### CMGC Process Report –Construction Phase For

Syracuse Road; 1000 West to 2000 West, Davis County Syracuse, Utah



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#### **Purpose**

In accordance with the Memorandum of Understanding SEP 14 (MOU) for Alternative Contracting Process, the CMGC Phase II report is to address the following topics from Section 4.1:

- The evaluation criteria applicable to the project.
- The innovations used and an analysis of their savings.
- Comparative analysis between the project final cost and the Independent Cost Estimate (ICE).
- Project data that will aide in the formulation of the Annual Report of all projects to be submitted to FHWA.

In accordance with the Project Justification guidelines outlined in the MOU, "All 7 criteria do NOT have to be considered". This report will only focus on those items that apply to this project. The evaluation criteria from the MOU that are applicable to this project are:

- A. Design and Constructability
- B. Project Schedule
- C. Risk
- D. Benefit to the Public

In addition to the information required in the MOU, this report contains additional information that the Utah Department of Transportation (UDOT) requires for internal evaluation. This information includes a discussion of change orders and a comparison of overruns and under runs.

This report discusses the implementation of the CMGC process during construction on Syracuse Road; 1000 West to 2000 West F-0108(24)4 and F-0108(26)4 in Davis County. This project constitutes the "Urban Reconstruction" project for Region 1 in accordance with the Process (Section 3) of the MOU.

#### **Project Overview**

This project consisted of widening and reconstructing Syracuse Road from 1000 West to 2000 West. This segment of Syracuse Road is located near Syracuse, Utah, in Davis County, and provides critical east/west access from I-15 to a growing West Davis County neighborhood. This facility carries approximately 26,500 vehicles per day. Widening from two lanes to five lanes (two each way with a center turn lane) will better accommodate existing and future traffic demand.

#### **Design Costs**

Table 1 shows a summary of the services and fees for companies that were involved in the CMGC Design phase for this project.

Table 1 – Design Services Summary

Firm	Service	Contract Amount	
Horrocks Engineers	Preparation of Final Construction Plans	\$972,491	
Geneva Rock	Constructability reviews, suggestions	\$128,415	
	for minimizing utility and traffic control		
	impacts, assistance in preparing		
	construction estimates, and assistance		
	in determining construction schedule.		
PB Americas	Review of PS&E, constructability, and	\$54,940	
	cost estimates		
Landon Group	Public involvement coordination and	\$111,960	
	information management, including		
	support during phase 1 of construction		
Stanton Constructability	Independent cost estimate (ICE)	\$65,000	
Total Design Services		\$1,333,806	

#### **Construction Costs**

UDOT contracted with Geneva Rock to provide construction services under the CMGC process for \$13,947,531.55. This included an early bid phase of \$1,915,066 for utilities, potholing, and demolition. For bid verification an Independent Cost Estimate (ICE) was performed. The total of the two bids came in 29.4 percent lower than the ICE. The project team had some concern that the ICE was so much higher than both the contractor's bid and the engineers estimate (EE). One explanation that could partially explain the disparity is that the ICE had a difficult time getting accurate bids from suppliers.

The total EE for the two phases was 7.4 percent lower than the total awarded bids for the two phases. The total costs of construction are listed in Table 2 and include change orders and overruns. Non-participating values shown in Table 2 are changes to the design as requested and paid for by the local government.

**TABLE 2 – Total Project Construction Costs** 

Contract Amounts	Engineer's Estimate (EE)	Independent Cost Estimate (ICE)	Awarded Bid	% above/ below EE	% above/ below ICE
F-0108(26)4 (Ph 1)	\$1,780,716.25	\$4,006,201.00	\$1,915,066.10	7.50%	-52.20%
F-0108(24)4 (Ph 2)	\$11,200,993.75	\$15,738,846.10	\$12,032,465.45	7.40%	-23.50%
Total Original Contract	\$12,981,710.00	\$19,745,047.10	\$13,947,531.55	7.40%	-29.40%
	Constru	uction Cost Changes-	Phase 1		
Change Orders (including	Non-Participating)	:	\$505,766.85	See Note 1	
Overruns/Underruns:			-\$649,338.38		
Incentives/Disincentives:			\$847.15		
Total:			-\$142,724.38		
	Constru	uction Cost Changes I	Phase 2		
Change Orders (including	Non-Participating)	:	\$986,914.55	See Note 2	
Overruns/Underruns			(\$12,048.33)		
Incentives/Disincentives			(\$18,023.09)		
Total			\$956,843.13		
	Const	ruction Cost Changes	- Total		
Change Orders (including	Non-Participating)	:	\$1,492,681.40		
Overruns/Underruns			(\$661,386.71)		
Incentives/Disincentives			(\$17,175.94)		
Total			\$814,118.75		
Total Project Cost			\$14,761,650.30		
Notes:					
1. Figure shown includes	\$403,539.88 of no	n-participating funds th	at were paid by tl	he local gove	rnment

2. Figure shown includes \$180,345.31 of non-participating funds that were paid by the local government

#### **Innovations and Achieved Savings**

As discussed in the CMGC Process Report – Phase I for Syracuse Road; 1000 West to 2000 West F-0108(24)4; Syracuse Utah, the primary innovations introduced during design included the use of concrete pavement, use of flexible poly pipe for potable water connections to residents, and the use of a nearby dump site for excess fill. Each of these items was discussed extensively in the aforementioned report. Total estimated savings of these innovations during construction is estimated at over \$1.1 million.

#### **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, particularly among the business and property owners, motorists, and other stakeholders;
- Adequate utility coordination to ensure the project met its schedules while avoiding conflicts;
- Development of a traffic control and phasing plan that minimized both the impacts to the traveling public, and the duration of construction;
- The establishment of a Guaranteed Maximum Price (GMP) at the beginning of construction to ensure completion of the project within the project budget.

The key project elements that affected the balance of these goals included the level of coordination with business and homeowners, impacts to motorists, utility relocations, right-of-way clearance, and overall constructability. UDOT recognized that achieving balance of the project goals required that the Contractor work closely with the design team during the design phase, which is why CMGC was selected as the best delivery method to achieve these goals.

#### **Applicability of the CMGC Process**

The Syracuse Road project was selected for CMGC because it presented opportunities for the team to better address:

- Design and Constructability
- Project Schedule
- Risk
- Benefit to the Public.

The construction phase report will now examine how well the CMGC process helped to address these issues throughout the project.

#### **Design and Constructability**

The CMGC process improved the overall design and increased constructability in a variety of ways. The

Contractor's involvement in design helped avoid many of the unexpected issues that normally arise during construction in an urban corridor. The most significant design change resulting from contractor involvement in design was switching from hot-mix asphalt (HMA) to Portland cement concrete pavement (PCCP). In most cases PCCP is considerably more expensive than HMA pavement. Because of the potential cost increase the



Department was reluctant to change the mix design.

Figure 1 Portland Cement Concrete Pavement on Syracuse Road

However, the contractor took advantage of market conditions, and was able to deliver PCCP for about the same price as HMA. Upon installation the Department was pleased with the results. The results of construction indicate that the contractor was successfully able to improve pavement quality while still controlling costs. Other ways that contractor involvement in design improved constructability include:

- Easements and right-of-way takes were refined and minimized
- Phasing and constructability reviews allowed for improved maintenance of traffic and ensured that at least one lane of traffic each way remained open during construction.
- The depth of the storm drain was decreased, resulting in a lower cost and increased constructability.
- Improved coordination with the utilities through potholing and direct contact between the contractor and the utility companies has resulted in a design that better accommodates the utilities.
- The contractor's experience with traffic control and construction phasing enabled them to adjust the phasing plans to make better use of the pavement available. The result was a cost savings by minimizing the use of temporary pavement.
- Following the contractor's recommendation to use flexible poly pipe for water laterals resulted in cost savings and reduced traffic impacts.

In one case, an idea put forth by the contractor during design did not turn out as hoped. Originally, the storm drain system was going to be moved a few feet to the south to avoid conflicts with the potable water line. The plan was to avoid looping the potable water laterals at approximately 10 locations. However, despite extensive potholing efforts, the location of the waterline was miscalculated in some spots, and the waterline needed to be replaced to meet coverage standards.

#### **Project Schedule**

One of the objectives of bringing the contractor on during design was to reduce the overall project schedule. The use of CMGC likely reduced the schedule by an entire construction season because of the early bid package that was released in the late winter/early spring. However, it produced an even larger benefit by increasing flexibility on the timing of construction for individual elements of the project. This allowed for phasing the project in ways that were less impactful to traffic and more cost-effective.

The project would have likely been finished sooner, but two main factors limited the benefit CMGC provided to the overall schedule:

- There was a three-month delay in late 2008/early 2009 due to statewide funding concerns, which delayed completion of the final design, and resulted in a late start to the 2009 construction season.
- Despite early and repeated efforts by the contractor to coordinate with the utility companies to
  encourage early completion of their portion of the work, the utilities still ended up impacting
  the critical path of the project. Quest in particular was slow to meet their obligations.

However, the use of CMGC did allow for an early procurement phase. This early phase built momentum for the project and resulted in increased public and political support.

#### Risk

One of the major benefits of CMGC is that UDOT is able to decide which risks it wants to assume. Before the bid UDOT determined that it would assume the risk of soft spots. The result was that the contractor left the usual contingency markup for soft spot repairs out of the roadway bid items. Major soft spot repairs were paid for through change orders, and ultimately represented a small portion of the project. UDOT paid the contractor \$102,000 for soft spot repairs through two different change orders. The contractors bid price for granular borrow, excavation, and untreated base course was approximately \$1.4 million. Had the contractor, rather than UDOT taken the risk of soft spot repairs, the contractor's bid price for these items would have been increased by approximately 10-15%, or \$140,000 to \$210,000. By taking on the risk of soft spot repairs, UDOT likely saved between \$40,000 and \$100,000.

In addition to the formal risk reductions, the increased amount of trust between UDOT and the Contractor reduced risk through open communication and a willingness to work together to solve

problems, rather than immediately resort to change orders. The contractor stated that they felt more reluctant to ask for a change order than in a traditional design-bid-build project because of the increased ownership that they felt having been involved in the design. In fact, in the follow up interview with the contractor, they said that they used some of their own geogrid to fix some soft spots, rather than request a change order for every soft spot.

#### Benefit to the Public

Based on a post-project interview, the UDOT PM felt that on projects like this, the public receives a higher quality product from CMGC than other procurement methods could provide. The following are some of the benefits to the public as a result of CMGC:

- Use of longer-lasting, lower maintenance PCCP pavement, constructed at a similar cost as HMA pavement.
- The phase 1, early construction package helped the public see action on the project sooner, helping to garner community support.
- The early construction package included the demolition of abandoned homes along the corridor, which presented a potential safety hazard to the community.
- During the design phase, the contractor was able to work with UDOT to obtain environmental clearance to use a dump site nearby the project. This allowed for shorter truck trips, lower costs, less congestion, and less air pollution.
- The contractor's early involvement allowed them to develop their own phasing plans, creating greater efficiencies, and fewer traffic impacts.

#### **Cost Model**

The RFP required a price proposal be provided for the following items: Granular borrow, Geogrid type 2, roadway excavation, 18, 24, and 30 inch irrigation/storm drain pipe Class C smooth, concrete drainage structure, asphalt treated base course, HMA mix ¾ inch, concrete curb and guttertype B1, Concrete Driveway, pedestrian access ramp, concrete sidewalk, and bonded wearing course (Appendix D of RFP). Comparisons of the bid items to the cost model are shown in Table 3. Compared to the state average unit prices, the cost model prices from the proposal indicate that the contractor's prices should have been approximately 15% higher than the state average prices.

Each of the items included in the cost model (Appendix D of the RFP) showed an increase in the unit costs when the bid was actually submitted. The RFP provided justification for ways that the price might need to be adjusted for each bid item. Due to some delays outside of the control of the project team, there was almost an entire year between the time that the contractor submitted their proposal, and the bid opening. Over the course of that year, and through the design process, many of these assumptions

that the contractor used to prepare their cost model changed. It should be noted that HMA as proposed in the RFP would have been the principle pavement material. Once the team decided to use PCCP, the quantities of HMA were greatly reduced which may explain the extreme pricing difference.

**TABLE 3 – Bid Items Verses Cost Model- Unit Costs** 

Description	Unit	Cost Model from Price Proposal			Bid	Percent Difference Bid to RFP
Granular Borrow	Cubic Yard	\$	31.49	\$	37.00	17%
Geogrid Type 2	Square Yard	\$	5.13		N/A	N/A
Roadway Excavation	Cubic Yard	\$	10.99	\$	12.00	9%
18 in Irrigation, Class C Smooth	Feet	\$	36.05	\$	47.00	30%
24 in Irrigation, Class C Smooth	Feet	\$	44.70	\$	55.00	23%
30 in Irrigation, Class C Smooth	Feet	\$	70.10	\$	76.00	8%
Concrete Drainage Structure	Each	\$	3,427.28	\$	3,600.00	5%
Asphalt Treated Base Course	Cubic Yard	\$	125.75	N/A		N/A
HMA ¾ inch	Ton	\$	88.56	\$	140.00	58%
Concrete Curb and Gutter, Type B1	Feet	\$	17.94	\$	18.00	0%
Concrete Driveway	Square Feet	\$	4.53	\$	7.00	55%
Pedestrian Access Ramp	Each	\$	938.00	\$	1,200.00	28%
Concrete Sidewalk	Square Feet	\$	4.43	\$	4.89	10%
Bonded Wearing Course	Square Yard	\$	9.40		N/A	N/A

#### **Budget Analysis**

#### Were Contractor's Prices Fair and Reasonable

The bid prices were compared with an Independent Cost Estimate (ICE) in accordance with accepted policy at UDOT. The Phase 1 (early items bid) was approximately 50% lower than the ICE, and the Phase 2 bid was approximately 24% lower than the ICE, indicating that the prices were reasonable for the work performed. Nevertheless, because the CMGC process is new, affordability is often questioned. To address this issue UDOT developed two algorithms to analyze the pricing performance of a CMGC bid. The Silver Standard algorithm compares the performance of the bid item unit prices to the average state unit prices. A silver standard ratio above 1 indicates that the contractor's bid item prices were higher than state averages. Previous performance of urban road reconstruction projects indicates that the pricing ratio is higher than 1 due to the complexity of the projects. This holds true for both CMGC and Design Bid Build projects. The Gold Standard algorithm compares the bid item prices to the proposed pricing ratio suggested during selection. A gold standard ratio above one indicates that the contractor's bid item prices were higher than indicated in their proposal. Figure 1 shows the results from the application of these two pricing models (See Appendix B).

With the Syracuse Road project, only 30% of the items matched, representing approximately 54% of the total bid price. Traditionally a higher percentage of bid items that are compared results in more confidence in the analysis. Despite their imperfections, these ratios do form a basis for assessing whether or not the contractor's prices are in a reasonable range.

Based on the ratios shown in Figure 1, it appears that the contractor's prices are slightly higher than state average prices. However, considering the risk and complexity of the project, it would be expected that this project would cost more than normal. It should be noted that the Gold Standard ratio indicates that the contractor delivered the project at a cost that was lower than would be expected based on the prices included in their proposal for selection as the CMGC contractor. Pricing above the 15% level suggested in the RFP stage did not materialize. This is due primarily to extremely low price on the Portland Cement Concrete Pavement as compared to state averages. Figure 1 suggests that the project prices were fair and reasonable.

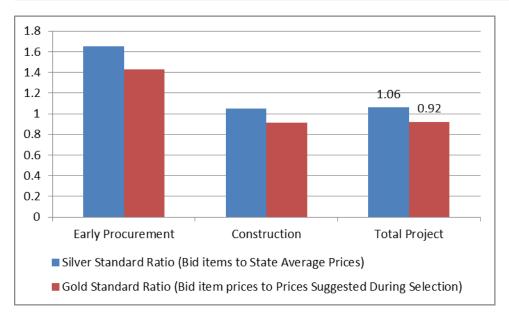


Figure 1 Pricing Comparison Results - Syracuse Road

#### **Analysis of Performance Measures**

In order to uniformly evaluate the cost of CMGC projects, UDOT developed a ratio of comparison for Total Project Costs to the "Projected Cost" of the Project. This ratio is represented in Equation 1 below. The Projected Cost of the project is the cost based on the state average unit prices plus the average impact of change orders and overruns. A discussion of how the projected cost is determined is outlined in Appendix C.

$$R_{PC} = \frac{Tc}{Pc}$$

Equation 1 – Ratio of Project Cost to Projected Cost

A value of  $R_{PC}$  above 1 suggests that the project was overpriced when compared to state average pricing data. A value less than 1 suggests that the project costs were reasonable. The  $R_{PC}$  for this project was 1.07. Considering the scope of work and the risks involved with the project, UDOT feels that this pricing ratio is acceptable.

#### **Change Orders and Overruns**

In general, CMGC projects have fewer change orders than traditional design-bid-build projects. This is because the contractor is involved in the design, and can provide feedback on the design and

constructability, and also help research and mitigate risks. In addition, the contractor has a better understanding of all aspects of the project, and can more accurately bid on the project. The change orders for Syracuse Road were 10.7% of the project bid price. The 5 year average for UDOT it 12% for traditional projects.

Table 4 and Table 5 show a description of the change orders for phases one and two, respectively. The majority of these change orders was minor, and was related to the City waterline and other underground utilities. By far the largest change order was number 8, which was to replace the 16-inch potable water line. Based on data from potholing during the design phase, it was determined that the waterline would not have to be replaced. However, once the entire line was uncovered, it was determined that it did not have adequate cover, and would need to be replaced with a new, deeper line.

Change order 9 included an expense that UDOT took on voluntarily because of the added value to the project. It was determined in the field that the transition on Antelope Drive at the west edge of the project would be smoother by extending the concrete pavement approximately 300 feet. UDOT agreed that this was worthwhile, and included it as a change order.

Because bid items are often replaced via change order, it is better to represent the overall price impacts to a contract by combining both overrun and change order values. Table 6 summarizes the total impact to project cost for Syracuse road. The 5 year average of Design Bid Build project s at UDOT (2005 through 3 quarter of 2009) is 9.4%.

TABLE 4— Change Orders for Syracuse Road—Phase 1 — Does not include "Non-participating" Items.

Change Order Number	Description	Amount Anticipated	Amount Paid (As reported during Physical Completion)	Planned <sup>1</sup>	planr	Specification Change (SC)	Reason	Responsible Party
							DIFFERENCES/CONFLICTS IN THE CONTRACT	Design
1	Waterline Specification change	\$0.00	\$0.00		Χ	Χ	DOCUMENTS	(UDOT/Consultant)
							UNFORSEEN OCCURRENCES / DIFFERING SITE	
2	Replacing unsuitable native backfill with imported suitable backfill	\$85,134.50	\$76,127.70		Χ		CONDITIONS	Construction Division
	Additional waterline connections, waterline loop, waterline specification changes, moving							Design
3	some waterline installations to phase 2	\$13,182.70	\$6,959.70		Χ	Х	GENERAL ADDITIONS / DELETIONS / ADJUSTMENT	(UDOT/Consultant)
	Removal of unexpected foundation, waterline loop, modifications to waterline due to						UNFORSEEN OCCURRENCES / DIFFERING SITE	
4	utility conflicts	\$18,085.05	\$18,086.05		Χ		CONDITIONS	Consultant
							UNFORSEEN OCCURRENCES / DIFFERING SITE	
5	Secondary waterline loops, waterline lateral	\$4,115.27	\$4,216.40		Χ		CONDITIONS	Construction Division
	Total	\$120,517.52	\$105,389.85					
	Total for Foreseen Change Orders	\$0.00	\$0.00					
	Total for Unforeseen Change Orders	\$120,517.52	\$105,389.85					

\*Notes: 1. Planned change orders are project items that were added by UDOT not because of error or omission in design; rather, because UDOT decided to add the items after design because it was determined that they added value.

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- 2. Unplanned change orders are project items that were first realized during construction.
- 3. Anticipated Amount is the value of the change order as entered into PDBS, Amount Paid is the amount that UDOT paid for items that the change order addressed.
- 4. Non-participating change orders account for another \$403,539.88.
- 5. Large discrepancies between the Amount Anticipated and the Amount Paid are due to quantity overruns/underruns as reported in Table 6 Below.

CMGC – Construction Phase

TABLE 5— Change Orders for Syracuse Road — Phase 2 — Does not include "Non-participating" Items.

Change Order Number	Description	Amount Anticipated <sup>3</sup>	Amount Paid (As reported during Physical Completion)	Planned <sup>1</sup>	Unplanned <sup>2</sup>	Specification Change (SC)	Reason	Responsible Party
	·	\$58,138.32	\$98,597.72			<i>0, 0</i>		Construction
1	Waterline modifications and transfer of bid items from phase 1 to phase 2				Х		GENERAL ADDITIONS / DELETIONS / ADJUSTMENT	Division
		\$8,961.67	\$8,473.23					Design
2	Change from RCP to elliptical concrete pipe, additional waterline loop				Х		GENERAL ADDITIONS / DELETIONS / ADJUSTMENT	(UDOT/Consultant)
	Over-excavation to replace unsuitable material, 10-inch secondary waterline replacement,	\$56,901.60	\$85,333.32					Construction
3	additional pipe for underground detention system				Χ		GENERAL ADDITIONS / DELETIONS / ADJUSTMENT	Division
		\$0.00	\$0.00				DIFFERENCES/CONFLICTS IN THE CONTRACT	
4	Revision of contract specifications				Χ	Χ	DOCUMENTS	Project Manager
5	18-inch secondary waterline replacement, replacement of concrete pipe with PVC for a segment	\$34,886.38	\$35,105.71		Х		GENERAL ADDITIONS / DELETIONS / ADJUSTMENT	Project Engineer
	Installation of 3-inch conduit to accommodate Rocky Mountain Power's new power source	\$27,915.10	\$23,806.66				UNFORSEEN OCCURRENCES / DIFFERING SITE	
6	location, additional traffic control and other accommodations to expedite Qwest's utility work				Χ		CONDITIONS	Utilities
7	DBE commitment reduction for Romero Construction	\$0.00	\$0.00		Х		ANTICIPATED SUPPLEMENTAL CONTRACT WORK	Contractor
		\$295,027.82	\$277,514.28				UNFORSEEN OCCURRENCES / DIFFERING SITE	Design
8	16-inch culinary waterline replacement due to inadequate cover, additional waterline loop				Χ		CONDITIONS	(UDOT/Consultant)
	Extension of PCCP pavement, soft spot repair, installation of additional light pole, electrical line	\$70,560.64	\$136,898.44				UNFORSEEN OCCURRENCES / DIFFERING SITE	
9	relocation				Χ		CONDITIONS	Contractor
	Additional secondary waterline service connections, extension of electrical conduit and wiring to	\$11,804.01	\$16,074.53				DIFFERENCES/CONFLICTS IN THE CONTRACT	
10	new power source				Χ		DOCUMENTS	Project Engineer
11	Contractor compensation for delays caused by Qwest	\$63,229.10	\$74,725.30		Χ		SETTLEMENT OF CLAIMS AND DISPUTES	Contractor
		\$12,195.68	\$0.00				UNFORSEEN OCCURRENCES / DIFFERING SITE	
12	Contractor compensation for delays caused by Irrigation Company				Χ		CONDITIONS	Contractor
		\$5,852.37	\$37,128.66				UNFORSEEN OCCURRENCES / DIFFERING SITE	
13	Change from slurry seal to microsurfacing				Х		CONDITIONS	Contractor
		\$0.00	\$0.00					Construction
14	Specification change for striping				Х		GENERAL ADDITIONS / DELETIONS / ADJUSTMENT	Division
15	Landscaping wall/ PED poles / Maverik light/ Signal Head etc.	\$11,081.24	\$12,911.39					
16			\$0.00					
	Total	\$656,553.93	\$806,569.24					
	Total for Foreseen Change Orders	\$0.00	\$0.00					
	Total for Unforeseen Change Orders	\$656,553.93	\$806,569.24					
*Notes:	Planned change orders are project items that were added by LIDOT not because of error or omission in design: rather, because LIDO	· ·		l doto	rminad	4 la = 4 da =	raddad valua	

\*Notes:

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<sup>1.</sup> Planned change orders are project items that were added by UDOT not because of error or omission in design; rather, because UDOT decided to add the items after design because it was determined that they added value.

<sup>2.</sup> Unplanned change orders are project items that were first realized during construction.

<sup>3.</sup> Anticipated Amount is the value of the change order as entered into PDBS, Amount Paid is the amount that UDOT paid for items that the change order addressed.

<sup>4.</sup> Non-participating change orders account for an additional \$180,345.31.

<sup>5.</sup> Large discrepancies between the Amount Anticipated and the Amount Paid are due to quantity overruns/underruns as reported in Table 6 Below.

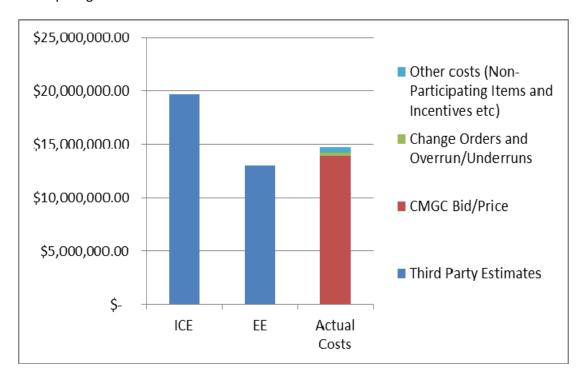
**WCEC Engineers** 

Table 6 Overruns/Under runs and Change Orders per the Original Bid Amount

	Overruns/Under runs as Percent of Original Bid	Change Orders as Percent of the Original Bid (including Non- Participating Items)	Total Impact to Project Cost
Syracuse Road Phase 1	-33.9%	26.4%	-7.5%
Syracuse Road Phase 2	-0.1%	8.2%	8.10%
Syracuse Road Total	-4.7%	10.7%	6.0%
5 year average Design Bid Build	-3.3%	12.7%	9.4%

#### **Cost Comparison of ICE and Final Cost**

The weighted average of the two awarded bids was approximately 29% lower than the ICE. Once the contract was let, scope extensions were added in the form of change orders and bid quantity overruns that accounted for an additional \$911,959.09. However, once the underrun quantities were added to the ledger the total cost of change orders was reduced to \$250,572.38. The Other Costs listed in Figure 2 are incentives/disincentives and Non-Participating Items.



**Figure 2 Projected Costs verses Final Costs** 

#### **Delivery Process and Timeline**

The total time to complete the project was 524 days (from 10 days after NTP on the Early Procurement Phase to the Substantial Completion of the final work on July 30, 2010). Figure 3 identifies the time spent on the project. The graphs suggests that only 20 calendar days were saved by phasing the project, however, due to the timing with the work and when the phasing took place, the team agreed that not phasing the project would have extended the beginning date into the following construction season.

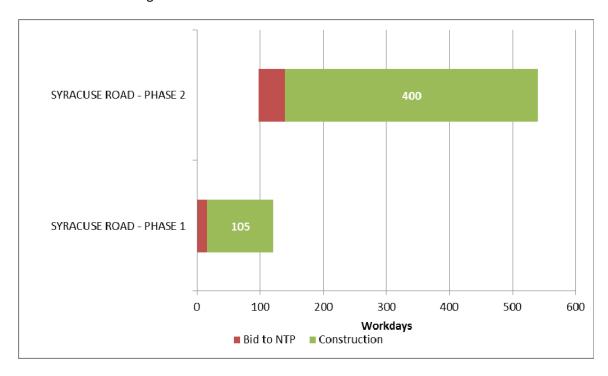


Figure 3 - Timeline for Syracuse Road

The completion date on this project would have likely been pushed to the end of 2010 construction season in a traditional DBB. With CMGC, the contractor was willing to take on more risk with the shorter schedule and trust UDOT that they'd be reasonable if a utility company caused the schedule to be pushed (Shane Albrecht – Geneva Rock Project Manager).

#### **Lessons Learned**

As the Substantial Completion date drew near, the UDOT project manager (Nathan Peterson) and the contractor (Geneva Rock- Shane Albrecht) were interviewed concerning the performance of the project. During the interviews the following issues were identified as "Lessons Learned":

- It was good to have a contractor on board early because they were helpful in design, but they could have been even more useful had they been brought in earlier (Nathan Peterson).
- The bid process for CMGC can be challenging and frustrating (Nathan Peterson).
- We need to improve the ICE process. It is challenging for them to get real numbers from suppliers, resulting in numbers which can be a bit arbitrary. In addition, there's no recourse for the ICE firm if their bid is off. UDOT would benefit from having multiple ICE firms to draw from (Nathan Peterson).
- We need to change the way that we discuss margin for change orders. Maybe let the contractor bid on the margin (Nathan Peterson).
- The contactor was inexperienced in how to price consulting services for the design reviews, and likely gave a discounted price for these services (Shane Albrecht).
- Be mindful of 3<sup>rd</sup> party utility company impacts to the project. Get agreements in writing beforehand (Shane Albrecht).
- The contractor should have a say in who can manage the [construction management] services. The wrong [construction management] consultant can damage the partnership that has been built up during the design (Shane Albrecht).
- Because the owner is in charge of decisions throughout the project, CMGC provides the best value (better quality) than DBB or DB. CMGC requires more time and effort from the PM, but is worth it on more complex projects (Nathan Peterson).

#### Conclusion

On July 30, 2010 the Syracuse Road; 1000 West to 2000 West roadway widening and reconstruction project entered substantial completion. The project goals involved safely providing the public with a high quality product while minimizing the impact on business and traffic. Furthermore the project was able to better manage the construction budget. However, delays by the utility companies were still a difficulty that plagued the schedule of work. CMGC was used to achieve the goals of the project.

The flexibility of CMGC allowed UDOT to begin work on early construction items during design, which helped build momentum and public support for the project. Other benefits of early contractor involvement include:

- A high quality product with longer-lasting pavement
- Reduced risk for UDOT
- Improved project phasing to minimize traffic impacts
- Other quality enhancing and cost saving innovations

There were some areas where CMGC didn't provide planned benefit, such as significantly reducing the overall project schedule. However, CMGC didn't take any longer than the traditional method, and most of the delays were due to influences outside of the project's control. While many of the final bid items rose in cost the major bid item of PCCP was affordable

and helped the project stay within the budget. This is notable particularly for complex urban projects of this type. Overall, CMGC was a useful tool in helping UDOT deliver a safe, successful project while building public support and minimizing impacts to the public during construction.

#### **APPENDIX A - Personal Interview Notes**

#### **CMGC Interview Questions**

**UDOT Project Manager- Nathan Peterson** 

**Project Description: Syracuse Road** 

**Pin:** 4896

Project Phase: Phase 2

#### Constructability

How was constructability improved by involvement of the contractor in design?

- The move to PCCP was a winner for the State (Shane Albrecht).
- ROW takes were minimized (Shane Albrecht).
- The use of fusible poly pipes for the waterline laterals allowed for phasing construction ½ of the roadway at a time, and worked out as well as hoped for in regards to constructability and traffic control (Shane Albrecht).
- For the most part, the phasing plans that the contractor developed in design have been carried out as planned (Shane Albrecht).
- In design, the contractor worked with UDOT to get the clearances for a dump site near the project. This worked out well. Other nearby projects discovered the site and began using it also (Shane Albrecht).

How did constructability ideas introduced by the contractor in the design process get incorporated in the field?

- The project has come together pretty well, as per the plans, not a lot of issues in the construction phase (Nathan Peterson).
- Qwest has been difficult to deal with. By using CMGC, we tried to engage them 1 ½ years early, but they've still dragged their feet to do their part (Nathan Peterson).
- Most of the contractor design and constructability ideas were implemented as expected in the field (Shane Albrecht).
- The contractor introduced some ideas with the storm drain to avoid conflicts with the City waterline. However, things didn't work out as well as was hoped, mostly due to the waterline being in a different location than was assumed in design due to erroneous interpolation between potholes (Shane Albrecht).

#### **Project Schedule**

Was the construction schedule shortened by the design effort? By how much?

- The early bid package for utilities may have helped, but overall, the project will have finished about the same time as it would have in a traditional process. CMGC did allow for more flexibility with specific portions of the schedule, which was helpful (Nathan Peterson).
- The schedule was hurt by Qwest dragging their feet (Shane Albrecht).
- The completion date on this project would have likely been pushed to the end of 2010 construction season in a traditional DBB. With CMGC, the contractor was willing to take on more risk with the shorter schedule and trust UDOT that they'd be reasonable if a utility company caused the schedule to be pushed (Shane Albrecht).

#### Risk

How did the team
identify, evaluate,
and track project
risk?

- A risk mitigation table was used.
- There was risk sharing between UDOT and the contractor in regards to the schedule. CMGC allowed for a greater level of trust between the UDOT PM and the contractor PM (Shane Albrecht).

## Which contractor suggestions helped you to reduce risk and control cost?

- Safety was managed well (Shane Albrecht).
- The contractor didn't include a soft-spot contingency in the bid- this was a risk that UDOT took on. As a result, UDOT only paid on a case-by-case basis for soft spots. In the spirit of cooperation, the contractor fixed several soft spots without asking for additional money (Shane Albrecht).

#### **Change Orders**

What was the total
cost of Change
Orders?

•

# What change orders were unexpected and occurred because of design oversights or unseen risk and what is the dollar value of these

- Majority of COs were small- in the \$25k or less range, such as extra connections to the city water line, temporary asphalt to assist utilities with their relocations, changing the pole height of streetlights, etc (Nathan Peterson).
- There was one large change order for \$300k to replace a waterline. This should have been caught in design, and was a source of frustration (Nathan Peterson).

change orders?	<ul> <li>We had to keep adding loops to the waterline due to underground utility issues and conflicts (Shane Albrecht).</li> </ul>
What change orders were anticipated and occurred to meet design or scope and what is the dollar value of these change orders?	<ul> <li>Extending the concrete pavement an additional 300' down Antelope Drive to the West to improve the transition was an optional CO that UDOT accepted because to the low cost and the benefit (Nathan Peterson, Shane Albrecht).</li> <li>Before construction, UDOT decided to take on the risk of soft-spot repairs, which resulted in a change order, but saved money compared to including the cost of risk in the bid (Nathan Peterson).</li> </ul>
How did having a contractor involved in design help to reduce change orders?	<ul> <li>The contractor had a better understanding of the specifications and what UDOT wanted and was thus able to give a more accurate bid (Nathan Peterson).</li> <li>The contractor had more ownership in the process, and as a result, we were slow to bring up issues that might result in a change order. On the first phase in particular, the contractor ate some costs on several issues (Shane Albrecht).</li> </ul>
How did you negotiate change orders?	<ul> <li>Same as traditional projects. UDOT held the contractor to the unit prices listed in the bid (Nathan Peterson).</li> <li>Similar to traditional projects. Change order procedures seem to vary more by resident engineer personality than anything else (Shane Albrecht).</li> </ul>

#### **Environmental Stewardship**

How did bringing	<ul> <li>For the phase 1 demolition of the homes, it was good to</li> </ul>
the contractor on	have the designer and contractor working closely together
early alleviate	to ensure environmental commitments were kept (Nathan
environmental concerns?	Peterson).
concerns:	<ul> <li>Clearance of a dumping site was a big one (Shane Albrecht).</li> </ul>

#### **Benefits to Public**

How did the public benefit from the CM/GC process?	<ul> <li>Because the owner is in charge of decisions throughout the project, CMGC provides the best value (better quality) than DBB or DB. CMGC requires more time and effort from the PM, but is worth it on more complex projects (Nathan Peterson).</li> <li>The phase 1 package allowed the public to see action soon,</li> </ul>
	rather than seeing a bunch of vacant homes sitting around

(Nathan Peterson).

- The public has benefited through money and time savings (Shane Albrecht).
- Traffic interruptions were minimized due to early contractor involvement in phasing and MOT (Shane Albrecht).

#### **Lessons Learned**

What did you learn in the CM/GC process?

- Good to have the contractor on board early as they are helpful in the design (Nathan Peterson).
- The bid process can be challenging and frustrating at times (Nathan Peterson).
- We need to improve the ICE. their numbers aren't necessarily realistic, it's hard for them to get real numbers from suppliers. They can be arbitrary at times, and there's no recourse to them if their bid is off. We need more than one firm to supply ICE services (Nathan Peterson).
- Would be smarted in the design review. Contractor gave a discounted price to UDOT on the design services (Shane Albrecht).
- Would be more firm in opinions regarding the schedule (Shane Albrecht).
- Would be more mindful of 3<sup>rd</sup> party (utility company) impacts to project. Get agreements in writing that all can agree to (Shane Albrecht).
- Would like more contractor say in who would be managing construction management services. Bringing in PB as a consultant RE was damaging to the relationships built during design (Shane Albrecht).

#### **General Notes/Other Items**

How would you rate the CMGC process now that the project is completed?

- CMGC is a better overall value the design bid build because
  of a better product, and UDOT doesn't get nickeled and
  dimed by the low bidder. CMGC is a much better value than
  design build. It is worth using again on the right project
  (Nathan Peterson).
- CMGC is a positive thing for the department, and good for the contractor. This allowed the contractor to bring experience, relationships, and value-added items to the

project (Shane Albrecht).

#### **APPENDIX B - Silver and Gold Standard Results**

CMGC – Construction Phase

	Project Nam SYRACUSE Desc of Cons	ate: 1-26-2009 e: SYRACUSE ROAD; 1000 WEST TO 2000 West t	VEST,		Engineer	's Estimate	ESTIMATE 3261 V	DENT COST (STANTON) W 5720 S LLE,UT 84118	302 WEST ! SUIT	CK PRODUCTS, NC. 5400 SOUTH E 201 ,UT 84057		erage - 12-26- o 12-25-2008	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
													1.15	
1	12850010	Mobilization	1	Lump	210,000.00	210,000.00	665,846.00	665,846.00	210,000.00	210,000.00		0	0	0
2	13150010	Public Information Services	1	Lump	5,000.00	5,000.00	13,000.00	13,000.00	16,000.00	16,000.00		0	0	0
3	15540005	Traffic Control	1	Lump	90,000.00	90,000.00	347,047.00	347,047.00	135,000.00	135,000.00		0	0	0
4	15710030	Silt Fence	737	ft	2.25	1,658.25	6	4,422.00	3.1	2,284.70	2.57	1894.09	2.9555	2178.2035
5	15710150	Temporary Environmental Fence	210	ft	2.3	483	6	1,260.00	4.3	903	2.31	485.1	2.6565	557.865
6	17210010	Survey	1	Lump	35,000.00	35,000.00	18,000.00	18,000.00	15,000.00	15,000.00		0	0	0
7	22210095	Remove Pipe Culvert	268	ft	24	6,432.00	46	12,328.00	11	2,948.00	20.99	5625.32	24.1385	6469.118
8	02221015P	Remove Driveway	2750	sq yd	9	24,750.00	7.4	20,350.00	5	13,750.00	11.66	32065	13.409	36874.75
9	02221802P	Remove Building, Basement, and Foundation -	1	Parcel	9,500.00	9,500.00	14,800.00	14,800.00	7,300.00	7,300.00		0	0	0
		Remove Building, Basement, and												
10	02221804P	Foundation -	1	Parcel	9,500.00	9,500.00	25,000.00	25,000.00	7,300.00	7,300.00		0	0	0
11	02221808P	Remove Building, Basement, and Foundation -	1	Parcel	7,000.00	7,000.00	20,880.00	20,880.00	7,300.00	7,300.00		0	0	0
12	02221810P	Remove Building, Basement, and Foundation -	1	Parcel	9,000.00	9,000.00	27,000.00	27,000.00	17,000.00	17,000.00		0	0	0
13	02221812P	Remove Building, Basement, and Foundation -	1	Parcel	7,000.00	7,000.00	19,700.00	19,700.00	16,000.00	16,000.00		0	0	0
14	02221814P	Remove Building, Basement, and Foundation -	1	Parcel	9,000.00	9,000.00	37,200.00	37,200.00	20,000.00	20,000.00		0	0	0
		Remove Building, Basement, and				·								
15	02221816P	Foundation -  Remove Building, Basement, and	1	Parcel	9,000.00	9,000.00	27,900.00	27,900.00	9,200.00	9,200.00		0	0	0
16	02221818P	Foundation -	1	Parcel	9,000.00	9,000.00	15,300.00	15,300.00	9,100.00	9,100.00		0	0	0

CMGC – Construction Phase

		Remove Building, Basement, and												
17	02221820P	Foundation -	1	Parcel	9,000.00	9,000.00	15,800.00	15,800.00	10,000.00	10,000.00		0	0	0
		Remove Building, Basement, and												
18	02221822P	Foundation -	1	Parcel	7,000.00	7,000.00	17,800.00	17,800.00	10,000.00	10,000.00		0	0	0
		Remove Building, Basement, and												
19	02221824P	Foundation -	1	Parcel	7,000.00	7,000.00	21,000.00	21,000.00	15,000.00	15,000.00		0	0	0
		Remove Building, Basement, and												
20	02221826P	Foundation -	1	Parcel	7,000.00	7,000.00	15,000.00	15,000.00	7,300.00	7,300.00		0	0	0
24	022240200	Remove Building, Basement, and		Damasi	0.000.00	0.000.00	16 000 00	16 000 00	0.600.00	0.000.00		0	0	0
21	02221828P	Foundation -	1	Parcel	9,000.00	9,000.00	16,800.00	16,800.00	9,600.00	9,600.00		0	0	0
22	02221830P	Remove Building, Basement, and Foundation -	1	Parcel	7,000.00	7,000.00	16,300.00	16,300.00	7,300.00	7,300.00		0	0	0
	02221830F	Remove Building, Basement, and	1	raicei	7,000.00	7,000.00	10,300.00	10,300.00	7,300.00	7,300.00		0	0	
23	02221832P	Foundation -	1	Parcel	7,000.00	7,000.00	20,000.00	20,000.00	7,300.00	7,300.00		0	0	0
	022210321	Remove Building, Basement, and		i di cei	7,000.00	7,000.00	20,000.00	20,000.00	7,300.00	7,500.00			J.	
24	02221834P	Foundation -	1	Parcel	7,000.00	7,000.00	27,000.00	27,000.00	7,300.00	7,300.00		0	0	0
		Remove Building, Basement, and												
25	02221836P	Foundation -	1	Parcel	9,000.00	9,000.00	19,800.00	19,800.00	12,000.00	12,000.00		0	0	0
		Remove Building, Basement, and												
26	02221838P	Foundation -	1	Parcel	7,000.00	7,000.00	18,900.00	18,900.00	7,300.00	7,300.00		0	0	0
27	02221840P	Remove Partial Building, Basement, and	1	Parcel	5,000.00	5,000.00	3,100.00	3,100.00	3,100.00	3,100.00		0	0	0
		24 Inch - Concrete Pipe,												
28	26101484	Irrigation/Storm	4546		52	236,392.00	107	486,422.00	55	250,030.00	27.5	125015	31.625	143767.25
29	26110050	Screw Gate and Frame 18 inch	4	Each	2,300.00	9,200.00	3,000.00	12,000.00	1,400.00	5,600.00		0	0	0
30	26110055	Screw Gate and Frame 24 inch	6	Each	2,600.00	15,600.00	3,500.00	21,000.00	2,000.00	12,000.00		0	0	0
		Concrete Drainage Structure - STD DWG												
31		DB1	1	Each	1,750.00	12,250.00	2,500.00	17,500.00	1,800.00	12,600.00		0	0	0
32	02633025P	Concrete Drainage Structure - Irrigation	+	Each	1,900.00	9,500.00	9,800.00	49,000.00	2,000.00	10,000.00		0	0	0
22	02622222	Concrete Drainage Structure - STD DWG			4 750 00	4 750 00	26 200 00	26 222 22	2 622 22	2.602.02		_		
33		DB3	1	Each	1,750.00	1,750.00	26,300.00	26,300.00	3,600.00	3,600.00		0	0	0
34	02633035P	5' Manhole	6	Each	2,500.00	15,000.00	3,400.00	20,400.00	3,900.00	23,400.00		0	0	0
35		Manhole Frame and Solid Cover - GF 2	+	Each	325	1,950.00	436	2,616.00	1,000.00	6,000.00	404.35	2426.1	465.0025	2790.015
36		Diversion Box Grated Lid		sq ft	150	24,900.00	72	11,952.00	76	12,616.00		0	0	0
37	16132002*	4 Inch PVC Schedule 40	2527	ft	8	20,216.00	14	35,378.00	7.2	18,194.40		0	0	0
38	02083010*	Short Side Fire Hydrant	9	Each	4,800.00	43,200.00	6,200.00	55,800.00	4,500.00	40,500.00		0	0	0
39	02083012*	Long Side Fire Hydrant Stub (Cap)	8	Each	1,000.00	8,000.00	5,900.00	47,200.00	4,000.00	32,000.00		0	0	0
40	02083014*	Long Side Fire Hydrant	7	Each	5,000.00	35,000.00	14,000.00	98,000.00	8,600.00	60,200.00		0	0	0
41	02511010*	Install New Meter Box w/ 1" Lateral	4	Each	1,500.00	6,000.00	2,300.00	9,200.00	2,000.00	8,000.00		0	0	0
42	02511012*	Install New Meter Box w/ 1 1/2" Lateral	1	Each	1,600.00	1,600.00	5,200.00	5,200.00	2,100.00	2,100.00		0	0	0
43	02511020*	Relocate Meter Box and Install New	3	Each	1,300.00	3,900.00	4,300.00	12,900.00	1,400.00	4,200.00		0	0	0
			_		,	,	, <del>-</del>	,	,	,	I	<del>_</del>		

		3/4"											
		Relocate Meter Box and Install New 1											
44	02511022*	1/2"	1	Each	1,400.00	1,400.00	4,350.00	4,350.00	1,400.00	1,400.00	0	0	0
45	02511030*	Install New 3/4" Lateral (Cap)	14	Each	1,000.00	14,000.00	2,800.00	39,200.00	990	13,860.00	0	0	0
46	02511032*	Install New 1" Lateral (Cap)	16	Each	1,100.00	17,600.00	3,000.00	48,000.00	1,000.00	16,000.00	0	0	0
47	02511034*	Install New 1" Lateral to 10" Line (Cap)	1	Each	1,200.00	1,200.00	2,100.00	2,100.00	1,000.00	1,000.00	0	0	0
48	02511036*	Replace Lateral W/ 1" Lateral to Existing Meter	2	Each	1,200.00	2,400.00	2,900.00	5,800.00	1,400.00	2,800.00	0	0	0
49	02511040*	Connect to Existing 3/4" Lateral, Install 3/4"	6	Each	1,500.00	9,000.00	3,200.00	19,200.00	2,200.00	13,200.00	0	0	0
50	02511042*	Connect to Existing 1" Lateral, Install 1"	2	Each	1,600.00	3,200.00	2,700.00	5,400.00	2,200.00	4,400.00	0	0	0
51	02511044*	Connect to Existing 3/4" Lateral, Install 3/4"	8	Each	1,300.00	10,400.00	2,500.00	20,000.00	2,200.00	17,600.00	0	0	0
52	02511046*	Connect to Existing 1" Lateral, Install 1"		Each	1,400.00	21,000.00	2,500.00	37,500.00	2,200.00	33,000.00	0	0	0
		Connect to Existing 8" Waterline w/ 8"				·	·	·		·	0	0	0
53	02511050*	Hot Tap  Connect to Existing 10" Waterline w/ 8"	1	Each	10,000.00	10,000.00	4,800.00	4,800.00	4,700.00	4,700.00	0	0	0
54	02511052*	Hot	1	Each	10,000.00	10,000.00	7,200.00	7,200.00	5,800.00	5,800.00	0	0	0
55	02511054*	Connect to Existing 16" Waterline w/ 8" Hot	1	Each	10,000.00	10,000.00	8,900.00	8,900.00	9,000.00	9,000.00	0	0	0
56	02511056*	Connect to Existing 16" Waterline w/ 10" Hot	1	Each	12,000.00	12,000.00	7,200.00	7,200.00	7,400.00	7,400.00	0	0	0
57	02511200*	Install 6" PVC Waterline	20	ft	35	700	250	5,000.00	140	2,800.00	0	0	0
58	02511202*	Install 8" PVC Waterline	5460	ft	37	202,020.00	71	387,660.00	37	202,020.00	0	0	0
59	02511204*	Install 10" PVC Waterline	210	ft	40	8,400.00	194	40,740.00	80	16,800.00	0	0	0
60	02511206*	Install 12" PVC Waterline	530	ft	44	23,320.00	221	117,130.00	42	22,260.00	0	0	0
61	02511300*	Install 16" Ductile Iron Waterline	20	ft	180	3,600.00	516	10,320.00	250	5,000.00	0	0	0
62	02511500*	Install 6" M.J. Gate Valve	2	Each	1,300.00	2,600.00	1,700.00	3,400.00	1,100.00	2,200.00	0	0	0
63	02511502*	Install 8" M.J. Gate Valve	15	Each	1,800.00	27,000.00	1,900.00	28,500.00	1,600.00	24,000.00	0	0	0
64	02511504*	Install 10" M.J. Gate Valve	4	Each	2,400.00	9,600.00	2,500.00	10,000.00	2,400.00	9,600.00	0	0	0
65	02511506*	Install 12" M.J. Butterfly Valve	3	Each	2,900.00	8,700.00	2,600.00	7,800.00	2,100.00	6,300.00	0	0	0
66	02511408*	8 Inch PVC C-900 Pipe	1435	ft	37	53,095.00	156	223,860.00	34	48,790.00	0	0	0
67	02511410*	10 Inch PVC C-900 Pipe	5530	ft	40	221,200.00	68	376,040.00	37	204,610.00	0	0	0
68	02511508*	8 Inch Gate Valve	13	Each	1,800.00	23,400.00	1,800.00	23,400.00	1,900.00	24,700.00	0	0	0
69	02511510*	10 Inch Gate Valve	2	Each	2,400.00	4,800.00	2,600.00	5,200.00	2,400.00	4,800.00	0	0	0
70	02511610*	Secondary Water Service Connection (Cap)	29	Each	1,000.00	29,000.00	2,500.00	72,500.00	1,200.00	34,800.00	0	0	0
71	02511612*	Secondary Single Water Service Connection	5	Each	1,500.00	7,500.00	1,600.00	8,000.00	1,700.00	8,500.00	0	0	0

72	02511614*	Extend Secondary Single Water Service	24 Each	1,800.00	43,200.00	2,900.00	69,600.00	2,200.00	52,800.00	0	0	0
		Secondary Double Water Service										
73	02511616*	Connection	2 Each	1,800.00	3,600.00	2,100.00	4,200.00	2,200.00	4,400.00	0	0	0
		Extend Secondary Double Water										
74	02511618*	Service	5 Each	2,000.00	10,000.00	2,800.00	14,000.00	2,200.00	11,000.00	0	0	0
75	02511915*	Connect to Existing Waterline	6 Each	1,500.00	9,000.00	2,800.00	16,800.00	2,200.00	13,200.00	0	0	0
					1,780,716.25		4,006,201.00		1,915,066.10			
									\$	\$		
									275,915.70	167,510.61		\$ 192,637.20
							Number of items	that matched	6			
							Percent of items	that matched	8.0%			
						perc	ent of bid with r	natching items	14.4%			
							Silver	Standard Ratio	1.65			
							Gold	Standard Ratio	1.43			

Project No: F-0108(2	24)4					OFNEWA BOX	OV DD OD LIGTS						
Project Name: SYRA	CUSE ROAD; 1000 WEST TO 2000 WEST,	SYRACUSE					CK PRODUCTS, NC.						
								INDEPENDENT (					
Desc of Construction	n: Road - Widen to Five Lanes					302 WEST !	5400 SOUTH	(STAN	ITON)				
Estimate Completio	n date on or before 06/30/2010					SUIT	E 201	3261 W	5720 S				
											ge Prices 4-4-		
County: DAVIS (11)	T		1	Engineer'	s Estimate	MURRAY	UT 84057	TAYLORSVIL	LE,UT 84118	2008 to	4-3-2009	-	Standard
Seq num item num	item desc	qty	unit	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount
ilain item_nam	item_uesc	Чч	unit	Office	Amount	Offic Frice	Amount	Office Price	Amount	Office Frice	Amount	FIICE	1.15
1 00830001U	Equal Opportunity Training	660	Hour	10	6,600.00	10	6,600.00	10	6,600.00		0	0	0
2 12850010		1	Lump	1,168,200.00	1,168,200.00	1,182,500.00	1,182,500.00	2,094,000.00	2,094,000.00		0	0	0
3 13150010	Public Information Services	1	Lump	15,000.00	15,000.00	12,400.00	12,400.00	32,500.00	32,500.00		0	0	0
4 15540005	Traffic Control	1	Lump	660,100.00	660,100.00	880,000.00	880,000.00	1,489,000.00	1,489,000.00		0	0	0
5 15710030	Silt Fence	1469	ft	2.25	3,305.25	3.9	5,729.10	3.9	5,729.10	2.26	3319.94	2.599	3817.931
6 01571010P	Filter Sock	81	Each	100	8,100.00	34	2,754.00	51	4,131.00		0	0	0
7 15720020	Dust Control and Watering	1038	1000 gal	9	9,342.00	39	40,482.00	9.1	9,445.80	12.63	13109.94	14.5245	15076.431
8 17210010	Survey	1	Lump	100,000.00	100,000.00	106,700.00	106,700.00	246,000.00	246,000.00		0	0	0
9 01727001*	Preconstruction Survey	1	Lump	15,000.00	15,000.00	81,500.00	81,500.00	16,120.00	16,120.00		0	0	0
10 01891002P	Relocate Mailbox	32	Each	200	6,400.00	110	3,520.00	375	12,000.00	111.63	3572.16	128.3745	4107.984
11 01892001P	Reconstruct Catch Basin	5	Each	1,100.00	5,500.00	2,000.00	10,000.00	1,550.00	7,750.00	1,291.41	6457.05	1485.122	7425.6075
12 01892002P	Reconstruct Manhole As Catch Basin	1	Each	1,400.00	1,400.00	2,000.00	2,000.00	2,640.00	2,640.00		0	0	0
13 18920040	Reconstruct Valve Box	36	Each	800	28,800.00	190	6,840.00	325	11,700.00	486.61	17517.96	559.6015	20145.654
14 18920050	Reconstruct Manhole	50	Each	1,200.00	60,000.00	190	9,500.00	500	25,000.00	1520.57	76028.5	1748.656	87432.775
15 20560015	Granular Borrow (Plan Quantity)	12164	cu yd	18	218,952.00	37	450,068.00	40	486,560.00	14.06	171025.84	16.169	196679.716
16 20820020	Relocate Water Meter	3	Each	1,500.00	4,500.00	370	1,110.00	2,000.00	6,000.00	1,216.89	3650.67	1399.424	4198.2705
17 02083002*	Remove & Salvage Fire Hydrant	8	Each	1,000.00	8,000.00	560	4,480.00	1,200.00	9,600.00		0	0	0
18 02083004*	Reconstruct Fire Hydrant	1	Each	1,200.00	1,200.00	4,800.00	4,800.00	1,845.00	1,845.00		0	0	0
19 22210025	Remove Manhole	4	Each	900	3,600.00	500	2,000.00	1,565.00	6,260.00	870.80	3483.2	1001.42	4005.68
20 22210030	Remove Catch Basin	26	Each	400	10,400.00	500	13,000.00	1,300.00	33,800.00	376.26	9782.76	432.699	11250.174
21 02221004P	Remove Valve Box	20	Each	400	8,000.00	180	3,600.00	425	8,500.00		0	0	0
22 22210050	Remove Tree	10	Each	500	5,000.00	300	3,000.00	369	3,690.00	334.81	3348.1	385.0315	3850.315
23 22210080	Remove Fence	68	ft	8	544	2.6	176.8	39	2,652.00	0.91	61.88	1.0465	71.162
24 22210095	Remove Pipe Culvert	5345	ft	19	101,555.00	11	58,795.00	12	64,140.00	18.03	96370.35	20.7345	110825.9025

25	02221009P	Remove Abandoned Sewer Lateral	20	Each	600	12,000.00	3,400.00	68,000.00	3,000.00	60,000.00		0	0	0
26	02221010P	Remove Water Meter	5	Each	400	2,000.00	180	900	430	2,150.00		0	0	0
27	22210110	Remove Concrete Sidewalk	4098	sq yd	3.5	14,343.00	7.5	30,735.00	9.8	40,160.40	7.71	31595.58	8.8665	36334.917
28	02221011P	Remove Concrete Flatwork	136	sq yd	4.5	612	7.5	1,020.00	19.65	2,672.40		0	0	0
29	22210125	Remove Concrete Curb and Gutter	7608	ft	3.5	26,628.00	2.3	17,498.40	5.6	42,604.80	3.88	29519.04	4.462	33946.896
30	02221015P	Remove Driveway	2434	sq yd	9.5	23,123.00	7.5	18,255.00	14.7	35,779.80		0	0	0
31	22210165	Remove Asphalt Pavement	2112	sq yd	4.5	9,504.00	1.4	2,956.80	5	10,560.00	3.49	7370.88	4.0135	8476.512
32	02221060P	Remove Light Pole	5	Each	400	2,000.00	850	4,250.00	800	4,000.00		0	0	0
		Remove Partial Building, Basement,												
33	02221802P	and Foundation - Parcel #24	1	Parcel	4,000.00	4,000.00	7,500.00	7,500.00	14,760.00	14,760.00		0	0	0
34	23160020	Roadway Excavation (Plan Quantity)	50260	cu yd	10	502,600.00	12	603,120.00	17	854,420.00	7.88	396048.8	9.062	455456.12
35	02511050*	Loop Water Line	10	Each	5,000.00	50,000.00	6,600.00	66,000.00	3,800.00	38,000.00		0	0	0
36	02533002*	Install 8" SDR-35 Pipe	209	ft	20	4,180.00	89	18,601.00	160	33,440.00		0	0	0
37	02533004*	Sewer Service Lateral	41	Each	2,500.00	102,500.00	3,900.00	159,900.00	3,060.00	125,460.00		0	0	0
20	26404206	18 Inch Irrigation/Storm Drain, Class C,	650	c.	2.5	22 500 00	4-	20.604.00	02.5	64.055.50	45.00	20020 46	<b>50</b> 600	24400 520
38	26101386	smooth	653	ft	36	23,508.00	47	30,691.00	93.5	61,055.50	45.82	29920.46	52.693	34408.529
39	26101388	24 Inch Irrigation/Storm Drain, Class C, smooth	1658	ft	44	72,952.00	55	91,190.00	94.7	157,012.60	27.95	46341.1	32.1425	53292.265
33	20101300	30 Inch Irrigation/Storm Drain, Class C,	1030	10		72,332.00	33	31,130.00	54.7	137,012.00	27.55	40541.1	32.1423	33232.203
40	26101390	smooth	806	ft	50	40,300.00	76	61,256.00	118	95,108.00	48.52	39107.12	55.798	44973.188
		36 Inch Irrigation/Storm Drain, Class C,								-				
41	26101391	smooth	23	ft	80	1,840.00	84	1,932.00	125	2,875.00	29.47	677.81	33.8905	779.4815
		15 Inch - Concrete Pipe,												
42	026101460	Irrigation/Storm Drain, Class C,	1576	tr.	6.5	102 440 00	F2	02 520 00	0.0	151 206 00		0	0	
42	02610146P	Smooth  18 Inch - Concrete Pipe,	1576	π	65	102,440.00	53	83,528.00	96	151,296.00		0	0	0
		Irrigation/Storm Drain, Class C,												
43	02610147P	Smooth	2673	ft	48	128,304.00	54	144,342.00	98.4	263,023.20	25.5	68161.5	29.325	78385.725
		24 Inch - Concrete Pipe,												
		Irrigation/Storm Drain, Class C,												
44	02610148P	Smooth	812	ft	56	45,472.00	63	51,156.00	99	80,388.00	47.93	38919.16	55.1195	44757.034
		30 Inch - Concrete Pipe,												
45	02610149P	Irrigation/Storm Drain, Class C, Smooth	585	ft	64	37,440.00	90	52,650.00	120	70,200.00	44	25740	50.6	29601
45	020101437	36 Inch - Concrete Pipe,	202	11	04	37,440.00	90	32,030.00	120	70,200.00	44	23740	30.0	23001
		Irrigation/Storm Drain, Class C,												
46	02610150P	Smooth	1276	ft	68	86,768.00	100	127,600.00	144	183,744.00		0	0	0
47	02633030P	3' Manhole	1	Each	3,200.00	3,200.00	2,500.00	2,500.00	2,650.00	2,650.00		0	0	0
48	02633035P	4' Manhole	18	Each	3,500.00	63,000.00	3,100.00	55,800.00	2,650.00	47,700.00		0	0	0
49	02633040P	5' Manhole	8	Each	3,800.00	30,400.00	3,500.00	28,000.00	3,100.00	24,800.00		0	0	0

1														
50	02633042P	6' Manhole	3	Each	3,200.00	9,600.00	4,600.00	13,800.00	4,200.00	12,600.00		0	0	0
51	02633045P	4' Sewer Manhole	2	Each	3,500.00	7,000.00	3,100.00	6,200.00	2,660.00	5,320.00		0	0	0
52	02633048P	5' Sewer Manhole	1	Each	3,800.00	3,800.00	3,500.00	3,500.00	3,115.00	3,115.00		0	0	0
53	02633052P	Standard Open Curb And Inlet	58	Each	2,600.00	150,800.00	2,900.00	168,200.00	2,720.00	157,760.00		0	0	0
54	02633054P	Deep Open Curb And Inlet	10	Each	2,800.00	28,000.00	2,900.00	29,000.00	4,730.00	47,300.00		0	0	0
55	02633056P	Median Grate And Inlet	8	Each	2,500.00	20,000.00	3,200.00	25,600.00	3,140.00	25,120.00		0	0	0
56	02633058P	Allison Way Pond Outlet Structure	1	Each	6,000.00	6,000.00	9,500.00	9,500.00	8,785.00	8,785.00		0	0	0
57	02633060P	Centennial Pond Outlet Structure	1	Each	6,000.00	6,000.00	13,000.00	13,000.00	12,000.00	12,000.00		0	0	0
		Remove and Restore Underground												
58	02636010*	Detention	1	Lump	15,000.00	15,000.00	6,100.00	6,100.00	14,650.00	14,650.00		0	0	0
59	27210020	Untreated Base Course (Plan Quantity)	8641	cu yd	27	233,307.00	38	328,358.00	49	423,409.00	26.96	232961.36	31.004	267905.564
60	27410060	HMA - 3/4 inch	2390	Ton	110	262,900.00	140	334,600.00	135	322,650.00	85.16	203532.4	97.934	234062.26
61	02741010P	HMA - 1/2 Inch (Driveway)	238	Ton	120	28,560.00	120	28,560.00	268	63,784.00	72.25	17195.5	83.0875	19774.825
		Portland Cement Concrete Pavement	64.600							. =			0.0 - 0	
62	02752002P	10 inch Thick	61630	sq yd	69.5	4,283,285.00	61	3,759,430.00	74	4,560,620.00	75.45	4649983.5	86.7675	5347481.025
63	02752003P	Portland Cement Concrete Pavement 10 inch thick (Decorative)	8806	sq ft	12.5	110,075.00	11	96,866.00	15.8	139,134.80		0	0	0
64	27650030	Remove Pavement Markings	2943	ft	0.8	2,354.40	0.5	1,471.50	0.9	2,648.70	0.70	2060.1	0.805	2369.115
65		Remove Pavement Markings	2943	Each	80	480	59	354	36.9	2,048.70	47.87	287.22	55.0505	330.303
66	27710017	•	1750		17	29,750.00	34	59,500.00	18.45	32,287.50	18.84	32970	21.666	37915.5
		Concrete Curb and Cuttor Type B1		ft		-		-		•			<del> </del>	
67	27710025	Concrete Curb and Gutter Type B1 Concrete Curb and Gutter Type B1	11235	ft	16	179,760.00	18	202,230.00	21.2	238,182.00	15.66	175940.1	18.009	202331.115
68	02771003P	Modified	622	ft	19	11,818.00	25	15,550.00	31.5	19,593.00		0	0	0
		Concrete Driveway Flared, 6 inch							3 2.13					
69	27710040	,	8034	sq ft	5.75	46,195.50	7	56,238.00	9.45	75,921.30	4.69	37679.46	5.3935	43331.379
		Concrete Driveway Flared, 7 inch												
70	27710045	Thick	4721	sq ft	6.25	29,506.25	7	33,047.00	10	47,210.00	7.35	34699.35	8.4525	39904.2525
		Concrete Driveway Modified Flared, 6	2222	c.			_	•••••		0.4.000.00				
71	02771004P	inch Thick	3329	sq ft	6	19,974.00	7	23,303.00	9.4	31,292.60		0	0	0
72	27710055	Concrete Driveway Open, 7 inch	1465	sa ft	6.25	9,156.25	7	10,255.00	9.85	14,430.25	5.92	8672.8	6.808	9973.72
73	27710059	Pedestrian Access Ramp	23	Each	900	20,700.00	1,200.00	27,600.00	2,125.00	48,875.00	1,513.10	34801.3		40021.495
/3	27710033	Concrete Driveway Modified Flared, 7	23	Lacii	300	20,700.00	1,200.00	27,000.00	2,123.00	48,873.00	1,313.10	34801.3	1740.005	40021.433
74	02771005P	inch Thick	1402	sq ft	6.5	9,113.00	7	9,814.00	10	14,020.00		0	0	0
75	27710100	Plowable End Section	10	Each	450	4,500.00	920	9,200.00	1,050.00	10,500.00	430.03	4300.3	494.5345	4945.345
76	02771010P	Concrete Retaining Curb	1499	sq ft	55	82,445.00	11	16,489.00	48.6	72,851.40		0	0	0
77		Concrete Sidewalk		•	35	269,885.00	44	339,284.00	46.9	361,645.90	4.22	32540.42	4.853	37421.483
78	02776001P	4' Concrete Sidewalk	279	sq yd	34	9,486.00	43	11,997.00	57	15,903.00	28.22	7873.38	32.453	9054.387
79		Concrete Flatwork 4 inch thick		sq ft	6	1,986.00	5	1,655.00	8	2,648.00	3.92	1297.52	4.508	1492.148
			551			=,555.55		_,000.00		=,0.0.00	5.52			_ :32:2:0

80	27760040	Concrete Flatwork 6 inch thick	5642	sq ft	7	39,494.00	6.5	36,673.00	8.4	47,392.80	4.87	27476.54	5.6005	31598.021
81	27760050	Concrete Flatwork 7 inch thick	1148	sq ft	7.5	8,610.00	7	8,036.00	9.7	11,135.60	5.01	5751.48	5.7615	6614.202
		Concrete Flatwork 4 inch thick												
82	02777004*	(Stamped and Colored)	26060	sq ft	9	234,540.00	9	234,540.00	9.8	255,388.00		0	0	0
83	27890010	Asphalt Slurry Seal Coat	8049	sq yd	3.5	28,171.50	5	40,245.00	3.7	29,781.30	4.21	33886.29	4.8415	38969.2335
84	28210008	6 ft Chain Link Fence, Type I	885	ft	24	21,240.00	23	20,355.00	19.7	17,434.50	19.50	17257.5	22.425	19846.125
85	28210084	Chain Link Gate, H= 6 ft X W= 12 ft	2	Each	900	1,800.00	910	1,820.00	615	1,230.00	920.00	1840	1058	2116
86	02826010*	Ornamental Picket Fence	459	ft	40	18,360.00	85	39,015.00	36.9	16,937.10		0	0	0
87	16132002*	4 Inch PVC Schedule 40	2349	ft	8	18,792.00	22	51,678.00	34.1	80,100.90		0	0	0
88	16132010*	Utility Vault	1	Each	25,000.00	25,000.00	15,000.00	15,000.00	13,550.00	13,550.00		0	0	0
89	02831009*	Wall R-559(Est. Lump Qty: 590 sq ft)	1	Lump	38,350.00	38,350.00	30,600.00	30,600.00	27,760.00	27,760.00		0	0	0
90	20750040	Geotextiles - Weed Barrier	1085	sq yd	2	2,170.00	5.5	5,967.50	1.6	1,736.00	1.21	1312.85	1.3915	1509.7775
91	22210050	Remove Tree	4	Each	380	1,520.00	300	1,200.00	370	1,480.00	334.81	1339.24	385.0315	1540.126
		Detention Basin Concrete Flatwork 4												
92	02776003P	inch Thick	8491	sq ft	6	50,946.00	6.5	55,191.50	6.4	54,342.40		0	0	0
		Detention Basin Concrete Flatwork 4												
93	02776004P	inch Thick (Stamped)	663	sq ft	9	5,967.00	6.5	4,309.50	8.2	5,436.60		0	0	0
94	02812002P	Pressurized Irrigation System - Allison Way	1	Lumn	5,000.00	5,000.00	16,300.00	16 200 00	14,650.00	14,650.00		0	0	0
94	02612002P	Pressurized Irrigation System -	1	Lump	3,000.00	5,000.00	16,300.00	16,300.00	14,650.00	14,650.00		0	0	0
95	02812004P	Centennial Park	1	Lump	25,000.00	25,000.00	76,600.00	76,600.00	68,700.00	68,700.00		0	0	0
96	02812010P	6 Inch Schedule 40 PVC Sleeve	8	ft	10	80	37	296	33.2	265.6		0	0	0
97	02911001P	Wood Fiber Mulch	4833	sq yd	0.4	1,933.20	2.5	12,082.50	2.3	11,115.90	0.38	1836.54	0.437	2112.021
	02022002.	Strip, Stockpile, and Spread Topsoil	.000	39 75	0	_,,,,,,	0				0.00		01.07	
98	29120050	(Plan Quantity)	12719	sq yd	2.5	31,797.50	1.7	21,622.30	8.4	106,839.60	0.91	11574.29	1.0465	13310.4335
99	02913002*	2" - 4" Angular Rock Mulch Type A	417	sq yd	10	4,170.00	23	9,591.00	25.6	10,675.20		0	0	0
100	02913004*	2" - 4" Angular Rock Mulch Type B	506	sq yd	12	6,072.00	48	24,288.00	47.6	24,085.60		0	0	0
101	02922004P	Broadcast Seed	2859	sq yd	0.7	2,001.30	1.9	5,432.10	1.75	5,003.25	0.24	686.16	0.276	789.084
102	02922006P	Turf Sod	7887	sq yd	0.8	6,309.60	4.6	36,280.20	4.15	32,731.05	6.84	53947.08	7.866	62039.142
103	02932010P	Tree	64	Each	450	28,800.00	410	26,240.00	365	23,360.00		0	0	0
104	02933010*	Relocate Tree	37	Each	375	13,875.00	340	12,580.00	310	11,470.00		0	0	0
105	02938002*	Relocate Monument	22	Each	350	7,700.00	340	7,480.00	1,010.00	22,220.00		0	0	0
106		Pavement Marking Paint	307	gal	27	8,289.00	32	9,824.00	32	9,824.00	24.32	7466.24	27.968	8586.176
		Pavement Message (Preformed		<u> </u>		,		,						
107	27680105	Thermoplastic)	446	Each	125	55,750.00	110	49,060.00	123	54,858.00	108.56	48417.76	124.844	55680.424
		Grinding For Grooved-In 4" Pavement												
108	02769002*	Marking	20643	ft	0.6	12,385.80	0.5	10,321.50	0.9	18,578.70		0	0	0
400	02760004*	Grinding For Grooved-In 6" Pavement	7505	C.		4.554.00	2 ==	4 4 7 4 7 7 7	0.0-	7 205 7-				
109	02769004*	Marking	7585	tt	0.6	4,551.00	0.55	4,171.75	0.95	7,205.75		0	0	0

		Grinding For Grooved-In 8" Pavement		_										
110	02769006*	Marking	5708	ft	0.65	3,710.20	0.75	4,281.00	1.1	6,278.80		0	0	0
111	02891001P	Sign Type A-1, 24 inch X 36 inch	2	Each	250	500	190	380	370	740		0	0	0
112	28910026	Sign Type A-1, 12 Inch X 24 Inch	+	Each	120	2,520.00	35	735	295	6,195.00	830.00	17430	954.5	20044.5
113	28910028	Sign Type A-1, 12 Inch X 36 Inch	6	Each	225	1,350.00	210	1,260.00	270	1,620.00	397.47	2384.82	457.0905	2742.543
114	02891002P	Sign Type A-1, 30 inch X 36 inch	2	Each	320	640	44	88	395	790		0	0	0
115	02891003P	Sign Type A-1, 12 Inch X 30 Inch	3	Each	150	450	44	132	240	720		0	0	0
116	28910042	Sign Type A-1, 24 inch x 24 inch	10	Each	180	1,800.00	69	690	320	3,200.00	341.68	3416.8	392.932	3929.32
117	02891004P	Sign Type A-1, 15 inch X 21 inch	7	Each	120	840	53	371	295	2,065.00		0	0	0
118	28910050	Sign Type A-1, 24 inch X 30 inch	14	Each	225	3,150.00	87	1,218.00	335	4,690.00	367.66	5147.24	422.809	5919.326
119	28910055	Sign Type A-1, 30 inch X 24 inch	8	Each	225	1,800.00	87	696	325	2,600.00	214.86	1718.88	247.089	1976.712
120	02891005P	Sign Type A-1, 30 inch X 60 inch	1	Each	550	550	360	360	375	375		0	0	0
121	28910065	Sign Type A-1, 36 inch X 36 inch	15	Each	380	5,700.00	230	3,450.00	395	5,925.00	416.55	6248.25	479.0325	7185.4875
122	02891006P	Sign Type A-1, 36 inch X 12 inch	10	Each	160	1,600.00	94	940	295	2,950.00		0	0	0
123	02891007P	Sign Type A-1, 48 inch X 24 inch	2	Each	400	800	140	280	355	710		0	0	0
124	02891008P	Sign Type A-2, 8 inch X 36 inch	9	Each	120	1,080.00	83	747	390	3,510.00		0	0	0
125	02891009P	Sign Type A-2, 8 inch X 42 inch	3	Each	130	390	94	282	370	1,110.00		0	0	0
126	02891010P	Sign Type A-2, 18 inch X 10 inch	2	Each	120	240	31	62	270	540		0	0	0
127	28910115	Sign Type A-2, 30 inch X 30 inch	6	Each	280	1,680.00	130	780	370	2,220.00	465.15	2790.9	534.9225	3209.535
128	02891011P	Sign Type A-2, 18 inch X 12 inch	33	Each	110	3,630.00	33	1,089.00	295	9,735.00		0	0	0
129	02891027P	Remove Sign	46	Each	140	6,440.00	130	5,980.00	150	6,900.00	125.32	5764.72	144.118	6629.428
130	02891028P	Relocate Sign	2	Each	450	900	450	900	290	580	314.42	628.84	361.583	723.166
		Small Sign Tubular Steel Post Base												
131	28910305	(B2A)	5	Each	100	500	270	1,350.00	92	460	80.00	400	92	460
		Small Sign Tubular Steel Post Base												
132	28910310	(B2B)	51	Each	90	4,590.00	330	16,830.00	210	10,710.00	189.67	9673.17	218.1205	11124.1455
133	28910315	Slipbase Sign Base With Top Casting	54	Each	240	12,960.00	450	24,300.00	315	17,010.00	249.73	12/05/12	287.1895	15508.233
134		Sign Post P2		Each	120	6,720.00	430	24,300.00	74	4,144.00	72.50	4060	83.375	4669
135		Sign Post P3	+	Each	150	7,350.00	97	4,753.00	160	7,840.00	154.17		177.2955	8687.4795
136		Sign Post P4		Each	200	600	150	4,755.00	235	7,840.00	376.11	1128.33		1297.5795
137 138	02892001P	Sign Post P5 School Speed Limit Assembly		Each Each	4 000 00	500 8 000 00	260	520 3 400 00	265	530	239.62	479.24	275.563	551.126
	+	'			4,000.00	8,000.00	1,200.00	2,400.00	2,335.00	4,670.00		0		0
139	02892010P	Traffic Signal System 2000 W		Lump	80,000.00	80,000.00	94,900.00	94,900.00	88,700.00	88,700.00		0	0	0
140	02892020P	Traffic Signal System 2000 W		Lump	80,000.00	80,000.00	101,900.00	101,900.00	95,200.00	95,200.00		0	0	0
141	02892030P	Underground System Marilyn Dr		Lump	20,000.00	20,000.00	10,700.00	10,700.00	10,000.00	10,000.00		0	0	0
142	16525002P	Highway Lighting System A	1	Lump	17,000.00	17,000.00	27,200.00	27,200.00	24,430.00	24,430.00		0	0	0

п												
143	16525004P	Highway Lighting System B	1	Lump	17,000.00	17,000.00	27,200.00	27,200.00	25,400.00	25,400.00	0	0 0
144	16525006P	Highway Lighting System C	1	Lump	20,000.00	20,000.00	27,200.00	27,200.00	25,430.00	25,430.00	0	0 0
145	16525008P	Highway Lighting System D	1	Lump	20,000.00	20,000.00	27,200.00	27,200.00	25,430.00	25,430.00	0	0 0
146	16525010P	Highway Lighting System E	1	Lump	20,000.00	20,000.00	27,200.00	27,200.00	25,430.00	25,430.00	0	0 0
147	16525012P	Highway Lighting System F	1	Lump	20,000.00	20,000.00	27,200.00	27,200.00	25,430.00	25,430.00	0	0 0
148	16525014P	Highway Lighting System G	1	Lump	20,000.00	20,000.00	22,700.00	22,700.00	21,200.00	21,200.00	0	0 0
149	16525016P	Highway Lighting System H	1	Lump	20,000.00	20,000.00	27,200.00	27,200.00	25,430.00	25,430.00	0	0 0
150	16525018P	Highway Lighting System I	1	Lump	20,000.00	20,000.00	27,200.00	27,200.00	25,430.00	25,430.00	0	0 0
151	16525020P	Highway Lighting System N	1	Lump	20,000.00	20,000.00	27,200.00	27,200.00	25,430.00	25,430.00	0	0 0
152	16525030P	Installation of City Furnished Material	1	Lump	6,000.00	6,000.00	4,200.00	4,200.00	3,900.00	3,900.00	0	0 0
153	135940010	Fiber Optic Communication System	1	Lump	110,000.00	110,000.00	157,900.00	157,900.00	147,500.00	147,500.00	0	0 0
154	02083010*	Short Side Fire Hydrant	1	Each	4,800.00	4,800.00	5,300.00	5,300.00	5,600.00	5,600.00	0	0 0
155	02083012*	Long Side Fire Hydrant	8	Each	5,000.00	40,000.00	6,400.00	51,200.00	7,300.00	58,400.00	0	0 0
156	02511010*	Install New Meter Box w/ 3/4" Lateral	1	Each	1,800.00	1,800.00	1,700.00	1,700.00	2,460.00	2,460.00	0	0 0
		Install New Meter Box w/ 1 1/2"										
157	02511014*	Lateral	1	Each	2,000.00	2,000.00	4,300.00	4,300.00	2,890.00	2,890.00	0	0 0
450	02544020*	Relocate Meter Box & Install New 3/4"		- 1	4 400 00	0.400.00	4 200 00	7 200 00	2 460 00	44.760.00		
158	02511020*	Relocate Meter Box & Install New 1	6	Each	1,400.00	8,400.00	1,200.00	7,200.00	2,460.00	14,760.00	0	0 0
159	02511022*	1/2" Lateral	1	Each	1,500.00	1,500.00	1,300.00	1,300.00	2,710.00	2,710.00	0	0 0
133	02311022	Replace Lateral w/ 3/4" Lateral to	-	Lucii	1,300.00	1,300.00	1,300.00	1,300.00	2,710.00	2,710.00	Ü	
160	02511030*	Existing Meter	7	Each	1,400.00	9,800.00	1,300.00	9,100.00	2,215.00	15,505.00	0	0 0
		Replace Lateral w/ 1" Lateral to										
161	02511032*	Existing Meter	19	Each	1,500.00	28,500.00	1,300.00	24,700.00	2,340.00	44,460.00	0	0 0
		Connect To Existing 8" Waterline W/6"										
162	02511050*	Hot Tap		Each	4,600.00	9,200.00	4,700.00	9,400.00	4,310.00	8,620.00	0	0 0
163	02511200*	Install 6" PVC Waterline	80	ft	100	8,000.00	92	7,360.00	135	10,800.00	0	0 0
164	02511202*	Install 8" PVC Waterline	290	ft	37	10,730.00	40	11,600.00	141	40,890.00	0	0 0
165	02511204*	Install 10" PVC Waterline	50	ft	75	3,750.00	94	4,700.00	148	7,400.00	0	0 0
166	02511500*	Install 6" M.J. Gate Valve	1	Each	1,300.00	1,300.00	1,200.00	1,200.00	1,260.00	1,260.00	0	0 0
167	02511502*	Install 8" M.J. Gate Valve	3	Each	1,800.00	5,400.00	1,600.00	4,800.00	1,720.00	5,160.00	0	0 0
		Extend Secondary Single Water										
168	02511610*	Service Connection	24	Each	1,900.00	45,600.00	1,500.00	36,000.00	1,845.00	44,280.00	0	0 0
		Extend Secondary Double Water	_									
169	02511612*	Service Connection	5	Each	2,100.00	10,500.00	1,800.00	9,000.00	2,100.00	10,500.00	0	0 0
						11,200,993.75		12,032,465.45		15,738,846.10		
								7 240 704 20			C 902 027 42	7.036.004.53
								7,210,781.20			6,893,027.42	7,926,981.53

			Number of items w/ match	69		
			Percent of Item matched	40.8%		
			Percent of Bid with matches	59.9%		
			Silver Standard Ratio	1.05		
			Gold Standard Ratio	0.91		
FOR 1	0" CONCRETE PAVEMENT, THE 11" CONCRETE PAVEMENT STATE AV	'ERAGE PRI	CE WAS REDUCED BY 1/11 FOR COMPARISON. 12-20-2010 BY			
dww						
IT WA	S DETERMINED THAT THIS IS CONSERVATIVE BECAUSE IT ONLY CON	SIDERS TH	E MATERIAL AND NOT THE EQUIPMENT OR LABOR WHICH WOUL	D BE		
CONS	TANT FOR BOTH THICKNESSES					

#### **APPENDIX C - Overall Costing Analysis**

Equation 1 shown in the report is a ratio of Total Project Cost to Projected Cost. The Total project cost is the bid price plus the change orders (including planned change orders) and overruns determined from the PDBS overrun status report for the project. It should be noted that the "other costs" shown in table 2 are not included as they typically do not account for a significant amount.

Total Cost = Bid + Change Orders + Overruns/Underruns (See Table 2 for values)

TC = \$13,947,531.55 + \$1,492,681.40 + (-\$661,386.71) = \$14,778,826.24

Equation #2

The Projected Cost is determined by taking the bid price (BP) and multiplying it by the inverse of the silver standard ratio (SSR) (See Appendix B of this report). This estimates the Projected Bid Price (PBP) assuming state average unit prices. It assumes that the unmatched bid items follow the same pricing pattern as the matched bid items. For this project the silver standard ratio is 1.65 and 1.05 respectively. This ratio is the ratio of bid items to the matched state average cost items. (See Appendix B weighted for value of each contract). The PBP become the basis for calculating the change orders and bid item overruns anticipated due to state average estimates. Over the last five years (2005 through last quarter of 2009) UDOT's change orders have averaged 12.7 % of the bid price and overruns of -3.3% of the bid price. By totaling these three values the Projected Cost (Pc) is determined.

```
PBP = BP x (1/SSR) Equation # 3

PC = PBP + (PBP x 0.127) + (PBP x -0.033)

or

PC = PBP x (1 + 0.127 - 0.033)

or

PC = PBP x 1.094

Substituting from Equation #3

PC=(BP/SRR) x 1.094 . . . This is done for each phase as shown below

PC = (($1,915,066.10 /1.65)+($12,032,465.45 /1.05)) x 1.094

PC = $13,806,429.91
```

The Ratio of Total Cost to Projected Cost is simply TC/PC

R<sub>PC</sub> = \$ 14,778,826.24/ \$13,806,429.91

 $R_{PC} = 1.07$