

Sacramento Regional County Sanitation District

Interceptor Sequencing Study

Technical Memorandum 11
Interceptor Conveyance Alternatives

June 2010

Sacramento Regional County Sanitation District

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TECHNICAL MEMORANDUM

NO. 11

Interceptor Conveyance Alternatives

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INTERCEPTOR CONVEYANCE ALTERNATIVES

1.0 INTRODUCTION

The Interceptor Sewer Study (ISS) is reconsidering the long term sewer conveyance service for those expansion areas of the SRCSD's sphere of influence. Although many of the interceptor conveyance projects identified in the Master Plan 2000 (MP2000) have been (or are being) constructed, some areas, specifically the south and eastern portions of the County, require long term planning. This chapter discusses the conveyance alternatives being considered and provides recommendations for future expansion facilities.

Regional sewer conveyance services for the County of Sacramento were originally discussed in the *1993/94 Sacramento Sewer Expansion Study* and later in the *Master Plan 2000 (MP2000)* and *MP2000 Reconciliation Report*. Up to 52 conveyance system projects were identified to serve everything within the region's Sphere of Influence (Sol). By the end of 2010, 30 of these projects (58%) will have been constructed (see Figure 11.0). Those expansion projects that remain unconstructed are primarily in the southern and eastern portions of the County and include projects associated with:

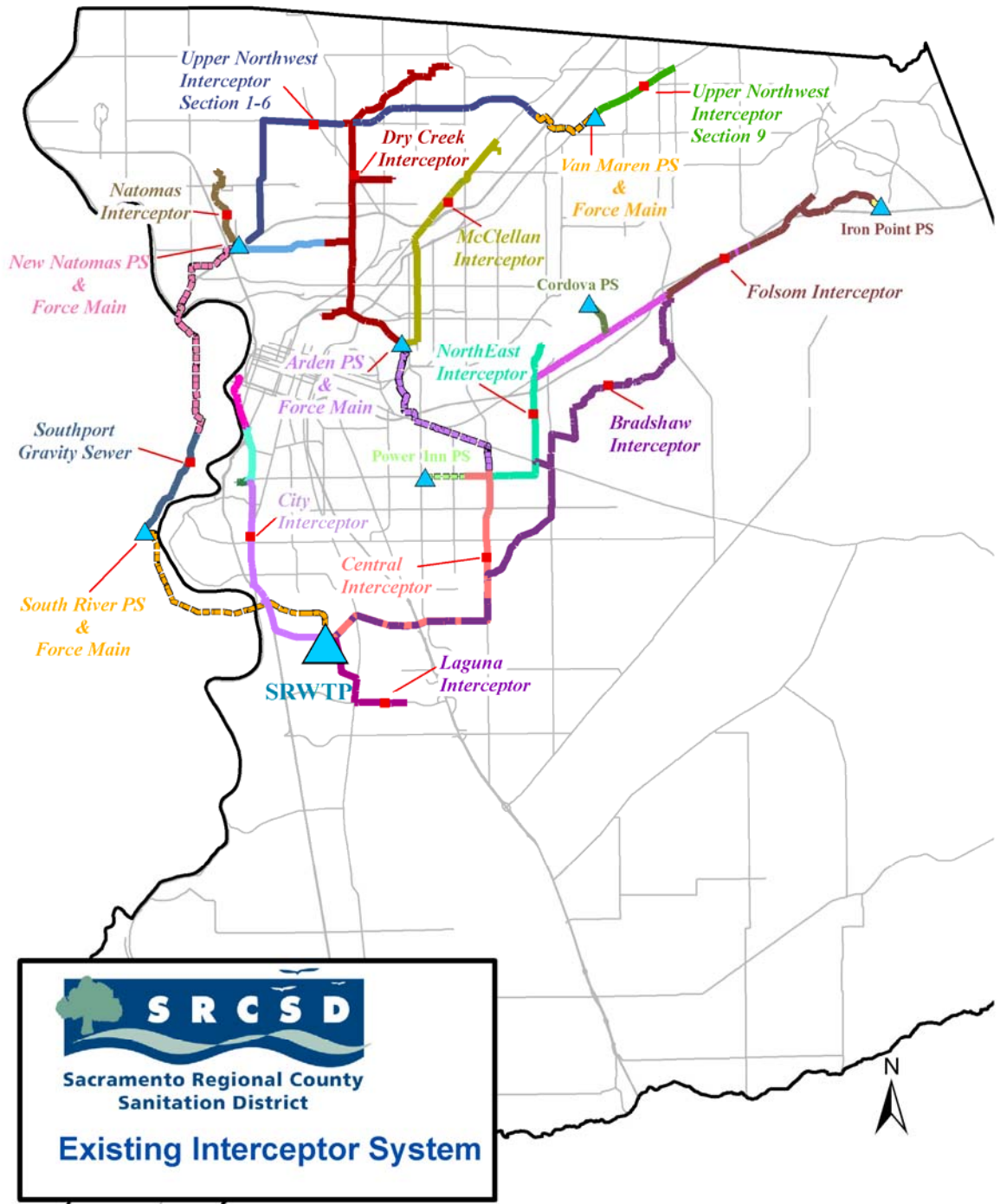
1. The Aerojet Interceptor.
2. The Mather Interceptor.
3. The Laguna Creek Interceptor.
4. The Grantline Road Interceptor.
5. The South Interceptor.

Other, smaller projects that have not been constructed are the the *Sunrise Interceptor* and the *Dry Creek Relief* project in the northern part of the region. Since these are considered to be *relief* projects, not *expansion* projects, they are not discussed in this study.

2.0 IDENTIFICATION OF ALTERNATIVES

Service to the areas of Folsom Sphere OF Influence (SOI), Eastborough, Glenborough, Aerojet, Westborough, Rio del Oro, Anatolia, Suncreek, Waegell and Cordova Hills were recognized as areas that were likely to start developing within the next 10 years. Therefore they would be studied in more detail under the *Mid Range Planning (MRP)* effort. However the ultimate (build-out) flows from these areas were considered in this ISS. Preliminary MRP investigations show that the flows from the "Aerojet Area", that is: Aerojet, Westborough, Rio del Oro, and Anatolia (see Fig. 11.1) will ultimately connect to the existing Bradshaw Interceptor system via a connection on White Rock Road (connecting to

Figure 11.0 Existing SRCSD Facilities



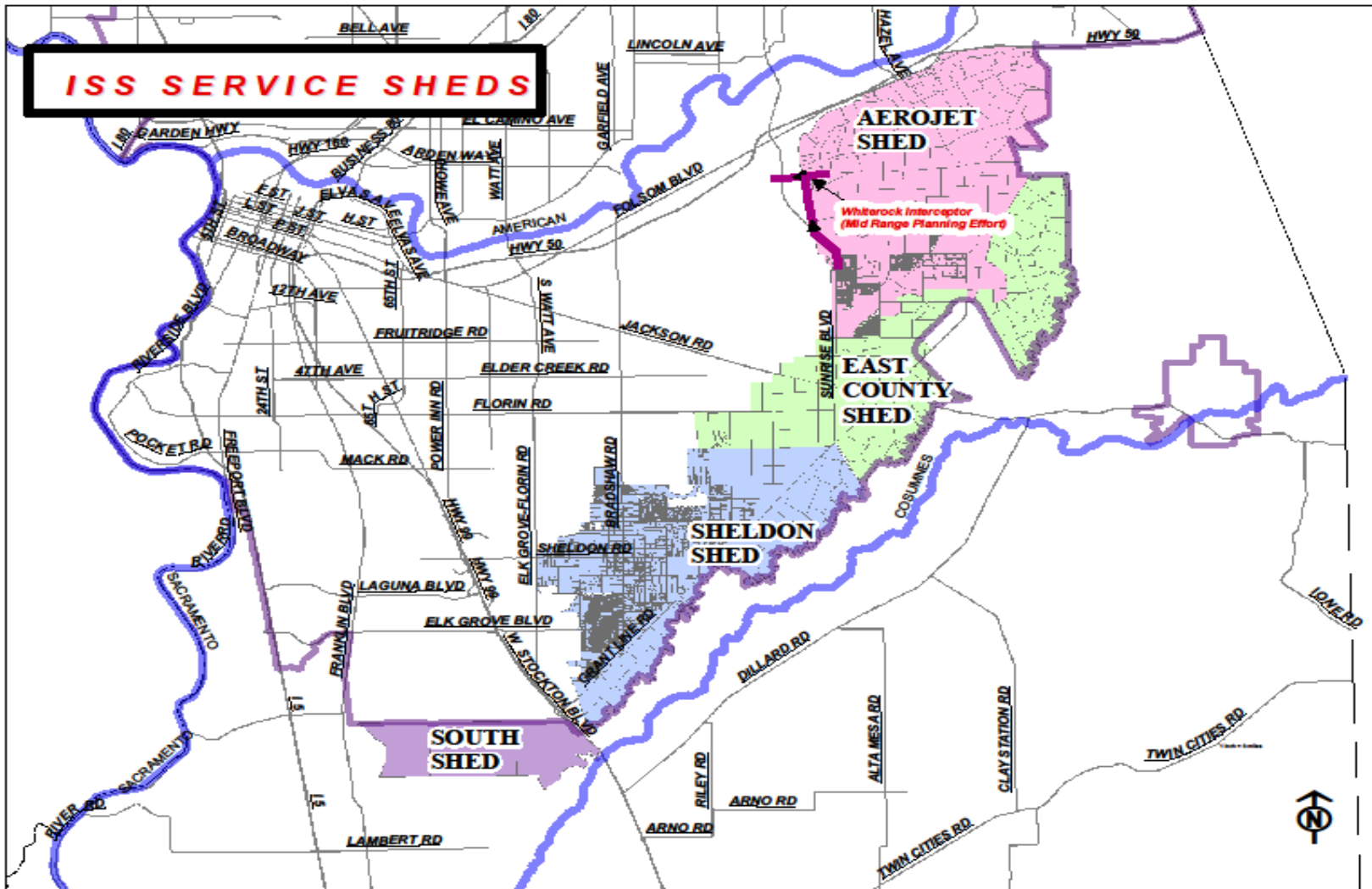
Bradshaw Interceptor Section 8 interceptor at Kilgore Rd). When and how they do this were matters for the MRP effort and so, although the flows from these areas are included in the calculations for future Bradshaw Interceptor flows, these areas were not considered further in the ISS. With that in mind, brainstorming sessions by staff were undertaken to identify alternatives to serve three main undeveloped areas that are described as follows and shown in Figure 11.1:

1. The “East Area” (Sun creek, Waegell, Cordova Hills, Florin Road areas)
2. The “Sheldon Area” (south of the *East Area* in the proximity of Sheldon Road, along Grantline Road)
3. The “South Area” (south of the *Sheldon Area* and primarily Elk Grove)

While choosing economically viable alternatives to serve these three areas, ISS flow generation criteria made it possible to utilize the excess future capacity of the existing **Bradshaw Interceptor** system. Selected alternatives should connect one or more of these areas to the Bradshaw Interceptor, either by gravity or by pump station and forcemain, depending on topography. Where possible, storage is also to be considered. Satellite wastewater treatment plants should also be investigated in an effort to save on conveyance costs to the Sacramento Regional Wastewater Treatment Plant (SRWTP) in Elk Grove and to possibly bring recycled water closer to prospective customers. The satellite alternatives are discussed in *Technical Memorandum No. 15 (Decentralized and Centralized Treatment Alternatives)*.

Timing: In order to gauge sewer service priorities it is important to be aware of the time frame in which **build-out** is expected to occur in the Sacramento District. The question of development growth rate is explored in the attached *Technical Memorandum No. 7 (ESD Absorption Rate Analysis)*. “Build-out” is defined in two ways: “realistically” and “conservatively”. The realistic estimate calculates the District-wide number of Equivalent Single Dwellings (ESDs) to be **1.18 million** at build-out, while the conservative estimate shows **1.46 million** ESDs. The TM analysis reveals that, using a moderate growth curve, realistic build-out in the District does not occur until approximately the year **2078**. For a conservative build-out, this date moves back even further to approximately **2109**. So, the TM concludes, “...it appears that in the year 2100, the District may be at or near a build-out scenario”.

Figure 11.1 ISS Service Sheds



Three (3) conveyance-only sewer service alternatives were chosen and analyzed. The following are descriptions and analysis of each of these 3 alternatives:

2.1 Conveyance-Only Option 1

See Figure 11.2. In this alternative, flows from the Cordova Hills development will be pumped (via pump station and force main) over to a gravity system that also serves the upper reaches of the MP2000 Laguna Creek area, including Suncreek and Waegell developments and those south to (and around) Florin Road. The sum of these flows will be conveyed by gravity directly west via the new **Florin Interceptor** (from about the corner of Jackson Hwy and Sunrise Blvd) and connected to the Bradshaw Interceptor. The remaining Laguna/Grantline flows will travel south-west (parallel to Cosumnes River) via a new **Laguna Interceptor** to the expanded Elk Grove SOI area. These flows, along with those collected directly from the Elk Grove Sol area itself, are taken north, via a pump station and force main referred to as the **South Interceptor**, to the Sacramento Regional Wastewater Treatment Plant (SRWTP).

In this alternative there are two pump stations (20 MGD and 68 MGD) and 39 miles of interceptor pipeline. These combine to make this alternative the second most cost effective alternative amongst the three conveyance-only alternatives analyzed, as shown in Table 11.2.

Hydraulic modeling was carried out for this alternative using the design and performance criteria set out in Chapter 4 of the ISS report and the attached *Technical Memorandum No.2 (Design and Performance Storms)*. The hydraulic grade line (HGL) was monitored in 14 existing and future interceptor systems (Bradshaw, Central, Northwest, Sunrise, City of Sacramento, McClellan, Lower Northwest, McClellan, Upper Dry Creek, Lower Dry Creek, Upper Northwest, Folsom, Folsom East and Laguna) to check for surcharges and possible sanitary sewer overflows (SSOs). The results of these modeling runs can be seen in detail in the attached *Technical Memorandum No.13 (Hydraulic Model Evaluation)*. A summary of these results are shown in the following Table 11.1.

Table 11.1 Modeling Results Summary for Alternative C1		
Interceptor	Realistic Buildout	Conservative Buildout
Bradshaw	No surcharge	Moderate surcharge (10 ft freeboard at N38-MH0020A)
Central	Moderate surcharge (7 ft freeboard at N21-MH0074B)	Critical surcharge; Overflows at N21-MH0074B
Northeast	No surcharge	Critical backup surcharge from Central Interceptor (3 ft freeboard at N16 (N24-MH0032A))
Sunrise	No surcharge; (6 ft freeboard at low MH SR2040)	Critical backup surcharge from Bradshaw Interceptor (4 ft freeboard at MH SR1130)
City	Critical surcharge; Overflows at N25-MH0033A and N25-MH0033B	Critical surcharge; Overflows at N25-MH0033A and N25-MH0033B
McClellan (after relieved)	No surcharge (4 ft freeboard at an upstream low MH (N33-MH0032A))	Minor surcharge downstream; (4 ft freeboard at an upstream low MH (N33-MH0032A))
Upper Dry Creek (after relieved)	No surcharge	Minor surcharge (12 ft freeboard at N17-MH0091A)
Lower Dry Creek	No surcharge	No surcharge
Upper Northwest	No surcharge	No surcharge
Lower Northwest	No surcharge	No surcharge
Natomas	No surcharge	No surcharge
Folsom	No surcharge; (6 ft freeboard at low MH (N23-MH0014A))	No surcharge; (5 ft freeboard at low MH (N23-MH0014A))
Folsom East	No surcharge; (5 ft freeboard at an upstream low MH (N37-MH0047A))	Minor backup surcharge from Bradshaw Interceptor; (5 ft freeboard at an upstream low MH (N37-MH0047A))
Laguna	No surcharge	No surcharge

Using the worst-case scenario in Table 11.2 (the Conservative Buildout column) it can be seen that, at build-out PWWF, there are critical surcharges in four (4) of these systems (the Central, Northeast, Sunrise and City of Sacramento systems). There are also possible SSOs at three manholes within two (2) of the systems (the Central and City of Sacramento interceptors). It should be remembered, however, that build-out PWWF is not expected to be reached for well over 50 years, in which time relief projects are assumed to have been constructed to mitigate these SSOs. A discussion of such relief projects is outside the scope of this ISS and will be addressed in a future report.

Table 11.2 ISS Cost Summary of Conveyance-Only Alternatives

Table 11.2: ISS Cost Summary of Conveyance-Only Alternatives													
Group	Alt #	Alternative	Interceptors	Notes	Estimated Wastewater Flows (MGD)		Interceptor Pipe Length (miles)	Interceptor Costs (\$Millions)	Total Conveyance Capital Cost. (\$Millions)	Water Recycling Capital Cost (\$Millions)	NPV of O&M (\$Millions)		Total Cost for Alternative (\$Millions)
					ADWF	PWWF					Conveyance	Sat WWTP	
Conveyance Only	1	Conveyance Only - Option 1	Florin Interceptor			56.1	13.8	\$158	\$435		\$41		\$476
			Laguna/South Interceptor			68.0	25.1	\$277					
	2	Conveyance Only - Option 2	Florin Interceptor	Gravity to LIE		56.1	13.8	\$158	\$468		\$32		\$500
			Sheldon Interceptor			41.9	12.4	\$184					
			South Interceptor			25.7	14.1	\$127					
	3	Conveyance Only - Option 3	Florin Interceptor	Pump to Brad		56.1	13.8	\$159	\$421		\$42		\$463
Sheldon Interceptor					41.9	9.3	\$135						
South Interceptor					25.7	14.1	\$127						

Risk: Using the criteria set out in *Technical Memorandum No. 8 (Risks Analysis)*, a risk assessment was done on this alternative with the following results:

Table 11.3 Alt 1: Conveyance Only - Option 1 Risk Assessment

	Description	Likelihood	Consequence	Risk Signature
Asset and Service Reliability	Large facility in south area has moderate potential for failure.	Unlikely 2%	Moderate \$1,000,000	Medium \$20,000
Environment	Large pumping station located near Consumes River would damage waterway if SSO occurred.	Unlikely 2%	Major \$10,000,000	Medium \$200,000
Financial	Alternative has 2 pump stations. Capital and M&O costs are predictable.	Rare 0.5%	Moderate \$1,000,000	Low \$5,000
Legal	System configuration has relatively low potential for legal actions.	Rare 0.5%	Moderate \$1,000,000	Low \$5,000
Public Health	Pump station could have health impacts to humans if SSO occurred.	Rare 0.5%	Major \$10,000,000	Medium \$50,000
Public Trust	Alternative has relatively low potential to impact public trust.	Rare 0.5%	Minor \$100,000	Low \$500
Regulatory	Alternative relies on single discharge permit at SRWTP that requires additional permitted capacity.	Unlikely 2%	Major \$10,000,000	Medium \$200,000

When comparing these risk costs to the overall capital costs for this alternative they are not financially significant. But it should be noted that, because this alternative has the largest facility (a 68 MGD pump station at South Interceptor), it does carry higher risk costs than the other two alternatives when considering the ***Asset and Service Reliability*** and ***Environmental*** categories.

2.2 Conveyance-Only Option 2

See Figure 11.3. As in Option #1, flows will be conveyed in the same way from Cordova Hills and the upper reaches of the Laguna Creek area, directly west via the **Florin Interceptor** (from about the corner of Jackson Hwy and Sunrise Blvd) and connected to the Bradshaw Interceptor. The remaining, southern, Laguna/Grantline flows will be conveyed west to the existing SRWTP, via gravity through the **Sheldon Interceptor**, along a corridor located on or near Sheldon Rd. Separately, the new **South Interceptor** in the expanded Elk Grove SOI will carry the flows from this area north to the SRWTP via a pump station and force main.

In this alternative there are two pump stations (20 MGD and 26 MGD) and 40 miles of interceptor pipeline. The smaller pump station in the South Area is offset by the longer Sheldon Interceptor to the SRWTP and this factor makes this the most expensive alternative amongst the three conveyance-only alternatives analyzed, as shown in Table 11.2.

Hydraulic modeling was carried out for this alternative using the design and performance criteria set out in Chapter 4 of this report and the attached *Technical Memorandum No.2 (Design and Performance Storms)*. The hydraulic grade line (HGL) was monitored in 14 existing and future interceptor systems (Bradshaw, Central, Northwest, Sunrise, City of Sacramento, McClellan, Lower Northwest, McClellan, Upper Dry Creek, Lower Dry Creek, Upper Northwest, Folsom, Folsom East and Laguna) to check for surcharges and possible sanitary sewer overflows (SSOs). The results of these modeling runs can be seen in detail in the attached *Technical Memorandum No.13 (Hydraulic Model Evaluation)*. A summary of these results are shown in table 11.4

Figure 11.3 Conveyance-Only Option 2

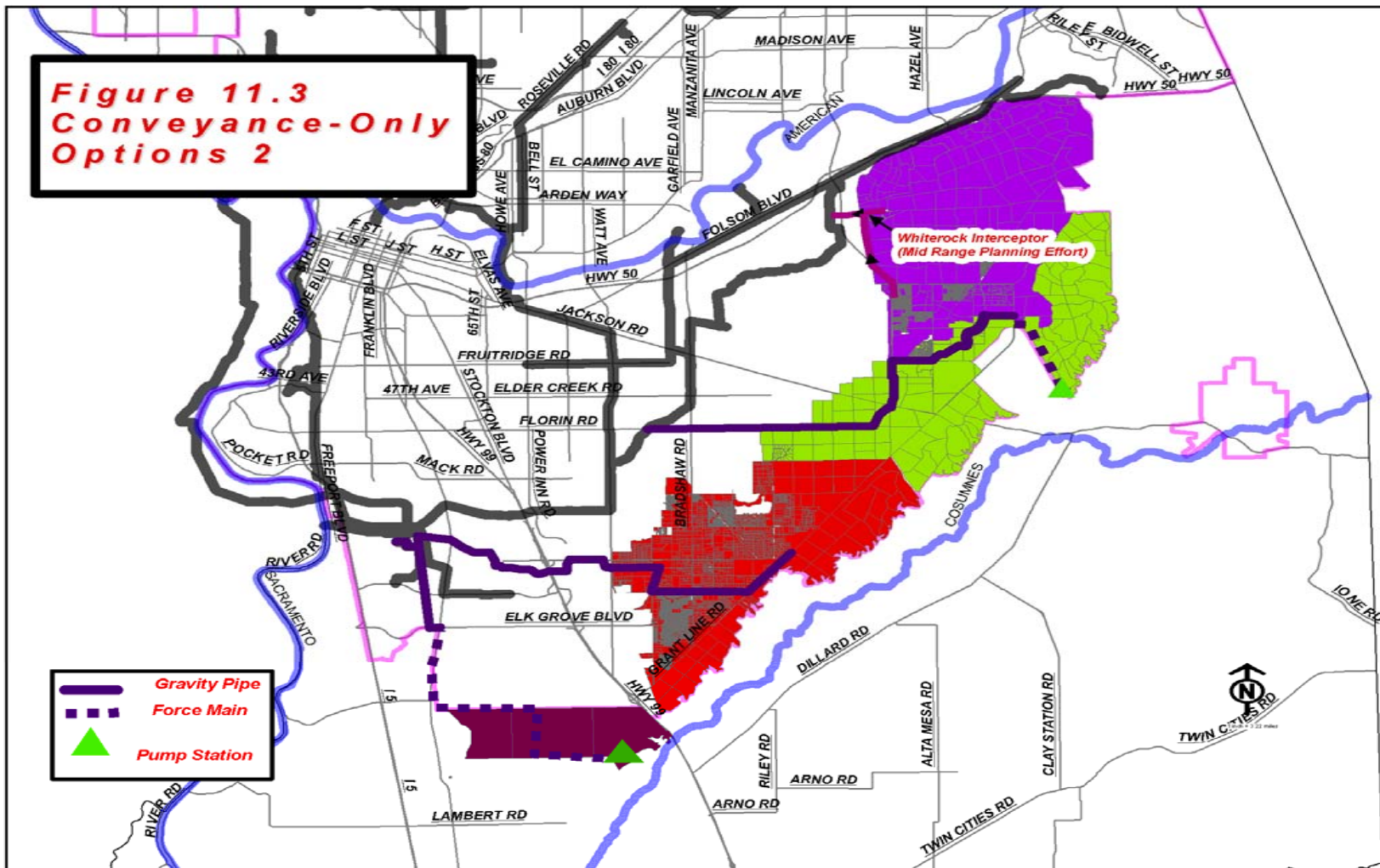


Table 11.4 Modeling Results Summary for Alternative C2		
Interceptor	Realistic Buildout	Conservative Buildout
Bradshaw	No surcharge	Moderate surcharge (10 ft freeboard at N38-MH0020A)
Central	Moderate surcharge (7 ft freeboard at N21-MH0074B)	Critical surcharge; Overflows at N21-MH0074B
Northeast	No surcharge	Critical backup surcharge from Central Interceptor (3 ft freeboard at N16 (N24-MH0032A))
Sunrise	No surcharge; (6 ft freeboard at low MH SR2040)	Critical backup surcharge from Bradshaw Interceptor (4 ft freeboard at MH SR1130)
City	Critical surcharge; Overflows at N25-MH0033A and N25-MH0033B	Critical surcharge; Overflows at N25-MH0033A and N25-MH0033B
McClellan (after relieved)	No surcharge (4 ft freeboard at an upstream low MH (N33-MH0032A))	Minor surcharge downstream; (4 ft freeboard at an upstream low MH (N33-MH0032A))
Upper Dry Creek (after relieved)	No surcharge	Minor surcharge (12 ft freeboard at N17-MH0091A)
Lower Dry Creek	No surcharge	No surcharge
Upper Northwest	No surcharge	No surcharge
Lower Northwest	No surcharge	No surcharge
Natomas	No surcharge	No surcharge
Folsom	No surcharge; (6 ft freeboard at low MH (N23-MH0014A))	No surcharge; (5 ft freeboard at low MH (N23-MH0014A))
Folsom East	No surcharge; (5 ft freeboard at an upstream low MH (N37-MH0047A))	Minor backup surcharge from Bradshaw Interceptor; (5 ft freeboard at an upstream low MH (N37-MH0047A))
Laguna	No surcharge	No surcharge

These modeling results are identical to that of Conveyance-Only Option 1 since the connection to the Bradshaw Interceptor is the same. Therefore, using the worst-case scenario in Table 11.4 (the Conservative Buildout column) it can be seen that, at build-out PWWF, there are critical surcharges in four (4) of these systems (the Central, Northeast, Sunrise and City of Sacramento systems). There are also possible SSOs at three manholes within two (2) of the systems (the Central and City of Sacramento interceptors). Again, it should be remembered that build-out PWWF is not expected to be reached for well over 50 years, in which time relief projects are assumed to have been constructed to mitigate these SSOs. A discussion of such relief projects is outside the scope of this ISS and will be addressed in a future report.

Risk: Using the criteria set out in *Technical Memorandum No. 8 (Risks Analysis)*, a risk assessment was done on this alternative with the following results:

Table 11.5 Alt 2: Conveyance Only - Option 2 Risk Assessment

	Description	Likelihood	Consequence	Risk Signature
Asset and Service Reliability	Alternative has moderate potential for failure. More flow is via gravity compared to Alt 1.	Unlikely 2%	Minor \$100,000	Low \$2,000
Environment	Smaller pumping station located near Consumes River would damage waterway if SSO occurred.	Unlikely 2%	Moderate \$1,000,000	Medium \$20,000
Financial	Alternative has 2 pump stations. Capital and M&O costs are predictable.	Rare 0.5%	Moderate \$1,000,000	Low \$5,000
Legal	System configuration has relatively low potential for legal actions.	Rare 0.5%	Moderate \$1,000,000	Low \$5,000
Public Health	Less pumping than alternative 1. Pump stations could have health impacts to humans if SSO occurred.	Rare 0.5%	Major \$10,000,000	Medium \$50,000
Public Trust	Alternative has relatively low potential to impact public trust.	Rare 0.5%	Minor \$100,000	Low \$500
Regulatory	Alternative relies on single discharge permit at SRWTP that requires additional permitted capacity.	Unlikely 2%	Major \$10,000,000	Medium \$200,000

As with Option #1, when comparing these risk costs to the overall capital costs for this alternative they are not financially significant. But it should be noted that Option #2 carries slightly less risk for the categories of **Asset & Service Reliability** and **Environmental** than Option #1 because it has a smaller pump station in the South Interceptor. Also, it contains less pump stations than Option #3 and so it carries slightly less risk.

2.3 Conveyance-Only Option 3

(Storage option) See Figure 11.4. As in Options #1 & 2, flows will be conveyed in the same way from Cordova Hills and the upper reaches of the Laguna Creek area, directly west via

the **Florin Interceptor** (from about the corner of Jackson Hwy and Sunrise Blvd) and connected to the Bradshaw Interceptor. The remaining, southern, Laguna/Grantline flows will be conveyed west toward the SRWTP (**Sheldon Interceptor**) along a corridor located on or near Sheldon Rd, but, instead of traveling by gravity all the way to the SRWTP, they would jog north, by pump station and force main, at Elk Grove-Florin Rd and connect to the Bradshaw Interceptor which will carry it on to the SRWTP (possible storage). Separately, the new **South Interceptor** in the expanded Elk Grove SOI will carry its flows north to the SRWTP via a pump station and force main.

In this alternative there are three pump stations (20 MGD, 42 MGD and 26 MGD) and 37 miles of interceptor pipeline. Despite the extra pump station, the substantially shorter Sheldon Interceptor makes this the most cost effective alternative amongst the three conveyance-only alternatives analyzed, as shown in Table 11.2.

Hydraulic modeling was carried out for this alternative using the design and performance criteria set out in Chapter 4 of this report and the attached *Technical Memorandum No.2 (Design and Performance Storms)*. The hydraulic grade line (HGL) was monitored in 14 existing and future interceptor systems (Bradshaw, Central, Northwest, Sunrise, City of Sacramento, McClellan, Lower Northwest, McClellan, Upper Dry Creek, Lower Dry Creek, Upper Northwest, Folsom, Folsom East and Laguna) to check for surcharges and possible sanitary sewer overflows (SSOs). The results of these modeling runs can be seen in detail in the attached *Technical Memorandum No.13 (Hydraulic Model Evaluation)*. A summary of these results are shown in table 11.6.

Figure 11.4 Conveyance-Only Option 3

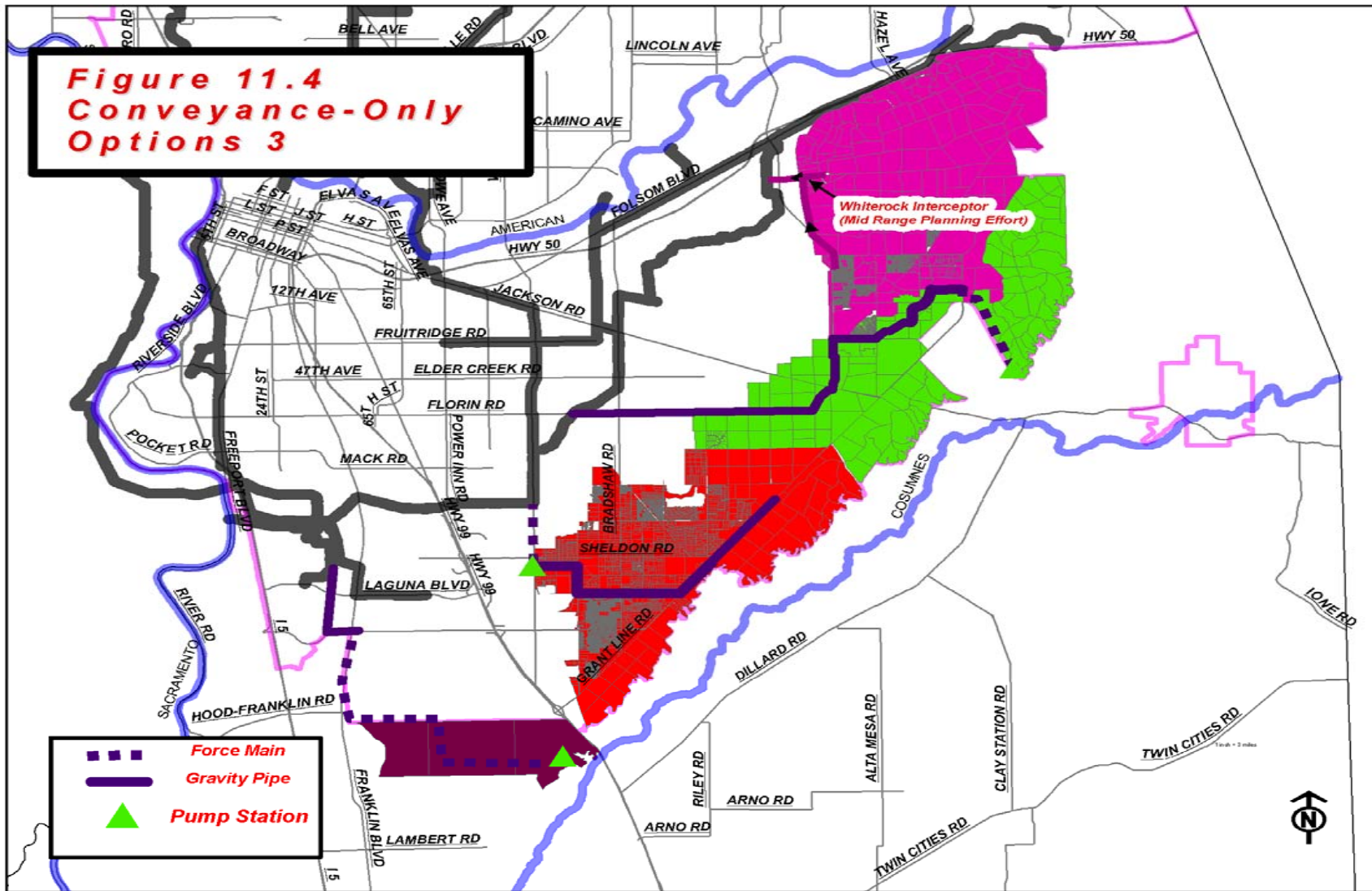


Table 11.6 Modeling Results Summary for Alternative C3		
Interceptor	Realistic Buildout	Conservative Buildout
Bradshaw	No surcharge (13 ft freeboard at N38-MH0020A)	Moderate surcharge (8 ft freeboard at N38-MH0020A)
Central	Moderate surcharge (6 ft freeboard at N21-MH0074B)	Critical surcharge; Overflows at N21-MH0074B and N21-MH0073B
Northeast	No surcharge	Critical backup surcharge from Central Interceptor (1 ft freeboard at N16 (N24-MH0032A))
Sunrise	No surcharge (6 ft freeboard at low MH SR2040)	Critical backup surcharge from Bradshaw Interceptor (4 ft freeboard at MH SR1130)
City	Critical surcharge; Overflows at N25-MH0033A and N25-MH0033B	Critical surcharge; Overflows at N25-MH0033A and N25-MH0033B
McClellan (after relieved)	No surcharge (4 ft freeboard at an upstream low MH (N33-MH0032A))	Minor surcharge downstream (4 ft freeboard at an upstream low MH (N33-MH0032A))
Upper Dry Creek (after relieved)	No surcharge	Minor surcharge (12 ft freeboard at N17-MH0091A)
Lower Dry Creek	No surcharge	No surcharge
Upper Northwest	No surcharge	No surcharge
Lower Northwest	No surcharge	No surcharge
Natomas	No surcharge	No surcharge
Folsom	No surcharge (6 ft freeboard at low MH (N23-MH0014A))	Minor backup surcharge from Central and Northeast Interceptors (5 ft freeboard at low MH (N23-MH0014A))
Folsom East	No surcharge (5 ft freeboard at an upstream low MH (N37-MH0047A))	Minor backup surcharge from Bradshaw Interceptor (5 ft freeboard at an upstream low MH (N37-MH0047A))
Laguna	No surcharge	No surcharge

Using the worst-case scenario in Table 11.6 (the Conservative Buildout column) it can be seen that, at build-out PWWF, there are critical surcharges in four (4) of these systems (the Central, Northeast, Sunrise and City of Sacramento systems). There are also possible SSOs at four manholes within two (2) of the systems (the Central and City of Sacramento interceptors). This is more potential overflow than the previous two alternatives because this alternative connects to the Bradshaw Interceptor in two locations. It should be stressed again, however, that build-out PWWF is not expected to be reached for well over 50 years, in which time relief projects are assumed to have been constructed to mitigate these SSOs. A discussion of such relief projects is outside the scope of this ISS and will be addressed in a future report.

Risk: Using the criteria set out in *Technical Memorandum No. 8 (Risks Analysis)*, a risk assessment was done on this alternative with the following results:

Table 11.7 Alt 3: Conveyance Only - Option 3 Risk Assessment

	Description	Likelihood	Consequence	Risk Signature
Asset and Service Reliability	More pump stations than other alternatives. More potential for escalating operating costs.	Possible 5%	Minor \$100,000	Low \$5,000
Environment	Smaller pumping station located near Consumes River would damage waterway if SSO occurred.	Unlikely 2%	Moderate \$1,000,000	Medium \$20,000
Financial	Alternative has 3 pump stations. Capital and M&O costs are less predictable than other conveyance only options.	Rare 0.5%	Moderate \$1,000,000	Low \$5,000
Legal	System configuration has relatively low potential for legal actions.	Rare 0.5%	Moderate \$1,000,000	Low \$5,000
Public Health	More pump stations than alternatives 1 and 2. Pump stations could have health impacts to humans if SSO occurred.	Rare 0.5%	Major \$10,000,000	Medium \$50,000
Public Trust	Alternative has relatively low potential to impact public trust.	Rare 0.5%	Minor \$100,000	Low \$500
Regulatory	Alternative relies on single discharge permit at SRWTP that requires additional permitted capacity.	Unlikely 2%	Major \$10,000,000	Medium \$200,000

As with the other two Options, when comparing these risk costs to the overall capital costs for this alternative they are not financially significant. But it should be noted that Option #3, although carrying slightly less risk for **Asset & Service Reliability** and **Environmental** than Option #1 (because it has a smaller pump station in the South Interceptor), its extra pump station on the Sheldon Interceptor does mean that this alternative carries more risk than Option #2 in the category of **Asset & Service Reliability**. The potential for higher volumes of SSOs in Option #3 is , as can be seen in the modeling results above, real. However, this reality is not believed to raise the risk of any of the categories by any degree of magnitude above the other alternatives.

3.0 ANALYSIS OF ALTERNATIVES

Maximizing the availability of the existing Bradshaw Interceptor is a key component to providing the most cost effective conveyance solution for the East County, Sheldon and South Areas. By doing this, *Conveyance-Only Option 3* minimizes the amount of pipeline required to be constructed and, despite having an additional pump station, positioned itself as the least expensive alternative amongst the three analyzed. In addition, by having the pump station on the Sheldon Interceptor to take flows to the Bradshaw Interceptor, an opportunity exists to provide some storage capacity in the force main and pump station itself during future critical storm events.

By adding the most flow to the existing Bradshaw Interceptor, *Option 3* is projected to create the largest potential SSOs in the *Central* and *City Interceptor* lines. But, as discussed earlier, this would be during a peak wet weather flow event at build-out, and build-out is not predicted to be reached for well over 50 years. This is ample time to implement relief projects to mitigate such overflows.

The risks for the three alternatives are very similar but, because the costs of all three alternatives are within 10% of each other, they should be considered. Option #3 is not only less expensive than Option #1, it carries slightly less risk. Option #2 carries \$3,000/year less risk than Option #3 because of the extra pump station. But this cost pales to the \$37 million that Option #3 saves over Option #2. The fact that four manholes may potentially overflow at build-out PWWF in Option #3 (rather than three manholes in the other two alternatives) does not constitute a higher degree of magnitude of risk. It should, however, be noted that this potential increase in SSO volume may occur if relief projects are not implemented before PWWF are achieved.

4.0 RECOMMENDATION

For purposes of purely sanitary sewer conveyance to the SRWTP, staff recommends that the ***Conveyance-Only Option No.3*** is the most cost efficient solution to serve the defined areas of East County, Sheldon and South.

The preliminary profiles of all three interceptors within this alternative are shown in Figures 11.5, 11.6 and 11.7

Figure 11.5 Conveyance-Only Option 3 – Florin Interceptor Profile

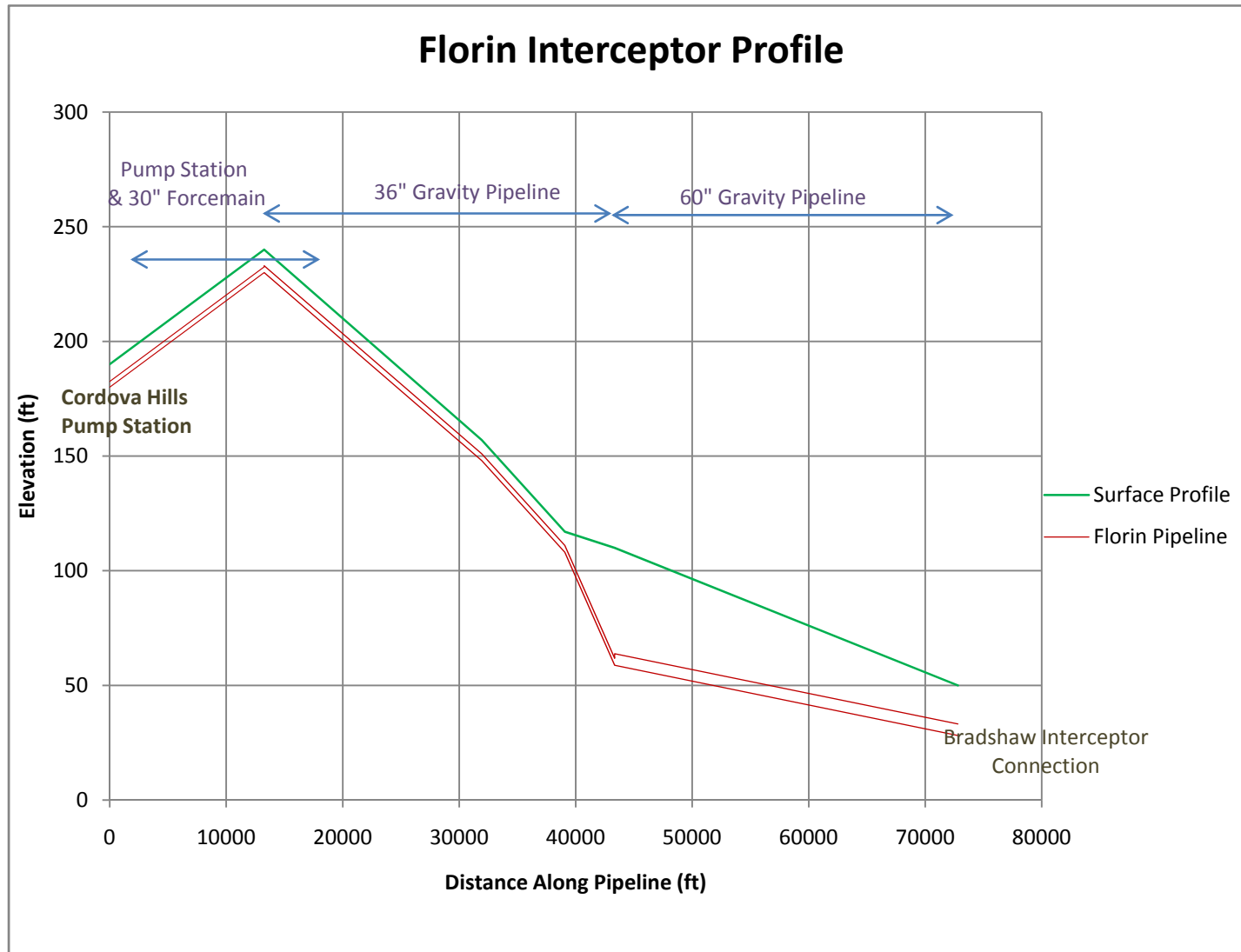


Figure 11.6 Conveyance-Only Option 3 – Sheldon Interceptor Profile

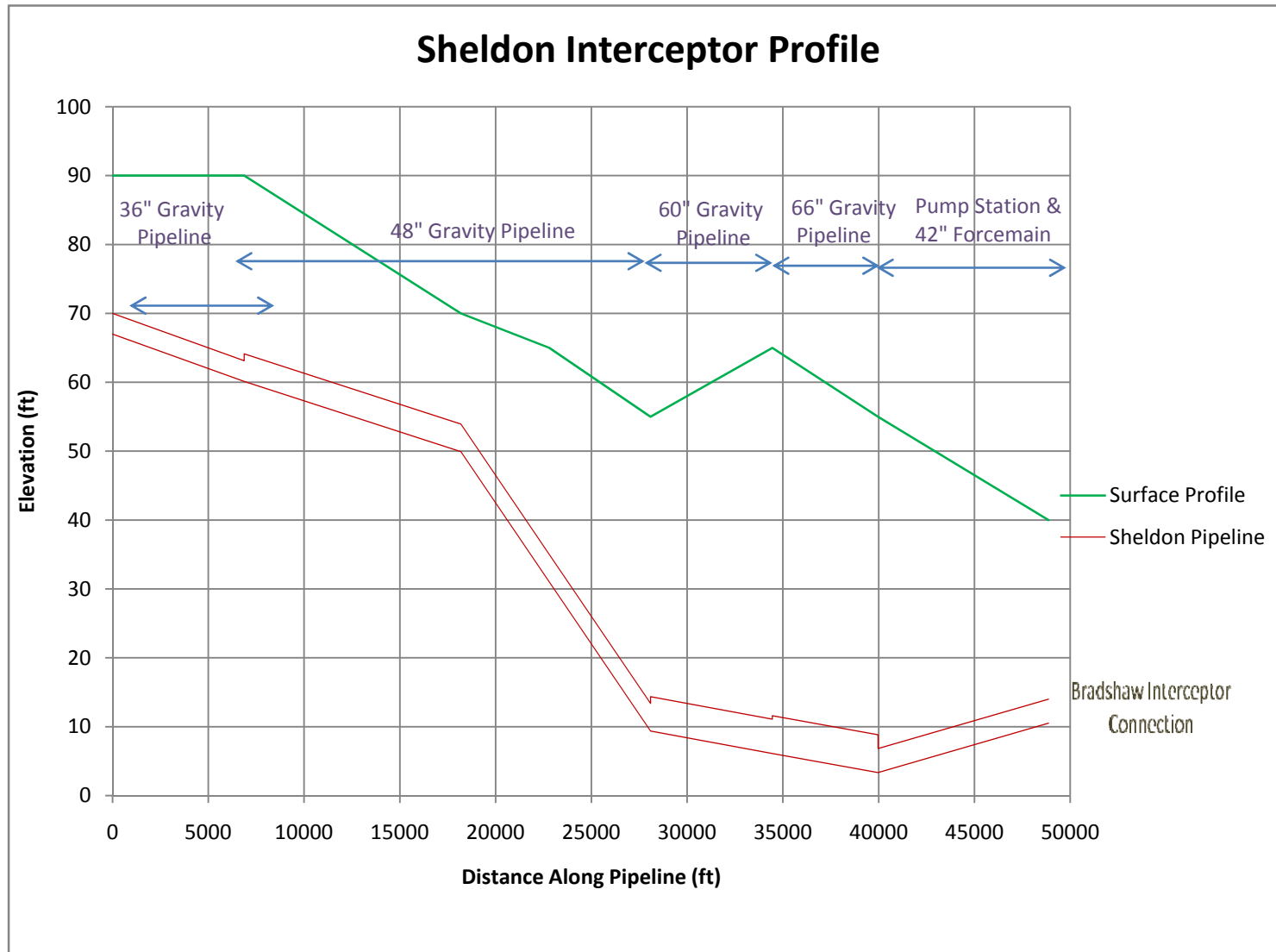


Figure 11.7 Conveyance-Only Option 3 – South Interceptor Profile

