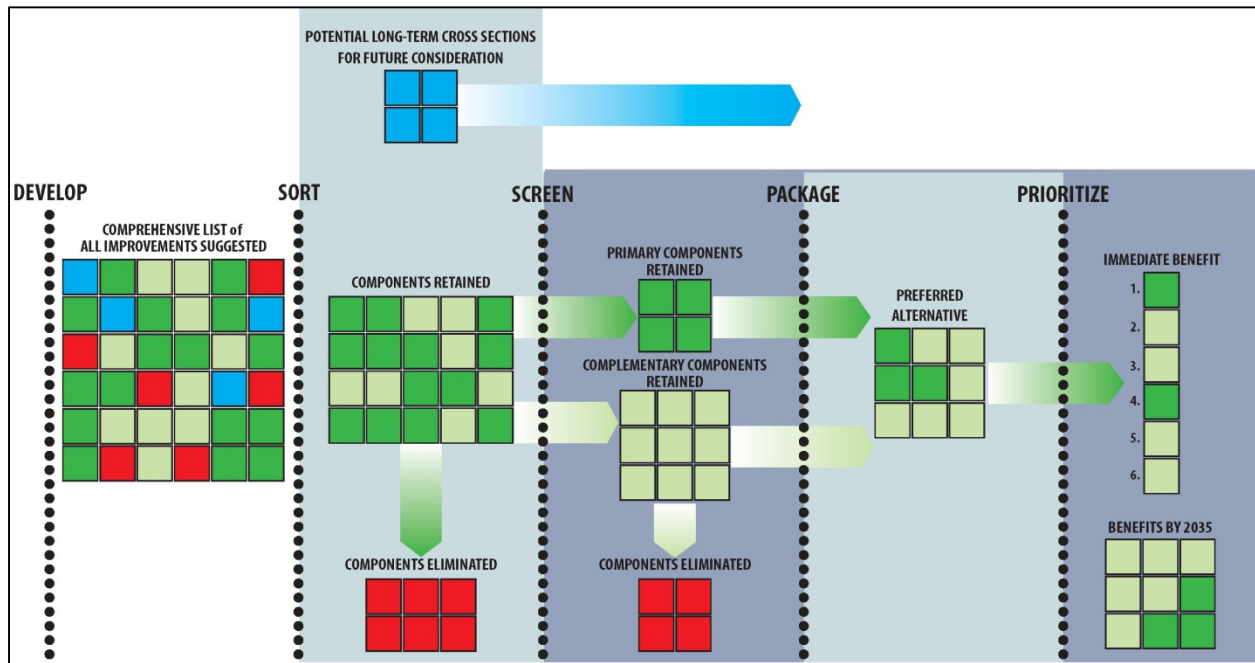


APPENDIX C ALTERNATIVES EVALUATION AND CONCEPTUAL DESIGN INFORMATION

C. ALTERNATIVES EVALUATION AND CONCEPTUAL DESIGN INFORMATION

This appendix provides supporting technical information regarding the alternatives development, evaluation, sorting and screening processes contained within the North I-25 PEL. Beginning with alternatives development, the following diagram depicts the process followed to reach the Recommended Alternative.

Figure C.1 Alternatives Process



C.1 Alternatives Development

C.1.1 Initial List of Alternatives

The initial list of alternatives (**Attachment C.1**) was developed in collaboration with the project stakeholders and general public. The listing included a total of 100 components grouped by type into the following categories:

- Roadway Infrastructure
- General Infrastructure
- Transit
- Intelligent Transportation Systems (ITS)
- Travel Demand Management (TDM) Strategies
- Transportation Systems Management (TSM) Strategies

C.1.2 Refinement of List

Over the course of the project, the list of alternatives underwent some modifications as additional options showed merit or new information came to light. These modifications are summarized as follows:

C.1.2.1 Refined components

The original list of components included a general corridor alternative to upgrade any substandard ramp merge and diverge locations to meet current design standards. After reviewing all of the corridor ramps, only one location was found to have a geometric deficiency: the northbound I-25 on ramp from 84th Avenue possesses substandard superelevation. The generalized component was revised to reflect a component to correct this particular deficiency.

C.1.2.2 Removed components

A number of components were removed from the listing, as shown in **Table C.1**.

Table C.1 Removed Components

Title	Ref.	Description	Reason for Removing
Physical improvements to ramp merge and diverge sections	S.11	Components currently under consideration based on a survey of existing geometrically deficient ramp merge and diverge sections	No southbound geometric deficiencies identified
Extend I-25 toll lane ingress/egress north of 84 th (SOUTHBOUND)	I.7	Restrict managed lane ingress and egress south of 84 th and make first point of access north of 84 th	Southbound version be implemented with managed lanes project
Increase use of articulated buses	B.2	Increase the passenger capacity of individual routes by using buses of larger carrying capacity	RTD has determined that maximum use of articulated buses is already occurring on the corridor
Expand Thornton Park-n-Ride	PNR.2	Expansion of current or construction of new Park-n-Ride locations	Project funded through FASTER
Upgrade Ramp Meter at 84th Ave NB	ITS.5	Ramp Meter to control the vehicles from the on-ramp to the highway	No upgrade is needed
Upgrade Ramp Meter at 84th Ave SB	ITS.6	Ramp Meter to control the vehicles from the on-ramp to the highway	No upgrade is needed
Upgrade Ramp Meter at 104th Ave SB	ITS.7	Ramp Meter to control the vehicles from the on-ramp to the highway	No upgrade is needed
Upgrade Travel Time Indicator (TTI) SB between US36 and 84th Ave	ITS.8	To provide vehicle travel times across segments from one TTI location to the next	To be implemented with managed lanes project

Title	Ref.	Description	Reason for Removing
Upgrade Travel Time Indicator (TTI) SB between 88th Ave and 92nd Ave	ITS.9	To provide vehicle travel times across segments from one TTI location to the next	To be implemented with managed lanes project
Upgrade Travel Time Indicator (TTI) SB at 112th Ave	ITS.10	To provide vehicle travel times across segments from one TTI location to the next	To be implemented with managed lanes project
Upgrade Travel Time Indicator (TTI) NB between 112th Ave and 120th Ave	ITS.11	To provide vehicle travel times across segments from one TTI location to the next	To be implemented with managed lanes project
New TTI units for Managed Lanes located between each ingress/egress point	ITS.13	To provide vehicle travel times across segments from one TTI location to the next	To be implemented with managed lanes project
Upgrade existing VMS's	ITS.14	To be used for traveler information	To be implemented with managed lanes project
Upgrade 12 existing cameras with new Ethernet-based cameras	ITS.17	To monitor the conditions in the corridor	To be implemented with managed lanes project
Guaranteed Ride Home	TDM.1	For commuters who use alternative modes, this program provides taxi rides home in cases of emergency. The Guaranteed Ride Home program is currently operated by DRCOG and the NFRMPO.	Regional programs all currently provided by DRCOG
Telework employer resources	TDM.2	This strategy promotes commuters working from home. This reduces the overall number of commute trips. DRCOG and NFRMPO provide information on Telework to employers. IT support for local businesses is included in the telework program for employers.	
Carpool Matching	TDM.6	DRCOG and NFRMPO operate a program to help match potential carpoolers with each other and to aid the formation of vanpools and schoolpools.	
Vanpool	TDM.7		
Schoolpool	TDM.8		

C.1.2.3 New components

Additional components were identified following the initial listing, and are summarized in **Table C.2**. These components were added to account for new information received after the initial component list was formed.

Table C.2 Additional Components

Title	Ref.	Description
Northbound general purpose lane segment – 84 th Avenue to Thornton Parkway	N.15	Additional northbound I-25 general purpose lane segment beginning at 84 th Avenue off ramp, extending under the 84 th Avenue bridge and terminating at Thornton Parkway
Southbound general purpose lane segment – Thornton Parkway to 84 th Avenue	S.15	Additional southbound I-25 general purpose lane segment beginning at the Thornton Parkway on ramp, extending under the 84 th Avenue bridge and terminating at the southbound 84 th Avenue on ramp junction
120 th Avenue Southbound ramp meter	ITS.20	Ramp Meter to control the vehicles from the on-ramp to the highway
Thornton Parkway Northbound ramp meter	ITS.21	Ramp Meter to control the vehicles from the on-ramp to the highway
136 th Avenue Northbound ramp meter	ITS.22	Ramp Meter to control the vehicles from the on-ramp to the highway
144 th Avenue Northbound ramp meter	ITS.23	Ramp Meter to control the vehicles from the on-ramp to the highway
SH 7 Southbound ramp meter	ITS.24	Ramp Meter to control the vehicles from the on-ramp to the highway
New Park-and-Ride at 128 th Avenue and I-25	PNR.7	New Park-and-Ride facility at 128 th Avenue. Could be configured as a median bus station.

C.2 Alternatives Sorting, Screening and Packaging

C.2.1 Sorting

All of the components were sorted into the following three categories:

Long Term Cross Sections for Future Consideration – Options that have potential to meet the long term needs and work within the Metro Vision Plan of a 202' corridor cross section that span the length of corridor (US 36 to SH 7);

Components Retained - Improvement components that could potentially contribute to addressing the problems in this corridor, and may or may not completely address all of the needs.

Components Eliminated – Improvements that are considered to have a fatal flaw were eliminated during this sorting process. These include improvements that would require reconstruction of recently constructed structures, have been considered and eliminated in a previous NEPA study, would cause operational problems and/or do not contribute to meeting the purpose and need identified for this study.

The results of the sorting process are tabulated in **Attachment C.2** to this Appendix, along with the rationale for the sorting category assigned to each component.

C.2.2 Screening

Alternative screening was conducted on the list of retained components resulting from the sorting step. During screening, each component was evaluated based on its ability to satisfy the purpose and need.

Prior to the screening evaluation, the components were categorized as primary or complementary, described as follows:

Primary components would meet the purpose and need as standalone projects. Examples of primary components include continuous acceleration/deceleration lanes, additional general purpose lane segments, changes to ramp configurations, and ramp metering installations.

Complementary components could be combined with virtually any primary component would be considered complementary (for example, development of a North I-25 area bike map). Other complementary components would be those that would only be considered if a particular primary component is retained (for example, shoulder busway north of 120th Avenue would be considered only if enhanced bus service north of 120th Avenue is recommended).

C.2.2.1 Component Evaluation

Various quantitative and qualitative methods were used to analyze the broad variety of component types. Analyses and findings related to each component type are summarized as follows.

Roadway Infrastructure Components

The roadway infrastructure components were evaluated based on their ability to reduce end-to-end travel time along I-25 through the study area in comparison with No Action conditions. The Dynamic Traffic Assignment modeling tool DynusT was used to measure travel time along I-25 between US 36 and SH 7 for each individual component. To evaluate component performance under critical conditions, the measurements focused only on the peak morning and afternoon directions: southbound traffic in the morning and northbound traffic in the afternoon.

Two model-year scenarios were used to evaluate the components: a Year 2035 scenario and a virtual Year 2015 scenario. Serving as a 20-year future time horizon, Year 2035 conditions were modeled to evaluate the ability of components to provide long term benefit. The Year 2015 scenario was modeled to demonstrate that components that can meet the immediate, pressing needs along the I-25 corridor, consistent with the PEL's focus on delivering near-term improvements.

The base-year DynusT model underwent an extensive calibration process to ensure accurate representation of traffic flow within the model area and consistency with experienced peak period travel speeds along I-25. Corridor travel time was not specifically used as a model calibration measure. Upon modeling of the No Action condition and the roadway infrastructure components, it was found that DynusT results had a tendency to over-predict corridor travel delay portion of corridor travel time. Specifically, the DynusT model allowed travel speed in some locations to dip as low as 3-5 miles per hour for extended periods of time. Such a condition is not currently experienced along I-25 and does not typically occur on urban freeways.

Adjustment of the raw model delay results was performed to enhance travel time accuracy. Comparison of base year model results with actual recorded travel times indicated that northbound PM delay was over-predicted by approximately 40 percent and southbound AM delay by approximately 51 percent. Accordingly, raw delay for each component was adjusted downward by these percentages, and the adjusted travel time results are depicted on **Tables C.3** and **C.4**.

As shown, the components provide a range of travel time savings, some as much as 8 minutes of travel time by the Year 2035. Components shown to provide benefit either in 2035 or 2015 were retained. Reasons for eliminating components included a lack of travel time savings, negative impacts to mobility, and not addressing an identified source of congestion.

In addition to measuring travel time savings, the DynusT model was used to extract the duration of congestion experienced along I-25 between US 36 and SH 7 for the No Action and each roadway component. As shown in **Tables C.3** and **C.4**, components show the ability to reduce the duration of northbound congestion by up to 10 minutes, while southbound components show more duration reduction, as high as 55 minutes in the Year 2015 scenario.

Transit Components

The evaluation of transit components was divided into two categories: Park-and-Ride and Transit Infrastructure components.

Park-and-Ride: With a focus on impacts to the Wagon Road Park-and-Ride, the change in route ridership and demand for use of individual Park-and-Ride locations was evaluated using the Year 2035 regional travel demand model. **Table C.5** provides the results. As shown, new Park-and-Ride facilities would accommodate up to more than 3,000 riders using new routes in addition to the routes that currently serve Wagon Road. Each new location also shows the potential to reduce demand at Wagon Road between 5 and 25 percent. On this basis, all of the Park-and-Ride components were retained.

Expansions to the existing two corridor Park-and-Ride locations were contemplated. Expanding the Wagon Road Park-and-Ride was evaluated qualitatively from two perspectives; adding structured or surface parking. Neither is physically feasible, so expansion was eliminated from further consideration. Expansion of the Thornton Park-and-Ride is currently planned and funded, so this component needed no further consideration in the PEL.

Transit Infrastructure: **Table C.6** provides the transit infrastructure results. Multiple quantitative methods were used to evaluate the ability of the components to reduce bus travel time along I-25. Simple calculations show that:

1. Converting the current one-way inbound bus tunnel at Wagon Road to two-way operations would provide a direct link to I-25, thereby saving 1 minute of bus travel time by re-routing buses that currently travel out of direction through multiple signalized intersections.
2. A shoulder busway north of 120th Avenue available for use when mainline I-25 is congested could save up to 3 minutes of travel time by the Year 2035 by increasing bus travel speeds.
3. Bus/HOV queue jump lanes can save bus travel time by routing buses around the queues that develop approaching ramp meter locations at I-25 on ramps.

A VISSIM traffic simulation model was used to quantify the potential benefits associated with a median bus station near 88th Avenue and a T-Ramp accessing the I-25 managed lanes at the same location. The VISSIM model was built from the available completed, calibrated VISSIM corridor model of I-25 between US 36 and 120th Avenue, adjusted to reflect Years 2035 and 2015 traffic conditions. The model was initially developed for the I-25 managed lanes project, to evaluate the appropriate layout for access to the new managed lanes. For both components, the average peak hour bus travel time for buses was extracted from the VISSIM model and compared with no action conditions. It was found that the T-Ramp provided no benefit in either 2035 or 2015, while the 88th Avenue median station would provide up to 4 minutes of peak hour bus travel time savings by the Year 2035.

Based on the technical evaluation, all transit infrastructure components were retained, with the exception of the 88th Avenue T-Ramp.

Intelligent Transportation Systems (ITS) Components

The ramp meter components were evaluated using the DynusT model, while the remaining ITS components were qualitatively reviewed to confirm benefit to the I-25 corridor. Year 2015 and 2035 DynusT modeling showed clear benefit to implementing ramp meters at I-25 access locations not currently metered, demonstrating that up to 6 minutes of travel time savings could be achieved. The ramp meter components also show capability to reduce the duration of congestion in the Southbound direction by up to nearly 40 minutes in 2015 and 3 minutes in 2035. **Table C.7** provides the results for each component, and notes that all of the evaluated ITS components were retained.

General Infrastructure Components

I-25 Crossings: The introduction of new crossings of I-25 could relieve traffic at current crossings and enhance multimodal mobility. Seven potential new crossing locations were identified, and it was determined that each location would be evaluated based on its ability to reduce the daily traffic volume at the nearest adjacent interchange or interchanges with I-25. Each location was added to the regional travel demand model and all were shown to provide some daily traffic reduction. It was found that up to a 12 percent reduction could be achieved and a range of 4,000 to 13,200 vehicles per day could be accommodated along a new crossing. All of the potential crossing locations were retained.

70th/Washington intersection: Peak hour turning movement counts were completed at this intersection, and the Synchro and CORSIM traffic analysis software tools were used to examine how lengthening the existing eastbound dual left turn lanes could improve operations. The CORSIM analysis was utilized to assess the traffic flow impacts of lengthening the left turn lanes, as Synchro is unable to fully account for the effects of additional left turn storage. The CORSIM analysis showed that no delay reduction could be achieved in the near term future, but, with added congestion in future years, 10 seconds could be saved by the average driver traveling through the intersection.

Two-lane interchange ramps: Two lane exit ramps provide additional exit capacity without hampering mainline operations, and can be paired with continuous acceleration/deceleration lanes. No quantitative analyses of two-lane ramps was performed, but the component was retained for pairing with roadway infrastructure components.

Extend toll lane ingress/egress north (NORTHBOUND): This component was evaluated qualitatively, and it was determined that it would negatively impact mobility for 84th Avenue users accessing the reversible lanes and new managed lanes and would not address the purpose and need.

Table C.8 provides the screening information for general infrastructure components.

Travel Demand Management (TDM)/Transportation Systems Management (TSM) Components

Based on qualitative assessment, all TDM/TSM components were retained based on their ability to enhance multimodal transportation options and complement infrastructure components. **Table C.9** lists the retained TDM/TSM components.

Table C.3 Northbound I-25 Roadway Infrastructure Components – Travel Time and Congestion Duration

Ref.	Title	Description	PM Travel time, Northbound I-25 between US 36 and State Highway 7 (minutes)				PM Congestion duration, Northbound I-25 between US 36 and State Highway 7 (hours)				RECOMMENDATION	
			Year 2035		Year 2015		Year 2035		Year 2015		RETAIN?	COMMENTS
			Travel Time	Travel Time Savings	Travel Time	Travel Time Savings	Duration (Hours)	Duration Savings (min)	Duration (Hours)	Duration Savings (min)		
NA	NO ACTION	Includes Managed Lanes US 36 to 120th Avenue	24.4	NA	21.3	NA	5.18	NA	4.2	NA	NA	
N.2	C-D system - US 36 to 84th	Consolidate all NB weaving movements on side parallel facility	23.3	1 min	20.2	1 min	5.73	-33 min	4.37	-10 min	No	Provides no measurable mobility improvement and therefore does not address the Purpose and Need.
N.3	Auxiliary Lane - I-270 to 84th	Provide lane add via northbound I-270/US 36/I-76 ramp	17.7	7 min	17.7	4 min	5.03	9 min	4.08	7 min	Yes	
N.4	I-76 direct connection to I-25	Slip ramp to mainline I-25 upstream of current connection	23.0	1 min	21.8	-1 min	5.23	-3 min	4.28	-5 min	No	Provided no measurable mobility improvement and therefore does not address the Purpose and Need.
N.6	84th to Thornton Parkway - NB	Construct a continuous acceleration/deceleration lane between interchanges; requires replacement of 88th Ave bridge	17.3	7 min	17.0	4 min	5.08	6 min	4.08	7 min	Yes	
N.7	Thornton Pkwy to 104th - NB	Construct a continuous acceleration/deceleration lane between interchanges	18.0	6 min	17.6	4 min	5.07	7 min	4.07	8 min	Yes	
N.8	104th to 120th - NB	Construct a continuous acceleration/deceleration lane between interchanges	16.5	8 min	16.8	4 min	5.02	10 min	4.08	7 min	Yes	
N.9	120th to 136th - NB	Construct a continuous acceleration/deceleration lane between interchanges	18.0	6 min	17.5	4 min	5.00	11 min	4.08	7 min	Yes	
N.10	136th to 144th - NB	Construct a continuous acceleration/deceleration lane between interchanges	18.6	6 min	NR	0 min	5.05	8 min	4.2	0 min	Yes	
N.11	144th to E-470 - NB	Construct a continuous acceleration/deceleration lane between interchanges	18.5	6 min	NR	0 min	5.15	2 min	4.2	0 min	Yes	
N.12	Correct 84th Avenue on ramp superelevation deficiency]	Existing deficiency identified related to superelevation of on ramp. Correct this deficiency	NA	NA	NA	NA	NA	NA	NA	NA	Yes	
N.14	144th to SH 7 C-D system	Construct parallel C-D system along I-25 between 144th Avenue and SH 7	NA	NA	NA	NA	NA	NA	NA	NA	No	Would negatively impact mobility for I-25 to E-470/Northwest Parkway users by eliminating direct connection and therefore would not address the Purpose and Need.
N.15	General Purpose Lane - 84th to Thornton Pkwy	Extend 4th travel lane north to Thornton Pkwy Interchange and replace 88th Ave bridge	16.8	8 min	16.9	4 min	5.02	10 min	4.08	7 min	Yes	

NA - Not Applicable.
NR - Not Rated.

Table C.4 Southbound I-25 Roadway Infrastructure Components – Travel Time and Congestion Duration

Ref.	Title	Description	Travel time, Southbound I-25 between State Highway 7 and US 36 (minutes)				AM Congestion duration, Southbound I-25 between State Highway 7 and US 36 (hours)				RECOMMENDATION	
			Year 2035		Year 2015		Year 2035		Year 2015		RETAIN?	COMMENTS
			Travel Time	Travel Time Savings	Travel Time	Travel Time Savings	Duration (Hours)	Duration Savings (min)	Duration (Hours)	Duration Savings (min)		
NA	NO ACTION	Includes Managed Lanes US 36 to 120th Avenue	42.9	0	20.5	0	3.98	NA	3.20	NA	NA	
S.1	Braided ramps - 84th Avenue to US 36	Physical grade separation to eliminate some weaving movements	51.7	NA	15.5	NA	4.12	NA	2.52	NA	No	US 36 and 84th Ave weave movements are not the cause of congestion in the I-25 corridor, therefore this component would not address Purpose and Need.
S.2	C-D system - 84th Avenue to US 36	Consolidate all SB weaving movements on side parallel facility	NA	NA	NA	NA	4.13	NA	2.83	NA	No	US 36 and 84th Ave weave movements are not the cause of congestion in the I-25 corridor, therefore this component would not address Purpose and Need.
S.3	84th Avenue on-ramp gore point extension	Restrict SB entering traffic from reaching I-270 flyover and eliminate tight right-to-left weaving movement	NA	NA	NA	NA	NA	NA	NA	NA	No	Would negatively impact mobility for 84th Ave users accessing I-270 and therefore would not address the Purpose and Need.
S.4	Auxiliary Lane - 84th to US 36	Widen I-25 to provide 5 southbound travel lanes between 84th and US 36	41.8	1 min	14.2	6 min	3.98	0 min	2.28	55 min	Yes	
S.5	E-470 to 144th - SB	Construct a continuous acceleration/deceleration lane between interchanges	43.2	0 min	NR	NR	3.98	0 min	3.20	0 min	Yes	
S.6	144th to 136th - SB	Construct a continuous acceleration/deceleration lane between interchanges	43.1	0 min	NR	NR	3.98	0 min	3.20	0 min	Yes	
S.7	136th to 120th - SB	Construct a continuous acceleration/deceleration lane between interchanges	30.6	5 min	16.3	4 min	3.17	49 min	2.63	34 min	Yes	
S.8	120th to 104th - SB	Construct a continuous acceleration/deceleration lane between interchanges	42.5	0 min	16.4	4 min	3.97	1 min	2.57	38 min	Yes	
S.9	104th to Thornton Pkwy - SB	Construct a continuous acceleration/deceleration lane between interchanges	40.9	2 min	16.4	4 min	3.90	5 min	2.57	38 min	Yes	
S.10	Thornton Parkway to 84th - SB	Construct a continuous acceleration/deceleration lane between interchanges; requires replacement of 88th Ave bridge	42.3	1 min	16.9	4 min	3.98	0 min	2.50	42 min	Yes	
S.13	SH 7 to 144th C-D system	Construct parallel C-D system along I-25 between SH 7 and 144th Avenue	NA	NA	NA	NA	NA	NA	NA	NA	No	Would negatively impact mobility for I-25 to E-470/Northwest Parkway users by eliminating direct connection and therefore would not address the Purpose and Need.
S.15	General Purpose Lane - Thornton Pkwy to 84th	Extend 4th travel lane north to Thornton Pkwy Interchange and replace 88th Ave bridge	42.4	1 min	16.5	4 min	3.93	3 min	2.47	44 min	Yes	

NA - Not Applicable.

NR - Not Rated.

Table C.5 Park-and-Ride Components – Ridership and Demand

Ref.	Title	Description	Ridership on new service in 2035	Change in ridership demand for 120X, 122X in 2035	Demand at new Park-and-Ride in 2035 ¹	Change in demand at Wagon Road ¹	Retain?	Comments
PNR.1	Expand Wagon Road Park-and-Ride	Expansion of current Park-and-Ride locations (SURFACE)	NA	NA	NA	NA	No	Small amount of land available; construction impacts likely for current Park-and-Ride users, less sustainable due to relief after North Metro implementation
PNR.1	Expand Wagon Road Park-and-Ride	Expansion of current Park-and-Ride locations (STRUCTURE)	NA	NA	NA	NA	No	Construction impacts likely for current Park-and-Ride users, less sustainable due to relief after North Metro implementation, high cost
PNR.3	New Park-and-Ride at 136th Ave and I-25	Construction of new Park-and-Ride locations	630	-3%	250	-5%	Yes	Medium effect on Wagon Road demand
PNR.4	New Park-and-Ride at 144th Ave and I-25	Construction of new Park-and-Ride locations	1340	-6%	510	-11%	Yes	Medium effect on Wagon Road demand
PNR.5	New Park-and-Ride at SH-7 and I-25	Construction of new Park-and-Ride locations	2560	-11%	1,020	-20%	Yes	Medium effect on Wagon Road demand
PNR.6	New Park-and-Ride at 124th Ave and Claude Court at Eastlake	Construction of new Park-and-Ride locations	740	-3%	210	-5%	Yes	Medium effect on Wagon Road demand
PNR.7	New Park-and-Ride near 128th Ave and I-25 with median station	Construction of new Park-and-Ride locations, addition of median station	3,080	-13%	1,230	-25%	Yes	Strong effect on Wagon Road demand. This component could be considered as a component of the long term cross-section.

NA - Not Applicable.

NR - Not Rated

¹travel demand model does not account for capacity of Park-and-Rides.

Table C.6 Transit Infrastructure Components – Bus Travel Time

Ref.	Title	Description	Bus Travel time savings, I-25 between US 36 and State Highway 7 (minutes)				Retain?	Comments
			Year 2035		Year 2015			
			Southbound AM	Northbound PM	Southbound AM	Northbound PM		
TI.1	Bi-directional tunnel for bus access to the Wagon Road P-n-R from the managed lanes	Convert the tunnel to a reversible bus-only connection	1 min	0 min	1 min	0 min	Yes	This component supports ITS.20, 120th Ave SB ramp meter.
TI.3	Build a shoulder busway from 120 th Ave to 144 th Ave	Allows buses only to travel on existing outside shoulder during peak congested conditions. Use of the busway would only be allowed when traffic speeds are less than 35 mph, and busway speed limit would be 35 mph.	30mph to 55mph 3 miles 3 min	0 min	50mph to 55mph 3 miles <1 min	0 min	Yes	
TI.4	Bus/HOV queue jump lanes and bus ramps at interchanges	Provide HOV and bus bypass around ramp meter.	NR	NR	NR	NR	Yes	Component has potential to address mobility issues when paired with other improvements.
TI.6	88th Ave Median Station	Inline station to prevent buses from weaving and replace 88th Ave bridge	4 min	1 min	3 min	1 min	Yes	
TI.7	88th Ave interchange T-ramp	Add T-ramp to current overpass to serve the managed lane	0 min	0 min	0 min	0 min	No	Provided no measurable mobility improvement and therefore does not address the Purpose and Need.

NR - Not Rated

Table C.7 Intelligent Transportation Systems Components – Travel Time and Congestion Duration

Ref.	Title	Description	Travel time savings, I-25 between US 36 and State Highway 7 (minutes)		Congestion duration savings, I-25 between US 36 and State Highway 7 (hours)		RECOMMENDATION	
			Year 2035	Year 2015	Year 2035	Year 2015	Retain?	Comments
			Peak Travel Time Savings	Peak Travel Time Savings	Congestion duration time savings (min)	Congestion duration time savings (min)		
ITS.1	New Ramp Meter at 104th Ave NB	Ramp Meter to control the flow from the on-ramp to the highway	6 min ¹	4 min ¹	3 min	6 min	Yes	
ITS.2	New Ramp Meter at 120th Ave NB	Ramp Meter to control the flow from the on-ramp to the highway					Yes	
ITS.22	New Ramp Meter at 136th Ave NB	Ramp Meter to control the flow from the on-ramp to the highway					Yes	
ITS.23	New Ramp Meter at 144th Ave NB	Ramp Meter to control the flow from the on-ramp to the highway					Yes	
ITS.21	New Ramp Meter at Thornton Parkway NB	Ramp Meter to control the flow from the on-ramp to the highway	NA	NA	NA	NA	Yes	Modeled as part of No Action, supporting infrastructure currently in place
ITS.3	New Ramp Meter at 136th Ave SB	Ramp Meter to control the flow from the on-ramp to the highway	0 min ²	4 min ²	1 min	39 min	Yes	
ITS.4	New Ramp Meter at 144th Ave SB	Ramp Meter to control the flow from the on-ramp to the highway					Yes	
ITS.20	New Ramp Meter at 120th Ave SB	Ramp Meter to control the flow from the on-ramp to the highway					Yes	Bidirectional bus tunnel would support this component.
ITS.24	New Ramp Meter at SH 7 SB	Ramp Meter to control the flow from the on-ramp to the highway					Yes	
ITS.12	Travel Time Indicators provide vehicle travel times across segments from one TTI location to the next	Add additional TTI units with spacing of no more than one mile, located before and after each interchange, and installed in between the off-ramp and on-ramp at each interchange	NA	NA	NA	NA	Yes	Supports ITS.19 north of 120th Ave.
ITS.15	Add VMS between each interchange	To be used for traveler information	NA	NA	NA	NA	Yes	Supports ITS.19 north of 120th Ave.
ITS.16	Add CCTV cameras North of 120th	To increase the coverage for monitoring the conditions in corridor. Spaced at 1.5 miles.	NA	NA	NA	NA	Yes	Supports ITS.19 north of 120th Ave.
ITS.18	Microwave Vehicle Radar Detection (MVRD) every 1/2 mile	Side Fire Radar - To collect volume, occupancy, and speed data at a given point	NA	NA	NA	NA	Yes	Supports ITS.19 north of 120th Ave.
ITS.19	Active Traffic Management (ATM)	Could consist of Lane Use Signals, Speed Harmonization, Supplemental VMS for putting advisory speeds and queue warning	10% savings	10% savings	10% savings	10% savings	Yes	ATM is already in place southbound from 120th Ave to US 36.

¹ Analysis was run once assuming additional northbound ramp meters at 104th Ave, 120th Ave, 136th Ave, and 144th Ave

² Analysis was run once assuming additional southbound ramp meters at 120th Ave, 136th Ave, 144th Ave, and SH 7

NA - Not Applicable

Table C.8 General Infrastructure Components – Delay and Daily Traffic

Ref.	Title	Description	PM Peak Intersection Delay Savings (Seconds/Vehicle)		2035 Daily Volume on new crossing	2035 ADT Reduction at adjacent interchange - %	RECOMMENDATION	
			Year 2035	Year 2012			Retain?	Comments
I.4	Construct two-lane interchange ramps	Widen single-lane ramps to provide two lane exit from I-25 at all diamond interchanges	NA	NA	NA	NA	Yes	Component has potential to address mobility issues when paired with auxiliary lane projects.
I.5	70th/Washington Intersection	Extend eastbound dual left-turn lane to better accommodate evening peak flows	10 sec	0 sec	NA	NA	Yes	Some reduction of interchange crossing volume.
I.6a	I-25 Crossing between US 36 and 84th Avenue	Construct additional roadway crossing of I-25	NA	NA	8,200	-6% (84th)	Yes	Some reduction of interchange crossing volume.
I.6b	I-25 Crossing between Thornton Parkway and 104th Avenue	Construct additional roadway crossing of I-25	NA	NA	13,200	-12% (104th)	Yes	Some reduction of interchange crossing volume.
I.6c	I-25 Crossing between 120th Avenue and 128th Avenue	Construct additional roadway crossing of I-25	NA	NA	9,200	-6% (120th)	Yes	Some reduction of interchange crossing volume.
I.6d	I-25 Crossing between 136th Avenue and 144th Avenue	Construct additional roadway crossing of I-25	NA	NA	9,700	-8% (144th), -7% (136th)	Yes	Some reduction of interchange crossing volume.
I.6e	I-25 Crossing between 144th Avenue and E470	Construct additional roadway crossing of I-25	NA	NA	9,100	-5% (E-470)	Yes	Some reduction of interchange crossing volume.
I.6f	I-25 Crossing between E470 and SH 7	Construct additional roadway crossing of I-25	NA	NA	9,200	-5% (E-470), -2% (SH 7)	Yes	Some reduction of interchange crossing volume.
I.6g	I-25 Crossing north of SH 7	Construct additional roadway crossing of I-25	NA	NA	4,000	-1% (SH 7)	Yes	Some reduction of interchange crossing volume.
I.7	Extend toll lane ingress/egress north (NORTHBOUND)	Restrict access to I-25 reversible lanes and managed lanes south of 84th Ave and make first point of access north of 84th Ave	NA	NA	NA	NA	No	Would negatively impact mobility for 84th Ave users accessing the reversible lanes and managed lanes and therefore would not address the Purpose and Need.

NA - Not Applicable

Table C.9 Retained Travel Demand Management / Transportation Systems Management Components

Ref.	Title	Description	RECOMMENDATION
TDM.3	Telework recognition awards	Incentives for employers to implement telework program	RETAIN ALL
TDM.4	Commuter cash program	This is a program that provides a subsidy for travelers to introduce them to alternative modes of transportation for a set period of time, to potentially alter long-term travel mode choices.	
TDM.5	Flexible work schedule resources	Promotion of off-peak work schedules, or flex-time, could result in reduced congestion during peak hours.	
TDM.9	Pool program subsidies	The provision of additional funds to increase the potential of carpools forming could reduce congestion and aid the shift from SOV to HOV travel.	
TDM.10	Carpool lots	A strategy to encourage carpooling, the provision of parking lots designated for carpooling. The location of the carpool lots is important to provide convenience. Lighting is also important to provide security.	
TDM.11	Peak hour bus-only lanes/transit priority	Peak hour bus-only lanes and/or queue jumps/transit signal priority help to maintain transit level of service and may promote transit usage in a congested corridor.	
TDM.12	First or Final mile programs – pool bikes, employer fleet vehicles, shuttles	First or Final mile programs address a typical gap in a journey by transit – the leg between a transit stop and the commuter’s origin and/or destination.	
TDM.13	Bike Map	This is an online map that provides up-to-date bicycle information for travelers in the corridor, including the location and condition of bike routes and paths.	
TDM.14	Bike share program	A bike share program provides bicycles to the public for daily check-out for a small fee. The bicycles are docked at a variety of activity centers. In Denver, the B-Cycle operates in downtown, Cherry Creek, and other areas.	
TDM.15	Marketing, including website, hotline, advertising, social networking, etc.	There are a variety of potential marketing mechanisms to promote TDM strategies: website, phone hotline, newspaper and radio advertising, social networks including Twitter, Facebook, mail-out campaigns, etc.	
TDM.16	Employer Outreach	These are programs directed at large employers to promote and provide education regarding TDM strategies.	
TDM.17	Corridor Transit Guide	Published guide to circulate to users	
TDM.18	Secure bike facilities	Secure bike lockers are typically located at park-and-rides.	
TDM.19	Master EcoPass contract	Developing agreements with larger groupings of employers (buildings, etc.) for transit passes	
TDM.20	Transit subsidies	Programs to incentivize transit ridership, that temporarily provide free or reduced fares to introduce transit to commuters who are accustomed to travel by driving alone.	
TSM.3	Implement education campaign to instruct drivers on appropriate use of buffer-separated managed lane	Increase awareness of how buffer-separation works to optimize driver understanding and enhance safety.	
TSM.5	Incident Management Plan	Incident Management Plan could be focused on improving response time and driver information, less focused on alternative routes due to urbanized surroundings.	

C.2.2.2 Screening Results

The evaluation revealed a number of components that would not address the purpose and need. These components were eliminated.

Attachment C.3 tabulates the retained Primary and Complementary components.

C.2.3 Packaging

Primary components, along with complementary components, were combined into a preferred package that addresses the problems identified along the corridor and meets the project goals. A single package was developed because all the components were retained after screening:

- Contributed to addressing the Purpose and Need
- Did not conflict with each other
- Did not preclude the long-term options

As a result, no additional screening was warranted.

C.3 *Prioritization and Phasing*

The prioritization of components was accomplished in two steps. The initial stage used the results of the screening evaluation to sort components into two categories based on the expected timeframe when benefits will be realized – “Benefits now” or “Benefits by 2035.” The “Benefits now” category represents higher-priority actions than the “Benefits by 2035” category. The second stage analyzed the components in the “Benefits now” category to develop phasing scenarios and recommend the order in which to construct the components.

C.3.1 Initial Prioritization

Attachment C.3 identifies the initial priority assigned to each of the retained primary and complementary components. The roadway infrastructure components demonstrating benefit in the Year 2015 traffic modeling were denoted as “Benefits now” components, while the additional components that showed benefit in 2035 were grouped into the “Benefits by 2035” category. The ramp metering locations currently warranted according to the *CDOT Ramp Metering Feasibility Study* were prioritized as “Now” components. The transit components were prioritized highly based on their ability to relieve demand at the Wagon Road and provide travel time savings, and be implemented in the near-term future. The TDM and TSM strategies were prioritized based on input received from Smart Commute Metro North Staff. Smart Commute Metro North is the Transportation Management Organization (TMO) covering 12 jurisdictions in the vicinity of the study area.

C.3.2 Phasing Scenarios

The phasing scenarios were developed to identify a sequence of implementation for the high priority roadway infrastructure, ramp metering and transit components. The components were ordered according to their ability to:

- Reduce near-term congestion while minimizing adverse operational impacts,
- Expand transportation options,
- Be more easily delivered, and
- Be cost effective

C.3.2.1 Safety and Design Analyses

Technical information supporting the phasing plan included the travel time results proceeding from the transportation modeling effort (Year 2015 scenario), transportation safety analysis, and preliminary conceptual design information developed for each component. Construction cost estimates were prepared based on conceptual designs of each component and environmental resource impacts were identified. An understanding of the resource impacts facilitated a preliminary assessment of the level of environmental documentation needed to clear the components for implementation.

The transportation modeling effort is described previously, in Section C.2.2.1 of this appendix. Safety and conceptual design analyses are described as follows:

Safety Analysis

Crash modification factors (CMF) provided in the online CMF clearinghouse (www.cmfclearinghouse.org), maintained by the Federal Highway Administration (FHWA), were used to evaluate the safety performance of roadway components. A CMF is a multiplicative factor used to compute the expected number of crashes after implementing a given component at a specific site. The CMF computation provided a comparison between the number of crashes that actually occurred between 2008 and 2010, and the expected number of crashes that would have occurred if the component had been in place during that time frame.

Table C.10 Crash Modification Factors for Component types

Component Type	Crash Modification Factor
Ramp Meter	0.50 ¹
Continuous acceleration/deceleration lane	0.80
Additional general purpose Lane	0.83
Managed Lane	0.95
¹ Applicable to Rear-end and sideswipe crash types only	

Table C.11 summarizes the crash modification factors and reduction calculations for each component. As shown, crash reduction varies from 1 fewer crash associated with a ramp meter installation at the northbound 144th Avenue on ramp to a maximum of 21 fewer crashes due to the addition of a general purpose segment southbound between Thornton Parkway and 84th Avenue.

Table C.11 Crash Modification Calculations

Component	Reported # of crashes, 2008 - 2010	Expected No Action # of crashes	Crash Modification Factor	3-year Crash Reduction (# of fewer crashes expected)
Continuous acceleration/deceleration lane (all crash types)				
NB I-270 to 84 th	71	64	0.80	13
NB 84 th to Thornton Pkwy.	59	53	0.80	11
NB Thornton Pkwy to 104 th	26	23	0.80	5
NB 104 th to 120 th	35	32	0.80	6
NB 120 th to 136 th	32	32	0.80	6
SB 84 th to US 36	40	36	0.80	7
SB 136 th to 120 th	33	33	0.80	7
SB 120 th to 104 th	96	86	0.80	17
SB 104 th to Thornton Pkwy.	68	61	0.80	12
SB Thornton Pkwy. To 84 th	86	77	0.80	15
General Purpose lane segments (all crash types)				
GP segment 84 th to Thornton Pkwy.	140	126	0.83	9 ¹
SB GP segment Thornton Pkwy. To 84 th	185	167	0.83	21 ¹
Ramp Meter locations (sideswipe and rear end only)				
NB Thornton Pkwy.	17	15	0.50	8
NB 104 th	6	5	0.50	3
NB 120 th	4	4	0.50	2
SB 144 th	2	2	0.50	1
SB 136 th	4	4	0.50	2
SB 120 th	24	22	0.50	11
¹ Includes loss of existing auxiliary lane between 84 th and US 36 that would be replaced by GP segment				

Preliminary Design Information

Conceptual design information developed for the “Benefits Now” roadway infrastructure components, along with the 88th Avenue median station is provided in **Attachment C.4**. Information includes a conceptual design and cost estimate for each component.

Table C.12 summarizes the travel time savings, construction cost, safety benefit and environmental clearance and resource information related to each roadway infrastructure component.

Table C.12 Summary of Component Technical Information

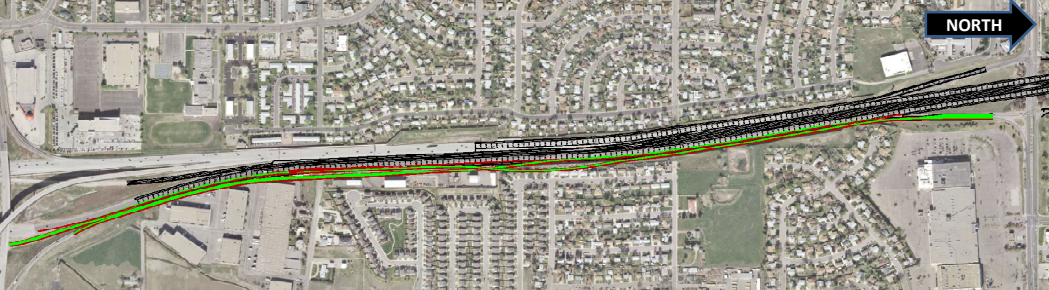


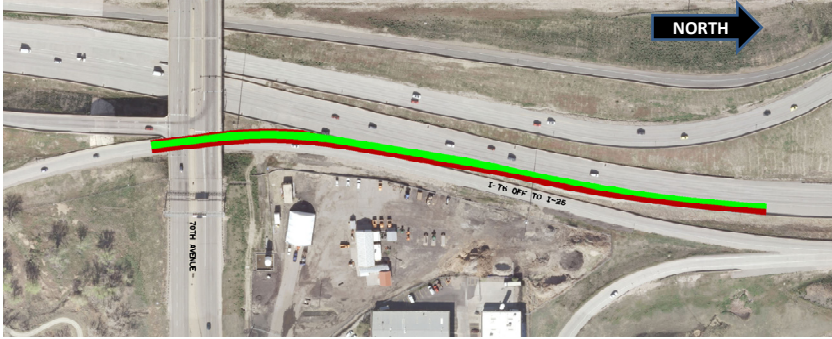
Reference and Title		Description	2015 General Purpose Travel Time Savings, US 36 to SH 7	Estimated Construction Cost (\$ Million)	3-year Crash Reduction (# of fewer crashes expected)	Environmental Clearance Required	Environmental Resource Impacted
N.3	Continuous acceleration/deceleration lane - I-270 to 84th	Provide lane add via northbound I-270/US 36/I-76 ramp	4 min	\$1.86 M	13	CatEx	HazMat; ROW
N.6	84th to Thornton Parkway - NB	Construct a continuous acceleration/deceleration lane between interchanges; requires replacement of 88th Ave bridge	4 min	\$25.49 M	11	CatEx	Wetlands; Parks; Trails; Floodplains; ROW
N.7	Thornton Pkwy to 104th - NB	Construct a continuous acceleration/deceleration lane between interchanges	4 min	\$1.39 M	5	CatEx	Wetlands; Parks; Trails; Floodplains
N.8	104th to 120th - NB	Construct a continuous acceleration/deceleration lane between interchanges	4 min	\$7.86 M	6	CatEx	Wetlands; Trails; Floodplains; ROW
N.9	120th to 136th - NB	Construct a continuous acceleration/deceleration lane between interchanges	4 min	\$1.98 M	6	CatEx	Wetlands; Trails; Floodplains
N.15	General Purpose Lane - 84th to Thornton Pkwy	Extend 4th travel lane north to Thornton Pkwy Interchange and replace 88th Ave bridge	4 min	\$27.11 M	9	Template EA	Wetlands; Parks; Trails; Floodplains; HazMat; ROW
S.4	Continuous acceleration/deceleration lane - 84th to US 36	Widen I-25 to provide 5 southbound travel lanes between 84th and US 36	6 min	\$C.10 M	7	CatEx / Template EA	HazMat; ROW
S.7	136th to 120th - SB	Construct a continuous acceleration/deceleration lane between interchanges	4 min	\$C.17 M	7	CatEx	Wetlands; Trails; Floodplains
S.8	120th to 104th - SB	Construct a continuous acceleration/deceleration lane between interchanges	4 min	\$6.95 M	17	CatEx	Wetlands; Trails
S.9	104th to Thornton Pkwy - SB	Construct a continuous acceleration/deceleration lane between interchanges	4 min	\$1.40 M	13	CatEx	Trails; Floodplains

Reference and Title		Description	2015 General Purpose Travel Time Savings, US 36 to SH 7	Estimated Construction Cost (\$ Million)	3-year Crash Reduction (# of fewer crashes expected)	Environmental Clearance Required	Environmental Resource Impacted
S.10	Thornton Parkway to 84th - SB	Construct a continuous acceleration/deceleration lane between interchanges; requires replacement of 88th Ave bridge	4 min	\$25.92 M	15	CatEx / Template EA	Wetlands; Parks; Trails; Floodplains; ROW
S.15	General Purpose Lane segment - Thornton Pkwy to 84th	Extend 4th travel lane north to Thornton Pkwy Interchange and replace 88th Ave bridge	4 min	\$26.54 M	21	Template EA	Wetlands; Parks; Trails; Floodplains; HazMat; ROW
ITS.21	New Ramp Meter at Thornton Pkwy NB	Ramp Meter to control the flow from the on-ramp to the highway	30 sec	\$0.1 M	7	CatEx	NA
ITS.1	New Ramp Meter at 104th Ave NB	Ramp Meter to control the flow from the on-ramp to the highway	30 sec	\$0.1 M	3	CatEx	NA
ITS.2	New Ramp Meter at 120th Ave NB	Ramp Meter to control the flow from the on-ramp to the highway	30 sec	\$0.1 M	2	CatEx	NA
ITS.4	New Ramp Meter at 144th Ave SB	Ramp Meter to control the flow from the on-ramp to the highway	30 sec	\$0.1 M	1	CatEx	NA
ITS.3	New Ramp Meter at 136th Ave SB	Ramp Meter to control the flow from the on-ramp to the highway	30 sec	\$0.1 M	2	CatEx	NA
ITS.20	New Ramp Meter at 120th Ave SB	Ramp Meter to control the flow from the on-ramp to the highway	30 sec	\$0.1 M	11	CatEx	NA
I.5	70th/Washington Intersection	Extend eastbound dual left-turn lane to better accommodate evening peak flows	5 sec	\$0.14 M	0	CatEx	NA

ATTACHMENT C.1



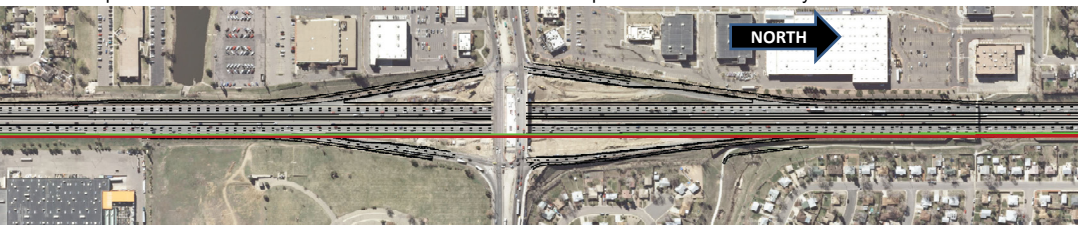

INITIAL LIST OF COMPONENTS

**Near Term Operational Improvements - North I-25 PEL
List of Initial Roadway Infrastructure Components**

Component Reference	Title	Description
<p>Northbound I-25</p> <p>The northbound merge of multiple ramps and connections currently cause congestion on I-25 and ramps, particularly in the weekday afternoon peak period. Ideas for addressing this are listed below.</p>		
N.1	Braided ramps - US 36 to 84th	<p>Physical grade separation to eliminate some weaving movements</p> 
N.2	C-D system - US 36 to 84th	<p>Consolidate all NB weaving movements on side parallel facility</p> 
N.3	Auxiliary lane - I-270 to 84th	<p>Provide lane add via northbound I-270/US 36/I-76 ramp</p> 
N.4	I-76 direct connection to I-25 upstream of current connection	<p>Slip ramp to mainline I-25 upstream of current connection</p> 

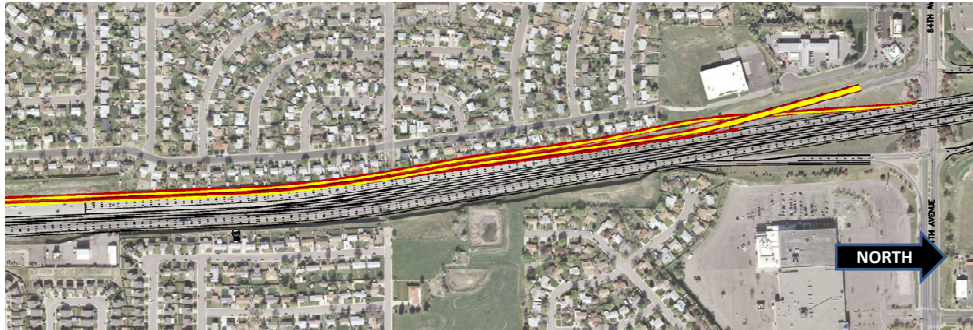
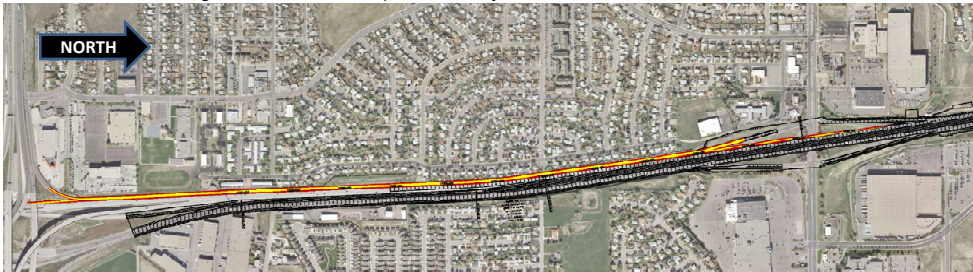
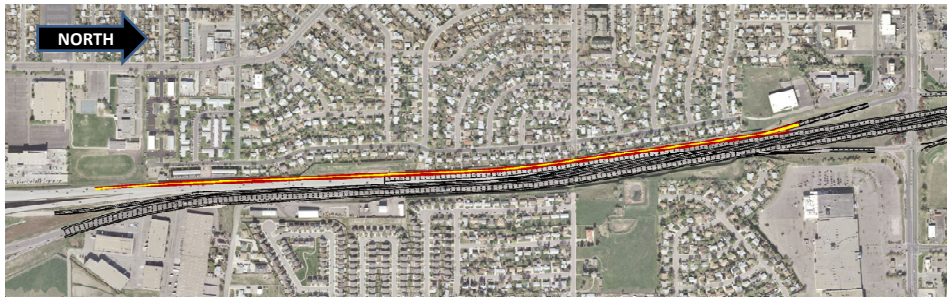
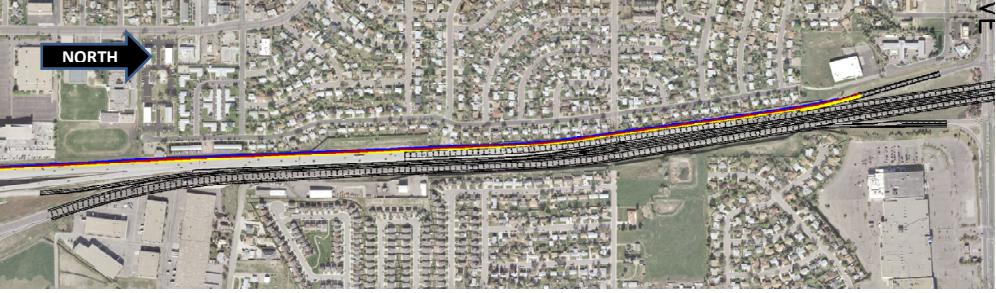
LEGEND:

- = Shoulder
- = Auxiliary Lane
- = General Purpose
- = Managed Lane
- = Reversible Lane
- = Buffer

Component Reference	Title	Description
N.5	Pre-mainline merge	Merge all northbound ramps prior to I-25 entry 
N.6	84th to Thornton Parkway NB	Construct a continuous acceleration/deceleration lane between interchanges. Example shown below 104th Avenue to 120th Avenue. 
N.7	Thornton Pkwy. to 104th - NB	
N.8	104th to 120th - NB	
N.9	120th to 136th - NB	
N.10	136th to 144th - NB	
N.11	144th to E-470 - NB	
N.12	Upgrade ramp merge and diverge sections to meet current design standards - NB	Components currently under consideration based on a survey of existing geometrically deficient ramp merge and diverge sections.
N.13	Additional General Purpose Lane	Widen I-25 to provide 4 GP lanes between 84th Avenue and SH 7. Example shown below in vicinity of 104th Avenue. 
N.14	144th to SH 7 C-D system	Construct parallel C-D system along I-25 between 144th Avenue and SH 7  <div data-bbox="1258 1312 1526 1501" style="border: 1px solid black; padding: 5px;"> <p>NOTE: The ongoing SH 7 PEL is evaluating two alternatives for the I-25/SH 7 interchange: A Diverging Diamond Interchange and the North I-25 EIS Preferred Alternative, a Partial Cloverleaf (depicted).</p> </div>



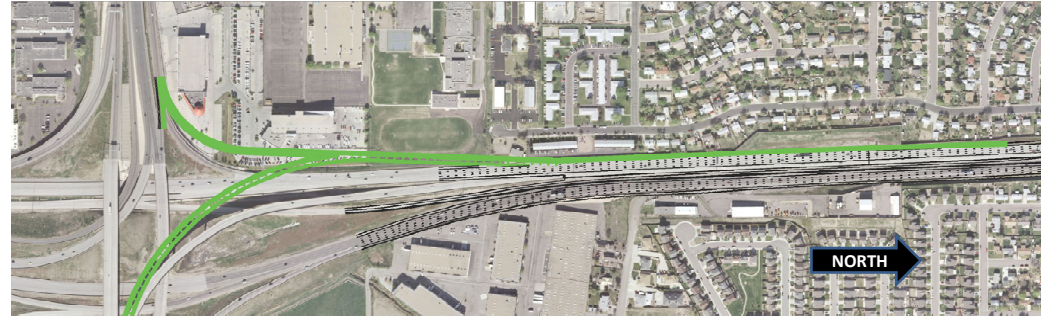
LEGEND:

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	=Auxiliary Lane
	=General Purpose
	=Managed Lane
	=Reversible Lane
	=Buffer

Component Reference	Title	Description
Southbound I-25		
Southbound I-25 typically experiences congestion between 84 th and US 36 during the weekday morning peak period. Ideas include:		
S.1	Braided ramps - 84th Avenue to US 36	Physical grade separation to eliminate some weaving movements 
S.2	C-D system - 84th Avenue to US 36	Consolidate all SB weaving movements on side parallel facility 
S.3	84th Avenue on-ramp gore point extension - restrict SB entering traffic from reaching I-270 flyover	Eliminate tight right-to-left weaving movement 
S.4	Auxiliary lane - 84th to US 36	Widen I-25 to provide 5 southbound travel lanes between 84th and US 36 
S.5	E-470 to 144th - SB	Construct a continuous acceleration/deceleration lane between interchanges. Example shown previously in northbound direction - 104th Avenue to 120th Avenue
S.6	144th to 136th - SB	
S.7	136th to 120th - SB	
S.8	120th to 104th - SB	
S.9	104th to Thornton Pkwy.- SB	
S.10	Thornton Parkway to 84th - SB	
S.11	Upgrade ramp merge and diverge sections to meet current design standards	Components currently under consideration based on a survey of existing geometrically deficient ramp merge and diverge sections.

LEGEND:

- =Shoulder
- =Auxiliary Lane
- =General Purpose
- =Managed Lane
- =Reversible Lane
- =Buffer

Component Reference	Title	Description
S.12	Additional General Purpose Lane	Widen I-25 to provide 4 GP lanes between SH 7 and 84th Avenue 
S.13	SH 7 to 144th C-D system	 <p>NOTE: The ongoing SH 7 PEL is evaluating two alternatives for the I-25/SH 7 interchange: A Diverging Diamond Interchange and the North I-25 EIS Preferred Alternative, a Partial Cloverleaf (depicted).</p>
S.14	Convert left-side I-270 flyover to right-side ramp	Shift major system-to-system ramp to opposite side of I-25 mainline 

Other Components

These Components address conditions not specific to direction of I-25

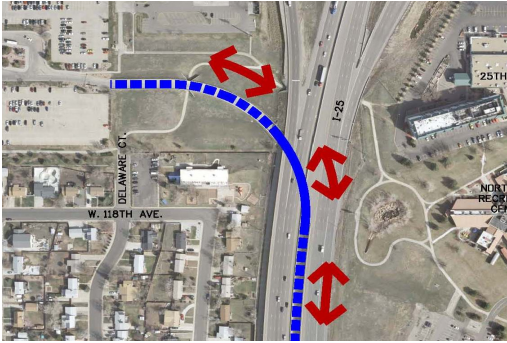
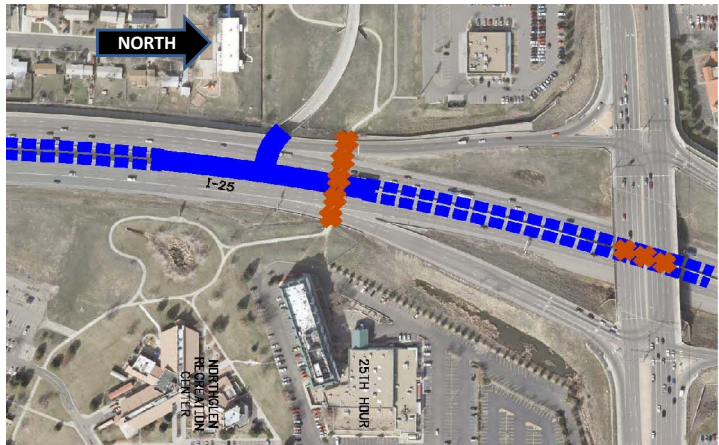

I.1	Extend Managed Lanes north to SH 7	Build planned managed lanes north to SH 7 from current terminus at 120th Avenue
I.2	Add second Managed Lane	Provide two managed lanes in each direction between US 36 and SH 7.
I.3	Construct parallel bypass route for trucks	New north south alternative for truck traffic only
I.4	Construct two-lane interchange ramps	Widen single-lane ramps to provide two lane exit and entry at I-25
I.5	70th/Washington Intersection Improvements	Extend eastbound dual left-turn lane to better accommodate evening peak flows.
I.6	Add I-25 Crossings	Construct additional roadway crossings of I-25 between interchanges
I.7	Extend toll lane ingress/egress north of 84th	Restrict managed lane ingress and egress south of 84th and make first point of access north of 84th
I.8	Extend reversible lane up I-25	Extend current reversible lane farther north along I-25 to SH 7




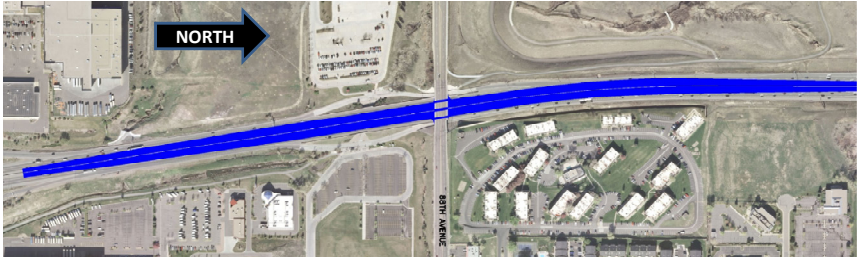
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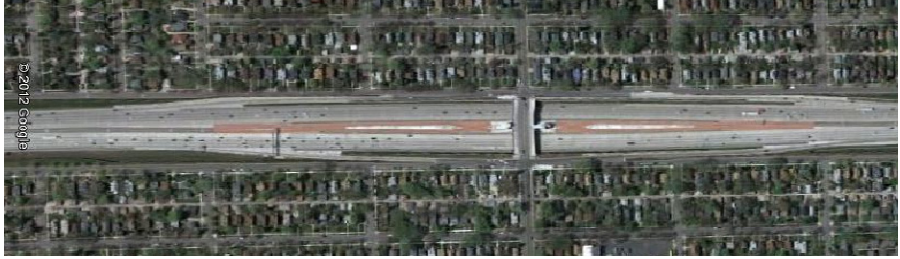
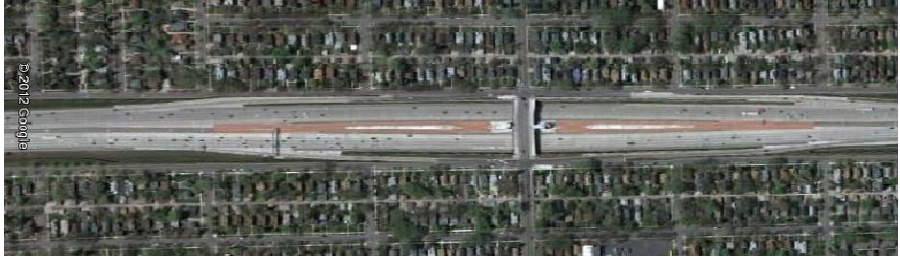
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	=Auxiliary Lane
	=General Purpose
	=Managed Lane
	=Reversible Lane
	=Buffer

**Near Term Operational Improvements - North I-25 PEL
List of Initial Transit Alternatives**

Component Reference	Title	Description
Park-n-Rides along I-25 are currently over-capacity or reaching capacity		
PNR.1	Expand Wagon Road Park-n-Ride	<p>Expansion of current or construction of new Park-n-Ride locations</p>
PNR.2	Expand Thornton Park-n-Ride	
PNR.3	New Park-n-Ride at 136 th Avenue and I-25	
PNR.4	New Park-n-Ride at 144 th Avenue and I-25	
PNR.5	New Park-n-Ride at SH-7 and I-25	
PNR.6	New Park-n-Ride at 124 th Avenue and Claude Court at Eastlake	
Bus service over-capacity		
B.1	Increase bus frequency during peak period	Increase the passenger capacity of individual routes by adding buses and reducing headways.
B.2	Increase use of articulated buses	Increase the passenger capacity of individual routes by using buses of larger carrying capacity.
B.3	Provide bus service farther north	Route L is the only current north connection, and does not stop at interchanges within the study area. More extensive northern service will be considered.

Component Reference	Title	Description
Transit infrastructure		
<p>TI.1</p>	<p>Convert 120th Avenue bus tunnel to be a bi-directional facility (to and from south)</p>	<p>Convert the tunnel to a reversible bus-only connection</p> 
<p>TI.2</p>	<p>Add structure to 120th Avenue bus tunnel to facilitate bus access to the managed lanes to and from the north.</p>	<p>Alternative would extend tunnel structure farther north to provide bus connectivity north to future p-n-R locations. Significant impacts to the existing pedestrian crossing and 120th Avenue bridge increase construction cost.</p> 
<p>TI.3</p>	<p>Build a shoulder busway from 120th Avenue to 144th Avenue</p>	<p>Allows buses only to travel on existing outside shoulder. Buses could be limited to 35 mph or less, and could not enter the shoulder when general purpose traffic is traveling at 35 mph or more. Below photo depicts bus-only shoulder in Minneapolis.</p> 

Component Reference	Title	Description
<p>TI.4</p>	<p>Bus queue jump lanes and bus ramps at interchanges</p>	<p>Provide HOV and bus bypass around ramp meter. Existing queue jump at I-25/Arapahoe interchange pictured.</p> 
<p>TI.5</p>	<p>84th Avenue interchange T-ramp</p>	<p>Add T-ramp to current diamond interchange - serving the managed lane.</p> 
<p>TI.6</p>	<p>88th Avenue Median Station</p>	<p>Inline station to prevent buses from weaving.</p> 
<p>TI.7</p>	<p>88th Avenue overpass T-ramp</p>	<p>Add T-ramp to current overpass to serve the managed lane.</p> 

Component Reference	Title	Description
TI.8	120th Avenue Median Station	Eliminate bus weaving at key locations and enhance passenger access to transit. Minneapolis example shown. 
TI.9	128th Avenue Median Station	
TI.10	Move 120th bus tunnel exit	Shift from left side to right side of northbound I-25 near 120th Avenue off ramp
TI.11	Light rail on I-25	Construct light rail line along I-25 mainline alignment

**Near Term Operational Improvements - North I-25 PEL
List of Initial ITS Components**

ITS Components fall into a number of categories:

1. Ramp Metering
2. Traveler Information
3. Active Traffic Management
4. Real-time Monitoring and Data Collection

Category	Component Reference	Title	Description
Ramp Metering	ITS.1	New Ramp Meter at 104th Ave NB	Ramp Meter to control the vehicles from the on-ramp to the highway
	ITS.2	New Ramp Meter at 120th Ave NB	Ramp Meter to control the vehicles from the on-ramp to the highway
	ITS.3	New Ramp Meter at 136th Ave SB	Ramp Meter to control the vehicles from the on-ramp to the highway
	ITS.4	New Ramp Meter at 144th Ave SB	Ramp Meter to control the vehicles from the on-ramp to the highway
	ITS.5	Upgrade Ramp Meter at 84th Ave NB	Ramp Meter to control the vehicles from the on-ramp to the highway
	ITS.6	Upgrade Ramp Meter at 84th Ave SB	Ramp Meter to control the vehicles from the on-ramp to the highway
	ITS.7	Upgrade Ramp Meter at 104th Ave SB	Ramp Meter to control the vehicles from the on-ramp to the highway
Traveler Information	ITS.8	Upgrade Travel Time Indicator (TTI) SB between US36 and 84th Ave	To provide vehicle travel times across segments from one TTI location to the next
	ITS.9	Upgrade Travel Time Indicator (TTI) SB between 88th Ave and 92nd Ave	To provide vehicle travel times across segments from one TTI location to the next
	ITS.10	Upgrade Travel Time Indicator (TTI) SB at 112th Ave	To provide vehicle travel times across segments from one TTI location to the next
	ITS.11	Upgrade Travel Time Indicator (TTI) NB between 112th and 120th Ave	To provide vehicle travel times across segments from one TTI location to the next
	ITS.12	Add additional TTI units with spacing of no more than one mile, located before and after each interchange, and installed in between the off-ramp and on-ramp at each interchange	To provide vehicle travel times across segments from one TTI location to the next
	ITS.13	New TTI units for Managed Lanes located between each ingress/egress point	To provide vehicle travel times across segments from one TTI location to the next
	ITS.14	Upgrade existing VMS's	To be used for traveler information
	ITS.15	Add VMS between each interchange	To be used for traveler information
Real-time Monitoring and Data Collection	ITS.16	Add CCTV cameras north of 120th spaced at 1.5 miles	To increase the coverage for monitoring the conditions in corridor
	ITS.17	Upgrade 12 existing cameras with new Ethernet-based cameras	To monitor the conditions in the corridor
	ITS.18	Microwave Vehicle Radar Detection (MVRD) every 1/2 mile	Side Fire Radar - To collect volume, occupancy, and speed data at a given point
Active Traffic Management	ITS.19	Active Traffic Management (ATM)	Could consist of Land Use Signals, Speed Harmonization, Supplemental VMS for putting advisory speeds and queue warning

Near Term Operational Improvements - North I-25 PEL
List of Initial TDM and TSM Components

TDM and TSM Components fall into a number of categories:

1. Improved Transportation Options
2. Incentives to use Alternative modes and reduce driving
3. Parking and Land Use Management
4. Policy and Institutional Reforms

(source: Victoria Transport Policy Institute)

Category	Component Reference	Title	Description
Transportation Demand Management			
Improved Transportation Options	TDM.1	Guaranteed Ride Home	For commuters who use alternative modes, this program provides taxi rides home in cases of emergency. The Guaranteed Ride Home program is currently operated by DRCOG.
	TDM.2	Telework employer resources	This strategy promotes commuters working from home. This reduces the overall number of commute trips. DRCOG provides information on Telework to employers. IT support for local businesses is included in the telework program for employers.
	TDM.3	Telework recognition awards	
	TDM.4	Commuter cash program	This is a program that provides a subsidy for travelers to introduce them to alternative modes of transportation for a set period of time, to potentially alter long-term travel mode choices.
	TDM.5	Flexible work schedule resources	Promotion of off-peak work schedules, or flex-time, could result in reduced congestion during peak hours.
	TDM.6	Carpool Matching	DRCOG operates a RideArrangers program to help match potential carpoolers with each other and to aid the formation of vanpools and schoolpools.
	TDM.7	Vanpool	
	TDM.8	Schoolpool	
	TDM.9	Pool program subsidies	The provision of additional funds to increase the potential of carpools forming could reduce congestion and aid the shift from SOV to HOV travel.
	TDM.10	Carpool lots	A strategy to encourage carpooling, the provision of parking lots designated for carpooling. The location of the carpool lots is important to provide convenience. Lighting is also important to provide security.
	TDM.11	Peak hour bus-only lanes	Peak hour bus-only lanes and/or queue jumps help to maintain transit level of service and may promote transit usage in a congested corridor.
	TDM.12	Final mile programs – pool bikes, employer fleet vehicles, shuttles	Final mile programs address a typical gap in a journey by transit – the leg between a transit stop and the commuter's destination. This strategy provides a shuttle service to connect transit stops or stations with a traveler's final destination, typically large employers.
Incentives to use alternative modes and reduce driving	TDM.13	Bike Map	This is an online map that provides up-to-date bicycle information for travelers in the corridor, including the location and condition of bike routes and paths.
	TDM.14	Bike share program	A bike share program provides bicycles to the public for daily check-out for a small fee. The bicycles are docked at a variety of activity centers. In Denver, the B-Cycle operates in downtown, Cherry Creek, and other areas.
	TDM.15	Education, Marketing, including website, hotline, advertising, social networking, etc.	There are a variety of potential marketing mechanisms to promote TDM strategies: website, phone hotline, newspaper and radio advertising, social networks including Twitter, Facebook, mail-out campaigns, etc.
	TDM.16	Employer Outreach	These are programs directed at large employers to promote and provide education regarding TDM strategies.
	TDM.17	Corridor Transit Guide	Published guide to circulate to users

Category	Component Reference	Title	Description
Parking and Land Use Management	TDM.18	Secure bike facilities	Secure bike lockers are typically located at park-and-rides.
	TDM.19	Master EcoPass contract	
Policy and Institutional Reforms	TDM.20	Transit subsidies	Programs to incentivize transit ridership, that temporarily provide free or reduced fares to introduce transit to commuters who are accustomed to travel by driving alone.
	Transportation Systems Management		
	TSM. 1	Designate inside lane of I-25 for trucks only	
	TSM.2	\$2 toll all day	
	TSM.3	Implement education campaign to instruct drivers on appropriate use of buffer-separated managed lane	
	TSM.4	Limit large trucks and buses to the rightmost three lanes of I-25	
	TSM.5	Incident Management Plan	

Color Code Legend
TDM program already established
Potential TDM Program

ATTACHMENT C.2

COMPONENT SORTING MATRIX

Components Eliminated



REF. NO.	Infrastructure Components Eliminated	
41	Pre-mainline merge [merge all ramps (I-270, US 36 and I-76) prior to I-25 northbound entry] N.5	Would reduce capacity of merge point and result in longer queues on the merging facilities and therefore would not contribute to meeting the Purpose and Need.
42	Convert left-side I-270 flyover to right-side ramp S.14	Would require reconstruction or modification of recently constructed structures and therefore would not meet the project Purpose and Need.
43	84th Avenue interchange T-ramp TI.5	
44	Construct new north/south route for trucks parallel to I-25 I.3	Construction of a new facility could not be accomplished in the near-term due to cost, property impacts or NEPA process and therefore would not meet the project Purpose and Need.
45	Northbound braided ramps US 36 to 84th Avenue N.1	Could not be implemented in near-term due to anticipated property impacts and/or NEPA process and therefore would not meet the project Purpose and Need.
REF. NO.	Transit Components Eliminated	
46	Light rail on I-25 TI.11	Considered during an extensive study of the North Metro corridor. Not considered as favorable as the commuter rail solution ultimately identified in the Environmental Impact Statement.
47	120th Avenue Median Station TI.8	Would require reconstruction or modification of recently constructed structures and therefore would not meet the project Purpose and Need.
48	Add structure to 120th Avenue bus tunnel to facilitate bus access to the managed lanes (to and from the north) TI.2	Would require reconstruction or modification of recently constructed structures and therefore would not meet the project Purpose and Need.
49	Shift 120th Avenue bus tunnel from left side to right side of northbound I-25 TI.10	Extension of managed lanes north to 120th (opening 2014) would allow the buses to enter the bus tunnel without changing lanes therefore this component would create an unnecessary weave on I-25. This would not address the Purpose and Need.
REF. NO.	TDM, ITS, TSM Components Eliminated	
50	Limit large trucks and buses to the rightmost three lanes of I-25 TSM.4	Not compatible with new managed lane and therefore would not contribute to meeting the Purpose and Need.
51	Designate inside lane of I-25 for trucks only TSM.1	
52	Implement \$2 toll all day TSM.2	The existing dynamic toll structure serves to maximize revenue and person through-put, therefore this does not meet the project Purpose and Need.

X.X Component Reference Number, June 28, 2012 TAC packet.

Components Retained

REF. NO.	Potential Infrastructure Improvements	
1	C-D system - US 36 to 84th, northbound	N.2
2	C-D system - 84th Avenue to US 36, southbound	S.2
3	Continuous acceleration lane/deceleration lane - I-270 to 84th, northbound	N.3
4	Continuous acceleration lane/deceleration lane - 84th to US 36, southbound	S.4
5	Braided ramps - 84th Avenue to US 36, southbound	S.1
6	I-76 direct connection to I-25 upstream of current connection	N.4
7	84th Avenue on-ramp gore point extension - restrict SB entering traffic from reaching I-270 flyover	S.3
8	Extend toll lane ingress/egress north of 84th (no access at 84th) (Northbound)	I.7
9	70th/Washington Intersection, extend eastbound dual left turn	I.5
10	88th Avenue T-ramp	TI.7
11	General purpose lane segment I-270 to Thornton Parkway northbound	N.15
12	General purpose lane segment Thornton Parkway to I-76 southbound	S.15
13	Continuous accel/decel lane 84th to 136th Avenue(between each interchange), northbound	N.9
14	Continuous acceleration/deceleration lane 84th to 136th Avenue (between each interchange), southbound	S.7-S.10
15	Add I-25 Crossings	I.6
16	Upgrade ramp merge and diverge sections to meet current design standards	N.12
17	Construct continuous acceleration/deceleration lanes between interchanges north of 136th Avenue	N.9, N.10, S.5, S.6
18	Construct parallel C-D system along I-25 between 144th Avenue and SH 7	N.14, S.13
19	Construct two-lane interchange ramps	I.4

These components could potentially address the need to reduce congestion and improve safety between 84th Avenue and US 36.

These components could potentially address the need to reduce congestion and improve safety between Thornton Parkway and US 36.

These components could potentially address the need to reduce congestion and improve safety between 84th Avenue and 136th Avenue.

These components could potentially contribute to addressing operations, safety and capacity needs.

X.X Component Reference Number, June 28, 2012 TAC packet.

Components Retained

REF. NO.	Potential Transit Improvements	
20	Expand Wagon Road Park-and-Ride PNR.1	These components could potentially address multimodal capacity needs and efficacy of various locations.
21	New Park-and-Ride at 136th Avenue and I-25 PNR.3	
22	New Park-and-Ride at 144th Avenue and I-25 PNR.4	
23	New Park-and-Ride at SH 7 and I-25 PNR.5	
24	New Park-and-Ride at 124th Avenue and Claude Court at Eastlake PNR.6	
25	New Park-and-Ride at 128th Avenue and I-25 PNR.7	
26	Increase bus frequency during peak period B.1	
27	Provide bus service farther north B.3	
28	Convert 120th Avenue bus tunnel to be a bi-directional facility (to and from south) TL.6	
29	88th Avenue Median Station TL.1	This component has potential to address operating condition needs by eliminating bus weave from managed lane to Thornton Park-and-Ride at 88th Avenue.
30	Build a shoulder busway from 120th Avenue to 144th Avenue TL.3	This component could potentially contribute to addressing the Purpose and Need. However, it will only be considered if alternatives recommend additional bus service north of 120th Avenue.
31	Bus queue jump lanes and bus ramps at interchanges TL.4	This component could potentially contribute to addressing the Purpose and Need. However, it will only be considered if bus service recommendations include use of interchange ramps.
32	128th Avenue Median Station TL.9	This component could potentially contribute to addressing the Purpose and Need. However, it will only be considered if alternatives include new transit station/Park-and-Ride at 128th Avenue.

X.X Component Reference Number, June 28, 2012 TAC packet.

Components Retained

REF. NO.	Potential TDM, ITS, TSM Improvements	
33	Travel Demand Management Measures (e.g., guaranteed ride home, carpooling, bike maps, bike share programs, marketing, etc.)	TDM.1-TDM.20
34	Intelligent Transportation Systems (e.g. ramp metering, travel time indicators, variable message signing, radar vehicle detection, active traffic management, etc.)	ITS.1-ITS.4, ITS.12, ITS.15, ITS.16, ITS.18-ITS.24
35	Incident management	TSM.5
36	Driver education campaigns (e.g., use of buffer separated lanes)	TSM.3

These components could potentially contribute to addressing the need to improve operations, safety and capacity.

X.X Component Reference Number, June 28, 2012 TAC packet.

Potential Long-Term Cross Sections for Future Consideration

REF. NO.	Potential Infrastructure Improvements	
37	Extend Managed Lanes north from 120th Ave. to SH 7	I.1
38	Additional General Purpose Lanes 84th Avenue to SH 7	N.13, S.12
39	Extend reversible managed lanes on I-25 to SH 7	I.8
40	Provide two managed lanes in each direction between US 36 and SH 7	I.2

These cross sections may meet long-term needs and fit within the Metro Vision Plan of a 202 foot corridor and therefore would not require reconstruction of recently constructed structures.

X.X Component Reference Number, June 28, 2012 TAC packet.

ATTACHMENT C.3

PRIMARY AND COMPLEMENTARY COMPONENTS

NORTH I-25 PEL

Primary Components

Title		Description	Benefits	Reason
N.3	Continuous acceleration/deceleration lane - I-270 to 84th	Provide lane add via northbound I-270/US 36/I-76 ramp	NOW	Travel Time Savings
N.6	84th to Thornton Parkway - NB	Construct a continuous acceleration/deceleration lane between interchanges; requires replacement of 88th Ave bridge	NOW	Travel Time Savings
N.7	Thornton Pkwy to 104th - NB	Construct a continuous acceleration/deceleration lane between interchanges	NOW	Travel Time Savings
N.8	104th to 120th - NB	Construct a continuous acceleration/deceleration lane between interchanges	NOW	Travel Time Savings
N.9	120th to 136th - NB	Construct a continuous acceleration/deceleration lane between interchanges	NOW or BY 2035	Travel Time Savings now without extension of I-25 managed lanes north of 120th Avenue. By 2035 if managed lanes are extended
N.10	136th to 144th - NB	Construct a continuous acceleration/deceleration lane between interchanges	BY 2035	No Travel Time Savings now
N.11	144th to E-470 - NB	Construct a continuous acceleration/deceleration lane between interchanges	BY 2035	No Travel Time Savings now
N.12	Physical improvements to ramp merge and diverge sections - 84th Ave NB	NB on-ramp superelevation correction	BY 2035	No Current Safety Need
N.15	General Purpose Lane - 84th to Thornton Pkwy	Extend 4th travel lane north to Thornton Pkwy Interchange and replace 88th Ave bridge	NOW	Travel Time Savings
S.5	E-470 to 144th - SB	Construct a continuous acceleration/deceleration lane between interchanges	BY 2035	No Travel Time Savings now
S.6	144th to 136th - SB	Construct a continuous acceleration/deceleration lane between interchanges	BY 2035	No Travel Time Savings now
S.7	136th to 120th - SB	Construct a continuous acceleration/deceleration lane between interchanges	NOW or BY 2035	Travel Time Savings now without extension of I-25 managed lanes north of 120th Avenue. By 2035 if managed lanes are extended
S.8	120th to 104th - SB	Construct a continuous acceleration/deceleration lane between interchanges	NOW	Travel Time Savings
S.9	104th to Thornton Pkwy - SB	Construct a continuous acceleration/deceleration lane between interchanges	NOW	Travel Time Savings
S.10	Thornton Parkway to 84th - SB	Construct a continuous acceleration/deceleration lane between interchanges; requires replacement of 88th Ave bridge	NOW	Travel Time Savings
S.15	General Purpose Lane - Thornton Pkwy to 84th	Extend 4th travel lane north to Thornton Pkwy Interchange and replace 88th Ave bridge	NOW	Travel Time Savings
ITS.21	New Ramp Meter at Thornton Pkwy NB	Ramp Meter to control the flow from the on-ramp to the highway	NOW	Travel Time Savings
ITS.1	New Ramp Meter at 104th Ave NB	Ramp Meter to control the flow from the on-ramp to the highway	NOW	Travel Time Savings
ITS.2	New Ramp Meter at 120th Ave NB	Ramp Meter to control the flow from the on-ramp to the highway	NOW	Travel Time Savings
ITS.22	New Ramp Meter at 136th Ave NB	Ramp Meter to control the flow from the on-ramp to the highway	BY 2035	No Current Congestion
ITS.23	New Ramp Meter at 144th Ave NB	Ramp Meter to control the flow from the on-ramp to the highway	BY 2035	No Current Congestion
ITS.24	New Ramp Meter at SH 7 SB	Ramp Meter to control the flow from the on-ramp to the highway	BY 2035	No Current Congestion
ITS.4	New Ramp Meter at 144th Ave SB	Ramp Meter to control the flow from the on-ramp to the highway	NOW	Travel Time Savings
ITS.3	New Ramp Meter at 136th Ave SB	Ramp Meter to control the flow from the on-ramp to the highway	NOW	Travel Time Savings
ITS.20	New Ramp Meter at 120th Ave SB	Ramp Meter to control the flow from the on-ramp to the highway	NOW	Travel Time Savings
ITS.12	Travel Time Indicators provide vehicle travel times across segments from one TTI location to the next	Add additional TTI units with spacing of no more than one mile, located before and after each interchange, and installed in between the off-ramp and on-ramp at each interchange	BY 2035	Part of ITS.19
ITS.15	Add VMS between each interchange	To be used for traveler information	BY 2035	Part of ITS.19
ITS.16	Add CCTV cameras North of 120th	To increase the coverage for monitoring the conditions in corridor. Spaced at 1.5 miles.	BY 2035	Part of ITS.19
ITS.18	Microwave Vehicle Radar Detection (MVRD) every 1/2 mile	Side Fire Radar - To collect volume, occupancy, and speed data at a given point	BY 2035	Part of ITS.19
ITS.19	Active Traffic Management (ATM) - North of 120th Ave	Could consist of Lane Use Signals, Speed Harmonization, Supplemental VMS for putting advisory speeds and queue warning	BY 2035	No Travel Time Savings now
PNR.3	New Park-and-Ride at 136th Ave and I-25	Construction of new Park-and-Ride location	BY 2035	Not enough current demand to support additional Park-and-Ride
PNR.4	New Park-and-Ride at 144th Ave and I-25	Construction of new Park-and-Ride location	BY 2035	Not enough current demand to support additional Park-and-Ride
PNR.5	New Park-and-Ride at SH-7 and I-25	Construction of new Park-and-Ride location	NOW	Relieves Wagon Road Parking Demand
PNR.6	New Park-and-Ride at 124th Ave and Claude Court at Eastlake	Construction of new Park-and-Ride location	NOW	Relieves Wagon Road Parking Demand
PNR.7	New Park-and-Ride at 128th Ave and I-25 (with median station)	Construction of new Park-and-Ride location	BY 2035	Relieves Wagon Road Parking Demand, could be implemented with long term future reconstruction of I-25 section
TI.1	Bi-directional tunnel for bus access to the Wagon Road P-n-R from the managed lanes	Convert the tunnel to a reversible bus-only connection	NOW	Bus Travel Time Savings
TI.6	88th Ave Median Station	Inline station to prevent buses from weaving and replace 88th Ave bridge	NOW	Bus Travel Time Savings
I.1	Extend Managed Lanes north from 120th Ave to SH 7	Extend managed lanes from 120th Ave to SH 7	NOW	Potential RAMP Project
I.5	70th/Washington Intersection	Extend eastbound dual left-turn lane to better accommodate evening peak flows	NOW	Travel Time Savings

NORTH I-25 PEL

Complementary Components

	Title	Description	Benefits	Reason
TI.4	Bus/HOV queue jump lanes and bus ramps at ramp meters	Provide HOV and bus bypass around ramp meter.	NOW	Implement with new ramp meters
I.4	Construct two-lane interchange ramps at interchanges	Widen single-lane ramps to provide two lane exit from I-25 at all diamond interchanges	NOW and BY 2035	Implement with new continuous acceleration/deceleration lanes
I.6	I-25 Crossings	Construct additional roadway crossing of I-25	NOW	Does not address immediate need
TI.3	Build a shoulder busway from 120 th Ave to 144 th Ave	Allows buses only to travel on existing outside shoulder during peak congested conditions. Use of the busway would only be allowed when traffic speeds are less than 35 mph and busway speed limit would be 35 mph	NOW	Only implement if managed lane is not extended along I-25 from 120th Ave to SH 7 and if RTD policy for shoulder busway is met
TDM.3	Telework recognition awards	Incentives for employers to implement telework program	BY 2035	Strategy is employer based; future development in corridor may facilitate reaching out to large employers to implement the strategy
TDM.4	Commuter cash program	This is a program that provides a subsidy for travelers to introduce them to alternative modes of transportation for a set period of time, to potentially alter long-term travel mode choices.	NOW	Addresses an immediate need
TDM.5	Flexible work schedule resources	Promotion of off-peak work schedules, or flex-time, could result in reduced congestion during peak hours.	BY 2035	Strategy is employer based; future development in corridor may facilitate reaching out to large employers to implement the strategy
TDM.6	Carpool Matching	DRCOG and NFRMPO operate a program to help match potential carpoolers with each other and to aid the formation of vanpools and schoolpools.	NOW	Addresses an immediate need
TDM.7	Vanpool			
TDM.8	Schoolpool			
TDM.9	Pool program subsidies	The provision of additional funds to increase the potential of carpools forming could reduce congestion and aid the shift from SOV to HOV travel.	NOW	Addresses an immediate need
TDM.10	Carpool lots	A strategy to encourage carpooling, the provision of parking lots designated for carpooling. The location of the carpool lots is important to provide convenience. Lighting is also important to provide security.	NOW	Addresses an immediate need
TDM.11	Peak hour bus-only lanes/transit priority	Peak hour bus-only lanes and/or queue jumps/transit signal priority help to maintain transit level of service and may promote transit usage in a congested corridor.	NOW	Addresses an immediate need
TDM.12	First or Final mile programs – pool bikes, employer fleet vehicles, shuttles	First or Final mile programs address a typical gap in a journey by transit – the leg between a transit stop and the commuter's origin and/or destination.	BY 2035	Strategy is employer based; future development in corridor may facilitate reaching out to large employers to implement the strategy
TDM.13	Bike Map	This is an online map that provides up-to-date bicycle information for travelers in the corridor, including the location and condition of bike routes and paths.	NOW	Addresses an immediate need
TDM.14	Bike share program	A bike share program provides bicycles to the public for daily check-out for a small fee. The bicycles are docked at a variety of activity centers. In Denver, the B-Cycle operates in downtown, Cherry Creek, and other areas.	BY 2035	Corridor currently not well suited for regional bicycle trips; this may change in the future
TDM.15	Marketing, including website, hotline, advertising, social networking, etc.	There are a variety of potential marketing mechanisms to promote TDM strategies: website, phone hotline, newspaper and radio advertising, social networks including Twitter, Facebook, mail-out campaigns, etc.	NOW	Addresses an immediate need
TDM.16	Employer Outreach	These are programs directed at large employers to promote and provide education regarding TDM strategies.	BY 2035	Strategy is employer based; future development in corridor may facilitate reaching out to large employers to implement the strategy
TDM.17	Corridor Transit Guide	Published guide to circulate to users	NOW	Addresses an immediate need
TDM.18	Secure bike facilities	Secure bike lockers are typically located at park-and-rides.	NOW	Addresses an immediate need
TDM.19	Master EcoPass contract	Developing agreements with larger groupings of employers (buildings, etc.) for transit passes	BY 2035	Strategy is employer based; future development in corridor may facilitate reaching out to large employers to implement the strategy
TDM.20	Transit subsidies	Programs to incentivize transit ridership, that temporarily provide free or reduced fares to introduce transit to commuters who are accustomed to travel by driving alone.	NOW	Addresses an immediate need
TSM.3	Implement education campaign to instruct drivers on appropriate use of buffer-separated managed lane	Increase awareness of how buffer-separation works to optimize driver understanding and enhance safety.	NOW	Addresses an immediate need
TSM.5	Incident Management Plan	Incident Management Plan could be focused on improving response time and driver information, less focused on alternative routes due to urbanized surroundings.	NOW	Addresses an immediate need

ATTACHMENT C.4

CONCEPTUAL DESIGN INFORMATION

84TH AVENUE

84TH AVENUE

RAMP TRAPS AT 84TH AVE.

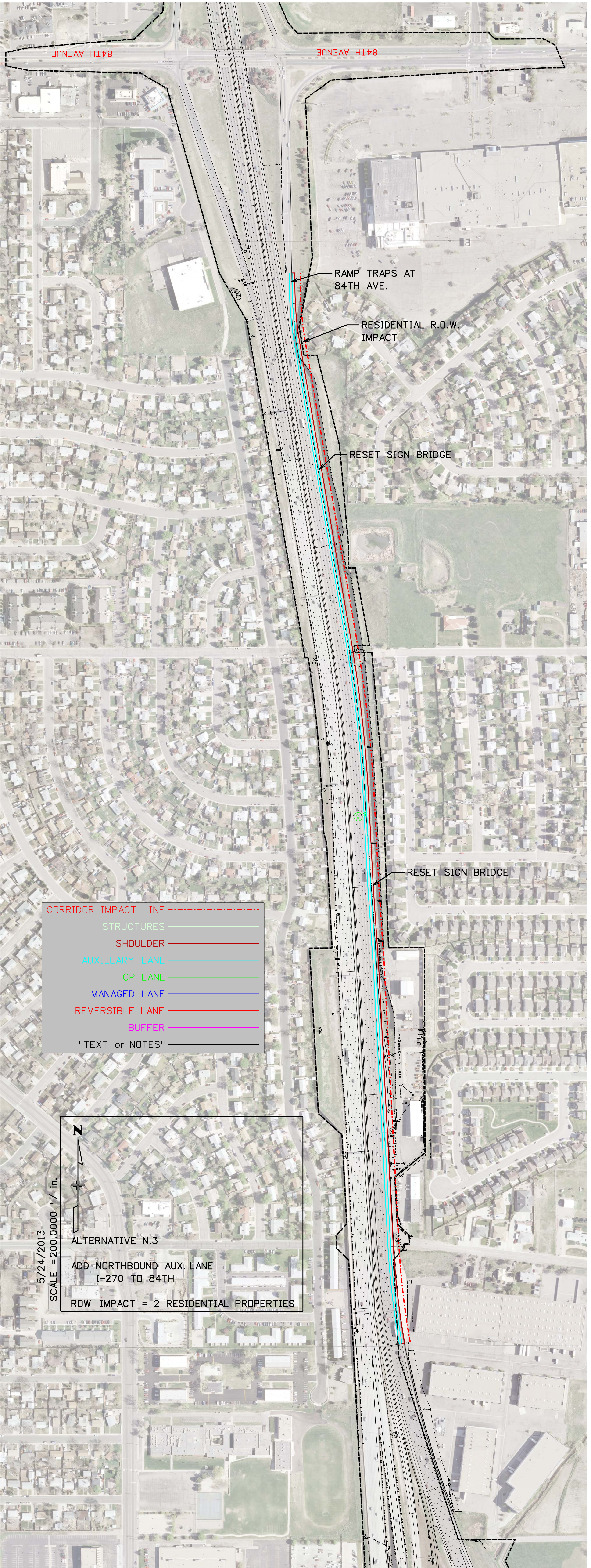
RESIDENTIAL R.O.W. IMPACT

RESET SIGN BRIDGE

RESET SIGN BRIDGE

CORRIDOR IMPACT LINE	---
STRUCTURES	—
SHOULDER	—
AUXILLARY LANE	—
GP LANE	—
MANAGED LANE	—
REVERSIBLE LANE	—
BUFFER	—
"TEXT or NOTES"	—

5/24/2013
 SCALE = 200,000 ' / in.
 ALTERNATIVE N.3
 ADD NORTHBOUND AUX. LANE
 I-270 TO 84TH
 ROW IMPACT = 2 RESIDENTIAL PROPERTIES



North I-25 PEL

Conceptual Design Cost Estimate

Alternative: N.3

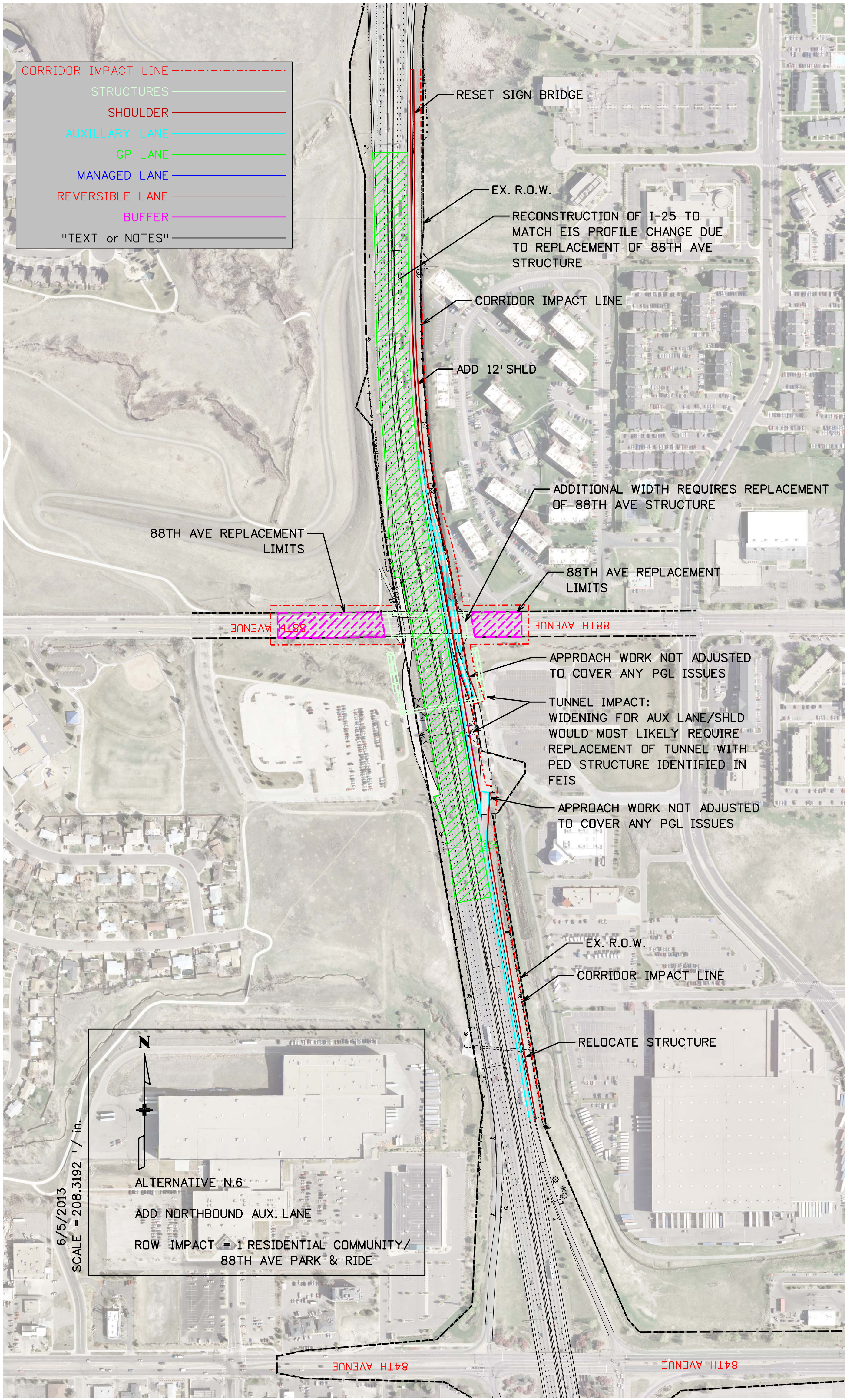
DATE: 5/29/2013

BY: KJB

ITEM DESCRIPTION	UNIT	UNIT COST	TOTALS	
			APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX Removals/Demolition (Flatwork)	SY	\$ 15.00	0	\$ -
XXX-XXXXX Removal of Wall	SF	\$ 10.00	290	\$ 2,900.00
XXX-XXXXX Removal of Guardrail (Type 3)	LF	\$ 12.00	2,350	\$ 28,200.00
XXX-XXXXX Removal of Guardrail (Type 7)	LF	\$ 15.00	1,480	\$ 22,200.00
XXX-XXXXX Removal of Overhead Sign Structure	EA	\$ 3,000.00	2	\$ 6,000.00
XXX-XXXXX Removal of Structure	SF	\$ 21.00	0	\$ -
XXX-XXXXX Aggregate Base Course (Class 6)	TON	\$ 35.00	3,330	\$ 116,550.00
XXX-XXXXX Hot Mix Asphalt (13.5")	TON	\$ 65.00	4,060	\$ 263,900.00
XXX-XXXXX Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	0	\$ -
XXX-XXXXX Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX Guardrail (Type 3)	LF	\$ 40.00	2,350	\$ 94,000.00
XXX-XXXXX Guardrail (Type 7)	LF	\$ 45.00	1,480	\$ 66,600.00
XXX-XXXXX Sound Wall	LF	\$ 400.00	275	\$ 110,000.00
XXX-XXXXX Retaining Wall (< 10')	LF	\$ 600.00	0	\$ -
XXX-XXXXX Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX Structure	SF	\$ 150.00	0	\$ -
XXX-XXXXX Sidewalk/Trail	SY	\$ 30.00	0	\$ -
XXX-XXXXX Overhead Sign Bridge	EA	\$ 50,000.00	0	\$ -
XXX-XXXXX Overhead Sign Cantilever	EA	\$ 20,000.00	2	\$ 40,000.00
XXX-XXXXX Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	5,475	\$ 65,700.00
XXX-XXXXX Impact Attenuator	EA	\$ 20,000.00	2	\$ 40,000.00
				\$ -
SUBTOTAL A				\$ 856,050
B.				
Drainage	(3% of A)	3%		\$25,682
Utility Relocations	(2% of A)	2%		\$17,121
Signing & Striping, Lighting	(2% of A)	2%		\$17,121
Construction Signing & Traffic Control	(8% of A)	8%		\$68,484
Mobilization	(7% of A)	7%		\$59,924
Erosion Control/Water Quality	(5% of A)	5%		\$42,803
Force Account - Misc.	(10% of A)	10%		\$85,605
SUBTOTAL B				\$316,739
C.				
Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$293,197
CDOT CE	(22% of A+B)	22%		\$258,013
Construction Engineering	(12% of A+B)	12%		\$140,735
SUBTOTAL C				\$691,945
D.				
R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$1,864,734

Assumptions: ROW acquisition cost are not included in this estimate
 13.5" HMA 12" ABC(CL 6) 2' Subgrade Treatment + 1' of Earthwork
 Assumes guardrail amt is same as removal
 Assumes replacement of existing impact attenuators

- CORRIDOR IMPACT LINE - - - - -
- STRUCTURES ———
- SHOULDER ———
- AUXILIARY LANE ———
- GP LANE ———
- MANAGED LANE ———
- REVERSIBLE LANE ———
- BUFFER ———
- "TEXT or NOTES" ———



88TH AVE REPLACEMENT LIMITS

RESET SIGN BRIDGE

EX. R.O.W.

RECONSTRUCTION OF I-25 TO MATCH EIS PROFILE CHANGE DUE TO REPLACEMENT OF 88TH AVE STRUCTURE

CORRIDOR IMPACT LINE

ADD 12' SHLD

ADDITIONAL WIDTH REQUIRES REPLACEMENT OF 88TH AVE STRUCTURE

88TH AVE REPLACEMENT LIMITS

88TH AVENUE

APPROACH WORK NOT ADJUSTED TO COVER ANY PGL ISSUES

TUNNEL IMPACT: WIDENING FOR AUX LANE/SHLD WOULD MOST LIKELY REQUIRE REPLACEMENT OF TUNNEL WITH PED STRUCTURE IDENTIFIED IN FEIS

APPROACH WORK NOT ADJUSTED TO COVER ANY PGL ISSUES

EX. R.O.W.

CORRIDOR IMPACT LINE

RELOCATE STRUCTURE

6/5/2013
SCALE = 208.3192' / in.

ALTERNATIVE N.6
ADD NORTHBOUND AUX. LANE
ROW IMPACT = 1 RESIDENTIAL COMMUNITY/
88TH AVE PARK & RIDE

84TH AVENUE

84TH AVENUE

North I-25 PEL

Conceptual Design Cost Estimate

Alternative: N.6

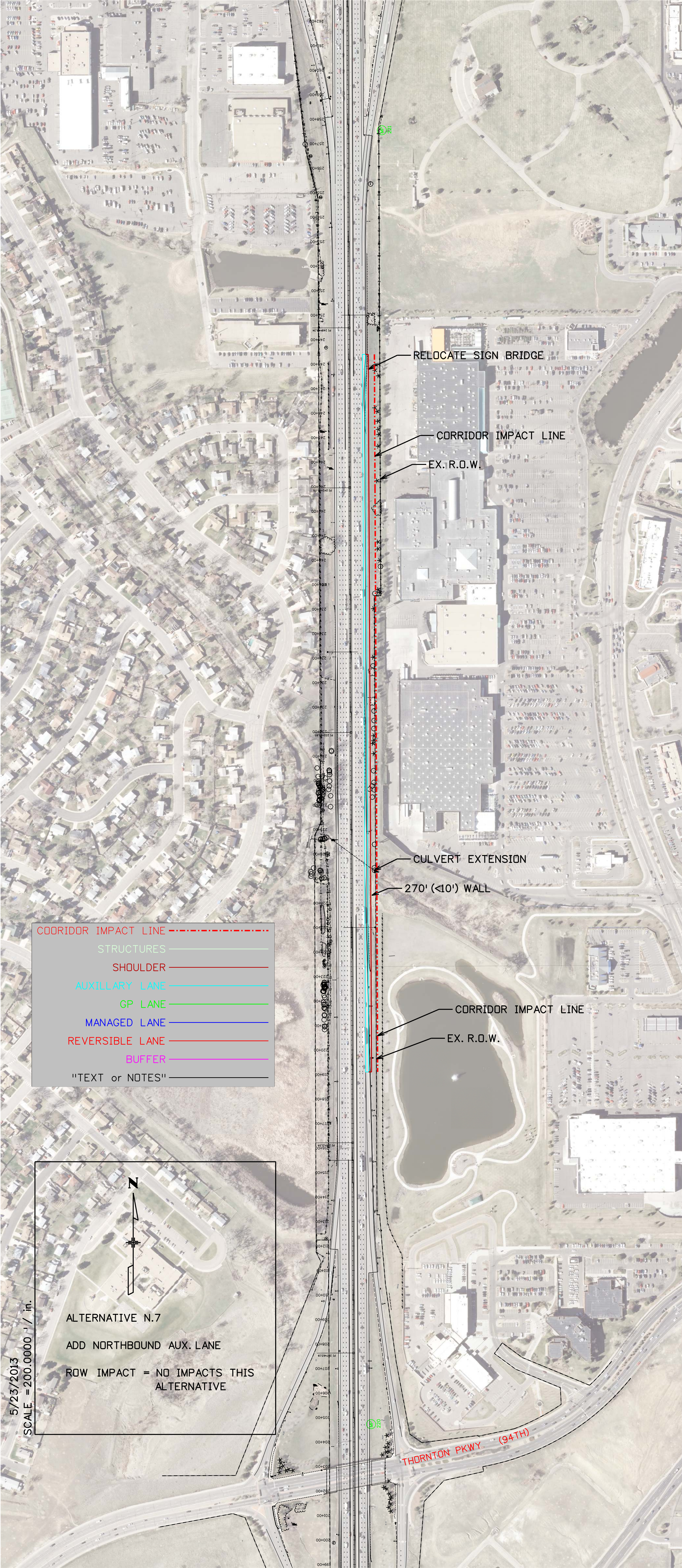
DATE: 5/30/2013

BY: KJB

				TOTALS	
ITEM DESCRIPTION	UNIT	UNIT COST	APPROX. QUANTITY	ESTIMATED COST	
A. BID ITEMS*					
XXX-XXXXX	Removals/Demolition (Flatwork)	SY	\$ 15.00	47,025	\$ 705,375.00
XXX-XXXXX	Removal of Wall	SF	\$ 10.00	300	\$ 3,000.00
XXX-XXXXX	Removal of Guardrail (Type 3)	LF	\$ 12.00	765	\$ 9,180.00
XXX-XXXXX	Removal of Guardrail (Type 7)	LF	\$ 15.00	1,270	\$ 19,050.00
XXX-XXXXX	Removal of Overhead Sign Structure	EA	\$ 3,000.00	1	\$ 3,000.00
XXX-XXXXX	Removal of Structure	SF	\$ 21.00	17,468	\$ 366,828.00
XXX-XXXXX	Aggregate Base Course (Class 6)	TON	\$ 35.00	28,560	\$ 999,600.00
XXX-XXXXX	Hot Mix Asphalt (13.5")	TON	\$ 65.00	34,916	\$ 2,269,540.00
XXX-XXXXX	Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX	Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	0	\$ -
XXX-XXXXX	Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX	Guardrail (Type 3)	LF	\$ 40.00	800	\$ 32,000.00
XXX-XXXXX	Guardrail (Type 7)	LF	\$ 45.00	850	\$ 38,250.00
XXX-XXXXX	Sound Wall	LF	\$ 400.00	0	\$ -
XXX-XXXXX	Retaining Wall (< 10')	LF	\$ 600.00	150	\$ 90,000.00
XXX-XXXXX	Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX	Structure	SF	\$ 150.00	35,988	\$ 5,398,200.00
XXX-XXXXX	Sidewalk/Trail	SY	\$ 30.00	0	\$ -
XXX-XXXXX	Overhead Sign Bridge	EA	\$ 50,000.00	0	\$ -
XXX-XXXXX	Overhead Sign Cantilever	EA	\$ 20,000.00	1	\$ 20,000.00
XXX-XXXXX	Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	75,025	\$ 900,300.00
XXX-XXXXX	Impact Attenuator	EA	\$ 20,000.00	2	\$ 40,000.00
					\$ -
SUBTOTAL A					\$ 10,894,323
B.					
	Drainage	(3% of A)	3%		\$326,830
	Utility Relocations	(2% of A)	2%		\$217,886
	Signing & Striping, Lighting	(2% of A)	2%		\$217,886
	Construction Signing & Traffic Control	(8% of A)	8%		\$871,546
	Mobilization	(7% of A)	7%		\$762,603
	Erosion Control/Water Quality	(5% of A)	5%		\$544,716
	Force Account - Misc.	(10% of A)	10%		\$1,089,432
SUBTOTAL B					\$4,030,900
C.					
	Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$3,731,306
	CDOT CE	(22% of A+B)	22%		\$3,283,549
	Construction Engineering	(12% of A+B)	12%		\$1,791,027
SUBTOTAL C					\$8,805,881
D.					
	R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D					\$0
GRAND TOTALS (A, B, C & D)					\$23,731,104

Assumptions:

ROW acquisition cost are not included in this estimate
 Assumes replacement of large swath of I-25 due to 88th Ave structure replacement and I-25 profile change
 Assumes I-25 work will be 13.5" HMA, 1' ABC, 2' Subgrade Treatment + 1' Earthwork
 Removal of flatwork - Is same area as I-25 repave



RELOCATE SIGN BRIDGE

CORRIDOR IMPACT LINE

EX. R.O.W.

CULVERT EXTENSION

270' (<10') WALL

CORRIDOR IMPACT LINE

EX. R.O.W.

THORNTON PKWY (94TH)

CORRIDOR IMPACT LINE	---
STRUCTURES	—
SHOULDER	—
AUXILLARY LANE	—
GP LANE	—
MANAGED LANE	—
REVERSIBLE LANE	—
BUFFER	—
"TEXT or NOTES"	—

5/23/2013
SCALE = 200.0000' / in.

N

ALTERNATIVE N.7
ADD NORTHBOUND AUX. LANE
ROW IMPACT = NO IMPACTS THIS ALTERNATIVE

North I-25 PEL

Conceptual Design Cost Estimate

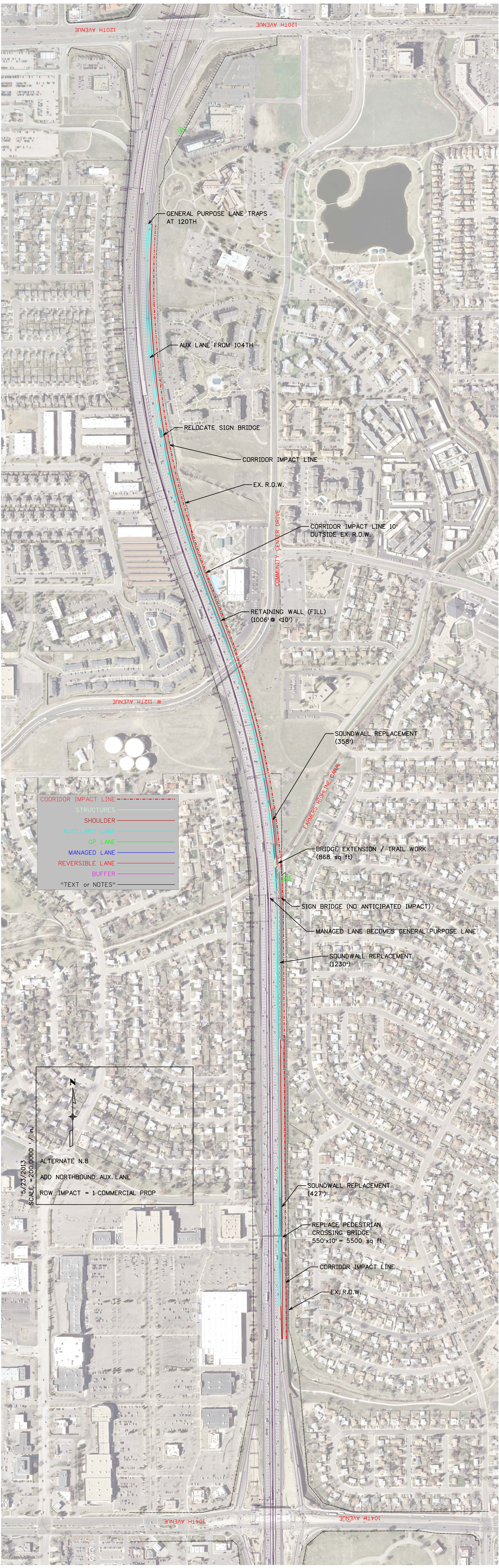
Alternative: N.7

DATE: 5/6/2013

BY:

ITEM DESCRIPTION	UNIT	UNIT COST	TOTALS	
			APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX Removals/Demolition (Flatwork)	SY	\$ 15.00		\$ -
XXX-XXXXX Removal of Wall	SF	\$ 10.00		\$ -
XXX-XXXXX Removal of Guardrail (Type 3)	LF	\$ 12.00	280	\$ 3,360.00
XXX-XXXXX Removal of Guardrail (Type 7)	LF	\$ 15.00		\$ -
XXX-XXXXX Removal of Overhead Sign Structure	EA	\$ 3,000.00	1	\$ 3,000.00
XXX-XXXXX Removal of Structure	SF	\$ 21.00		\$ -
XXX-XXXXX Aggregate Base Course (Class 6)	TON	\$ 35.00	3,037	\$ 106,295.00
XXX-XXXXX Hot Mix Asphalt (13.5")	TON	\$ 65.00	3,712	\$ 241,280.00
XXX-XXXXX Concrete Pavement (13 Inch)	SY	\$ 50.00		\$ -
XXX-XXXXX Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00		\$ -
XXX-XXXXX Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00		\$ -
XXX-XXXXX Guardrail (Type 3)	LF	\$ 40.00	280	\$ 11,200.00
XXX-XXXXX Guardrail (Type 7)	LF	\$ 45.00	270	\$ 12,150.00
XXX-XXXXX Sound Wall	LF	\$ 400.00		\$ -
XXX-XXXXX Retaining Wall (< 10')	LF	\$ 600.00	270	\$ 162,000.00
XXX-XXXXX Retaining Wall (> 10')	LF	\$ 1,200.00		\$ -
XXX-XXXXX Structure	SF	\$ 150.00		\$ -
XXX-XXXXX Sidewalk/Trail	SY	\$ 30.00		\$ -
XXX-XXXXX Overhead Sign Bridge	EA	\$ 50,000.00		\$ -
XXX-XXXXX Overhead Sign Cantilever	EA	\$ 20,000.00		\$ -
XXX-XXXXX Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	5,000	\$ 60,000.00
XXX-XXXXX Impact Attenuator	EA	\$ 20,000.00	2	\$ 40,000.00
SUBTOTAL A				\$ 639,285
B.				
Drainage	(3% of A)	3%		\$19,179
Utility Relocations	(2% of A)	2%		\$12,786
Signing & Striping, Lighting	(2% of A)	2%		\$12,786
Construction Signing & Traffic Control	(8% of A)	8%		\$51,143
Mobilization	(7% of A)	7%		\$44,750
Erosion Control/Water Quality	(5% of A)	5%		\$31,964
Force Account - Misc.	(10% of A)	10%		\$63,929
SUBTOTAL B				\$236,535
C.				
Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$218,955
CDOT CE	(22% of A+B)	22%		\$192,680
Construction Engineering	(12% of A+B)	12%		\$105,098
SUBTOTAL C				\$516,734
D.				
R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$1,392,555

Assumptions: 13.5" HMA 12" ABC(CL 6) 2' Subgrade Treatment + 1' of Earthwork
 270' NEW WALL ACROSS DRAINAGE CHANNEL, BARRIER AND IMPACT ATTENUATOR
 ROW acquisition cost are not included in this estimate



120TH AVENUE

GENERAL PURPOSE LANE TRAPS AT 120TH

AUX LANE FROM 104TH

RELOCATE SIGN BRIDGE

CORRIDOR IMPACT LINE

EX. R.O.W.

CORRIDOR IMPACT LINE 10' OUTSIDE EX. R.O.W.

COMMUNITY CENTER DRIVE

RETAINING WALL (FILL) (1006' @ <10')

W 112TH AVENUE

SOUNDWALL REPLACEMENT (358')

FARMERS HIGHLINE CANAL

BRIDGE EXTENSION / TRAIL WORK (868 sq ft)

SIGN BRIDGE (NO ANTICIPATED IMPACT)

MANAGED LANE BECOMES GENERAL PURPOSE LANE

SOUNDWALL REPLACEMENT (1230')

SOUNDWALL REPLACEMENT (427')

REPLACE PEDESTRIAN CROSSING BRIDGE 550'x10' = 5500 sq ft


CORRIDOR IMPACT LINE

EX. R.O.W.

104TH AVENUE

104TH AVENUE

- CORRIDOR IMPACT LINE
- STRUCTURES
- SHOULDER
- AUXILIARY LANE
- GP LANE
- MANAGED LANE
- REVERSIBLE LANE
- BUFFER
- "TEXT or NOTES"


 5/23/2013
 SCALE = 200.0000' / in.
 ALTERNATE N.8
 ADD NORTHBOUND AUX. LANE
 ROW IMPACT = 1 COMMERCIAL PROP

North I-25 PEL

Conceptual Design Cost Estimate

Alternative: N.8

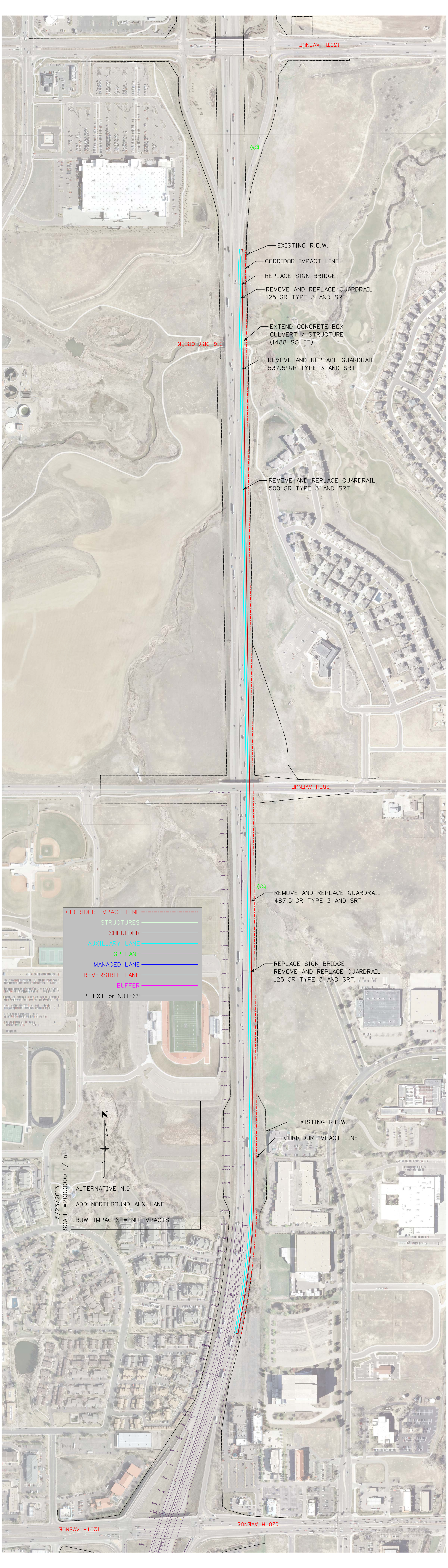
DATE: 5/6/2013

BY:

				TOTALS	
ITEM DESCRIPTION	UNIT	UNIT COST	APPROX. QUANTITY	ESTIMATED COST	
A. BID ITEMS*					
XXX-XXXXX	Removals/Demolition (Flatwork)	SY	\$ 15.00		\$ -
XXX-XXXXX	Removal of Wall	SF	\$ 10.00		\$ -
XXX-XXXXX	Removal of Guardrail (Type 3)	LF	\$ 12.00		\$ -
XXX-XXXXX	Removal of Guardrail (Type 7)	LF	\$ 15.00		\$ -
XXX-XXXXX	Removal of Overhead Sign Structure	EA	\$ 3,000.00	1	\$ 3,000.00
XXX-XXXXX	Removal of Structure	SF	\$ 21.00		\$ -
XXX-XXXXX	Aggregate Base Course (Class 6)	TON	\$ 35.00	7,468	\$ 261,380.00
XXX-XXXXX	Hot Mix Asphalt (13.5")	TON	\$ 65.00	9,127	\$ 593,255.00
XXX-XXXXX	Concrete Pavement (13 Inch)	SY	\$ 50.00		\$ -
XXX-XXXXX	Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00		\$ -
XXX-XXXXX	Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00		\$ -
XXX-XXXXX	Guardrail (Type 3)	LF	\$ 40.00		\$ -
XXX-XXXXX	Guardrail (Type 7)	LF	\$ 45.00	3,121	\$ 140,445.00
XXX-XXXXX	Sound Wall	LF	\$ 400.00	2,015	\$ 806,000.00
XXX-XXXXX	Retaining Wall (< 10')	LF	\$ 600.00	1,006	\$ 603,600.00
XXX-XXXXX	Retaining Wall (> 10')	LF	\$ 1,200.00		\$ -
XXX-XXXXX	Structure	SF	\$ 150.00	6,368	\$ 955,200.00
XXX-XXXXX	Sidewalk/Trail	SY	\$ 30.00		\$ -
XXX-XXXXX	Overhead Sign Bridge	EA	\$ 50,000.00		\$ -
XXX-XXXXX	Overhead Sign Cantilever	EA	\$ 20,000.00	1	\$ 20,000.00
XXX-XXXXX	Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	12,293	\$ 147,516.00
XXX-XXXXX	Impact Attenuator	EA	\$ 20,000.00	4	\$ 80,000.00
SUBTOTAL A					\$ 3,610,396
B.					
	Drainage	(3% of A)	3%		\$108,312
	Utility Relocations	(2% of A)	2%		\$72,208
	Signing & Striping, Lighting	(2% of A)	2%		\$72,208
	Construction Signing & Traffic Control	(8% of A)	8%		\$288,832
	Mobilization	(7% of A)	7%		\$252,728
	Erosion Control/Water Quality	(5% of A)	5%		\$180,520
	Force Account - Misc.	(10% of A)	10%		\$361,040
SUBTOTAL B					\$1,335,847
C.					
	Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$1,236,561
	CDOT CE	(22% of A+B)	22%		\$1,088,173
	Construction Engineering	(12% of A+B)	12%		\$593,549
SUBTOTAL C					\$2,918,283
D.					
	R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D					\$0
GRAND TOTALS (A, B, C & D)					\$7,864,526

Assumptions:

- 1006' WALL AT BOONDOCKS AMUSEMENT PARK
- REPLACE PED STRUCTURE AT SCHOOL, BEST ESTIMATE
- BARRIER LENGTH EQUAL TO WALL + SOUNDWALL LENGTH
- ROW acquisition cost are not included in this estimate



136TH AVENUE

BIG DRY CREEK

128TH AVENUE

120TH AVENUE

CORRIDOR IMPACT LINE - - - - -
 STRUCTURES - - - - -
 SHOULDER - - - - -
 AUXILIARY LANE - - - - -
 GP LANE - - - - -
 MANAGED LANE - - - - -
 REVERSIBLE LANE - - - - -
 BUFFER - - - - -
 "TEXT or NOTES" - - - - -

5/23/2013
 SCALE = 200.0000' / in.
 ALTERNATIVE N.9
 ADD NORTHBOUND AUX. LANE
 ROW IMPACTS = NO IMPACTS

- EXISTING R.O.W.
- CORRIDOR IMPACT LINE
- REPLACE SIGN BRIDGE
- REMOVE AND REPLACE GUARDRAIL
125' GR TYPE 3 AND SRT
- EXTEND CONCRETE BOX
CULVERT / STRUCTURE
(1488 SQ FT)
- REMOVE AND REPLACE GUARDRAIL
537.5' GR TYPE 3 AND SRT
- REMOVE AND REPLACE GUARDRAIL
500' GR TYPE 3 AND SRT

- REMOVE AND REPLACE GUARDRAIL
487.5' GR TYPE 3 AND SRT
- REPLACE SIGN BRIDGE
REMOVE AND REPLACE GUARDRAIL
125' GR TYPE 3 AND SRT

- EXISTING R.O.W.
- CORRIDOR IMPACT LINE

North I-25 PEL

Conceptual Design Cost Estimate

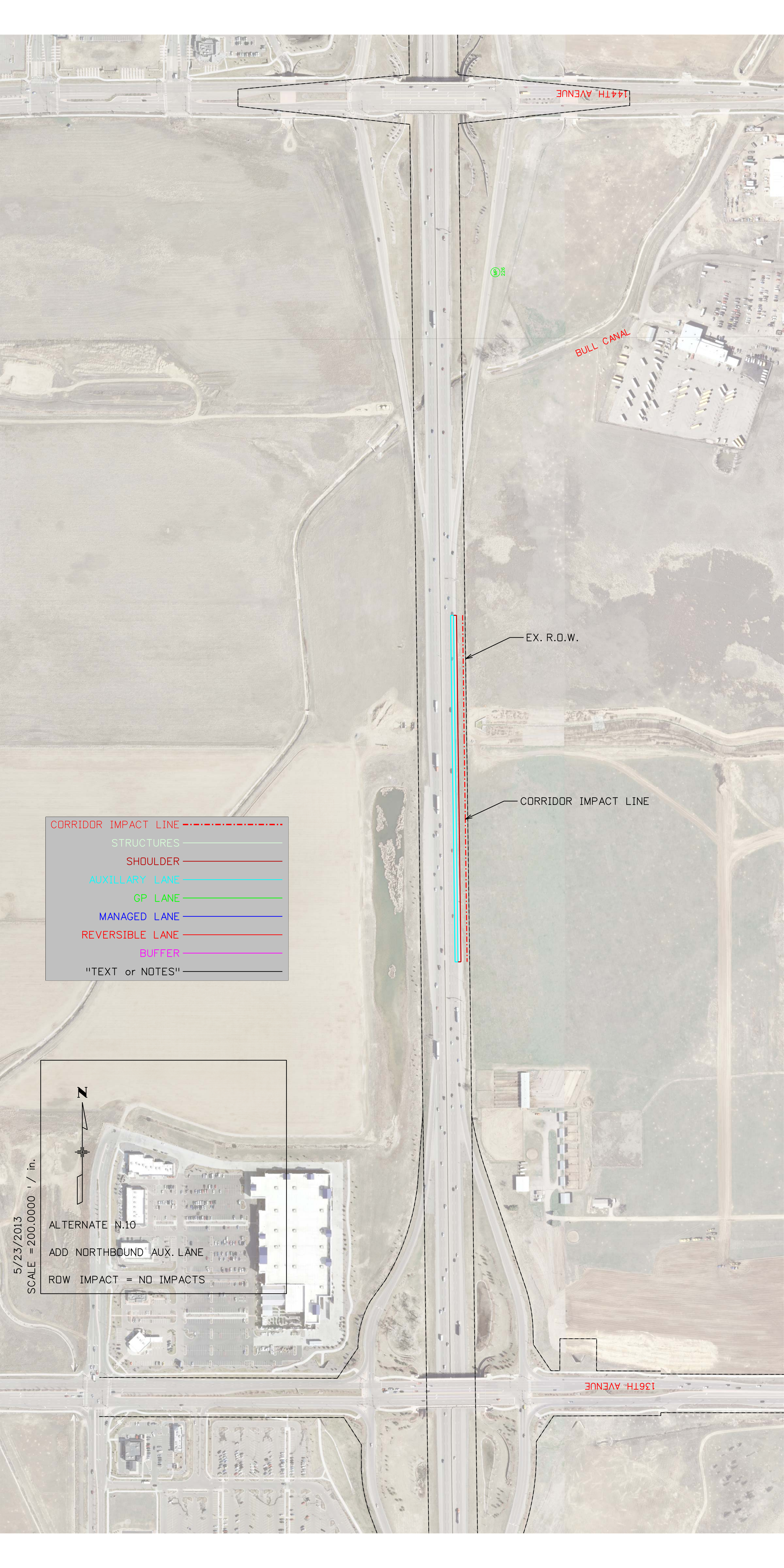
Alternative: N.9

DATE: 5/6/2013

BY:

				TOTALS	
ITEM DESCRIPTION	UNIT	UNIT COST	APPROX. QUANTITY	ESTIMATED COST	
A. BID ITEMS*					
XXX-XXXXX	Removals/Demolition (Flatwork)	SY	\$ 15.00		\$ -
XXX-XXXXX	Removal of Wall	SF	\$ 10.00		\$ -
XXX-XXXXX	Removal of Guardrail (Type 3)	LF	\$ 12.00	1,775	\$ 21,300.00
XXX-XXXXX	Removal of Guardrail (Type 7)	LF	\$ 15.00		\$ -
XXX-XXXXX	Removal of Overhead Sign Structure	EA	\$ 3,000.00	2	\$ 6,000.00
XXX-XXXXX	Removal of Structure	SF	\$ 21.00		\$ -
XXX-XXXXX	Aggregate Base Course (Class 6)	TON	\$ 35.00	4,989	\$ 174,615.00
XXX-XXXXX	Hot Mix Asphalt (13.5")	TON	\$ 65.00	6,098	\$ 396,370.00
XXX-XXXXX	Concrete Pavement (13 Inch)	SY	\$ 50.00		\$ -
XXX-XXXXX	Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00		\$ -
XXX-XXXXX	Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00		\$ -
XXX-XXXXX	Guardrail (Type 3)	LF	\$ 40.00	1,775	\$ 71,000.00
XXX-XXXXX	Guardrail (Type 7)	LF	\$ 45.00		\$ -
XXX-XXXXX	Sound Wall	LF	\$ 400.00		\$ -
XXX-XXXXX	Retaining Wall (< 10')	LF	\$ 600.00		\$ -
XXX-XXXXX	Retaining Wall (> 10')	LF	\$ 1,200.00		\$ -
XXX-XXXXX	Structure	SF	\$ 150.00		\$ -
XXX-XXXXX	Sidewalk/Trail	SY	\$ 30.00		\$ -
XXX-XXXXX	Overhead Sign Bridge	EA	\$ 50,000.00		\$ -
XXX-XXXXX	Overhead Sign Cantilever	EA	\$ 20,000.00	2	\$ 40,000.00
XXX-XXXXX	Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	8,212	\$ 98,544.00
XXX-XXXXX	Impact Attenuator	EA	\$ 20,000.00	5	\$ 100,000.00
SUBTOTAL A					\$ 907,829
B.					
	Drainage	(3% of A)	3%		\$27,235
	Utility Relocations	(2% of A)	2%		\$18,157
	Signing & Striping, Lighting	(2% of A)	2%		\$18,157
	Construction Signing & Traffic Control	(8% of A)	8%		\$72,626
	Mobilization	(7% of A)	7%		\$63,548
	Erosion Control/Water Quality	(5% of A)	5%		\$45,391
	Force Account - Misc.	(10% of A)	10%		\$90,783
SUBTOTAL B					\$335,897
C.					
	Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$310,931
	CDOT CE	(22% of A+B)	22%		\$273,620
	Construction Engineering	(12% of A+B)	12%		\$149,247
SUBTOTAL C					\$733,798
D.					
	R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D					\$0
GRAND TOTALS (A, B, C & D)					\$1,977,524

Assumptions: 13.5" HMA 12" ABC(CL 6) 2' Subgrade Treatment + 1' of Earthwork
 Extend Big Dry Creek Structure, no trail work
 Remove and replace two cantilever signs
 No Walls
 ROW acquisition cost are not included in this estimate



144TH AVENUE

BULL CANAL

226

EX. R.O.W.

CORRIDOR IMPACT LINE

- CORRIDOR IMPACT LINE - - - - -
- STRUCTURES _____
- SHOULDER _____
- AUXILLARY LANE _____
- GP LANE _____
- MANAGED LANE _____
- REVERSIBLE LANE _____
- BUFFER _____
- "TEXT or NOTES" _____



5/23/2013
SCALE = 200:0000 ' / in.

ALTERNATE N.10
ADD NORTHBOUND AUX. LANE
RDW IMPACT = NO IMPACTS

136TH AVENUE

North I-25 PEL

Conceptual Design Cost Estimate

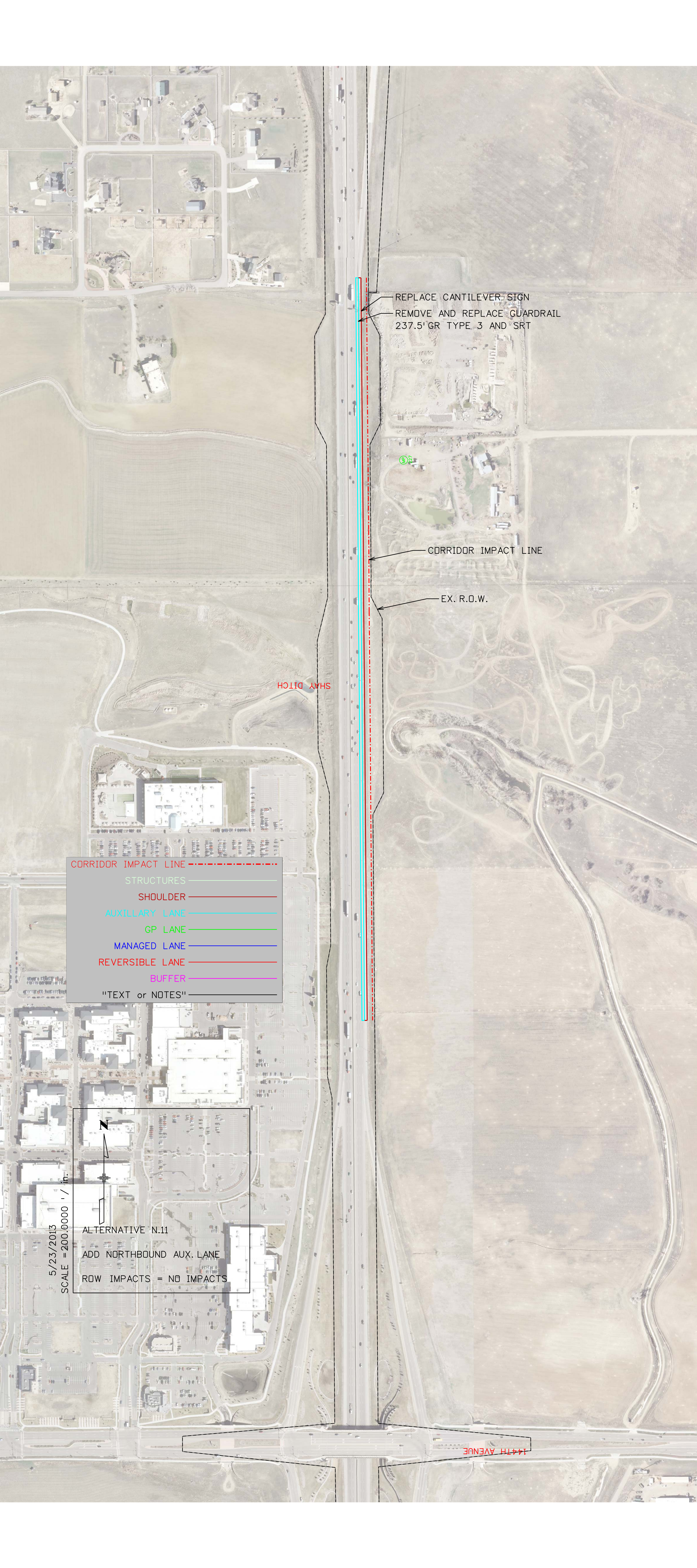
Alternative: N.10

DATE: 5/6/2013

BY:

			TOTALS	
ITEM DESCRIPTION	UNIT	UNIT COST	APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX	Removals/Demolition (Flatwork)	SY	\$ 15.00	\$ -
XXX-XXXXX	Removal of Wall	SF	\$ 10.00	\$ -
XXX-XXXXX	Removal of Guardrail (Type 3)	LF	\$ 12.00	\$ -
XXX-XXXXX	Removal of Guardrail (Type 7)	LF	\$ 15.00	\$ -
XXX-XXXXX	Removal of Overhead Sign Structure	EA	\$ 3,000.00	\$ -
XXX-XXXXX	Removal of Structure	SF	\$ 21.00	\$ -
XXX-XXXXX	Aggregate Base Course (Class 6)	TON	\$ 35.00	532 \$ 18,620.00
XXX-XXXXX	Hot Mix Asphalt (13.5")	TON	\$ 65.00	649 \$ 42,185.00
XXX-XXXXX	Concrete Pavement (13 Inch)	SY	\$ 50.00	\$ -
XXX-XXXXX	Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	\$ -
XXX-XXXXX	Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	\$ -
XXX-XXXXX	Guardrail (Type 3)	LF	\$ 40.00	\$ -
XXX-XXXXX	Guardrail (Type 7)	LF	\$ 45.00	\$ -
XXX-XXXXX	Sound Wall	LF	\$ 400.00	\$ -
XXX-XXXXX	Retaining Wall (< 10')	LF	\$ 600.00	\$ -
XXX-XXXXX	Retaining Wall (> 10')	LF	\$ 1,200.00	\$ -
XXX-XXXXX	Structure	SF	\$ 150.00	\$ -
XXX-XXXXX	Sidewalk/Trail	SY	\$ 30.00	\$ -
XXX-XXXXX	Overhead Sign Bridge	EA	\$ 50,000.00	\$ -
XXX-XXXXX	Overhead Sign Cantilever	EA	\$ 20,000.00	\$ -
XXX-XXXXX	Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	875 \$ 10,500.00
XXX-XXXXX	Impact Attenuator	EA	\$ 20,000.00	\$ -
SUBTOTAL A				\$ 71,305
B.				
	Drainage	(3% of A)	3%	\$2,139
	Utility Relocations	(2% of A)	2%	\$1,426
	Signing & Striping, Lighting	(2% of A)	2%	\$1,426
	Construction Signing & Traffic Control	(8% of A)	8%	\$5,704
	Mobilization	(7% of A)	7%	\$4,991
	Erosion Control/Water Quality	(5% of A)	5%	\$3,565
	Force Account - Misc.	(10% of A)	10%	\$7,131
SUBTOTAL B				\$26,383
C.				
	Project Construction Bid Items Contingencies	(25% of A+B)	25%	\$24,422
	CDOT CE	(22% of A+B)	22%	\$21,491
	Construction Engineering	(12% of A+B)	12%	\$11,723
SUBTOTAL C				\$57,636
D.				
	R.O.W Acquisition	Project Dependant	0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$155,324

Assumptions: 13.5" HMA 12" ABC(CL 6) 2' Subgrade Treatment + 1' of Earthwork
 Shoulder work mostly
 ROW acquisition cost are not included in this estimate



REPLACE CANTILEVER SIGN
REMOVE AND REPLACE GUARDRAIL
237.5' GR TYPE 3 AND SRT

CORRIDOR IMPACT LINE

EX. R.O.W.

SHAY DITCH

CORRIDOR IMPACT LINE	---
STRUCTURES	—
SHOULDER	—
AUXILLARY LANE	—
GP LANE	—
MANAGED LANE	—
REVERSIBLE LANE	—
BUFFER	—
"TEXT or NOTES"	—

5/23/2013
SCALE = 200,000' / in.

▲
N

ALTERNATIVE N.11
ADD NORTHBOUND AUX. LANE
ROW IMPACTS = NO IMPACTS

144TH AVENUE

North I-25 PEL

Conceptual Design Cost Estimate

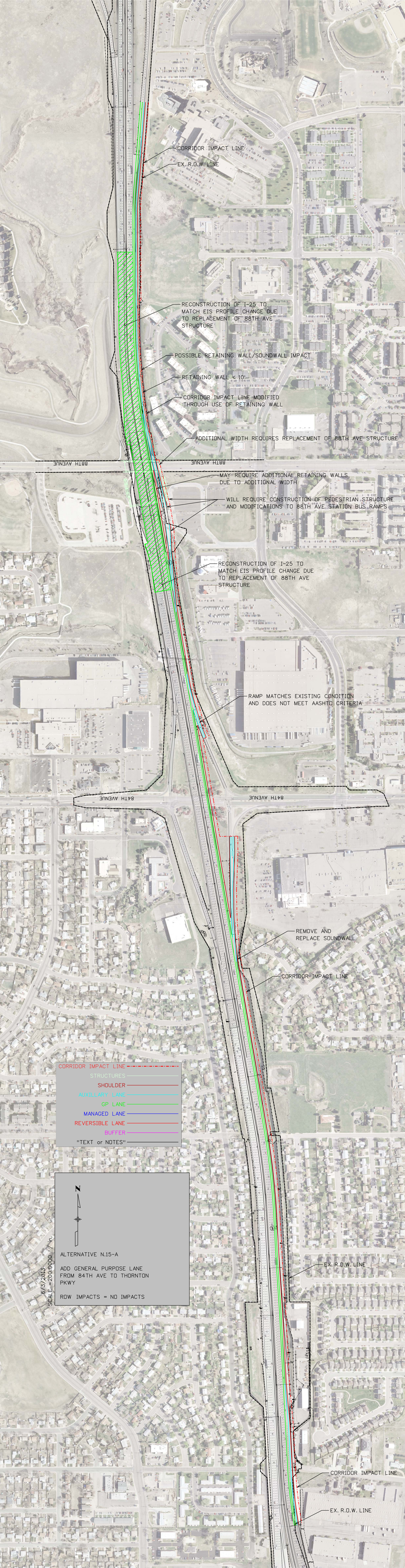
Alternative: N.11

DATE: 5/10/2013

BY: KJB

ITEM DESCRIPTION	UNIT	UNIT COST	TOTALS	
			APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX Removals/Demolition (Flatwork)	SY	\$ 15.00	0	\$ -
XXX-XXXXX Removal of Wall	SF	\$ 10.00	0	\$ -
XXX-XXXXX Removal of Guardrail (Type 3)	LF	\$ 12.00	238	\$ 2,850.00
XXX-XXXXX Removal of Guardrail (Type 7)	LF	\$ 15.00	0	\$ -
XXX-XXXXX Removal of Overhead Sign Structure	EA	\$ 3,000.00	1	\$ 3,000.00
XXX-XXXXX Removal of Structure	SF	\$ 21.00	0	\$ -
XXX-XXXXX Aggregate Base Course (Class 6)	TON	\$ 35.00	2,667	\$ 93,345.00
XXX-XXXXX Hot Mix Asphalt (13.5")	TON	\$ 65.00	3,260	\$ 211,900.00
XXX-XXXXX Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	0	\$ -
XXX-XXXXX Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX Guardrail (Type 3)	LF	\$ 40.00	238	\$ 9,500.00
XXX-XXXXX Guardrail (Type 7)	LF	\$ 45.00	0	\$ -
XXX-XXXXX Sound Wall	LF	\$ 400.00	0	\$ -
XXX-XXXXX Retaining Wall (< 10')	LF	\$ 600.00	0	\$ -
XXX-XXXXX Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX Structure	SF	\$ 150.00	0	\$ -
XXX-XXXXX Sidewalk/Trail	SY	\$ 30.00	0	\$ -
XXX-XXXXX Overhead Sign Bridge	EA	\$ 50,000.00	0	\$ -
XXX-XXXXX Overhead Sign Cantilever	EA	\$ 20,000.00	1	\$ 20,000.00
XXX-XXXXX Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	4,390	\$ 52,680.00
XXX-XXXXX Impact Attenuator	EA	\$ 20,000.00	1	\$ 20,000.00
SUBTOTAL A				\$ 413,275
B.				
Drainage	(3% of A)	3%		\$12,398
Utility Relocations	(2% of A)	2%		\$8,266
Signing & Striping, Lighting	(2% of A)	2%		\$8,266
Construction Signing & Traffic Control	(8% of A)	8%		\$33,062
Mobilization	(7% of A)	7%		\$28,929
Erosion Control/Water Quality	(5% of A)	5%		\$20,664
Force Account - Misc.	(10% of A)	10%		\$41,328
SUBTOTAL B				\$152,912
C.				
Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$141,547
CDOT CE	(22% of A+B)	22%		\$124,561
Construction Engineering	(12% of A+B)	12%		\$67,942
SUBTOTAL C				\$334,050
D.				
R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$900,237

Assumptions: 13.5" HMA
 12" ABC
 2' Subgrade treatment + 1' of earthwork
 ROW acquisition cost are not included in this estimate



CORRIDOR IMPACT LINE

EX. R.O.W. LINE

RECONSTRUCTION OF I-25 TO MATCH EIS PROFILE CHANGE DUE TO REPLACEMENT OF 88TH AVE STRUCTURE

POSSIBLE RETAINING WALL/SOUNDWALL IMPACT

RETAINING WALL < 10'

CORRIDOR IMPACT LINE MODIFIED THROUGH USE OF RETAINING WALL

ADDITIONAL WIDTH REQUIRES REPLACEMENT OF 88TH AVE STRUCTURE

88TH AVENUE

88TH AVENUE

MAY REQUIRE ADDITIONAL RETAINING WALLS DUE TO ADDITIONAL WIDTH

WILL REQUIRE CONSTRUCTION OF PEDESTRIAN STRUCTURE AND MODIFICATIONS TO 88TH AVE. STATION BUS RAMP

RECONSTRUCTION OF I-25 TO MATCH EIS PROFILE CHANGE DUE TO REPLACEMENT OF 88TH AVE STRUCTURE

RAMP MATCHES EXISTING CONDITION AND DOES NOT MEET AASHTO CRITERIA

84TH AVENUE

84TH AVENUE

REMOVE AND REPLACE SOUNDWALL

CORRIDOR IMPACT LINE

CORRIDOR IMPACT LINE - - - - -

STRUCTURES - - - - -

SHOULDER - - - - -

AUXILIARY LANE - - - - -

GP LANE - - - - -

MANAGED LANE - - - - -

REVERSIBLE LANE - - - - -

BUFFER - - - - -

"TEXT or NOTES" - - - - -



ALTERNATIVE N.15-A
 ADD GENERAL PURPOSE LANE FROM 84TH AVE TO THORNTON PKWY
 ROW IMPACTS = NO IMPACTS

6/3/2013
 SCALE = 200:0000' / 1" =

EX. R.O.W. LINE

CORRIDOR IMPACT LINE

EX. R.O.W. LINE

North I-25 PEL

Conceptual Design Cost Estimate

Alternative: N.15

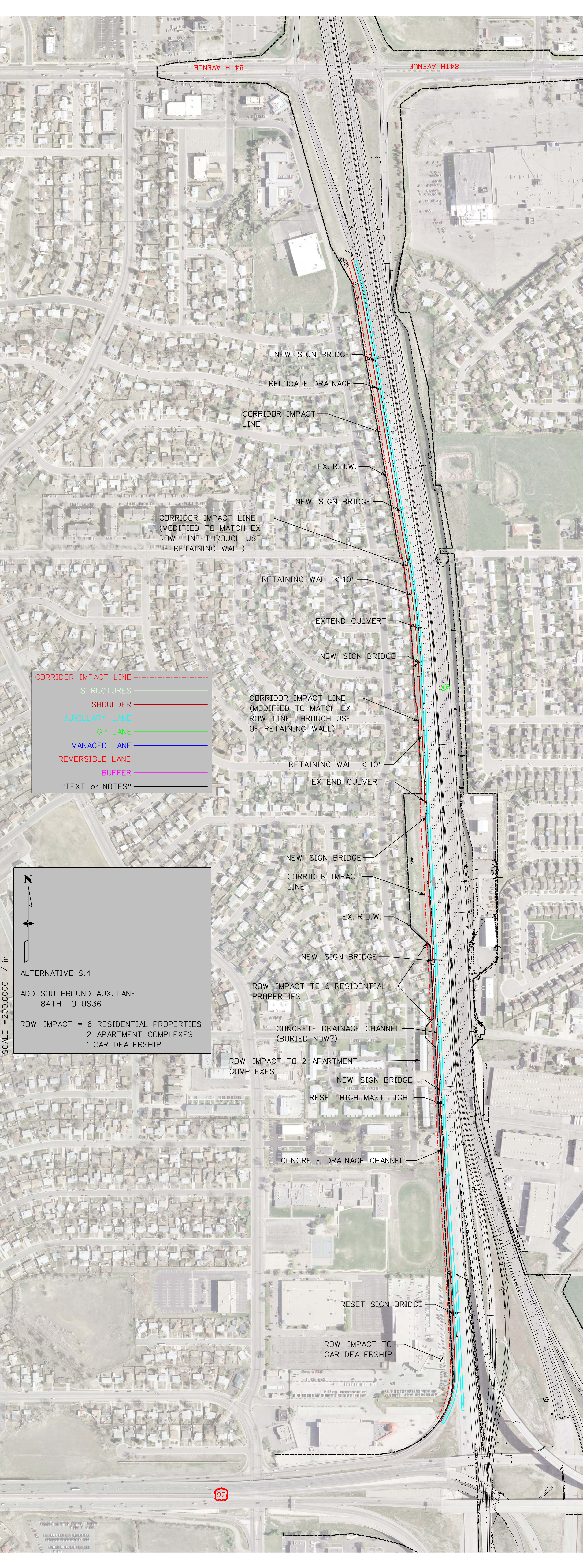
DATE: 5/16/2013

BY: KJB

				TOTALS	
ITEM DESCRIPTION	UNIT	UNIT COST	APPROX. QUANTITY	ESTIMATED COST	
A. BID ITEMS*					
XXX-XXXXX	Removals/Demolition (Flatwork)	SY	\$ 15.00	41,000	\$ 615,000.00
XXX-XXXXX	Removal of Wall	SF	\$ 10.00	490	\$ 4,900.00
XXX-XXXXX	Removal of Guardrail (Type 3)	LF	\$ 12.00	3,360	\$ 40,320.00
XXX-XXXXX	Removal of Guardrail (Type 7)	LF	\$ 15.00	50	\$ 750.00
XXX-XXXXX	Removal of Overhead Sign Structure	EA	\$ 3,000.00	1	\$ 3,000.00
XXX-XXXXX	Removal of Structure	SF	\$ 21.00	13,525	\$ 284,025.00
XXX-XXXXX	Aggregate Base Course (Class 6)	TON	\$ 35.00	35,155	\$ 1,230,425.00
XXX-XXXXX	Hot Mix Asphalt (13.5")	TON	\$ 65.00	38,713	\$ 2,516,345.00
XXX-XXXXX	Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX	Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	0	\$ -
XXX-XXXXX	Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX	Guardrail (Type 3)	LF	\$ 40.00	3,480	\$ 139,200.00
XXX-XXXXX	Guardrail (Type 7)	LF	\$ 45.00	1,900	\$ 85,500.00
XXX-XXXXX	Sound Wall	LF	\$ 400.00	185	\$ 74,000.00
XXX-XXXXX	Retaining Wall (< 10')	LF	\$ 600.00	150	\$ 90,000.00
XXX-XXXXX	Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX	Structure	SF	\$ 150.00	35,900	\$ 5,385,000.00
XXX-XXXXX	Sidewalk/Trail	SY	\$ 30.00	0	\$ -
XXX-XXXXX	Overhead Sign Bridge	EA	\$ 50,000.00	0	\$ -
XXX-XXXXX	Overhead Sign Cantilever	EA	\$ 20,000.00	1	\$ 20,000.00
XXX-XXXXX	Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	85,870	\$ 1,030,440.00
XXX-XXXXX	Impact Attenuator	EA	\$ 20,000.00	6	\$ 120,000.00
SUBTOTAL A					\$ 11,638,905
B.					
	Drainage	(3% of A)	3%		\$349,167
	Utility Relocations	(2% of A)	2%		\$232,778
	Signing & Striping, Lighting	(2% of A)	2%		\$232,778
	Construction Signing & Traffic Control	(8% of A)	8%		\$931,112
	Mobilization	(7% of A)	7%		\$814,723
	Erosion Control/Water Quality	(5% of A)	5%		\$581,945
	Force Account - Misc.	(10% of A)	10%		\$1,163,891
SUBTOTAL B					\$4,306,395
C.					
	Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$3,986,325
	CDOT CE	(22% of A+B)	22%		\$3,507,966
	Construction Engineering	(12% of A+B)	12%		\$1,913,436
SUBTOTAL C					\$9,407,727
D.					
	R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D					\$0
GRAND TOTALS (A, B, C & D)					\$25,353,027

Assumptions:

- ROW acquisition cost are not included in this estimate
- Assumes replacement of large swath of I-25 due to 88th Ave structure replacement and I-25 profile change
- Assumes I-25 work will be 13.5" HMA, 1' ABC, 2' Subgrade Treatment + 1' Earthwork
- Removal of flatwork - Is same area as I-25 repave
- 150' retaining wall quantity (< 10') added for area adjacent 88th ave station. No retaining wall are identified in layouts



84TH AVENUE

84TH AVENUE

NEW SIGN BRIDGE

RELOCATE DRAINAGE

CORRIDOR IMPACT LINE

EX. R.O.W.

NEW SIGN BRIDGE

CORRIDOR IMPACT LINE (MODIFIED TO MATCH EX ROW LINE THROUGH USE OF RETAINING WALL)

RETAINING WALL < 10'

EXTEND CULVERT

NEW SIGN BRIDGE

CORRIDOR IMPACT LINE (MODIFIED TO MATCH EX ROW LINE THROUGH USE OF RETAINING WALL)

RETAINING WALL < 10'

EXTEND CULVERT

NEW SIGN BRIDGE

CORRIDOR IMPACT LINE

EX. R.O.W.

NEW SIGN BRIDGE

ROW IMPACT TO 6 RESIDENTIAL PROPERTIES

CONCRETE DRAINAGE CHANNEL (BURIED NOW?)

ROW IMPACT TO 2 APARTMENT COMPLEXES

NEW SIGN BRIDGE

RESET HIGH MAST LIGHT

CONCRETE DRAINAGE CHANNEL

RESET SIGN BRIDGE

ROW IMPACT TO CAR DEALERSHIP

- CORRIDOR IMPACT LINE - - - - -
- STRUCTURES - - - - -
- SHOULDER - - - - -
- AUXILLARY LANE - - - - -
- GP LANE - - - - -
- MANAGED LANE - - - - -
- REVERSIBLE LANE - - - - -
- BUFFER - - - - -
- "TEXT or NOTES" - - - - -



ALTERNATIVE S.4

ADD SOUTHBOUND AUX. LANE 84TH TO US36

ROW IMPACT = 6 RESIDENTIAL PROPERTIES
2 APARTMENT COMPLEXES
1 CAR DEALERSHIP

SCALE = 200,000:1



North I-25 PEL

Conceptual Design Cost Estimate

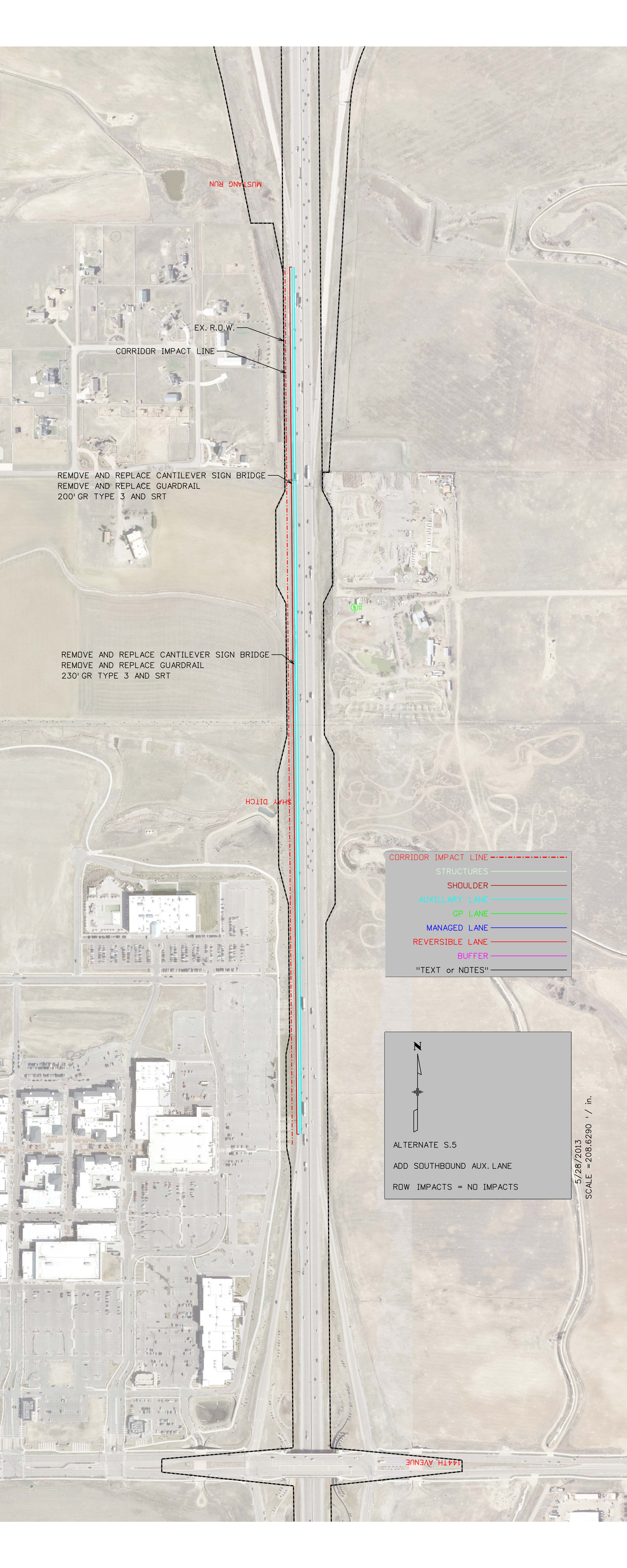
Alternative: S.4

DATE: 5/6/2013

BY:

				TOTALS	
ITEM DESCRIPTION	UNIT	UNIT COST	APPROX. QUANTITY	ESTIMATED COST	
A. BID ITEMS*					
XXX-XXXXX	Removals/Demolition (Flatwork)	SY	\$ 15.00		\$ -
XXX-XXXXX	Removal of Wall	SF	\$ 10.00		\$ -
XXX-XXXXX	Removal of Guardrail (Type 3)	LF	\$ 12.00	255	\$ 3,060.00
XXX-XXXXX	Removal of Guardrail (Type 7)	LF	\$ 15.00	4,909	\$ 73,635.00
XXX-XXXXX	Removal of Overhead Sign Structure	EA	\$ 3,000.00	6	\$ 18,000.00
XXX-XXXXX	Removal of Structure	SF	\$ 21.00		\$ -
XXX-XXXXX	Aggregate Base Course (Class 6)	TON	\$ 35.00	5,440	\$ 190,400.00
XXX-XXXXX	Hot Mix Asphalt (13.5")	TON	\$ 65.00	6,649	\$ 432,185.00
XXX-XXXXX	Concrete Pavement (13 Inch)	SY	\$ 50.00		\$ -
XXX-XXXXX	Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00		\$ -
XXX-XXXXX	Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00		\$ -
XXX-XXXXX	Guardrail (Type 3)	LF	\$ 40.00		\$ -
XXX-XXXXX	Guardrail (Type 7)	LF	\$ 45.00	6,150	\$ 276,750.00
XXX-XXXXX	Sound Wall	LF	\$ 400.00		\$ -
XXX-XXXXX	Retaining Wall (< 10')	LF	\$ 600.00		\$ -
XXX-XXXXX	Retaining Wall (> 10')	LF	\$ 1,200.00		\$ -
XXX-XXXXX	Structure	SF	\$ 150.00		\$ -
XXX-XXXXX	Sidewalk/Trail	SY	\$ 30.00		\$ -
XXX-XXXXX	Overhead Sign Bridge	EA	\$ 50,000.00	6	\$ 300,000.00
XXX-XXXXX	Overhead Sign Cantilever	EA	\$ 20,000.00		\$ -
XXX-XXXXX	Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	8,954	\$ 107,448.00
XXX-XXXXX	Impact Attenuator	EA	\$ 20,000.00	1	\$ 20,000.00
SUBTOTAL A					\$ 1,421,478
B.					
	Drainage	(3% of A)	3%		\$42,644
	Utility Relocations	(2% of A)	2%		\$28,430
	Signing & Striping, Lighting	(2% of A)	2%		\$28,430
	Construction Signing & Traffic Control	(8% of A)	8%		\$113,718
	Mobilization	(7% of A)	7%		\$99,503
	Erosion Control/Water Quality	(5% of A)	5%		\$71,074
	Force Account - Misc.	(10% of A)	10%		\$142,148
SUBTOTAL B					\$525,947
C.					
	Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$486,856
	CDOT CE	(22% of A+B)	22%		\$428,433
	Construction Engineering	(12% of A+B)	12%		\$233,691
SUBTOTAL C					\$1,148,981
D.					
	R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D					\$0
GRAND TOTALS (A, B, C & D)					\$3,096,406

Assumptions: 13.5" HMA 12" ABC(CL 6) 2' Subgrade Treatment + 1' of Earthwork
 Assumed no wall or soundwall work, pavement and barrier only, replaced all but one of sign bridges
 ROW acquisition cost are not included in this estimate



MUSTANG RUN

EX. R.O.W.

CORRIDOR IMPACT LINE

REMOVE AND REPLACE CANTILEVER SIGN BRIDGE
REMOVE AND REPLACE GUARDRAIL
200' GR TYPE 3 AND SRT

REMOVE AND REPLACE CANTILEVER SIGN BRIDGE
REMOVE AND REPLACE GUARDRAIL
230' GR TYPE 3 AND SRT

SHAY DITCH

CORRIDOR IMPACT LINE	---
STRUCTURES	---
SHOULDER	---
AUXILLARY LANE	---
GP LANE	---
MANAGED LANE	---
REVERSIBLE LANE	---
BUFFER	---
"TEXT or NOTES"	---

N

ALTERNATE S.5
ADD SOUTHBOUND AUX. LANE
ROW IMPACTS = NO IMPACTS

5/28/2013
SCALE = 208.6290' / in.

144TH AVENUE

North I-25 PEL

Conceptual Design Cost Estimate

Alternative: S.5

DATE: 5/6/2013

BY:

				TOTALS		
ITEM DESCRIPTION			UNIT	UNIT COST	APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*						
XXX-XXXXX	Removals/Demolition (Flatwork)		SY	\$ 15.00		\$ -
XXX-XXXXX	Removal of Wall		SF	\$ 10.00		\$ -
XXX-XXXXX	Removal of Guardrail (Type 3)		LF	\$ 12.00	430	\$ 5,160.00
XXX-XXXXX	Removal of Guardrail (Type 7)		LF	\$ 15.00		\$ -
XXX-XXXXX	Removal of Overhead Sign Structure		EA	\$ 3,000.00	2	\$ 6,000.00
XXX-XXXXX	Removal of Structure		SF	\$ 21.00		\$ -
XXX-XXXXX	Aggregate Base Course (Class 6)		TON	\$ 35.00	3,214	\$ 112,490.00
XXX-XXXXX	Hot Mix Asphalt (13.5")		TON	\$ 65.00	3,928	\$ 255,320.00
XXX-XXXXX	Concrete Pavement (13 Inch)		SY	\$ 50.00		\$ -
XXX-XXXXX	Curb and Gutter Type 2 (Section II-B)		LF	\$ 14.00		\$ -
XXX-XXXXX	Traffic Signal (Ramp/Partial)(Per Intersection)		EA	\$ 150,000.00		\$ -
XXX-XXXXX	Guardrail (Type 3)		LF	\$ 40.00	430	\$ 17,200.00
XXX-XXXXX	Guardrail (Type 7)		LF	\$ 45.00		\$ -
XXX-XXXXX	Sound Wall		LF	\$ 400.00		\$ -
XXX-XXXXX	Retaining Wall (< 10')		LF	\$ 600.00		\$ -
XXX-XXXXX	Retaining Wall (> 10')		LF	\$ 1,200.00		\$ -
XXX-XXXXX	Structure		SF	\$ 150.00		\$ -
XXX-XXXXX	Sidewalk/Trail		SY	\$ 30.00		\$ -
XXX-XXXXX	Overhead Sign Bridge		EA	\$ 50,000.00		\$ -
XXX-XXXXX	Overhead Sign Cantilever		EA	\$ 20,000.00	2	\$ 40,000.00
XXX-XXXXX	Subgrade Treatment / Embankment (CIP)		CY	\$ 12.00	5,290	\$ 63,480.00
XXX-XXXXX	Impact Attenuator		EA	\$ 20,000.00		\$ -
SUBTOTAL A						\$ 499,650
B.						
	Drainage	(3% of A)		3%		\$14,990
	Utility Relocations	(2% of A)		2%		\$9,993
	Signing & Striping, Lighting	(2% of A)		2%		\$9,993
	Construction Signing & Traffic Control	(8% of A)		8%		\$39,972
	Mobilization	(7% of A)		7%		\$34,976
	Erosion Control/Water Quality	(5% of A)		5%		\$24,983
	Force Account - Misc.	(10% of A)		10%		\$49,965
SUBTOTAL B						\$184,871
C.						
	Project Construction Bid Items Contingencies	(25% of A+B)		25%		\$171,130
	CDOT CE	(22% of A+B)		22%		\$150,595
	Construction Engineering	(12% of A+B)		12%		\$82,142
SUBTOTAL C						\$403,867
D.						
	R.O.W Acquisition		Project Dependant		0	\$0
SUBTOTAL D						\$0
GRAND TOTALS (A, B, C & D)						\$1,088,388

Assumptions: 13.5" HMA 12" ABC(CL 6) 2' Subgrade Treatment + 1' of Earthwork
 Replaced cantilever signs
 ROW acquisition cost are not included in this estimate

144TH AVENUE

BULL CANAL

2%

EX. R.O.W.

CORRIDOR IMPACT LINE

REMOVE AND REPLACE CANTILEVER SIGN BRIDGE
REMOVE AND REPLACE 150' GR TYPE 3
WITH SRT

CORRIDOR IMPACT LINE - - - - -

STRUCTURES - - - - -

SHOULDER - - - - -

AUXILLARY LANE - - - - -

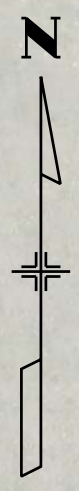
GP LANE - - - - -

MANAGED LANE - - - - -

REVERSIBLE LANE - - - - -

BUFFER - - - - -

"TEXT or NOTES" - - - - -



ALTERNATIVE S.6

ADD SOUTHBOUND AUX. LANE

ROW IMPACT = NO IMPACTS

5/24/2013
SCALE = 200.0000' / in.

136TH AVENUE

North I-25 PEL

Conceptual Design Cost Estimate

Alternative: S.6

DATE: 5/6/2013

BY:

ITEM DESCRIPTION	UNIT	UNIT COST	TOTALS	
			APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX Removals/Demolition (Flatwork)	SY	\$ 15.00		\$ -
XXX-XXXXX Removal of Wall	SF	\$ 10.00		\$ -
XXX-XXXXX Removal of Guardrail (Type 3)	LF	\$ 12.00	150	\$ 1,800.00
XXX-XXXXX Removal of Guardrail (Type 7)	LF	\$ 15.00		\$ -
XXX-XXXXX Removal of Overhead Sign Structure	EA	\$ 3,000.00	1	\$ 3,000.00
XXX-XXXXX Removal of Structure	SF	\$ 21.00		\$ -
XXX-XXXXX Aggregate Base Course (Class 6)	TON	\$ 35.00	582	\$ 20,370.00
XXX-XXXXX Hot Mix Asphalt (13.5")	TON	\$ 65.00	711	\$ 46,215.00
XXX-XXXXX Concrete Pavement (13 Inch)	SY	\$ 50.00		\$ -
XXX-XXXXX Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00		\$ -
XXX-XXXXX Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00		\$ -
XXX-XXXXX Guardrail (Type 3)	LF	\$ 40.00	150	\$ 6,000.00
XXX-XXXXX Guardrail (Type 7)	LF	\$ 45.00		\$ -
XXX-XXXXX Sound Wall	LF	\$ 400.00		\$ -
XXX-XXXXX Retaining Wall (< 10')	LF	\$ 600.00		\$ -
XXX-XXXXX Retaining Wall (> 10')	LF	\$ 1,200.00		\$ -
XXX-XXXXX Structure	SF	\$ 150.00		\$ -
XXX-XXXXX Sidewalk/Trail	SY	\$ 30.00		\$ -
XXX-XXXXX Overhead Sign Bridge	EA	\$ 50,000.00		\$ -
XXX-XXXXX Overhead Sign Cantilever	EA	\$ 20,000.00	1	\$ 20,000.00
XXX-XXXXX Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	150	\$ 1,800.00
XXX-XXXXX Impact Attenuator	EA	\$ 20,000.00	1	\$ 20,000.00
SUBTOTAL A				\$ 119,185
B.				
Drainage	(3% of A)	3%		\$3,576
Utility Relocations	(2% of A)	2%		\$2,384
Signing & Striping, Lighting	(2% of A)	2%		\$2,384
Construction Signing & Traffic Control	(8% of A)	8%		\$9,535
Mobilization	(7% of A)	7%		\$8,343
Erosion Control/Water Quality	(5% of A)	5%		\$5,959
Force Account - Misc.	(10% of A)	10%		\$11,919
SUBTOTAL B				\$44,098
C.				
Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$40,821
CDOT CE	(22% of A+B)	22%		\$35,922
Construction Engineering	(12% of A+B)	12%		\$19,594
SUBTOTAL C				\$96,337
D.				
R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$259,621

Assumptions: 13.5" HMA 12" ABC(CL 6) 2' Subgrade Treatment + 1' of Earthwork
 Replaced cantilever signs
 ROW acquisition cost are not included in this estimate

136TH AVENUE

EXTEND CONCRETE BOX
CULVERT / STRUCTURE
BIG DRY CREEK


EX. R.O.W.
CORRIDOR IMPACT LINE

RELOCATE SIGN BRIDGE

128TH AVENUE

5/24/2013
SCALE = 200.0000 ' / in.

CORRIDOR IMPACT LINE	---
STRUCTURES	---
SHOULDER	---
AUXILLARY LANE	---
GP LANE	---
MANAGED LANE	---
REVERSIBLE LANE	---
BUFFER	---
"TEXT or NOTES"	---


 ALTERNATIVE S.7
 ADD SOUTHBOUND AUX. LANE
 ROW IMPACT = NO IMPACTS

CULVERT CROSSING
(NO WORK ANTICIPATED)



North I-25 PEL

Conceptual Design Cost Estimate

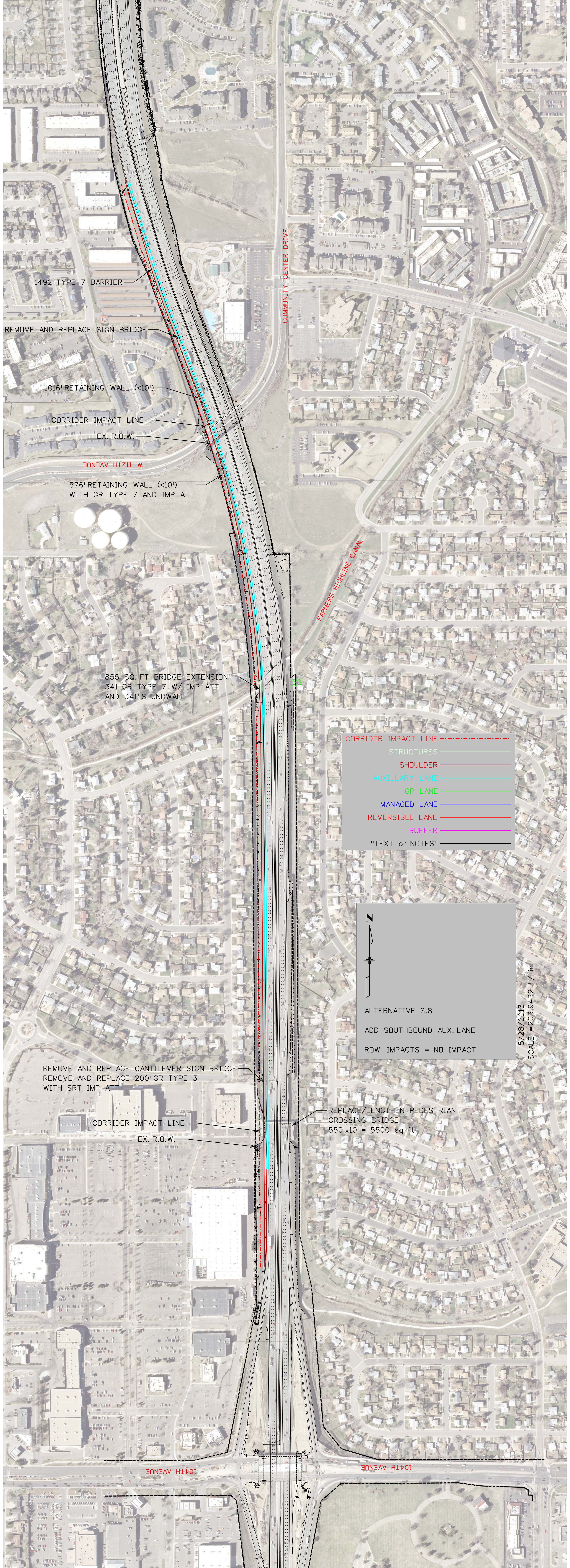
Alternative: S.7

DATE: 5/15/2007

BY: KJB

ITEM DESCRIPTION	UNIT	UNIT COST	TOTALS	
			APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX Removals/Demolition (Flatwork)	SY	\$ 15.00	0	\$ -
XXX-XXXXX Removal of Wall	SF	\$ 10.00	0	\$ -
XXX-XXXXX Removal of Guardrail (Type 3)	LF	\$ 12.00	2,435	\$ 29,220.00
XXX-XXXXX Removal of Guardrail (Type 7)	LF	\$ 15.00	0	\$ -
XXX-XXXXX Removal of Overhead Sign Structure	EA	\$ 3,000.00	1	\$ 3,000.00
XXX-XXXXX Removal of Structure	SF	\$ 21.00	1,615	\$ 33,915.00
XXX-XXXXX Aggregate Base Course (Class 6)	TON	\$ 35.00	6,939	\$ 242,865.00
XXX-XXXXX Hot Mix Asphalt (13.5")	TON	\$ 65.00	8,481	\$ 551,265.00
XXX-XXXXX Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	0	\$ -
XXX-XXXXX Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX Guardrail (Type 3)	LF	\$ 40.00	2,435	\$ 97,400.00
XXX-XXXXX Guardrail (Type 7)	LF	\$ 45.00	0	\$ -
XXX-XXXXX Sound Wall	LF	\$ 400.00	0	\$ -
XXX-XXXXX Retaining Wall (< 10')	LF	\$ 600.00	0	\$ -
XXX-XXXXX Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX Structure	SF	\$ 150.00	1,615	\$ 242,250.00
XXX-XXXXX Sidewalk/Trail	SY	\$ 30.00	0	\$ -
XXX-XXXXX Overhead Sign Bridge	EA	\$ 50,000.00	0	\$ -
XXX-XXXXX Overhead Sign Cantilever	EA	\$ 20,000.00	1	\$ 20,000.00
XXX-XXXXX Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	11,422	\$ 137,064.00
XXX-XXXXX Impact Attenuator	EA	\$ 20,000.00	5	\$ 100,000.00
SUBTOTAL A				\$ 1,456,979
B.				
Drainage	(3% of A)	3%		\$43,709
Utility Relocations	(2% of A)	2%		\$29,140
Signing & Striping, Lighting	(2% of A)	2%		\$29,140
Construction Signing & Traffic Control	(8% of A)	8%		\$116,558
Mobilization	(7% of A)	7%		\$101,989
Erosion Control/Water Quality	(5% of A)	5%		\$72,849
Force Account - Misc.	(10% of A)	10%		\$145,698
SUBTOTAL B				\$539,082
C.				
Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$499,015
CDOT CE	(22% of A+B)	22%		\$439,133
Construction Engineering	(12% of A+B)	12%		\$239,527
SUBTOTAL C				\$1,177,676
D.				
R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$3,173,737

Assumptions: 13.5" HMA
 12" ABC
 Earthwork = 2' Subgrade treatment + 1' of earthwork for areas of pavement replacement.
 Assumes all type 3 guardrail is removed and replaced
 ROW acquisition cost are not included in this estimate



1492' TYPE 7 BARRIER

REMOVE AND REPLACE SIGN BRIDGE

1016' RETAINING WALL (<10')

CORRIDOR IMPACT LINE

EX. R.O.W.

W 112TH AVENUE

576' RETAINING WALL (<10') WITH GR TYPE 7 AND IMP ATT

855 SQ. FT BRIDGE EXTENSION
341' GR TYPE 7 W/ IMP ATT
AND 341' SOUNDWALL

REMOVE AND REPLACE CANTILEVER SIGN BRIDGE
REMOVE AND REPLACE 200' GR TYPE 3
WITH SRT IMP ATT

CORRIDOR IMPACT LINE

EX. R.O.W.

REPLACE/LENGTHEN PEDESTRIAN
CROSSING BRIDGE
550'x10' = 5500 sq ft

104TH AVENUE

104TH AVENUE

COMMUNITY CENTER DRIVE

FARMERS HIGHLINE CANAL

CORRIDOR IMPACT LINE - - - - -

STRUCTURES - - - - -

SHOULDER - - - - -

AUXILIARY LANE - - - - -

GP LANE - - - - -

MANAGED LANE - - - - -

REVERSIBLE LANE - - - - -

BUFFER - - - - -

"TEXT or NOTES" - - - - -

N

ALTERNATIVE S.8

ADD SOUTHBOUND AUX. LANE

ROW IMPACTS = NO IMPACT

5/28/2013
SCALE = 203.94:32 / in.

North I-25 PEL

Conceptual Design Cost Estimate

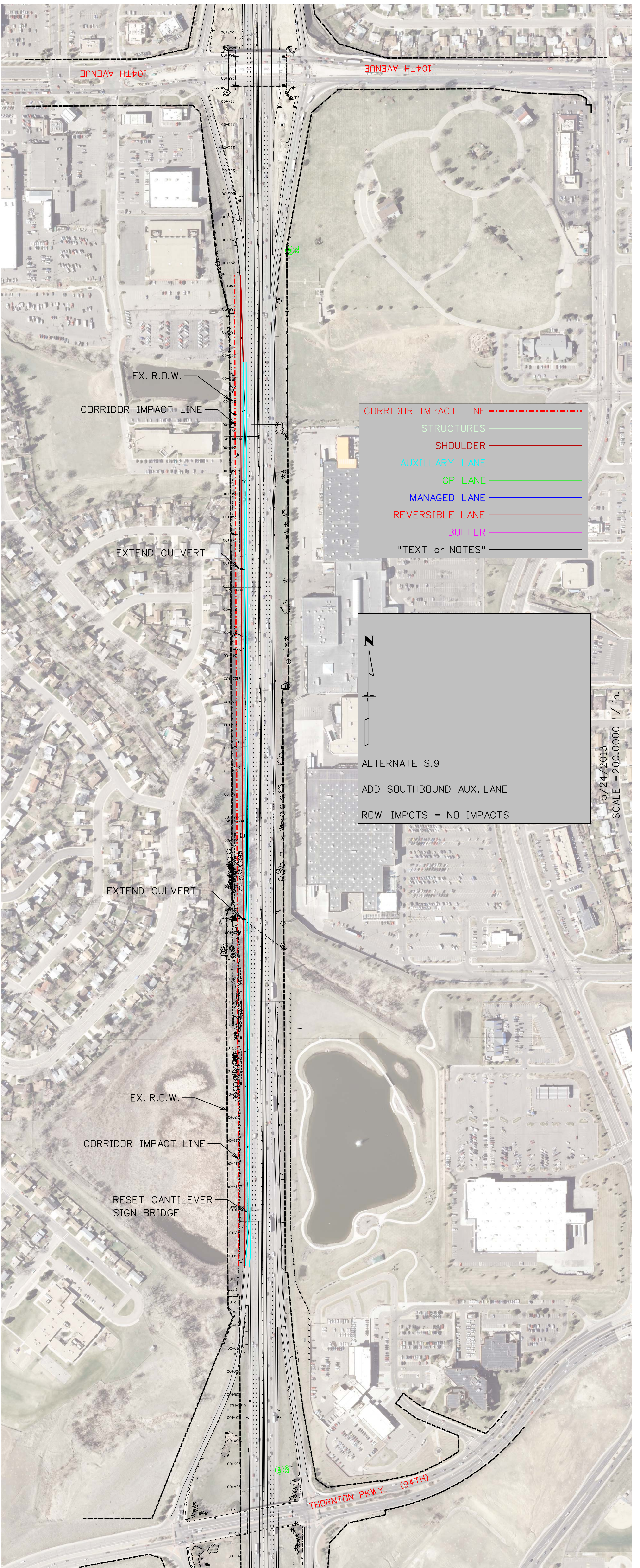
Alternative: S.8

DATE: 5/6/2013

BY:

				TOTALS	
ITEM DESCRIPTION	UNIT	UNIT COST	APPROX. QUANTITY	ESTIMATED COST	
A. BID ITEMS*					
XXX-XXXXX	Removals/Demolition (Flatwork)	SY	\$ 15.00		\$ -
XXX-XXXXX	Removal of Wall	SF	\$ 10.00		\$ -
XXX-XXXXX	Removal of Guardrail (Type 3)	LF	\$ 12.00	975	\$ 11,700.00
XXX-XXXXX	Removal of Guardrail (Type 7)	LF	\$ 15.00		\$ -
XXX-XXXXX	Removal of Overhead Sign Structure	EA	\$ 3,000.00	2	\$ 6,000.00
XXX-XXXXX	Removal of Structure	SF	\$ 21.00	5,500	\$ 115,500.00
XXX-XXXXX	Aggregate Base Course (Class 6)	TON	\$ 35.00	6,441	\$ 225,435.00
XXX-XXXXX	Hot Mix Asphalt (13.5")	TON	\$ 65.00	7,873	\$ 511,745.00
XXX-XXXXX	Concrete Pavement (13 Inch)	SY	\$ 50.00		\$ -
XXX-XXXXX	Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00		\$ -
XXX-XXXXX	Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00		\$ -
XXX-XXXXX	Guardrail (Type 3)	LF	\$ 40.00	200	\$ 8,000.00
XXX-XXXXX	Guardrail (Type 7)	LF	\$ 45.00	914	\$ 41,130.00
XXX-XXXXX	Sound Wall	LF	\$ 400.00	341	\$ 136,400.00
XXX-XXXXX	Retaining Wall (< 10')	LF	\$ 600.00	1,592	\$ 955,200.00
XXX-XXXXX	Retaining Wall (> 10')	LF	\$ 1,200.00		\$ -
XXX-XXXXX	Structure	SF	\$ 150.00	6,355	\$ 953,250.00
XXX-XXXXX	Sidewalk/Trail	SY	\$ 30.00		\$ -
XXX-XXXXX	Overhead Sign Bridge	EA	\$ 50,000.00		\$ -
XXX-XXXXX	Overhead Sign Cantilever	EA	\$ 20,000.00	2	\$ 40,000.00
XXX-XXXXX	Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	10,603	\$ 127,236.00
XXX-XXXXX	Impact Attenuator	EA	\$ 20,000.00	3	\$ 60,000.00
SUBTOTAL A					\$ 3,191,596
B.					
	Drainage	(3% of A)	3%		\$95,748
	Utility Relocations	(2% of A)	2%		\$63,832
	Signing & Striping, Lighting	(2% of A)	2%		\$63,832
	Construction Signing & Traffic Control	(8% of A)	8%		\$255,328
	Mobilization	(7% of A)	7%		\$223,412
	Erosion Control/Water Quality	(5% of A)	5%		\$159,580
	Force Account - Misc.	(10% of A)	10%		\$319,160
SUBTOTAL B					\$1,180,891
C.					
	Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$1,093,122
	CDOT CE	(22% of A+B)	22%		\$961,947
	Construction Engineering	(12% of A+B)	12%		\$524,698
SUBTOTAL C					\$2,579,767
D.					
	R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D					\$0
GRAND TOTALS (A, B, C & D)					\$6,952,254

Assumptions: 13.5" HMA 12" ABC(CL 6) 2' Subgrade Treatment + 1' of Earthwork
 Replaced cantilever signs
 Replaced pedestrian structure
 Extended Highline Canal Ditch Structure with new soundwall on top
 ROW acquisition cost are not included in this estimate



EX. R.O.W.
CORRIDOR IMPACT LINE

EXTEND CULVERT

EXTEND CULVERT

EX. R.O.W.

CORRIDOR IMPACT LINE

RESET CANTILEVER
SIGN BRIDGE

CORRIDOR IMPACT LINE - - - - -

STRUCTURES ———

SHOULDER ———

AUXILLARY LANE ———

GP LANE ———

MANAGED LANE ———

REVERSIBLE LANE ———

BUFFER ———

"TEXT or NOTES" ———

N

ALTERNATE S.9
ADD SOUTHBOUND AUX. LANE
ROW IMPCTS = NO IMPACTS

5/24/2013
SCALE = 200.0000' / in.

THORNTON PKWY. (94TH)

North I-25 PEL

Conceptual Design Cost Estimate

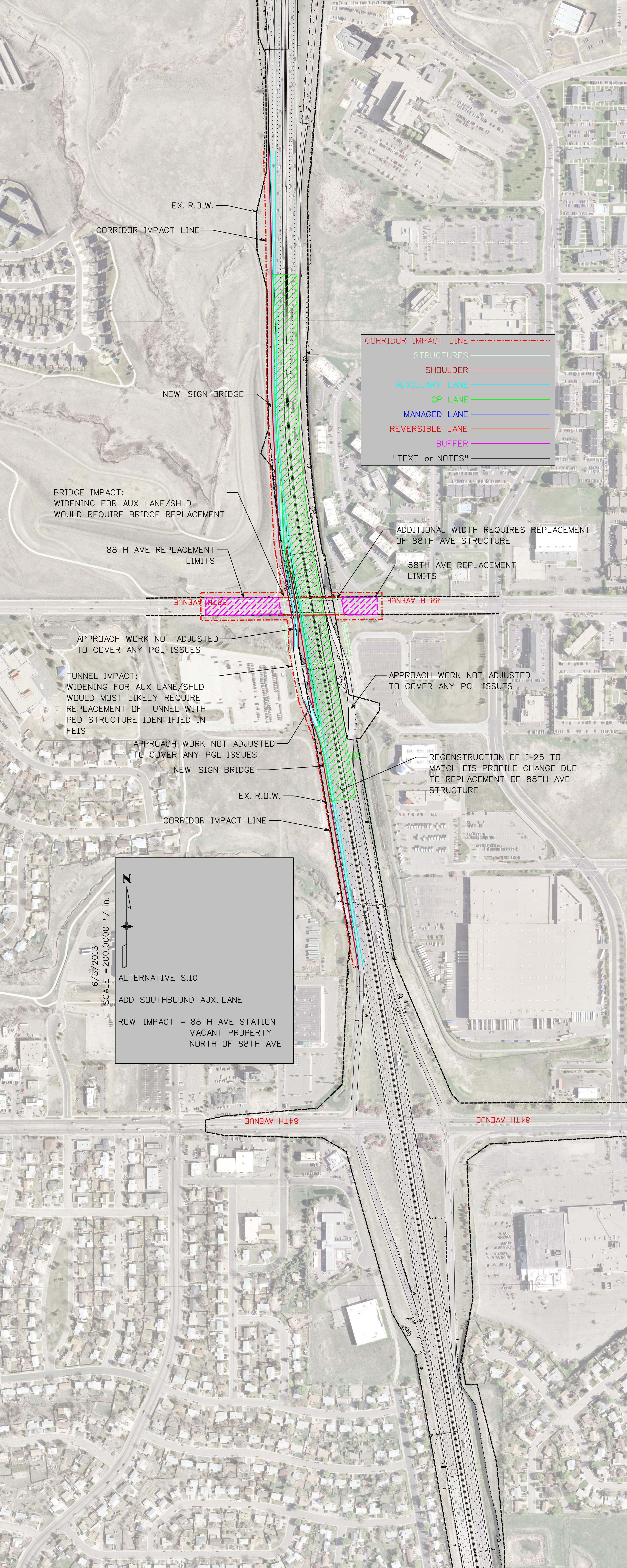
Alternative: S.9

DATE: 5/15/2007

BY: KJB

ITEM DESCRIPTION	UNIT	UNIT COST	TOTALS	
			APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX Removals/Demolition (Flatwork)	SY	\$ 15.00	0	\$ -
XXX-XXXXX Removal of Wall	SF	\$ 10.00	0	\$ -
XXX-XXXXX Removal of Guardrail (Type 3)	LF	\$ 12.00	400	\$ 4,800.00
XXX-XXXXX Removal of Guardrail (Type 7)	LF	\$ 15.00	0	\$ -
XXX-XXXXX Removal of Overhead Sign Structure	EA	\$ 3,000.00	1	\$ 3,000.00
XXX-XXXXX Removal of Structure	SF	\$ 21.00	0	\$ -
XXX-XXXXX Aggregate Base Course (Class 6)	TON	\$ 35.00	4,173	\$ 146,055.00
XXX-XXXXX Hot Mix Asphalt (13.5")	TON	\$ 65.00	5,101	\$ 331,565.00
XXX-XXXXX Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	0	\$ -
XXX-XXXXX Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX Guardrail (Type 3)	LF	\$ 40.00	400	\$ 16,000.00
XXX-XXXXX Guardrail (Type 7)	LF	\$ 45.00	0	\$ -
XXX-XXXXX Sound Wall	LF	\$ 400.00	0	\$ -
XXX-XXXXX Retaining Wall (< 10')	LF	\$ 600.00	0	\$ -
XXX-XXXXX Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX Structure	SF	\$ 150.00	0	\$ -
XXX-XXXXX Sidewalk/Trail	SY	\$ 30.00	0	\$ -
XXX-XXXXX Overhead Sign Bridge	EA	\$ 50,000.00	0	\$ -
XXX-XXXXX Overhead Sign Cantilever	EA	\$ 20,000.00	1	\$ 20,000.00
XXX-XXXXX Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	6,870	\$ 82,440.00
XXX-XXXXX Impact Attenuator	EA	\$ 20,000.00	2	\$ 40,000.00
SUBTOTAL A				\$ 643,860
B.				
Drainage	(3% of A)	3%		\$19,316
Utility Relocations	(2% of A)	2%		\$12,877
Signing & Striping, Lighting	(2% of A)	2%		\$12,877
Construction Signing & Traffic Control	(8% of A)	8%		\$51,509
Mobilization	(7% of A)	7%		\$45,070
Erosion Control/Water Quality	(5% of A)	5%		\$32,193
Force Account - Misc.	(10% of A)	10%		\$64,386
SUBTOTAL B				\$238,228
C.				
Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$220,522
CDOT CE	(22% of A+B)	22%		\$194,059
Construction Engineering	(12% of A+B)	12%		\$105,851
SUBTOTAL C				\$520,432
D.				
R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$1,402,520

Assumptions: 13.5" HMA
 12" ABC
 Earthwork = 2' Subgrade treatment + 1' of earthwork for areas of pavement replacement.
 Assumes same amount of new guardrail as removal
 ROW acquisition cost are not included in this estimate



EX. R.O.W.
CORRIDOR IMPACT LINE

CORRIDOR IMPACT LINE	---
STRUCTURES	—
SHOULDER	—
AUXILLARY LANE	—
GP LANE	—
MANAGED LANE	—
REVERSIBLE LANE	—
BUFFER	—
"TEXT or NOTES"	—

BRIDGE IMPACT:
WIDENING FOR AUX LANE/SHLD
WOULD REQUIRE BRIDGE REPLACEMENT

88TH AVE REPLACEMENT
LIMITS

ADDITIONAL WIDTH REQUIRES REPLACEMENT
OF 88TH AVE STRUCTURE

88TH AVE REPLACEMENT
LIMITS

88TH AVENUE

APPROACH WORK NOT ADJUSTED
TO COVER ANY PGL ISSUES

TUNNEL IMPACT:
WIDENING FOR AUX LANE/SHLD
WOULD MOST LIKELY REQUIRE
REPLACEMENT OF TUNNEL WITH
PED STRUCTURE IDENTIFIED IN
FEIS

APPROACH WORK NOT ADJUSTED
TO COVER ANY PGL ISSUES

APPROACH WORK NOT ADJUSTED
TO COVER ANY PGL ISSUES

NEW SIGN BRIDGE

RECONSTRUCTION OF I-25 TO
MATCH EIS PROFILE CHANGE DUE
TO REPLACEMENT OF 88TH AVE
STRUCTURE

EX. R.O.W.

CORRIDOR IMPACT LINE

6/5/2013
SCALE = 200.0000' / in.

N

ALTERNATIVE S.10
ADD SOUTHBOUND AUX. LANE

ROW IMPACT = 88TH AVE STATION
VACANT PROPERTY
NORTH OF 88TH AVE

84TH AVENUE

84TH AVENUE

North I-25 PEL

Conceptual Design Cost Estimate

Alternative: S.10

DATE: 5/30/2013

BY: KJB

				TOTALS	
ITEM DESCRIPTION	UNIT	UNIT COST	APPROX. QUANTITY	ESTIMATED COST	
A. BID ITEMS*					
XXX-XXXXX	Removals/Demolition (Flatwork)	SY	\$ 15.00	42,078	\$ 631,166.67
XXX-XXXXX	Removal of Wall	SF	\$ 10.00	550	\$ 5,500.00
XXX-XXXXX	Removal of Guardrail (Type 3)	LF	\$ 12.00	1,300	\$ 15,600.00
XXX-XXXXX	Removal of Guardrail (Type 7)	LF	\$ 15.00	0	\$ -
XXX-XXXXX	Removal of Overhead Sign Structure	EA	\$ 3,000.00	3	\$ 9,000.00
XXX-XXXXX	Removal of Structure	SF	\$ 21.00	14,800	\$ 310,800.00
XXX-XXXXX	Aggregate Base Course (Class 6)	TON	\$ 35.00	29,480	\$ 1,031,800.00
XXX-XXXXX	Hot Mix Asphalt (13.5")	TON	\$ 65.00	36,031	\$ 2,342,015.00
XXX-XXXXX	Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX	Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	0	\$ -
XXX-XXXXX	Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX	Guardrail (Type 3)	LF	\$ 40.00	0	\$ -
XXX-XXXXX	Guardrail (Type 7)	LF	\$ 45.00	4,700	\$ 211,500.00
XXX-XXXXX	Sound Wall	LF	\$ 400.00	0	\$ -
XXX-XXXXX	Retaining Wall (< 10')	LF	\$ 600.00	150	\$ 90,000.00
XXX-XXXXX	Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX	Structure	SF	\$ 150.00	35,900	\$ 5,385,000.00
XXX-XXXXX	Sidewalk/Trail	SY	\$ 30.00	0	\$ -
XXX-XXXXX	Overhead Sign Bridge	EA	\$ 50,000.00	2	\$ 100,000.00
XXX-XXXXX	Overhead Sign Cantilever	EA	\$ 20,000.00	1	\$ 20,000.00
XXX-XXXXX	Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	76,527	\$ 918,324.00
XXX-XXXXX	Impact Attenuator	EA	\$ 20,000.00	1	\$ 20,000.00
					\$ -
SUBTOTAL A					\$ 11,090,706
B.					
	Drainage	(3% of A)	3%		\$332,721
	Utility Relocations	(2% of A)	2%		\$221,814
	Signing & Striping, Lighting	(2% of A)	2%		\$221,814
	Construction Signing & Traffic Control	(8% of A)	8%		\$887,256
	Mobilization	(7% of A)	7%		\$776,349
	Erosion Control/Water Quality	(5% of A)	5%		\$554,535
	Force Account - Misc.	(10% of A)	10%		\$1,109,071
SUBTOTAL B					\$4,103,561
C.					
	Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$3,798,567
	CDOT CE	(22% of A+B)	22%		\$3,342,739
	Construction Engineering	(12% of A+B)	12%		\$1,823,312
SUBTOTAL C					\$8,964,617
D.					
	R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D					\$0
GRAND TOTALS (A, B, C & D)					\$24,158,884

Assumptions:

ROW acquisition cost are not included in this estimate
 Assumes replacement of large swath of I-25 due to 88th Ave structure replacement and I-25 profile change
 Assumes I-25 work will be 13.5" HMA, 1' ABC, 2' Subgrade Treatment + 1' Earthwork
 Removal of flatwork - Is same area as I-25 repave

EX. R.O.W.

CORRIDOR IMPACT LINE

IMPACT TO SIGN BRIDGE

RESET GUARDRAIL

RECONSTRUCTION OF I-25 TO MATCH EIS PROFILE CHANGE DUE TO REPLACEMENT OF 88TH AVE STRUCTURE

88TH AVE REPLACEMENT LIMITS

CORRIDOR IMPACT LINE

STRUCTURES

SHOULDER

AUXILLARY LANE

GP LANE

MANAGED LANE

REVERSIBLE LANE

BUFFER

"TEXT or NOTES"

ADDITIONAL WIDTH REQUIRES REPLACEMENT OF 88TH AVE STRUCTURE

88TH AVE REPLACEMENT LIMITS

RECONSTRUCT 88TH AVE APPROACH RAMP

ASSUMES CONSTRUCTION OF PED BRIDGE

RECONSTRUCT 88TH AVE APPROACH RAMP

RESET GUARDRAIL

IMPACT TO OVERHEAD SIGN STRUCTURE

POSSIBLE IMPACT TO DRAINAGE STRUCTURE.

EX. R.O.W.

N

6/5/2013

SCALE = 200,000 / in.

ALTERNATIVE S.15

ADD GENERAL PURPOSE LANE FROM THORNTON PKWY TO 84TH AVE.

ROW IMPACTS = NO IMPACTS

CORRIDOR IMPACT LINE

EX. R.O.W.

North I-25 PEL

Conceptual Design Cost Estimate

Alternative: S.15

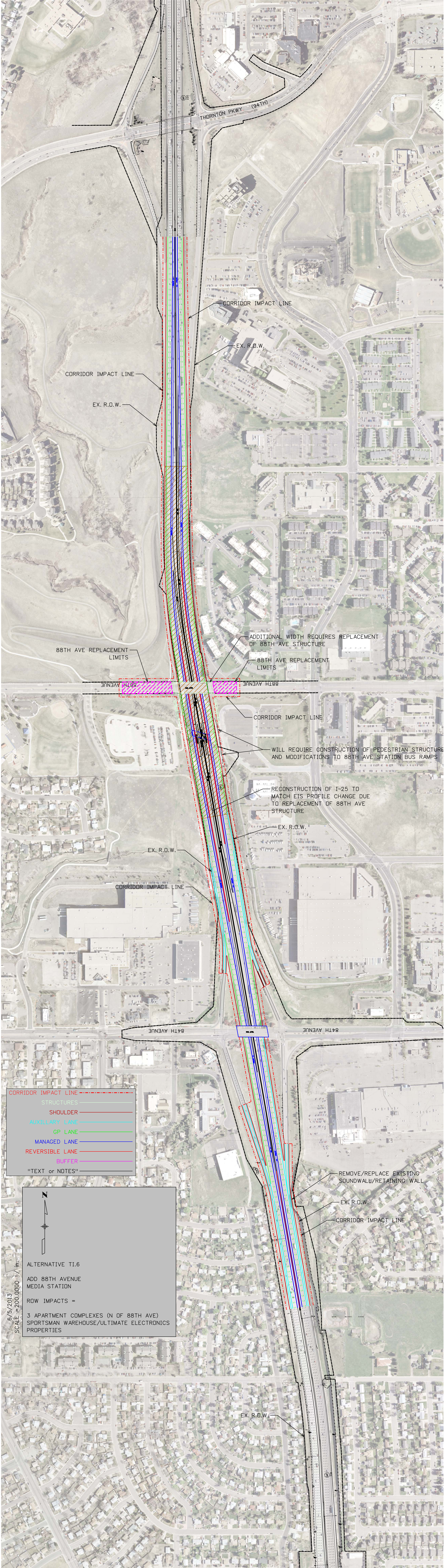
DATE: 5/31/2013

BY: KJB

ITEM DESCRIPTION	UNIT	UNIT COST	TOTALS	
			APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX Removals/Demolition (Flatwork)	SY	\$ 15.00	42,078	\$ 631,166.67
XXX-XXXXX Removal of Wall	SF	\$ 10.00	550	\$ 5,500.00
XXX-XXXXX Removal of Guardrail (Type 3)	LF	\$ 12.00	1,870	\$ 22,440.00
XXX-XXXXX Removal of Guardrail (Type 7)	LF	\$ 15.00	1,040	\$ 15,600.00
XXX-XXXXX Removal of Overhead Sign Structure	EA	\$ 3,000.00	5	\$ 15,000.00
XXX-XXXXX Removal of Structure	SF	\$ 21.00	14,800	\$ 310,800.00
XXX-XXXXX Aggregate Base Course (Class 6)	TON	\$ 35.00	31,081	\$ 1,087,835.00
XXX-XXXXX Hot Mix Asphalt (13.5")	TON	\$ 65.00	37,988	\$ 2,469,220.00
XXX-XXXXX Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	0	\$ -
XXX-XXXXX Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX Guardrail (Type 3)	LF	\$ 40.00	1,870	\$ 74,800.00
XXX-XXXXX Guardrail (Type 7)	LF	\$ 45.00	1,040	\$ 46,800.00
XXX-XXXXX Sound Wall	LF	\$ 400.00	0	\$ -
XXX-XXXXX Retaining Wall (< 10')	LF	\$ 600.00	150	\$ 90,000.00
XXX-XXXXX Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX Structure	SF	\$ 150.00	35,900	\$ 5,385,000.00
XXX-XXXXX Sidewalk/Trail	SY	\$ 30.00	0	\$ -
XXX-XXXXX Overhead Sign Bridge	EA	\$ 50,000.00	5	\$ 250,000.00
XXX-XXXXX Overhead Sign Cantilever	EA	\$ 20,000.00	0	\$ -
XXX-XXXXX Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	79,162	\$ 949,944.00
XXX-XXXXX Impact Attenuator	EA	\$ 20,000.00	1	\$ 20,000.00
				\$ -
SUBTOTAL A				\$ 11,374,106
B.				
Drainage	(3% of A)	3%		\$341,223
Utility Relocations	(2% of A)	2%		\$227,482
Signing & Striping, Lighting	(2% of A)	2%		\$227,482
Construction Signing & Traffic Control	(8% of A)	8%		\$909,928
Mobilization	(7% of A)	7%		\$796,187
Erosion Control/Water Quality	(5% of A)	5%		\$568,705
Force Account - Misc.	(10% of A)	10%		\$1,137,411
SUBTOTAL B				\$4,208,419
C.				
Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$3,895,631
CDOT CE	(22% of A+B)	22%		\$3,428,155
Construction Engineering	(12% of A+B)	12%		\$1,869,903
SUBTOTAL C				\$9,193,690
D.				
R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$24,776,214

Assumptions:

ROW acquisition cost are not included in this estimate
 Assumes replacement of large swath of I-25 due to 88th Ave structure replacement and I-25 profile change
 Assumes I-25 work will be 13.5" HMA, 1' ABC, 2' Subgrade Treatment + 1' Earthwork
 Removal of flatwork - Is same area as I-25 repave



CORRIDOR IMPACT LINE

EX. R.O.W.

CORRIDOR IMPACT LINE

EX. R.O.W.

88TH AVE REPLACEMENT LIMITS

ADDITIONAL WIDTH REQUIRES REPLACEMENT OF 88TH AVE STRUCTURE

88TH AVE REPLACEMENT LIMITS

88TH AVENUE

88TH AVENUE

WILL REQUIRE CONSTRUCTION OF PEDESTRIAN STRUCTURE AND MODIFICATIONS TO 88TH AVE STATION BUS RAMPS

RECONSTRUCTION OF I-25 TO MATCH EIS PROFILE CHANGE DUE TO REPLACEMENT OF 88TH AVE STRUCTURE

EX. R.O.W.

EX. R.O.W.

CORRIDOR IMPACT LINE

84TH AVENUE

84TH AVENUE

CORRIDOR IMPACT LINE	---
STRUCTURES	▨
SHOULDER	—
AUXILIARY LANE	—
GP LANE	—
MANAGED LANE	—
REVERSIBLE LANE	—
BUFFER	—
"TEXT or NOTES"	—

6/5/2013
SCALE = 200,0000 1" = 1/4 mi.

ALTERNATIVE T1.6
ADD 88TH AVENUE MEDIA STATION
ROW IMPACTS =
3 APARTMENT COMPLEXES (N OF 88TH AVE)
SPORTSMAN WAREHOUSE/ULTIMATE ELECTRONICS PROPERTIES

REMOVE/REPLACE EXISTING SOUNDWALL/RETAINING WALL

EX. R.O.W.

CORRIDOR IMPACT LINE

EX. R.O.W.

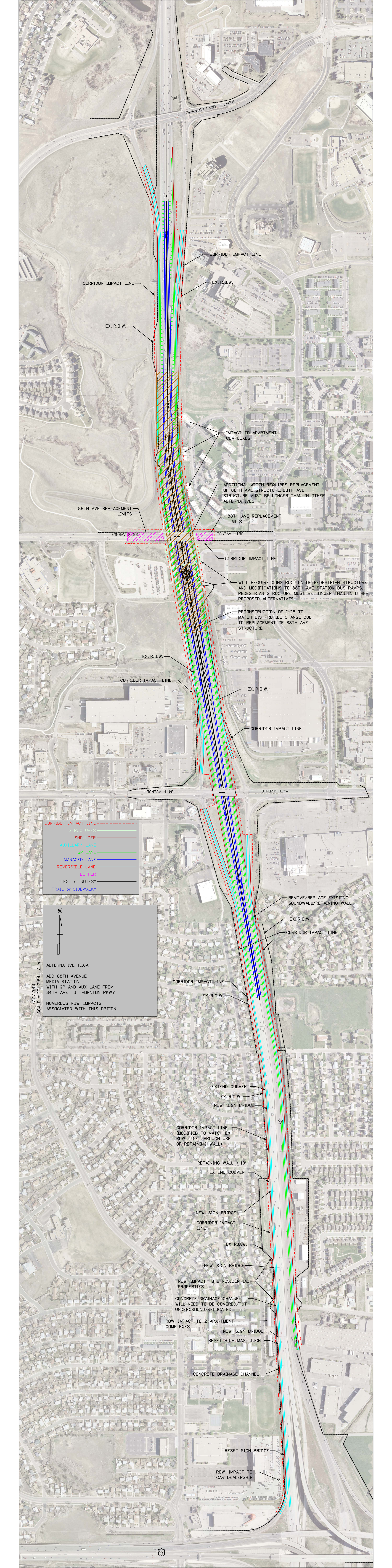
THORNTON PKWY (94TH)

North I-25 PEL
Conceptual Design Cost Estimate
Alternative: TI.6

DATE: 6/5/2013
 BY: KJB

ITEM DESCRIPTION	UNIT	UNIT COST	TOTALS	
			APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX Removals/Demolition (Flatwork)	SY	\$ 15.00	45,889	\$ 688,333.33
XXX-XXXXX Removal of Wall	SF	\$ 10.00	100	\$ 1,000.00
XXX-XXXXX Removal of Guardrail (Type 3)	LF	\$ 12.00	4,500	\$ 54,000.00
XXX-XXXXX Removal of Guardrail (Type 7)	LF	\$ 15.00	325	\$ 4,875.00
XXX-XXXXX Removal of Overhead Sign Structure	EA	\$ 3,000.00	7	\$ 21,000.00
XXX-XXXXX Removal of Structure	SF	\$ 21.00	14,800	\$ 310,800.00
XXX-XXXXX Aggregate Base Course (Class 6)	TON	\$ 35.00	48,560	\$ 1,699,600.00
XXX-XXXXX Hot Mix Asphalt (13.5")	TON	\$ 65.00	59,375	\$ 3,859,375.00
XXX-XXXXX Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	0	\$ -
XXX-XXXXX Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX Guardrail (Type 3)	LF	\$ 40.00	4,500	\$ 180,000.00
XXX-XXXXX Guardrail (Type 7)	LF	\$ 45.00	325	\$ 14,625.00
XXX-XXXXX Sound Wall	LF	\$ 400.00	100	\$ 40,000.00
XXX-XXXXX Retaining Wall (< 10')	LF	\$ 600.00	500	\$ 300,000.00
XXX-XXXXX Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX Structure	SF	\$ 150.00	35,900	\$ 5,385,000.00
XXX-XXXXX Sidewalk/Trail	SY	\$ 30.00	0	\$ -
XXX-XXXXX Overhead Sign Bridge	EA	\$ 50,000.00	4	\$ 200,000.00
XXX-XXXXX Overhead Sign Cantilever	EA	\$ 20,000.00	3	\$ 60,000.00
XXX-XXXXX Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	108,000	\$ 1,296,000.00
XXX-XXXXX Impact Attenuator	EA	\$ 20,000.00	8	\$ 160,000.00
				\$ -
SUBTOTAL A				\$ 14,274,608
B.				
Drainage	(3% of A)	3%		\$428,238
Utility Relocations	(2% of A)	2%		\$285,492
Signing & Striping, Lighting	(2% of A)	2%		\$285,492
Construction Signing & Traffic Control	(8% of A)	8%		\$1,141,969
Mobilization	(7% of A)	7%		\$999,223
Erosion Control/Water Quality	(5% of A)	5%		\$713,730
Force Account - Misc.	(10% of A)	10%		\$1,427,461
SUBTOTAL B				\$5,281,605
C.				
Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$4,889,053
CDOT CE	(22% of A+B)	22%		\$4,302,367
Construction Engineering	(12% of A+B)	12%		\$2,346,746
SUBTOTAL C				\$11,538,166
D.				
R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$31,094,379

Assumptions: Assumes replacement of large swath of I-25 due to 88th Ave structure replacement and I-25 profile change
 Assumes I-25 work will be 13.5" HMA, 1' ABC, 2' Subgrade Treatment + 1' Earthwork
 500' retaining wall quantity (< 10') added for area adjacent 88th ave station. No retaining wall are identified in layouts
 Assumes guardrail removal quantities will be reset.



- - - CORRIDOR IMPACT LINE
- STRUCTURES
- SHOULDER
- AUXILIARY LANE
- GP LANE
- MANAGED LANE
- REVERSIBLE LANE
- BUFFER
- "TEXT or NOTES"
- "TRAIL or SIDEWALK"

N

ALTERNATIVE TI.6A
 ADD 88TH AVENUE
 MEDIA STATION
 WITH GP AND AUX LANE FROM
 84TH AVE TO THORNTON PKWY
 NUMEROUS ROW IMPACTS
 ASSOCIATED WITH THIS OPTION

7/11/2013
 SCALE = 201.7154' / in.

- REMOVE/REPLACE EXISTING SOUNDWALL/RETAINING WALL
- EX. R.O.W.
- CORRIDOR IMPACT LINE
- EXTEND CULVERT
- EX. R.O.W.
- NEW SIGN BRIDGE
- CORRIDOR IMPACT LINE (MODIFIED TO MATCH EX ROW LINE THROUGH USE OF RETAINING WALL)
- RETAINING WALL < 10'
- EXTEND CULVERT
- NEW SIGN BRIDGE
- CORRIDOR IMPACT LINE
- EX. R.O.W.
- NEW SIGN BRIDGE
- ROW IMPACT TO 6 RESIDENTIAL PROPERTIES
- CONCRETE DRAINAGE CHANNEL WILL NEED TO BE COVERED/PUT UNDERGROUND/RELOCATED
- ROW IMPACT TO 2 APARTMENT COMPLEXES
- NEW SIGN BRIDGE
- RESET HIGH MAST LIGHT
- CONCRETE DRAINAGE CHANNEL
- RESET SIGN BRIDGE
- ROW IMPACT TO CAR DEALERSHIP

North I-25 PEL

Conceptual Design Cost Estimate

Alternative: TI.6-A Median Station with Aux and GP Lane

DATE: 7/22/2013

BY: KJB

ITEM DESCRIPTION	UNIT	UNIT COST	TOTALS	
			APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX Removals/Demolition (Flatwork)	SY	\$ 15.00	45,889	\$ 688,333.33
XXX-XXXXX Removal of Wall	SF	\$ 10.00	100	\$ 1,000.00
XXX-XXXXX Removal of Guardrail (Type 3)	LF	\$ 12.00	5,515	\$ 66,180.00
XXX-XXXXX Removal of Guardrail (Type 7)	LF	\$ 15.00	5,600	\$ 84,000.00
XXX-XXXXX Removal of Overhead Sign Structure	EA	\$ 3,000.00	9	\$ 27,000.00
XXX-XXXXX Removal of Structure	SF	\$ 21.00	14,800	\$ 310,800.00
XXX-XXXXX Aggregate Base Course (Class 6)	TON	\$ 35.00	75,168	\$ 2,630,880.00
XXX-XXXXX Hot Mix Asphalt (13.5")	TON	\$ 65.00	91,872	\$ 5,971,680.00
XXX-XXXXX Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	0	\$ -
XXX-XXXXX Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX Guardrail (Type 3)	LF	\$ 40.00	5,515	\$ 220,600.00
XXX-XXXXX Guardrail (Type 7)	LF	\$ 45.00	5,600	\$ 252,000.00
XXX-XXXXX Sound Wall	LF	\$ 400.00	100	\$ 40,000.00
XXX-XXXXX Retaining Wall (< 10')	LF	\$ 600.00	1,700	\$ 1,020,000.00
XXX-XXXXX Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX Structure	SF	\$ 150.00	38,735	\$ 5,810,250.00
XXX-XXXXX Sidewalk/Trail	SY	\$ 30.00	0	\$ -
XXX-XXXXX Overhead Sign Bridge	EA	\$ 50,000.00	6	\$ 300,000.00
XXX-XXXXX Overhead Sign Cantilever	EA	\$ 20,000.00	3	\$ 60,000.00
XXX-XXXXX Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	151,733	\$ 1,820,796.00
XXX-XXXXX Impact Attenuator	EA	\$ 20,000.00	8	\$ 160,000.00
				\$ -
SUBTOTAL A				\$ 19,463,519
B.				
Drainage	(3% of A)	3%		\$583,906
Utility Relocations	(2% of A)	2%		\$389,270
Signing & Striping, Lighting	(2% of A)	2%		\$389,270
Construction Signing & Traffic Control	(8% of A)	8%		\$1,557,082
Mobilization	(7% of A)	7%		\$1,362,446
Erosion Control/Water Quality	(5% of A)	5%		\$973,176
Force Account - Misc.	(10% of A)	10%		\$1,946,352
SUBTOTAL B				\$7,201,502
C.				
Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$6,666,255
CDOT CE	(22% of A+B)	22%		\$5,866,305
Construction Engineering	(12% of A+B)	12%		\$3,199,803
SUBTOTAL C				\$15,732,363
D.				
R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$42,397,384

Assumptions:

- Assumes replacement of large swath of I-25 due to 88th Ave structure replacement and I-25 profile change
- Assumes I-25 work will be 13.5" HMA, 1' ABC, 2' Subgrade Treatment + 1' Earthwork
- 500' retaining wall quantity (< 10') added for area adjacent 88th ave station. No retaining wall are identified in layouts
- Assumes guardrail removal quantities will be reset.
- Assumes no approach work along 88th Ave
- Additional 28,000 cy earthwork to compensate for lower I-25

North I-25 PEL

Conceptual Design Cost Estimate

Alternative: 88th Ave Surface Work

DATE: 6/5/2013

BY: KJB

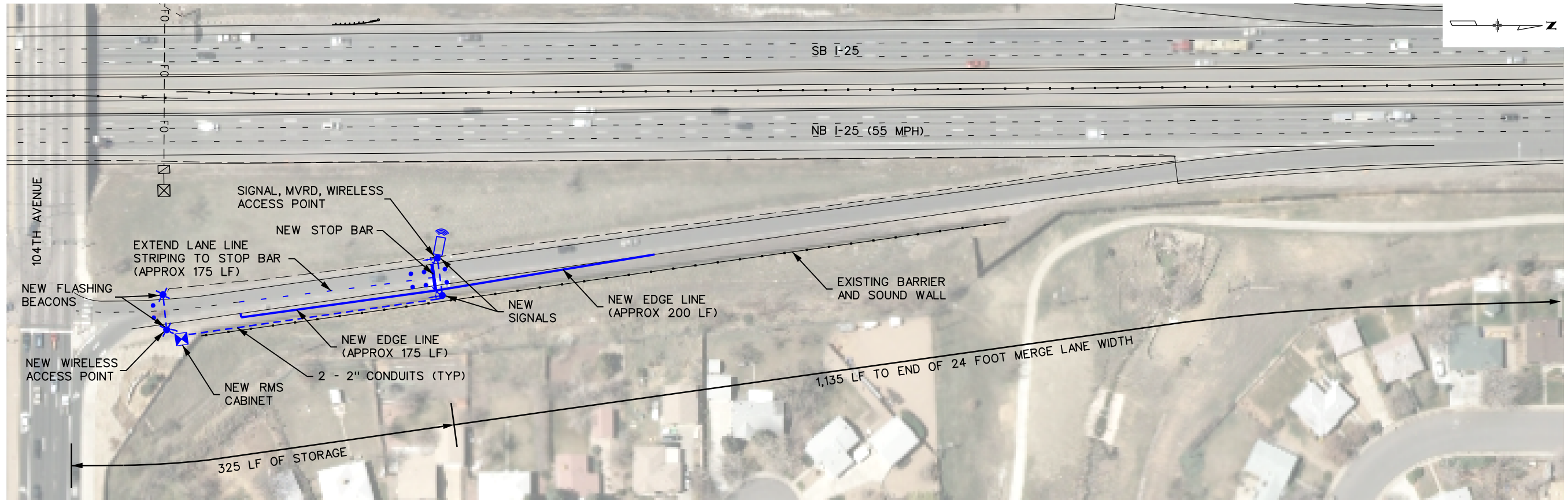
ITEM DESCRIPTION	UNIT	UNIT COST	TOTALS	
			APPROX. QUANTITY	ESTIMATED COST
A. BID ITEMS*				
XXX-XXXXX Removals/Demolition (Flatwork)	SY	\$ 15.00	5,533	\$ 83,000.00
XXX-XXXXX Removal of Wall	SF	\$ 10.00	0	\$ -
XXX-XXXXX Removal of Guardrail (Type 3)	LF	\$ 12.00	0	\$ -
XXX-XXXXX Removal of Guardrail (Type 7)	LF	\$ 15.00	0	\$ -
XXX-XXXXX Removal of Overhead Sign Structure	EA	\$ 3,000.00	0	\$ -
XXX-XXXXX Removal of Structure	SF	\$ 21.00	0	\$ -
XXX-XXXXX Aggregate Base Course (Class 6)	TON	\$ 35.00	3,362	\$ 117,670.00
XXX-XXXXX Hot Mix Asphalt (13.5")	TON	\$ 65.00	4,110	\$ 267,150.00
XXX-XXXXX Concrete Pavement (13 Inch)	SY	\$ 50.00	0	\$ -
XXX-XXXXX Curb and Gutter Type 2 (Section II-B)	LF	\$ 14.00	1,100	\$ 15,400.00
XXX-XXXXX Traffic Signal (Ramp/Partial)(Per Intersection)	EA	\$ 150,000.00	0	\$ -
XXX-XXXXX Guardrail (Type 3)	LF	\$ 40.00	0	\$ -
XXX-XXXXX Guardrail (Type 7)	LF	\$ 45.00	0	\$ -
XXX-XXXXX Sound Wall	LF	\$ 400.00	0	\$ -
XXX-XXXXX Retaining Wall (< 10')	LF	\$ 600.00	400	\$ 240,000.00
XXX-XXXXX Retaining Wall (> 10')	LF	\$ 1,200.00	0	\$ -
XXX-XXXXX Structure	SF	\$ 150.00	0	\$ -
XXX-XXXXX Sidewalk/Trail	SY	\$ 30.00	611	\$ 18,333.33
XXX-XXXXX Overhead Sign Bridge	EA	\$ 50,000.00	0	\$ -
XXX-XXXXX Overhead Sign Cantilever	EA	\$ 20,000.00	0	\$ -
XXX-XXXXX Subgrade Treatment / Embankment (CIP)	CY	\$ 12.00	5,500	\$ 66,000.00
XXX-XXXXX Impact Attenuator	EA	\$ 20,000.00	0	\$ -
				\$ -
SUBTOTAL A				\$ 807,553
B.				
Drainage	(3% of A)	3%		\$24,227
Utility Relocations	(2% of A)	2%		\$16,151
Signing & Striping, Lighting	(2% of A)	2%		\$16,151
Construction Signing & Traffic Control	(8% of A)	8%		\$64,604
Mobilization	(7% of A)	7%		\$56,529
Erosion Control/Water Quality	(5% of A)	5%		\$40,378
Force Account - Misc.	(10% of A)	10%		\$80,755
SUBTOTAL B				\$298,795
C.				
Project Construction Bid Items Contingencies	(25% of A+B)	25%		\$276,587
CDOT CE	(22% of A+B)	22%		\$243,397
Construction Engineering	(12% of A+B)	12%		\$132,762
SUBTOTAL C				\$652,745
D.				
R.O.W Acquisition	Project Dependant		0	\$0
SUBTOTAL D				\$0
GRAND TOTALS (A, B, C & D)				\$1,759,093

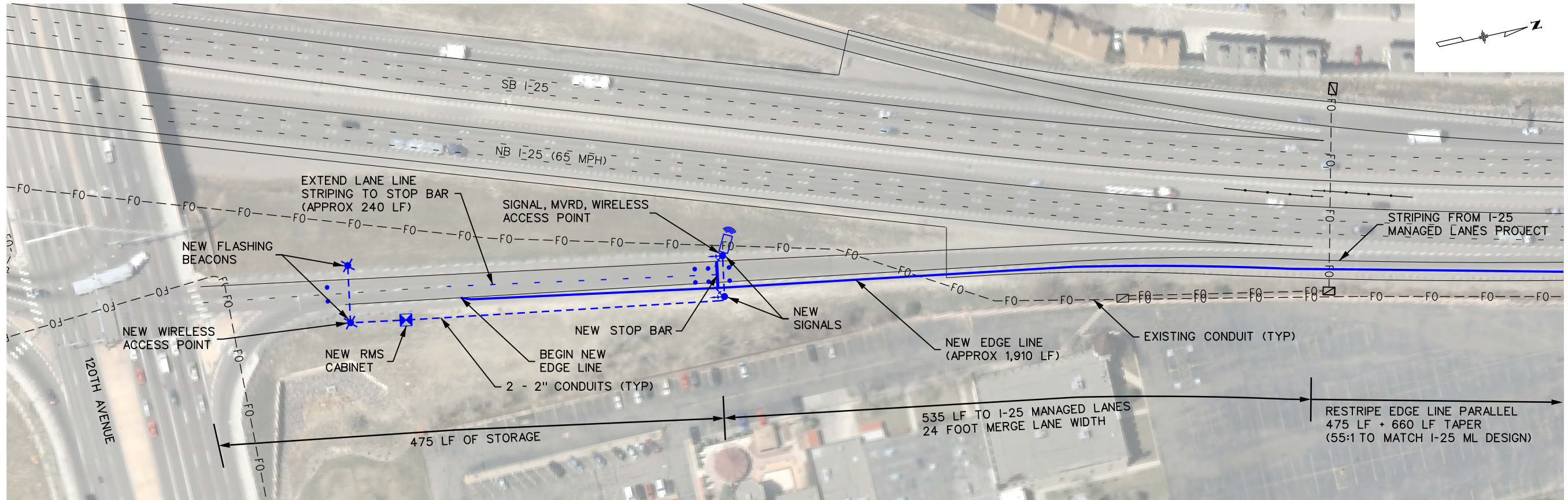
Assumptions: ROW acquisition cost are not included in this estimate
 13.5" HMA
 12" ABC
 2' Subgrade treatment + 1' of earthwork

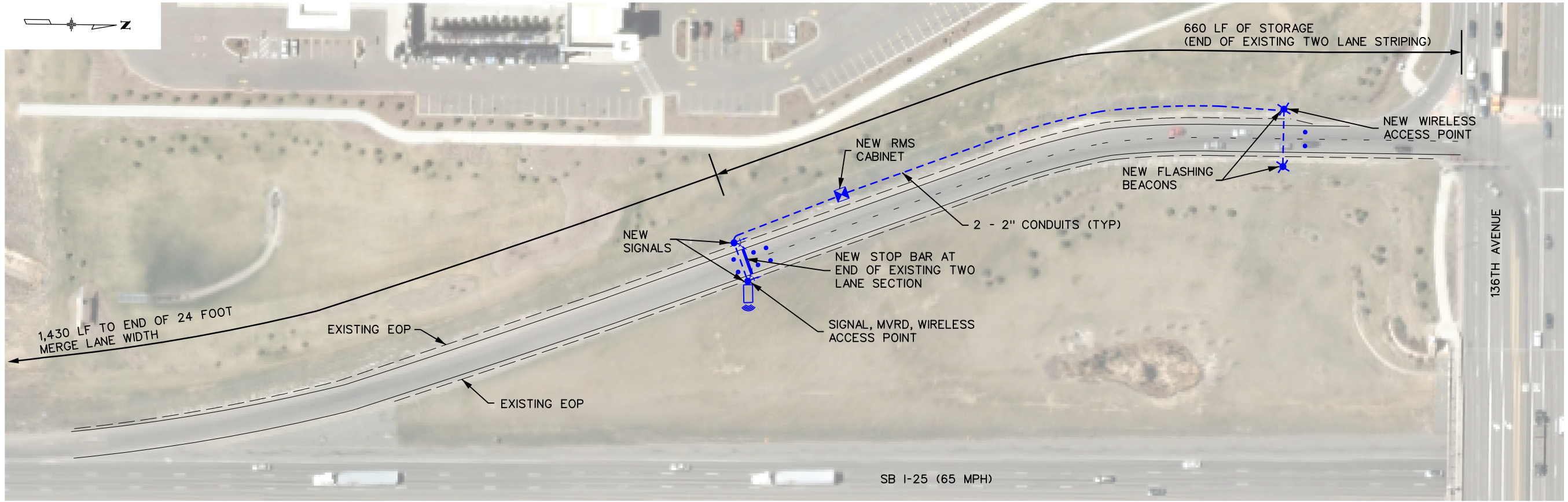


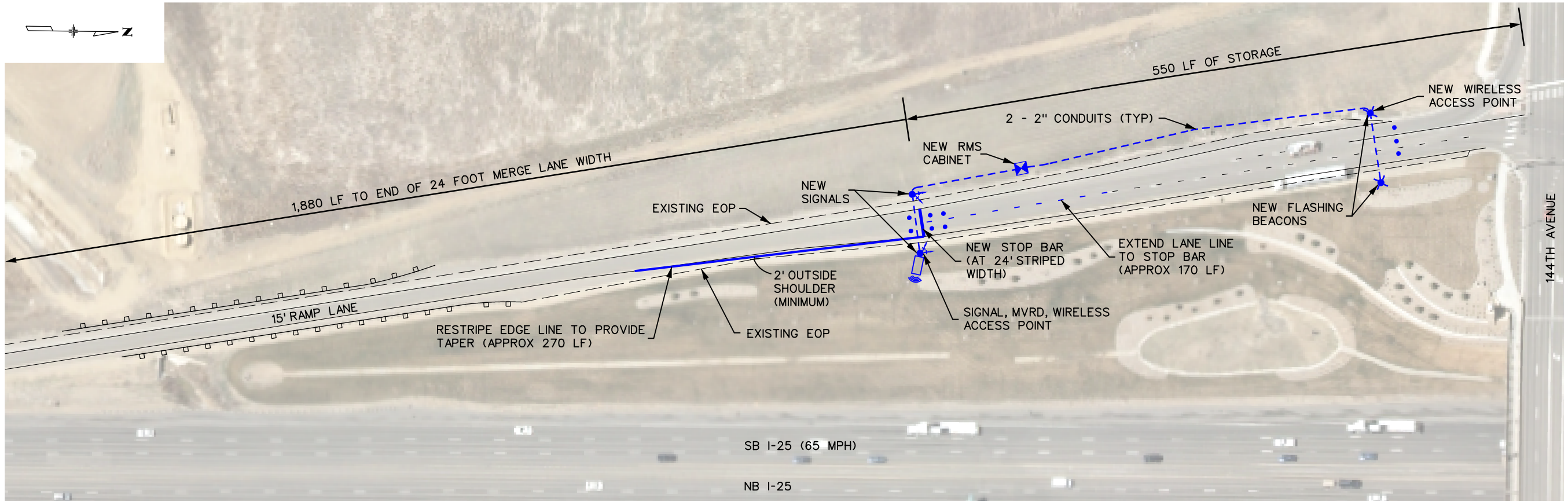
70TH AVE

WASHINGTON









SB I-25 (65 MPH)

NB I-25

144TH AVENUE

