

Final Improvement Plan

South Awbrey Butte Drainage Study

City of Bend Project #SR15AA

Bend, Oregon

October 17, 2017





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ATTACHMENTS

Attachment 1: Existing Drainage Evaluation Report

Attachment 2: Preferred Improvement Area Technical Memorandum

Attachment 3: Alternatives Analysis Technical Memorandum

1 Introduction

Drainage issues on Awbrey Butte and along Newport Avenue have persisted for decades and continue to inconvenience citizens and require a disproportionate amount of the City of Bend's (City) maintenance resources and funding. Additionally, numerous segments of the Newport Avenue Storm Sewer are known to be deficient and require replacement. To better understand the scope and magnitude of the issues, the City selected HDR Engineering, Inc. (HDR) to perform the South Awbrey Butte Drainage Study (Study). The overall objective of the Study is to develop a prioritized basin wide stormwater improvement plan that is strategic, effective and capable of phased implementation with limited public infrastructure funds. This is a planning level study and is intended to inform the next phases of design and the development of a Capital Improvement Plan, which was not a part of this work.

The Final Improvement Plan is the last major task element of the Study and presents the final prioritized stormwater improvement recommendations developed for the Study Area. The Study Area is defined as the portion of the south side of Awbrey Butte extending from College Way east to 9th Street, and from Newport Avenue north to the top of the Butte. Figure 1 shows this area. The recommendations included in Section 3 of this report are intended to be used by City staff to program and prioritize drainage improvements within the Study Area.

2 Scope of Work

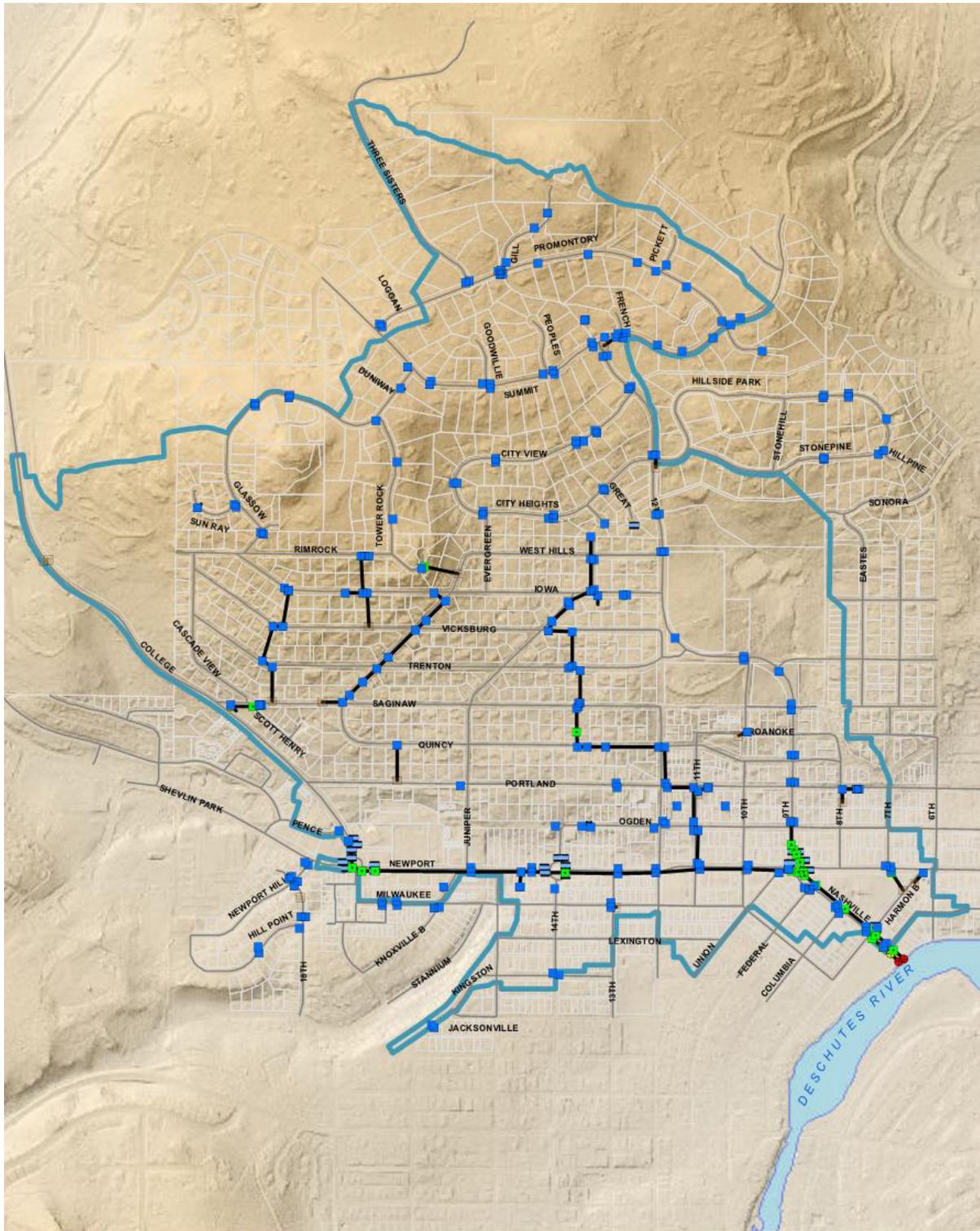
The South Awbrey Butte Drainage Study is a planning phase study to identify existing drainage issues, understand their impact within the project area, develop conceptual design alternatives, and ultimately develop a prioritized list of projects to address the most critical drainage issues.

The Study included the following major sequential task elements:

- Task 4: Existing Drainage System Evaluation (Included as Attachment 1)
- Task 5: Development of Preferred Improvement Areas (Included as Attachment 2)
- Task 6: Development and Evaluation of Design Alternatives (Included as Attachment 3)
- Task 7: Prioritization of Improvement Areas and Alternatives

Each of these major task elements are summarized in further detail below and were implemented in sequence to inform subsequent tasks.

Figure 1: Study Area



	Study Area	Distribution Box	Up Basin
Catch Basin	Outfall	Vault	
Curb Inlet	Sediment Manhole	Storm Pipe	

STUDY AREA - EXISTING STORM SYSTEM
FIGURE 1
DATA SOURCE: (City of Bend, 2016)

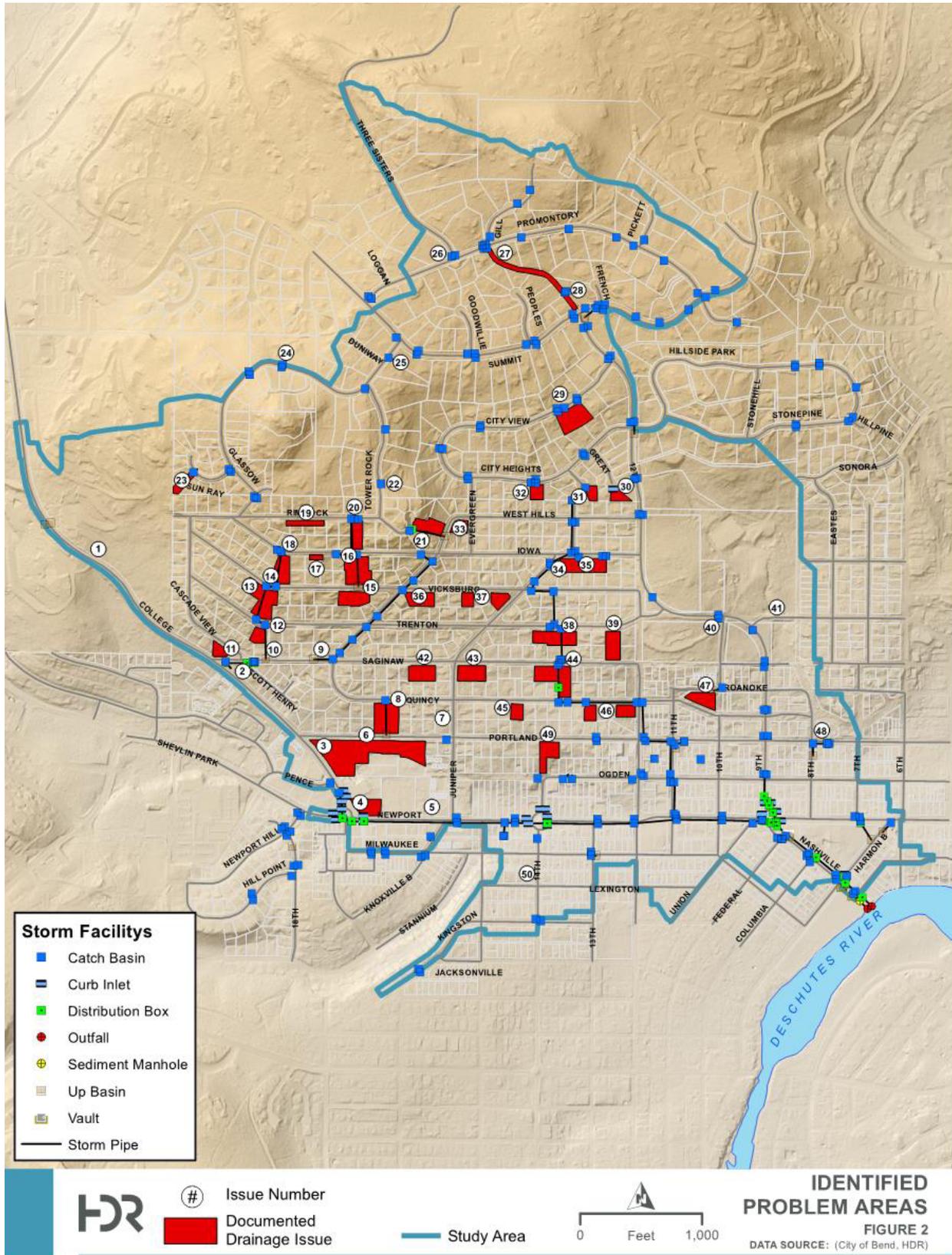
X:\B:\PROJECTS\BEND\SOUTH\BWBRE\BUTTEDRAINAGE\STUDY\MAP_DOC\FIGURE 1 STUDY AREA - EXISTING STORM SYSTEM.MXD - USER: LLSMITH - DATE: 10/5/2017

2.1 Existing Drainage System Evaluation

The existing conditions assessment involved identifying, analyzing and summarizing the type and extent of drainage issues within the Study Area. The evaluation included a thorough review of system data provided by the City, including CCTV footage review, Operations and Maintenance records, and received public comments. In addition, a hydrologic and hydraulic model of the existing system was developed using XP Software's Storm Water Management Model (XP-SWMM). The model was used to perform a pipe capacity analysis, surface flooding analysis, and to identify system deficiencies. The full Existing Drainage System Evaluation Report is included as Attachment 1.

The Existing Drainage System Evaluation Report led to the identification of both systemic and specific drainage issues within the Awbrey Butte Study Area. Systemic issues are those seen basin wide which negatively impact properties, water quality, water quantity, and/or system performance. Specific drainage issues identified included locations of flooding, non-compliant structures, insufficient pipe capacity, and inlet clogging, among others. These identified issues from the evaluation effort were then mapped, along with reported drainage issues from residents and City staff, to convey the magnitude of drainage problems in the Awbrey Butte drainage Study Area. Figure 2 includes a summary of the identified specific drainage issues, and further mapping efforts are also included in Attachment 1.

Figure 2: Identified Problem Areas



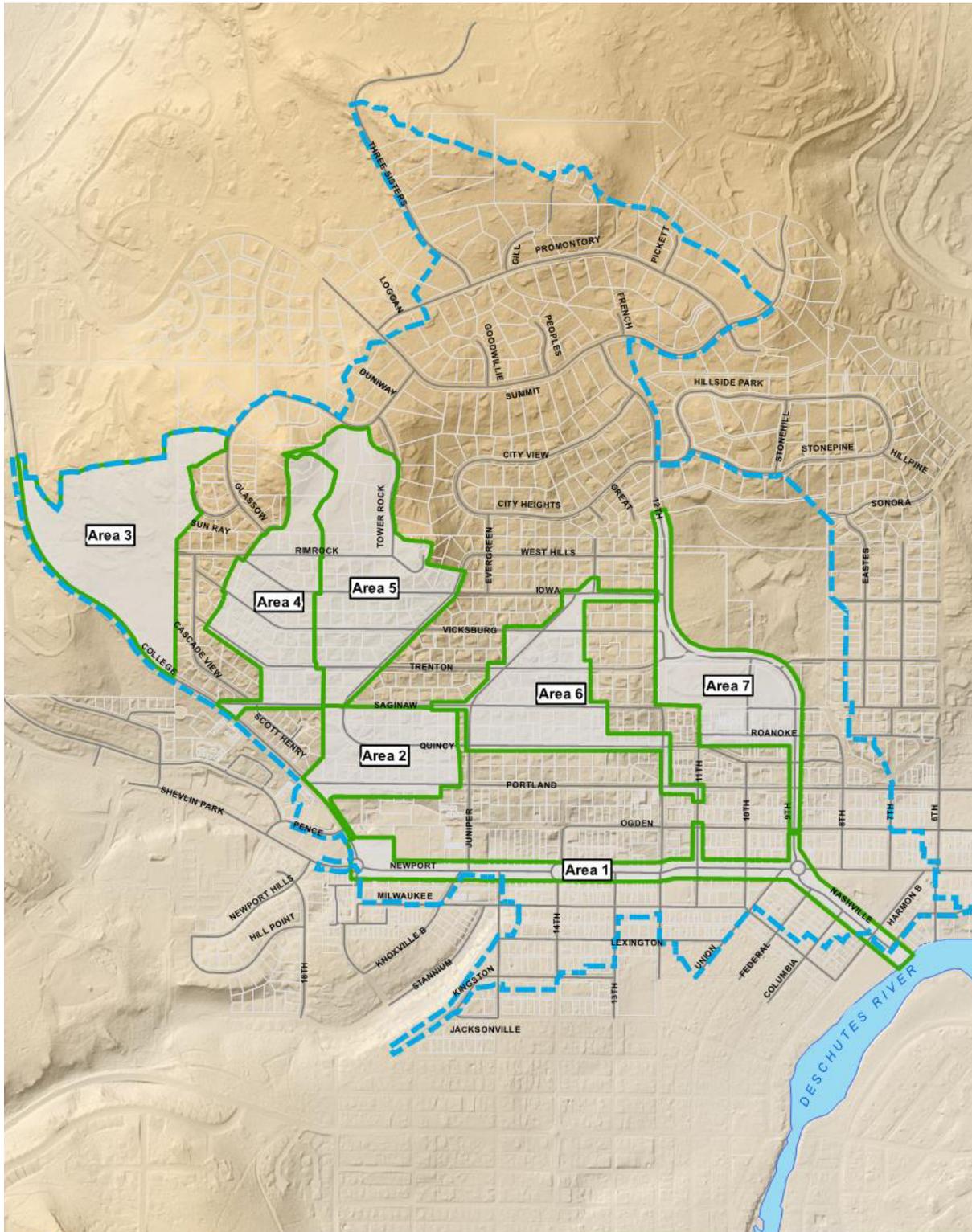
2.2 Preferred Improvement Areas

Preferred Improvements Areas (PIAs) were defined for this project as “a feasible list or set area of drainage problems to be improved, which in the opinion of the City and HDR, will balance future expenditures and benefits.” The identification of PIAs focused on those portions of the system that directly contribute flow via piped or street conveyance to the Newport Avenue Storm System. The areas included the most significant drainage issues that could be addressed at a systems level, or at a level that impacted both directly adjacent areas as well as downstream sections of the storm system.

A total of seven PIAs were developed and carried forward into the Alternatives Analysis and Final Improvement Plan for this project. These areas included portions of College Way, Portland Avenue, Saginaw Avenue, West Hills Avenue, Juniper Avenue, Quincy Avenue and 12th Street, and the basins associated with those streets. The Newport Avenue system, including all conveyance and catch basin structures, was also identified as a PIA; however, it was determined that the entire system on Newport Avenue is in need of replacement, and thus the design of a comprehensive drainage system for Newport Avenue was placed outside the scope of this project. Figure 3 shows the extents of the seven PIA areas.

In addition to those deficiencies identified in the PIAs, there are other specific drainage problems which have been documented throughout the basin. These issues have been documented in the Final Preferred Improvement Area Technical Memorandum provided as Attachment 2. None of the documented issues located outside of the PIAs are included in the final project prioritization list, as these issues may be addressed by City crews or included in future CIP projects.

Figure 3: Preferred Improvement Areas



— Issue Area
- - - Study Area

0 Feet 1,000

PREFERRED IMPROVEMENT AREAS

FIGURE 3
DATA SOURCE: (City of Bend, HDR)

ATE: B:\PROJECTS\BEND\SOUTHAWBREYBUTTEDRAINAGESTUDY\MAP_DOCS\FIGURE 3 PREFERRED IMPROVEMENT AREAS.MXD - USER: LLSMITH - DATE: 10/5/2017

2.3 Alternatives Development and Evaluation

2.3.1 Alternatives Development

The conceptual design alternatives developed for each of the PIA areas focus on the most significant drainage problems at a systems level. All design alternatives aim to better manage street conveyance and private property flooding, reduce the total amount of runoff discharged to the Deschutes River, improve storm water quality, and replace or repair damaged pipes and structures. The complete set of guidelines and standard design criteria used to develop conceptual designs can be found in the Alternatives Analysis Technical Memorandum provided as Attachment 3.

In general, design alternatives included one base alternative and one comprehensive alternative. The base alternative was developed with the primary objective of managing the water quality storm: a 6-month, 24-hour storm event, or the equivalent of 1.0 inches of rain falling over the entire study area during a 24-hour period. In all cases where applicable, this alternative focused on replacing or repairing ineffective infrastructure, improving overland conveyance to catch basins, and providing UIC facilities to the extent practicable in a given PIA. The comprehensive alternative built upon the base alternative, and had the goal of further reducing street and private property flooding and providing piped conveyance for the 25-year event, which is the equivalent of 2.5 inches of rainwater over the study area in 24 hours. The Central Oregon Stormwater Manual recommends that new storm infiltration and enclosed conveyance systems be designed with capacity for the 25-year event. In two of the areas, only one alternative was developed, as a second alternative was not feasible or practical based on site constraints. These areas included the upstream portion of College Way from Saginaw Avenue to the Central Oregon Community College Campus, and 9th to 12th street, on the eastern border of the study area. A description and map of each of the conceptual designs can also be found in the Alternatives Analysis Technical Memorandum, Attachment 3.

2.3.2 Alternatives Evaluation

The alternatives developed for each PIA area, most often a base and a comprehensive alternative, represent the spectrum of possible improvement projects. As a result of this approach, a typical comparative alternatives analysis was not performed. Instead, HDR selected recommended improvement alternatives which in its opinion best met the following criteria:

- Direct benefit to Newport Avenue Storm System (Newport Avenue pipe replacement, flow reduction, or water quality improvement)
- Reduced flooding of documented areas
- Improved water quality

In the Alternative Analysis memo, a preferred alternative is provided for each of the PIAs. However, it is recognized that a phased approach for the implementation of these

recommendations may be required. The following Final Improvement Plan provides an outline for this approach.

3 Final Improvement Plan

3.1 Methodology

This final improvement plan presents a prioritized list of drainage improvements which attempts to balance future expenditures and benefits. The proposed projects are grouped into three (3) priority tiers with Tier 1 representing the highest priority projects and Tier 3 representing the lowest priority projects.

Each of the developed alternatives were broken up into schedules, which are defined as “a group of improvements that is reasonably undertaken as a single construction contract.” These schedules were designed to maximize targeted benefits within each PIA and took into consideration the location, type, and constructability of improvements. This approach allows for phased implementation of the developed alternatives and provides flexibility to implement portions of the developed alternatives across the Study Area.

The individual projects were prioritized by HDR based on the following criteria:

- Direct benefit to Newport Avenue Storm System (Newport Avenue pipe replacement, flow reduction or water quality improvement)
- Reduction of flooding of key areas documented by the City, HDR, and public comment.
- Provision of water quality treatment infrastructure

Numerous additional factors were considered during project prioritization including the logical phasing of improvements, constructability, cost, collective magnitude of improvement benefit, extent of benefit area, and long term Operations and Maintenance benefits.

3.2 Estimates of Probable Construction Costs

AACE Class 5 estimates of probable construction cost (cost estimate) were prepared for each of the developed alternatives. The cost estimates detail each individual improvement schedule. Individual schedule costs were summed by alternative, with additional cost items, including, but not limited to, mobilization, traffic control, engineering, and contingency, added to the estimates as percentages of the total. The Class 5 estimates are summarized in **Table 1**, which includes the summed schedule costs with the additional cost items applied. The detailed estimates and figures delineating the limits of each construction schedule are located in Appendix A.

Table 1: Estimate of Probable Construction Cost

PIA	Alternative	Estimated Cost
2	2.1	\$208,000
2	2.2	\$460,000
3	3.1	\$379,000
4	4.1	\$216,000
4	4.2	\$622,000
5	5.1	\$669,000
5	5.2	\$1,183,000
6	6.1	\$930,000
6	6.2	\$1,807,000
7	7.1	\$379,000

3.3 Prioritized Project List

3.3.1 Tier 1 Projects

The highest priority projects for implementation are summarized in

Table 2.

Table 2: Prioritized Tier 1 Project List

Priority	Improvement	Description	Estimated Cost
1	PIA 1	Replace Newport Trunk Line from outfall to College Way.	Not Estimated
2	Alt 2.2, Schedules A&B	Extend College Way collection system to DCB001020 on Portland Avenue.	\$402,220
3	Alt 4.2, Schedules A&E	Extend College Way collection system to DCB001014 on Saginaw Avenue. Install inlets on Cascade View. Requires priority 2.	\$436,020
4	Alt 5.2, Schedule E	Extend storm in Saginaw Avenue to intersection of West Hills Avenue. Requires priorities 2 and 3.	\$119,990
5	Alt 6.2, Schedule A	Reconstruct storm system from Newport Avenue to Quincy Avenue, extending west on Quincy Avenue to DCB001032	\$415,750

6	Alt 6.2, Schedules C, D, & E	Extend Quincy Avenue storm system to Juniper Street, then northeast on Juniper Street to Iowa Avenue. Requires Priority 5.	\$1,264,120
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3.3.1.1 TIER 1 PRIORITIZATION RATIONALE

Replacement of the Newport Avenue Trunk Line was selected as the highest priority project in the basin. This critical pipeline consists of approximately 4,500 lineal feet (LF) of corrugated metal pipe (CMP) that varies in both size and shape. The storm system is in poor condition: nearly all pipe segments have structural defects including extensive surface corrosion, collapsed pipe segments, visible holes, separated joints, and considerable sediment deposits. In addition, segments of the system have non-compliant structures and insufficient hydraulic capacity. Pipe sizing is discussed in section 3.1 and Appendix B of the Alternatives Analysis Technical Memo. Upstream improvements are expected to add flows to the Newport Avenue system, and thus the pipe should be sized in anticipation of additional improvements in basin. Sizing depends on additional factors selected in design, included detention and infiltration along Newport Avenue.

Priority projects 2, 3, and 4 were selected next to alleviate excessive flows on the street surface originating from upbasins located on Portland Avenue and Saginaw Avenue. Flows from these upbasins result in frequent flooding of properties on Portland Avenue and College Way, and cascade downslope along Newport Avenue to 14th street. Erosion and the resuspension of pollutants on the street surface degrade water quality and are ultimately discharged to the Deschutes River. When compared to projects 5 and 6, these projects have greater potential to improve water quality in the Newport Avenue Storm System, and are relatively easy to plan and implement.

Projects 5 and 6 are included in Tier 1 as they have the potential to benefit the largest number of homeowners in the Study Area. PIA 6 received the highest number of public comment complaints and HDR believes that the majority of homes in PIA 6 are negatively impacted by excessive street surface flows originating from Iowa and Juniper. The addition of curbs and construction of a piped collection system is required to adequately manage and convey flows in this PIA. Upsizing pipe from Portland Avenue to Newport Avenue is included in the cost estimate for PIA 6.2, Schedule A, as it will facilitate conveyance from upstream improvements to the Newport Avenue system. With the exception of Newport Avenue, these projects will be the most difficult to plan and will cost the most to implement.

3.3.2 Tier 2 Projects

The second highest priority projects for implementation are summarized in **Table 3**.

Table 3: Prioritized Tier 2 Project List

Priority	Improvement	Description	Estimated Cost
7	Alt 5.1, Schedule C	Install storm system in Vicksburg Avenue and connect to existing West Hills Avenue system. Replace and add inlets on Iowa Avenue and Rimrock Drive.	\$163,930
8	Alt 5.1, Schedule D	Install UICs and inlets on Tower Rock Road, flanking inlets on Rimrock Drive, and replace upbasin DCB000981 on West Hills Avenue with new UIC.	\$251,810
9	Alt 5.1, Schedules A&B	Install storm line in Trenton Avenue and connect to existing West Hills System. Add additional inlets and UICs on West Hills Avenue.	\$253,500
10	Alt 4.2, Schedules B,C, &D	Repair pipes and add flanking inlets at sag low points along Trenton Avenue, Vicksburg Avenue and Iowa Avenue.	\$185,900
11	Alt 7.1, Schedule C	Add inlets and UIC at 10 th and Roanoke Avenue.	\$67,600

3.3.2.1 TIER 2 PRIORITIZATION RATIONALE

The highest ranked Tier 2 projects focus on managing flows tributary to the West Hills system. In the Alternatives Analysis, HDR recommends implementing Alternative 5.2. HDR continues to believe that Alternative 5.2 is the best long term approach; however given that West Hills Drive has curbs and an existing storm system, Alternative 5.1 provides a lower cost approach to improve the drainage issues in PIA 5.

Project 7 was selected as the highest Tier 2 project as it eliminates upbasin DCB000984 and connects the Rimrock Drive and Iowa Avenue storm line to the West Hills Drive Storm Line. Primary benefits include reduced flooding on Vicksburg Avenue and West Hills Avenue and improved water quality to the Newport Avenue storm system.

Project 8 was selected next to alleviate flooding that results in severe erosion near the Rimrock Avenue cul-de-sac. The additional inlets and UIC added on West Hills Drive are intended to reduce the frequency of flooding downslope at the intersection of West Hills Avenue and Evergreen Street.

Project 9 was selected third to reduce excessive street surface flow from Trenton Avenue onto West Hills Drive. Improved collection and the addition of UIC's are intended to reduce the amount of runoff tributary to Newport Avenue and improve water quality.

Project 10 was prioritized lower than the previous projects because the storm system in this area functions, but is in need of repair and improvements. This project will reduce or

eliminate the flood hazard for approximately 6 residential properties, but does not provide infrastructure to improve water quality or significantly reduce flow to the Newport Avenue System.

Project 11 is the lowest ranked Tier 2 project due to its limited benefit area. The project is expected to capture the turbid flows witnessed on 10th Street and reduce the frequency of flooding to the downslope apartment complex. As proposed the facilities are not adequate to manage large storm events due to site constraints, including limited suitable locations for UICs and lack of a piped system within close proximity for connection.

3.3.3 Tier 3 Projects

The lowest priority projects for implementation are summarized in **Table 4**.

Table 4: Prioritized Tier 3 Project List

Priority	Improvement	Description	Estimated Cost
12	Alt 2.2, Schedule C	Install flanking inlets, new UIC, curb and asphalt berm on Saginaw Avenue.	\$57,460
13	Alt 6.2, Schedule B	Add flanking inlets and curb at sag low points on Saginaw Avenue and Trenton Avenue.	\$126,750
14	Alt 7.1, Schedules A&B	Install new inlets and UICs on 9 th Street, 12 th Street, and Saginaw Avenue.	\$310,960
15	Alt 3.1, Schedule B	Install flanking inlets and new UIC on Sun Ray Court.	\$52,390
16	Alt 3.1, Schedule A	Install new inlets and UICs on College Way from Saginaw Avenue to COCC.	\$326,170

3.3.3.1 TIER 3 PRIORITIZATION RATIONALE

Projects prioritized in Tier 3 are those with relatively small benefit areas, which directly depend on or connect to higher tier projects, and those projects where flooding could otherwise be addressed.

Project 12 was selected as the highest ranking Tier 3 project as it will eliminate flooding of two residential lots, improve water quality and decrease the amount of flow to Newport Avenue.

Project 13 was selected next as it decreases the flood hazard to 3 residential lots and is relatively cost effective and easy to implement. Construction of Project 6 (Tier 1) is anticipated to significantly reduce the flows to this area, thereby potentially decreasing

the need for this project. HDR recommends reevaluating this project once Project 6 is complete.

Project 14 includes replacing existing grated catch basin inlets and UIC facilities on 9th and 12th streets, and providing additional inlet locations and UICs. This project is aimed at decreasing flows to Newport Avenue and improving water quality. The existence of current facilities justifies this project's low priority; if the current facilities are rigorously maintained then they provide some benefit for managing stormwater.

Project 15 is ranked lower than the previous projects based on its small benefit area. This project will eliminate minor flooding onto the COCC campus and associated erosion of the hillside above College Way which contributes to high turbidity of College Way flows.

Project 16 is the lowest ranked Tier 3 project due to its relatively high cost. The project would significantly reduce the total runoff to Newport Avenue and would improve water quality in the basin; however, the majority of flow this project is designed to manage is runoff from the Central Oregon Community College (COCC) campus. HDR recommends that the City work with COCC to develop on-campus stormwater solutions that minimize erosion and flow discharge to College Way. If this effort fails, the City may re-evaluate classification of this project to Tier 2.

4 Next Steps

The information provided in this Final Improvement Plan is the first step to improving the drainage on the south side of Awbrey Butte. Further work, including a geotechnical study of proposed UIC facilities and additional hydrologic and hydraulic analysis to properly locate and design the proposed stormwater facilities, is needed prior to the implementation of the design elements included in this plan. Geotechnical information required will be site specific, but will likely include, at a minimum: infiltration rate, rock fracture percentage, potential for downstream seepage, and slope stability. Additional program planning and budgeting of the proposed improvements is also necessary. This plan provides a foundation for this further work and a prioritization of projects that need to be implemented.

The existing conditions and proposed conditions models will be provided to the city for future use. Model calibration and validation was based on limited data. In many cases, the quality of data was questionable and some timeseries were missing. Negative depths observed in the data may be a result of gauges that were not recently calibrated or maintained. Negative velocities observed in the data may have been physically accurate, resulting from backwatered conditions. However peak flows and volumes taken from timeseries with negative values are more variable and have more uncertainty. Additional data collection is recommended to develop a robust set of baseline data from which to further improve the model.

Appendix A: Estimate of Probable Construction Cost and Cost Estimate Figures



**ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 2.1
SCHEDULE SUMMARY**

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE	DESCRIPTION	COST
2.1A	College Way and Portland Avenue Improvements	\$89,000.00
2.1B	Quincy Avenue Improvements	\$34,000.00
SUBTOTAL ALL SCHEDULES		\$123,000.00
	MOBILIZATION @ 8%	\$9,840.00
	EROSION CONTROL @ 3%	\$3,690.00
	CONSTRUCTION SURVEY WORK @ 3%	\$3,690.00
	TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC @ 3%	\$3,690.00
	CONSTRUCTION MANAGEMENT @ 5%	\$6,150.00
	ENGINEERING @ 12%	\$14,760.00
	CONTINGENCY (35%)	\$43,050.00
TOTAL COST		\$207,870.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 2.1

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "2.1A"- COLLEGE WAY/PORTLAND AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
A-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	200	FT	\$70.00	\$14,000.00
A-2	Concrete Manholes, Drywell	470	4	EA	\$8,000.00	\$32,000.00
A-3	Concrete Manholes, Sedimentation	470	4	EA	\$6,000.00	\$24,000.00
A-4	Manholes over Existing Sewers	470	1	EA	\$5,300.00	\$5,300.00
A-5	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
A-6	Concrete Inlets, Type CG-3	470	4	EA	\$2,800.00	\$11,200.00
A-7	Removal of Inlets	310	1	EA	\$550.00	\$550.00
A-8	Asphalt/Concrete Saw Cutting	310	300	LF	\$2.00	\$600.00
SCHEDULE "A" SUBTOTAL						\$89,000.00

SCHEDULE "2.1B"- QUINCY AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
B-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	90	FT	\$70.00	\$6,300.00
B-2	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
B-3	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
B-4	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
B-5	Concrete Inlets, Type CG-3	470	3	EA	\$2,800.00	\$8,400.00
B-6	Concrete Curbs, Standard Curb	759	200	FT	\$10.00	\$2,000.00
B-7	Asphalt Berm	749	205	LF	\$5.00	\$1,025.00
B-8	Removal of Inlets	310	1	EA	\$550.00	\$550.00
B-9	Asphalt/Concrete Saw Cutting	310	340	LF	\$2.00	\$680.00
SCHEDULE "B" SUBTOTAL						\$34,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



**ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 2.2
SCHEDULE SUMMARY**

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE	DESCRIPTION	COST
2.2A	College Way Improvements	\$126,000.00
2.2B	Portland Avenue Improvements	\$112,000.00
2.2C	Quincy Avenue Improvements	\$34,000.00
SUBTOTAL ALL SCHEDULES		\$272,000.00
	MOBILIZATION @ 8%	\$21,760.00
	EROSION CONTROL @ 3%	\$8,160.00
	CONSTRUCTION SURVEY WORK @ 3%	\$8,160.00
	TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC @ 3%	\$8,160.00
	CONSTRUCTION MANAGEMENT @ 5%	\$13,600.00
	ENGINEERING @ 12%	\$32,640.00
	CONTINGENCY (35%)	\$95,200.00
TOTAL COST		\$459,680.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 2.2

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "2.2A"- COLLEGE WAY IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
A-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	80	FT	\$70.00	\$5,600.00
A-2	24 inch Storm Sewer Pipe, 5 ft Depth	445	550	FT	\$120.00	\$66,000.00
A-3	Concrete Storm Sewer Manholes	470	4	EA	\$3,500.00	\$14,000.00
A-4	Concrete Manholes, Drywell	470	2	EA	\$8,000.00	\$16,000.00
A-5	Concrete Manholes, Sedimentation	470	2	EA	\$6,000.00	\$12,000.00
A-6	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
A-7	Concrete Inlets, Type CG-3	470	3	EA	\$2,800.00	\$8,400.00
A-8	Asphalt/Concrete Saw Cutting	310	1,240	LF	\$2.00	\$2,480.00
SCHEDULE "A" SUBTOTAL						\$126,000.00

SCHEDULE "2.2B"- PORTLAND AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
B-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	95	FT	\$70.00	\$6,650.00
B-2	24 inch Storm Sewer Pipe, 5 ft Depth	445	680	FT	\$120.00	\$81,600.00
B-3	Concrete Storm Sewer Manholes	470	3	EA	\$3,500.00	\$10,500.00
B-4	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
B-5	Concrete Inlets, Type CG-3	470	3	EA	\$2,800.00	\$8,400.00
B-6	Removal of Inlets	310	1	EA	\$550.00	\$550.00
B-7	Asphalt/Concrete Saw Cutting	310	1,540	LF	\$2.00	\$3,080.00
SCHEDULE "B" SUBTOTAL						\$112,000.00

SCHEDULE "2.2C"- QUINCY AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
C-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	90	FT	\$70.00	\$6,300.00
C-2	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
C-3	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
C-4	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
C-5	Concrete Inlets, Type CG-3	470	3	EA	\$2,800.00	\$8,400.00
C-6	Concrete Curbs, Standard Curb	759	200	FT	\$10.00	\$2,000.00
C-7	Asphalt Berm	749	205	LF	\$5.00	\$1,025.00
C-8	Removal of Inlets	310	1	EA	\$550.00	\$550.00
C-9	Asphalt/Concrete Saw Cutting	310	340	LF	\$2.00	\$680.00
SCHEDULE "C" SUBTOTAL						\$34,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 3.1
SCHEDULE SUMMARY

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE	DESCRIPTION	COST
3.1A	College Way Improvements	\$193,000.00
3.1B	Sun Ray Court Improvements	\$31,000.00
SUBTOTAL ALL SCHEDULES		\$224,000.00
	MOBILIZATION @ 8%	\$17,920.00
	EROSION CONTROL @ 3%	\$6,720.00
	CONSTRUCTION SURVEY WORK @ 3%	\$6,720.00
	TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC @ 3%	\$6,720.00
	CONSTRUCTION MANAGEMENT @ 5%	\$11,200.00
	ENGINEERING @ 12%	\$26,880.00
	CONTINGENCY (35%)	\$78,400.00
TOTAL COST		\$378,560.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 3.1

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "3.1A"- COLLEGE WAY IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
A-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	110	FT	\$70.00	\$7,700.00
A-2	Concrete Manholes, Drywell	470	11	EA	\$8,000.00	\$88,000.00
A-3	Concrete Manholes, Sedimentation	470	11	EA	\$6,000.00	\$66,000.00
A-4	Concrete Inlets, Type CG-3	470	11	EA	\$2,800.00	\$30,800.00
A-5	Asphalt/Concrete Saw Cutting	310	44	LF	\$2.00	\$88.00
SCHEDULE "A" SUBTOTAL						\$193,000.00

SCHEDULE "3.1B"- SUN RAY COURT IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
B-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	95	FT	\$70.00	\$6,650.00
B-2	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
B-3	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
B-4	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
B-5	Concrete Inlets, Type CG-3	470	3	EA	\$2,800.00	\$8,400.00
B-6	Asphalt/Concrete Saw Cutting	310	170	LF	\$2.00	\$340.00
SCHEDULE "B" SUBTOTAL						\$31,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



**ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 4.1
SCHEDULE SUMMARY**

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE	DESCRIPTION	COST
4.1A	College Way Improvements	\$18,000.00
4.1B	Trenton Avenue Improvements	\$39,000.00
4.1C	Vicksburg Avenue Improvements	\$48,000.00
4.1D	Iowa Avenue Improvements	\$23,000.00
SUBTOTAL ALL SCHEDULES		\$128,000.00
MOBILIZATION @ 8%		\$10,240.00
EROSION CONTROL @ 3%		\$3,840.00
CONSTRUCTION SURVEY WORK @ 3%		\$3,840.00
TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC @ 3%		\$3,840.00
CONSTRUCTION MANAGEMENT @ 5%		\$6,400.00
ENGINEERING @ 12%		\$15,360.00
CONTINGENCY (35%)		\$44,800.00
TOTAL COST		\$216,320.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 4.1

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "4.1A"- COLLEGE WAY IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
A-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	10	FT	\$70.00	\$700.00
A-2	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
A-3	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
A-4	Concrete Inlets, Type CG-3	470	1	EA	\$2,800.00	\$2,800.00
A-5	Asphalt/Concrete Saw Cutting	310	4	LF	\$2.00	\$8.00
SCHEDULE "A" SUBTOTAL						\$18,000.00

SCHEDULE "4.1B" - TRENTON AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
B-1	Removal of Pipes	310	90	FT	\$30.00	\$2,700.00
B-2	12 inch Storm Sewer Pipe, 5 ft Depth	445	160	FT	\$70.00	\$11,200.00
B-3	Concrete Storm Sewer Manholes	470	2	EA	\$3,500.00	\$7,000.00
B-4	Connection to Existing Structure	470	2	EA	\$950.00	\$1,900.00
B-5	Concrete Inlets, Type CG-3	470	5	EA	\$2,800.00	\$14,000.00
B-6	Removal of Inlets	310	2	EA	\$550.00	\$1,100.00
B-7	Asphalt/Concrete Saw Cutting	310	315	LF	\$2.00	\$630.00
SCHEDULE "B" SUBTOTAL						\$39,000.00

SCHEDULE "4.1C"- VICKSBURG AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
C-1	Removal of Pipes	310	80	FT	\$30.00	\$2,400.00
C-2	12 inch Storm Sewer Pipe, 5 ft Depth	445	210	FT	\$70.00	\$14,700.00
C-3	Concrete Storm Sewer Manholes	470	3	EA	\$3,500.00	\$10,500.00
C-4	Connection to Existing Structure	470	2	EA	\$950.00	\$1,900.00
C-5	Concrete Inlets, Type CG-3	470	5	EA	\$2,800.00	\$14,000.00
C-6	Concrete Curbs, Standard Curb	759	140	FT	\$10.00	\$1,400.00
C-7	Removal of Inlets	310	2	EA	\$550.00	\$1,100.00
C-8	Asphalt/Concrete Saw Cutting	310	560	LF	\$2.00	\$1,120.00
SCHEDULE "C" SUBTOTAL						\$48,000.00

SCHEDULE "4.1D"- IOWA AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
D-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	110	FT	\$70.00	\$7,700.00
D-2	Connection to Existing Structure	470	3	EA	\$950.00	\$2,850.00
D-3	Concrete Inlets, Type CG-3	470	3	EA	\$2,800.00	\$8,400.00
D-4	Concrete Curbs, Standard Curb	759	265	FT	\$10.00	\$2,650.00
D-5	Asphalt/Concrete Saw Cutting	310	400	LF	\$2.00	\$800.00
SCHEDULE "D" SUBTOTAL						\$23,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



**ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 4.2
SCHEDULE SUMMARY**

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE	DESCRIPTION	COST
4.2A	College Way Improvements	\$233,000.00
4.2B	Trenton Avenue Improvements	\$39,000.00
4.2C	Vicksburg Avenue Improvements	\$48,000.00
4.2D	Iowa Avenue Improvements	\$23,000.00
4.2E	Cascade View Drive Improvements	\$25,000.00
SUBTOTAL ALL SCHEDULES		\$368,000.00
MOBILIZATION @ 8%		\$29,440.00
EROSION CONTROL @ 3%		\$11,040.00
CONSTRUCTION SURVEY WORK @ 3%		\$11,040.00
TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC @ 3%		\$11,040.00
CONSTRUCTION MANAGEMENT @ 5%		\$18,400.00
ENGINEERING @ 12%		\$44,160.00
CONTINGENCY (35%)		\$128,800.00
TOTAL COST		\$621,920.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 4.2

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "4.2A"- COLLEGE WAY IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
A-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	195	FT	\$70.00	\$13,650.00
A-2	24 inch Storm Sewer Pipe, 5 ft Depth	445	1,310	FT	\$120.00	\$157,200.00
A-3	Concrete Storm Sewer Manholes	470	8	EA	\$3,500.00	\$28,000.00
A-4	Connection to Existing Structure	470	2	EA	\$950.00	\$1,900.00
A-5	Concrete Inlets, Type CG-3	470	9	EA	\$2,800.00	\$25,200.00
A-6	Asphalt/Concrete Saw Cutting	310	3,045	LF	\$2.00	\$6,090.00
SCHEDULE "A" SUBTOTAL						\$233,000.00

SCHEDULE "4.2B" - TRENTON AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
B-1	Removal of Pipes	310	90	FT	\$30.00	\$2,700.00
B-2	12 inch Storm Sewer Pipe, 5 ft Depth	445	160	FT	\$70.00	\$11,200.00
B-3	Concrete Storm Sewer Manholes	470	2	EA	\$3,500.00	\$7,000.00
B-4	Connection to Existing Structure	470	2	EA	\$950.00	\$1,900.00
B-5	Concrete Inlets, Type CG-3	470	5	EA	\$2,800.00	\$14,000.00
B-6	Removal of Inlets	310	2	EA	\$550.00	\$1,100.00
B-7	Asphalt/Concrete Saw Cutting	310	315	LF	\$2.00	\$630.00
SCHEDULE "B" SUBTOTAL						\$39,000.00

SCHEDULE "4.2C"- VICKSBURG AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
C-1	Removal of Pipes	310	80	FT	\$30.00	\$2,400.00
C-2	12 inch Storm Sewer Pipe, 5 ft Depth	445	210	FT	\$70.00	\$14,700.00
C-3	Concrete Storm Sewer Manholes	470	3	EA	\$3,500.00	\$10,500.00
C-4	Connection to Existing Structure	470	2	EA	\$950.00	\$1,900.00
C-5	Concrete Inlets, Type CG-3	470	5	EA	\$2,800.00	\$14,000.00
C-6	Concrete Curbs, Standard Curb	759	140	FT	\$10.00	\$1,400.00
C-7	Removal of Inlets	310	2	EA	\$550.00	\$1,100.00
C-8	Asphalt/Concrete Saw Cutting	310	560	LF	\$2.00	\$1,120.00
SCHEDULE "C" SUBTOTAL						\$48,000.00

SCHEDULE "4.2D"- IOWA AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
D-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	110	FT	\$70.00	\$7,700.00
D-2	Connection to Existing Structure	470	3	EA	\$950.00	\$2,850.00
D-3	Concrete Inlets, Type CG-3	470	3	EA	\$2,800.00	\$8,400.00
D-4	Concrete Curbs, Standard Curb	759	265	FT	\$10.00	\$2,650.00
D-5	Asphalt/Concrete Saw Cutting	310	400	LF	\$2.00	\$800.00
SCHEDULE "D" SUBTOTAL						\$23,000.00

SCHEDULE "4.2E"- CASCADE VIEW DRIVE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
E-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	150	FT	\$70.00	\$10,500.00
E-2	Concrete Storm Sewer Manholes	470	2	EA	\$3,500.00	\$7,000.00
E-3	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
E-4	Concrete Inlets, Type CG-3	470	2	EA	\$2,800.00	\$5,600.00
E-5	Asphalt/Concrete Saw Cutting	310	300	LF	\$2.00	\$600.00
SCHEDULE "E" SUBTOTAL						\$25,000.00

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**ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 5.1
SCHEDULE SUMMARY**

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE	DESCRIPTION	COST
5.1A	Lower NW West Hills Avenue Improvements	\$122,000.00
5.1B	Upper NW West Hills Avenue Improvements	\$28,000.00
5.1C	Vicksburg/Iowa Avenue Improvements	\$97,000.00
5.1D	Rimrock Drive	\$149,000.00
SUBTOTAL ALL SCHEDULES		\$396,000.00
MOBILIZATION @ 8%		\$31,680.00
EROSION CONTROL @ 3%		\$11,880.00
CONSTRUCTION SURVEY WORK @ 3%		\$11,880.00
TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC @ 3%		\$11,880.00
CONSTRUCTION MANAGEMENT @ 5%		\$19,800.00
ENGINEERING @ 12%		\$47,520.00
CONTINGENCY (35%)		\$138,600.00
TOTAL COST		\$669,240.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 5.1

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "5.1A"- LOWER NW WEST HILLS AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
A-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	480	FT	\$70.00	\$33,600.00
A-2	Concrete Storm Sewer Manholes	470	4	EA	\$3,500.00	\$14,000.00
A-3	Concrete Manholes, Drywell	470	4	EA	\$8,000.00	\$32,000.00
A-4	Concrete Manholes, Sedimentation	470	4	EA	\$6,000.00	\$24,000.00
A-5	Manholes over Existing Sewers	470	1	EA	\$5,300.00	\$5,300.00
A-6	Connection to Existing Structure	470	3	EA	\$950.00	\$2,850.00
A-7	Concrete Inlets, Type CG-3	470	3	EA	\$2,800.00	\$8,400.00
A-8	Asphalt/Concrete Saw Cutting	310	920	LF	\$2.00	\$1,840.00
SCHEDULE "A" SUBTOTAL						\$122,000.00

SCHEDULE "5.1B"- UPPER NW WEST HILLS AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
B-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	10	FT	\$70.00	\$700.00
B-2	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
B-3	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
B-4	Connection to Existing Structure	470	4	EA	\$950.00	\$3,800.00
B-5	Concrete Inlets, Grated	470	4	EA	\$2,000.00	\$8,000.00
B-6	Removal of Inlets	310	1	EA	\$550.00	\$550.00
B-7	Asphalt/Concrete Saw Cutting	310	20	LF	\$2.00	\$40.00
SCHEDULE "B" SUBTOTAL						\$28,000.00

SCHEDULE "5.1C"- VICKSBURG/IOWA AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
C-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	575	FT	\$70.00	\$40,250.00
C-2	Concrete Storm Sewer Manholes	470	5	EA	\$3,500.00	\$17,500.00
C-3	Connection to Existing Structure	470	7	EA	\$950.00	\$6,650.00
C-4	Concrete Inlets, Type CG-3	470	9	EA	\$2,800.00	\$25,200.00
C-5	Concrete Curbs, Standard Curb	759	200	FT	\$10.00	\$2,000.00
C-6	Removal of Inlets	310	4	EA	\$550.00	\$2,200.00
C-7	Asphalt/Concrete Saw Cutting	310	1,285	LF	\$2.00	\$2,570.00
SCHEDULE "C" SUBTOTAL						\$97,000.00

SCHEDULE "5.1D"- RIMROCK DRIVE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
D-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	65	FT	\$70.00	\$4,550.00
D-2	Line Existing Pipe	406	1	LS	\$75,000.00	\$75,000.00
D-3	Concrete Storm Sewer Manholes	470	1	EA	\$3,500.00	\$3,500.00
D-4	Concrete Manholes, Drywell	470	3	EA	\$8,000.00	\$24,000.00
D-5	Concrete Manholes, Sedimentation	470	3	EA	\$6,000.00	\$18,000.00
D-6	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
D-7	Concrete Inlets, Type CG-3	470	7	EA	\$2,800.00	\$19,600.00
D-8	Concrete Curbs, Standard Curb	759	120	FT	\$10.00	\$1,200.00
D-9	Removal of Inlets	310	2	EA	\$550.00	\$1,100.00
D-10	Asphalt/Concrete Saw Cutting	310	65	LF	\$2.00	\$130.00
SCHEDULE "D" SUBTOTAL						\$149,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



**ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 5.2
SCHEDULE SUMMARY**

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE	DESCRIPTION	COST
5.2A	Lower NW West Hills Avenue Improvements	\$206,000.00
5.2B	Upper NW West Hills Avenue Improvements	\$165,000.00
5.2C	Vicksburg/Iowa Avenue Improvements	\$97,000.00
5.2D	Rimrock Drive Improvements	\$161,000.00
5.2E	Saginaw Avenue Improvements	\$71,000.00
SUBTOTAL ALL SCHEDULES		\$700,000.00
MOBILIZATION @ 8%		\$56,000.00
EROSION CONTROL @ 3%		\$21,000.00
CONSTRUCTION SURVEY WORK @ 3%		\$21,000.00
TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC @ 3%		\$21,000.00
CONSTRUCTION MANAGEMENT @ 5%		\$35,000.00
ENGINEERING @ 12%		\$84,000.00
CONTINGENCY (35%)		\$245,000.00
TOTAL COST		\$1,183,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 5.2

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "5.2A"- LOWER NW WEST HILLS AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
A-1	Removal of Pipes	310	440	FT	\$30.00	\$13,200.00
A-2	12 inch Storm Sewer Pipe, 5 ft Depth	445	520	FT	\$70.00	\$36,400.00
A-3	18 inch Storm Sewer Pipe, 5 ft Depth	445	450	FT	\$95.00	\$42,750.00
A-4	Concrete Storm Sewer Manholes	470	8	EA	\$3,500.00	\$28,000.00
A-5	Concrete Manholes, Drywell	470	4	EA	\$8,000.00	\$32,000.00
A-6	Concrete Manholes, Sedimentation	470	4	EA	\$6,000.00	\$24,000.00
A-8	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
A-9	Concrete Inlets, Type CG-3	470	8	EA	\$2,800.00	\$22,400.00
A-10	Removal of Inlets	310	3	EA	\$550.00	\$1,650.00
A-11	Asphalt/Concrete Saw Cutting	310	1,940	LF	\$2.00	\$3,880.00
SCHEDULE "A" SUBTOTAL						\$206,000.00

SCHEDULE "5.2B"- UPPER NW WEST HILLS AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
B-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	245	FT	\$70.00	\$17,150.00
B-2	18 inch Storm Sewer Pipe, 5 ft Depth	445	730	FT	\$95.00	\$69,350.00
B-3	Concrete Storm Sewer Manholes	470	9	EA	\$3,500.00	\$31,500.00
B-4	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
B-5	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
B-6	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
B-7	Concrete Inlets, Type CG-3	470	10	EA	\$2,800.00	\$28,000.00
B-8	Asphalt/Concrete Saw Cutting	310	1,950	LF	\$2.00	\$3,900.00
SCHEDULE "B" SUBTOTAL						\$165,000.00

SCHEDULE "5.2C"- VICKSBURG AND IOWA AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
C-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	575	FT	\$70.00	\$40,250.00
C-2	Concrete Storm Sewer Manholes	470	5	EA	\$3,500.00	\$17,500.00
C-3	Connection to Existing Structure	470	7	EA	\$950.00	\$6,650.00
C-4	Concrete Inlets, Type CG-3	470	9	EA	\$2,800.00	\$25,200.00
C-5	Concrete Curbs, Standard Curb	759	200	FT	\$10.00	\$2,000.00
C-6	Removal of Inlets	310	4	EA	\$550.00	\$2,200.00
C-7	Asphalt/Concrete Saw Cutting	310	1,285	LF	\$2.00	\$2,570.00
SCHEDULE "C" SUBTOTAL						\$97,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 5.2 (continued)

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "5.2D"- RIMROCK DRIVE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
D-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	230	FT	\$70.00	\$16,100.00
D-2	Line Existing Pipe	406	1	LS	\$75,000.00	\$75,000.00
D-3	Concrete Storm Sewer Manholes	470	1	EA	\$3,500.00	\$3,500.00
D-4	Concrete Manholes, Drywell	470	3	EA	\$8,000.00	\$24,000.00
D-5	Concrete Manholes, Sedimentation	470	3	EA	\$6,000.00	\$18,000.00
D-6	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
D-7	Concrete Inlets, Type CG-3	470	7	EA	\$2,800.00	\$19,600.00
D-8	Concrete Curbs, Standard Curb	759	120	FT	\$10.00	\$1,200.00
D-9	Removal of Inlets	310	2	EA	\$550.00	\$1,100.00
D-10	Asphalt/Concrete Saw Cutting	310	485	LF	\$2.00	\$970.00
SCHEDULE "D" SUBTOTAL						\$161,000.00

SCHEDULE "5.2E"- SAGINAW AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
E-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	90	FT	\$70.00	\$6,300.00
E-2	18 inch Storm Sewer Pipe, 5 ft Depth	445	515	FT	\$95.00	\$48,925.00
E-3	Concrete Storm Sewer Manholes	470	1	EA	\$3,500.00	\$3,500.00
E-4	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
E-5	Concrete Inlets, Type CG-3	470	3	EA	\$2,800.00	\$8,400.00
E-6	Removal of Inlets	310	1	EA	\$550.00	\$550.00
E-7	Asphalt/Concrete Saw Cutting	310	1,090	LF	\$2.00	\$2,180.00
SCHEDULE "E" SUBTOTAL						\$71,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



**ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 6.1
SCHEDULE SUMMARY**

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE	DESCRIPTION	COST
6.1A	Quincy Avenue to Portland Avenue Improvements	\$246,000.00
6.1B	Saginaw/Trenton Avenue Improvements	\$75,000.00
6.1C	Quincy Avenue Improvements	\$63,000.00
6.1D	Juniper Avenue Improvements	\$77,000.00
6.1E	Iowa Avenue Improvements	\$89,000.00
SUBTOTAL ALL SCHEDULES		\$550,000.00
MOBILIZATION @ 8%		\$44,000.00
EROSION CONTROL @ 3%		\$16,500.00
CONSTRUCTION SURVEY WORK @ 3%		\$16,500.00
TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC @ 3%		\$16,500.00
CONSTRUCTION MANAGEMENT @ 5%		\$27,500.00
ENGINEERING @ 12%		\$66,000.00
CONTINGENCY (35%)		\$192,500.00
TOTAL COST		\$929,500.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 6.1

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "6.1A"- QUINCY AVENUE TO PORTLAND AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
A-1	Removal of Pipes	310	650	FT	\$30.00	\$19,500.00
A-2	12 inch Storm Sewer Pipe, 5 ft Depth	445	180	FT	\$70.00	\$12,600.00
A-3	21 inch Storm Sewer Pipe, 5 ft Depth	445	1,310	FT	\$110.00	\$144,100.00
A-4	Concrete Storm Sewer Manholes	470	7	EA	\$3,500.00	\$24,500.00
A-5	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
A-6	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
A-7	Concrete Inlets, Type CG-3	470	8	EA	\$2,800.00	\$22,400.00
A-8	Removal of Inlets	310	7	EA	\$550.00	\$3,850.00
A-9	Asphalt/Concrete Saw Cutting	310	2,375	LF	\$2.00	\$4,750.00
SCHEDULE "A" SUBTOTAL						\$246,000.00

SCHEDULE "6.1B"- SAGINAW AND TRENTON AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
B-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	165	FT	\$70.00	\$11,550.00
B-2	14 inch Storm Sewer Pipe, 5 ft Depth	445	115	FT	\$80.00	\$9,200.00
B-3	Concrete Storm Sewer Manholes	470	2	EA	\$3,500.00	\$7,000.00
B-4	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
B-5	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
B-6	Connection to Existing Structure	470	6	EA	\$950.00	\$5,700.00
B-7	Concrete Inlets, Type CG-3	470	7	EA	\$2,800.00	\$19,600.00
B-8	Concrete Curbs, Standard Curb	759	445	FT	\$10.00	\$4,450.00
B-9	Removal of Inlets	310	3	EA	\$550.00	\$1,650.00
B-10	Asphalt/Concrete Saw Cutting	310	575	LF	\$2.00	\$1,150.00
SCHEDULE "B" SUBTOTAL						\$75,000.00

SCHEDULE "6.1C"- QUINCY AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
C-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	120	FT	\$70.00	\$8,400.00
C-2	Concrete Manholes, Drywell	470	3	EA	\$8,000.00	\$24,000.00
C-3	Concrete Manholes, Sedimentation	470	3	EA	\$6,000.00	\$18,000.00
C-4	Concrete Inlets, Type CG-3	470	3	EA	\$2,800.00	\$8,400.00
C-5	Concrete Curbs, Standard Curb	759	260	FT	\$10.00	\$2,600.00
C-6	Asphalt/Concrete Saw Cutting	310	470	LF	\$2.00	\$940.00
SCHEDULE "C" SUBTOTAL						\$63,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 6.1 (continued)

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "6.1D"- JUNIPER AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
D-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	90	FT	\$70.00	\$6,300.00
D-2	Concrete Manholes, Drywell	470	3	EA	\$8,000.00	\$24,000.00
D-3	Concrete Manholes, Sedimentation	470	3	EA	\$6,000.00	\$18,000.00
D-4	Concrete Inlets, Type CG-3	470	6	EA	\$2,800.00	\$16,800.00
D-5	Concrete Curbs, Standard Curb	759	945	FT	\$10.00	\$9,450.00
D-6	Asphalt/Concrete Saw Cutting	310	970	LF	\$2.00	\$1,940.00
SCHEDULE "D" SUBTOTAL						\$77,000.00

SCHEDULE "6.1E"- IOWA AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
E-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	110	FT	\$70.00	\$7,700.00
E-2	Concrete Manholes, Drywell	470	3	EA	\$8,000.00	\$24,000.00
E-3	Concrete Manholes, Sedimentation	470	3	EA	\$6,000.00	\$18,000.00
E-4	Connection to Existing Structure	470	4	EA	\$950.00	\$3,800.00
E-5	Concrete Inlets, Type CG-3	470	8	EA	\$2,800.00	\$22,400.00
E-6	Concrete Curbs, Standard Curb	759	1,035	FT	\$10.00	\$10,350.00
E-7	Asphalt/Concrete Saw Cutting	310	1,205	LF	\$2.00	\$2,410.00
SCHEDULE "E" SUBTOTAL						\$89,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



**ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 6.2
SCHEDULE SUMMARY**

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE	DESCRIPTION	COST
6.2A	Quincy Avenue to Newport Avenue Improvements	\$246,000.00
6.2B	Saginaw/Trenton Avenue Improvements	\$75,000.00
6.2C	Quincy Avenue Improvements	\$222,000.00
6.2D	Juniper Avenue Improvements	\$283,000.00
6.2E	Iowa Avenue Improvements	\$243,000.00
SUBTOTAL ALL SCHEDULES		\$1,069,000.00
MOBILIZATION @ 8%		\$85,520.00
EROSION CONTROL @ 3%		\$32,070.00
CONSTRUCTION SURVEY WORK @ 3%		\$32,070.00
TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC @ 3%		\$32,070.00
CONSTRUCTION MANAGEMENT @ 5%		\$53,450.00
ENGINEERING @ 12%		\$128,280.00
CONTINGENCY (35%)		\$374,150.00
TOTAL COST		\$1,806,610.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 6.2

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "6.2A"- QUINCY AVENUE TO NEWPORT AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
A-1	Removal of Pipes	310	650	FT	\$30.00	\$19,500.00
A-2	12 inch Storm Sewer Pipe, 5 ft Depth	445	180	FT	\$70.00	\$12,600.00
A-3	21 inch Storm Sewer Pipe, 5 ft Depth	445	1,310	FT	\$110.00	\$144,100.00
A-4	Concrete Storm Sewer Manholes	470	7	EA	\$3,500.00	\$24,500.00
A-5	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
A-6	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
A-7	Concrete Inlets, Type CG-3	470	8	EA	\$2,800.00	\$22,400.00
A-8	Removal of Inlets	310	7	EA	\$550.00	\$3,850.00
A-9	Asphalt/Concrete Saw Cutting	310	2,375	LF	\$2.00	\$4,750.00
SCHEDULE "A" SUBTOTAL						\$246,000.00

SCHEDULE "6.2B"- SAGINAW AND TRENTON AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
B-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	165	FT	\$70.00	\$11,550.00
B-2	14 inch Storm Sewer Pipe, 5 ft Depth	445	115	FT	\$80.00	\$9,200.00
B-3	Concrete Storm Sewer Manholes	470	2	EA	\$3,500.00	\$7,000.00
B-4	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
B-5	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
B-6	Connection to Existing Structure	470	6	EA	\$950.00	\$5,700.00
B-7	Concrete Inlets, Type CG-3	470	7	EA	\$2,800.00	\$19,600.00
B-8	Concrete Curbs, Standard Curb	759	445	FT	\$10.00	\$4,450.00
B-9	Removal of Inlets	310	3	EA	\$550.00	\$1,650.00
B-10	Asphalt/Concrete Saw Cutting	310	575	LF	\$2.00	\$1,150.00
SCHEDULE "B" SUBTOTAL						\$75,000.00

SCHEDULE "6.2C"- QUINCY AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
C-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	145	FT	\$70.00	\$10,150.00
C-2	21 inch Storm Sewer Pipe, 5 ft Depth	445	1,120	FT	\$110.00	\$123,200.00
C-3	Concrete Storm Sewer Manholes	470	6	EA	\$3,500.00	\$21,000.00
C-4	Concrete Manholes, Drywell	470	3	EA	\$8,000.00	\$24,000.00
C-5	Concrete Manholes, Sedimentation	470	3	EA	\$6,000.00	\$18,000.00
C-6	Concrete Inlets, Type CG-3	470	6	EA	\$2,800.00	\$16,800.00
C-7	Concrete Curbs, Standard Curb	759	285	FT	\$10.00	\$2,850.00
C-8	Asphalt/Concrete Saw Cutting	310	2,790	LF	\$2.00	\$5,580.00
SCHEDULE "C" SUBTOTAL						\$222,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 6.2 (continued)

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "6.2D"- JUNIPER AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
D-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	365	FT	\$70.00	\$25,550.00
D-2	21 inch Storm Sewer Pipe, 5 ft Depth	445	1,085	FT	\$110.00	\$119,350.00
D-3	Concrete Storm Sewer Manholes	470	11	EA	\$3,500.00	\$38,500.00
D-4	Concrete Manholes, Drywell	470	3	EA	\$8,000.00	\$24,000.00
D-5	Concrete Manholes, Sedimentation	470	3	EA	\$6,000.00	\$18,000.00
D-6	Concrete Inlets, Type CG-3	470	14	EA	\$2,800.00	\$39,200.00
D-7	Concrete Curbs, Standard Curb	759	1,010	FT	\$10.00	\$10,100.00
D-8	Asphalt/Concrete Saw Cutting	310	3,900	LF	\$2.00	\$7,800.00
SCHEDULE "D" SUBTOTAL						\$283,000.00

SCHEDULE "6.2E"- AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
E-1	Removal of Pipes	310	570	FT	\$30.00	\$17,100.00
E-2	12 inch Storm Sewer Pipe, 5 ft Depth	445	445	FT	\$70.00	\$31,150.00
E-3	14 inch Storm Sewer Pipe, 5 ft Depth	445	745	FT	\$80.00	\$59,600.00
E-4	Concrete Storm Sewer Manholes	470	8	EA	\$3,500.00	\$28,000.00
E-5	Concrete Manholes, Drywell	470	3	EA	\$8,000.00	\$24,000.00
E-6	Concrete Manholes, Sedimentation	470	3	EA	\$6,000.00	\$18,000.00
E-7	Connection to Existing Structure	470	1	EA	\$950.00	\$950.00
E-8	Concrete Inlets, Type CG-3	470	15	EA	\$2,800.00	\$42,000.00
E-9	Concrete Curbs, Standard Curb	759	1,035	FT	\$10.00	\$10,350.00
E-10	Removal of Inlets	310	8	EA	\$550.00	\$4,400.00
E-11	Asphalt/Concrete Saw Cutting	310	3,355	LF	\$2.00	\$6,710.00
SCHEDULE "E" SUBTOTAL						\$243,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



**ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 7.1
SCHEDULE SUMMARY**

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE	DESCRIPTION	COST
7.1A	12th and 9th Street Improvements	\$154,000.00
7.1B	Saginaw Avenue Improvements	\$30,000.00
7.1C	Roanoke Avenue Improvements	\$40,000.00
SUBTOTAL ALL SCHEDULES		\$224,000.00
MOBILIZATION @ 8%		\$17,920.00
EROSION CONTROL @ 3%		\$6,720.00
CONSTRUCTION SURVEY WORK @ 3%		\$6,720.00
TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC @ 3%		\$6,720.00
CONSTRUCTION MANAGEMENT @ 5%		\$11,200.00
ENGINEERING @ 12%		\$26,880.00
CONTINGENCY (35%)		\$78,400.00
TOTAL COST		\$378,560.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.



ENGINEERS OPINION OF PROBABLE COST
ALTERNATIVE 7.1

PROJECT : S. Awbrey Butte Drainage Study
HDR JOB # : 10030242
LOCATION : Bend, OR
ENR CCI :

ESTIMATE CLASS : 5
DATE : DRAFT
BY : KH
REVIEWED : BW

SCHEDULE "7.1A" - 12th AND 9th AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
A-1	Removal of Pipes	310	100	FT	\$30.00	\$3,000.00
A-2	12 inch Storm Sewer Pipe, 5 ft Depth	445	245	FT	\$70.00	\$17,150.00
A-3	Concrete Manholes, Drywell	470	7	EA	\$8,000.00	\$56,000.00
A-4	Concrete Manholes, Sedimentation	470	7	EA	\$6,000.00	\$42,000.00
A-5	Connection to Existing Structure	470	4	EA	\$950.00	\$3,800.00
A-6	Concrete Inlets, Type CG-3	470	10	EA	\$2,800.00	\$28,000.00
A-7	Removal of Inlets	310	4	EA	\$550.00	\$2,200.00
A-8	Asphalt/Concrete Saw Cutting	310	485	LF	\$2.00	\$970.00
SCHEDULE "A" SUBTOTAL						\$154,000.00

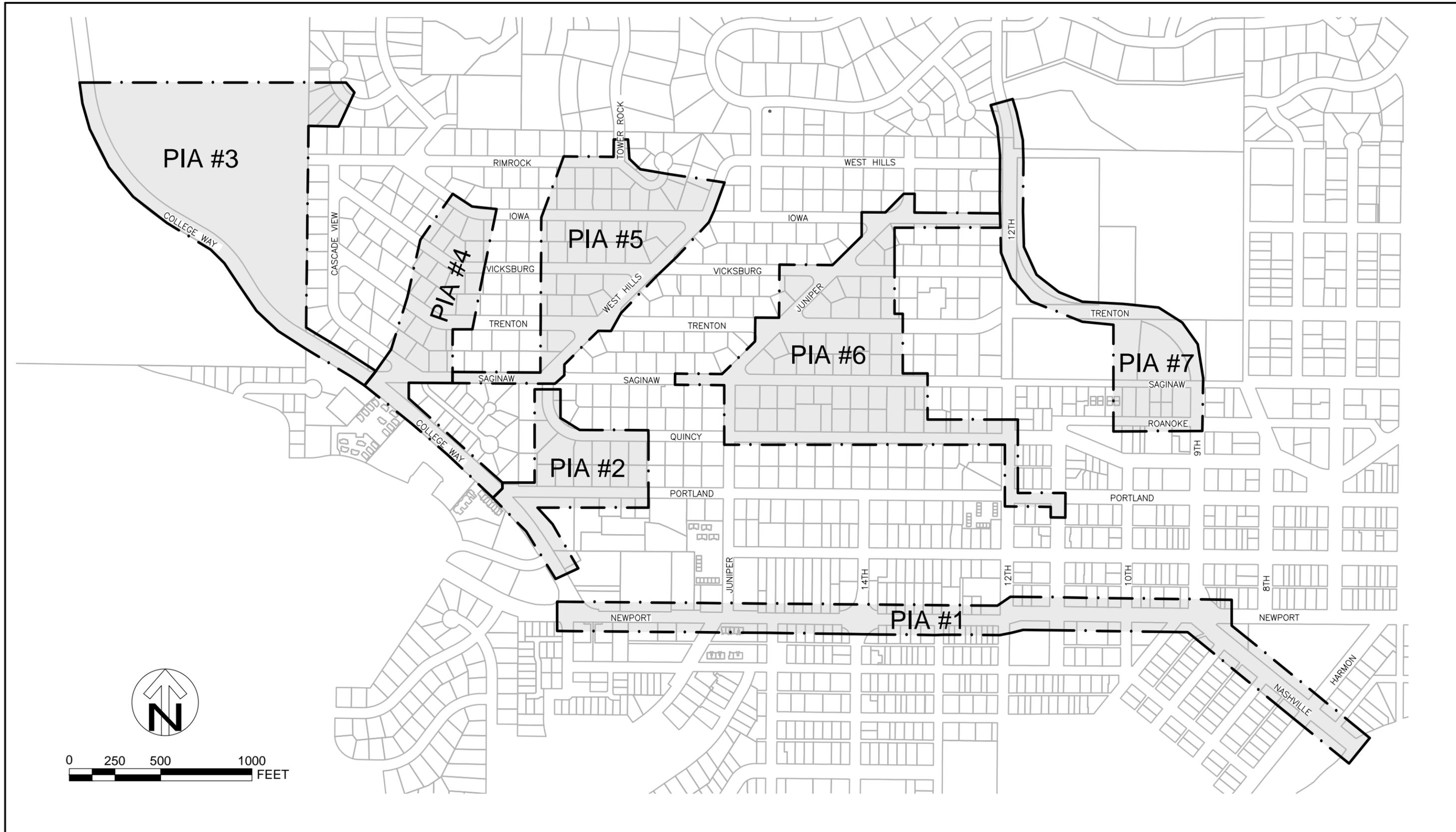
SCHEDULE "7.1B" - SAGINAW AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
B-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	140	FT	\$70.00	\$9,800.00
B-2	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
B-3	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
B-4	Concrete Inlets, Type CG-3	470	2	EA	\$2,800.00	\$5,600.00
B-5	Asphalt/Concrete Saw Cutting	310	280	LF	\$2.00	\$560.00
SCHEDULE "B" SUBTOTAL						\$30,000.00

SCHEDULE "7.1C" - ROANOKE AVENUE IMPROVEMENTS

NO.	DESCRIPTION	SECTION	QTY	UNIT	UNIT PRICE	COST
C-1	12 inch Storm Sewer Pipe, 5 ft Depth	445	145	FT	\$70.00	\$10,150.00
C-2	Concrete Storm Sewer Manholes	470	1	EA	\$3,500.00	\$3,500.00
C-3	Concrete Manholes, Drywell	470	1	EA	\$8,000.00	\$8,000.00
C-4	Concrete Manholes, Sedimentation	470	1	EA	\$6,000.00	\$6,000.00
C-5	Concrete Inlets, Type CG-3	470	4	EA	\$2,800.00	\$11,200.00
C-6	Asphalt/Concrete Saw Cutting	310	290	LF	\$2.00	\$580.00
SCHEDULE "C" SUBTOTAL						\$40,000.00

This estimate of probable cost reflects our professional opinion of accurate costs at this time based on current conditions at the project location. This estimate is subject to change through the project planning and design process. Actual construction cost will depend on the cost of labor, materials, equipment, and services provided by others, contractor's methods of determining prices, competitive bidding and market conditions.

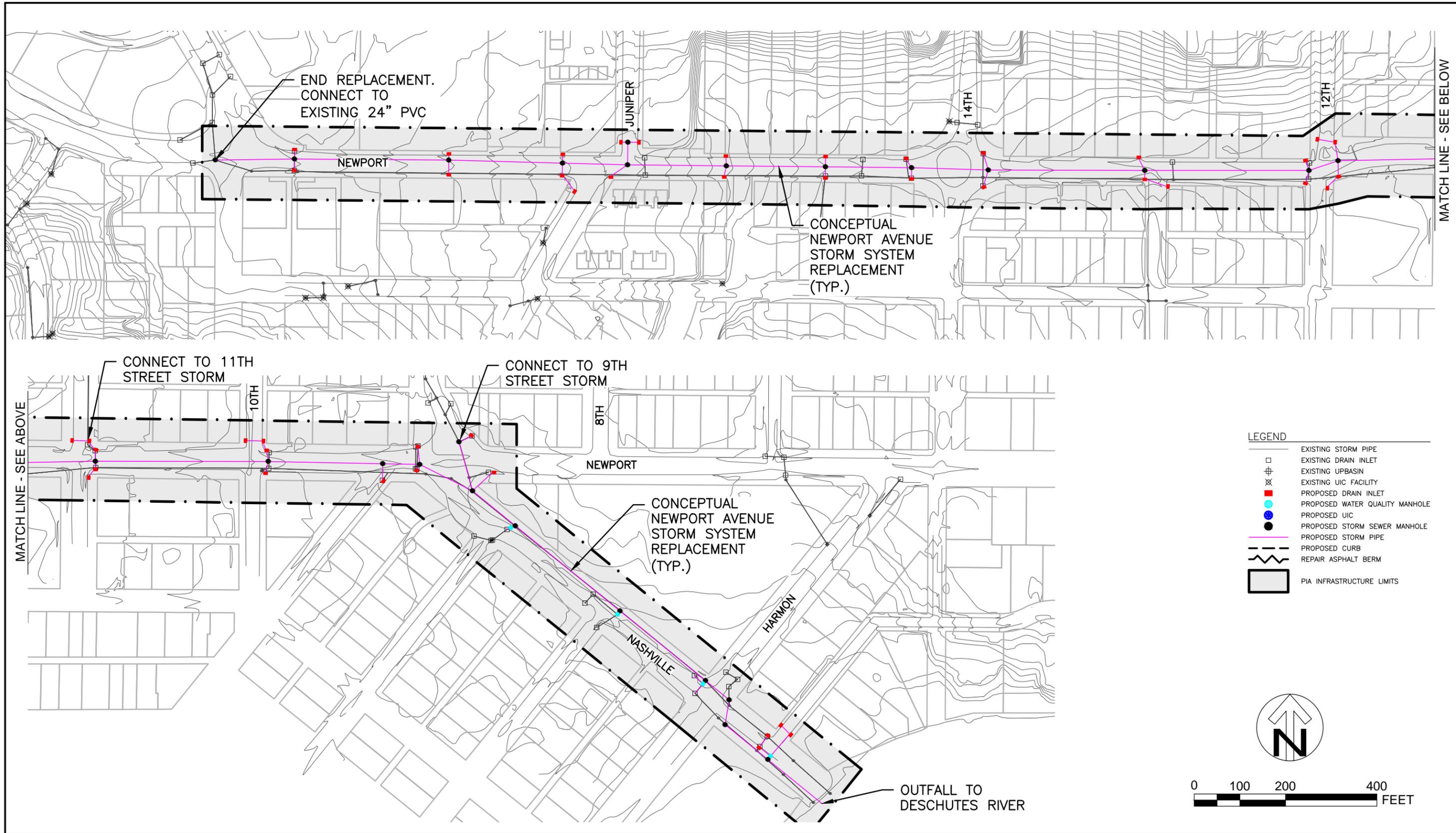


**SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVE ANALYSIS**

PIA KEYMAP

DATE
5/15/2017

FIGURE
KEYMAP

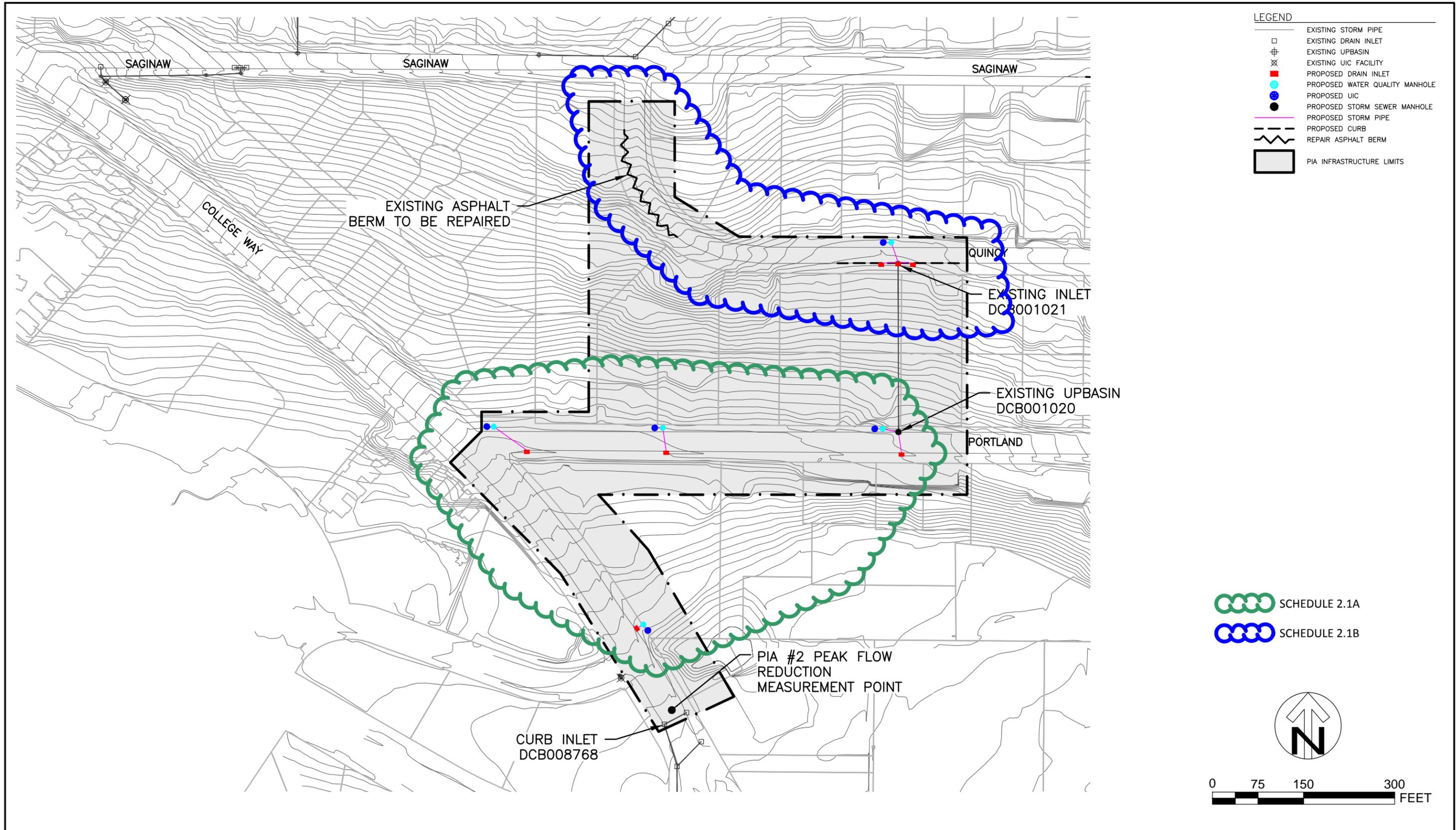


**SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVE ANALYSIS**

CONCEPTUAL NEWPORT AVENUE REPLACEMENT SYSTEM

DATE
5/15/2017

FIGURE
1.1

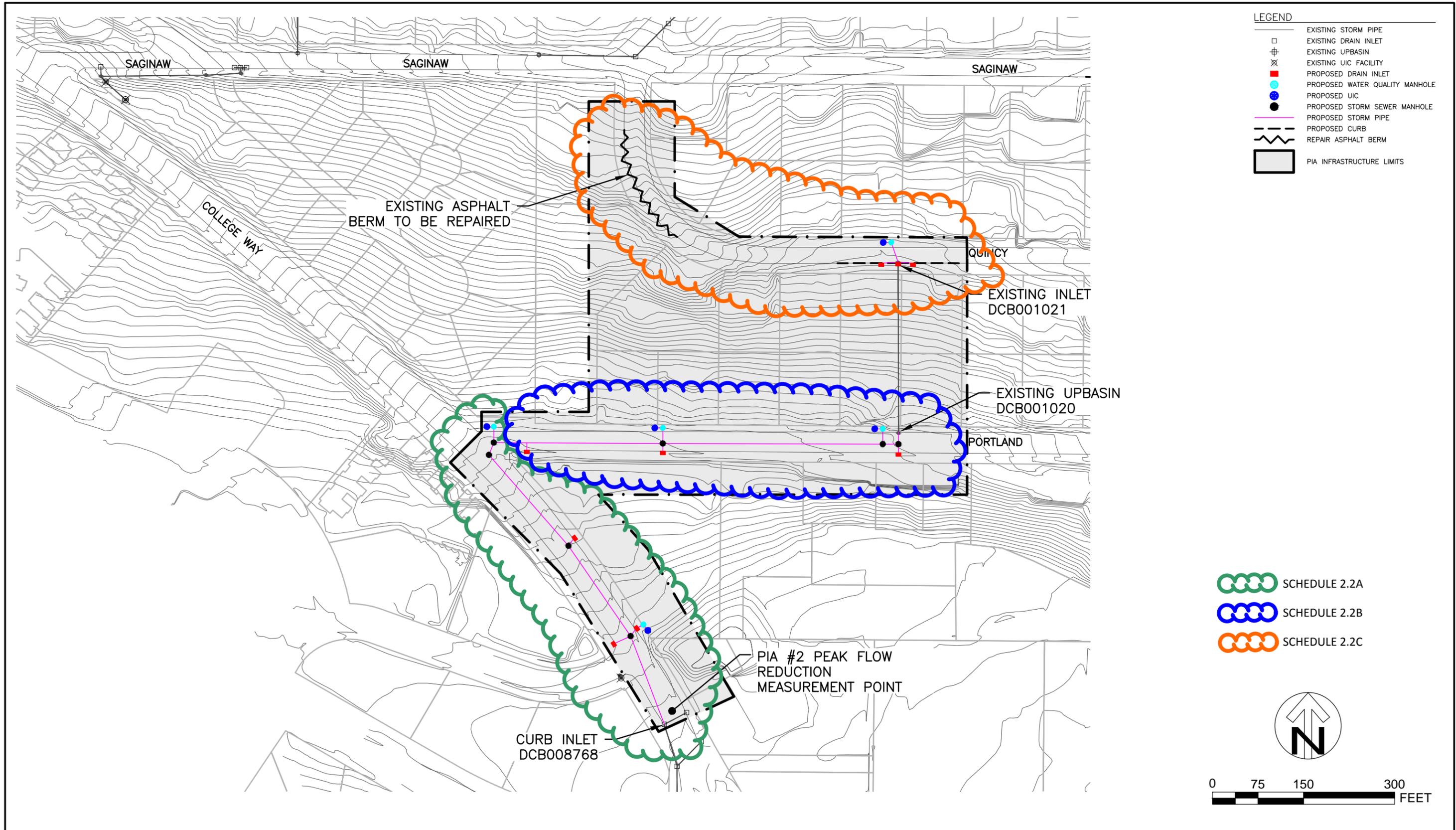


**SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVE ANALYSIS**

PIA #2- ALTERNATIVE 2.1

DATE
5/15/2017

FIGURE
2.1



LEGEND

	EXISTING STORM PIPE
	EXISTING DRAIN INLET
	EXISTING UPBASIN
	EXISTING UIC FACILITY
	PROPOSED DRAIN INLET
	PROPOSED WATER QUALITY MANHOLE
	PROPOSED UIC
	PROPOSED STORM SEWER MANHOLE
	PROPOSED STORM PIPE
	PROPOSED CURB
	REPAIR ASPHALT BERM
	PIA INFRASTRUCTURE LIMITS

- SCHEDULE 2.2A
- SCHEDULE 2.2B
- SCHEDULE 2.2C



**SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVE ANALYSIS**

PIA #2- ALTERNATIVE 2.2

DATE
5/15/2017

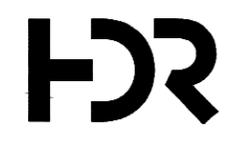
FIGURE
2.2



LEGEND

	EXISTING STORM PIPE
	EXISTING DRAIN INLET
	EXISTING UPBASIN
	EXISTING UIC FACILITY
	PROPOSED DRAIN INLET
	PROPOSED WATER QUALITY MANHOLE
	PROPOSED UIC
	PROPOSED STORM SEWER MANHOLE
	PROPOSED STORM PIPE
	PROPOSED CURB
	REPAIR ASPHALT BERM
	PIA INFRASTRUCTURE LIMITS

SCHEDULE 3.1A
 SCHEDULE 3.1B

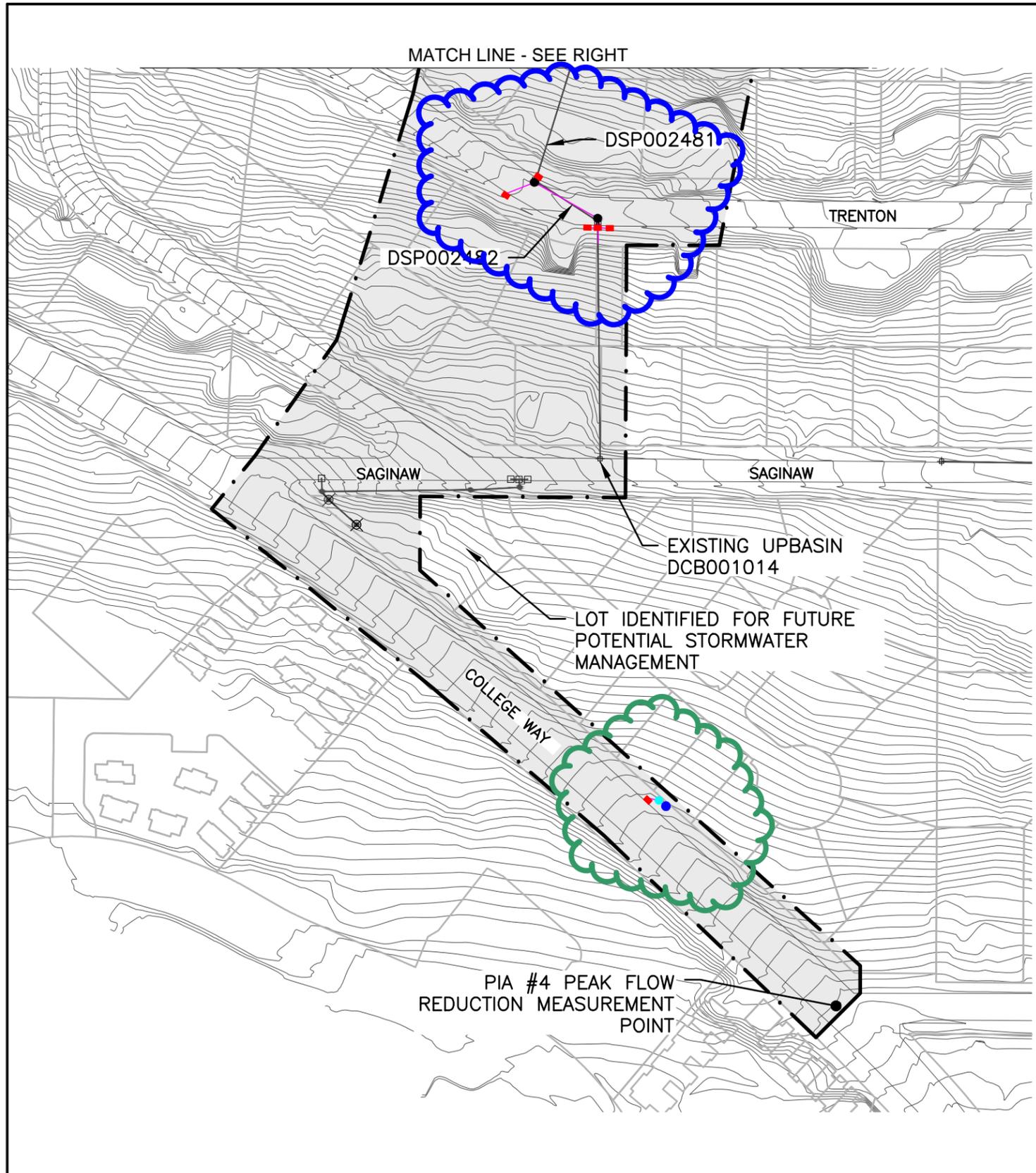


**SOUTH AWBREY BUTTE DRAINAGE STUDY
 ALTERNATIVE ANALYSIS**

PIA #3- ALTERNATIVE 3.1

DATE
 5/15/2017

FIGURE
 3.1



-  SCHEDULE 4.1A
-  SCHEDULE 4.1B
-  SCHEDULE 4.1C
-  SCHEDULE 4.1D

LEGEND	
	EXISTING STORM PIPE
	EXISTING DRAIN INLET
	EXISTING UPBASIN
	EXISTING UIC FACILITY
	PROPOSED DRAIN INLET
	PROPOSED WATER QUALITY MANHOLE
	PROPOSED UIC
	PROPOSED STORM SEWER MANHOLE
	PROPOSED STORM PIPE
	PROPOSED CURB
	REPAIR ASPHALT BERM
	PIA INFRASTRUCTURE LIMITS

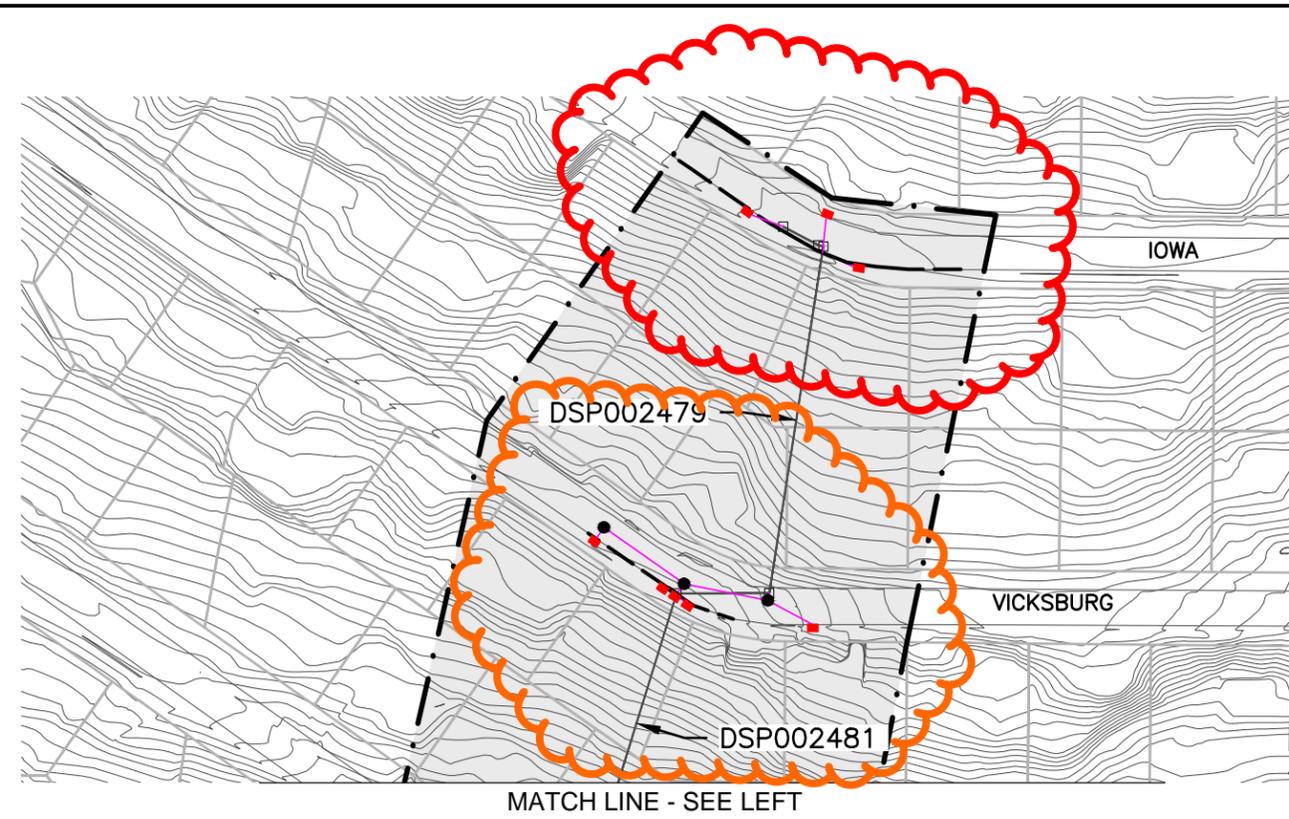
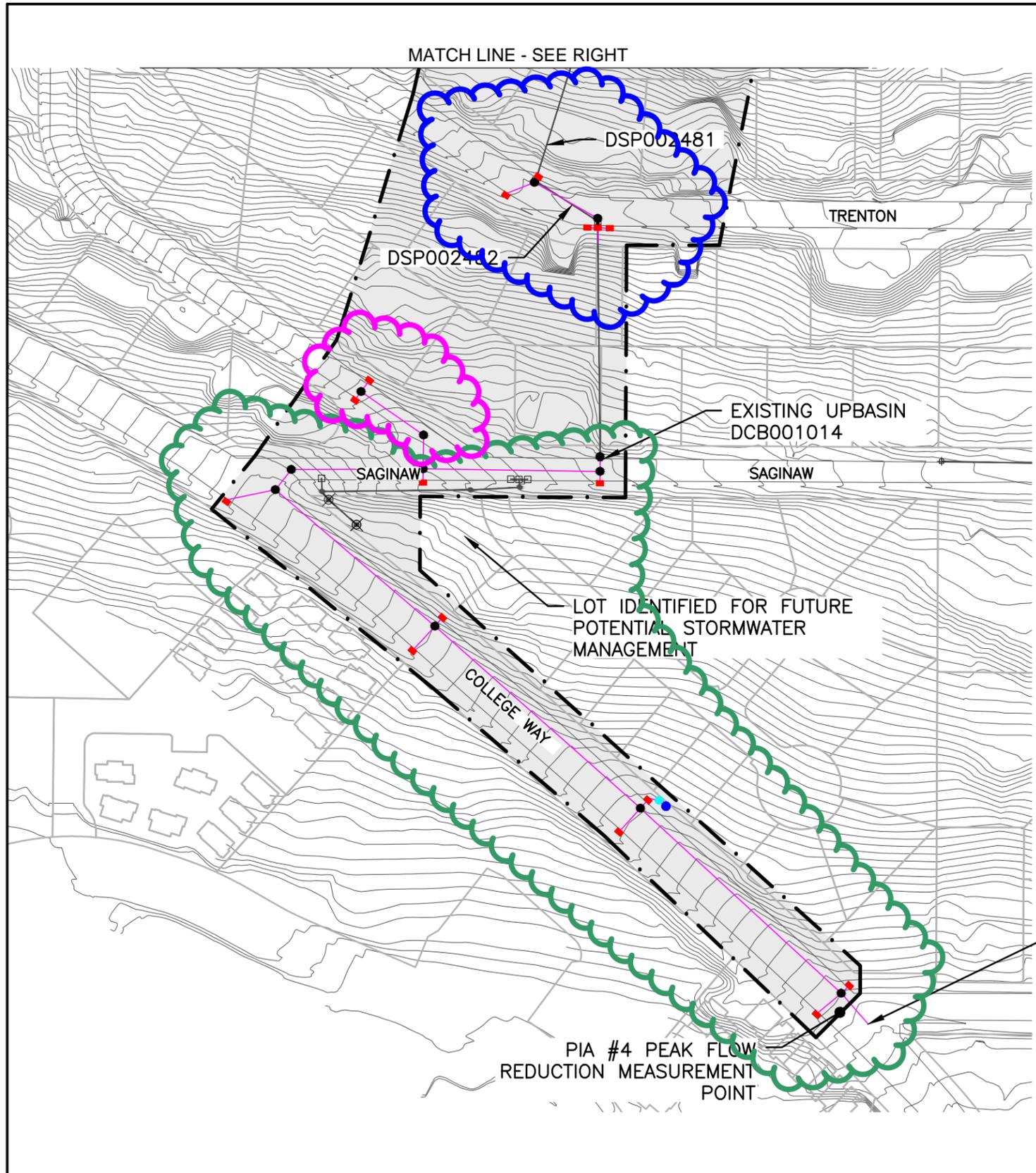


**SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVE ANALYSIS**

PIA #4- ALTERNATIVE 4.1

DATE
5/15/2017

FIGURE
4.1



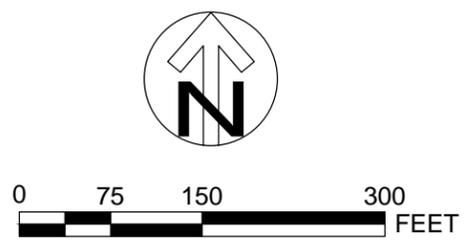
-  SCHEDULE 4.2A
-  SCHEDULE 4.2B
-  SCHEDULE 4.2C
-  SCHEDULE 4.2D
-  SCHEDULE 4.2E

LEGEND

	EXISTING STORM PIPE
	EXISTING DRAIN INLET
	EXISTING UPBASIN
	EXISTING UIC FACILITY
	PROPOSED DRAIN INLET
	PROPOSED WATER QUALITY MANHOLE
	PROPOSED UIC
	PROPOSED STORM SEWER MANHOLE
	PROPOSED STORM PIPE
	PROPOSED CURB
	REPAIR ASPHALT BERM
	PIA INFRASTRUCTURE LIMITS

POINT OF CONNECTION TO ALTERNATIVE 2.2

PIA #4 PEAK FLOW REDUCTION MEASUREMENT POINT

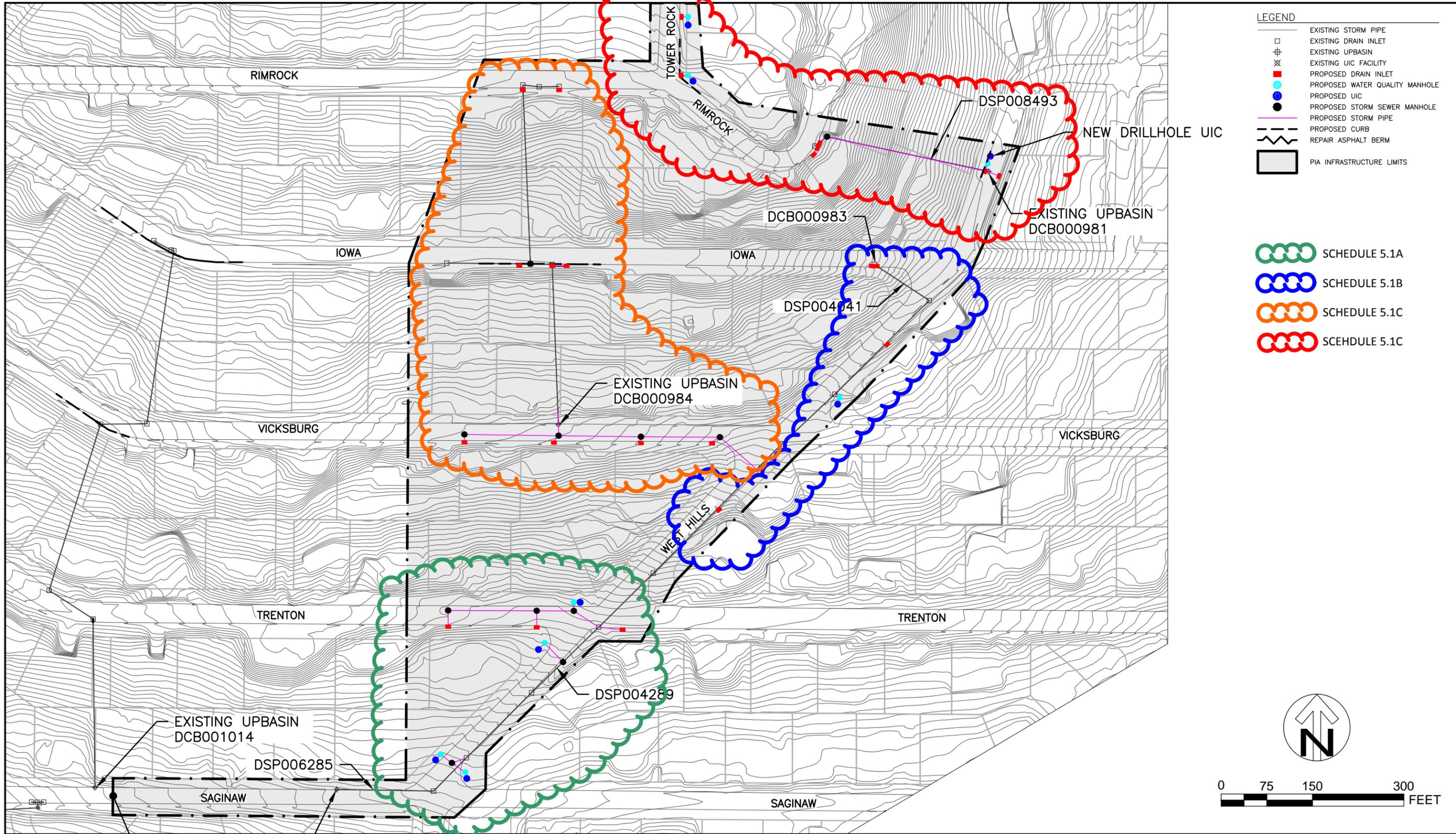


**SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVE ANALYSIS**

PIA #4- ALTERNATIVE 4.2

DATE 5/15/2017

FIGURE 4.2



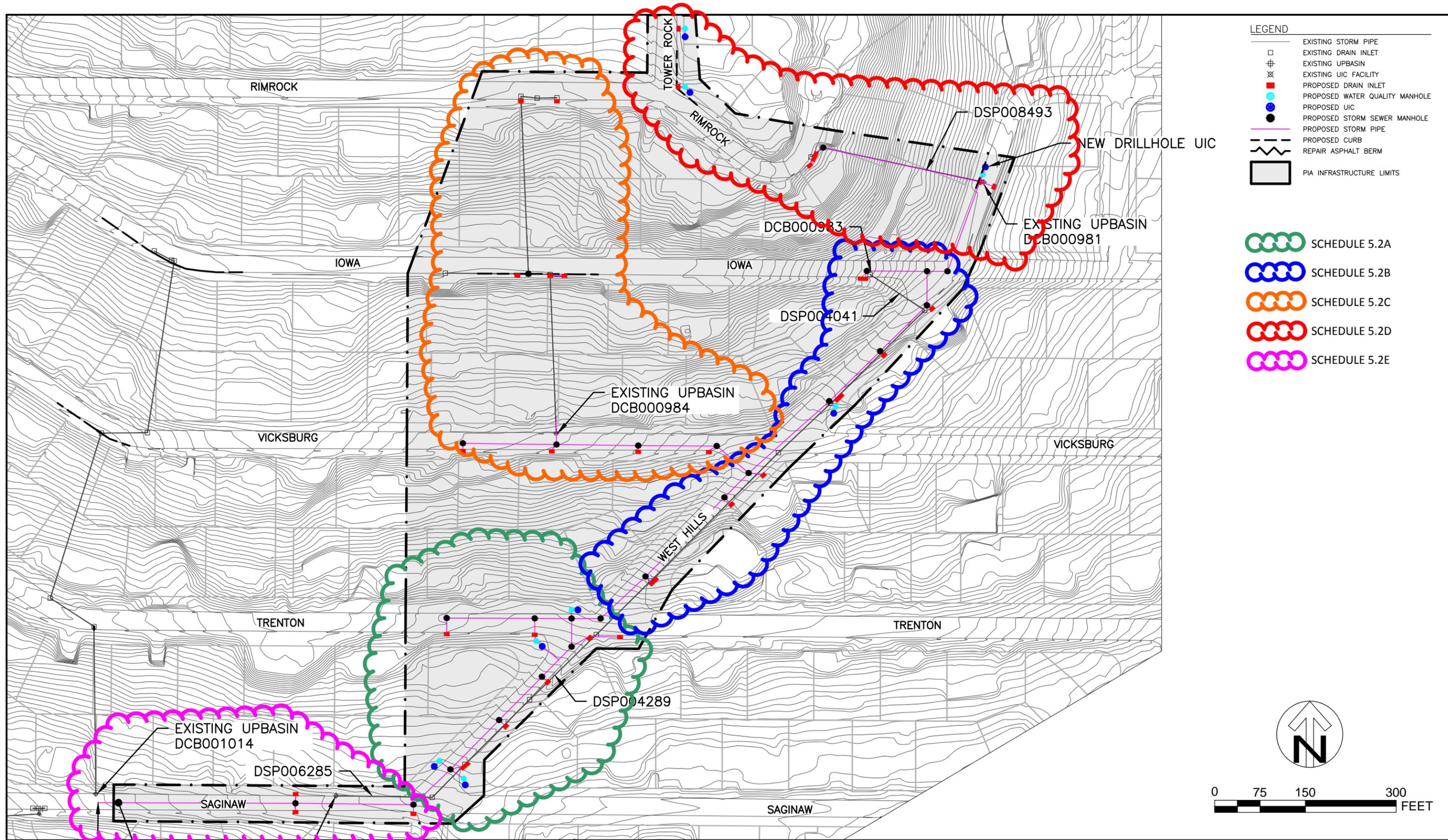
EXISTING UPBASIN
DCB001023
PIA #5 PEAK FLOW
REDUCTION MEASUREMENT
POINT



**SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVE ANALYSIS**

PIA #5- ALTERNATIVE 5.1

DATE
5/15/2017
FIGURE
5.1



REQUIRES CONNECTION TO ALTERNATIVE 4.2

EXISTING UPBASIN DCB001014

DSP006285

SAGINAW

EXISTING UPBASIN DCB001023

PIA #5 PEAK FLOW REDUCTION MEASUREMENT POINT

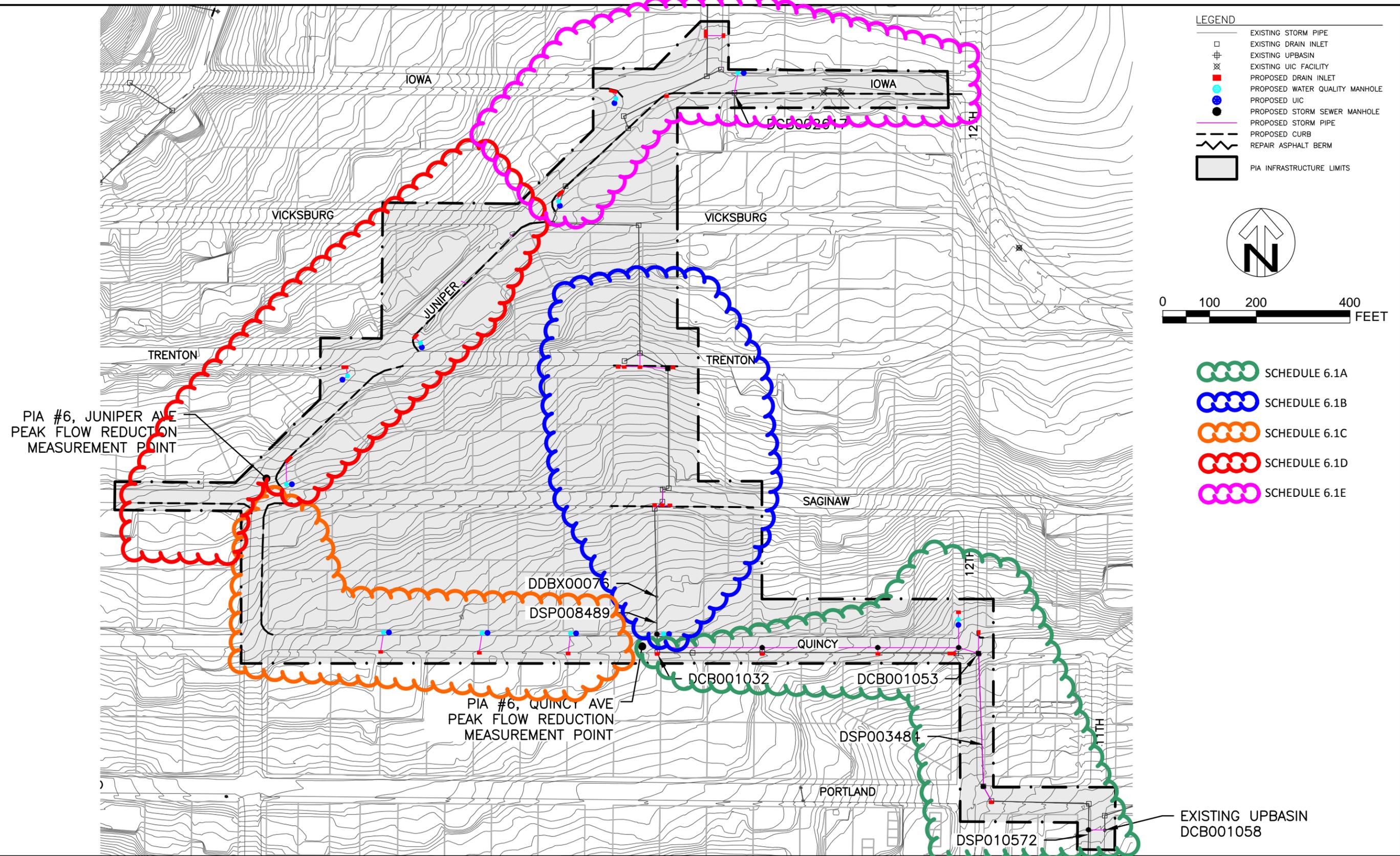


SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVE ANALYSIS

PIA #5- ALTERNATIVE 5.2

DATE 5/15/2017

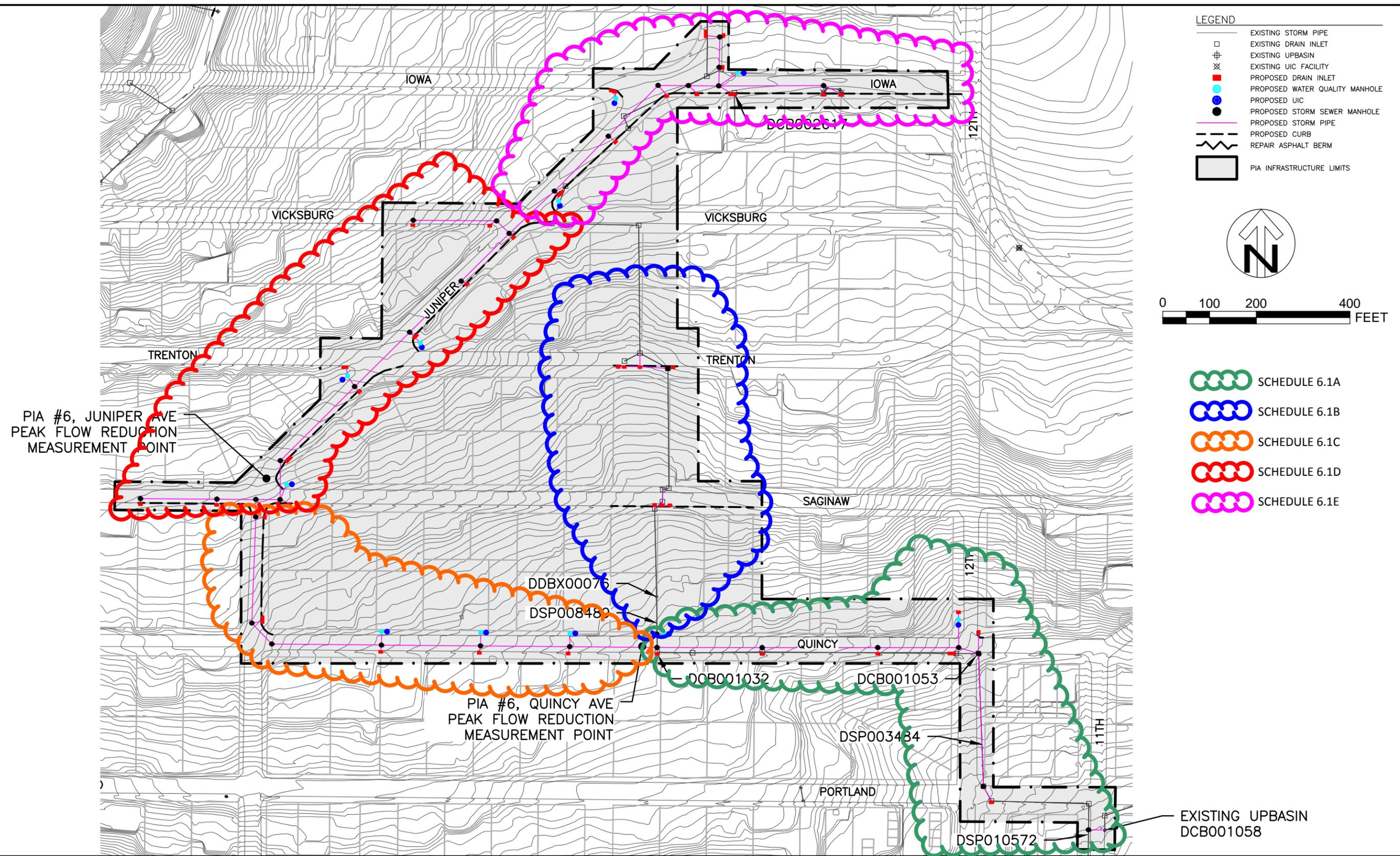
FIGURE 5.2



**SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVE ANALYSIS**

PIA #6- ALTERNATIVE 6.1

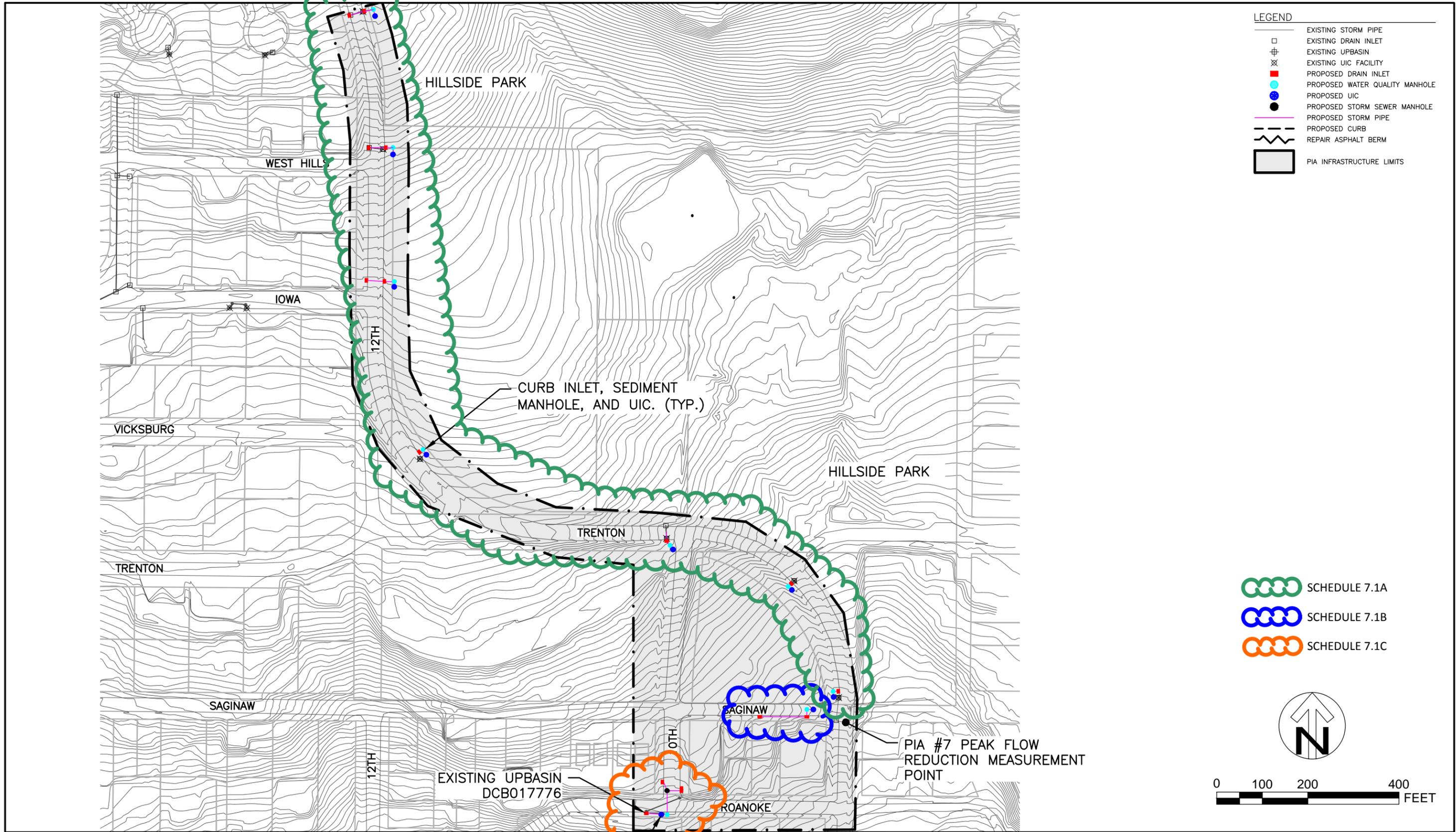
DATE 5/15/2017
FIGURE 6.1



**SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVE ANALYSIS**

PIA #6- ALTERNATIVE 6.2

DATE
5/15/2017
FIGURE
6.2



LEGEND

	EXISTING STORM PIPE
	EXISTING DRAIN INLET
	EXISTING UPBASIN
	EXISTING UIC FACILITY
	PROPOSED DRAIN INLET
	PROPOSED WATER QUALITY MANHOLE
	PROPOSED UIC
	PROPOSED STORM SEWER MANHOLE
	PROPOSED STORM PIPE
	PROPOSED CURB
	REPAIR ASPHALT BERM
	PIA INFRASTRUCTURE LIMITS

	SCHEDULE 7.1A
	SCHEDULE 7.1B
	SCHEDULE 7.1C



NEW UIC WITH OVERFLOW
TO UPBASIN DCB017776



**SOUTH AWBREY BUTTE DRAINAGE STUDY
ALTERNATIVES ANALYSIS**

PIA #7- ALTERNATIVE 7.1

DATE
5/15/2017

FIGURE
7.1