

APPENDIX I
SEPTIC SYSTEM ABATEMENT PLAN

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SEPTIC SYSTEM ABATEMENT MASTER PLAN

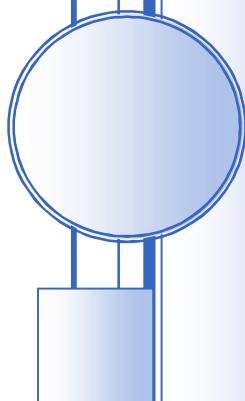
Project Report

Prepared for City of Bonney Lake

This Report has been prepared by RH2 Engineering to describe the proposed Septic System Abatement Master Plan for the City of Bonney Lake and address the requirements of WAC 246-290-110.



RH2 Engineering, Inc
May 2012
BON 511.068



City of Bonney Lake

Sewer Abatement Master Plan

Project Report

Board Members/Commissioners

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Randy McKibben
Mark Hamilton
Dan Swatman
James Rackley
Tom Watson
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Katrina Minton-Davis

Public Works Director

Dan Grigsby, P.E.

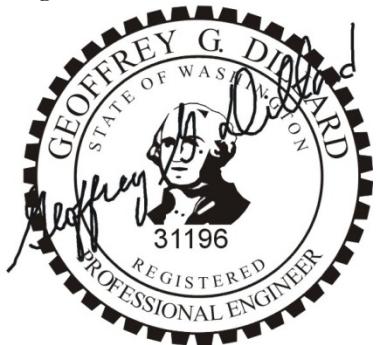
Operations Division Assistant Public Works Director

Charlie Simpson

City Engineer

John Woodcock, P.E.

The information contained in this report has been prepared by and under the direct supervision of the undersigned.



Geoffrey G. Dillard, P.E.
Principal-in-Charge



David J. Matz, P.E.
Project Engineer

CITY OF BONNEY LAKE
SEPTIC SYSTEM ABATEMENT MASTER PLAN
PROJECT REPORT

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- Exhibit C – Sewer Plans and Profiles
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CITY OF BONNEY LAKE

SEPTIC SYSTEM ABATEMENT MASTER PLAN

PROJECT REPORT

Background

In August 2011, the City of Bonney Lake (City) authorized RH2 Engineering, Inc., (RH2) to establish a Master Plan that identifies areas within the City's Core Sewer Service Area (CSSA) currently served by on-site septic sewage systems and drainfields and develop a systematic program for connecting these areas to the City's existing municipal sewer collection system. RH2 was asked to develop an abatement criteria matrix to assist in identifying and ranking the areas where abandonment of on-site sewage systems is most feasible.

The Tacoma Pierce County Health Department (TPCHD) allows cities and utility districts to establish criteria for sewer connections and drainfield abandonment. It is anticipated that the existing on-site sewage systems farther than 250 feet from an existing sanitary sewer main per the requirements of the Municipal Code Section 13.12.150 will be included in the matrix. The Municipal Code outlines connection requirements for private and public entities within the city limits. Single-family in-fill lots within 250 feet of a sanitary sewer main were not identified or included in the plan. The City will handle these lots on a case-by-case basis.

The matrix criteria was based on readily available information and included such criteria such as planning-level capital costs (based on length, diameter, and approximate depth); the age and condition of the existing on-site sewage systems (if information available from TPCHD); existing regional (or neighborhood-wide) site conditions (e.g., soils types, geology, groundwater levels); distance to available existing system conveyance capacity, number of properties connected per proposed improvement, and phasing of other improvements (e.g., water main or roadway) in the area.

The following tasks were performed as part of preparing this report:

- Prepare a basemap that identifies the locations of areas with existing on-site sewage systems within the City's CSSA.
- Research and gather existing data from the City and TPCHD on existing on-site sewage systems within the City's CSSA. This includes one field day to help verify field conditions.
- Review hydraulic flow directions and estimated conveyance capacity from existing data and maps within the City Comprehensive Sewer System Plan (CSSP).
- Prepare an abatement criteria matrix establishing a priority list to eliminate on-site sewage systems within the City's CSSA.
- Prepare sanitary sewer schematic designs for each area to help in evaluation of flow direction, approximate sewer main depths, and relative construction costs.
- Provide planning-level cost estimates for each major alignment.
- Evaluate and rank on-site sewage system areas based on criteria.
- Segregate the improvements into distinct pieces that can be phased and funded as allowed by the City annual budget for this type of project and prepare a priority schedule for each major alignment.

Findings

Reviewing existing utility and mapping information and having discussions with City of Bonney Lake there were 13 areas identified to be studied. These areas can be seen on the attached map (**Exhibit A – Septic System Abatement Map**) and include:

Area A – 80th Street Court East

Area B – 181st Ave East

Area C1 – Cedar View (NW)

Area C2 – Cedar View (NE)

Area C3 – Cedar View (W)

Area C4 – Cedar View (E)

Area C5 – Cedar View (S)

Area D – 62nd Street East

Area E – Cedar Grove

Area F – 192nd Ave East (N)

Area G – 190th/192nd Ave East

Area H – 192nd Ave East (S)

Area I – 204th Avenue East

The septic abatement matrix (**Exhibit B – Prioritization Ranking Matrix**) was separated into 10 criteria. Each criterion was given a range of points from 0 to 20, with construction costs designated as a major item. The matrix criteria were:

1. Construction Costs
2. Age of Septic Systems
3. Soil Type
4. Proximity to Domestic Wells
5. Proximity to High Ground or Surface Water
6. Health Department Concerns
7. Topography
8. Downstream Sewer System
9. Existing Roadway Condition
10. Future Improvements Planned

1. Construction Costs

A conceptual sewer design (**Exhibit C – Sewer Plans and Profiles**) was completed for each area and using previous construction cost estimates for the City as a baseline, construction costs were calculated. The construction costs (**Exhibit D – Construction Cost Estimate by Area**) for the sewer lines and appurtenances varied based on depth. Pierce County GIS topography was used in the design plans and estimates. The point range was from 0 to 20 points within these criteria. The

less expensive the improvements, the more likely sewer systems could be provided in a timely manner. Improvements under \$1,000,000 were given a 20 point value whereas improvements over \$3,000,000 were given 0 points (**Exhibit E – Construction Cost Estimate Summary**).

2. Age of Septic Systems

The ages of the septic systems were determined by referencing Pierce County assessor information. The parcels within the areas were checked to see what year the structures were built and an average age was calculated. The timeframes of before 1980, 1980 to 1995, and after 1995 were used. Septic design criteria were changing during the 1980s and new design techniques and requirements were being implemented. Most of the septic systems built prior to 1980 were gravity, and after 1995 they became pressurized or required 3 feet of separation for gravity systems. The point range was from 0 to 10 points within these criteria. Septic systems installed prior to 1980 were given a higher point value of 10 due to the higher possibility of failure, and systems installed after 1995 were given a value of 0.

3. Soil Type

The criteria for soil type were based on two review items. Sources consulted include the Soils Conservation Service Mapping from the 1979 Soil Survey of Pierce County Area, Washington, and evaluation by a geotechnical engineer. The geotechnical engineer based soil type on relative percentage of soils (Alderwood, Xerochrept, Indianola, Everett) and comparison to Soil Textural Classifications in Tacoma Pierce County Health Code, On-site Sewage Regulations (**Exhibit F – Soils Map**). The point range was from 0 to 10 points within these criteria. Sand and gravels (Type 1) were given 0 points, whereas poor soils (Type 5) were given 10 points.

4. Proximity to Domestic Wells

The criteria for establishing proximity to domestic wells were established by reviewing the City Water System Plan for well locations and areas of private well/water systems. If the study areas were within 1,000 feet of a well they were given a point value. The point range was from 0 to 10 points within these criteria. If a well was within 250 feet it was given a value of 10; if between 250 feet and 1,000 feet, it was given a value of 5.

5. Proximity to High Ground or Surface Water

By reviewing wetland mapping and high groundwater studies, the areas were given point values. High groundwater and surface water areas were considered areas of potential contamination and higher rankings were given if there was the possibility of septic water leaching into the ground or surface waters. The Bonney Lake Wellhead Protection Plan identifies one year time of travel at 1,000 feet for the highest risk well. If high groundwater or surface water was outside of the 1,000 foot setback, no point value was assigned. The point range was from 0 to 10 points within these criteria. If surface water or high ground water was within 250 feet a value of 10 was given; if between 250 feet and 1,000 feet it was given a value of 5.

6. Health Department Concerns

RH2 had a meeting with Ron Howard of TPCHD on April 13, 2012, during which the study areas were discussed as well as any known septic problems. The Cedar View area was identified as an area of concern due to the current small lot sizes. Most of the large lots in Bonney Lake have the ability to shift septic system if problems are incurred. The Cedar View area has small lots and limited the

ability to fix septic problems. A point range was from 0 to 10 points was assigned within these criteria. If the area had TPCHD concerns, it was given a value of 10; otherwise, a value of 0 was given.

7. Topography

Areas of steep slopes have a tendency to create septic challenges. Using Pierce County GIS topography, average slopes were evaluated for each of the septic areas. Areas steeper than 20 percent were given a value of 5, and anything less than 20 percent was given a value of 0. The point range was from 0 to 5 points within these criteria.

8. Downstream Sewer System

The conceptual sewer designs and costs for each area were based on serving only those areas identified in the abatement map. Part of the evaluation process was to determine whether additional downstream sewer system problems existed or if additional infrastructure would be required. If a pump station upgrade was required due to the additional flow or new sewer transmission mains being constructed, a value of 5 was given. The costs of these off-site improvements were not incorporated into the estimated construction costs for each area. The point range was from 0 to 5 points within these criteria.

9. Existing Roadway Condition

Using Bonney Lake's road improvement and overlay program for the past several years, we were able to identify roadway conditions. A site visit and discussions with the City also helped determine the ages and conditions of the study area roads. Relatively new roadways (built within the last 10 years) were assigned a lower point value. The point range was from 0 to 10 points within these criteria. Roadways older than 20 years or in poor condition were given a value of 10 points. Moderately old (10 to 20 years) were given a point value of 5.

10. Future Improvements Planned

By reviewing the City's Water Line Replacement Program and Roadway Improvement Plan, we were able to identify areas that may require utility or roadway improvements within the next several years. If a septic area was slated to receive future improvements, it was given a point value of 10. By combining septic abatement with future improvements, the project funding could be stretched. The point range was from 0 to 10 points within these criteria.

Conclusion

After reviewing the septic abatement matrix and ranking all the criteria, a priority list was created for each of the areas. The ranking for the areas are as follows.

Area Rankings			
	NAME	AREA	TOTAL POINTS
1.	80 th Street Court East	A	68
2.	181 st Avenue East	B	56
3.	Cedar View (NE)	C2	51
4.	192 nd Avenue East (N)	F	46
5.	Cedar View (W)	C3	41
6.	Cedar View (E)	C4	41
7.	Cedar Grove	E	40
8.	204 th Avenue East	I	38
9.	Cedar View (S)	C5	36
10.	62 nd Street East	D	35
11.	190 th /192 nd Avenue East	G	28
12.	Cedar View (NW)	C1	28
13.	192 nd Avenue East (S)	H	26

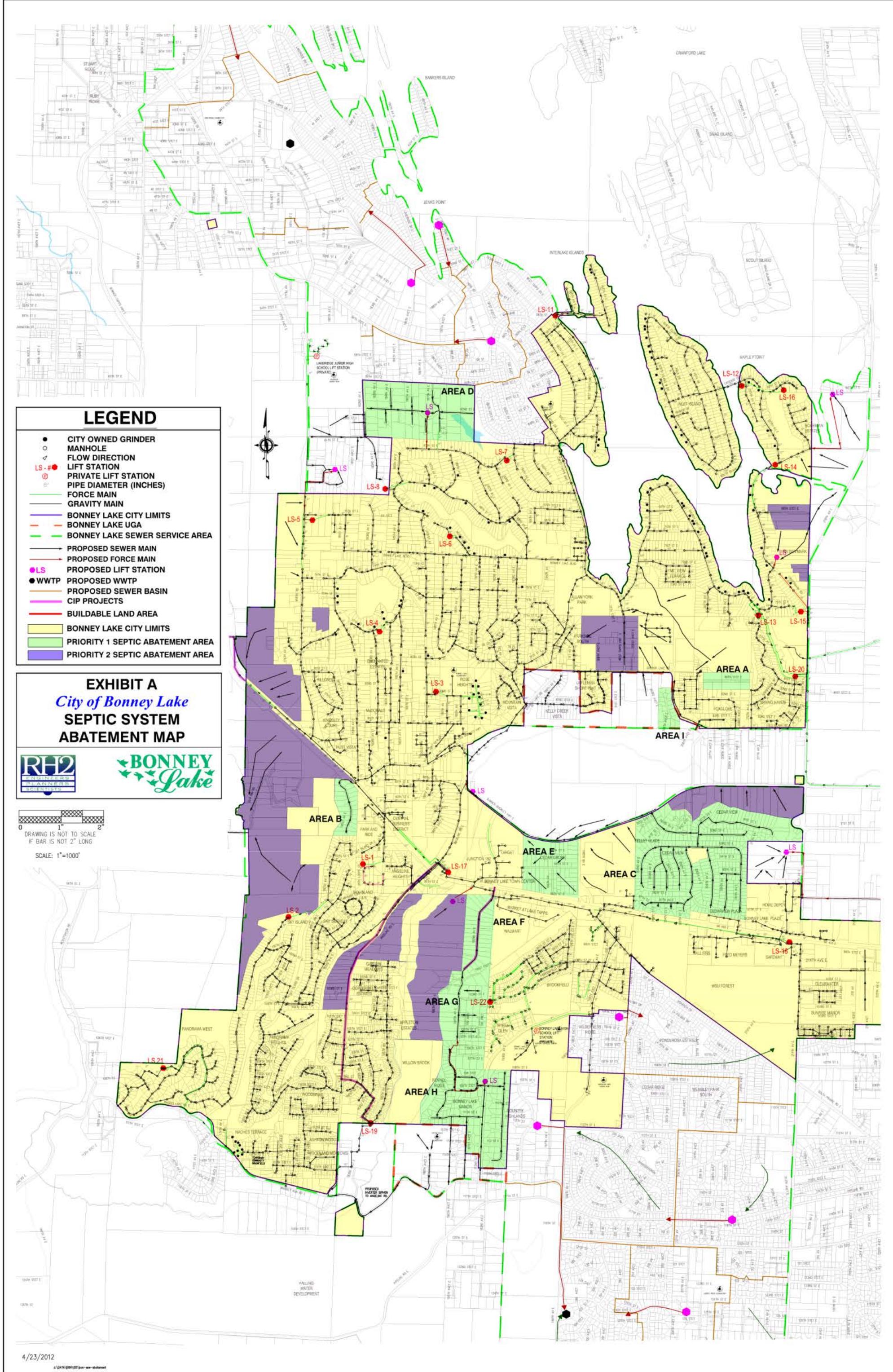
The creation of a ULID, obtaining Public Works Trust Funds, and setting aside money from the City's General Fund are all ways to help finance the above projects. The City will need to develop a formal policy document to help achieve septic abatement.

Exhibits

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**Exhibit A –
Sewer System Abatement Map**

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**Exhibit B –
Prioritization Ranking Matrix**

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Exhibit B

City of Bonney Lake

Septic System Abatement Plan

Prioritization Ranking Matrix

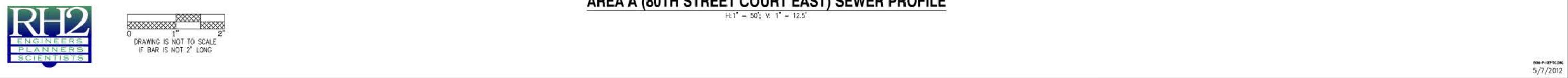
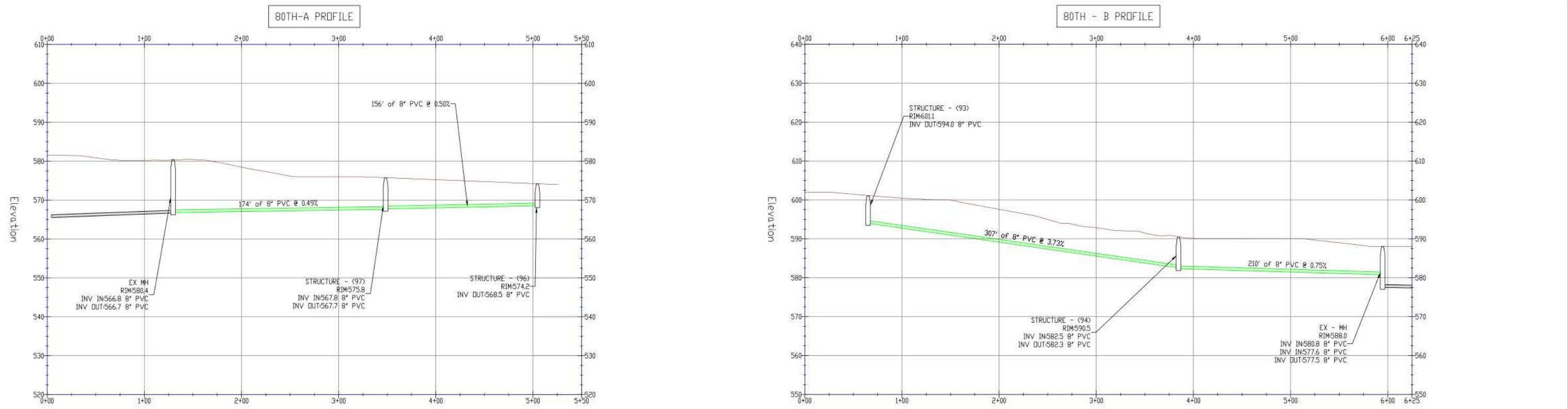
(highest score = highest priority)

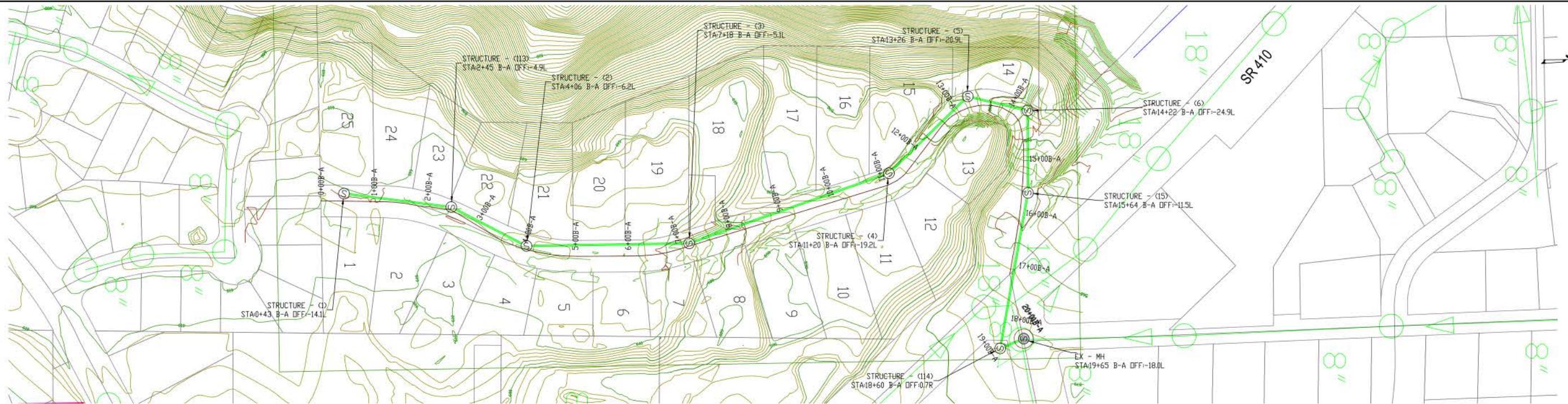
CRITERIA	POINTS	A	B	C1	C2	C3	C4	C5	D	E	F	G	H	I	
Construction Costs															
Over \$3,000,000	0													0	
\$2,000,000 to \$3,000,000	5					5	5		5				5		
\$1,000,000 to \$2,000,000	10			10	10			10		10	10				
Under \$1,000,000	20	20	20											20	
Age of Septic Systems															
Installed after 1990	0			0					0			0	0	0	
Installed 1980 to 1990	5		5			5	5	5							
Installed before 1980	10		10		10					10	10				
Soil Type															
Type 1, 2	0									0					
Type 3	3	3		3								3		3	
Type 4	6		6		6	6	6	6			6		6		
Type 5, 6	10								10						
Proximity to Domestic Well															
Greater than 1,000 feet	0			0	0	0	0	0	0	0	0	0	0	0	
Between 250 feet to 1,000 feet	5														
Less than 250 feet	10	10	10												
Proximity to High Ground or Surface Water															
Greater than 1,000 feet	0		0	0	0	0	0	0		0	0	0	0	0	
Between 250 feet to 1,000 feet	5		5						5						
Less than 250 feet	10														
Health Department Concern															
No	0	0	0						0		0	0	0	0	
Yes	10			10	10	10	10	10		10					
Topography															
Less than 20%	0	0		0	0	0	0	0		0	0	0	0	0	
Steeper than 20%	5		5						5						
Downstream Sewer System															
Improvements required	0			0	0	0	0	0		0					
No improvements required	5	5	5						5		5	5	5	5	
Existing Roadway Condition															
Relatively new (last 10 years)	0		0											0	
Moderately old (10 to 20 years)	5			5	5	5	5	5			5	5	5		
Old or in poor condition	10	10								10					
Future Improvements Planned															
No	0		0	0					0	0	0			0	
Yes	10	10			10	10	10				10	10	10	10	
TOTAL SCORE			68	56	28	51	41	41	36	35	40	46	28	26	38
PRIORITY RANKING			1	2	12	3	5	6	9	10	7	4	11	13	8

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**Exhibit C –
Sewer Plans and Profiles**

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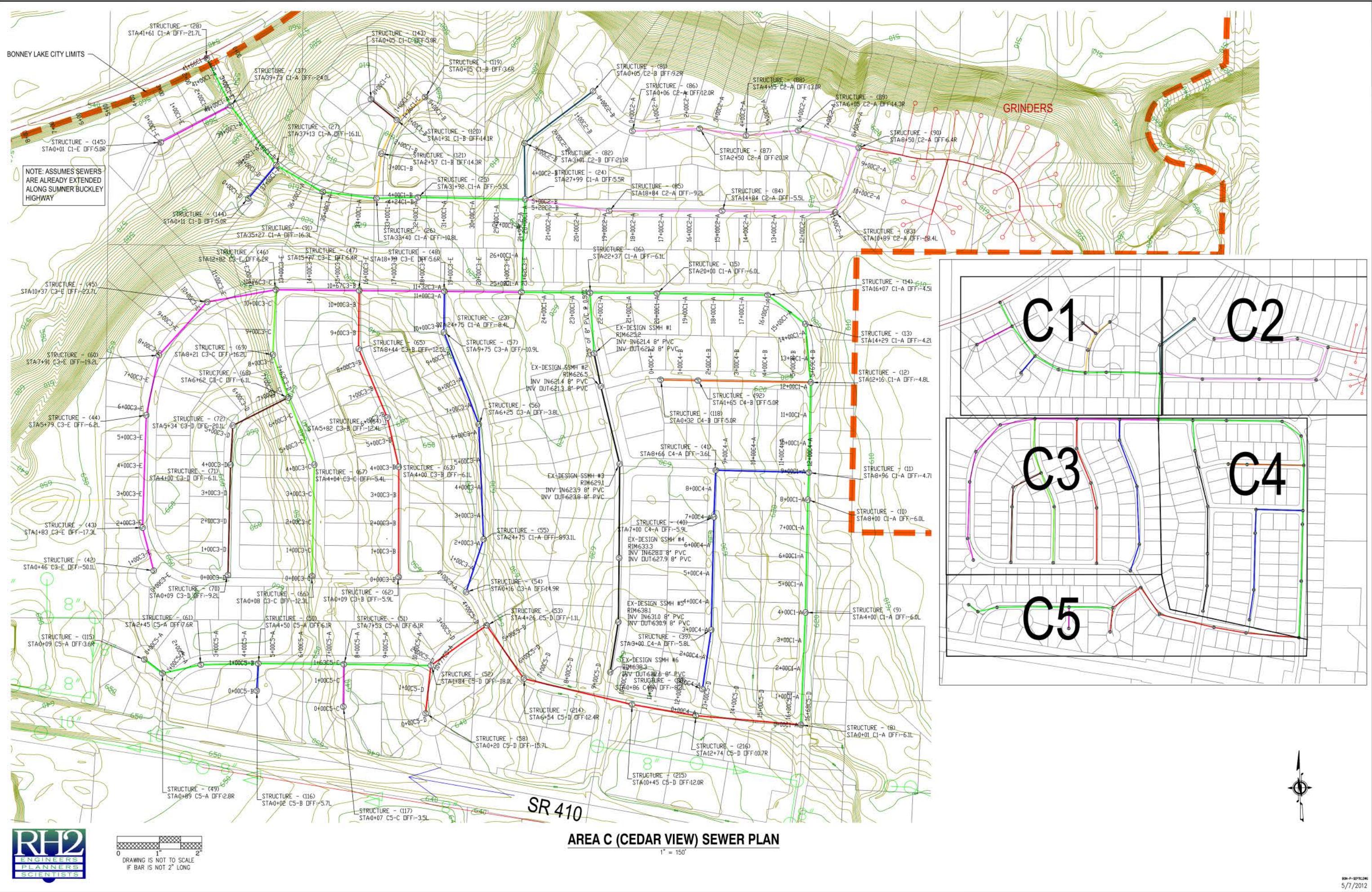


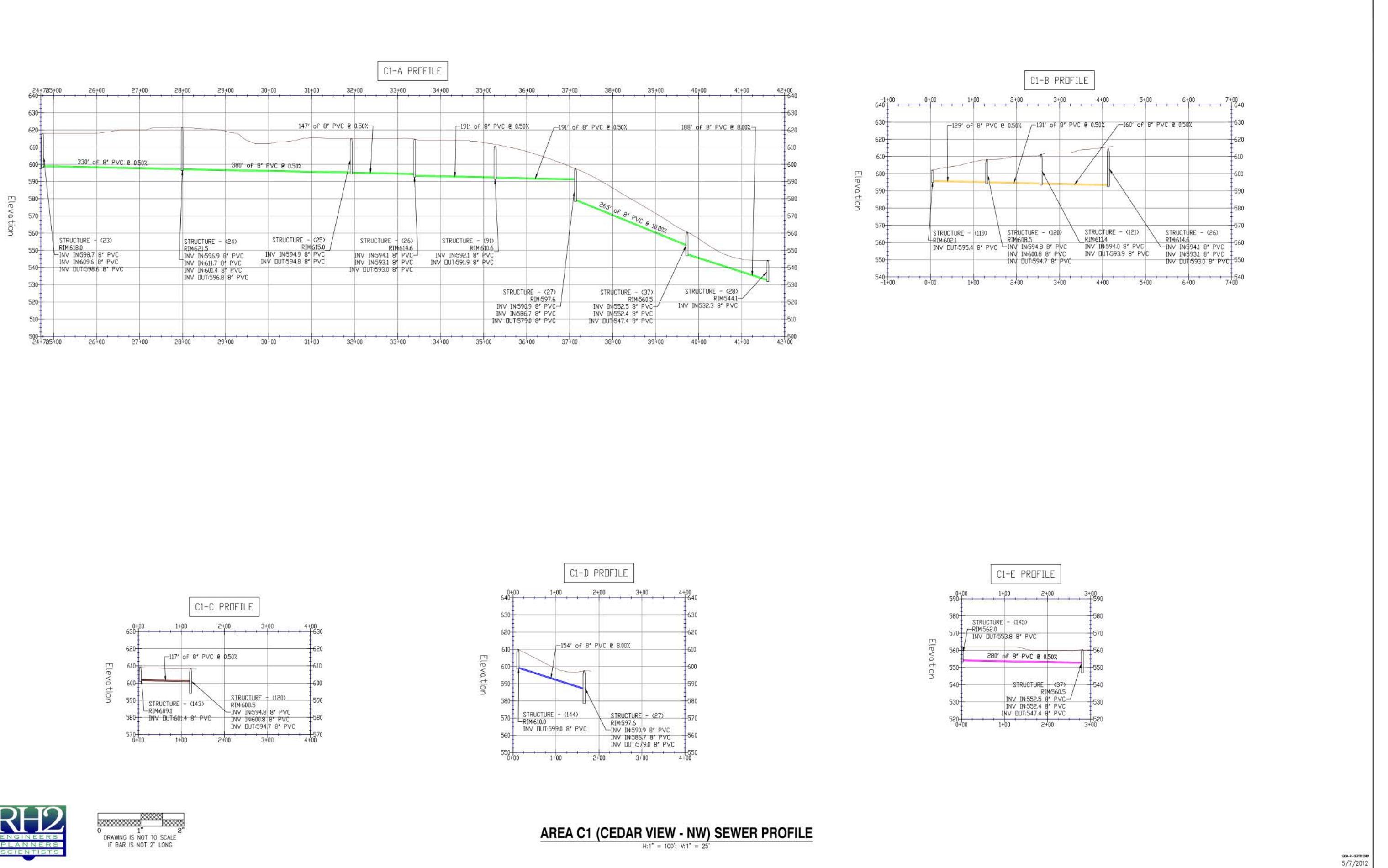
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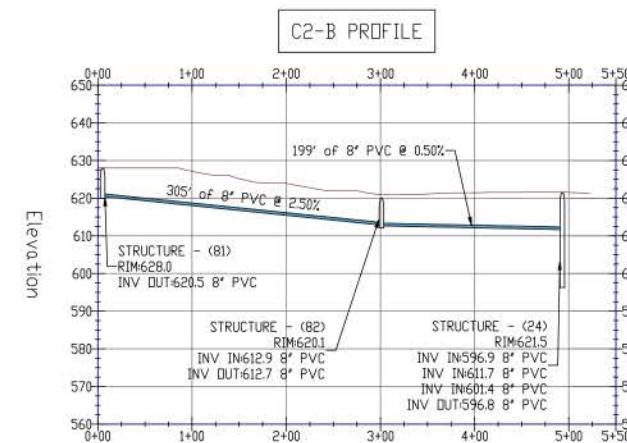
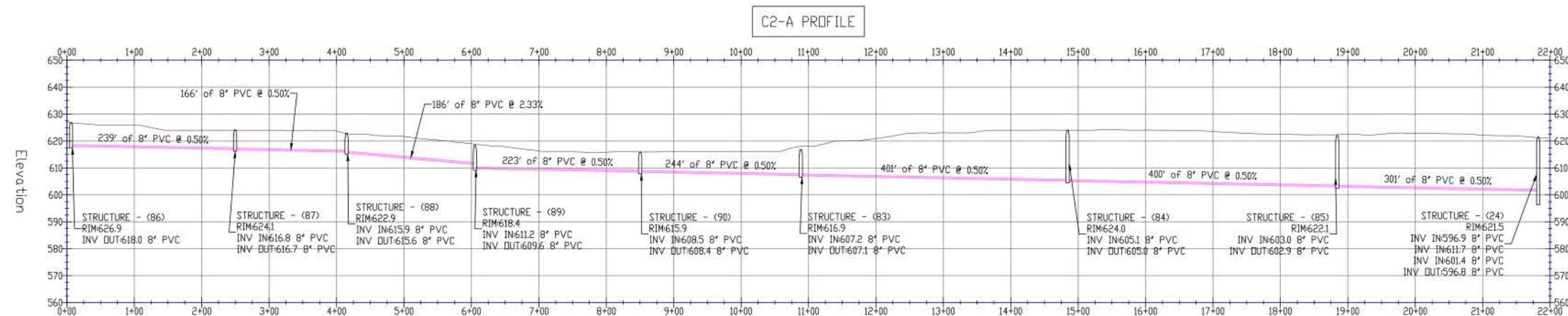


AREA B (181ST AVE) SEWER PROFILE

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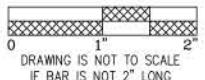




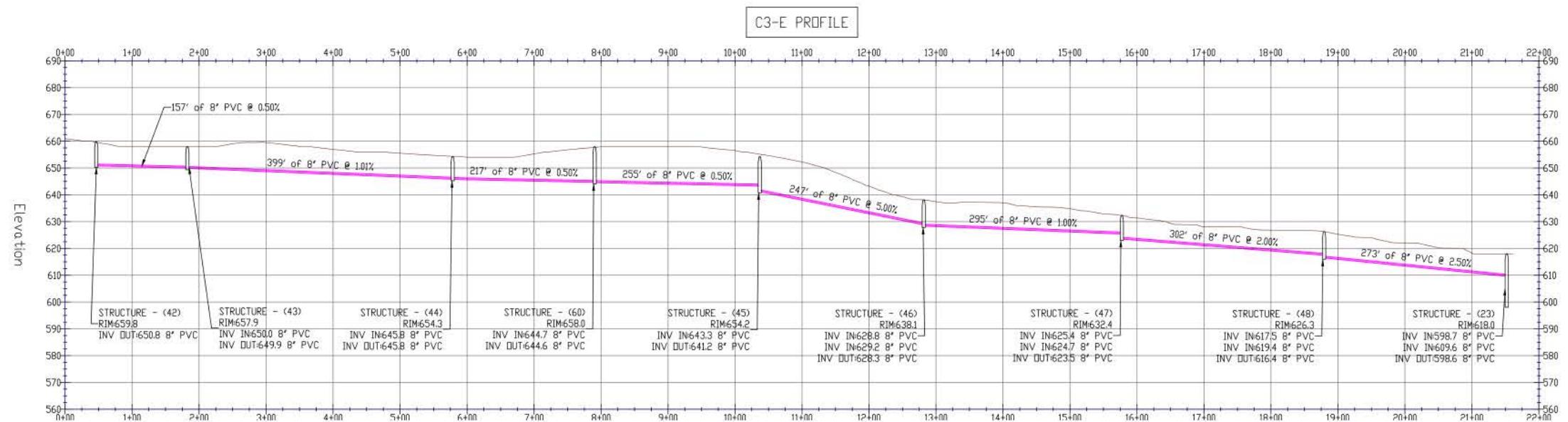
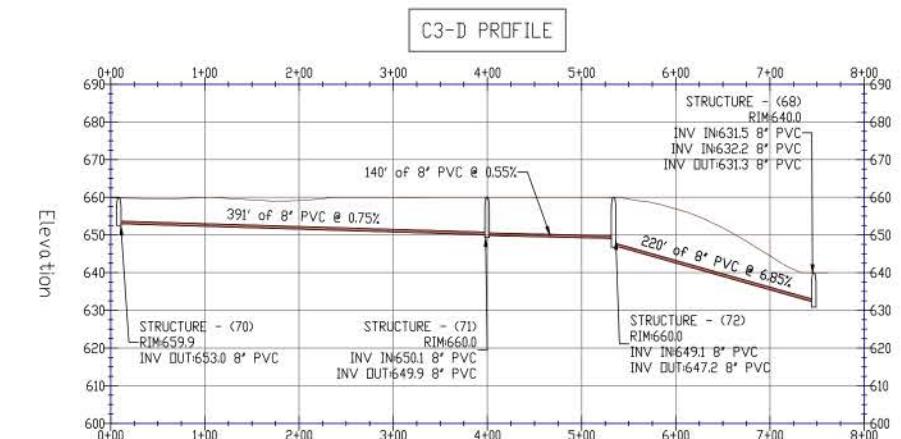
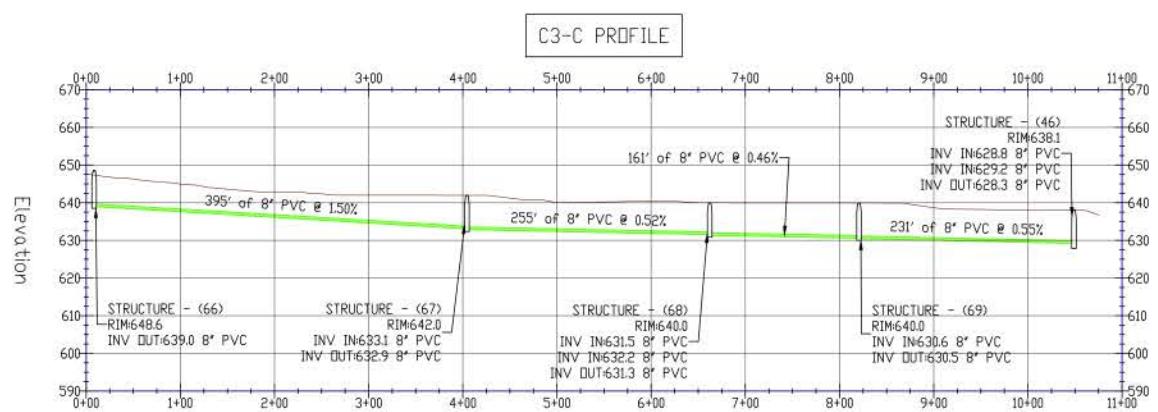
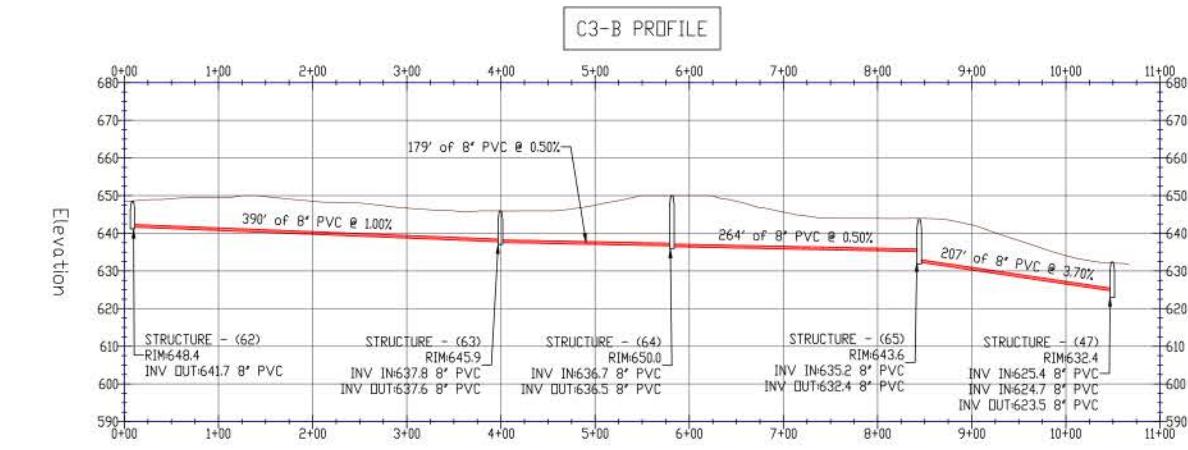
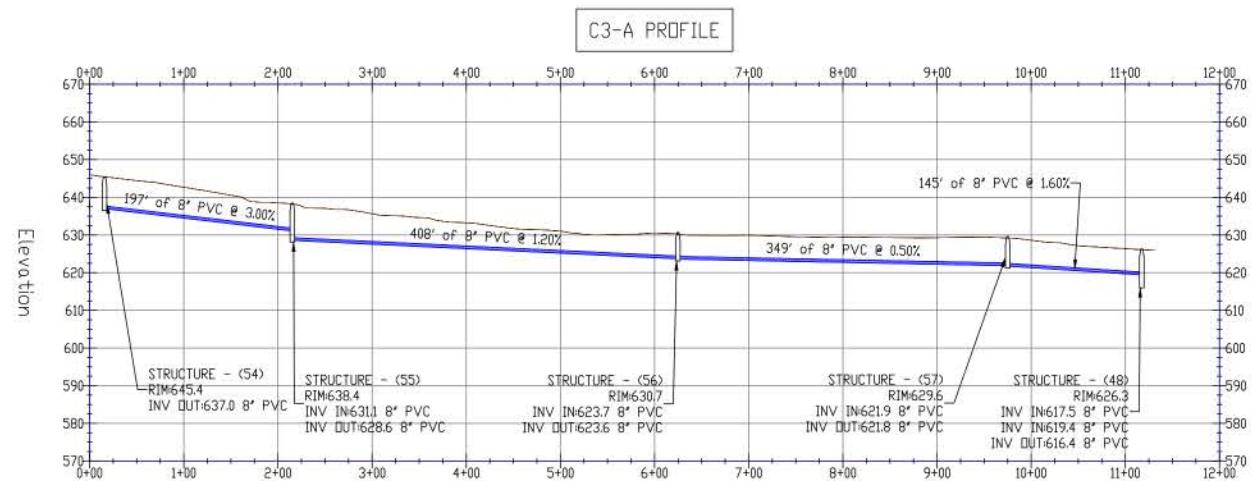


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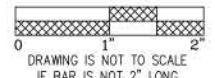


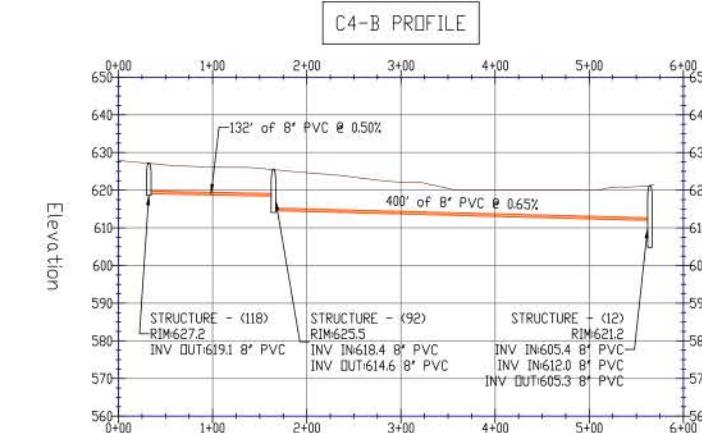
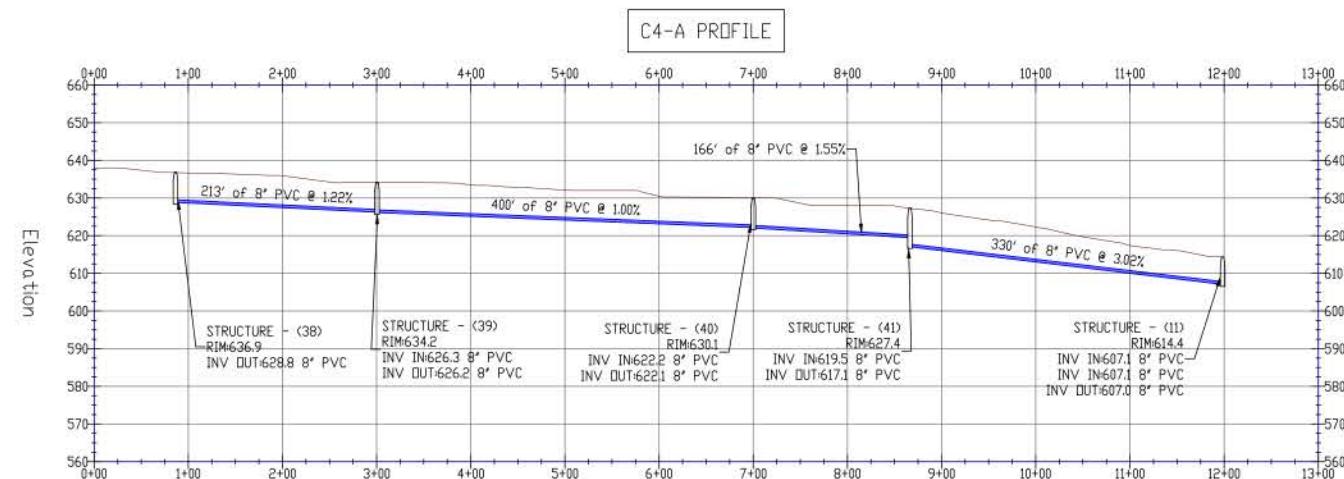
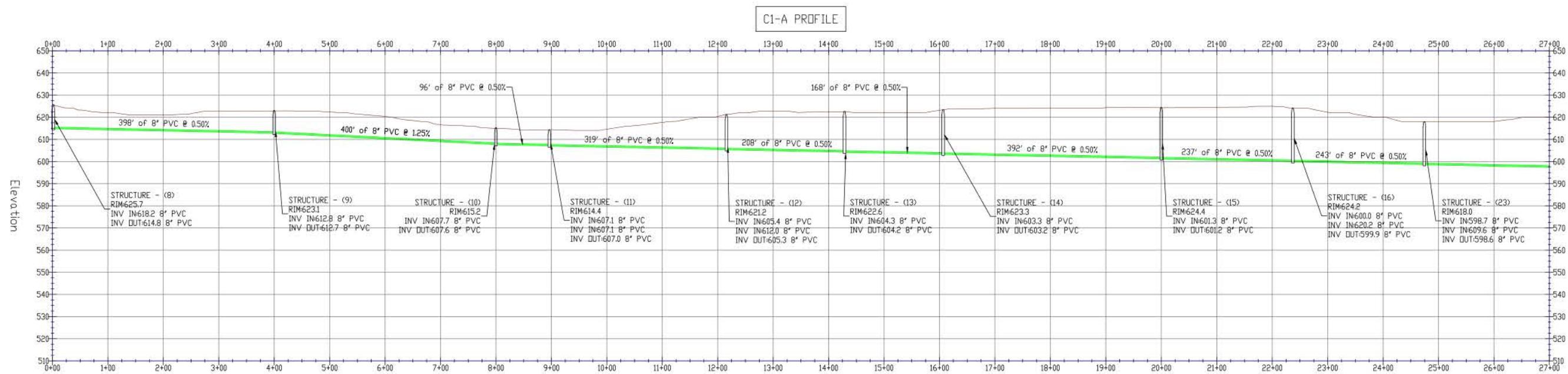
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IF BAR IS NOT 2" LONG



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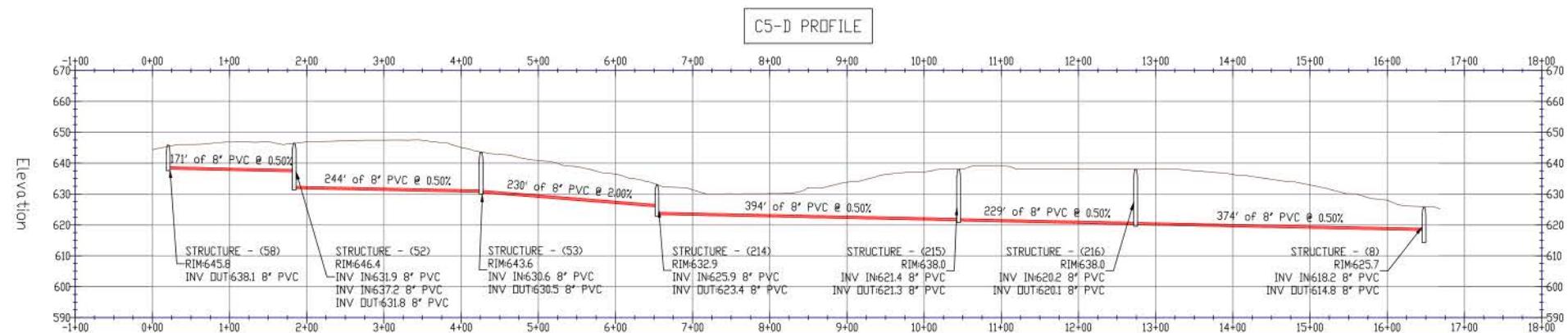
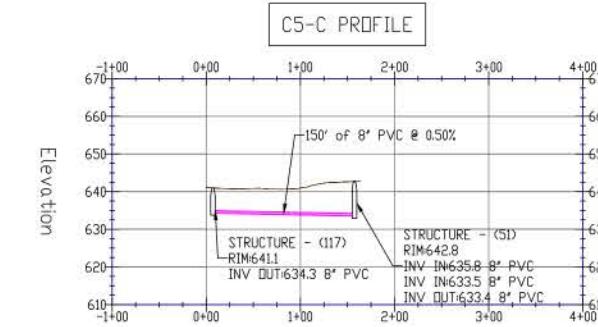
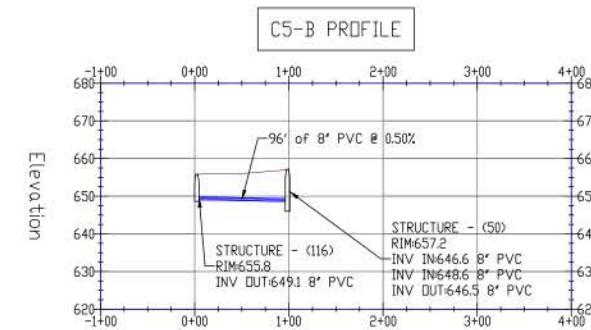
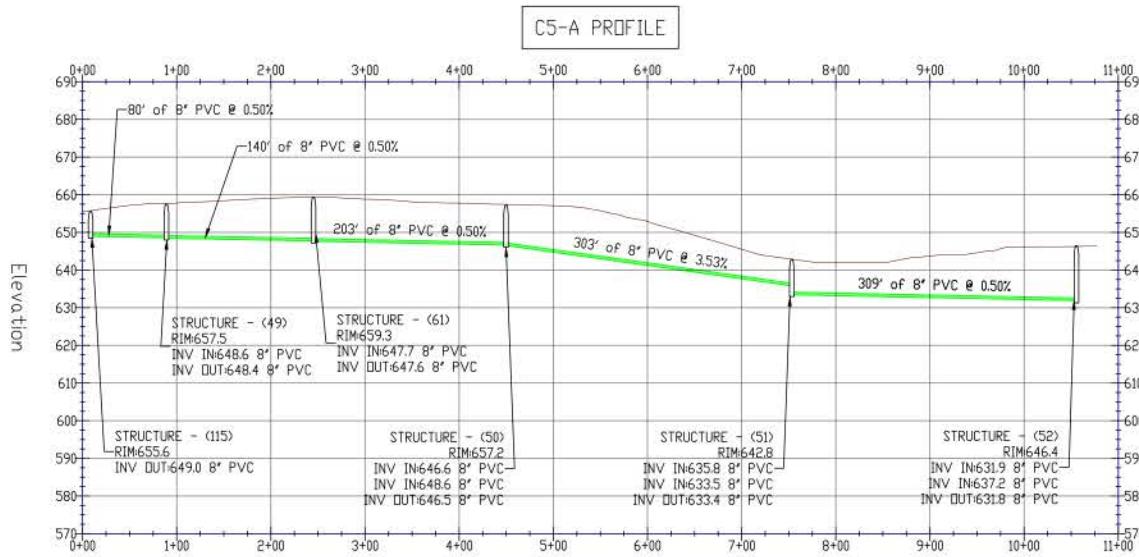
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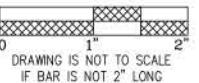
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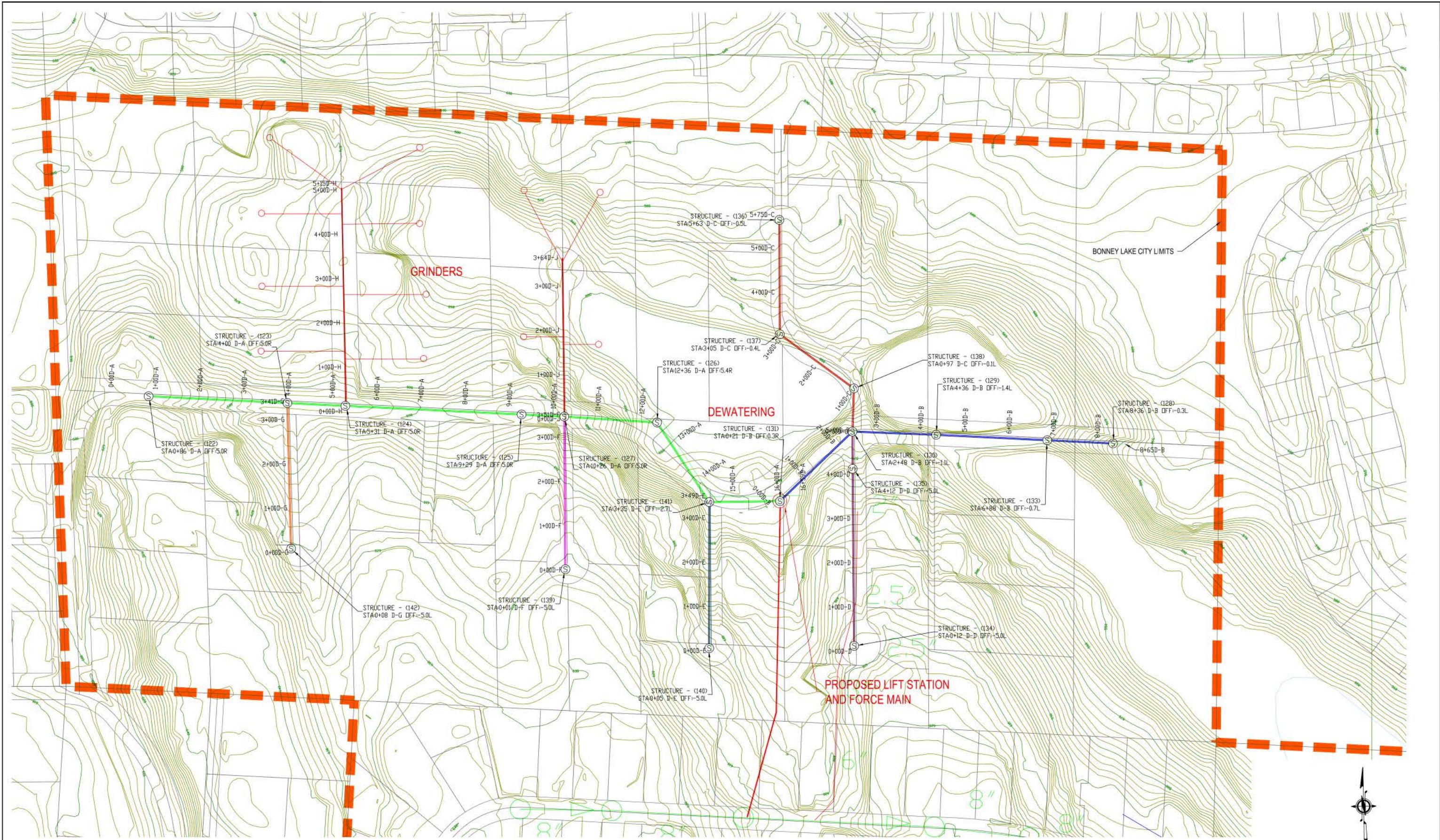
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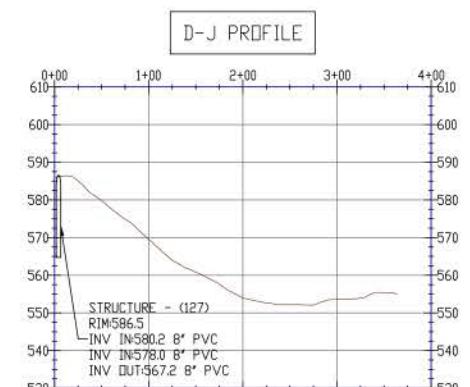
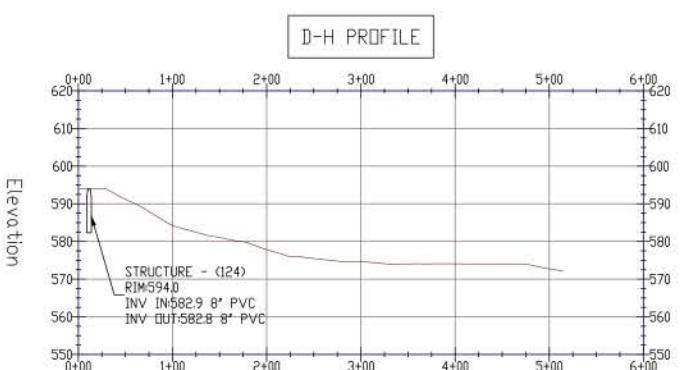
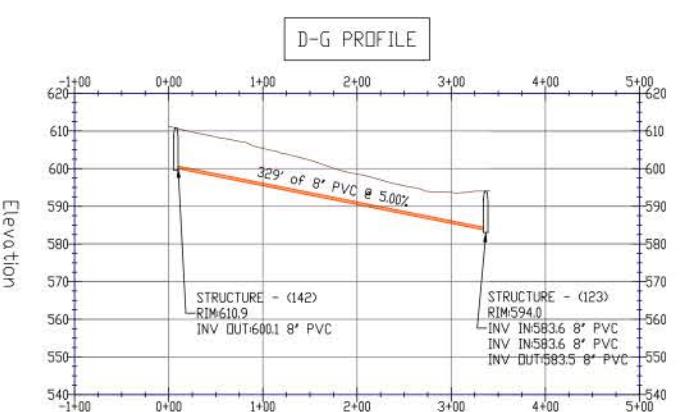
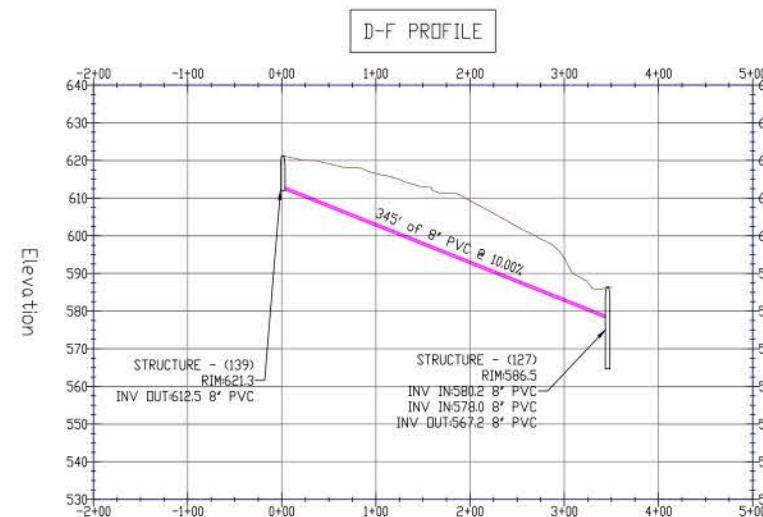
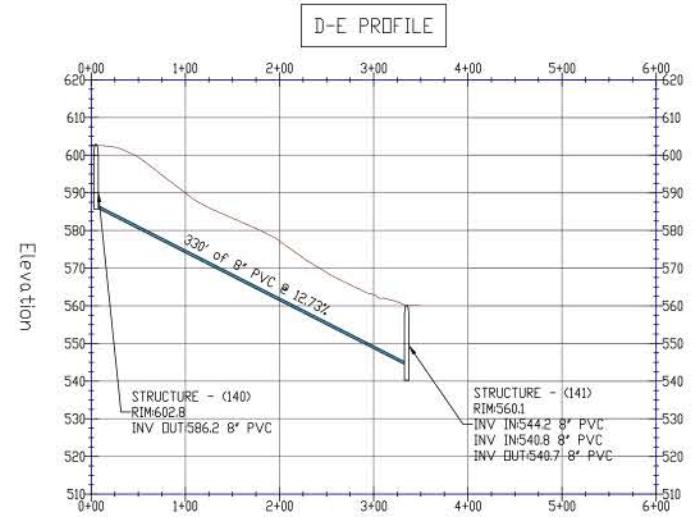
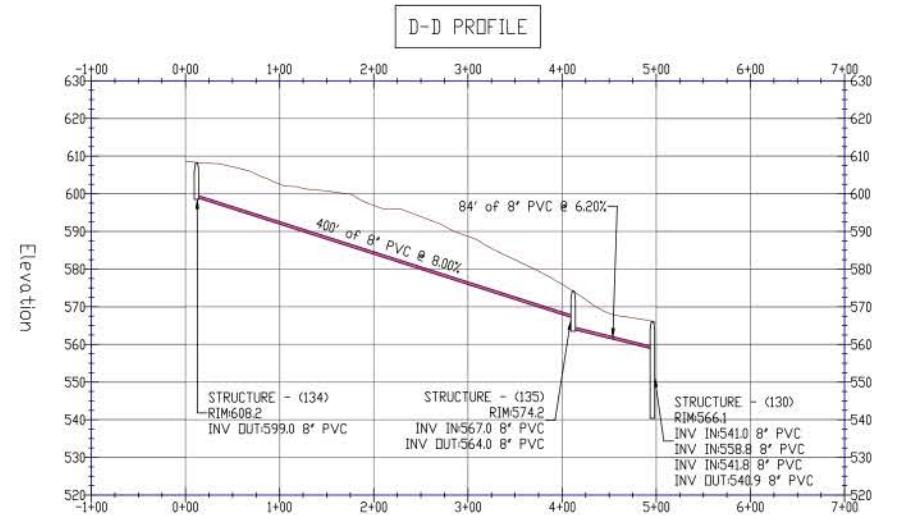
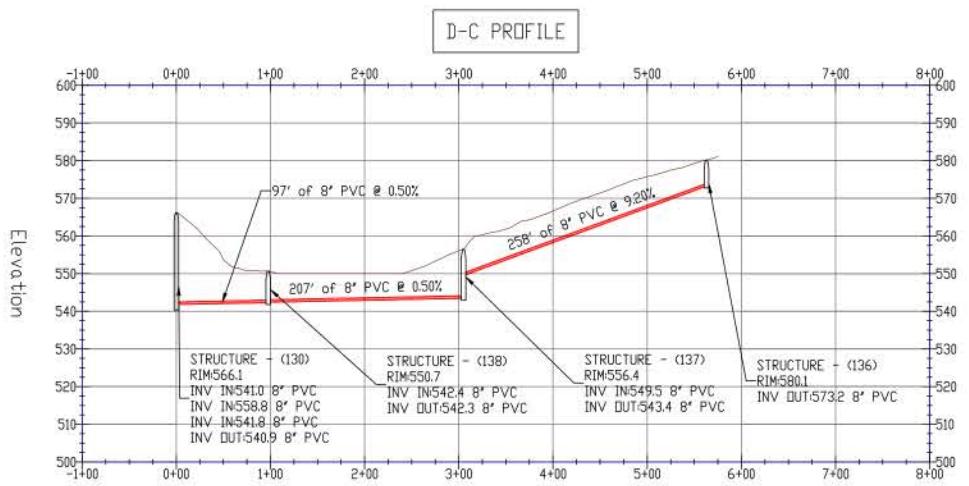
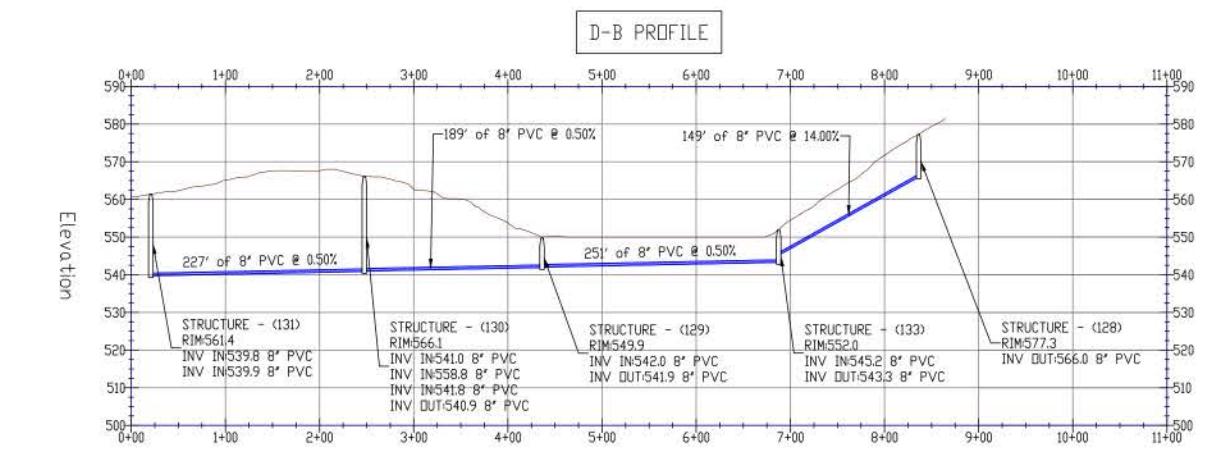
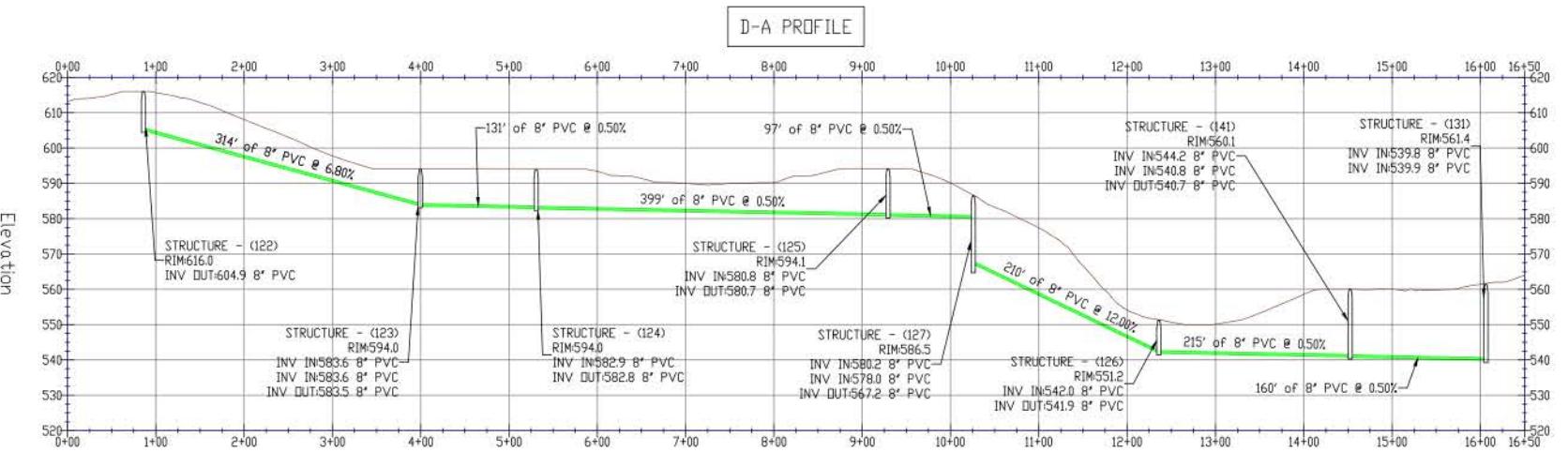
AREA C5 (CEDAR VIEW - S) SEWER PROFILE

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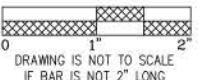


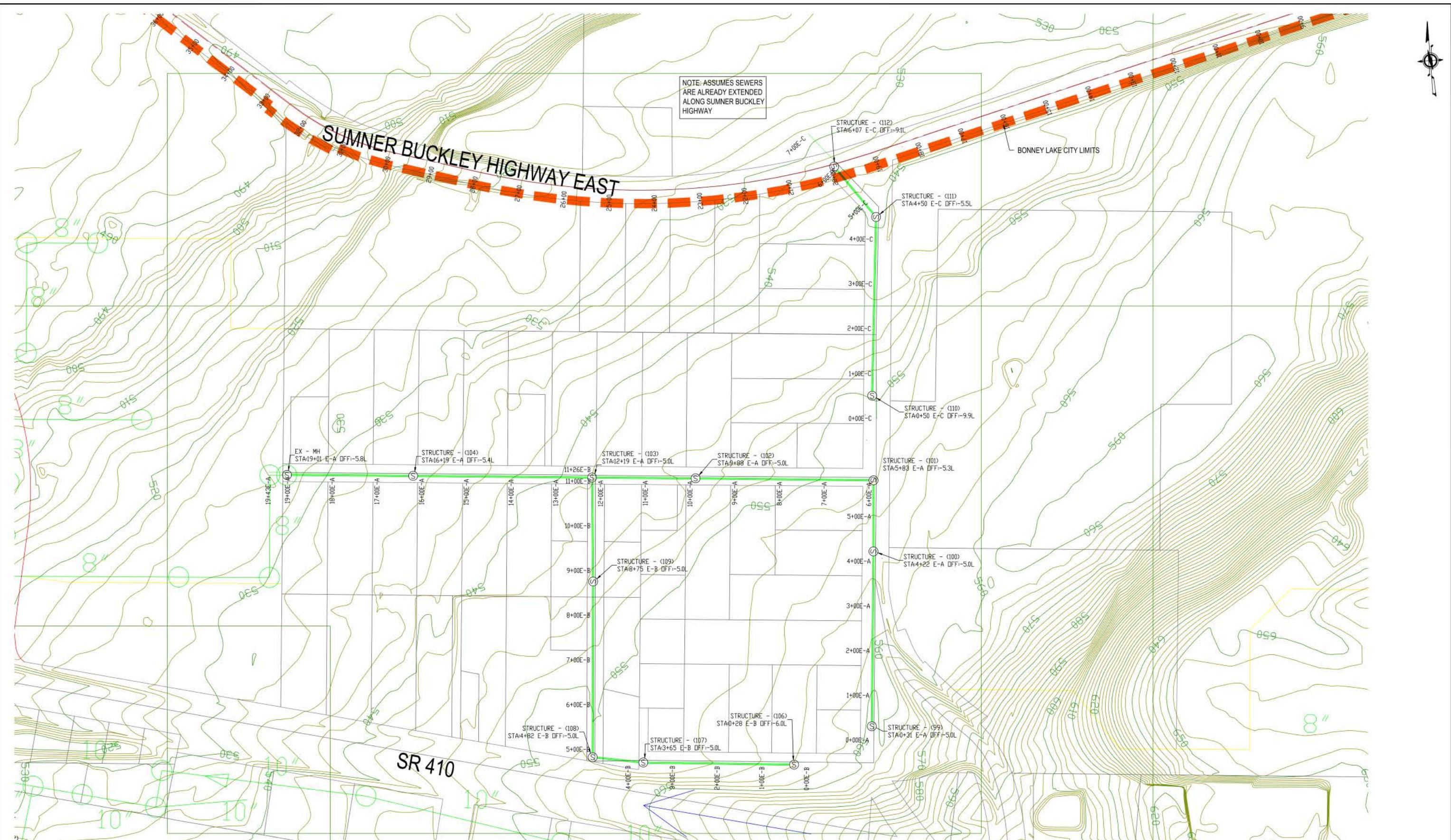
AREA D (62ND STREET EAST) SEWER PLAN

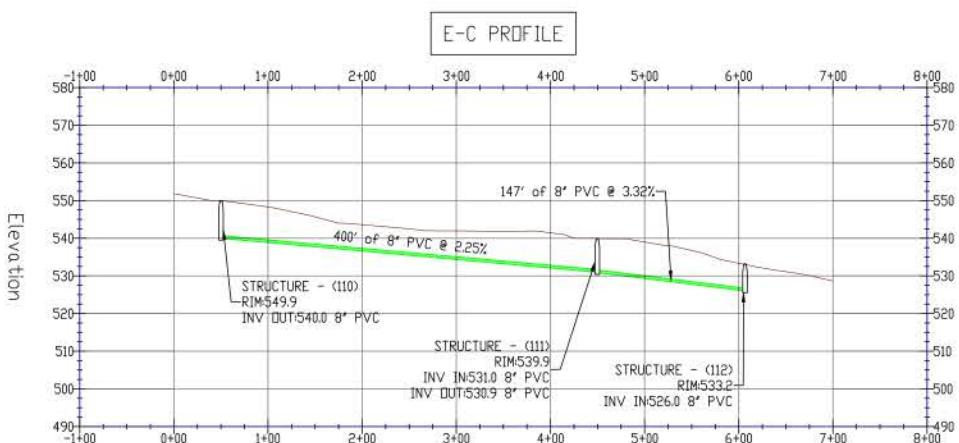
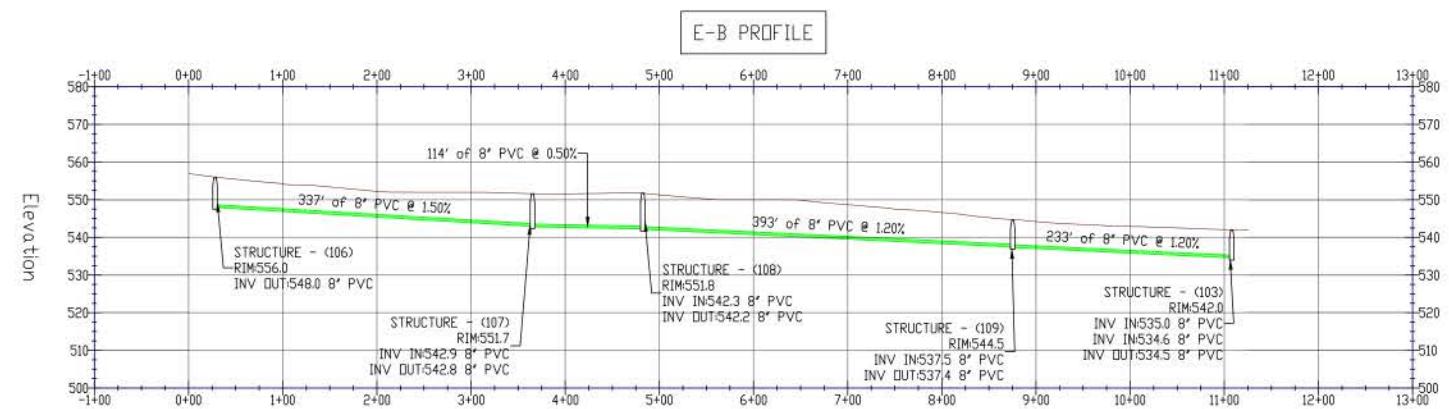
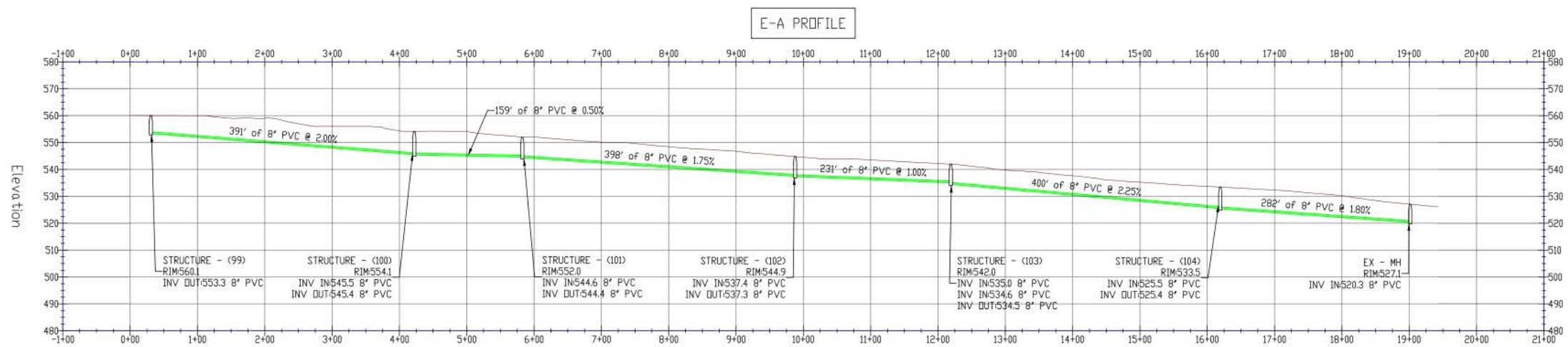


AREA D (62ND STREET EAST) PROFILE

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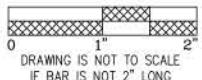




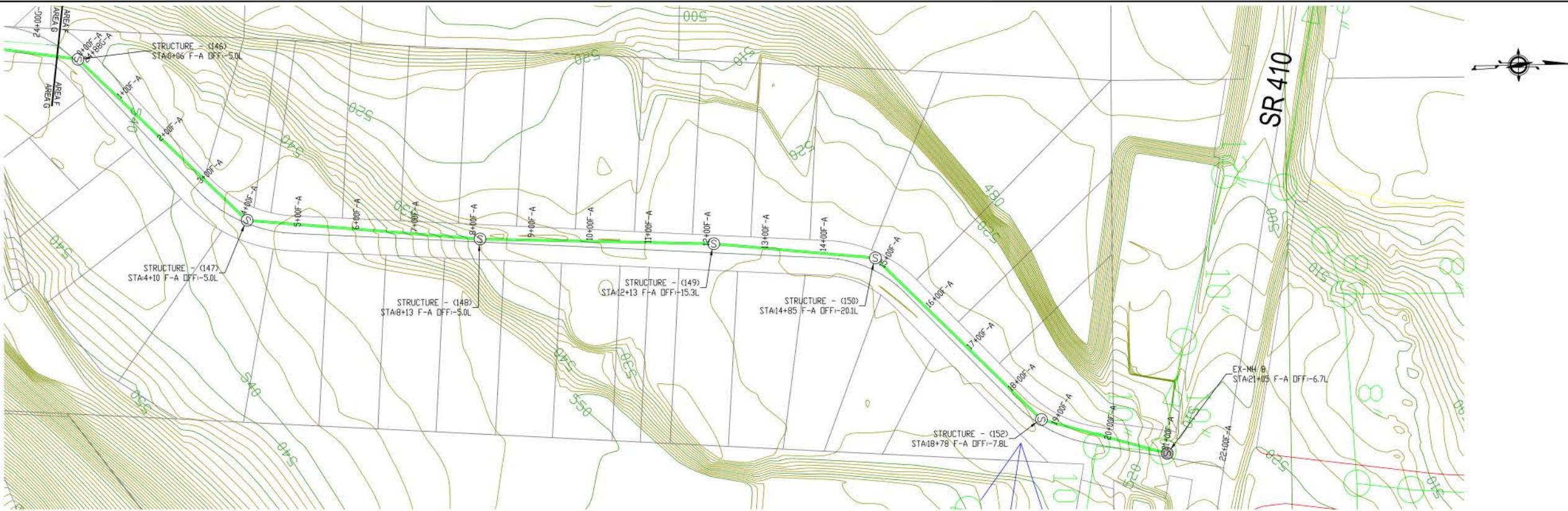


**AREA E (CEDAR GROVE)
SEWER PROFILE**

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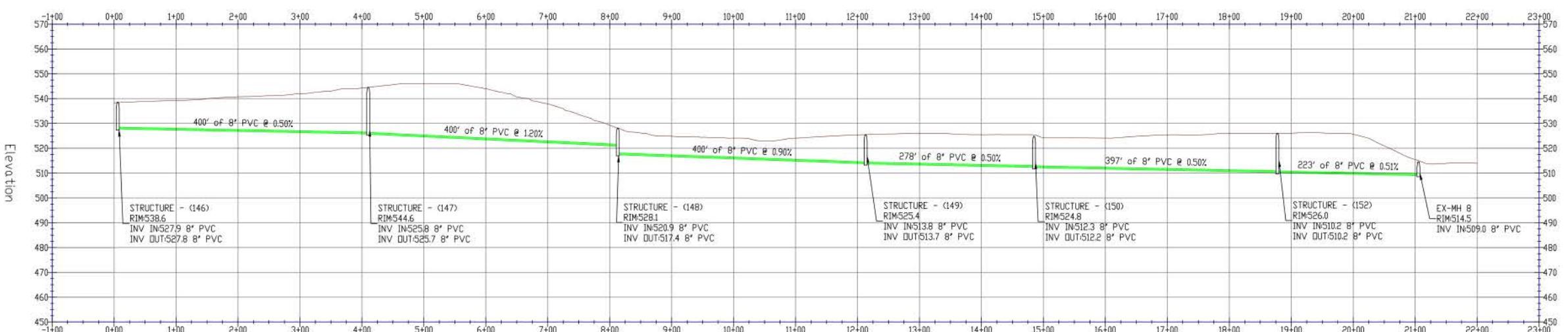


DRAWING IS NOT TO SCALE
IF BAR IS NOT 2" LONG



AREA F (192ND - N) SEWER PLAN

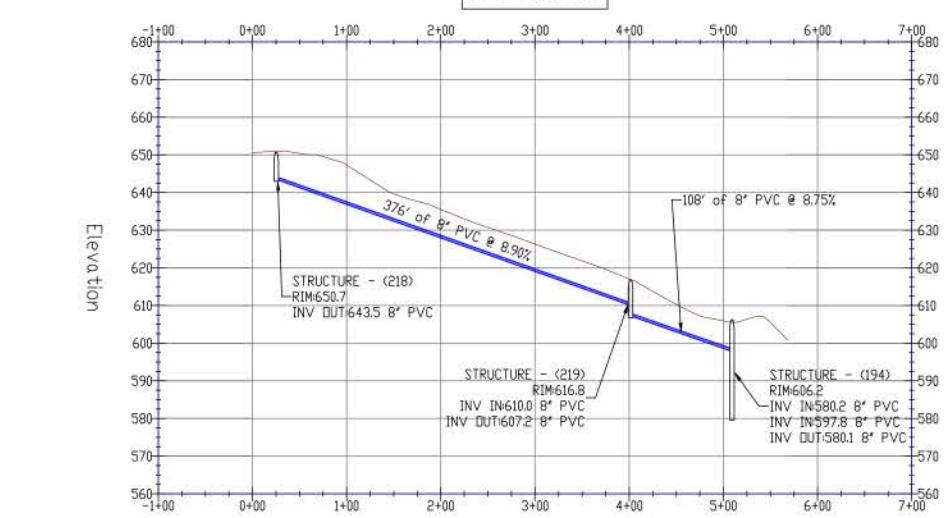
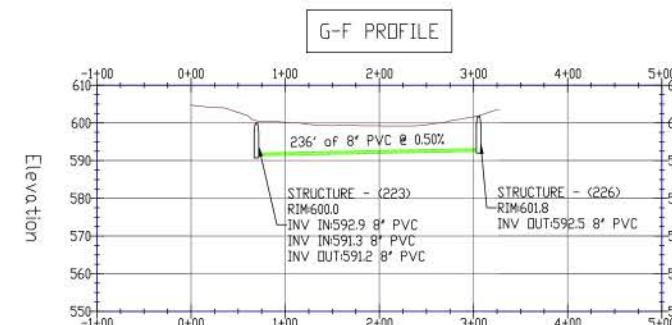
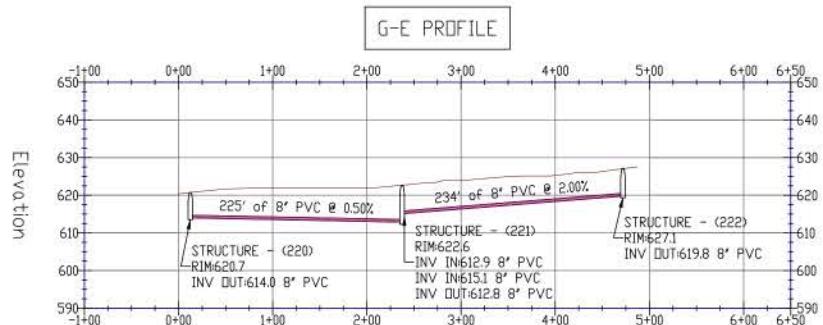
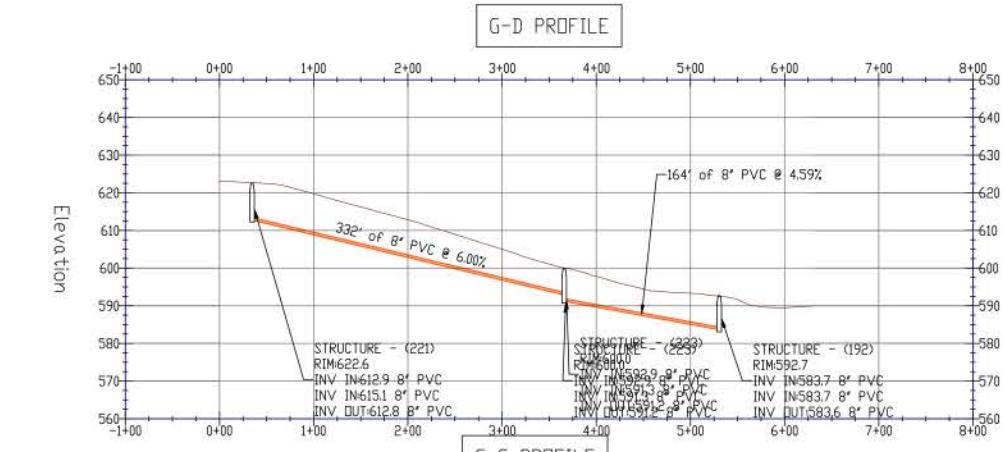
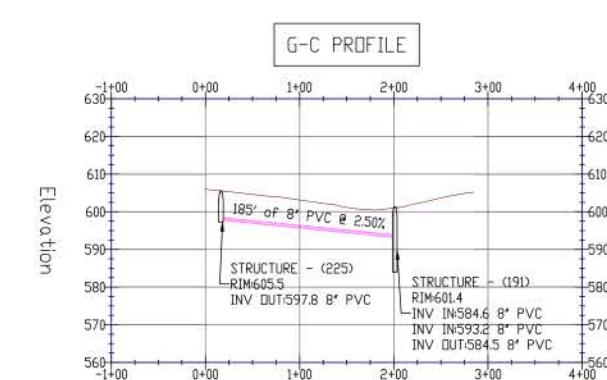
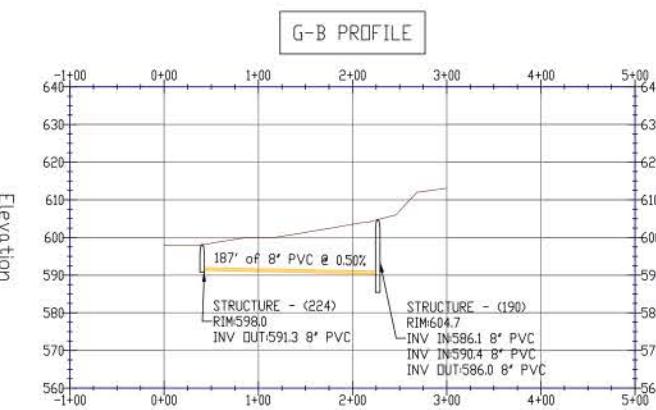
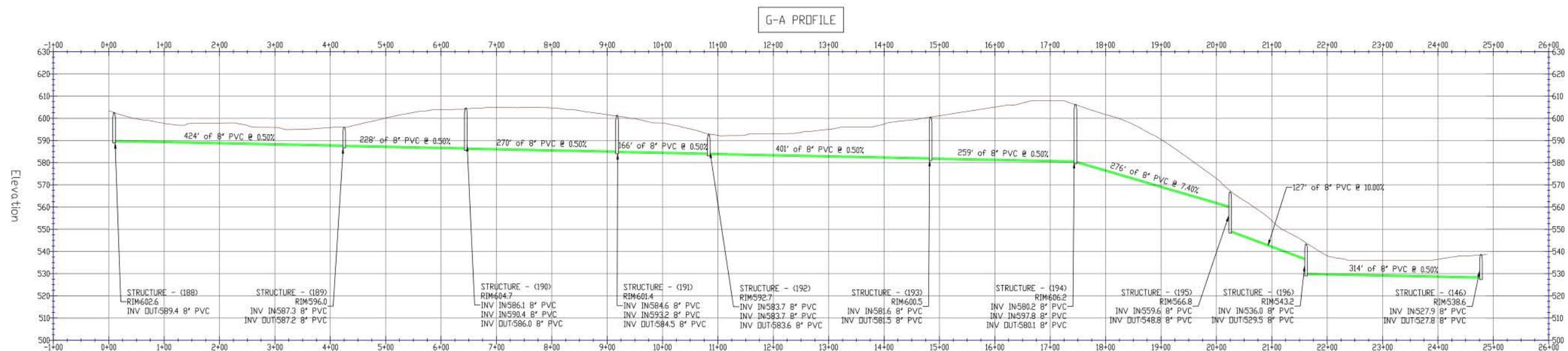
1" = 100'



AREA F (192ND - N) SEWER PROFILE

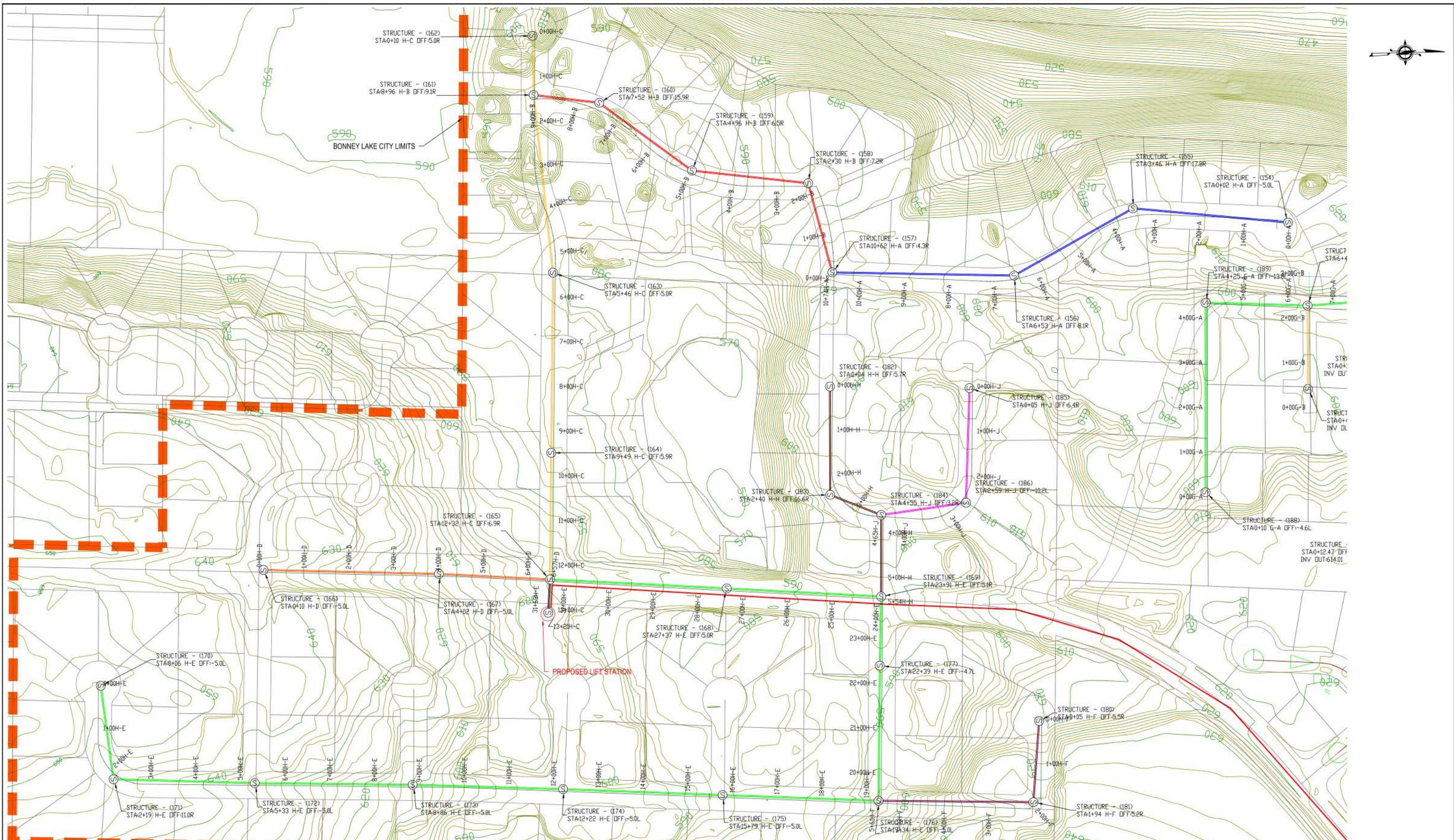
H: 1" = 100'; V: 1" = 25'





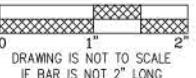
AREA G (190th/ 192nd) SEWER PROFILE

H:1" = 100'; V:1" = 25'



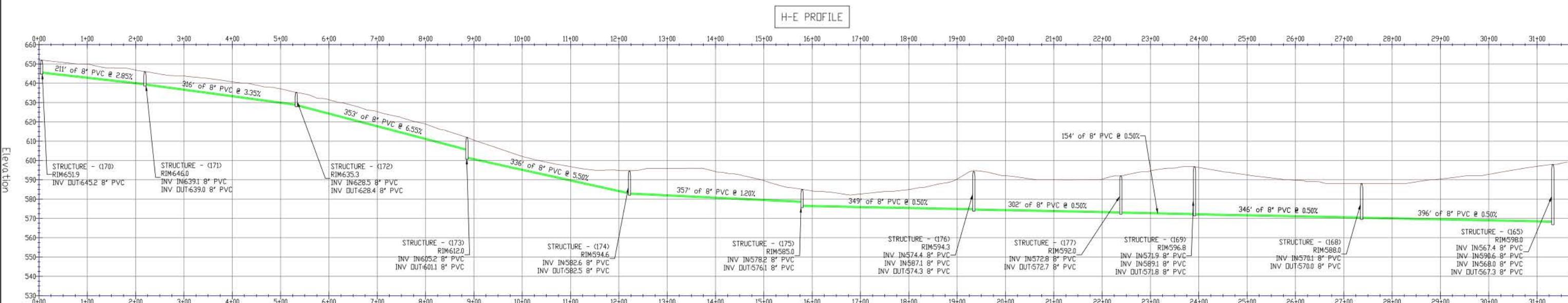
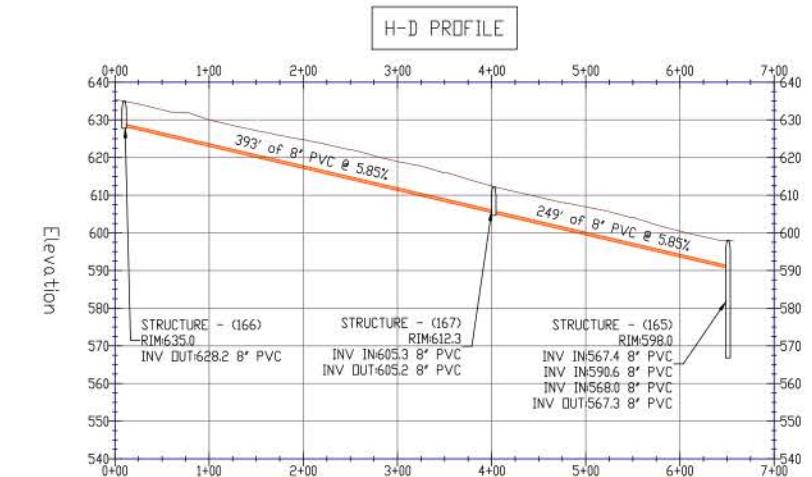
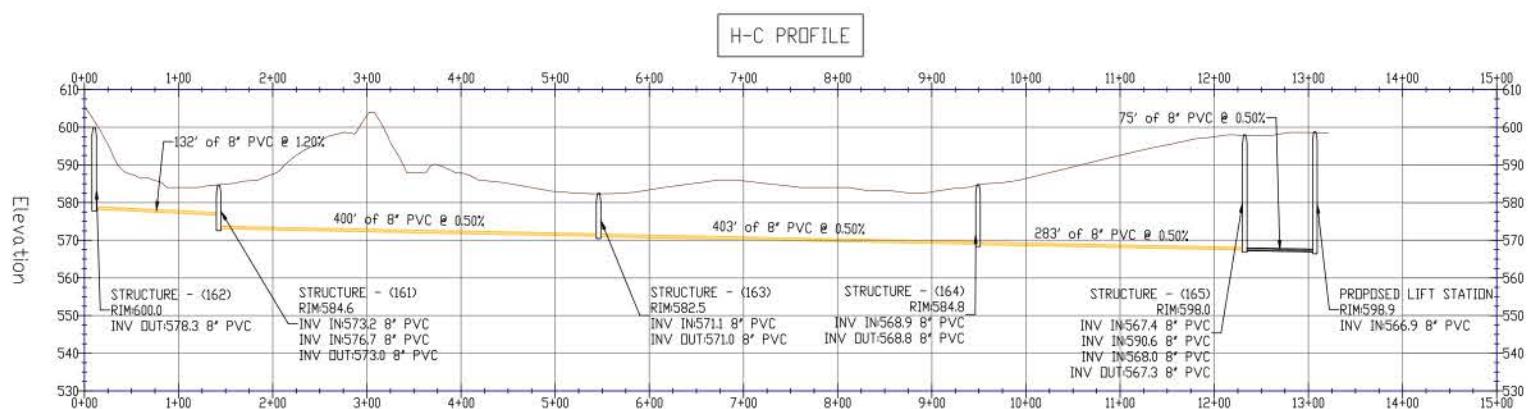
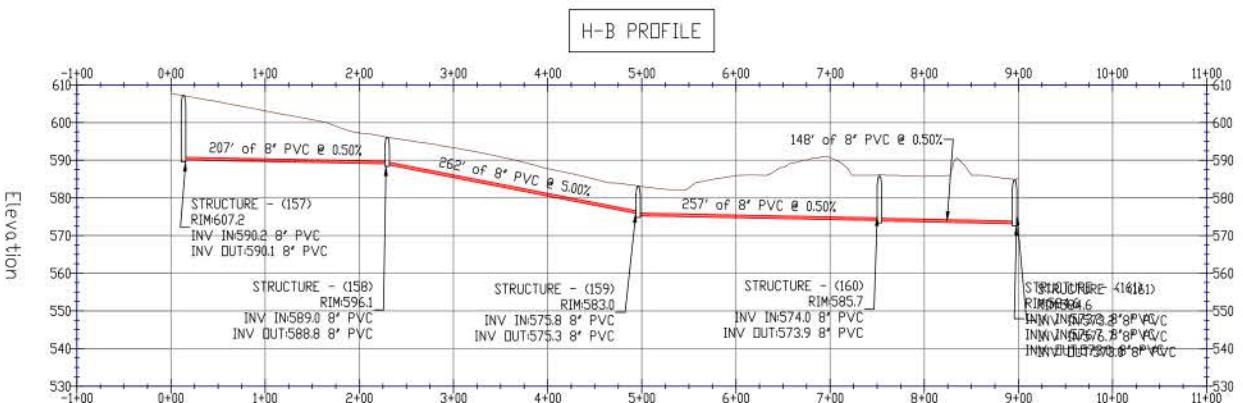
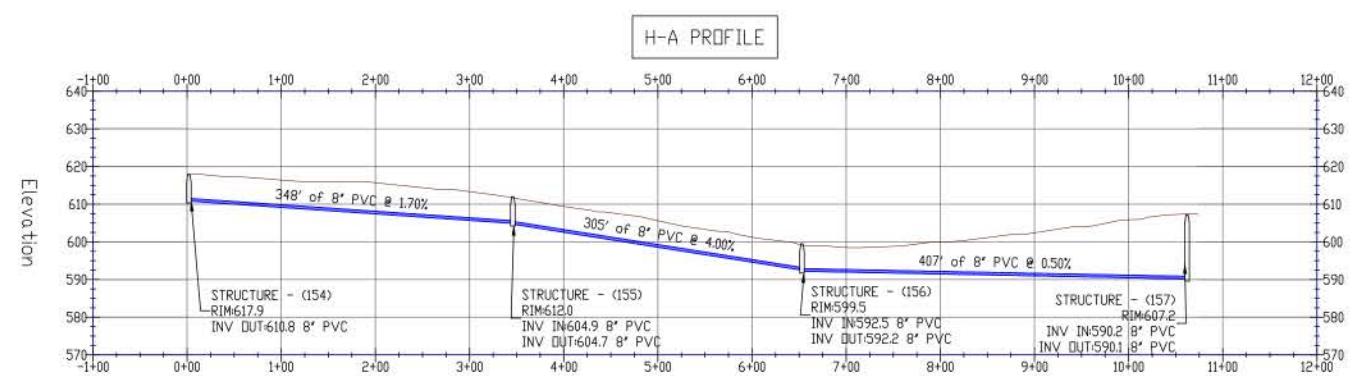
AREA H (192nd - S) SEWER PLANS

1^{*} = 100



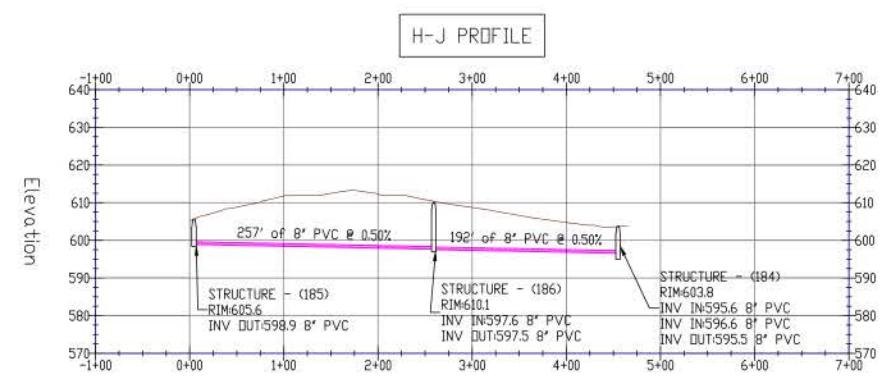
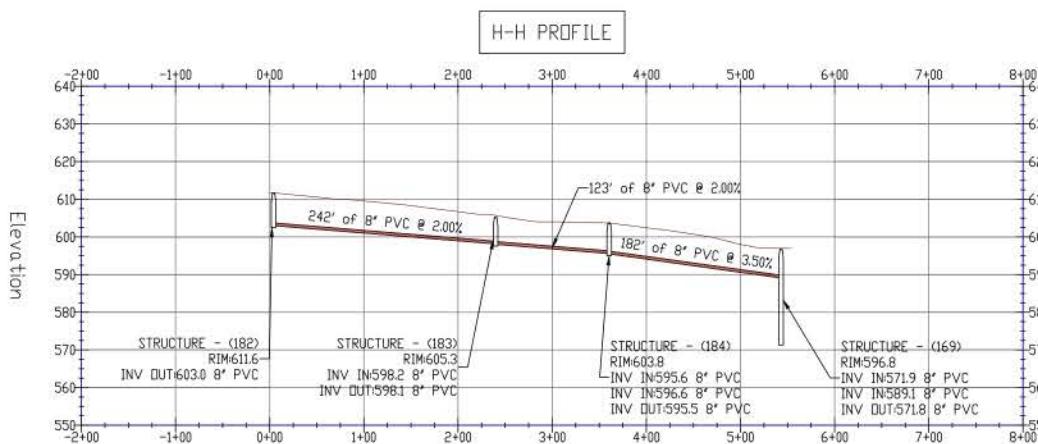
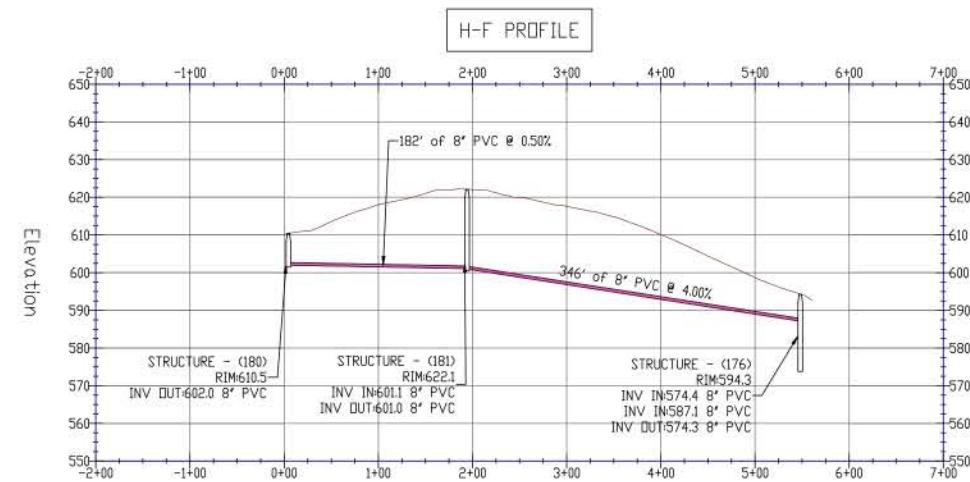
DRAWING IS NOT TO SCALE
IF BAR IS NOT 2" LONG





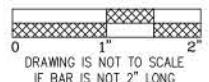
AREA H (192nd - S) SEWER PROFILE

H:1" = 100'; V:1" = 25'

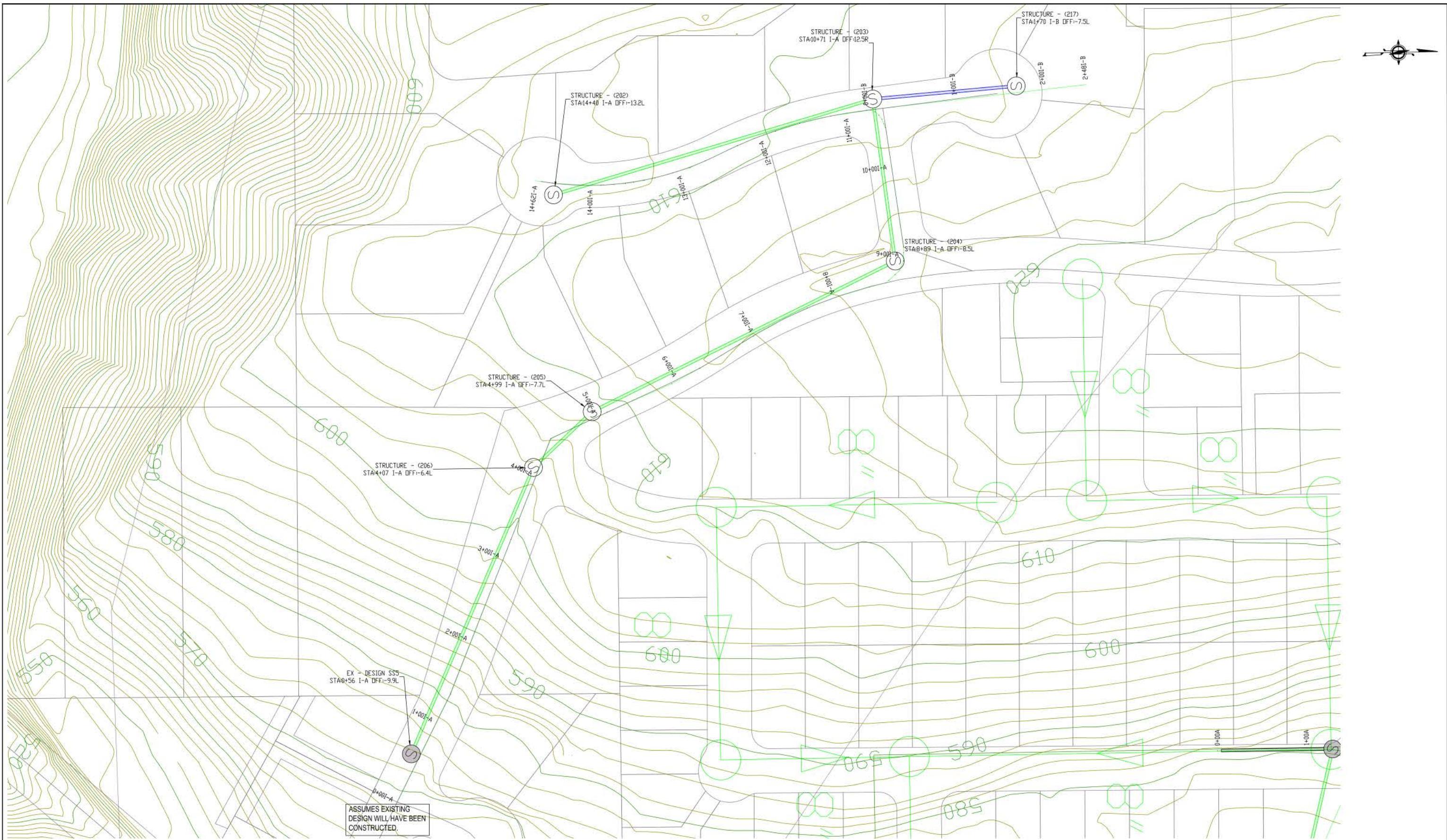


AREA H (192ns - S) SEWER PROFILE

H:1" = 100'; V:1" = 25'

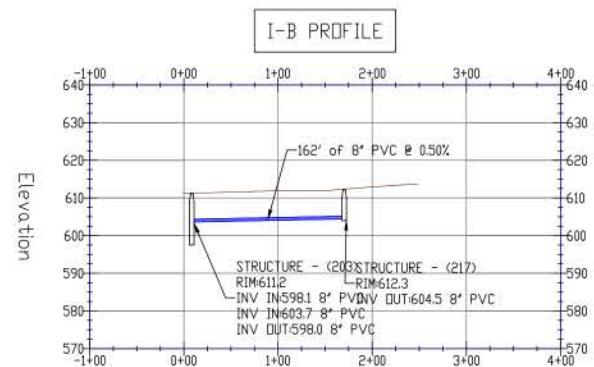
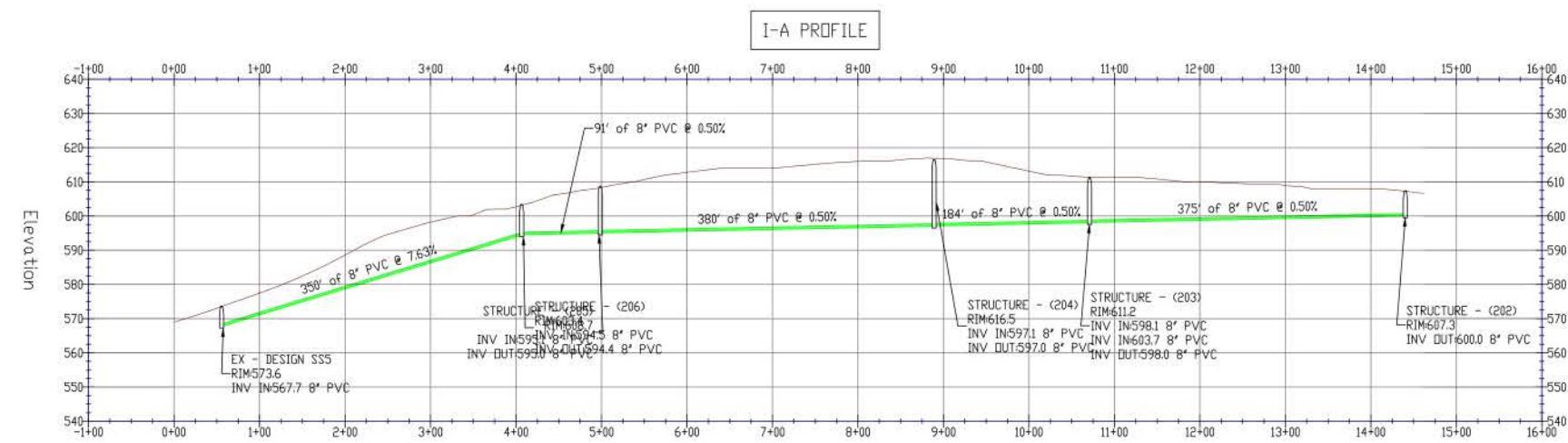


DRAWING IS NOT TO SCALE
IF BAR IS NOT 2" LONG



AREA I (204th) SEWER PLAN

1" = 50'

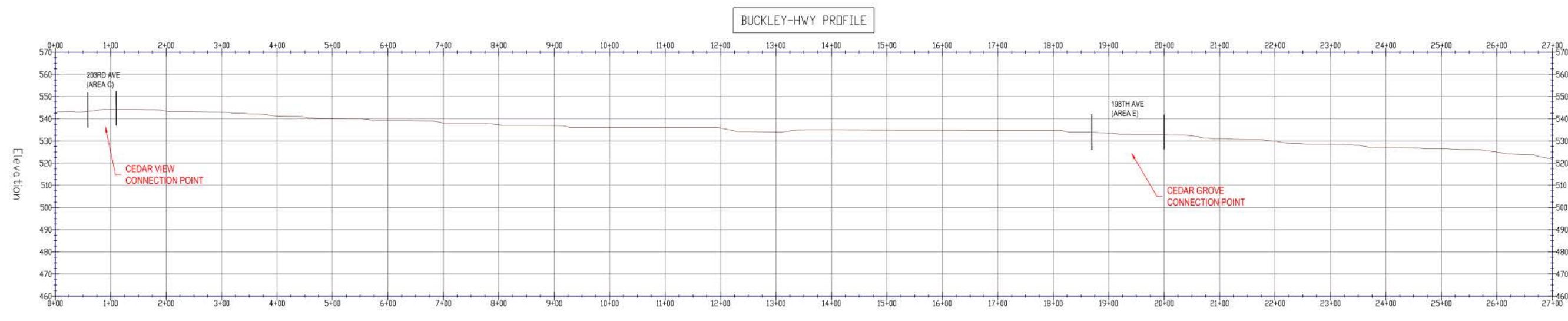


AREA I (204th) SEWER PROFILE

H:1" = 100'; V:1" = 25'

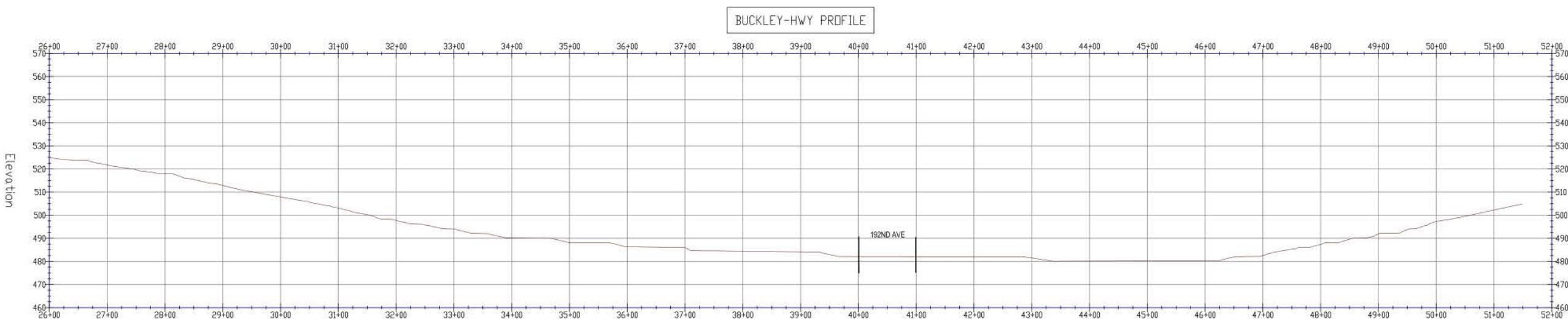


0 1" 2"
DRAWING IS NOT TO SCALE
IF BAR IS NOT 2" LONG



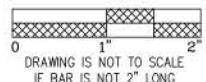
E

W



SUMNER BUCKLEY HWY EAST PROFILE

H:1" = 100'; V:1" = 25'



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**Exhibit D –
Construction Cost Estimate by Area**

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Exhibit D

City of Bonney Lake

Septic System Abatement Plan

Construction Cost Estimate

*Note – Sewer main costs by depth include pipe cost, pipe installation, erosion control, construction survey, as-builts, traffic control, trench safety, backfill, backfill pipe zone, and crushed rock (pipe bedding.)

Area A – 80th Street Court East				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	780	LF	\$190	\$148,200
8" PVC SDR 35 Sewer Main 10'-20' Depth	65	LF	\$400	\$26,000
8" DI Sewer Main 20'+ Depth	0	LF	\$530	\$0
Side Sewer Connection	7	EA	\$5,000	\$35,000
MH (Up To 10' Depth)	4	EA	\$5,000	\$20,000
MH (Greater Than 10' Depth)	0	VF	\$175	\$0
Road Reconstruction	845	LF	\$50	\$42,250
			Subtotal Sewer	\$271,450
			Mob/Demob	7% \$19,000
			Sub-Total Project	\$290,450
			Sales Tax	9.40% \$27,000
			Total Sewer System Cost	\$317,450
			Cost/LF	\$376
			Cost/Service	\$45,350

Area B – 181st				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	1052	LF	\$190	\$199,900
8" PVC SDR 35 Sewer Main 10'-20' Depth	839	LF	\$400	\$335,600
8" DI Sewer Main 20'+ Depth	0	LF	\$530	\$0
Side Sewer Connection	25	EA	\$5,000	\$125,000
MH (Up To 10' Depth)	9	EA	\$5,000	\$45,000
MH (Greater Than 10' Depth)	11.6	VF	\$175	\$2,000
Road Reconstruction	1891	LF	\$50	\$94,550
SR 410 Boring	250	LF	\$450	\$112,500
			Sum	\$914,550
			Mob/Demob	7% \$64,000
			Subtotal Sewer Main	\$978,550
			Tax	9.40% \$92,000
			Total On-site Sewer Main	\$1,070,550
			Cost/LF	\$566
			Cost/Service	\$42,822

Area C1 – Cedar view				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	707	LF	\$190	\$134,300
8" PVC SDR 35 Sewer Main 10'-20' Depth	1227	LF	\$400	\$490,800
8" DI Sewer Main 20'+ Depth	728	LF	\$530	\$385,800
Side Sewer Connection	43	EA	\$5,000	\$215,000
MH (Up To 10' Depth)	14	EA	\$5,000	\$70,000
MH (Greater Than 10' Depth)	80.4	VF	\$175	\$14,100
Road Reconstruction	2662	LF	\$50	\$133,100
		Sum		\$1,443,100
		Mob/Demob	7%	\$101,000
		Subtotal Sewer Main		\$1,544,100
		Tax	9.40%	\$145,000
		Total On-site Sewer Main		\$1,689,100
		Cost/LF		\$635
		Cost/Service		\$39,281

Area C2 – Cedar view				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	1058	LF	\$190	\$201,000
8" PVC SDR 35 Sewer Main 10'-20' Depth	801	LF	\$400	\$320,400
8" DI Sewer Main 20'+ Depth	301	LF	\$530	\$159,500
Side Sewer Connection	62	EA	\$5,000	\$310,000
MH (Up To 10' Depth)	14	EA	\$5,000	\$70,000
MH (Greater Than 10' Depth)	19.5	VF	\$175	\$3,400
Road Reconstruction	2160	LF	\$50	\$108,000
Grinders	20	EA	\$6,000	\$120,000
		Sum		\$1,292,300
		Mob/Demob	7%	\$90,000
		Subtotal Sewer Main		\$1,382,300
		Tax	9.40%	\$130,000
		Total On-site Sewer Main		\$1,512,300
		Cost/LF		\$700
		Cost/Service		\$24,392

Area C3 – Cedar view				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	5167	LF	\$190	\$981,700
8" PVC SDR 35 Sewer Main 10'-20' Depth	909	LF	\$400	\$363,600
8" DI Sewer Main 20'+ Depth	0	LF	\$530	\$0
Side Sewer Connection	122	EA	\$5,000	\$610,000
MH (Up To 10' Depth)	23	EA	\$5,000	\$115,000
MH (Greater Than 10' Depth)	7.6	VF	\$175	\$1,300
Road Reconstruction	6076	LF	\$50	\$303,800
		Sum		\$2,375,400
		Mob/Demob	7%	\$166,000
		Subtotal Sewer Main		\$2,541,400
		Tax	9.40%	\$239,000
		Total On-site Sewer Main		\$2,780,400
		Cost/LF		\$458
		Cost/Service		\$22,790

Area C4 – Cedar view				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	2650	LF	\$190	\$503,500
8" PVC SDR 35 Sewer Main 10'-20' Depth	685	LF	\$400	\$274,000
8" DI Sewer Main 20'+ Depth	767	LF	\$530	\$406,500
Side Sewer Connection	91	EA	\$5,000	\$455,000
MH (Up To 10' Depth)	15	EA	\$5,000	\$75,000
MH (Greater Than 10' Depth)	54.4	VF	\$175	\$9,500
Road Reconstruction	4102	LF	\$50	\$205,100
		Sum		\$1,928,600
		Mob/Demob	7%	\$135,000
		Subtotal Sewer Main		\$2,063,600
		Tax	9.40%	\$194,000
		Total On-site Sewer Main		\$2,257,600
		Cost/LF		\$550
		Cost/Service		\$24,809

Area C5 – Cedar view				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	1364	LF	\$190	\$259,200
8" PVC SDR 35 Sewer Main 10'-20' Depth	1559	LF	\$400	\$623,600
8" DI Sewer Main 20'+ Depth	0	LF	\$530	\$0
Side Sewer Connection	56	EA	\$5,000	\$280,000
MH (Up To 10' Depth)	15	EA	\$5,000	\$75,000
MH (Greater Than 10' Depth)	24.7	VF	\$175	\$4,300
Road Reconstruction	2923	LF	\$50	\$146,150
		Sum		\$1,388,250
		Mob/Demob	7%	\$97,000
		Subtotal Sewer Main		\$1,485,250
		Tax	9.40%	\$140,000
		Total On-site Sewer Main		\$1,625,250
		Cost/LF		\$556
		Cost/Service		\$29,022

Area D – 62nd st				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	2225	LF	\$190	\$422,800
8" PVC SDR 35 Sewer Main 10'-20' Depth	1851	LF	\$400	\$740,400
8" DI Sewer Main 20'+ Depth	320	LF	\$530	\$169,600
Side Sewer Connection	51	EA	\$5,000	\$255,000
MH (Up To 10' Depth)	19	EA	\$5,000	\$95,000
MH (Greater Than 10' Depth)	51	VF	\$175	\$8,900
Road Reconstruction	4396	LF	\$50	\$219,800
Lift Station and Force Main	1	LS	\$535,000	\$535,000
Grinders	12	EA	\$6,000	\$72,000
Dewatering	1	LS	\$10,000	\$10,000
		Sum		\$2,528,500
		Mob/Demob	7%	\$177,000
		Subtotal Sewer Main		2,705,500.00
		Tax	9.40%	254,000.00
		Total On-site Sewer Main		2,959,500.00
		Cost/LF		673.23
		Cost/Service		58,029.41

Area E – Cedar Grove				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	3485	LF	\$190	\$662,200
8" PVC SDR 35 Sewer Main 10'-20' Depth	0	LF	\$400	\$0
8" DI Sewer Main 20'+ Depth	0	LF	\$530	\$0
Side Sewer Connection	47	EA	\$5,000	\$235,000
MH (Up To 10' Depth)	13	EA	\$5,000	\$65,000
MH (Greater Than 10' Depth)	0	VF	\$175	\$0
Road Reconstruction	3485	LF	\$50	\$174,250
		Sum		\$1,136,450
		Mob/Demob	7%	\$80,000
		Subtotal Sewer Main		\$1,216,450
		Tax	9.40%	\$114,000
		Total On-site Sewer Main		\$1,330,450
		Cost/LF		\$382
		Cost/Service		\$28,307

Area F – 192nd (North)				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	455	LF	\$190	\$86,500
8" PVC SDR 35 Sewer Main 10'-20' Depth	1482	LF	\$400	\$592,800
8" DI Sewer Main 20'+ Depth	125	LF	\$530	\$66,300
Side Sewer Connection	33	EA	\$5,000	\$165,000
MH (Up To 10' Depth)	6	EA	\$5,000	\$30,000
MH (Greater Than 10' Depth)	20.5	VF	\$175	\$3,600
Road Reconstruction	2062	LF	\$50	\$103,100
		Sum		\$1,047,300
		Mob/Demob	7%	\$73,000
		Subtotal Sewer Main		\$1,120,300
		Tax	9.40%	\$105,000
		Total On-site Sewer Main		\$1,225,300
		Cost/LF		\$594
		Cost/Service		\$37,130

Area G – 190th/ 192nd				
Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	2917	LF	\$190	\$554,200
8" PVC SDR 35 Sewer Main 10'-20' Depth	1195	LF	\$400	\$478,000
8" DI Sewer Main 20'+ Depth	400	LF	\$530	\$212,000
Side Sewer Connection	50	EA	\$5,000	\$250,000
MH (Up To 10' Depth)	19	EA	\$5,000	\$95,000
MH (Greater Than 10' Depth)	59.2	VF	\$175	\$10,400
Road Reconstruction	4512	LF	\$50	\$225,600
		Sum		\$1,825,200
		Mob/Demob	7%	\$128,000
		Subtotal Sewer Main		\$1,953,200
		Tax	9.40%	\$184,000
		Total On-site Sewer Main		\$2,137,200
		Cost/LF		\$474
		Cost/Service		\$42,744

Area H – 192nd (South)

Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	4385	LF	\$190	\$833,200
8" PVC SDR 35 Sewer Main 10'-20' Depth	3233	LF	\$400	\$1,293,200
8" DI Sewer Main 20'+ Depth	895	LF	\$530	\$474,400
Side Sewer Connection	130	EA	\$5,000	\$650,000
MH (Up To 10' Depth)	31	EA	\$5,000	\$155,000
MH (Greater Than 10' Depth)	108.3	VF	\$175	\$19,000
Road Reconstruction	8513	LF	\$50	\$425,650
Lift Station and Force Main	1	LS	\$635,000	\$635,000
		Sum		\$4,485,450
		Mob/Demob	7%	\$314,000
		Subtotal Sewer Main		\$4,799,450
		Tax	9.40%	\$451,000
		Total On-site Sewer Main		\$5,250,450
		Cost/LF		\$617
		Cost/Service		\$40,388

Area I – 204th Ave

Item	QTY	Unit	Price/Unit	Total
8" PVC SDR 35 Sewer Main 0'-10' Depth	598	LF	\$190	\$113,600
8" PVC SDR 35 Sewer Main 10'-20' Depth	944	LF	\$400	\$377,600
8" DI Sewer Main 20'+ Depth	0	LF	\$530	\$0
Side Sewer Connection	19	EA	\$5,000	\$95,000
MH (Up To 10' Depth)	6	EA	\$5,000	\$30,000
MH (Greater Than 10' Depth)	16.4	VF	\$175	\$2,900
Road Reconstruction	1542	LF	\$50	\$77,100
		Sum		\$696,200
		Mob/Demob	7%	\$49,000
		Subtotal Sewer Main		\$745,200
		Tax	9.40%	\$70,000
		Total On-site Sewer Main		\$815,200
		Cost/LF		\$529
		Cost/Service		\$42,905

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**Exhibit E –
Construction Cost Estimate Summary**

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Exhibit E

**City of Bonney Lake
Septic System Abatement Plan
Construction Cost Estimate Summary**

Area	Name	Length (LF)	Services	Cost/LF	Cost/Service	Total Cost
A	80 th Street Court East	845	7	\$ 376	\$ 45,400	\$ 317,450
B	181 st Avenue East	1,891	25	\$ 566	\$ 42,800	\$ 1,070,550
C1	Cedar View (NW)	2,662	43	\$ 635	\$ 39,300	\$ 1,689,100
C2	Cedar View (NE)	2,160	62	\$ 700	\$ 24,400	\$ 1,512,300
C3	Cedar View (W)	6,076	122	\$ 458	\$ 22,800	\$ 2,780,400
C4	Cedar View (E)	4,102	91	\$ 550	\$ 24,800	\$ 2,257,600
C5	Cedar View (S)	2,923	56	\$ 556	\$ 29,000	\$ 1,625,250
D	62 nd Street East	4,396	51	\$ 673	\$ 58,000	\$ 2,959,500
E	Cedar Grove	3,485	47	\$ 382	\$ 28,300	\$ 1,330,450
F	192 nd Avenue East (N)	2,062	33	\$ 594	\$ 37,100	\$ 1,225,300
G	190 th /192 nd Avenue East	4,512	50	\$ 474	\$ 42,700	\$ 2,137,200
H	192 nd Avenue East (S)	8,513	130	\$ 617	\$ 40,400	\$ 5,250,450
I	204 th Avenue East	1,542	19	\$ 529	\$ 42,900	\$ 815,200
Total		45,169	736	\$ 553	\$ 33,928	\$ 24,970,750

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**Exhibit F –
Soils Map**

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Exhibit F
City of Bonney Lake
Septic System Abatement Plan
Soils Map

