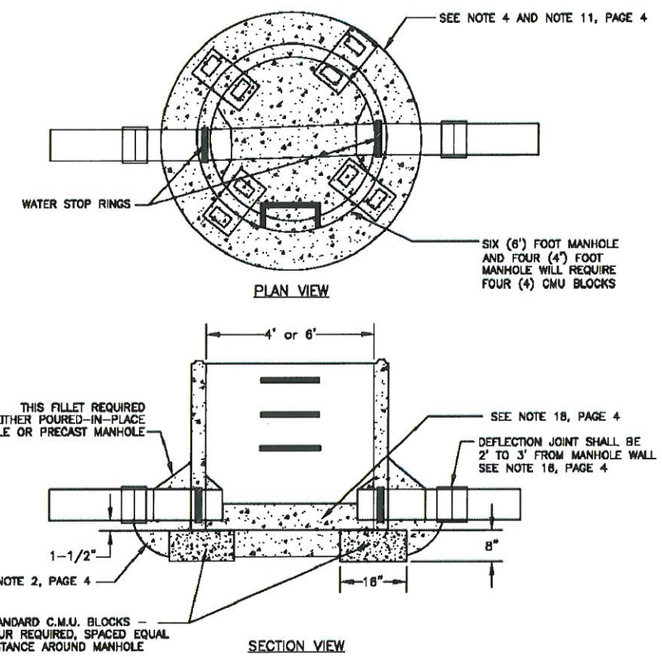


NOTE: ALL PERTINENT DESIGN AND CONSTRUCTION NOTES ARE ON PAGE 4 OF STD-301

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Sanitary and Storm Sewer Manhole | Page 1 of 4 | Approved By City Engineer Kevin J. Slovarp | Adopted: 01/1973 Revised: 01/10/2007 | STD - 301

POURED IN PLACE MANHOLE BASE

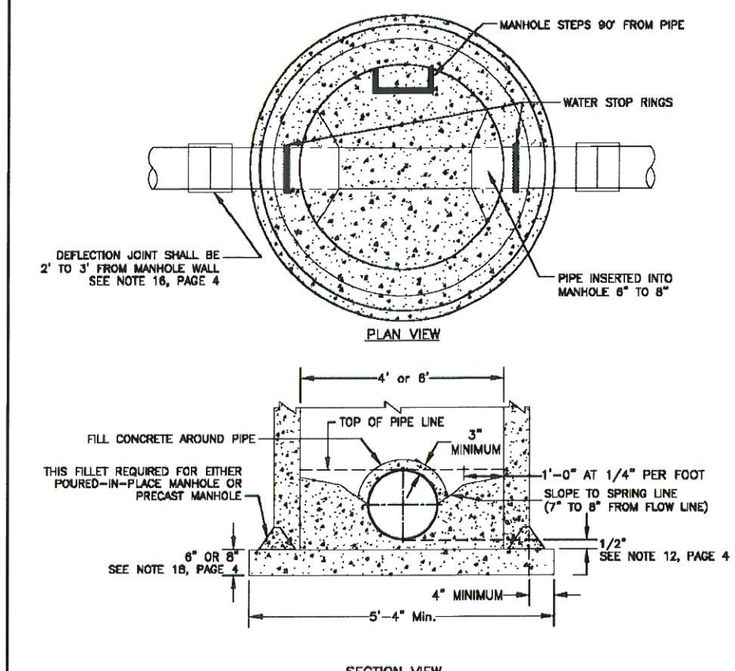


NOTE: ALL PERTINENT DESIGN AND CONSTRUCTION NOTES ARE ON PAGE 4 OF STD-301

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Sanitary and Storm Sewer Manhole | Page 2 of 4 | Approved By City Engineer Kevin J. Slovarp | Adopted: 01/1973 Revised: 01/10/2007 | STD - 301

PRECAST MANHOLE BASE



NOTE: ALL PERTINENT DESIGN AND CONSTRUCTION NOTES ARE ON PAGE 4 OF STD-301

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division | Sanitary and Storm Sewer Manhole | Page 3 of 4 | Approved By City Engineer Kevin J. Slovarp | Adopted: 01/1973 Revised: 01/10/2007 | STD - 301

NOTE:
INSTALL CONCRETE COLLAR AROUND ALL MANHOLES AS PER CITY OF MISSOULA SPECIFICATIONS.

RECORD DOCUMENT
BY: PP DATE: 3/27/13

DESIGN KG	PROJ. NO. 6157.03	DJ&A, P.C. CONSULTING ENGINEERS & LAND SURVEYORS 3203 Russell Street, Missoula, Montana 59801-8591 Phone 406/721-4320 Fax 406/549-6371	FLYNN RANCH PHASE 2
DRAWN KG	DATE Jan-2013		
CHECKED PD	SURVEYED DJ&A		

SEWER DETAILS 07-019(D)-5

SHEET 5 OF 6

ADDITIONAL NOTES FOR MISSOULA SANITARY SEWER AND STORM SEWER MANHOLE STANDARDS

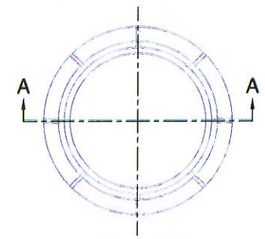
1. USE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS) SECTION 02700 WITH CITY OF MISSOULA AMENDMENTS.
2. POURED-IN-PLACE OR PRECAST BASE MAY BE USED.
   POURED-IN-PLACE BASE: MINIMUM CONCRETE THICKNESS MUST BE SIX (6) INCHES.
   PRECAST BASE: MINIMUM THICKNESS MUST BE SIX (6) INCHES PER MPWSS STANDARD DRAWING 02720-3
3. THE POURED-IN-PLACE CONCRETE BASE MUST START ONE (1') FOOT FROM OUTSIDE THE MANHOLE AND MUST BE A MINIMUM OF EIGHT (8") INCHES DEEP UNDER THE MANHOLE WITH A THREE (3") INCH COLLAR AROUND THE PIPE.
4. POUR AGAINST UNDISTURBED EARTH SIX (6") INCHES OF CONCRETE ENCASEMENT TO SPRING LINE AND FIRST JOINT OF INLET PIPE.
5. ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, MANHOLE RING AND TOP SECTION, AND AROUND SEWER PIPE INTO MANHOLE SHALL BE WATERTIGHT. JOINTING MATERIAL SHALL BE "RAM-NEK®" OR EQUAL FOR ALL JOINTS EXCEPT BETWEEN SEWER PIPE AND MANHOLE WALL.
6. CONCRETE FOR DROP STRUCTURES SHALL BE FORMED.
7. ALL MANHOLE PENETRATIONS SHALL BE MADE BY CORE DRILLING.
8. DROP MANHOLE CONNECTIONS SHALL BE USED ONLY WHERE SLOPE OF LATERAL INCOMING TO MAIN SEWER WOULD EXCEED TEN PERCENT AND ONLY WITH APPROVAL OF THE CITY ENGINEER.
9. CROWN OF LATERAL MAIN SHALL MATCH CROWN OF TRUNK SEWER.
10. MANHOLES PLACED IN UNPAVED AREAS SHALL HAVE THE COVERS PLACED EIGHTEEN (18") INCHES ABOVE FINISHED GRADE PER CITY OF MISSOULA, ENGINEERING/UTILITY SECTION ADMINISTRATIVE RULE NO. 604.
11. BASE AND FILL CONCRETE MAY BE POURED MONOLITHICALLY.
12. ONE-HALF (1/2") INCH SPACING MAY BE OMITTED WHEN BASE AND FILL CONCRETE ARE POURED MONOLITHICALLY.
13. BASE IS TO BE SUPPORTED BY FOUR (4) CEMENT BLOCKS (CMU) EQUALLY SPACED AROUND PERIMETER OF MANHOLE.
14. DUE TO PROVISIONS IN THE FEDERAL TRANSPORTATION ACT, VENDOR MUST AUTHENTICATE UNITED STATES ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
15. COVERS (LIDS) MUST BE AS SPECIFIED IN STANDARD DRAWINGS; STD-300A (SANITARY SEWER), STD-300B (STORM SEWER) OR STD-C (DRY WELL OR SUMP).
16. ALL P.V.C. TO P.V.C. DEFLECTON JOINTS SHALL BE MADE WITH A GASKETED P.V.C. REPAIR COUPLING AS A GPK 906 STYLE COUPLING OR EQUIVALENT. THE USE OF A PIPE BELL AND SPIGOT ASSEMBLY WILL ALSO BE ALLOWED.
17. ALL PRECAST MANHOLE BASES SHALL HAVE A FOUR (4") INCH CONCRETE BASE EXTENSION OUTSIDE THE MANHOLE FOR SUPPORT.
18. ALL FLOW ACROSS MANHOLES SHALL BE ONE-TENTH (1/10') OF A FOOT FALL, UNLESS THE FLOW CHANGES DIRECTION MORE THAN FORTY-FIVE (45°) DEGREES, THEN THE FALL SHALL BE TWO-TENTHS (2/10') OF A FOOT FALL OR GREATER.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

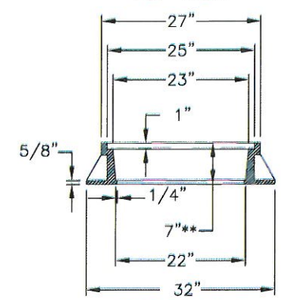
MISSOULA Engineering Division	Sanitary and Storm Sewer Manhole	Page 4 of 4
	Approved By City Engineer Kevin J. Slovarp	Adopted: 01/1973 Revised: 01/10/2007	STD - 301

EJIW / IFCO NO. 3777 OR APPROVED EQUIVALENT

MANHOLE RING



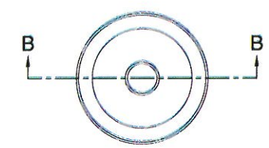
TOP VIEW



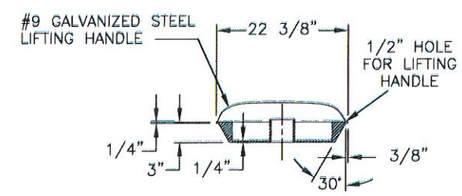
SECTION A-A

MANHOLE RING – MINIMUM 180lb.

DUSTPAN



TOP VIEW



SECTION B-B

DUSTPAN – GRAY IRON

** 4" MANHOLE RING MAY BE USED ONLY WITH PRIOR CITY ENGINEER APPROVAL

USE ONLY APPROVED COVERS:
STD-300A SANITARY SEWER
STD-300B STORM SEWER
STD-300C DRY WELL / SUMP

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA Engineering Division	Standard Manhole Ring and Dustpan (Replaces STD-319)	
	Approved By City Engineer Kevin J. Slovarp	Adopted: 11/1997 Revised: 01/08/2007	STD -300D

RECORD DOCUMENT
BY: [illegible] DATE 3/27/13

DESIGN KG	PROJ. NO. 6157.03	D&A, P.C. CONSULTING ENGINEERS & LAND SURVEYORS 3203 Russell Street, Missoula, Montana 59801-8591 Phone 406/721-4320 Fax 406/549-6371	FLYNN RANCH PHASE 2
DRAWN KG	DATE Jan-2013		
CHECKED PD	SURVEYED D&A		

SEWER DETAILS 07-019(D)-6

SHEET 6 OF 6

MISSOULA
DEVELOPMENT SERVICES – ENGINEERING DIVISION
435 RYMAN • MISSOULA, MT 59802 - 4297 • (406) 552-6630 • FAX: (406) 552-6053

CORR 2020-0131

25 August 2020

Matt Hammerstein
matt@woitheng.com
Woith Engineering, Inc.

RE: McNett Flats - Intent to Serve Water and Sewer Availability
Project **#2020-037**

Matt,

The intent of this letter is to satisfy requirements for the subdivision application. At this time, our expectation is that you will also need a water and sewer availability letter to satisfy Montana Department of Environmental Quality (DEQ) regulations. Upon request, the water and sewer availability letter will be provided when the infrastructure plan is submitted to DEQ.

It is the City of Missoula's intent to provide public water and sanitary sewer for the McNett Flats Subdivision. It is the obligation of the developer to design and construct infrastructure necessary to serve the development. The City will review and approve design prior to construction.

If the planned sanitary sewer infrastructure is designed and constructed that meets City of Missoula standards and capacity criteria (including main size, lift station size, and plant capacity), then service will be available to the property at Project McNett Flats Subdivision, legally described as Parcel 8A of C.O.S. 6109, Section 12, Township 13 North, Range 20 West. With respect to its water system, given the information provided to the City and known at this time, the City intends to serve the McNett Flats Subdivision connecting to the existing system at the northern terminus of George Elmer Drive and the intersection of Pius Way and Old Ranch Road. Additional connections will be at the boundary with the proposed Remington Flats Subdivision.

The property is within the City of Missoula Wastewater and Water Facilities Service Area boundaries. This property is also outside the City's incorporated boundary and the City cannot legally provide sanitary sewer in the future unless the property developer owner contracts to receive service. Please ensure to comply with the below requirements:

1. Include **Project #2019-037** on all future correspondence for this project;

2. Obtain State Department of Environmental Quality approval of the proposed water and sewer system if a public water and sewer main extension is proposed;

3. Submit design report(s) to City Engineering for review;

4. Obtain City approval of plans design report and specifications from the City Engineering Division if a water and sewer main extension is proposed;

5. Prior to connection to water and sewer systems, the property owners must pay the necessary utility development, connection or other applicable fees, and sign the appropriate legal documents as applicable;

6. Arrange for a City licensed and bonded contractor to obtain the necessary excavation permits and perform the installation of the sewer and utility lines;

7. Prior to construction startup, verify information regarding depth and location of the existing water and sewer lines with Missoula Water and Utility Services staff; and

8. If the sewer is dry-laid, it will be the responsibility of the parcel/lot owners to bring the dry-laid sanitary sewer into compliance with City standards at the time of connection.

Sincerely,

Ida L. Sajor

Digitally signed by Ida Sajor
Date: 2020.08.25 15:10:56 -06'00'

Ida Sajor
City Engineering

cc: Kevin Slovarp
Troy Monroe
Logan McInnis
Ross Mollenhauer
Andy Schultz
Mickey Morin
Pat Brook
Bob Hayes
Triston Firth
Aaron Lebsack