TECHNICAL MEMO

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FROM: Naser Abusaad, P.E., AICP
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SUBJECT: US 377 Cresson Mobility Project – Alternative Analysis Evaluation Methodology

This memo explains the development of evaluation standards for comparing alternative alignments for the proposed US 377 Mobility project in the City of Cresson. The technical methodology represents an opportunity to uniquely define the benefits and costs of each transportation alternative, and determine performance measures that will carry the recommended alternative(s) through the final selection and prioritization process.

The technical methodology has the following major objectives:

- To establish procedures for evaluating the various alternatives.
- To identify performance measures and analytical processes for organizing information on potential benefits and costs of the various alternatives.
- To develop a recommended program for implementing transportation improvements to help meet existing and future transportation demand.

Using an Alternatives Analysis Evaluation Matrix (see attached), the evaluation criteria have been organized into nine major categories: Mobility & Productivity, Safety, Innovative Finance, Environmental Stewardship and Streamlining (Built Environment), Environmental Stewardship and Streamlining (Natural Environment), Efficiency, Level of Public Support, Level of Agency Support, and Regional and Local Connectivity. These categories and criteria are based upon the established purpose and objectives of this study, guidance from the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and public and agency input.

Mobility & Productivity

Level of Service (LOS) at Existing US 377 & SH 171 Intersection – Quantitative assessment of intersection LOS at the existing location of US 377 and SH 171 intersection, excluding delay related to the Fort Worth & Western Railroad crossing. LOS is defined in terms of average travel speed and is dependent on the amount of delay experienced at the signalized intersection. LOS ranges from LOS A, which describes free-flow operation with minimum delays at the signalized intersection, to LOS F, which describes extremely low speeds, high delays, high volumes, and extensive queuing. LOS D is where the influence of congestion becomes more noticeable as it describes the border between stable operations and significant delays. The LOS for the US 377 & SH 171 intersection is based on the afternoon (PM) peak-hour traffic counts provided by the Texas Transportation Institute (TTI) in the year 2008. For the purpose of this study, the 2008 PM peak-hour traffic volume from TTI was converted to the 2030 (design year) PM peak-hour traffic volume.

LOS of each Alternative by Direction (NB/SB) – Quantitative assessment of the LOS for each alternative for the year 2030 based on the Highway Capacity Manual (HCM) guidelines and using the Highway

Capacity Software (HCS). The values provided in the matrix are results from the operational analyses performed for the northbound and southbound directions using a speed of 50 mph.

Delay at US 377 due to the Fort Worth & Western Railroad (FW&WR) – The number of minutes a train blocks US 377 traffic because of switching movements or through movements. These numbers are based on current information from the FW&WR and represent the minimum and maximum minutes of delay per train movement (through crossings and switching movements). Approximately 15 through train crossings and 12 switching movements occur each day.

Delay at the Existing SH 171 Intersection (per cycle) – Quantitative assessment measured in seconds of the controlled delay to motorists caused by the traffic signal cycle during the PM peak hour.

New Street Crossings – Quantitative assessment of the number of new street crossings based on 2007 aerial photography.

Identified Utility Crossings – Quantitative assessment of the number of identified existing and planned utility crossings provided by the City of Cresson.

Safety

Grade Separated Railroad Crossings – Quantitative assessment of the number of grade separated railroad crossings per alternative.

At-Grade Railroad Crossings - Quantitative assessment of the number of at-grade railroad crossings per alternative. This number includes any associated frontage roads or service roads.

Innovative Finance

Est. Construction Cost – The total construction cost, in 2010 dollars, for each alternative represent a combination of bridge construction costs, road construction costs, and right-of-way (ROW) costs. These costs were determined using the Average TxDOT Low Bid tabulations and current market real estate values.

Environmental Stewardship and Streamlining (Built Environment)

Commercial/Industrial Land Use Impacts – Preliminary analysis using existing land use as shown on 2007 aerial photography to identify the potential number of acres of retail, commercial, and industrial land uses that could be affected to implement an alternative.

Residential Impacts – Preliminary analysis using existing land use as shown on 2007 aerial photography and Hood County and Johnson County appraisal district data to identify the potential acres of residential land use that could be affected to implement an alternative.

Displacements – Quantitative assessment of the number of potential displacements based on 2007 aerial photography.

Consistency with Existing/Planned Development – Qualitative indication that each alternative is consistent with major approved plans for transportation, park development, land use, zoning, etc. and existing/planned development and/or redevelopment along the alternative. A yes (Y) indicates that both needs of existing and planned development have been met by the alternative, and a no (N) indicates that the alternative does not meet these needs.

Potential Noise Impacts – Preliminary analysis of residential receivers within the design year 2030 noise impact contour for residential use. A noise impact occurs at a residence when sound approaches or exceeds 66 dBA. A residential receiver would be a residence, house, or apartment unit.

Haz-mat Sites within 300 Feet – Quantitative assessment of the number of known hazardous material sites within 300 feet of an alternative.

Economic Impact to Existing Businesses (Weekday Impact) – Qualitative assessment based on the City of Cresson's expectations, past relief route studies and Work Group input.

Economic Impact to Existing Businesses (Weekend Impact) – Qualitative assessment based on planned entertainment events at the Motorsport Ranch and other special events (e.g.: Civil War reenactment) provided by the City of Cresson and the Work Group.

Environmental Stewardship and Streamlining (Natural Environment)
Section 404 Jurisdictional Waters Impacts - Exploratory-level analysis to identify the number of crossings of potential jurisdictional waters that would be affected by an alternative based on 2007 aerial photography.

100-Year Floodplains – The acreage of floodplain impacts based on the right-of-way footprint for each alternative. Exploratory-level analysis to identify the potential number of existing acres of 100-year floodplain (as presented in Federal Emergency Management Agency Flood Insurance Rate Maps) that could be affected by an alternative.

Agricultural Land Use Impacts – Preliminary analysis using existing land use as shown on 2007 aerial photography to identify the potential acres of agricultural land that could be affected by an alternative.

Woodland Impacts – Preliminary analysis using existing land use as shown on 2007 aerial photography to identify the potential number of acres of dense woodlands that could be affected by an alternative.

Efficiency
Alignment Length – Quantitative assessment of the length of each alternative in miles.

Construction Difficulty or Disruption – Qualitative determination of how easily an alternative could be constructed. Potential factors are traffic operations during construction, impacts to existing roadways, constructability, etc.

Parcels/Property Owners Impacted – Quantitative assessment of the total number of property owners potentially impacted per alternative. Note that an owner of multiple parcels potentially impacted would be counted as one.

Right-of-Way Acreage – Quantitative assessment to determine the preliminary area (in acres) of right-of-way needed per alternative.

Level of Public Support
This criterion documents general support or acceptance of an alternative by the public based on comments and input received from public meetings and presentations. "++" for strong support; "+" for moderate support; "o" for neutral; "-" for moderate opposition; and "- -" for strong opposition.

Level of Agency Support
This criterion documents general support or acceptance of an alternative by federal, state and local agencies based on comments and input received from agency meetings, review with local governments and presentations. “++” for strong support; “+” for moderate support; “o” for neutral; “-” for moderate opposition; and “- -” for strong opposition.

Regional and Local Connectivity
Qualitative indication of how each alternative connects to other existing or planned regionally-significant transportation corridors.

Public Involvement Factor (PIF)
This criterion ranks the importance of the items assessed in the Alternatives Analysis Evaluation Matrix by the public, federal, state and local agencies based on comments and input received. The following will be placed in the matrix to depict the public’s support: “H” for high support; “M” for medium support; and “L” for low support.

Attachment: Alternatives Analysis Evaluation Matrix

US 377 Cresson Mobility Project
Alternatives Analysis Evaluation Matrix

Civil Associates, Inc.

Criteria			No Build Alt	Alt A	Alt B1	Alt B2	Alt C	Alt D
Item	**Unit**	**PIF**						
Mobility & Productivity								
- Level of Service at Existing US 377/SH 171 Intersection	LOS							
- Level of Service for Alternatives by Direction (NB/SB)	LOS							
- Delay at US 377 due to FW&WR (min/max)	minutes							
- Delay at the Existing SH 171 Intersection (per cycle)	seconds							
- New Street Crossings	# of							
- Identified Utility Crossings	# of							
Safety								
- Grade Separated Railroad Crossings on US 377	# of							
- At-Grade Railroad Crossings on US 377	# of							
Innovative Finance								
- Est. Construction Cost (Inclusive of ROW Cost), 2010 dollars	$M							
Environmental Stewardship and Streamlining (Built Environment)								
- Commercial/Industrial Land Use Impacts	acres							
- Residential Impacts	acres							
- Displacements	# of							
- Consistency with Existing/Planned Development	y/n							
- Potential Noise Impacts	# of							
- Historic Resources	# of							
- Haz-mat sites within 300 feet	# of							
- Economic Impact to Existing Businesses - Weekday Impact	* legend							
- Economic Impact to Existing Businesses - Weekend Impact	* legend							
Environmental Stewardship and Streamlining (Natural Environment)								
- Section 404 Jurisdictional Waters Impacts	# of							
- 100-Year Floodplains (total area crossed)	acres							
- Agricultural Land Use Impacts	acres							
- Woodland Impacts	acres							
Efficiency								
- Alignment Length	miles							
- Construction Difficulty or Disruption	* legend							
- Parcels/Property Owners Impacted	# of							
- Right-of-Way Acreage (Additional)	acres							
Level of Public Support	* legend							
Level of Agency Support	* legend							
Regional and Local Connectivity	* legend							

NOTE: Data provided in this analysis is independent of other potential projects (e.g., the proposed SH 171 Couplet and the potential Fort Worth & Western Railroad switch yard relocation).

***Legend**

Public Input Factor (PIF)
High
Medium
Low

Major Negative Effect	Some Negative Effect	No Effect, Neutral	Some Positive Effect	Major Positive Effect
- -	-	o	+	+ +