CMGC Process Report – Design Phase -

For

500 South; 1100 West to I-15
STP-0068(16)68; Bountiful, Utah

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Purpose

In accordance with the Memorandum of Understanding SEP 14 (MOU) for Alternative Contracting Process, the CMGC Phase I report is to provide "a detailed comparison of the Utah Department of Transportation (UDOT) prepared Independent Cost Estimate (ICE) and the negotiated price for construction as well discussion of each of the evaluation criteria". The following Evaluation Criteria are outlined in the MOU:

A. Design and Constructability
B. Innovation
C. Project Schedule
D. Risk
E. Learning opportunities
F. Environmental Stewardship
G. Benefit to the Public

In accordance with the Project Justification guidelines this report will only focus on those items that are outlined in the Justification report, which was approved March 4, 2008. A copy of this report is included in the appendix.

Furthermore, the UDOT has required that this report provide additional information for internal evaluation. This information includes an assessment of schedule performance, and observations of how team members successfully addressed difficulties associated with the CMGC process.

This report focuses on the 500 South; 1100 West to I-15; Bountiful, project number STP-0068(16)68, located in UDOT Region 1 area. This project has been identified as an "Urban Reconstruction" project.

Project Overview

This project, located in Bountiful and West Bountiful, Utah, involves correcting existing roadway geometric design deficiencies, and widening the existing two-lane roadway to five lanes, with two lanes in each direction, and a center turn lane. Shoulders with bike lanes and curb, gutter, and sidewalk are also included. The project includes new pavement, storm drain, utility relocations, curb and gutter, and sidewalks. The project was divided into three phases. The first phase was for utilities, early procurement, and some demolition. Phase two covered the north half of the roadway, and phase three covered the southern half.

Some of the issues that contribute to the risk and complexity of this project include:

- Three at-grade railroad crossings, owned by a variety of entities: Union Pacific Railroad, UTA, and Holly Oil added complexity and risk due to the inflexibility of dealing with railroads.
- 500 South serves as a major utility corridor in the area, carrying culinary and secondary water, storm and sanitary sewers, overhead and underground power, natural gas, communication lines, petroleum pipelines, box culverts, canals, and open ditches. The risks associated with these utilities ranges from minor construction delays to catastrophic damage.
- There is uncertainty regarding the location and severity of contaminated groundwater plumes and soils in the construction area.
- Maintenance of traffic near refineries and I-15 could result in project delays if not addressed properly.

Figure 1 below shows a picture of 500 South, looking west near Holly Oil.

Figure 1 – Railroad Crossings, Oil Refineries, and Utilities Contribute to Complexity of Project

Table 1 shows a summary of the project.

TABLE 1 – Project Overview Information Summary

Project Type:	Roadway Widening/Reconstruction
Project Number:	STP-0068(16)68
PIN:	4178, 7437, 7658, 8218
Funding:	Federal and State
Justification Report Approval:	March 4, 2008
Preliminary Cost Estimate:	$20,000,000

Design costs

Table 2 shows a summary of the firms that provided preconstruction services and the fee associated with those services.

TABLE 2 – Design Services Summary

Firm	Service	Cost of Services
URS Corporation	Preparation of final construction plans	$1,538,126
Geneva Rock	Constructability reviews, design input, risk minimization	$205,905
JUB Engineers	Independent Cost Estimation	$202,060
Total Design Services		$1,946,091

As shown in Table 2, $205,905 was paid to the contractor for their design services, which is approximately 11% of the design fee.

Construction Costs

The project construction was divided into three phases, which were bid separately. A summary of the final bid price for these phases is shown in Table 3.

TABLE 3 COST COMPARISONS OF FINAL BIDs

Phase	Bid Price
Phase 1- Utilities and Early Procurement	$839,398.00
Phase 2- North Half	$8,834,794.00
Phase 3- South Half	$5,028,377.50
Phase 4 – Final Segment	$532,809.90
Total- All Phases	$15,235,379.40

As shown in Table 3, UDOT contracted with Geneva Rock Company to provide construction services for $15,235,379.40, which was $328,547.46 more than the engineer's estimate for the project, and $503,018.15 more than the ICE.

Project Goals

UDOT determined that success on this project required a balance of the following outcomes:

- A high level of safety for motorists, pedestrians, and workers.
- A high level of public satisfaction with the business and property owners, motorists, and other stakeholders through minimizing impacts to traffic.
- Safe disposal of contaminated ground water and soils encountered during construction.
- Construction of a new storm drain system and relocation of utilities associated with the project completed by February 2009.
- Completion of overall project by December 2009.

Key project elements affecting the achievement of these goals include: the level of coordination with business and homeowners, impacts to motorists, coordination with railroad operations (Union Pacific, UTA, and Holly Oil); utility relocations, right-of-way clearance, traffic control (especially routing of tanker trucks to the filling station near 800 West); overall constructability, and project construction phasing.

Price Component

To establish standard pricing comparisons, UDOT included in the RFP a Contractor Price Submittal (RFP-Appendix D) which identifies standardized services or supplies and set quantities for a few selected bid items. As part of the review of the procurement process these costs were compared. Items on the lists included:

- HMA Pavement
- Concrete Curb and Gutter Type B1
- Concrete Sidewalk

These prices were not only used in the selection process, but UDOT also used them to compare to the contractor's bid prices later on.

Cost Model

The RFP provided instructions for preparing an Approach to Price Proposal (RFP-Appendix E) which explains the cost of bid items. As part of the proposal, a breakdown of the unit price was required for each of the price component items listed in Appendix D of the RFP. The breakdown included the following elements:

- Labor
- Equipment
- Material
- Trucking
- Other- a description was required
- Overhead
- Profit

Furthermore, the RFP Appendix D stated that the unit prices reported in the proposal would be held throughout the project unless justification was provided and approved by UDOT. The Contractor proposing on the project could provide justification by showing that the assumptions used to develop the unit price were not met. Proposers were asked to disclose their assumptions by providing the following information:

- Identify assumptions used to create unit cost:
- Identify amount of quantity change that would justify a change in price:
- Identify risks that would increase the cost:
- Identify risk mitigation to manage the cost:
- What action will you take in the design process to help identify and minimize these risks?

By requiring the contractors to "open their books" in the proposal, UDOT was able to evaluate the integrity/fairness of their prices and understand the risk factors involved. This information

was also used in the bid process to ensure that the contractor bid the project the way that they said that they would.

Applicability of the CM/GC Process

In accordance with the original MOU between UDOT and FHWA, each project selected for the CMGC contracting process must evaluate how the criteria for selection issues were impacted by the project. It is important to note that in accordance with the MOU, additional characteristics that make the project a good candidate for the CMGC process can be justified by UDOT. The justification report indicated that this project was justified by the following criteria outlined in the MOU: Design and Constructability, Innovation, Environmental Stewardship, Benefits to the Public, and Risk. Much of the information provided in this section comes from interviews with UDOT, designer, and contractor staff. The notes from these interviews are included in the appendix.

Design and Constructability

The contractor was actively involved in the design by providing continuous review and feedback. The biggest design change resulting from contractor involvement was in the pavement design. The original design showed hot-mix asphalt (HMA) pavement, which typically has a lower up-front cost than Portland cement concrete (PCC) pavement. However, under the current market conditions, PCC pavement was approximately $240,000 less expensive to construct. In addition, PCC has a longer service life and lower maintenance costs than HMA pavement, resulting in up to $2 million in savings over the life of the pavement. Based on the overall cost savings, the decision became clear to UDOT and the project team that the PCC option was best.

In addition to modifying the pavement design, the contractor facilitated the following design and constructability enhancements:

- Creation of a phasing plan to work around outstanding right-of-way issues
- Eliminating 30,000 yards of haul by balancing the cut and fill
- Slipping the new storm drain pipe inside of an existing culvert under the railroad tracks, rather than boring
- Early creation of the traffic control plan, closely coordinated with the project phasing
- Collaboration with the utility companies, resulting in the ability for moving the utilities early

Including these contractor ideas into the design has resulted in reduced risk and cost, and greater contractor buy-in of the project.

Innovative Process

One of the key benefits of the CMGC process is the ability to bring in contractors early on in the process so that they can influence the design. Contractors often bring a different perspective than the engineers, which can be useful in solving complex issues. This section focuses on how these innovations have improved this project.

Innovation Used

The project team faced the challenging task of running a new storm drain system under three railroad tracks. Typically, this would require boring. However, these tracks are in close vicinity to petroleum refineries and holding tanks, and there were concerns about hitting one of the various high pressure gas lines. After collaborating and brainstorming ideas, the project team decided to slip the new storm drain pipe inside of the existing concrete pipe. HDPE "snap tight" pipe was used, facilitating a section-by-section installation of the pipe, allowing for smaller trenches. The storm pipe was also slipped under 800 West, and the plans call for the same process under 1100 West.

At the beginning of the project, the contractor realized that the earthwork was imbalanced, and that balancing could result in major cost savings. The contractor recommended raising the elevation of the roadway by four inches, which eliminated half of the 600,000 cubic yards of haul.

Other cost-saving innovations include using topsoil from nearby property, rather than hauling it in from off site, switching the curb and gutter type to a less expensive design, using a requisitioned house as a construction office instead of renting a construction trailer, and using the yard of the temporary construction office as a site for stockpiling materials.

Money Saved by Innovation

The following are the contractor's estimated cost savings from innovations:

- Balancing the haul will save approximately $300,000 in trucking and earthwork costs.
- Slipping the storm drain instead of boring under railroad tracks and cross streets will save approximately $250,000.
- Other minor innovations related to curb and gutter, landscaping, and logistics will result in savings of more than $150,000.

Impact to Schedule

As stated in the justification report, this project was not schedule driven. However, the overall project schedule will benefit from having the contractor pre-work utilities, begin early

procurement on certain items, and develop phasing plans early in the process. The total time savings are estimated at approximately 2 months.

Impact to Quality

Of the innovations that the contractor introduced, the use of concrete pavement instead of asphalt had the greatest impact on quality. Use of concrete pavement doubles the life expectancy and decreases the maintenance costs. The contractor estimates life cycle cost savings of up to $2 million.

Benefit to Public

Slipping the new HDPE storm drain pipe under 800 West and 1100 West, rather than the more traditional method of cutting a trench, will allow the public to benefit from lessened traffic impacts while pre-working utilities. This is the same method of slipping the pipe inside of the existing concrete pipe that was proposed under the railroad crossings.

Risk

At the onset of the project, the team identified five major risks, listed as follows:

1. Right-of-way delays
2. Utility conflicts- There are numerous known utilities on this corridor, some of which pose extreme cost and/or safety hazards, such as high-pressure oil and gas lines, and fiber optic lines. There was also concern about the presence of unmarked utilities.
3. The cost of asphalt has been particularly volatile for the last couple of years.
4. Rail road crossings- often the railroad companies are a challenge to coordinate with, as they tend to operate by their own time frames. Planning phasing, traffic control, and construction around three rail lines posed a major challenge.
5. Contaminated soil and groundwater- there are three known contaminated groundwater plumes. Disturbing contaminated soils or groundwater during construction could cause delays and increase construction costs.

Contractor involvement has helped mitigate these risks by:

- Coordinating with the Cities and property owners regarding right-of-way issues.
- Pre-working utilities and performing early potholing.
- Switching the pavement design to PCC saved the State money by taking the risk of HMA price fluctuations out of the bid.
- Slipping water lines through existing concrete pipe rather than boring under railroads. This innovation avoided the risk of conflicts and delays in coordinating with the railroad companies.

- Reducing the potential conflicts with high-pressure gas lines by slipping a concrete storm pipe beneath 800 West and 1100 West. Figure 2 shows a picture, provided by the contractor, of the devastation caused by a track hoe hitting a high-pressure gas line on a different project.
- Raising the roadway grade 4 inches and decreasing the roadway cross section by 3 inches has allowed an additional 7 inches of leeway to avoid conflicts with utilities and contaminated soils.

Figure 2 – Example of Damage Caused by Hitting Gas Line (out-of-state contractor not associated with this project)

Due to their early involvement, the contractor had a better understanding of the risks, felt more comfortable taking on risks in the bid that they would have been unwilling to assume in a traditional design-bid-build process.

Learning Opportunities

The use of CMGC provided opportunities for all parties involved in this project to learn from each other and gain exposure to new insights. Through the process of weighing the pros and cons of asphalt versus PCC pavement, the Department and the designer were exposed to the contractor's pavement design and costing approach. This process was helpful to obtain a better

understanding of factors that contractors weigh when pricing pavement. In addition, the contractor was able to gain exposure to the pre-construction processes. Through early involvement, the contractor was able to gain a better understanding of the design, right-of-way, and environmental challenges that both UDOT and the designers face (Steve Sussdorff, Geneva Rock). These learning opportunities not only produced benefits on this project, but will produce benefits to the State on future projects that these team members are involved in.

Environmental Stewardship

From the start of the project, one of the major environmental concerns was the possibility of disturbing contaminated soils or impacting one of the three contaminated ground water plumes near the site. Raising the roadway grade 4 inches and decreasing the roadway cross section by 3 inches has allowed an additional 7 inches of leeway to avoid disturbing contaminated soils and/or groundwater.

Procurement

This section gives a description of the procurement process for CMGC that was set forth in the RFP for CMGC services on the project).

Project Milestones

Key dates and milestones for the CMCG process are listed in Table 4.

TABLE 4 – Project Milestones

Stage	Date
Begin Design	Feb, 27, 2008
Environmental Document	November 5, 2007
CMGC RFP Advertised	June 2, 2008
Contractor Selected	June 11, 2008
Contractor Design Services NTP	July 21, 2008
Construction NTP, Phase 1	March 19, 2009
Construction NTP, Phase 2	June 16, 2009
Construction NTP, Phase 3	March 30, 2010

Selection of Committee Members

The Selection Committee Members were made up of a mix of UDOT staff from the Region and from the Complex. Representatives from ACEC and AGC were also on the committee, but did not have a vote.

Evaluation/Selection Criteria

The Department established 5 weighted criteria for selection. To weight the criteria the Department developed a 100 point scale and assigned point values. The contractor was selected based on the following criteria:

- Project Team/Capability of the Contractor (15 pts)
- Project Approach (35 pts)
- Project Innovations (20 pts)
- Contractor Price Proposal (15 pts)
- Approach to Price Proposal (15 pts)

A section within the proposal response was dedicated to each of the criteria listed above.

Project Team/Capability of the Contractor

The Selection Team considered the qualifications and experience of the contractor's team and how it related to the specific project. The Contractor provided qualifications and experience for the following key personnel:

- Project manager
- Superintendant
- Public involvement specialist

Each voting member of the Selection Team ranked the candidates based on a point system. The maximum points available for this section were 15. The following qualifications were considered:

- Lists of similar projects completed during the last five years.
- Description of methods, approaches, and innovations implemented, including risks taken, on previous projects that achieved success in relation to the project goals.

Project Approach

Contractors were asked to supply the following information in their proposals in regards to their project approach:

- Project phasing and cost model
- Subcontractor plan
- Public Involvement
- Maintenance of Traffic

- Identification of resources and capabilities
- Coordination with Cities to upgrade their utilities

The Selection Team evaluated how well each candidate's approach to the project addressed UDOT's stated goals for the project. The selection team considered any specific commitments made by the candidate's team that would assist in achieving the established goals as proposed courses of action. This included commitments that were stated by the Contractor in the Technical Proposal, either during the design phase or the construction phase. A maximum of 35 points were available for this section.

Project Innovations

Each candidate was invited to offer innovative ideas that could increase the likelihood of a successful project. The Selection Team then considered how well the innovative ideas help balance the goals of the project. A maximum of 20 points were available for this section. The RFP required that each proposed innovation be accompanied by a discussion of the following:

- Describe of how the innovation helps achieve the project goals.
- Project how much time and money were saved if the innovation was implemented.
- Identify of which innovations meet the technical information and which do not.

Contractor Price Proposal

The Selection Team evaluated each Contractor's Price Proposal (total amount bid). Price was rated on a modified curve. All price proposals were granted a maximum score of 15 if they were between the average price and one standard deviation below the average price. Points were deducted from the score for price proposals more than one standard deviation below the average price and for price proposals above the average price as shown in Table 5.

TABLE 5- Deduction of Score Base on Bid Price

STDEV=Standard Deviation	Percent Reduction	Points Scored
3 STDEV below average	60%	6.0
2 STDEV below average	30%	10.5
1 STDEV below average	0%	15.0
Average	0%	15.0
1 STDEV above average	40%	9.0
3 STDEV above average	80%	3.0
3 STDEV above average	100%	0.0

Scores between the values listed in Table 5 were calculated using linear interpolation. Furthermore, it was maintained that if the standard deviation was less than 5% of the average of

all bids, the price would be dropped as a selection criteria. If the standard deviation was between 5% and 10% of the average of all bids, the percent reduction would be reduced by half. Since only three candidates responded to the RFP, the engineer's estimate was included in the analysis as an independent bid.

Approach to Price Proposal

Candidates were scored by the Selection Team based on the Unit Prices submitted. Unit Prices for the bid items included in the Price Proposal were held by the Contractor for their Final Bid Amount submitted in January 2008. The sum of the price components equaled the total Unit Price Bid. Unit Prices reflected the approach and commitments proposed by the Contractor as described in the Project Approach identified above. Each candidate included a baseline "indexed" cost for raw materials. The purpose of this was to allow for changes (increase or decrease) in unit prices based on future changes in the cost of raw materials. A maximum of 15 points were available for this section. Each candidate was asked to provide a response concerning impacts to the unit price for the following issues:

- Schedule – Delays
- Schedule – early RFC for specific project items
- Daytime versus night-time work
- Segmenting the work
- Traffic control shifts and phasing
- Substantial Changes in Quantities – what % increase / decrease would affect unit price

Selection Results

Each of the candidates were scored and ranked on the selection criteria discussed above. Geneva Rock was selected based on both their proposal and performance in the interview.

Analysis of Performance

Schedule Timeline

Figure 3 shows the project timeline.

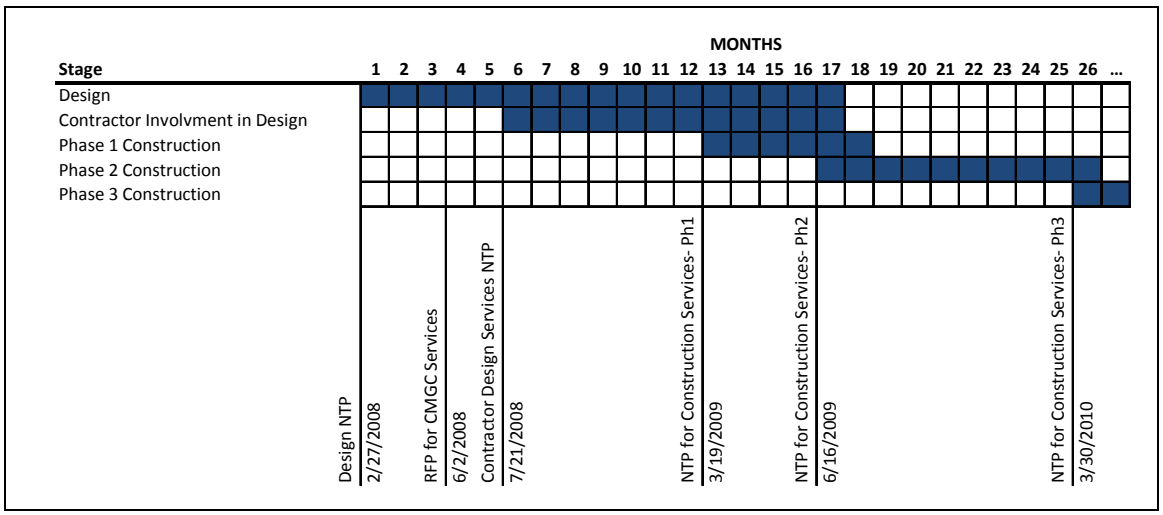

Figure 3 - Project Timeline

Based on feedback from the designers, CMGC did not necessarily result in time savings during design. The Contractor was able to pre-work some utilities, and provided valuable feedback to the designers, which helped help simplify complex issues involving right-of-way and utilities. However, feedback from the contractor often resulted in an iterative process in which the designers had to recheck or redesign elements of the project. Although the CMGC process did not produce a time savings during the design, the final result was an improved project. The schedule as it relates to construction will be examined in the construction phase report for this project.

Cost Comparison

The proposed bids presented by the contractor were compared with the Engineer's Estimate prepared by the Designer and an Independent Cost Estimate (JUB engineers) in accordance with UDOT's standard procedure. This project was divided into three phases, with the contractor submitting separate bids for each phase. Table 6 shows the results of the bid for Phase 1 of the project, which included early procurement items, and preliminary utility work.

TABLE 6 COST COMPARISONS OF FINAL BID - Phase 1

	Engineer's Estimate	ICE	Bid
Final Bid- Phase 1			
Cost	$830,783.40	$1,080,846.10	$839,398.00
Percent Diff. of Eng. Est.		+30.10	-1.04
Percent Diff. of ICE			-22.34

As shown in Table 6, the bid for the first phase was favorable, coming in lower than both the engineer's estimate and the ICE.

Results for Phase 2 are shown in Table 7. For this phase, two bid openings were performed. Because the original bid was more than 10 percent higher than the ICE bid, UDOT deemed that this first bid was unacceptable, requiring a second, refined bid.

TABLE 7 COST COMPARISONS OF INITIAL AND FINAL BIDs - Phase 2

	Engineer's Estimate	ICE	Bid
Initial Bid			
Cost	$8,493,950.18	$8,114,917.00	$8,988,802.00
Percent Diff. of Eng. Est.		-4.46	+5.83
Percent Diff. of ICE			+10.7
Final Bid			
Cost	$8,493,950.18	$8,347,015.50	$8,834,794.00
Percent Diff. of Eng. Est.		-1.73	+4.01
Percent Diff. of ICE			+5.84

After the initial bid, UDOT reviewed the bid prices that appeared too high, resulting in a concern that perhaps there was a misunderstanding in the assumptions used for bidding these items. The bid items of concern were: mobilization, the drainage pond, 54 inch irrigation, Portland Cement Concrete (PCC) sidewalk, and the Woods Cross waterline. For the final bid, the contractor reduced their price for five of these six items, for a total reduction in cost of $154,008.00. The ICE also adjusted their bid. Between the initial and final bid, the difference between the ICE and Contractor bids dropped from 10.7% to 5.84%.

Table 8 below gives a detailed comparison of the Independent Cost Estimate (ICE) and the final price for construction. The entire bid breakdown and the ICE are included in the Appendix of this report.

TABLE 8 – Final Price vs. Independent Cost Estimate

Project Component	ICE Price	Negotiated Price	Percent Difference
Roadway	$7,379,315.20	$7,809,794.00	5.83%
Landscaping	$539,700.00	$555,000.00	2.83%
Lighting	$104,000.00	$105,000.00	0.96%
Waterline	$324,000.00	$365,000.00	12.65%
Total	**$8,347,015.50**	**$8,834,794.00**	**5.84%**

As shown in Table 8, the final bid was more than just over 5% higher than the ICE. However, the bid was within 5% of the engineer's estimate. UDOT deemed the bid acceptable, and received authorization from FHWA to proceed, under the following contingencies:

- Receipt by FHWA of a letter listing the reasons why UDOT wanted to award the contract.
- Receipt by FHWA of a letter of concurrence from the cities of West Bountiful and Woods Cross that both are in agreement to the bids/costs, since these are non-participating costs.
- Receipt by FHWA of a letter from Geneva Rock on commitment to abide by the "Buy America" requirement per CFR 635.410 on the iron/steel pipe.

For Phase 3, it was determined that a blind bid opening should be performed prior to the final bid opening. Table 9 shows a comparison of the initial (blind) and final bid openings.

TABLE 9 COST COMPARISONS OF INITIAL AND NEGOTIATED BIDs - Phase 3

	Engineer's Estimate	ICE	Bid
Initial Bid			
Cost	$5,105,049.80	Blind	$5,348,177.00
Percent Diff. of Eng. Est.		Within 10%	+4.76%
Percent Diff. of ICE			Over 10%
Final Bid			
Cost	$5,105,057.86	$4,749,306.95	$5,028,377.50
Percent Diff. of Eng. Est.		-6.97	-1.50
Percent Diff. of ICE			+5.88

As shown in Table 9, in the blind bid, the contractor's price was more than 10 percent higher than the ICE. After the blind bid opening, UDOT discussed with the contractor the bid items which were more than 10 percent higher than the ICE. After adjusting some assumptions, the contractor lowered the overall bid by nearly $320,000. The final bid was within 6 percent of the ICE.

Table 10 compares how the prices indicated in the proposal compared to the awarded bid prices. From the proposals UDOT realized that the project pricing should be about 105% of the state average unit prices. This pricing goal was determined based on the performance pricing shown in the winning proposal. The ratio of Price to Anticipated Price was 1.07 indicating that the goal was not quite achieved.

Table 10 – Winning Proposal Pricing Comparison with 2007 State Averages

Description	RFP Quantity	Unit	Winning Proposal Unit Price	State Ave. Price 2-19-2008 to 2-18-2009	Anticipated Ratio of Price [2]	Awarded Bid Quantities	Awarded Bid Unit Price [1]
Concrete Curb and Gutter, Type B1	47,000	Ft	$17.64	$16.13	1.05	11,710	$17.70
Concrete Sidewalk	202,300	Sq Ft	$4.36	4.33		54,846	$ 4.33
Notes:							
1. Unit prices are a weighted average of all three phases.							
2. Anticipated Ratio of Price is the SOQ Appendix D elements compared to the State Average							
3. State aveage prices for HMA are not tracked by the square foot. HMA compared to average of all bids, rather than state average.							

Figure 4 shows the pricing of each phase of the project compared to state average prices (Silver Standard ratio) and the phase's efforts to achieve the 1.05% goal (Gold Standard ratio). This analysis indicates that the overall price came in approximately 7% higher than the Gold Standard ratio, indicating that prices were approximately 7% higher than would be expected, based on the prices presented in the Contractor's proposal.

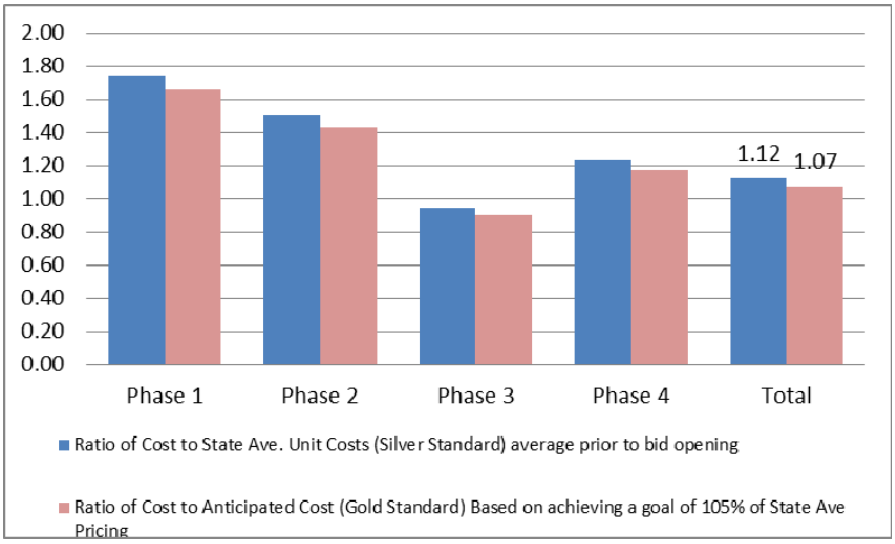

Figure 4 Pricing Performance Ratios for 500 South; 1100 West to I-15

For phases 1 and 2, the bid item prices that were higher than expected were likely related to the complexities of the project involving underground utilities and traffic control. The phase 3 prices

came in lower than the Gold Standard ratio, due to a combination of fewer utility conflicts, and the use of a blind bid process to show the Contractor areas where UDOT may consider their prices to be unreasonable.

Lessons Learned

Based on interviews with the UDOT project manager, the contractor, and the designer, the following is a list of valuable lessons learned:

- The contractor developed a greater understanding of UDOT right-of-way process and the design process (Steve Sussdorff, Geneva Rock).
- Because the designer and contractor worked well together, the result was a great team effort (Steve Sussdorff, Geneva Rock).
- After the bid, the designer's contract ended, and thus the collaboration ended. There have been some issues where collaboration with the designer would be valuable. It would be helpful to have a small contract with the designer so they can be available during construction for small issues that arise (Steve Sussdorff, Geneva Rock).
- The pass-off from the design/CMGC group to the construction group could be smoother. (Steve Sussdorff, Geneva Rock).
- It was helpful to have designer input on the selection and scoping for the contractor (Greg Davis, URS).

Conclusion

This was a complex project with right-of-way, utility, railroad, and environmental issues that needed to be addressed. In addition, this project presented a variety of risks due to the proximity to oil refineries, including associated trucks and high-pressure gas lines. The CMGC process allowed the contractor to get involved early on in the project, during the design phase. This contractor involvement benefited the project by providing earlier coordination on utilities and public involvement, improved traffic control, fewer environmental impacts, and reduced risk, particularly with regards to the oil refineries.

APPENDIX- Justification Report

500 South Bountiful

CMGC Method Justification

Project Number STP-0068(16)68; Pin 4178

Regions 1 Project Type: Urban Reconstruction

This project involves Railroad, UTA, and utilities to include industrial pipelines. Contractor participation would help us to improve the design, reduce errors, and minimize change orders in an area where we have environmental concerns. There are environmental plumbs within 5 feet of the surface of the roadway where contractor knowledge, experience, and innovation will help reduce our risk. We anticipate that the CMGC process will provide innovative solutions for the environmental plums and the industrial pipelines.

Schedule will not drive the design as it has in recent CMGC projects; however, with contractor participation we expect that we can shorten the design time by choosing a solution the contractor understands and is able to perform within existing capabilities.

We do not anticipate a lot of Right-of-Way issues but identifying the contractor in the design phase will help us establish a better connection to the utility companies. We have learned from previous CMGC projects that when the utility companies know who the contractor is, they provide better cooperation and support to clear utility issues quickly. This is an important benefit for this project.

The contractor's input in the design will identify and reduce risk for UDOT as the owner and the contractor. We anticipate this risk reduction will reduce the cost of the project and since the project is not schedule driven we should be able to get some valuable data on cost savings. We also need their help in developing Maintenance of Traffic solutions. The area near the I-15 interchange has a large amount of utilities and a large traffic count as well as the refinery's truck loading facility and two rail crossings.

We request the CMGC process be used on this program

APPENDIX- Interview Notes

CMGC Interview Questions

UDOT Project Manager- Charles Mace

Project Description: 500 South widening and reconstruction

Pin: 4178

Project Phase: Design

Design

What benefits did you see in design because of contractor participation?	• Geneva rock recommendations resulted in cost savings, reduced risk, and a longer pavement life cycle. GR also worked the schedule around ROW issues (Steve Sussdorff). • Working with the contractor has been a huge benefit in regards to utility coordination and railroad crossings (Charles Mace, Greg Davis).
Describe the nature and value of contractors' design suggestions?	• GR assisted with utility conflicts (Steve Sussdorff). • Initially the project was 60,000 yards out of balance. GR recommending raising the grade 4 inches, which eliminated 30,000 yards of haul (Steve Sussdorff). • The Contractor assisted in better refining the vertical grade (Greg Davis). • Switched from HMA to PCC pavement, saving 3 inches in depth for the sub base, further helping with balancing issue (Steve Sussdorff). • Great team effort on solution for running storm and water line under RR crossings. Slipped HDPE through the existing concrete storm drain pipe, rather than boring. Besides the cost savings, the reduction in risk of hitting a high-pressure gas line was huge (Steve Sussdorff). • Several more minor recommendations came out of review

	during PS&E, such as using topsoil from adjacent property, rather than hauling it in, and switching the curb type (Steve Sussdorff). • The contractor was able to address complex issues, such as underground utilities, railroad crossings and contaminated groundwater plumes (Charles Mace). • Having the contractor provide potholing was useful in better understanding and designing for utilities (Charles Mace, Greg Davis).
How did you evaluate and decide which suggestions to use?	• GR created a spreadsheet with ideas and benefits, and emailed it to the team (Steve Sussdorff). • Decisions were based on group consensus involving 5-6 of the key decision makers (Steve Sussdorff, Greg Davis).
What Challenges came up during design and did you resolve them?	• ROW has been the biggest challenge. GR has had to redo the schedule and critical path analysis several times (Steve Sussdorff). • Although ROW issues have created schedule concerns, it would likely be worse in a typical design-bid-build process. CMGC has helped get a head start and plan around unresolved ROW issues (Steve Sussdorff). • The ROW risk would have driven up the construction costs substantially in a DBB project, but having the contractor on board early has allowed them to work around ROW concerns, and as a partner, they have been willing to shoulder more of the ROW risk (Steve Sussdorff). • The project was phased to help with the scheduling. Three phases were put into place: storm drain, north half, south half (Greg Davis).
What is the cost savings anticipated and or produced by contractor's suggestions?	• At least $300k on earthwork balancing (Steve Sussdorff). • $240k up front savings for switch from HMA to PCC + substantial life cycle savings (Steve Sussdorff). • Slips instead of bores under RR tracks saved at least $250k (Steve Sussdorff). • Using local topsoil, curb& gutter modifications, and use of abandoned house as construction office have saved more than $150k (Steve Sussdorff). • Savings of about $100k on switching the curbing type (Greg Davis).

How did the contractor communicate cost changes that corresponded with design changes?	• Cost savings were presented along with suggestions, often with a spreadsheet (Steve Sussdorff). • The contractor provided monthly documentation on innovations and cost saving measures (Charles Mace). • The contractor provided emails, memos, and spreadsheets. He was very thorough (Greg Davis).
Was there any work besides design that was required of the contractor prior to design?	• The contractor participated substantially in subsurface utility engineering (potholing). This allowed the potholing to be customized to the contractor's needs. The potholing ended up taking longer than if a 3rd party contractor did it, but it was likely more thorough and useful (Greg Davis).

Constructability

How was constructability improved by involvement of the contractor in design?	• The slips under the RR tracks went very well (Steve Sussdorff). • Switch from concrete pipe to HDPE snap-tight greatly improved constructability (Steve Sussdorff). • Use of yard by the construction office to stockpile materials has helped with cost and efficiency (Steve Sussdorff). • The contractor was able to collaborate on utilities, particularly underground utilities near the refineries. Using CMGC has allowed for moving some utilities early (Charles Mace). • The contractor was able to manage the earthwork to minimize haul (Greg Davis). • They developed an efficient traffic control plan (Greg Davis).
What constructability issues identified by the contractor were included in design?	• Slips instead of bores under RR tracks and use of HDPE snap-tight pipes (Steve Sussdorff).

Innovations

What innovations were used to reduce cost?	• Use of HDPE snap-tight products saved time and money (Steve Sussdorff).

	• In general, contractor focused on "base hits" instead of "grand slams". The focus was on proven ideas that may have been overlooked, rather than brand-new ideas (Steve Sussdorff). • The change in curbing type reduced costs (Greg Davis).
What innovations were used to reduce schedule?	• Schedule is still being driven by ROW (Steve Sussdorff).
What innovations were used to improve quality?	• The switch to concrete pavement will improve the quality of the pavement (Steve Sussdorff, Greg Davis).
What technology innovations were used?	• Use of HDPE snap-tight pipes (Steve Sussdorff, Greg Davis).
What innovations were used to reduce impacts to the public?	• Slipped pipes under 800 West, and planning on the same for 1100 West, reducing road closures and impact to traffic (Steve Sussdorff). • Doing the phasing plan to build one side of the road then the other will reduce impacts to traffic (Steve Sussdorff). • It was helpful to have confidence early on in the traffic control plan that was in place long before construction (Greg Davis).

Project Schedule

How much time was saved in design?	• CMGC has allowed GR to work around the ROW issues in a way that should reduce the schedule from what it would have been in DBB (Steve Sussdorff).
How much cost was saved in design?	•

Risk

How did the team identify, evaluate, and track project risk?	• There was a 4 hour risk assessment meeting at the beginning of the process, which identified the top 5 risks: 1. ROW 2. utilities

	3. cost of asphalt 4. railroad crossings- coordination with RRs can be a challenge because they work on their own timetables. 5. contaminated groundwater and soil (Steve Sussdorff) • In the early risk assessment meeting, the procedure was set for which items to work on, which were followed up on weekly. It may have been a good idea to hold another official risk meeting (Greg Davis).
Which contractor suggestions helped you to reduce risk and control cost?	• Raising the grade of the road helped with utilities and avoiding contaminated soil (Steve Sussdorff). • Slipping pipes rather than boring helped avoid utilities. Particularly the high-pressure oil and gas lines from the refineries. Hitting one of these high-pressure lines would be catastrophic, and the benefits of reducing that risk cannot be emphasized enough (Steve Sussdorff). • UDOT held the risk on hitting contaminated groundwater, which allowed the contractor to leave the cost of that risk out of their bid (Greg Davis). • The contractor's understanding of the utilities greatly reduced risk. Under design-bid-build, there would have been a 'ton' of change orders and schedule delays (Greg Davis).

Environmental Stewardship

How did bringing the contractor on early alleviate environmental concerns?	• Raising the grade and using a lesser roadway cross section allowed the contractor (hopefully) to avoid digging up contaminated soil (Steve Sussdorff).

Benefits to Public

How did the public benefit from the CM/GC process?	• Slipping rather than boring lessoned the risk of hitting high-pressure gas lines (Steve Sussdorff). • Having the contractor attend meetings early on with property owners relieved residents' concerns (Greg Davis).

Lessons Learned

What did you learn in the CM/GC process?	• Understanding of UDOT ROW process and the design process. URS was great to work with. Appreciation of the team effort (Steve Sussdorff). • After the bid, the designer's contract ended, and thus the collaboration ended. There have been some issues where collaboration with the designer would be invaluable. It would be helpful to have a small contract with the designer so they can be available during construction for the small issues that arise (Steve Sussdorff). • The pass-off from the design/CMGC group to the construction group could be smoother. However, the construction group has been great to deal with (Steve Sussdorff). • CMGC takes a 'ton' of coordination, and is not conducive to a tight schedule. You lose a lot of the value of CMGC in a tight schedule (Greg Davis). • It was helpful to have designer input on the selection and scoping for the contractor (Greg Davis). • There were some challenges in dealing with differing expectations from the Complex and the Region (Greg Davis).
Was there anything you would change during the RFP portion of the project?	• Comparing the 500 S and Syracuse Road proposals and scoring, it seemed that the grading could be a bit arbitrary. Areas where GR scored high in 500 South were the same areas where they scored low on Syracuse Road (Steve Sussdorff). • Make it more of a quality based selection. The costing items in the proposals didn't add much value (Greg Davis).
Would you have used different selection criteria?	•
Would you change the way you selected based on price?	• It was a little inflexible. For example, the pavement type completely changed, making much of the pricing irrelevant (Greg Davis).
What changes	• None (Greg Davis).

would you have made in the way you developed the RFP?	
What changes would you make in the selection process?	• Concern that maybe 1 or 2 strong personalities could sway the rest of the committee (Steve Sussdorff). • It went pretty well (Greg Davis).
How would you improve the RFP development?	•

General Notes/Other Items

Did you set a committed advertising date and did you meet your schedule?	• Sort of. We met the date for phase 1, but the subsequent phases haven't met the original goal. However, phasing wasn't originally planned for this project (Greg Davis).
Describe negotiation problems and their resolution.	• Schedule is a big issue. Delays on the award of contract are hurting the schedule. Unresolved ROW issues have been a major frustration (Steve Sussdorff).
How would you rate the CMGC process prior to the beginning of the project?	• CMGC was the "ultimate" solution for an approach to a project like this, with considerable unknowns and risks (Steve Sussdorff). • CMGC has allowed the contractor to accomplish many of the benefits of design build without the major upfront investment (risk) to propose on the project (Steve Sussdorff). • It was extremely painful and time consuming while in the middle of it, but ultimately CMGC saved cost for the Department due to the risk reduction (Greg Davis).

APPENDIX- Bid Abstracts

Project No: S-0068(57)68 Project Name: 500 SOUTH; 1100 WEST TO I-15, WEST BOUNTIFUL Desc of Construction: DRAINAGE, UTILITIES & RAILROAD ACTIVITIES Estimate Completion date on or before County: DAVIS (11)Date Opened: 02/19/2009 County: 15 Pavement Surfacing Width: 0.01 ft Length of Project: 1.75 mi					Engineer's Estimate		INDEPENDENT COST ESTIMATE (JUB ENGINEERS 2875 SOUTH DECKER LAKE DRIVE SUITE 575 SALT LAKE CITY,UT 84119		GENEVA ROCK PRODUCTS, INC. 302 WEST 5400 SOUTH SUITE 201 MURRAY,UT 84057		State Average (2-19-2008 through 2-18-2009)		Gold Standard	
seq_num	item_num	item_desc	qty	unit	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount
													1.05	
1	12850010	Mobilization	1	Lump	85,000.00	85,000.00	136,587.40	136,587.40	83,000.00	83,000.00		0.00	0	0
2	01554001P	Traffic Control	1	Lump	76,000.00	76,000.00	70,002.70	70,002.70	70,000.00	70,000.00		0.00	0	0
3	01571015*	Environmental Controls	1	Lump	21,700.00	21,700.00	15,655.50	15,655.50	27,000.00	27,000.00		0.00	0	0
4	17210010	Survey	1	Lump	6,000.00	6,000.00	3,858.40	3,858.40	5,000.00	5,000.00		0.00	0	0
5	02221001*	Partial Demolition of Parcel # 5 and 5B	1	Parcel	20,000.00	20,000.00	28,882.20	28,882.20	22,000.00	22,000.00		0.00	0	0
6	22210030	Remove Catch Basin	6	Each	550	3,300.00	810.2	4,861.20	600	3,600.00	471.72	2,830.32	495.306	2971.836
7	22210095	Remove Pipe Culvert	1976	ft	13	25,688.00	8	15,808.00	8	15,808.00	19.98	39,480.48	20.979	41454.504
8	02229001*	Relocate Fire Hydrant	2	Each	4,000.00	8,000.00	1,402.90	2,805.80	4,400.00	8,800.00		0.00	0	0
9	26101386	18 Inch Irrigation/Storm Drain, Class C, smooth	1081	ft	50	54,050.00	128.2	138,584.20	54	58,374.00	45.82	49,531.42	48.111	52007.991
10	02610139*	18 Inch - HDPE, Irrigation/Storm Drain, Class C	295	ft	120	35,400.00	189.6	55,932.00	165	48,675.00	81.87	24,151.65	85.9635	25359.2325
11	26101391	36 Inch Irrigation/Storm Drain, Class C, smooth	2071	ft	90	186,390.00	145.5	301,330.50	89	184,319.00	29.47	61,032.37	30.9435	64083.9885
12	02610140*	42 Inch - HDPE, Irrigation/Storm Drain, Class C	103	ft	350	36,050.00	339.5	34,968.50	380	39,140.00		0.00	0	0
13	02610141*	Clean Pipe	232	ft	30	6,960.00	20.2	4,686.40	27	6,264.00		0.00	0	0
14	02610142*	Plug Pipe	2	Each	800	1,600.00	289.8	579.6	100	200		0.00	0	0
15	26130060	Culvert End Section 36 inch	1	Each	1,000.00	1,000.00	1,487.90	1,487.90	1,100.00	1,100.00	911.59	911.59	957.1695	957.1695
16	02633010*	Catch Basin	7	Each	2,700.00	18,900.00	3,118.50	21,829.50	2,900.00	20,300.00		0.00	0	0
17	02633011*	Cleanout Box	7	Each	3,400.00	23,800.00	3,463.90	24,247.30	3,500.00	24,500.00		0.00	0	0
18	02633012*	Combination Box	1	Each	5,900.00	5,900.00	5,306.20	5,306.20	6,000.00	6,000.00		0.00	0	0
19	02633013*	Pressure Grout	232	ft	95	22,040.00	54.5	12,644.00	95	22,040.00		0.00	0	0
20	26350030	Manhole Frame and Solid Cover - GF 2	4	Each	300	1,200.00	456.5	1,826.00	400	1,600.00	461.27	1,845.08	484.3335	1937.334
21	02229002*	Reconstruct Fire Hydrant	2	Each	6,700.00	13,400.00	6,555.60	13,111.20	7,500.00	15,000.00		0.00	0	0
22	02229003*	12" PVC C900 DR-14 Waterline	690	ft	80	55,200.00	94.5	65,205.00	81	55,890.00		0.00	0	0
23	02229004*	Air Release and Vacuum Valve and Vent Assemb	1	Each	7,860.00	7,860.00	5,687.80	5,687.80	8,200.00	8,200.00		0.00	0	0
24	02229005*	12" Connection STA 00+09.31 (West End)	1	Lump	8,000.00	8,000.00	9,180.70	9,180.70	4,000.00	4,000.00		0.00	0	0
25	02229006*	6" Connection STA 01+18.45 (Refinery Fire Line)	1	Lump	9,500.00	9,500.00	7,775.30	7,775.30	10,400.00	10,400.00		0.00	0	0
26	02229007*	Temporary Connection at STA 06+18.18	1	Lump	8,750.00	8,750.00	3,698.10	3,698.10	5,700.00	5,700.00		0.00	0	0
27	02229008*	12" Connection to STA 06+36.92 (800 West)	1	Lump	18,000.00	18,000.00	16,024.20	16,024.20	20,000.00	20,000.00		0.00	0	0
28	02229009*	Future Connection at STA 08+31.10 (East End)	1	Lump	6,750.00	6,750.00	8,474.90	8,474.90	7,300.00	7,300.00		0.00	0	0
29	02229010*	Temporary Service Connection	2	Each	560	1,120.00	536.9	1,073.80	600	1,200.00		0.00	0	0
30	02229011*	22" HDPE Waterline Casing	165	ft	90	14,850.00	83.6	13,794.00	83	13,695.00		0.00	0	0
31	02229012*	Installation of Railroad Crossing Casing	165	ft	65	10,725.00	61	10,065.00	93	15,345.00		0.00	0	0
32	02229013*	12" DIP Railroad Crossing Carrier Pipe	170	ft	126.62	21,525.40	203.1	34,527.00	113	19,210.00		0.00	0	0
33	02610141*	Clean Pipe	129	ft	30	3,870.00	20.2	2,605.80	27	3,483.00		0.00	0	0
34	02633013*	Pressure Grout	129	ft	95	12,255.00	60	7,740.00	95	12,255.00		0.00	0	0
						830,783.40		1,080,846.10	Total	839,398.00				
								Total that matched		$313,476.00		$179,782.91		188,772.06
								Number of items that matched			7			
								Percent of items that matched			0.2058824			
								percent of cost that matched			0.3734534			
								Silver Ratio			1.7436363			
								Gold Ratio			1.660606			

Project No: F-0068(58)68 Project Name: SR-68; 500 SOUTH & 1100 WEST, BOUNTIFUL Desc of Construction: Roadway Wiidening, Reconstruction & Landscaping, Phase 2 Estimate Completion date on or before 12/08/2009 County: DAVIS (11)Date Opened: 05/19/2009 County: 15 Pavement Surfacing Width: 62 ft Length of Project: 1.72 mi					Engineer's Estimate		INDEPENDENT COST ESTIMATE (JUB ENGINEERS 2875 SOUTH DECKER LAKE DRIVE SUITE 575 SALT LAKE CITY,UT 84119		GENEVA ROCK PRODUCTS, INC. 302 WEST 5400 SOUTH SUITE 201 MURRAY,UT 84057		State Average (2-19-2008 through 2-18-2009)		Gold Standard	
seq_num	item_num	item_desc	qty	unit	Unit Cost	Amount	Unit Cost	Amount	Unit Cost	Amount	Unit Cost	Amount	Unit Cost	Amount
													1.05	
1	00830001U	Equal Opportunity Training	5500	Hour	10	55,000.00	10	55,000.00	10	55,000.00		0	0	0
2	12850010	Mobilization	1	Lump	700,000.00	700,000.00	443,000.00	443,000.00	634,000.00	634,000.00		0	0	0
3	13150010	Public Information Services	1	Lump	20,000.00	20,000.00	17,600.00	17,600.00	20,000.00	20,000.00		0	0	0
4	15540005	Traffic Control	1	Lump	420,000.00	420,000.00	465,000.00	465,000.00	421,000.00	421,000.00		0	0	0
5	15710030	Silt Fence	2179	ft	2.55	5,556.45	3.6	7,844.40	4	8,716.00	2.58	5621.82	2.709	5902.911
6	01571007P	Drop-Inlet Barrier (Fiber Roll)	7	Each	100	700	118	826	500	3,500.00	7.33	51.31	7.6965	53.8755
7	15710100	Curb Inlet Barrier	24	Each	90	2,160.00	118	2,832.00	500	12,000.00	129.44	3106.56	135.912	3261.888
8	01572002P	Dust Control and Watering	1	Lump	15,000.00	15,000.00	29,300.00	29,300.00	30,000.00	30,000.00		0	0	0
9	17210010	Survey	1	Lump	60,000.00	60,000.00	54,500.00	54,500.00	55,000.00	55,000.00	40,717.37	40717.37	42753.24	42753.2385
10	18910020	Move Mailbox	6	Each	200	1,200.00	215	1,290.00	100	600	220.75	1324.5	231.7875	1390.725
11	01892001P	Reconstruct Irrigation Box	1	Each	2,000.00	2,000.00	1,400.00	1,400.00	4,000.00	4,000.00		0	0	0
12	18920040	Reconstruct Valve Box	20	Each	420	8,400.00	325	6,500.00	500	10,000.00	503.70	10074	528.885	10577.7
13	18920050	Reconstruct Manhole	26	Each	800	20,800.00	500	13,000.00	800	20,800.00	1,491.76	38785.76	1566.348	40725.048
14	20560015	Granular Borrow (Plan Quantity)	7899	cu yd	20	157,980.00	32.4	255,927.60	29	229,071.00	15.32	121012.68	16.086	127063.314
15	02221001*	Relocate Fire Hydrant	2	Each	2,200.00	4,400.00	2,100.00	4,200.00	3,500.00	7,000.00		0	0	0
16	02221003*	Remove Masonry Wall	82	ft	25	2,050.00	6.3	516.6	10	820		0	0	0
17	22210030	Remove Catch Basin	4	Each	200	800	800	3,200.00	600	2,400.00	471.72	1886.88	495.306	1981.224
18	02221005*	Remove Flagpole	1	Each	500	500	560	560	500	500		0	0	0
19	22210050	Remove Tree	4	Each	380	1,520.00	350	1,400.00	500	2,000.00	321.91	1287.64	338.0055	1352.022
20	02221008*	Remove and Salvage Steel Fence	308	ft	3	924	2.5	770	5	1,540.00		0	0	0
21	22210080	Remove Fence	3106	ft	0.9	2,795.40	1.75	5,435.50	3	9,318.00	1.30	4037.8	1.365	4239.69
22	02221009*	Remove Bollard	2	Each	400	800	50	100	200	400		0	0	0
23	22210095	Remove Pipe Culvert	2067	ft	6	12,402.00	16.5	34,105.50	9	18,603.00	19.98	41298.66	20.979	43363.593
24	02221009P	Remove Light Pole	4	Each	550	2,200.00	826	3,304.00	300	1,200.00	469.42	1877.68	492.891	1971.564
25	22210106	Remove Mailbox	2	Each	25	50	50	100	50	100	106.00	212	111.3	222.6
26	22210110	Remove Concrete Sidewalk	83	sq yd	5.5	456.5	8.5	705.5	9	747	7.30	605.9	7.665	636.195
27	22210115	Remove Concrete Driveway	200	sq yd	10	2,000.00	9.45	1,890.00	10	2,000.00	11.46	2292	12.033	2406.6
28	02221012*	Remove Concrete Vault	1	Each	2,000.00	2,000.00	4,800.00	4,800.00	1,000.00	1,000.00		0	0	0
29	22210125	Remove Concrete Curb and Gutter	482	ft	3.1	1,494.20	3.5	1,687.00	5	2,410.00	3.75	1807.5	3.9375	1897.875
30	02221014*	Remove Poles	4	Each	200	800	125	500	300	1,200.00		0	0	0
31	02221015*	Remove Boulder	2	Each	100	200	80	160	100	200		0	0	0
32	02221016D	Remove Building, Basement, and Foundation - Parcel #79_____	1	Parcel	10,000.00	10,000.00	8,200.00	8,200.00	8,000.00	8,000.00		0	0	0
33	02221034D	Remove Building, Basement, and Foundation - Parcel #3_____	1	Parcel	40,000.00	40,000.00	30,600.00	30,600.00	29,000.00	29,000.00		0	0	0
34	02221035D	Remove Building, Basement, and Foundation - Parcel #4____	1	Parcel	10,000.00	10,000.00	12,400.00	12,400.00	12,000.00	12,000.00		0	0	0
35	23160020	Roadway Excavation (Plan Quantity)	18044	cu yd	13	234,572.00	14.4	259,833.60	13	234,572.00	10.01	180620.44	10.5105	189651.462
36	02317001*	Drainage Pond	1	Lump	400,000.00	400,000.00	338,000.00	338,000.00	372,000.00	372,000.00		0	0	0
37	26101386	18 Inch Irrigation/Storm Drain, Class C, smooth	2108	ft	55	115,940.00	67	141,236.00	62	130,696.00	45.82	96588.56	48.111	101417.988
38	26101388	24 Inch Irrigation/Storm Drain, Class C, smooth	1150	ft	65	74,750.00	59	67,850.00	64	73,600.00	27.95	32142.5	29.3475	33749.625
39	02610138P	15 Inch Irrigation/Storm Drain, Class C, smooth	55	ft	60	3,300.00	72	3,960.00	55	3,025.00	60	3300	63	3465
40	26101391	36 Inch Irrigation/Storm Drain, Class C, smooth	80	ft	80	6,400.00	127	10,160.00	125	10,000.00	29.47	2357.6	30.9435	2475.48
41	26101392	42 Inch Irrigation/Storm Drain, Class C, smooth	472	ft	110	51,920.00	104	49,088.00	120	56,640.00	64.68	30528.96	67.914	32055.408
42	02610139P	54 Inch Irrigation/Storm Drain, Class C, smooth	2632	ft	170	447,440.00	146	384,272.00	178	468,496.00		0	0	0
43	02610144P	42 Inch - HDPE, Irrigation/Storm Drain, Class C, smooth	100	ft	280	28,000.00	221	22,100.00	270	27,000.00		0	0	0
44	02610145P	34 Inch - HDPE, Irrigation/Storm Drain, Class C, smooth	88	ft	220	19,360.00	256	22,528.00	265	23,320.00		0	0	0
45	02610148P	12 Inch - Concrete Pipe, Irrigation/Storm Drain, Class C	75	ft	40	3,000.00	100	7,500.00	86	6,450.00		0	0	0
46	26101490	42 Inch - Concrete Pipe, Irrigation/Storm Drain, Class C	285	ft	180	51,300.00	128	36,480.00	168	47,880.00		0	0	0
47	26130030	Culvert End Section 18 inch	1	Each	350	350	820	820	900	900	495.87	495.87	520.6635	520.6635
48	02633010P	Catch Basin	27	Each	3,200.00	86,400.00	2,850.00	76,950.00	3,400.00	91,800.00		0	0	0
49	02633011P	Cleanout Box	5	Each	4,000.00	20,000.00	3,200.00	16,000.00	4,200.00	21,000.00		0	0	0
50	02633012P	Open Curb Shallow Catch Basin	3	Each	900	2,700.00	2,900.00	8,700.00	2,600.00	7,800.00		0	0	0
51	02635003*	Open Curb Inlet Grate and Frame	33	Each	450	14,850.00	670	22,110.00	750	24,750.00		0	0	0
52	26350030	Manhole Frame and Solid Cover - GF 2	8	Each	270	2,160.00	640	5,120.00	350	2,800.00	461.27	3690.16	484.3335	3874.668
53	26350040	Rectangular Grate And Frame (Bicycle Safe Grating) - GF 3	7	Each	650	4,550.00	675	4,725.00	750	5,250.00	606.24	4243.68	636.552	4455.864
54	27210020	Untreated Base Course (Plan Quantity)	5410	cu yd	25	135,250.00	45.5	246,155.00	39	210,990.00	29.46	159378.6	30.933	167347.53
55	27410060	HMA - 3/4 inch	335	Ton	130	43,550.00	177	59,295.00	175	58,625.00	84.72	28381.2	88.956	29800.26
56	02752003P	Portland Cement Concrete Pavement 10 inch Thick	45825	sq yd	63	2,886,975.00	59	2,703,675.00	63	2,886,975.00		0	0	0
57	27710017	Concrete Curb Type B5	3455	ft	20	69,100.00	8	27,640.00	17	58,735.00	15.18	52446.9	15.939	55069.245
58	27710025	Concrete Curb and Gutter Type B1	6923	ft	15	103,845.00	16	110,768.00	17.5	121,152.50	16.13	111667.99	16.9365	117251.3895
59	02771003*	Inverted Curb and Gutter Type B1	5939	ft	16	95,024.00	16	95,024.00	17.5	103,932.50		0	0	0
60	02771004*	Modified Concrete Driveway Flared, 7 inch Thick	1184	sq ft	6.6	7,814.40	5	5,920.00	6.5	7,696.00		0	0	0
61	27710040	Concrete Driveway Flared, 6 inch Thick	462	sq ft	5.4	2,494.80	4.75	2,194.50	6.5	3,003.00	4.86	2245.32	5.103	2357.586
62	27710045	Concrete Driveway Flared, 7 inch Thick	6079	sq ft	5.8	35,258.20	5	30,395.00	6.5	39,513.50	7.32	44498.28	7.686	46723.194
63	27710059	Pedestrian Access Ramp	7	Each	1,600.00	11,200.00	1,370.00	9,590.00	1,300.00	9,100.00	1,502.11	10514.77	1577.216	11040.5085
64	27710100	Plowable End Section	7	Each	500	3,500.00	700	4,900.00	600	4,200.00	477.68	3343.76	501.564	3510.948
65	02771011*	Modified Plowable End Section	7	Each	1,200.00	8,400.00	850	5,950.00	900	6,300.00		0	0	0
66	27760015	Concrete Sidewalk	3896	sq yd	25	97,400.00	33.5	130,516.00	39	151,944.00	4.33	16869.68	4.5465	17713.164
67	27760040	Concrete Flatwork 6 inch thick	1175	sq ft	4	4,700.00	5	5,875.00	6.5	7,637.50	4.92	5781	5.166	6070.05
68	28210008	6 ft Chain Link Fence, Type I	274	ft	16	4,384.00	28	7,672.00	14	3,836.00	15.12	4142.88	15.876	4350.024
69	28210014	4 ft Chain Link Fence, Type II	68	ft	16.66	1,132.88	16	1,088.00	13	884	16.66	1132.88	17.493	1189.524
70	28210018	6 ft Chain Link Fence, Type II	351	ft	25	8,775.00	24	8,424.00	14	4,914.00	21.01	7374.51	22.0605	7743.2355
71	02821001P	6 ft Chain Link Fence, Type I With Barb Wire Arm	228	ft	28	6,384.00	30	6,840.00	17	3,876.00		0	0	0
72	02821002P	6 ft Chain Link Fence, Type II With Barb Wire Arm	108	ft	35	3,780.00	31	3,348.00	17	1,836.00		0	0	0
73	28210068	Chain Link Gate, H= 6 ft X W= 8 ft	2	Each	900	1,800.00	800	1,600.00	500	1,000.00		0	0	0
74	28210072	Chain Link Gate, H= 4 ft X W= 10 ft	2	Each	450	900	675	1,350.00	650	1,300.00		0	0	0
75	28210076	Chain Link Gate, H= 6 ft X W= 10 ft	4	Each	880	3,520.00	800	3,200.00	650	2,600.00		0	0	0
76	28210084	Chain Link Gate, H= 6 ft X W= 12 ft	2	Each	900	1,800.00	850	1,700.00	750	1,500.00	706.40	1412.8	741.72	1483.44
77	02821009P	Chain Link Gate, H= 4 ft X W= 25 ft	1	Each	1,200.00	1,200.00	1,800.00	1,800.00	1,250.00	1,250.00		0	0	0
78	02821010P	Chain Link Gate, H= 6 ft X W= 15 ft	4	Each	1,800.00	7,200.00	1,300.00	5,200.00	900	3,600.00		0	0	0
79	02822001*	Steel Fence and Gate	220	ft	10	2,200.00	10.5	2,310.00	35	7,700.00		0	0	0
80	28220010	Right-of-Way Fence, Type A (Metal Post)	1381	ft	3.6	4,971.60	2.3	3,176.30	5	6,905.00	5.76	7954.56	6.048	8352.288
81	28220050	Right-of-Way Fence, Type F (Metal Post)	7	ft	80	560	7.5	52.5	25	175		0	0	0
82	28220080	Right-of-Way Gate 10 ft	2	Each	420	840	500	1,000.00	650	1,300.00	656.67	1313.34	689.5035	1379.007
83	28220085	Right-of-Way Gate 12 ft	2	Each	550	1,100.00	525	1,050.00	750	1,500.00	840.22	1680.44	882.231	1764.462
84	02822009P	Right-of-Way Gate 20 ft	1	Each	1,600.00	1,600.00	1,175.00	1,175.00	1,000.00	1,000.00		0	0	0
85	02822010*	Temporary Fence	1610	ft	5	8,050.00	2.25	3,622.50	3	4,830.00		0	0	0
86	28220105	Right-of-Way Brace Post	18	Each	200	3,600.00	255	4,590.00	140	2,520.00	288.61	5194.98	303.0405	5454.729
87	02831001*	Modular Block Retaining Wall	200	sq ft	50	10,000.00	53	10,600.00	45	9,000.00		0	0	0
88	02831002*	Modular Block Retaining Wall with Fence	1323	sq ft	60	79,380.00	64	84,672.00	55	72,765.00		0	0	0
89	02861002P	10 ft Precast Decorative Post and Panel Wall	1535	ft	160	245,600.00	154	236,390.00	159	244,065.00		0	0	0
90	02873001*	Holly Oil Railroad Track Modifications	1	Lump	600,000.00	600,000.00	553,000.00	553,000.00	497,000.00	497,000.00		0	0	0
91	02892001D	Traffic Signal System ____1100 West_____	1	Lump	10,000.00	10,000.00	17,700.00	17,700.00	18,000.00	18,000.00		0	0	0
92	02892002D	Traffic Signal System _____Redwood Road_____	1	Lump	10,000.00	10,000.00	26,550.00	26,550.00	27,000.00	27,000.00		0	0	0
93	02898001*	Block Wall	50	sq ft	50	2,500.00	46	2,300.00	50	2,500.00		0	0	0
94	29610030	Rotomilling - 2 Inch	103	sq yd	2.25	231.75	7	721	10	1,030.00	2.36	243.08	2.478	255.234
95	03310001P	Concrete Access Stair	1	Lump	4,500.00	4,500.00	4,200.00	4,200.00	4,000.00	4,000.00		0	0	0
96	02932001P	Landscaping	1	Lump	365,000.00	365,000.00	492,500.00	492,500.00	515,000.00	515,000.00		0	0	0
97	02936001*	Vegetation Establishment Period	1	Lump	30,000.00	30,000.00	47,200.00	47,200.00	40,000.00	40,000.00		0	0	0
98	16525001D	Highway Lighting System ___500 South_____	1	Lump	50,000.00	50,000.00	104,000.00	104,000.00	105,000.00	105,000.00		0	0	0
99	02243001*	Woods Cross Waterline	1	Lump	387,249.00	387,249.00	324,000.00	324,000.00	365,000.00	365,000.00		0	0	0
				Totals		8,493,950.18		8,347,015.50		8,834,794.00				
				Totals that Match						$ 1,585,237.50		$ 1,095,544.80		1,150,322.04
				Number of items that Match							45			
				Percent of Items that Match							0.4545455			
				Percent of Cost that Match							0.1794312			
				Siver Standard Ratio							1.4469856			
				Gold Standard Ratio							1.3780815			

		PIN 4178													1.05	
	10 - ROADWAY					Engineer's Estimate		INDEPENDENT COST		GENEVA ROCK		State Average (2-19-2008		Gold Standard		
				qty	unit	Unit Cost	Amount	Unit Cost	Amount	Unit Cost	Amount	Unit Cost	Amount	Unit Cost	Amount	
1		12850010	Mobilization	1	Lump	480,000	480,000	395,000	395,000	552,000	552,000		0	0	0	
2		13150010	Public Information Services	1	Lump	40,000	40,000	29,000	29,000	40,000	40,000		0	0	0	
3		15540005	Traffic Control	1	Lump	480,000	480,000	334,000	334,000	430,000	430,000		0	0	0	
4		15710030	Silt Fence	2949	ft	4	10,322	2	5,898	3	8,847	2.58	7608.42	2.709	7988.841	
5		01571007P	Drop-Inlet Barrier (Fiber Roll)	6	Each	500	3,000	95	570	150	900	7.33	43.98	7.6965	46.179	
6		15710100	Curb Inlet Barrier	31	Each	500	15,500	95	2,945	150	4,650		0	0	0	
7		01572002P	Dust Control and Watering	1	Lump	85,000	85,000	54,000	54,000	85,000	85,000		0	0	0	
8		17210010	Survey	1	Lump	50,000	50,000	39,000	39,000	35,000	35,000		0	0	0	
9		18910020	Move Mailbox	6	Each	50	300	200	1,200	100	600	220.75	1324.5	231.7875	1390.725	
10		01892003P	Reconstruct Water Meter	13	Each	1,200	15,600	500	6,500	400	5,200	700.62	9108.06	735.651	9563.463	
11		18920040	Reconstruct Valve Box	27	Each	350	9,450	420	11,340	500	13,500	503.70	13599.9	528.885	14279.895	
12		18920050	Reconstruct Manhole	29	Each	700	20,300	650	18,850	800	23,200	1,491.76	43261.04	1566.348	45424.092	
13		01892006P	Reconstruct Junction Box	2	Each	950	1,900	800	1,600	900	1,800	634.94	1269.88	666.687	1333.374	
14		20560010	Borrow	1090	Ton	11	12,263	12	13,462	11	12,219	7.73	8425.7	8.1165	8846.985	
15		20560015	Granular Borrow (Plan Quantity)	3848	cu yd	29	111,592	30	115,440	29	111,592	15.32	58951.36	16.086	61898.928	
16		02221001*	Remove Boulder	78	Each	100	7,800	39	3,042	10	780		0	0	0	
17		02221001D	Remove Building, Basement, and Foundation - Pa	1	Parcel	10,000	10,000	9,950	9,950	7,000	7,000		0	0	0	
18		02221002*	Remove Wall	8	ft	80	640	70	560	100	800		0	0	0	
19		22210020	Remove Box Culvert	1	Each	40,000	40,000	32,000	32,000	30,000	30,000	18,000.00	18000	18900	18900	
20		02221002D	Remove Building, Basement, and Foundation - Pa	1	Parcel	15,000	15,000	14,900	14,900	9,000	9,000		0	0	0	
21		22210030	Remove Catch Basin	20	Each	600	12,000	720	14,400	500	10,000	471.72	9434.4	495.306	9906.12	
22		22210050	Remove Tree	7	Each	450	3,150	120	840	200	1,400	321.91	2253.37	338.0055	2366.0385	
23		22210080	Remove Fence	1489	ft	3	4,467	1	968	4	5,956	1.30	1935.7	1.365	2032.485	
24		22210095	Remove Pipe Culvert	712	ft	12	8,544	10	6,764	15	10,680	19.98	14225.76	20.979	14937.048	
25		02221009P	Remove Light Pole	3	Each	350	1,050	310	930	500	1,500	469.42	1408.26	492.891	1478.673	
26		22210110	Remove Concrete Sidewalk	1703	sq yd	9	15,327	8	14,050	9	15,327	7.30	12431.9	7.665	13053.495	
27		22210115	Remove Concrete Driveway	953	sq yd	10	9,530	9	8,863	9	8,577	11.46	10921.38	12.033	11467.449	
28		22210120	Remove Concrete Curb	455	ft	5	2,275	4	1,593	6	2,730	0.83	377.65	0.8715	396.5325	
29		22210125	Remove Concrete Curb and Gutter	3627	ft	5	18,135	4	13,601	6	21,762	3.75	13601.25	3.9375	14281.3125	
30		02221013P	Remove Concrete Gutter	21	ft	4	84	6	116	5	105	3.98	83.58	4.179	87.759	
31		02221014*	Remove Poles	2	Each	300	600	150	300	200	400		0	0	0	
32		22210140	Remove Raised Island	324	sq yd	8	2,592	14	4,536	20	6,480	11.78	3816.72	12.369	4007.556	
33		02221015*	Remove Bollard	2	Each	100	200	95	190	100	200		0	0	0	
34		22210165	Remove Asphalt Pavement	19316	sq yd	4	75,332	3	53,119	4	74,367	3.92	75718.72	4.116	79504.656	
35		22210170	Remove Precast Concrete Barrier	143	ft	20	2,860	10	1,430	5	715		0	0	0	
36		02229020*	Relocate Fire Hydrant	6	Each	5,000	30,000	2,600	15,600	5,100	30,600		0	0	0	
37		02243001*	Stabilize and Abandon Pipe Culvert	1939	ft	13	25,207	21	40,719	15	29,085		0	0	0	
38		23160020	Roadway Excavation (Plan Quantity)	9934	cu yd	13	129,142	14	141,560	14	139,076	10.01	99439.34	10.5105	104411.307	
39		23730030	Compacted Riprap	19	cu yd	85	1,615	88	1,663	85	1,615	33.25	631.75	34.9125	663.3375	
40		26101384	15 Inch Irrigation/Storm Drain, Class C, smooth	144	ft	55	7,920	70	10,080	55	7,920	60.00	8640	63	9072	
41		26101386	18 Inch Irrigation/Storm Drain, Class C, smooth	2664	ft	65	173,160	64	170,496	68	181,152	45.82	122064.48	48.111	128167.704	
42		02610138P	12 Inch Irrigation/Storm Drain, Class C, smooth	82	ft	55	4,510	77	6,314	50	4,100		0	0	0	
43		26101391	36 Inch Irrigation/Storm Drain, Class C, smooth	459	ft	120	55,080	122	55,998	125	57,375	29.47	13526.73	30.9435	14203.0665	
44		02610141*	Plug Pipe	12	Each	50	600	250	3,000	50	600		0	0	0	
45		26130030	Culvert End Section 18 inch	8	Each	450	3,600	480	3,840	200	1,600	495.87	3966.96	520.6635	4165.308	
46		26130060	Culvert End Section 36 inch	1	Each	1,200	1,200	750	750	900	900	911.59	911.59	957.1695	957.1695	
47		02633010P	Catch Basin	24	Each	4,000	96,000	3,000	72,000	3,400	81,600		0	0	0	
48		02633011P	Cleanout Box	6	Each	4,500	27,000	4,000	24,000	4,200	25,200		0	0	0	
49		02633012P	Open Curb Shallow Catch Basin	8	Each	3,500	28,000	2,000	16,000	2,900	23,200		0	0	0	
50		02633013*	Shallow Catch Basin	4	Each	3,500	14,000	2,200	8,800	2,900	11,600		0	0	0	
51		02633014*	Box Culvert Connection	3	Each	1,500	4,500	2,200	6,600	2,000	6,000		0	0	0	
52		02633015*	Box Culvert Patching	2	Each	1,000	2,000	2,000	4,000	2,000	4,000		0	0	0	
53		02635003*	Open Curb Inlet Grate and Frame	31	Each	750	23,250	570	17,670	650	20,150		0	0	0	
54		26350030	Manhole Frame and Solid Cover - GF 2	6	Each	400	2,400	300	1,800	300	1,800	461.27	2767.62	484.3335	2906.001	
55		26350040	Rectangular Grate And Frame (Bicycle Safe Grati	5	Each	700	3,500	700	3,500	650	3,250	606.24	3031.2	636.552	3182.76	
56		02636001*	Trench Drain	30	ft	180	5,400	170	5,100	150	4,500		0	0	0	
57		27210020	Untreated Base Course (Plan Quantity)	3377	cu yd	37	124,949	44	146,900	39	131,703	29.46	99486.42	30.933	104460.741	
58		27410060	HMA - 3/4 inch	1552	Ton	95	147,440	106	164,512	95	147,440	84.72	131485.44	88.956	138059.712	
59		02752003P	Portland Cement Concrete Pavement 10 inch Thic	22292	sq yd	63	1,404,396	64	1,426,688	65	1,448,980	83.00	1850236	87.15	1942747.8	
60		02771000*	Rolled Gutter	10	ft	40	400	27	270	20	200		0	0	0	
61		02771001*	Modified Concrete Curb Type B4	103	ft	30	3,090	19	1,906	20	2,060	12.70	1308.1	13.335	1373.505	
62		27710017	Concrete Curb Type B5	3144	ft	16	50,304	8	25,152	9	28,296	15.18	47725.92	15.939	50112.216	
63		02771002*	Modified Concrete Curb and Gutter Type B1	167	ft	18	3,006	18	2,923	18	2,923	16.13	2693.71	16.9365	2828.3955	
64		27710025	Concrete Curb and Gutter Type B1	4787	ft	18	83,773	16	76,592	18	83,773	16.13	77214.31	16.9365	81075.0255	
65		02771003*	Inverted Curb and Gutter Type B1	818	ft	18	14,560	17	13,497	18	14,315	33.00	26994	34.65	28343.7	
66		02771004*	Modified Concrete Driveway Flared, 7 inch Thick	407	sq ft	7	2,646	5	2,157	7	2,849	4.86	1978.02	5.103	2076.921	
67		27710040	Concrete Driveway Flared, 6 inch Thick	1926	sq ft	6	11,556	5	10,400	7	13,482	4.86	9360.36	5.103	9828.378	
68		27710045	Concrete Driveway Flared, 7 inch Thick	9354	sq ft	6	56,124	6	52,382	7	65,478	7.32	68471.28	7.686	71894.844	
69		02771005*	Landscape Drain	51	ft	40	2,040	25	1,275	20	1,020	5.00	255	5.25	267.75	
70		27710059	Pedestrian Access Ramp	18	Each	1,400	25,200	1,360	24,480	700	12,600	1,502.11	27037.98	1577.2155	28389.879	
71		27710086	Detectable Warning Surface	2	Each	900	1,800	1,700	3,400	600	1,200	766.92	1533.84	805.266	1610.532	
72		27710100	Plowable End Section	7	Each	550	3,850	660	4,620	700	4,900	477.68	3343.76	501.564	3510.948	
73		02771011*	Modified Plowable End Section	1	Each	900	900	825	825	1,400	1,400		0	0	0	
74		02771012*	Type B5 Modified Plowable End Section	1	Each	900	900	700	700	800	800		0	0	0	
75		02771013*	Refuge Island Plowable End Section	2	Each	1,200	2,400	680	1,360	900	1,800		0	0	0	
76		27760015	Concrete Sidewalk	2198	sq yd	38	82,425	34	74,732	39	85,722	29.67	65214.66	31.1535	68475.393	
77		27760020	Concrete Median Filler	461	sq ft	6	2,766	5	2,443	7	3,227	4.46	2056.06	4.683	2158.863	
78		27760030	Concrete Flatwork 4 inch thick	44	sq ft	7	308	5	220	7	308	4.81	211.64	5.0505	222.222	
79		27760040	Concrete Flatwork 6 inch thick	1745	sq ft	7	12,215	6	9,598	7	12,215	4.92	8585.4	5.166	9014.67	
80		28210008	6 ft Chain Link Fence, Type I	170	ft	14	2,380	26	4,420	19	3,230	15.12	2570.4	15.876	2698.92	
81		28210014	4 ft Chain Link Fence, Type II	106	ft	13	1,378	25	2,650	17	1,802	16.66	1765.96	17.493	1854.258	
82		28210018	6 ft Chain Link Fence, Type II	309	ft	14	4,326	30	9,270	19	5,871	21.01	6492.09	22.0605	6816.6945	
83		02821002P	Chain Link Gate, H= 4 ft X W= 9 ft	2	Each	650	1,300	670	1,340	800	1,600		0	0	0	
84		02821007P	Chain Link Gate, H= 6 ft X W= 9 ft	2	Each	650	1,300	760	1,520	1,400	2,800		0	0	0	
85		02821008P	Chain Link Gate, H= 4 ft X W= 12 ft	2	Each	600	1,200	760	1,520	1,000	2,000		0	0	0	
86		28210100	Chain Link Gate, H= 6 ft X W= 16 ft	1	Each	900	900	1,600	1,600	2,100	2,100		0	0	0	
87		02831001*	Modular Block Retaining Wall	213	sq ft	45	9,585	41	8,733	45	9,585		0	0	0	
88		28440010	Precast Concrete Full Barrier (New Jersey Shape	167	ft	80	13,360	70	11,690	50	8,350	49.98	8346.66	52.479	8763.993	
89		28440080	Precast Concrete Barrier Terminal (New Jersey S	1	Each	1,785	1,785	1,700	1,700	900	900	1,790.67	1790.67	1880.2035	1880.2035	
90		03310001P	Cast-In-Place Concrete Retaining Wall	138	sq ft	75	10,350	41	5,658	50	6,900		0	0	0	
91		02932001P	Landscaping	1	Lump	220,000	220,000	275,000	275,000	216,000	216,000		0	0	0	
92		02936001*	Vegetation Establishment Period	1	Lump	20,000	20,000	23,600	23,600	10,000	10,000		0	0	0	
93		02892005D	Traffic Signal System SB I-15 Ramp	1	Lump	15,000	15,000	4,000	4,000	4,000	4,000		0	0	0	
94		02892006D	Traffic Signal System Redwood Road	1	Lump	80,000	80,000	69,000	69,000	70,000	70,000		0	0	0	
95		02892007P	Remove and Salvage Existing Equipment	1	Lump	500	500	420	420	400	400		0	0	0	
96		13553001P	One 1 1/2-Inch Conduit	1050	ft	9	9,450	7	7,613	10	10,500		0	0	0	
97		135540040	Polymer Concrete Junction Box, Type III	3	Each	1,600	4,800	1,650	4,950	2,000	6,000	2,254.10	6762.3	2366.805	7100.415	
98		01282000P	Redwood Road Extension	1	Lump	233,000	233,000	200,300	200,300	199,000	199,000		0	0	0	
99		12850010	Mobilization	1	Lump	30,000	30,000	22,000	22,000	30,000	30,000		0	0	0	
100		15540005	Traffic Control	1	Lump	9,600	9,600	1,260	1,260	5,000	5,000		0	0	0	
101		17210010	Survey	1	Lump	7,200	7,200	5,900	5,900	3,500	3,500		0	0	0	
102		02229001*	12" PVC C900 DR-14 Waterline	1032	ft	75	77,400	84	86,688	75	77,400		0	0	0	
103		02229002*	Reconstruct Fire Hydrant	2	Each	5,000	10,000	6,000	12,000	5,100	10,200		0	0	0	
104		02229003*	12" water Line Loop	5	Each	3,750	18,750	4,900	24,500	4,300	21,500		0	0	0	
105		02229004*	12" Connection to STA 08+26.80 (West End)	1	Lump	2,500	2,500	2,300	2,300	1,700	1,700		0	0	0	
106		02229005*	Air Release and Vacuum Valve	1	Each	3,500	3,500	4,800	4,800	4,200	4,200		0	0	0	
107		02229006*	6" Connect to Existing (STA 09+28.85)	1	Lump	7,500	7,500	8,500	8,500	6,900	6,900		0	0	0	
108		02229007*	6" Connect to Existing (STA 12+24.14)	1	Lump	6,000	6,000	9,100	9,100	8,100	8,100		0	0	0	
109		02229008*	6" Connect to Existing (STA 14+47.19)	1	Lump	6,000	6,000	9,100	9,100	8,100	8,100		0	0	0	
110		02229009*	6" Connect to Existing (STA 16+32.48)	1	Lump	6,000	6,000	9,100	9,100	8,100	8,100		0	0	0	
111		02229010*	12" Connection to STA 18+00.17	1	Lump	2,750	2,750	7,400	7,400	8,400	8,400		0	0	0	
112		02229011*	Removal of Temporary Connection at STA 06+17.	1	Lump	3,500	3,500	2,300	2,300	2,000	2,000		0	0	0	
113		02229012*	3/4" Water Meters and Lateral	5	Each	2,000	10,000	1,850	9,250	2,100	10,500		0	0	0	
114		02229013*	1-1/2" Water Meter and Lateral	1	Each	3,000	3,000	2,700	2,700	3,000	3,000		0	0	0	
115		02229014*	Mill Creek Crossing Casing	24	ft	750	18,000	950	22,800	780	18,720		0	0	0	
116		02229015*	Mill Creek Crossing Carrier Pipe	26	ft	492	12,800	275	7,150	220	5,720		0	0	0	
116							**5,105,058**		**4,749,307**		**5,028,378**					
					Totals that Match						$ 2,850,072.50		$ 3,015,701.18		**$ 3,166,486.24**	
					Number of items that Match							47				
					Percent of Items that Match							0.405172				
					Percent of Cost that Match							0.566798				
					Siver Standard Ratio							0.945078				
					Gold Standard Ratio							0.900074				