

SPECIAL REFUNDING AREA

INSPIRADA WEST SIDE SEWER

Henderson, Nevada

W.O. # 7420

Prepared for:

Inspirada Builders, LLC

Submitted to:

City of Henderson

Department of Utility Services



**INSPIRADA WEST SIDE SEWER SPECIAL REFUNDING AREA
CITY OF HENDERSON
SR-016**

**Prepared for:
City of Henderson
Department of Utility Services
240 Water Street
Henderson, Nevada 89015**



**Prepared by:
VTN Nevada
2727 South Rainbow Boulevard
Las Vegas, Nevada 89146**

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EXECUTIVE SUMMARY

In order to provide sanitary sewer service to development in the Inspirada Master Planned Communities, a new sanitary sewer is required. A portion of the Inspirada West Side sewer will qualify for the City of Henderson's Special Refunding. Please refer to Figure 1 for the Alignment of the Inspirada West Side Sewer. The portion of the sewer qualifying for special refunding is portions of the sewer with a diameter of 15 inches or greater. The qualifying sections of sewer are termed the Executive Airport section (A), the Senate section (B), the Town Center Section (C) and the West section (D). The sewer primarily runs North and South. This sanitary sewer facility was oversized at the direction of the City of Henderson (referred to herein after as the City) to accommodate future development. The sewer will be designed and constructed by Inspirada Builders L.L.C. (referred to herein after as the Developers).

The Developer wishes to enter into a special refunding agreement with the City of Henderson, in order to receive repayment of a portion of the cost of the Project from special refunding fees to be collected by the City from other customers.

This report shall define the boundaries of the proposed Special Refunding Area, generally between the intersection of (Executive Airport Rd. and Volunteer Blvd.) and the future intersection of (Via Napoli and Inspirada Ave.), the proposed sewer for use by surrounding developments and the associated unit cost per ERU.

A cost for sewer service is broken down by segment of sewer pipeline. Cost allocations are based on pipe size.

The Cost to provide sanitary sewer service to **Sub-Area A is \$24.35 per ERU.**

The Cost to provide sanitary sewer service to **Sub-Area B is \$71.46 per ERU.**

The Cost to provide sanitary sewer service to **Sub-Area C is \$141.81 per ERU.**

The Cost to provide sanitary sewer service to **Sub-Area D is \$161.64 per ERU.**

BACKGROUND

A program was developed by the City of Henderson (COH) that provides for distribution of the cost of backbone infrastructure to those landowners that benefit from the sanitary sewer system through a Special Refunding Agreement. It is based on the successful water and sewer main extensions refunding program used for small water and sewer extensions constructed by individual homeowners/small developers. City Ordinance No. 1440 added a new section to Title 13 of the Henderson Municipal Code to further expand the refunding concept to include major backbone systems. An update to the Henderson Municipal Code has since repealed and replaced the original Title 13 with Title 14 in accordance with City of Henderson Ordinance No. 2536. *See Appendix C.3 for title 14.16*

The Municipal Code requires that each Special Refunding Agreement is based on a Refunding Report (Report) completed in accordance with the Utility Services Department's Service Rules and adopted by the City Council. The Report shall define the boundaries of the proposed special refunding areas; the type, extent and general route of the backbone infrastructure to be constructed; and the method for calculation of the actual refunding fees to be collected and refunded to the Developers who advance the construction costs generally based on the prorated capacity of the installed facilities. As stated in Ordinance 14.16.050, the term of any special refunding agreement shall be 20 years, which will commence on the date the infrastructure covered by the special refunding agreement is completed, tested and accepted by the city

This Report will establish the general methodology with which to equitably allocate the refunding costs for oversizing the sanitary sewer infrastructure for the Inspirada area known as "Inspirada West Side Sewer Special Refunding Area". Following City Council approval of the Report and after completion of the final audit report, a Special Refunding Agreement will be drafted between the City and Developers for the projects identified in the Report. The agreement will then identify the final cost of the work to be included in the Special Refunding Area.

The Special Refunding Area is not an assessment district. It is a process that provides for construction cost refunding when developers, owners and/or the City build infrastructure at a size and capacity well in excess of their needs. The developer/City that constructs the oversized facilities will be eligible for refunding subsequent to City acceptance of the constructed facilities.

GENERAL CONCEPT

This report outlines procedures, which will allow the Developers who fronted the costs of building the sanitary sewer backbone infrastructure needed to serve areas outside of Inspirada by oversizing the sewer system infrastructure to be reimbursed, and sets in motion the mechanism to equitably estimate and distribute oversizing costs. The method used must be fair and equitable to share in the cost of the infrastructure based on the proportionate benefit of that improvement.

Refunding will be based on the following concepts:

1. The costs of designing and constructing oversized sewer infrastructure necessary to serve the Special Refunding Area will be equally allocated per ERU based on segment capacity.
2. Potential area contributions will be determined by the location of parcels within the Sub-Area of the designated Special Refunding Area in relation to likely connection points.
3. Costs are allocated by ERU capacity of each pipe segment between nodes and are additive for Sub-Areas using successive downstream segments.
4. Funds collected from these users are refunded to the developers that constructed the facility in accordance with Henderson Municipal Code.

BACKBONE SEWER INFRASTRUCTURE

PROJECT DESCRIPTION

In order to provide sanitary sewer service to the developments in the Inspirada Master Planned Communities, a new sanitary sewer is required. The new sanitary sewer will supply service to areas generally located along Executive Airport Dr. and Via Inspirada Dr. between Democracy Drive and Volunteer Blvd. See Figure 1 *Inspirada West Side Sewer* for the project alignment. This sanitary sewer facility was oversized at the direction of the City to accommodate future developments that will utilize the sewer. The Inspirada West Side Sewer will be designed and constructed by Inspirada Builders L.L.C. The portion of the Inspirada West Side Sewer believed to be eligible for special refunding is hereinafter termed The Project.

Refer to Figure 1 while reading the below text. In Figure 1 Pipe lengths are color coded based on inlet of Sub-Area. Planned sewer less than 15” is shown in grey on Figure 1, but is not included in the Special Refunding analysis. Area contributions to a segment of pipe are color coded based on which pipe the area will be inletting. For instance, area D (shown in blue) inlets at the 18” section of sewer, and therefore contributes to sewer sections A, B, C, and D. Furthermore, areas contributing to the project are shown on the map as a solid color or hatched color. A solid color represents property being developed by Inspirada Builders L.L.C., and the hatched color represents other properties expected to contribute flow to the project.

The Project is comprised of four sections of sewer. The most downstream segment of sewer within the project is the Executive Airport Sewer (A). The Executive Airport is a 27” sewer line and is shown in Orange on Figure 1. The Senate Sewer (B) is just upstream, and is also a 27” sewer line, shown in magenta on Figure 1. Upstream of the Senate section of sewer is the Town Center Sewer (C) with a diameter of 21”, and shown in red in Figure 1. Upstream of the Town Center Sewer is the West Sewer (D) the West Sewer has a diameter of 18”, and is colored blue on Figure 1. The project segments will be referred to as Segments A, B, C, and D here and after.

Sewer Segments:

- Segment A: Orange in Figure 1
Executive Airport Sewer (A) – 1,290’
- Segment B: Magenta in Figure 1
Senate Sewer (B) – 3,846’
- Segment C: Red in Figure 1
Town Center Sewer (C) – 3,445’
- Segment D: Blue in Figure 1
West Sewer (D) – 990’

All projects will be reviewed and approved by the City prior to construction.

SPECIAL REFUNDING AREA

The Inspirada special Refunding Area is comprised of single family, multi –family residential, and commercial that is currently under development. Refer to Figure 1 *Inspirada West Side Sewer* for delineation of the area. Figure 1 shows all areas that contribute flow to the project, and depicts the general location in which each area enters the Project. Areas contributing flow to the Project are shown with either parcel identification, or developer’s village identification and a flow arrow. The parcel identification can be matched with the Parcel APN#, refer the Table 1. The flow arrow depicts an estimated direction of flow from the parcel or lot to the Project. The area contributing flow will pay for each segment of pipe used downstream of their estimated entry node. The monetary contribution is based on ERU’s for the developed area.

Total area being developed by Inspirada Builders L.L.C. is 499 acres. Other areas contributing to the Project is 1,227 acres. The combined total area expected to be contributing flow to the Project is 1,726 acres. See the table below for the areas contributing flow to the Project. Table 1 is comprised of all areas in which will benefit from the Project, but do not contribute to the developers initial cost. Tables 2, 3, 4 and 5 cover areas that will be under development by the Developers; these areas are not included in the expected refund.

- Sub-area A is approximately 36 acres
- Sub-area B is approximately 389 acres
- Sub-area C is approximately 68 acres
- Sub-area D is approximately 1,234 acres

Table 1 Other Areas contributing flow to the Project

Other Areas Contributing to the Project			
Sub Area	PARCEL I.D	Parcel Number	Contributing Area
A	3	191-11-101-004	8.02
A	4	191-14-101-004	27.64
A	32	191-10-801-006	10.37
A	33	191-10-801-019	4.64
B	5	191-15-501-002	59.60
B	6	191-15-101-002	10.37
B	7	191-14-301-001	109.67
B	8	191-15-711-002	34.46
B	9	191-15-811-003	1.50
B	10	191-15-811-005	11.46
B	11	191-15-811-006	40.73
B	12	191-22-511-003	23.99
B	13	191-23-211-001	5.14
B	14	191-23-211-002	0.68
B	15	191-23-111-006	21.40
B	16	191-23-211-007	0.68
B	17	191-23-211-003	7.39
B	18	191-23-211-004	8.12
B	19	191-23-111-004	2.92
B	20	191-23-211-005	1.28
B	21	191-23-211-006	11.40
B	22	191-23-210-003	35.13
B	31	191-23-111-002	4.76
C	23	191-15-811-001	27.45
C	24	191-15-811-002	2.72
C	25	191-15-811-004	29.90
C	26	191-22-511-001	2.71
C	27	191-22-511-002	5.51
C	32	191-10-801-006	14.28
C	33	191-10-801-019	4.64
D	28	191-22-310-001	37.48
D	29	191-27-000-003	320.00
D	30	191-26-000-003	380.00
Total			1266.04

PROJECT SEGMENTS

Special Refunding fees will be based on segment usage, determined by ERU contributions to the pipe network. Contributions to the pipe network will be allocated depending on an estimated point of entry for the sewer segment and future land usage. The Project consists 4 segments of pipe as previously discussed. For segments included in the special refunding of the 4 segments refer to Table 1, and Figure 1. For the Developers contributions see Tables 2, 3, 4, and 5 along with Figure 1.

All areas, both the Developers and “other areas” analyzed within this project flow through segment A.

All of the Developers parcels are expected to utilize Segment B, however flows from “other areas” parcels 3, and 4, (see Table 1) will not use segment B.

Segment C will convey flows from all of the Developers areas except for parcel PS. Segment C will convey contributions from “other areas” (see Table 1) parcels 23 through 30.

Segment D will convey all of the Developers flow except for parcel PS. For the “other areas” contributions (see Table 1) parcels 28, 29, and 30 will be contributing for funding of segment D.

Funding for segment D includes funding for downstream pipes C, B, and A. Funding for Segment C includes funding for downstream pipes B, and A. Funding for segment B includes funding for segment A.

Refunding for segment A will be paid by contributions from “Other Areas” (see Table 1) contributing to the project parcels 3 through 30.

Refunding for segment B will be paid by contributions from “Other Areas” parcels 5 through 30.

Refunding for segment C will be paid by contributions from “Other Areas” parcels 23 through 30.

Refunding for segment D will be paid by contributions from “Other Areas” parcels 28 through 30.

Table 2 Residential Waste Water Contributions

Inspirada Builders L.L.C Wastewater Contribution by POD				
Land Use Component	Total Acres	Total Dwelling Units (DU's)	Average Day WW Contributions	ERU's
Village 5				
5-1	37.33	239	59750	239
5-2	32.70	209	52250	209
5-3	62.59	400	100000	400
Total for Village 5	132.62	848	212000	848
Village 6				
6-1	35.41	226	56500	226
6-3	26.15	161	40250	161
6-4	33.10	212	53000	212
6-5	69.19	443	110750	443
Totals for Village 6	163.85	1042	260500	1042
Village 7				
7-1	6.65	43	10750	43
7-2	55.00	352	88000	352
7-3	33.74	216	54000	216
7-4	28.00	179	44750	179
Totals for Village 7	123.39	790	197500	790
TOTAL	420	2680	670000	2680

Table 3 Park Waste Water Contributions

Inspirada Builders L.L.C Park WW Contributions						
Park ID	Land Use Component	Total Area (Acres)	Estimated Building Square Footage (ft²)	Contribution Factor	Average Day WW Contributions	ERU's
Park K	Neighborhood (1)	5.19	213095.52	0.10 gpd/ft ²	21310	85
Park I		7.04				
Park J	Community (2)	19.04	NA	800 gpd/acre	9139	37
TOTAL		31.27			30449	122

Table 4 School Waste Water Contributions

Inspirada Builders L.L.C School Wastewater Contributions				
School Site	Total Area (Acres)	Contribution Factor	Average WW Flow (gpd)	ERU's
Elementary	12.5	800 gpd/acre	10000	40
Elementary	12.5	800 gpd/acre	10000	40
Middle	20	800 gpd/acre	16000	64
Total	45		36000	144

Table 5 Police Department Waste Water Contributions

Inspirada Builders L.L.C Police Department Wastewater Contributions				
Parcel	Total Area (Acres)	Contribution Factor	Average WW Flow (gpd)	ERU's
1	2.6	800 gpd/acre	2080	8

Table 6 Waste Water Contributions Summary

Inspirada Builder L.L.C. Total Sewer Contributions		
Land Use	Average WW Flow (gpd)	Developers ERU's
All Residential	670000	2680
All Parks	30449	122
All Schools	36000	144
Police Station	2080	8
Total	738529	2954

METHOD OF CALCULATION

DETERMINATION OF AVAILABLE SEWER SEGMENT ERU'S

Costs per Equivalent Residential Unit (ERU) are calculated based on pipeline section capacity. The capacity for each section of pipeline within the Project was analyzed based on the minimum capacity within the section. The capacity of the constraining pipe in each section was calculated, using the Manning's equation, based on the following factors:

- Design slope of 0.006 ft/ft for Sewer Sections D
- Design slope of 0.004 ft/ft for Sewer Sections C
- Minimum slope of 0.0025 ft/ft for Sewer Section A and B
- Pipe Diameter
- Manning's n = 0.013
- Flow depth to pipe diameter ratio of 0.75 ft/ft

See Appendix B.1 for Flowmaster Discharge Calculations

The calculated segment capacity reflects the peak flow that the pipe can accommodate. This peak flow capacity is then converted to an average flow by applying the below equation:

$$Q_{Ave} = \left(\frac{Q_{Peak}}{2.6186} \right)^{\left(\frac{1}{0.9044} \right)}$$

The above equation is from the South Edge (Inspirada) Water and Sewer Master Plan Update See Appendix C.2 Pipe Oversizing Reference material.

Once the average flow is determined, it is further divided by 250 gallons per day to determine the available ERU's per segment, as provided in the Service Rules.

Table 7 Available ERU's per Sewer Section

Available ERU's per Sewer Section									
Sewer Section	Sewer Section	Sewer Diameter (in)	Length (ft)	Pipe Flow Capacity from Flowmaster (MGD) @ Minimum Slope (Peak Flow)	Minimum Slope (%)	Average Flow (MGD)	Total Available ERU's	Developers ERU's	Difference
Executive Airport Sewer	A	27	1290	9.13	0.25	3.98	15907	2954	12953
Senate Sewer	B	27	3846	9.13	0.25	3.98	15907	2954	12953
Town Center Sewer	C	21	3445	5.91	0.40	2.46	9834	2954	6880
West Sewer	D	18	990	4.80	0.60	1.95	7809	2954	4855

Final costs are determined for the Project, as defined in Title 14 and include the following items:

1. Construction Cost (including administration and safety and traffic control measures)
2. Pre-design, design, and inspection costs
3. Permits and fees
4. Performance and related bond costs not included in construction costs
5. Actual financing costs related to items 1-4 of this section
6. All fees and expenses reasonably incurred concerning the preparation of the Special Refunding Agreement.

Table 8 Sewer Itemized Cost Estimate

Sewer Itemized Cost Estimate				
Segment	Construction	Engineering/ Survey	Bonding/Inspection	Project Total
<u>A</u>	\$337,482.00	\$30,988.49	\$18,801.07	\$387,271.56
<u>B</u>	\$600,970.00	\$92,388.94	\$56,053.41	\$749,412.35
<u>C</u>	\$576,939.94	\$71,525.05	\$43,395.05	\$691,860.04
<u>D</u>	\$129,112.92	\$16,006.53	\$9,711.34	\$154,830.80

The City Council and Director of Utility Services have determined that Item 2 shall not exceed 15% of the construction cost. The actual final cost of the work shall be depreciated annually over forty years using the straight line method of depreciation. Special refunding fees collected by the City shall be computed in accordance with the Municipal Code, based on the prime rate that is published in the Wall Street Journal.

CALCULATION OF REFUND TO DEVELOPER

The table below labeled table 10 displays the cost to construct the Project. For cost estimate tables see Table 8. For determination of total available ERU's see Table 7. For determination of the Developers ERU's see Summary Table 6.

Table 9 Sewer Cost by Segment

Sewer Cost by Segment						
Sewer Name	Sewer Section	Total Sewer Cost Estimate	Total Available ERU's	Cost per ERU	Inspirada Builder L.L.C. ERU's	Inspirada Builder L.L.C. Cost
Executive Airport Sewer	A	387,271.56	15907	\$ 24.35	2954	\$ 71,918.45
Senate Sewer	B	749,412.35	15907	\$ 47.11	2954	\$ 139,169.98
Town Center Sewer	C	691,860.04	9834	\$ 70.35	2946	\$ 207,262.28
West Sewer	D	154,830.80	7809	\$ 19.83	2946	\$ 58,408.02
TOTAL	-	\$ 1,983,374.75	-	-	-	\$ 476,758.73

Based on ERU's Inspirada Builders L.L.C. will be contributing to an estimated \$476,758.73 of the total \$1,983,374.75 cost of the Inspirada Sewer. The refund amount Inspirada Builders L.L.C. will be allotted for the construction of the Inspirada sewer is \$1,506,616.02.

DEVELOPERS ERU's

The Developers ERU's are found for areas that will be developed as residential, parks, schools, and a police station. ERU's for the parks, schools and police station are based off of methods used in the South Edge Water and Sewer Master Plan Update Final Version 2.1 dated August of 2007, See Appendix C.2 . Since the known number of dwelling units has changed since the 2007 report, ERU's have been determined utilizing current data for dwelling units. Waste water contributions for residential areas are one dwelling unit contributes 250 gallons per day. See Table 6 Waste Water Contribution Summary for developers ERU's. The developers ERU's are 2,954 ERU's.

COST ESTIMATE

Costs for each of the four sewer segments that contribute to the Inpirada West Side Sewer have been calculated based on cost estimates. See Table 3 for the Sewer Itemized Cost Estimate for each of the segments.

The segment's percentage of total cost will be further evaluated to obtain the Segment Cost per ERU, based on the following equation:

$$\text{(Equation 1) Segment Cost per ERU} = \frac{\text{Segment cost (\$)}}{\text{Segment's available ERU capacity}}$$

For Sub-Areas requiring the use of successive downstream segments, the costs along the route will be additive, for example:

$$\begin{aligned} \text{(Equation 2) Sub-Area C fees (Total cost per ERU) =} \\ \text{Segment C Cost per ERU +} \\ \text{Segment B Cost per ERU +} \\ \text{Segment A Cost per ERU} \end{aligned}$$

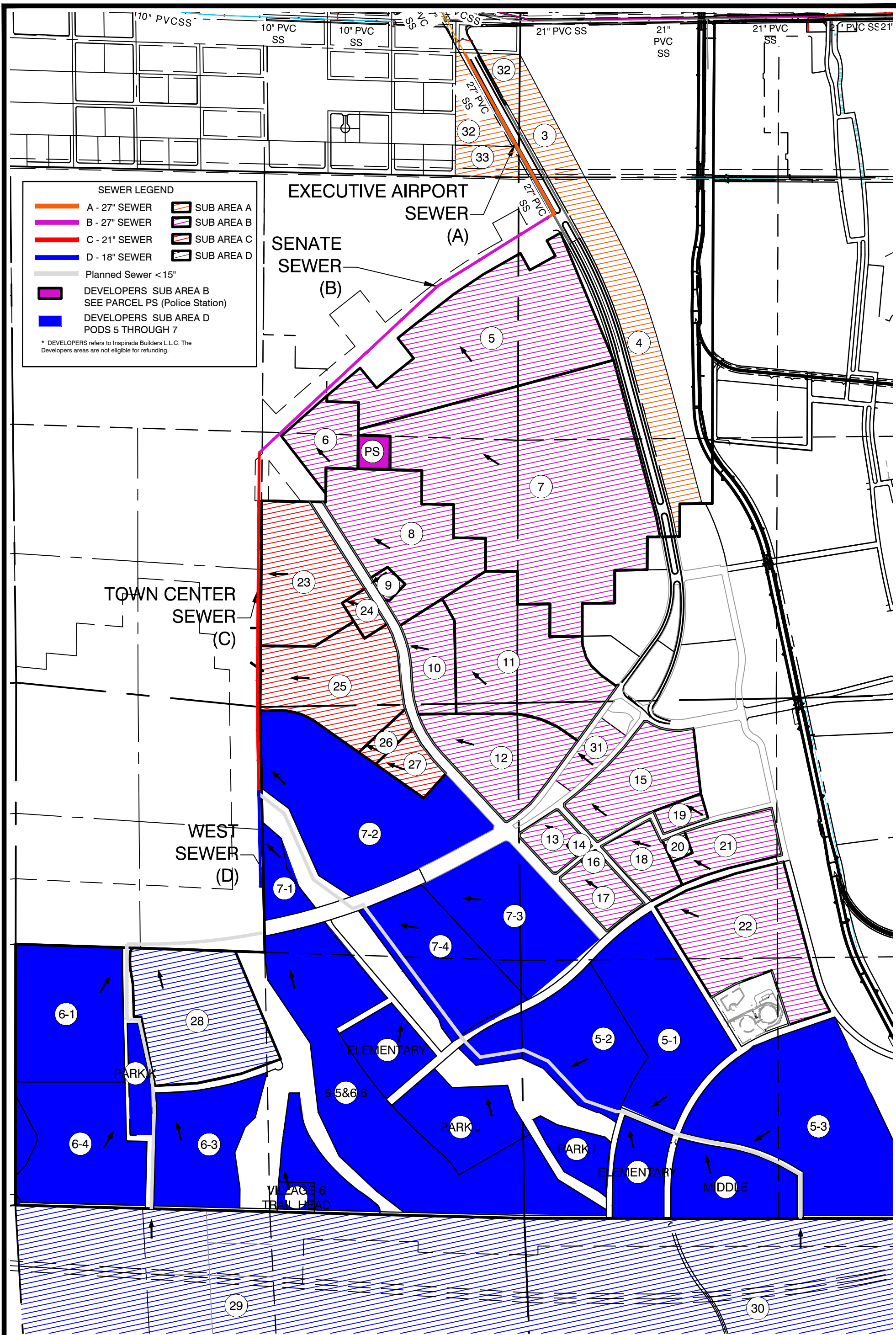
Refer to Table 2 for detailed calculations for Costs per ERU per Sub-Area. **Costs per ERU per Segment are summarized as follows:**

Table 10 Costs per Segment

Segment	Cost per ERU per Segment	Cost to Provide Sewer to Sub Area
A	\$ 24.35	\$ 24.35
B	\$ 47.11	\$ 71.46
C	\$ 70.35	\$ 141.81
D	\$ 19.83	\$ 161.64

REFERENCES

1. *South Edge Water and Sewer Master Plan Update Final Version 2.1*, by Stanley Consultants Inc. dated August 2007
2. Refunding Report for St. Rose Sewer Special Refunding Area SR-0007 Prepared for the City of Henderson , by G.C. Wallace, Inc



SEWER LEGEND

- A - 27" SEWER
- B - 27" SEWER
- C - 21" SEWER
- D - 18" SEWER
- Planned Sewer <15"
- SUB AREA A
- SUB AREA B
- SUB AREA C
- SUB AREA D
- DEVELOPERS SUB AREA B
SEE PARCEL PS (Police Station)
- DEVELOPERS SUB AREA D
PODS 5 THROUGH 7

* DEVELOPERS refers to Inspirada Builders L.L.C. The Developers areas are not eligible for refunding.

**EXECUTIVE AIRPORT
SEWER (A)**

**SENATE
SEWER (B)**

**TOWN CENTER
SEWER (C)**

**WEST
SEWER (D)**

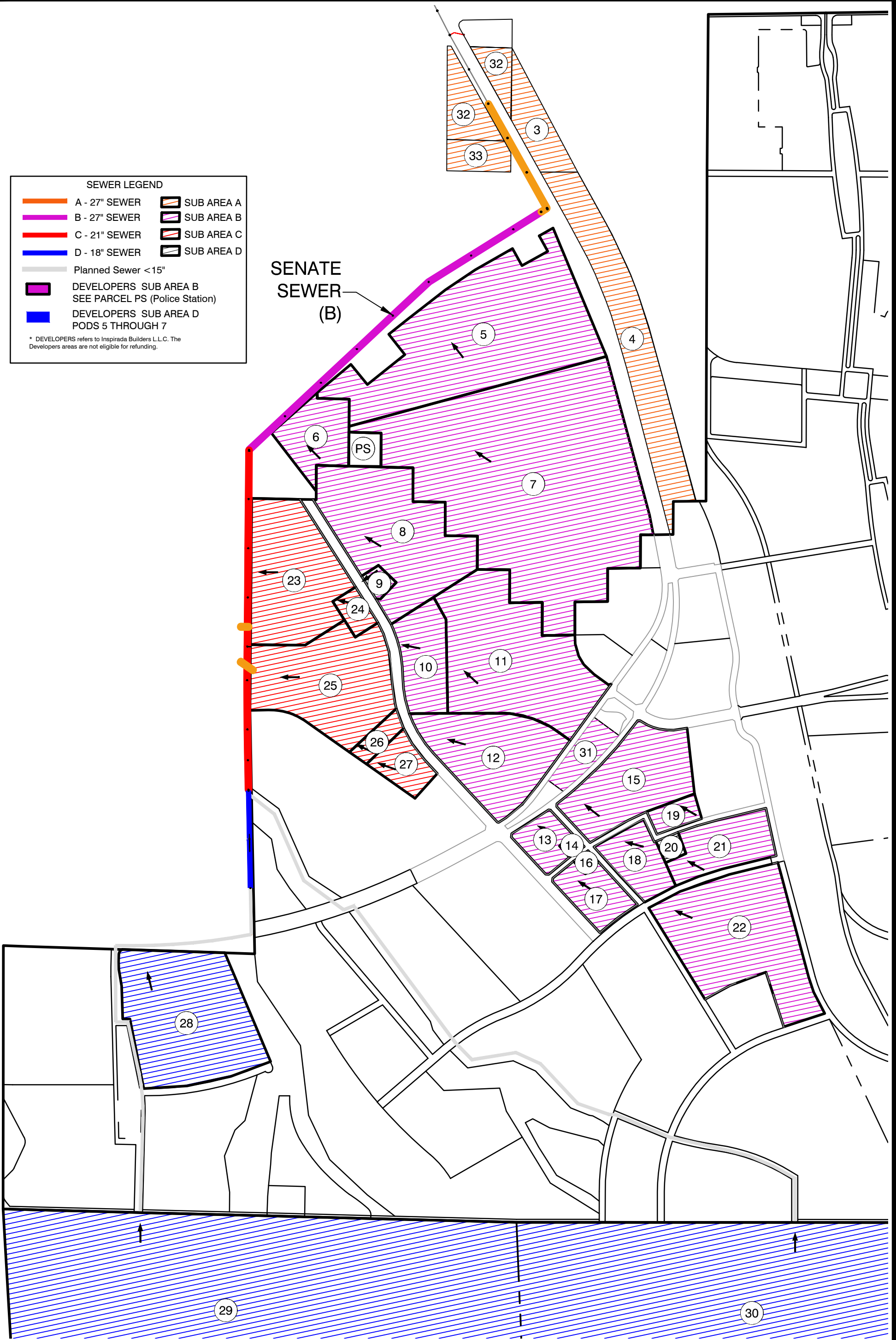
**FIGURE 1: SEWER SERVICE EXHIBIT
INSPIRADA WEST SIDE SEWER**

W.O.#:	7420 WS
DATE:	SEPTEMBER 2016
BY:	SVB
SCALE:	1" = 900'
SHEET	1 OF 1

H:\7420 WS\5_Supplemental Information\Westside Sewer Usage ERU Based Supplemental Update.dwg;kylej; Nov 12, 2018 - 1:43pm

SEWER LEGEND			
	A - 27" SEWER		SUB AREA A
	B - 27" SEWER		SUB AREA B
	C - 21" SEWER		SUB AREA C
	D - 18" SEWER		SUB AREA D
	Planned Sewer <15"		
	DEVELOPERS SUB AREA B SEE PARCEL PS (Police Station)		
	DEVELOPERS SUB AREA D PODS 5 THROUGH 7		

* DEVELOPERS refers to Inspirada Builders L.L.C. The Developers areas are not eligible for refunding.



**FIGURE 2: SEWER SERVICE EXHIBIT
INSPIRADA WEST SIDE SEWER**

W.O.#:	7420 WS
DATE:	SEPTEMBER 2016
BY:	SVB
SCALE:	1" = 900'
SHEET	1 OF 1