Example Application from HSIP-Cycle 5 and HR3-Cycle 3

04-Concord-1

Countermeasures Used:

S6: Provide protected left turn phase (left turn lane already exists)
S7: Convert signal to mast arm (from pedestal-mounted)

Primary reasons this application was selected to show as an Example:

- Locations are based on a semi-annual review of the top 20 roadway intersections identified using Crossroads data. Locations are analyzed quantitatively and qualitatively. Highest crash locations are paired with countermeasures
- Multiple locations with similar crash patterns are combined together
- Locations with different countermeasures combined together
- Attachments clearly labeled, which is especially useful for multi-location projects
- Combination of plan view (aerial photo) and photos used to clearly show limits/locations of improvements
- Summary of collisions and costs by location

Changes needed for similar applications in future HSIP calls for projects:

- Applicant misunderstood the Table of Countermeasures. All collisions not just sideswipe and rear-end collisions, should be used. Thus, the B/C for this application is understated. Most of the CRFs Caltrans incorporated into the B/C calculation are intended to be used for "All" intersection collisions
- The collision summary and crash diagrams need to clearly show the collisions going to each CM and the totals. This can be done by writing on the Crossroads printouts or creating a new table

APPLICATION FOR HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROGRAM CYCLE 5 AND HIGH RISK RURAL ROADS (HR3) PROGRAM CYCLE 3

APPLICATION SUMMARY

After the application is finalized, please save this PDF form using the exact "Application ID" (shown below) as the file name.

This summary page is filled out automatically once the application is completed.

Application ID: 04-Concord-1

Submitted By (Agency):
Concord

Caltrans District	Application Number	Out of
04	1	3

Project Location

On Concord Blvd. at the intersections of Sixth Street (1A), Farm Bureau Road (1B), Clayton Way (1C) and West Street (1D).

Project Description

Replace existing permissive/protected left-turn (LT) phases and signal heads with protected LT phases and signal heads on existing poles and mast arms: install new protected LT phases and signal heads on new poles and mast arms for exist LT lanes.

Countermeasure 1: S6: Provide protected left turn phase (left turn lane already exists)

Countermeasure 2: S7: Convert signal to mast arm (from pedestal-mounted)

Countermeasure 3:

Total Expected Benefit $1,963,600.00 **Total Project Cost** $249,600.00

B/C Ratio: 7.87

I. Basic Project Information

Date: Jul 20, 2012 Caltrans District: 04 MPO: MTC

Agency: Concord County: Contra Costa County

Total number of applications being submitted by your agency: 3

Application Number (each application must have a unique number): 1

Contact Person Information

Name (*Last, First*): Danea Gemmell

Position/Title of Contact Person: City Engineer

Email: dgemmell@ci.concord.ca.us Telephone: (925) 671-3470 Extension:

Address: 1950 Parkside Drive, MS/40

City: Concord Zip Code: CA 94519 (Enter only a 5-digit number.)

Project Information

Project Location
-Be Brief (limited to 250 characters)
-See Instructions

On Concord Blvd. at the intersections of Sixth Street (1A), Farm Bureau Road (1B), Clayton Way (1C) and West Street (1D).

Project Description
-Be Brief (limited to 250 characters)
-See Instructions

Replace existing permissive/protected left-turn (LT) phases and signal heads with protected LT phases and signal heads on existing poles and mast arms; install new protected LT phases and signal heads on new poles and mast arms for exist LT lanes.

Functional Classification: Minor Arterial (For Functional Classification and CRS Maps, Visit http://www.dot.ca.gov/hq/tsip/hseb/crs_maps/)

CRS Map ID (e.g. 08E14): 05K55, 06K51

Urban/Rural Area: Urban (Visit http://earth.dot.ca.gov/)

Eligible for HR3 Funding ***(See Instructions)*** No

Work on the State Highway System *(See Instructions)*

Does the project include improvements on the State Highway System? No

If no, move on to the next page; If yes, go to the below question.

Is this a joint-funded project with Caltrans? No

☐ If yes, check this box to confirm a formal Letter of Support from Caltrans - District Traffic is attached to the application. The letter should include estimates of cost sharing.

☐ If no, check this box to confirm a written correspondence from Caltrans District Traffic is attached to the application. The correspondence should indicate that Caltrans does not see issues that would prevent the proposed project from receiving an encroachment permit

Additional Information

1. Is the project focused primarily on "spot location" or "systemic" improvements? Systemic

The primary type of the "systemic" improvements: Add/Upgrade/Modify/Romove Traffic Signal

2. Which of the California's Strategic Highway Safety Plan (SHSP) Challenge Areas does the project address primarily? (For more information on the SHSP and its Challenge Areas, see: http://www.dot.ca.gov/SHSP/)

7: Improve Intersection and Interchange Safety for Roadway Users

3. How were the safety needs and potential countermeasures for this project **first** identified?

Corridor Safety Analysis/Road Safety Assessment

4. What is the primarily mode of travel intended to be benefited by this project?

Motorized users

5. Approximate percentage of project cost going to improvements related to **motorized** travel 100 %

6. Approximate percentage of project cost going to improvements related to **non-motorized** travel 0 %

7. Is the project focused primarily on "Intersection" or "Roadway" improvement?

Intersection

Number of Intersections 4

8. Posted Speed Limit (mph) 35

9. Average Daily Traffic *(See Instructions)*

ADT (Major Road)	ADT (Minor Road)	Year Collected
17,757	4,132	2005

II. Narrative Questions (See Instructions)

These narrative questions are intended to provide additional project details for the application reviewers and project files. Application reviewers will use the information in their "fatal flaw" assessment of the applications, including:

1) The project scope is eligible for HSIP and/or HR3 funding;
2) The countermeasures used in the B/C ratio calculation are appropriately applied based on the scope of the project;
3) The crash data used in the B/C ratio calculation is appropriately applied based on the scope of the project and countermeasures used;
4) The costs included in the application represent the likely total project cost necessary to fully construct the proposed scope. If the proposed project is a piece of a larger construction project, the entire scope of the larger project must be identified.
5) The application data and attachments are reasonable and meet generally accepted traffic engineering and transportation safety principles.

If significant inconsistencies or errors are found in the application information, the Caltrans reviewers may conclude that the application includes one or more "fatal flaws" and the application will be dropped from further funding considerations. The applicant will be notified of Caltrans findings until after the selection process is complete.

1. Overall Identification of Need

Describe how the agency identified the project as one of its top safety priorities. Was a data-driven, safety evaluation of their entire roadway network completed? (limited to 5,000 characters)

City of Concord staff routinely complete reviews of the top 20 roadway intersection and 20 roadway segment accident locations (40 locations total). Completed at least semi-annually, each review encompasses accident data for the previous twelve month period utilizing CROSSROAD traffic collision database management software. The CROSSROAD database is managed and maintained through a collaborative effort between the City's Police and Public Works Depts. High accident locations are identified and analyzed in regards to both crash frequency and crash rate, both quantitatively and qualitatively. Ultimately, the identified worst locations are paired with appropriate countermeasures and developed into deliverable projects for implementation as part of the City's Capital Improvement Program as funding allows. Additional reviews are completed in conjunction with specific funding opportunities. The need for the proposed improvements at the individual intersection locations were identified during such a review based on observed increases in right-of-way violation collisions for left-turning vehicles on Concord Blvd at the intersections of Sixth Street (1A), Farm Bureau Road (1B), Clayton Way (1C) and West Street (1D) and a systemic desire to ultimately move toward uniform "protected" left turn phasing wherever separate left turn lanes are provided on arterials. Over the past six years, the four subject intersections had a total of 43 accidents which are correctable by the proposed countermeasures. Concord Blvd is a primary arterial corridor, providing west-east access across mid-Concord and to large abutting residential areas. Given the similar nature of the existing intersection improvements and accidents, the close proximity of the individual intersection locations along a main arterial corridor, the anticipated corrective improvements for left-turn countermeasures, and the estimated high benefit to cost ratio and positive applicability for HSIP funding, staff recognized the opportunity to advance the combined project for the four locations listed. Additional project benefits include better visibility of intersection signs & signals for Sixth Street traffic (both directions) @ Concord Blvd w/ installation of mast arm signals which are currently pedestal mounted.

2. Potential for Proposed Improvements to Correct the Problem

Describe the primary causes of the collisions that have occurred within the project limits. Are there patterns in the crash types? Clearly demonstrate the connection between the problem and the proposed countermeasures utilized in the Benefit/Cost Ratio calculations. (limited to 5,000 characters)

Note: Safety improvements that do not have countermeasures and crash reduction factors identified in the TIMS B/C Calculator can be included in the project scope; they just won't be added to the project's B/C ratio shown in the application.

The Concord Blvd intersections of Farm Bureau Road (1B), Clayton Way (1C) and West Street (1D), are each currently signalized and provide for combined "permissive/protected" left-turn signal phases for existing left-turn lanes for both directions of Concord Blvd Although signalized, the Concord Blvd/Sixth Street intersection currently provides only "permissive" left-turn signal phasing for

existing left-turn lanes for both directions of Concord Blvd. While "permissive" left-turn signal phasing has worked at these intersections in the past, increasing traffic volumes are reducing the turning opportunities, resulting in increasing right-of-way violation collisions for left-turning vehicles and increased queuing for left-turning vehicles, sometimes to the point of exceeding the available left-turn pocket storage length and blocking through traffic. With fewer clear opportunities, left-turning drivers are increasingly taking chances with oncoming traffic. Due to the mix of both "protected" and "permissive/protected" left-turn signal phasing that currently exists along the subject stretch of Concord Blvd corridor, staff believes driver confusion also plays a part in causing accidents.

In order to minimize the number of accidents for left-turning vehicles at these locations, the proposed HSIP project is to replace the existing "combined permissive/protected" left-turn phases and signal heads for both directions on Concord Blvd with "protected" left-turn phases and signal heads on the existing poles and mast arms at the intersections of Farm Bureau Road (1B), Clayton Way (1C) and West Street (1D).

At the Concord Blvd/Sixth Street intersection (1A), the project will install new "protected" left-turn phases and signal heads for the existing left-turn pockets for both directions of Concord Blvd and Sixth Street, utilizing new poles and mast arms and removal of the existing pedestal poles for Sixth Street.

For all locations, elimination of "permissive" left turns and/or provision of consistent "protected" left-turn phasing for the Concord Blvd corridor will serve to clearly assign right-of-way for left-turning vehicles, reduce driver confusion and ultimately reduce accidents. Additionally, signal timing will be lengthened for left turning from Concord Blvd onto the side streets to make up the loss of the "permissive" portion of the "protected/permissive" phase.

3. Crash Data Evaluation

Describe how the limits of the crash data were established to ensure only appropriate crashes were included in the Collision Summary Report(s), Collision Diagram(s) and B/C calculations. Explain how the influence areas for each separate countermeasure were established. (limited to 5,000 characters)

Collisions that reported and occurred within 250 feet of the intersections in all directions of Concord Blvd @ Sixth Street, @ Farm Bureau Road, @ West Street, and @ Clayton Way for a period of six years (01/01/2006 – 12/31/2012) were considered to justify the proposed improvements. Only sideswipe and rear-end collisions were evaluated to justify the installation of "protected" only left turn phasing for Concord Boulevard @ Farm Bureau Road, @ Clayton Way, @ West Street by eliminating the existing "protective/ permissive" left turn phasing. According to Ted Devini of Caltrans, Division of Local Assistance (916-651-8256), CAMUTCD guideline analysis for the installation of "protected" only left turn phasing is not required for this type of improvements (attached Ted Devini's e-mail to Abul Hossain, City of Concord, dated July 09, 2012). Therefore, staff did not perform this analysis for the above three (3) intersections.

As stated in Caltrans Counter Measure Number: S6, "protected" only left turn phasing is installed to address sideswipe and rear-end type collisions; therefore, staff only considered these two types of collisions reported for a recent twelve month period (07/01/2006 – 06/30/2007) to satisfy the requirement of CAMUTCD collisions guideline for the installation of new "protected" only left turn phasing for Concord Boulevard @ Sixth Street (analysis attached). Additionally, right-angle and rear-end collisions (as described in Counter Measure Number: S7) were evaluated to justify the installation of mast arm signals for Sixth Street by removing the existing pedestal-mounted standards.

4. Prior attempts to address the Safety Issue

If appropriate, list all other projects/countermeasures that have been (or are being) deployed at this location. Applicants must identify all prior federal HSIP, HR3 or Safe Routes To School (SRTS) funds approved within or directly adjacent to the propose projects limits within the last 5 years. (limited to 5,000 characters)

The City initially addressed the subject safety issue through the original installation of the existing traffic signal improvements at each of the intersections. At that time, the left-turn lanes and "permissive" and/or "permissive/protected" signal phasing provided at each intersection was adequate for the existing traffic volumes. As traffic volumes have increased over time, staff has adjusted the signal cycle timing to maximize the best balance between traffic flow and traffic safety.

In the past two years, the City has expended approximately $1.5M for sidewalk and pedestrian safety improvements and approximately $3M for pavement rehabilitation along the subject sections of Concord Blvd.

5. Total project costs

Describe the process used to establish the total cost for the project. Confirm contingencies for reasonably expected costs, including drainage, environmental, traffic, etc, are included. (limited to 5,000 characters)

Note: For applications with more than one countermeasure used in the B/C calculations, applicants need to describe the logic used to distribute the total project cost to each countermeasure.

The estimated total cost for the project was developed based on estimation of the needed scope of environmental (such as number and degree of anticipated studies and appropriate level of NEPA/CEQA approval) and engineering (such as surveying and geotechnical work, and complexity of final design) services, the anticipated division of work effort between City staff and consultants, and the estimated prediction of the scope of the physical improvements to ultimately be constructed/installed. Costs for both professional services and construction were estimated based on review of actual costs expended on similar past projects. Construction costs were adjusted based on engineering judgement as to the impact of the current bidding climate and estimated economies of scale. Estimated environmental and engineering costs were also evaluated against normal industry standards and the estimated total construction cost, which includes a 20% contingency.

Estimated total project costs were distributed to each of the two listed countermeasures based on an estimated split in the estimated construction costs. This split was based on assignment of 100% of those construction costs clearly attributable to either of the specific countermeasures, such as changing out a left-turn-lane signal head. Shared costs, such as mobilization, traffic control, intersection wiring, etc., were then distributed between the two listed countermeasures. The cost share distributed to each countermeasure was based on engineering judgement and various quantitative factors, such as a simple split, the relative percentage of the costs of the other items of work, the number of relocated signal poles assigned to each countermeasure, etc.

III. Project Cost Estimate (See Instructions)

All project costs must be accounted for on this form, even if substantial elements of the overall project are to be funded by other sources.

Round all costs up to the nearest hundred dollars. Once all costs are entered, click "Check Cost Estimate" to perform validation. If errors are detected, they will appear below the button. Click it to check again each time when the costs have been revised.

Phase		Federal Funds	Local/Other Funds(7)	Total Cost	Federal/Total(5)
Preliminary Engineering	Environmental	$3,500	$500	$4,000	
	PS&E	$26,500	$2,900	$29,400	
	PE Subtotal(2)	**$30,000**	**$3,400**	**$33,400**	**90%**
	☐ Agency does NOT request **federal** funds for PE Phase (automatically checked if PE - federal funds is $0).				
Right of Way	Right of Way Engineering				
	Appraisals, Acquisitions & Utilities				
	ROW Subtotal(3)				**0%**
Construction Engineering & Construction	Construction Engineering(4)	$19,400	$2,200	$21,600	**90%**
	Construction(1)	$175,100	$19,500	$194,600	**90%**
	CON Subtotal	**$194,500**	**$21,700**	**$216,200**	
	Total Cost(5)(6)(7)	**$224,500**	**$25,100**	**$249,600**	

(1) The "Total Construction Cost" (including contingencies) must match the detailed Engineer's Estimate (attached to the application).
(2) "Federal Funds" for Preliminary Engineering may not exceed 25% of the Federal Construction Cost.
(3) "Federal Funds" for Right of Way may not exceed 25% of the Federal Construction Cost.
(4) "Federal Funds" for Construction Engineering may not exceed 15% of the Federal Construction Cost.
(5) "Federal Funds" may not exceed 90% of "Total Cost." This applies to each phase.
(6) "Federal Funds" may not exceed $900,000.
(7) To maintain efficiencies in the overall Program and Project Management, the total "Federal Funds" must be no less than $100,000 (see Application Form Instructions for exceptions). If needed, agencies should consider extending the project limits and/or adding other safety improvements in order to increase both the Benefits and Costs.

Check Cost Estimate [Per (2) through (7) above]

Congratulations! No errors have been found in the cost estimate

IV. Implementation Schedule *(See Instructions)*

The local agency is expected to deliver the project per Caltrans Local Assistance safety program delivery requirements.
In order for the milestones to be calculated correctly, all fields needs to be filled in. For steps that are not applicable, enter "0".

Target Date for the Project's Amendment into the FTIP: 01/01/2013

Time for agency to internally staff project and request PE authorization	3	Month(s)
Typical Time for Caltrans and FHWA to process and approve PE authorization	2	Month(s)
Proposed PE Authorization Date:	06/02/2013	**(PE Authorization Delivery Milestone)**
Will external consultants be required to complete the PE phase of this project?	*Yes*	
Additional time needed to the Delivery Process for hiring PE consultant(s)	3	Month(s) (0 - 6)
Time to prepare environmental studies request	3	Month(s)
Time to complete CEQA/NEPA studies/approvals	4	Month(s)
See PES Form in the LAPM for Typical studies and permits		
Time to complete the Right of Way Acquisition (federal process)	1	Month(s)
Plan on 18 months minimum for federal process including a condemnation		
Time to complete final PS&E documentation	6	Month(s)
Other	0	Month(s)
Expected Completion Date for the PE Phase:	11/01/2014	
Time for agency to request CON authorization	2	Month(s)
Typical Time for Caltrans and FHWA to process and approve CON Auth	3	Month(s)
Proposed CON Authorization Date:	04/02/2015	**(CON Authorization Delivery Milestone)**
Time included for the agency's workload-leveling or construction-window needs	0	Month(s)
Time to award contract with CON contractor (following the federal process, including Board/Council approval, advertise, award, execute and mobilize)	4	Month(s)
Time to complete construction	8	Month(s)
Time included for closing the CON contract	3	Month(s)
Other	0	Month(s)
Expected Completion Date for the CON Phase:	07/01/2016	
Time to complete the project close-out process	3	Month(s)
Typical Time for Caltrans and FHWA to process and approve project close-out	3	Month(s)
Expected Completion Date for the project Close-Out:	12/30/2016	**(Close-Out Delivery Milestone)**

V. Countermeasures, Crash Data and Benefit/Cost Ratio *(See Instructions)*

In the process of completing this application, the Local Agency is required to utilize the Benefit/Cost Ratio Calculation Tool that is included in the Safe Transportation research and Education Center (SafeTREC) Transportation Injury Mapping System (TIMS) web site. This **web site** can be assessed at http://tims.berkeley.edu/

The final output summary page from TIMS must be included as part of the official application (both electronically and hard copy). The hard copy page must be included in the application following this page.

In order to facilitate the electronic collection and tracking of this data, Caltrans is requiring agencies to manually enter some of the key "input data" and "output data" used in their final TIMS B/C Ratio. *NOTE: If any of the values inputted on this sheet do not match the values from the TIMS B/C Ratio Output Summary sheet, THE APPLICATION WILL BE REJECTED.* ***Be Careful and confirm the numbers!***

TIMS Application ID: **04-Concord-1** (This ID is generated by this form. TIMS Application ID must match this ID.)

Version (from TIMS) : **1**

Total Project Cost: $249,600 (This must match the total project cost in Section III.)

Countermeasure Information

Number of countermeasures utilized: 2

	Countermeasure	% of Total Project Cost
#1:	S6: Provide protected left turn phase (left turn lane already exists)	65 (%)
#2:	S7: Convert signal to mast arm (from pedestal-mounted)	35 (%)
#3:		0 (%)

B/C Ratio Calculation

	Expected Benefit (Life)	Expected Cost	Resulting B/C
Countermeasure #1	$1,502,000	$162,240	9.26
Countermeasure #2	$461,600	$87,360	5.28
Countermeasure #3		$0	0.00
Project's Total (Overall)	**$1,963,600**	**$249,600**	**7.87**

VI. Application Data Verification and Signature (See Instructions)

All HSIP/HR3 applications (hard-copies only) must be signed by a registered engineer or the Agency's Transportation Manager in responsible charge of their Traffic Engineering section. By signing and submitting this application, the engineer/manager is attesting to:

1. All data in the application is accurate and represents the total scope of the planned project.
2. All likely project costs are included in the Total Project Cost (additional federal funds for cost increases will not be approved.)
3. Each countermeasure included represents a minimum of 20% of the Total Project Cost.
4. All crash data is: 1) accurately shown in collision diagram(s) attached to this application; and 2) applied to countermeasures using generally accepted traffic engineering principles.
5. The agency understands the Project Delivery Requirements for the HSIP and HR3 programs and is prepared to deliver the project with these requirements;
6. The agency understands if Caltrans staff determine that any of the above requirements are not met, inaccurate, or fail to meet the program guidelines and application instructions, the application will be rejected and will not be eligible to receive federal safety funding. Due to time constraints in the evaluation process, applicants will not be notified until after the selection process is complete. Refer to Application Form Instructions for more information on "fatal flaws."

Name *(Last, First)*: Gemmell, Danea

Title: City Engineer

Signature*: Danea Gemmell

Engineer License Number: 54151

Date: Jul 20, 2012

* Note: This signature is only expected on the two hard copies of the application. The electronic copy of this PDF form must be saved in the original format (NOT a scanned copy) so the application data can be extracted.

Application Attachments (See Instructions)

Check all attachments included in this application.

- ☒ Vicinity map /Location map (Required)
- ☒ Project map showing existing and proposed conditions (Required)
- ☒ Collision diagram(s) (Required)
- ☒ Collision summary report / list (Required)
- ☒ TIMS output summary sheet (Required)
- ☒ Detailed Engineer's Estimate (Required)
- ☒ Warrant studies (Required when applicable to proposed improvements)
- ☐ Letter of Support from Caltrans (Required when applicable)
- ☒ Additional narration, documentation, photographs, letters of support, etc.

Application Submittal Process

For applications to be included in the final Caltrans review, ranking and selection process, they must follow the exact submittal process identified in the application instructions. Some of the key requirements are as follows:

1). Submit two (2) original copies of the SIGNED application form and attachments;

2). On a CD or flash drive, submit electronic copies of

- The original PDF form with application data. The file name must match the "Application ID" shown on the cover page. This file will be used to extract the application data. It can not be a scanned or printed copy.
- Separate electronic PDF files for a scanned copy of signed application form and application attachments.

3) The above must be submitted to Caltrans Local Assistance District Local Assistance Engineer (DLAE), by Friday, July 20, 2012.

CITY OF CONCORD

Application Attachments

PROJECT 1 – CONCORD BLVD. LEFT TURN LANE TRAFFIC SIGNAL IMPROVEMENTS

Attachment	Description
1	Location map
2.1	Project Map - Concord Boulevard @ Sixth Street (1A)
2.1.1- 2.1.4	Existing/Proposed Condition - Concord Boulevard @ Sixth Street (1A)
2.2	Project Map – Concord Boulevard @ Farm Bureau Road (1B)
2.2.1- 2.2.2	Existing/Proposed Condition - Concord Boulevard @ Farm Bureau Road (1B)
2.3	Project Map – Concord Boulevard @ Clayton Way (1C)
2.3.1-2.3.2	Existing/Proposed Condition - Concord Boulevard @ Clayton Way (1C)
2.4	Project Map – Concord Boulevard @ West Lane (1D)
2.4.1	Existing/Proposed Condition - Concord Boulevard @ West Lane (1D)
3.1-3.4	Collision diagram(s)
4.1-4.4	Collision summary report / list
5	TIMS output summary sheet
6	Detailed Engineer's Estimate – Project 1
6.1- 6.4	Indiv. Detailed Engineer's Estimates – Locs. 1A, B, C, & D
7	Warrant Study - Concord Boulevard @ Sixth Street (1A): Protected Left Turns Only

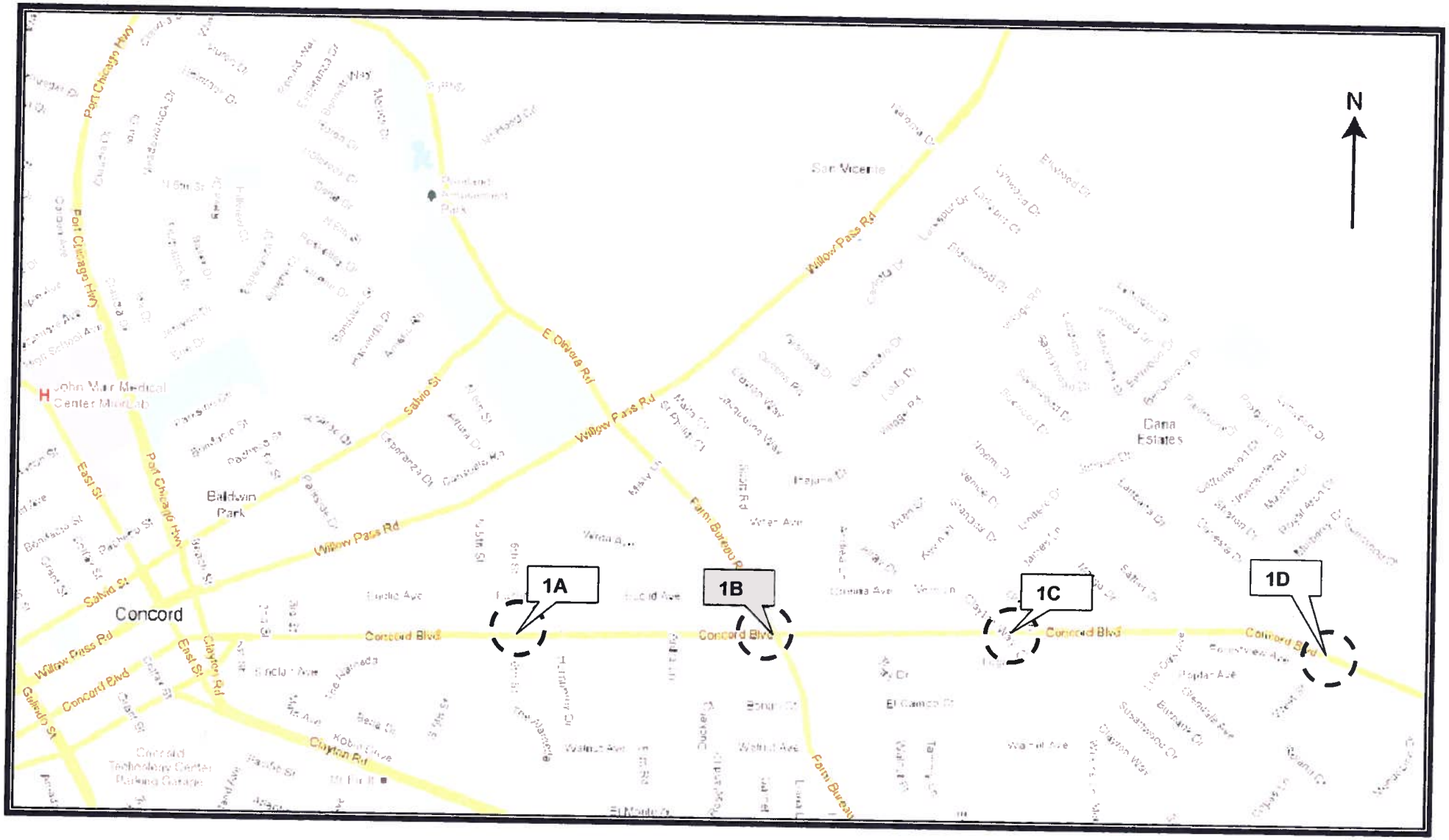


FIGURE 1 - LOCATION MAP

PROJECT 1: CONCORD BOULEVARD LEFT-TURN-LANE TRAFFIC SIGNAL IMPROVMENTS

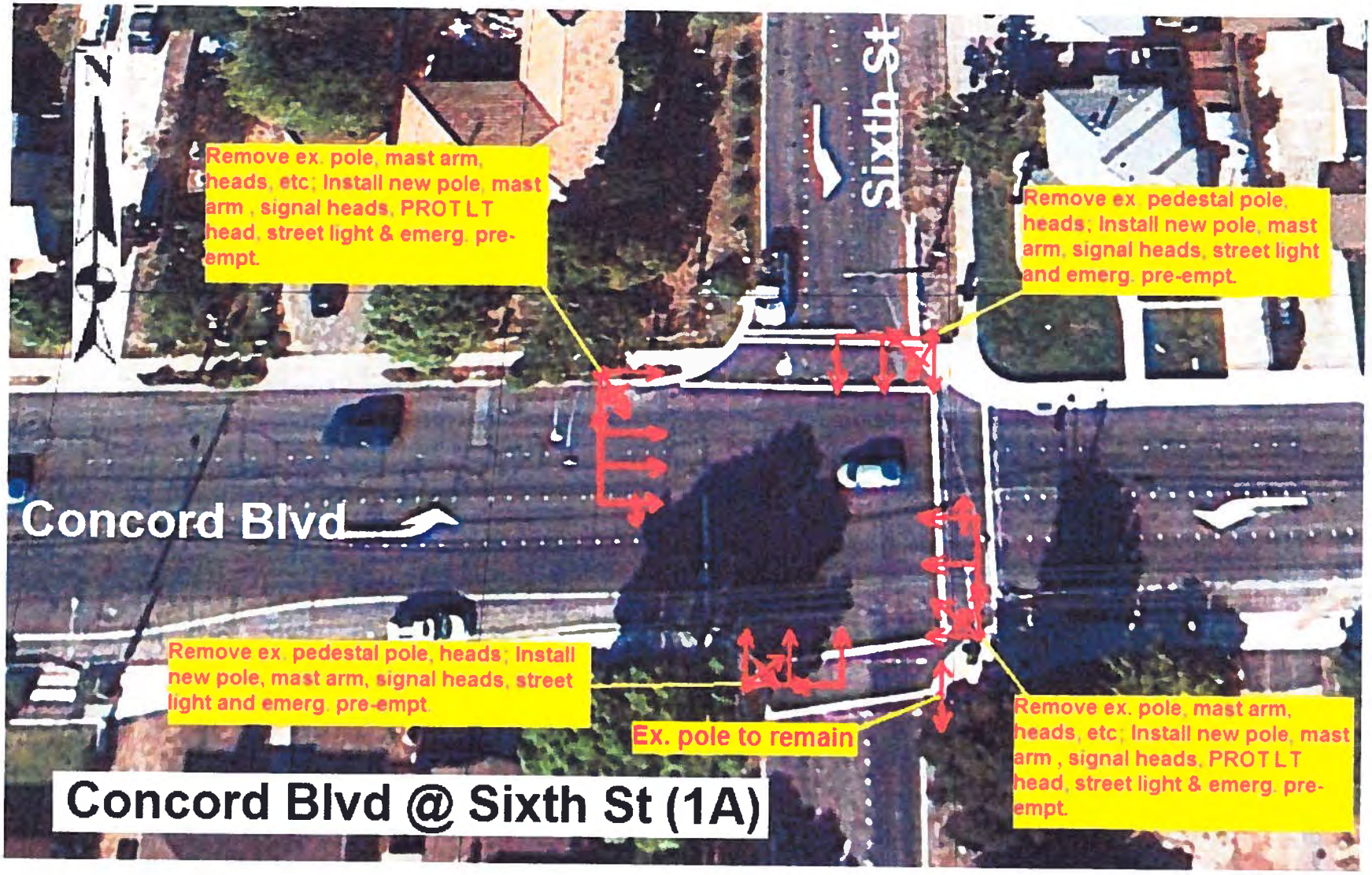


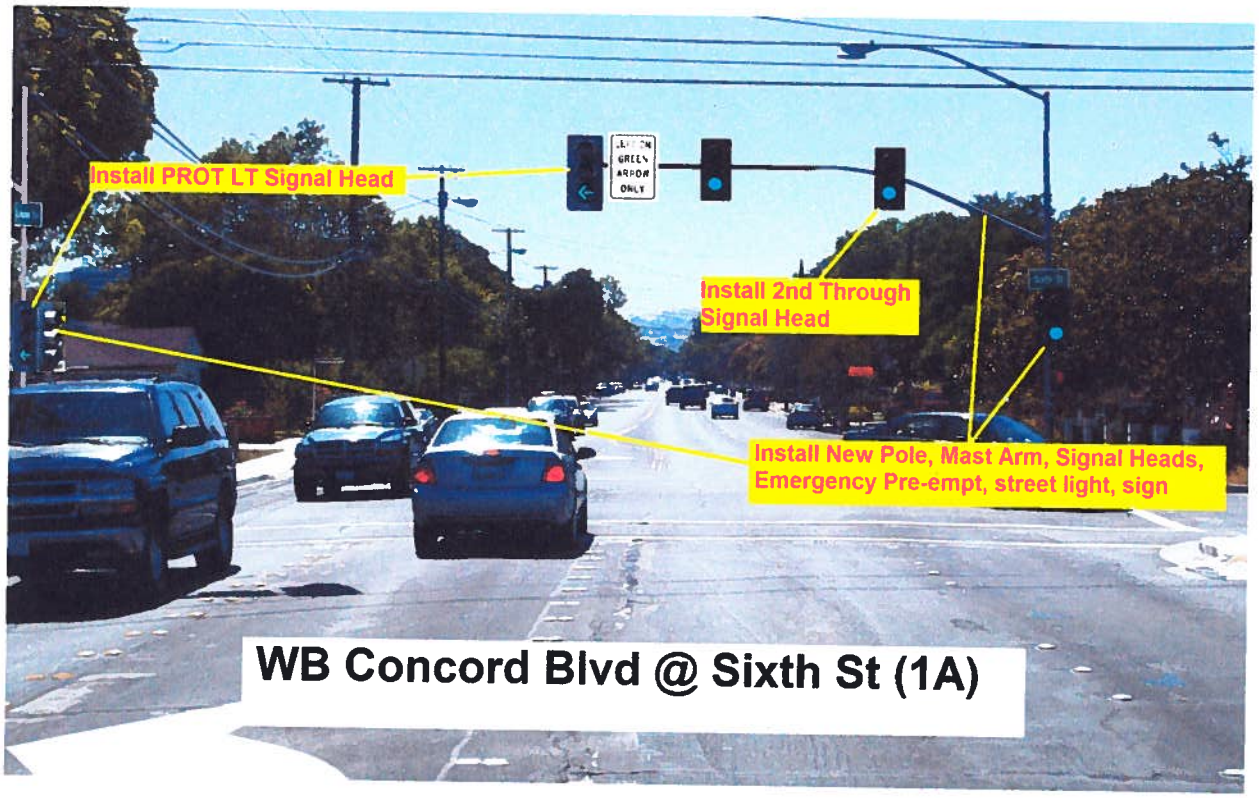
FIGURE 2.1 - Project Map : Concord Boulevard Street @ Sixth Street (1A)

EXISTING CONDITION

PROPOSED CONDITION

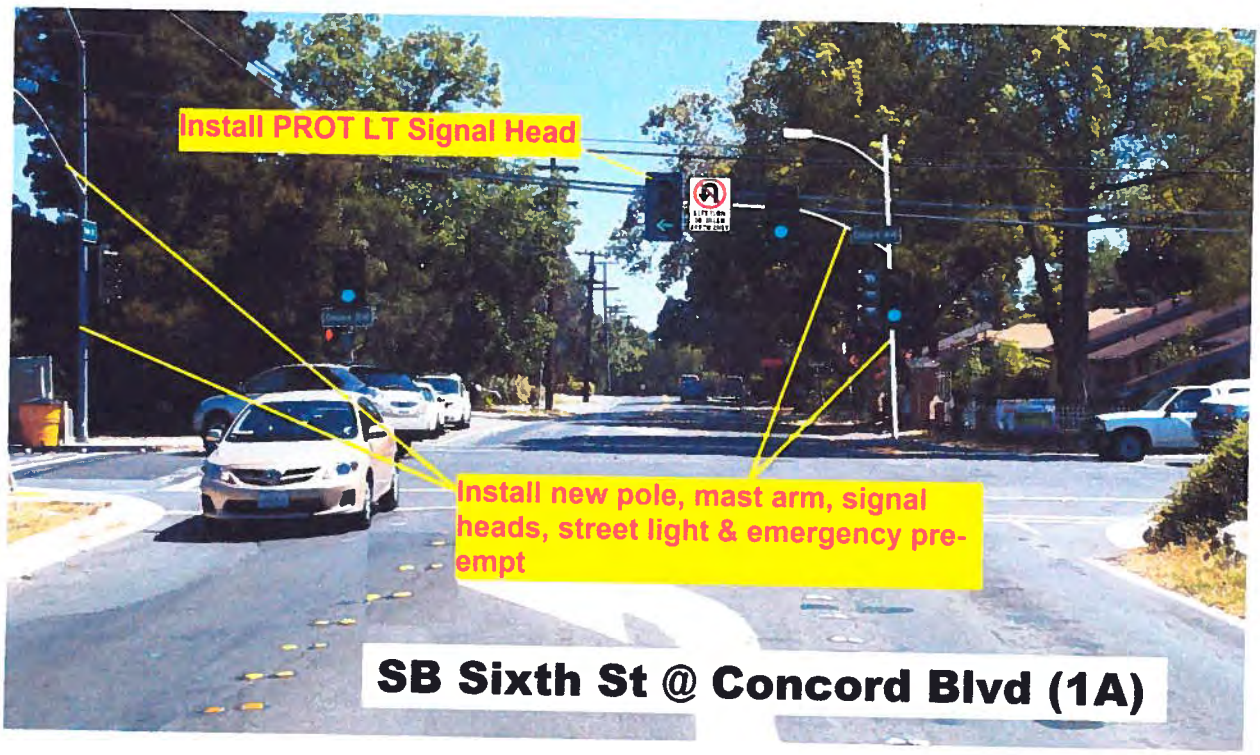
FIGURE 2.1.1

EXISTING CONDITION



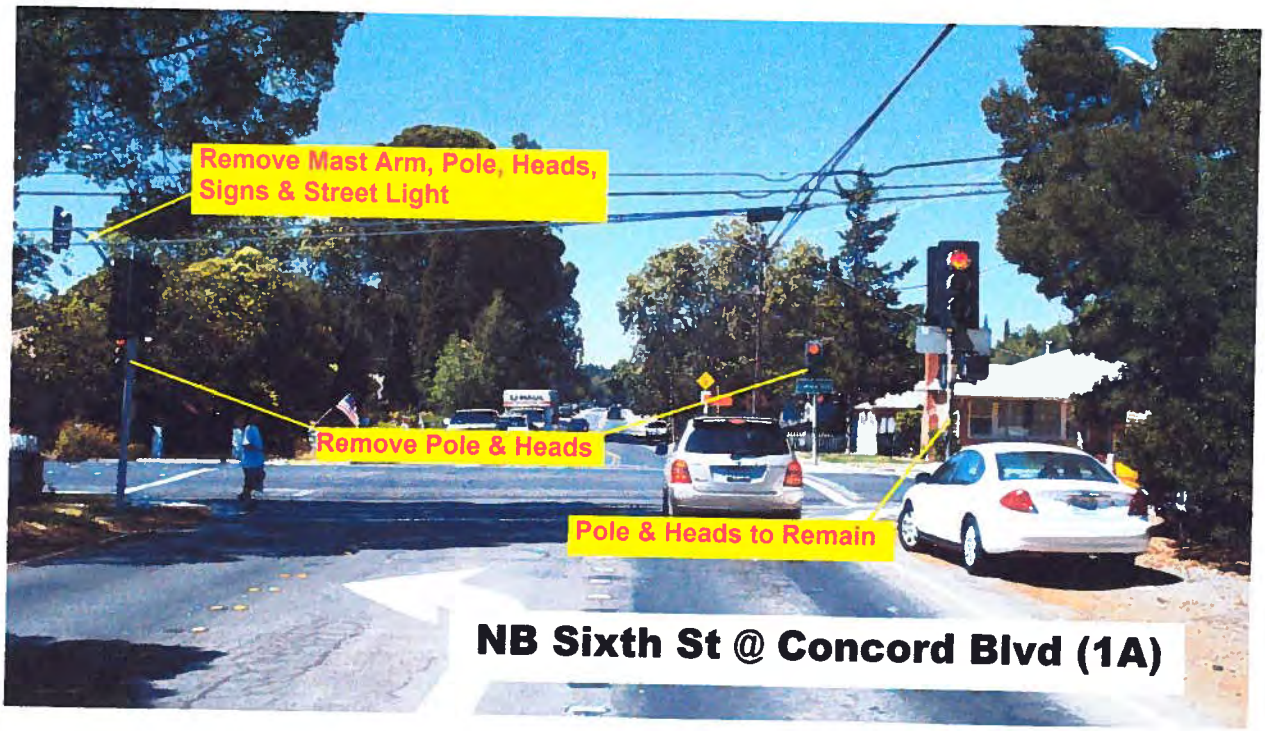
PROPOSED CONDITION
FIGURE 2.1.2

EXISTING CONDITION



PROPOSED CONDITION

FIGURE 2.1.3



EXISTING CONDITION

PROPOSED CONDITION

FIGURE 2.1.4

Project 1 (Concord B @ Farm Bureau Rd, @ Clayton Way, @ West St and @ Sixth St)
Date: 07/09/2012

Intersection	Type of Counter Measure	Reporting Period	# of Reported Collisions	Total # of Correctible Collisions	Total # of Correctible Collisions by "Left Turn Arrow"/and or "Mast Arm Signals"	Years of Service Life (YSL)	# of Property Damage Only (PDO) (O)	# of Minor Injury (C)	# of Injury (B)	# of Severe Injury (A)	# of Fatality (K)	Crash Reduction Factor	Benefit (Annual)	Benefit (Life)	Const. Cost (AH)	Benefit /cost (AH)	Const. Cost (Gregg)	Benefit /cost (Gregg)
Concord Bl @ Farm Bureau Rd	Remove ex. "protected permissive" phase & install protected only "left turn" phase for Concord Bl	1/1/2006 - 12/31/2011 = 6 Years	33	20	20	20	17		4			0.3	$22,090	$441,800	$30,000	14.73	$18,480	23.91
Concord Bl @ Clayton Way	Remove ex. "protected permissive" phase & install protected only "left turn" phase for Concord Bl	1/1/2006 - 12/31/2011 = 6 Years	9	4	4	20	2		3			0.3	$12,590	$251,800	$30,000	8.39	$23,520	10.71
Concord Bl @ West St	Remove ex. "protected permissive" phase & install protected only "left turn" phase for Concord Bl	1/1/2006 - 12/31/2011 = 6 Years	19	11	11	20	8		3	1		0.3	$25,610	$512,200	$30,000	17.07	$15,960	32.09
Concord Bl @ 6th St	Install "protected left turn Phase" for Concord Bl (left turn lane already exists)	1/1/2006 - 12/31/2011 = 6 Years	26	21	10	20	8		3			0.3	$14,810	$296,200	$225,000	1.32	$101,482	2.92
Total (Protected left turn phase)					45		35		13	1			$75,100	$1,502,000	$315,000	4.77	$159,442	9.42
Concord Bl @ 6th St	Convert signal to mast arm (from pedestal-mounted) for 6th St	1/1/2006 - 12/31/2011 = 6 Years	26	21	11	20	9		5			0.3	$23,080	$461,600	$175,000	2.64	$90,158	5.12
Total (Mast arm signal)					11	20	9		5				$23,080	$461,600	$175,000	2.64	$90,158	5.12
Grand Total (Left turn phase+mast arm)					56		44	0	18	1	0		$98,180	$1,963,600	$490,000	4.01	$249,600	7.87

#	Crash Severity*	Severity Factor	Crash Cost**
1	Fatality (K)	4	$4,008,900
2	Severe Injury/Disabling Injury (A)	3	$216,000
3	Evident Injury - Other Visible (B)	2	$79,000
4	Possible Injury - Complaint of Pain (C)	1	$44,900
5	Property Damage Only (PDO) (O)	0	$7,400

*: The letter in parenthesis (K, A, B, C, and O) refer to KABCO scale; it is commonly used by law enforcement agencies in their crash reporting efforts and is further documented in the HSM.

**: Highway Safety Manual (HSM), First Edition, 2010

Benefit (Annual) = ((O*$7,400 + C*$44,900 + B*$79,000 + A*$216,000 + K*$4,008900)*CRF)/Reporting Period

Benefit (Life) = Benefit (Annual)*YSL

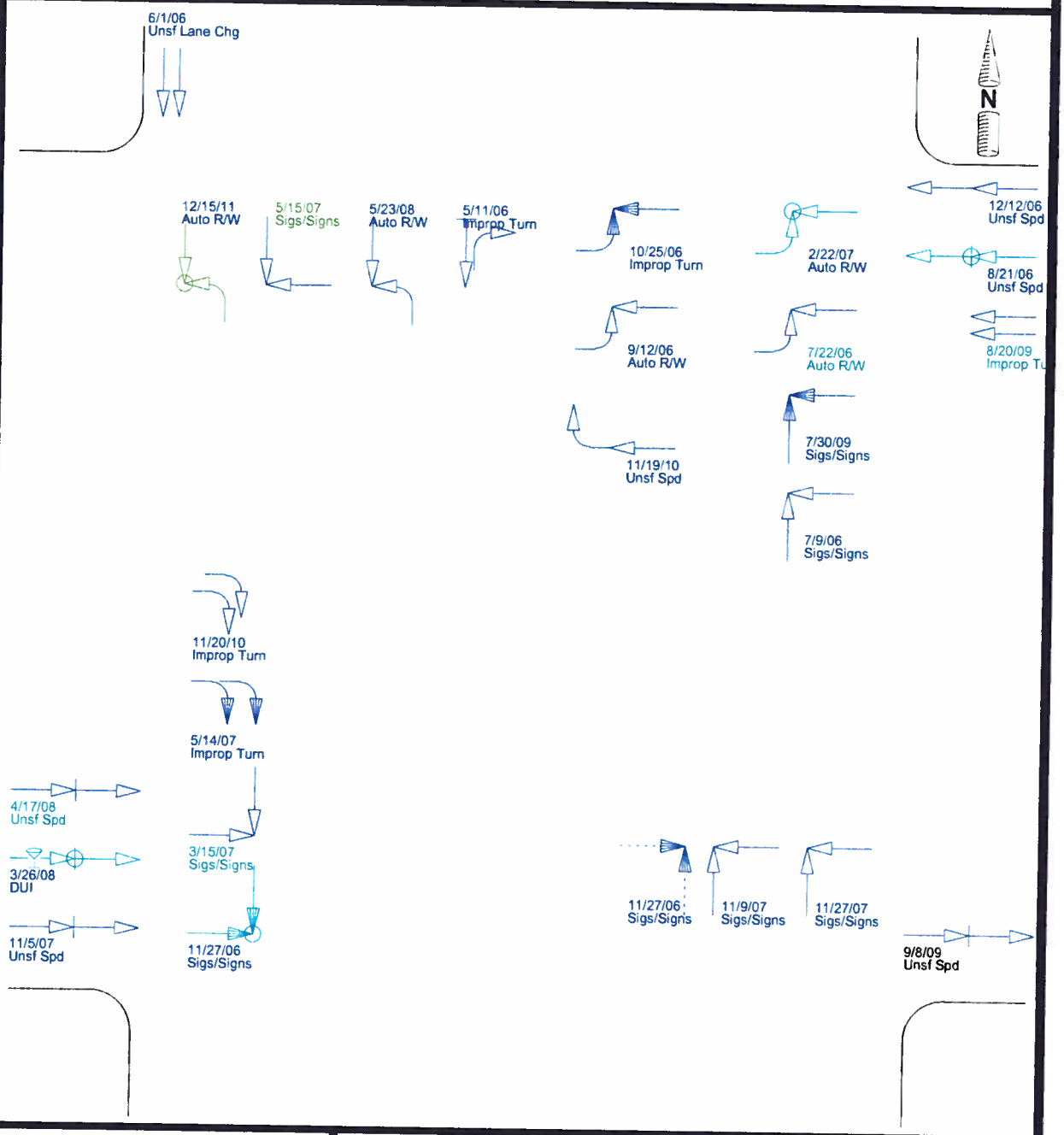
Collision Diagram

Horizontal Street: CONCORD BL

Vertical Street: SIXTH ST

From: 1/1/2006 To: 12/31/2011

Date Prepared: 6/25/2012



Number of Collisions

21	Property Damage Only
5	Injury Collisions
0	Fatal Collisions
26	Total Collisions

Legend

- Moving Vehicle
- Stopped Vehicle
- Backing Vehicle
- Ran Off Road
- Movement Unknown
- Right Turn
- Left Turn
- Sideswipe
- Day
- Night
- Pedestrian
- Fixed Object
- Bicycle
- DUI
- Injury
- Fatal

LOCATION 1A

Color Legend - Highest Degree of Injury

Maroon = Fatal

Purple = Severe Injury

Green = Other Visible Injury

Teal = Complaint of Pain

Dark Blue = Property Damage Only

Settings Used For Query

Parameter	Setting
Street Name	CONCORD BL
Cross Street	SIXTH ST
Starting Date	1/1/2006
Ending Date	12/31/2011
Intersection	Intersection Related

Analysis for Left Turn Arrow Signal
Intersection: Concord Blvd (E/W) @ Sixth (N/S)
Date of Analysis: 06/25/2012
Analyzed by: Abul Hossain

Accident Warrant

Period	Total # of Months	# of Reported Collisions	# of Collisions Correctible by the Installation of "Left Turn Arrow" Signals for EB/WB Approaches (Concord Bl)	Guideline for the Installation of "Left Turn Arrow" Signals Satisfied? (Minimum Requirement is 5)
07/01/2006 - 06/30/2007	12	12	6	Yes

Support:

05 The most likely possibilities are:

1. Prohibition of left turns. This can be done only if there are convenient alternate means of making the movement. Typical alternate means are:
   a. A series of right and/or left turns around a block to permit getting to the desired destination; or
   b. Making the left turn at an adjacent unsignalized intersection during gaps in the opposing through traffic.
2. Geometric changes to eliminate the left turn. An effective change would be a complete separation or a complete or partial "clover leaf" at grade. Any of these, while eliminating left turns, requires additional cost and right of way.
3. Provide protected-permissive or permissive-protected left turn operation. The protected left turn interval may be prohibited during certain periods of the day to allow only permissive intervals for left turn movement in order to increase the green time available for other phases. Refer to Section 4D.20 for the requirements of protected-permissive or permissive-protected left turn operation.

Guidance:

06 Protected left turn phases should be considered where such alternatives couldn't be utilized, and one or more of the following conditions exist:

1. *Collisions - Five or more left turn collisions for a particular left turn movement during a recent 12-month period.*
2. *Delay - Left-turn delay of one or more vehicles, which were waiting at the beginning of the green interval and are still remaining in the left turn lane after at least 80% of the total number of cycles for one hour.*
3. *Volume - At new intersections where only estimated volumes are available, the following criteria may be used. For pretimed signal or a background-cycle-controlled actuated signal, a left turn volume of more than two vehicles per approach per cycle for a peak hour; or for a traffic-actuated signal, 50 or more left turning vehicles per hour in one direction with the product of the turning and conflicting through traffic during the peak hour of 100,000 or more.*
4. *Miscellaneous. Other factors that might be considered include but are not limited to: impaired sight distance due to horizontal or vertical curvature, or where there are a large percentage of buses and trucks.*

Section 4D.20 Signal Indications for Protected/Permissive Mode Left-Turn Movements

Standard:

01 If a shared signal face is provided for a protected/permissive mode left turn, it shall meet the following requirements (see Figure 4D-11):

A. It shall be capable of displaying the following signal indications: steady CIRCULAR RED, steady CIRCULAR YELLOW, CIRCULAR green, steady left-turn YELLOW ARROW, and left-turn GREEN ARROW. Only one of the three circular indications shall be displayed at any given time. Only one of the two arrow indications shall be displayed at any given time. If the left-turn GREEN ARROW signal indication and the CIRCULAR GREEN signal indication(s) for the adjacent through movement are always terminated together, the steady left-turn YELLOW ARROW signal indication shall not be required.

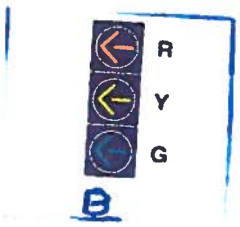
B. During the protected left-turn movement, the shared signal face shall simultaneously display a left-turn GREEN ARROW signal indication and a circular signal indication that is the same color as the signal indication for the adjacent through lane on the same approach as the protected left turn.

C. A steady left-turn YELLOW ARROW signal indication shall be displayed following the left-turn GREEN ARROW signal indication, unless the left-turn GREEN ARROW signal indication and the CIRCULAR GREEN signal indication(s) for the adjacent through movement are being terminated together. When the left-turn GREEN ARROW and CIRCULAR GREEN signal indications are being terminated together, the required display following the left-turn GREEN ARROW signal indication shall be either the display of a CIRCULAR YELLOW signal indication alone or the simultaneous display of the CIRCULAR YELLOW and left-turn YELLOW ARROW signal indications.

D. During the permissive left-turn movement, the shared signal face shall display only a CIRCULAR GREEN signal indication.

E. A protected/permissive shared signal face, regardless of where it is positioned and regardless of how many adjacent through signal faces are provided, shall always simultaneously display the same color of circular indication that the adjacent through signal face or faces display.

Existing Installation: Protected/Permissive Mode Left Turns



Proposed Change: Protected Only Mode Left Turns

Question: Do we need to submit guideline/warrant for left-turn phasing?

City of Concord
Transportation Division

Traffic Collision History Report

Location: Concord Bl / Sixth St
Date Range Reported: 1/1/2006 - 12/31/2011
Total Number of Collisions: 26

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
~~06-11167~~	~~5/11/06~~	~~11:49~~	~~23~~	~~North~~	~~Sideswipe~~	~~Other Motor~~ Vehicle	~~North~~	~~Making Right~~ Turn	~~South~~	~~Stopped In~~ Road	~~Improper Turning~~	0	0
06-13016	6/1/06	15:13	0	In Int.	Sideswipe	Other Motor Vehicle	South	Proceeding Straight	South	Proceeding Straight	Unsafe Lane Change	0	0
06-16235	7/9/06	12:09	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
06-17292	7/22/06	7:54	0	In Int.	Broadside	Other Motor Vehicle	East	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	0	0
06-19954	8/21/06	8:09	31	East	Rear-End	Other Motor Vehicle	West	Stopped In Road	West	Slowing/Stoppi ng	Unsafe Speed	2	0
06-21809	9/12/06	8:17	0	In Int.	Head-On	Other Motor Vehicle	East	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	0	0
0625442	10/25/06	20:05	0	In Int.	Head-On	Other Motor Vehicle	East	Making Left Turn	West	Proceeding Straight	Improper Turning	0	0
06-28313	11/27/06	18:05	0	In Int.	Broadside	Other Motor Vehicle	North		East		Traffic Signals and Signs	0	0
06-28318	11/27/06	18:48	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	2	0
06-29551	12/12/06	14:05	20	East	Rear-End	Other Motor Vehicle	West	Proceeding Straight	West	Proceeding Straight	Unsafe Speed	0	0
07-04359	2/22/07	13:14	0	In Int.	Broadside	Other Motor Vehicle	East	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	1	0
07-06094	3/15/07	12:16	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
~~07-11012~~	~~5/14/07~~	~~22:51~~	~~9~~	~~North~~	~~Broadside~~	~~Other Motor~~ Vehicle	~~East~~	~~Making Right~~ Turn	~~East~~	~~Making Right~~ Turn	~~Improper Turning~~	0	0
07-11031	5/15/07	9:25	0	In Int.	Broadside	Motor Vehicle on Other	South	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	0	0
07-25165	11/5/07	13:15	0	In Int.	Rear-End	Other Motor Vehicle	East	Proceeding Straight	East	Stopped In Road	Unsafe Speed	0	0

LOCATION 1A

City of Concord
Transportation Division

Traffic Collision History Report

Location: Concord Bl / Sixth St
Date Range Reported: 1/1/2006 - 12/31/2011
Total Number of Collisions: 26

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
07-25461	11/9/07	13:01	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	0	0
07-26742	11/27/07	16:00	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	0	0
~~08-06443~~	~~3/26/08~~	~~13:06~~	~~31~~	~~West~~	~~Rear-End~~	~~Other Motor Vehicle~~	~~East~~	~~Proceeding Straight~~	~~East~~	~~Stopped In Road~~	~~Driving Under Influence~~	1	0
08-08173	4/17/08	7:27	20	West	Rear-End	Other Motor Vehicle	East	Proceeding Straight	East	Stopped In Road	Unsafe Speed	0	0
08-11210	5/23/08	13:47	0	In Int.	Head-On	Other Motor Vehicle	North	Making Left Turn	South	Proceeding Straight	Auto R/W Violation	0	0
09-16097	7/30/09	21:30	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
09-17680	8/20/09	14:00	36	East	Sideswipe	Other Motor Vehicle	West	Changing Lanes	West	Proceeding Straight	Improper Turning	0	0
09-19079	9/8/09	17:31	15	East	Rear-End	Other Motor Vehicle	East	Proceeding Straight	East	Stopped In Road	Unsafe Speed	0	0
~~10-22157~~	~~11/19/10~~	~~14:02~~	~~0~~	~~In Int.~~	~~Rear-End~~	~~Other Motor Vehicle~~	~~West~~	~~Proceeding Straight~~	~~West~~	~~Making Right Turn~~	~~Unsafe Speed~~	0	0
~~10-22229~~	~~11/20/10~~	~~14:07~~	~~0~~	~~In Int.~~	~~Sideswipe~~	~~Other Motor Vehicle~~	~~East~~	~~Making Right Turn~~	~~East~~	~~Making Right Turn~~	~~Improper Turning~~	0	0
11-20415	12/15/11	9:10	0	In Int.	Broadside	Other Motor Vehicle	North	Making Left Turn	South	Proceeding Straight	Auto R/W Violation	3	0

City of Concord
Transportation Division

Traffic Collision History Report

Location: Concord Bl / Sixth St
Date Range Reported: 1/1/2006 - 12/31/2011
Total Number of Collisions: 26

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 26

Settings Used For Query

Parameter	Setting
Street Name	CONCORD BL
Cross Street	SIXTH ST
Starting Date	1/1/2006
Ending Date	12/31/2011
Intersection	Intersection Related

Benefit / Cost Calculation Result

1. Project Information

Application ID	Application No. 1: Concord Bl @ Farm Bureau Rd, Clayton Way, West St & Sixth St	Version	1

2. Countermeasures and Crash Data

• Provide protected left turn phase (left turn lane already exists)

CM Number	Project Type	Crash Type	CRF	Life
S6	Signal Mod	All	30	20

Crash Type	Fatality (Death)	Severe Injury	Injury - Other Visible	Injury - Complaint of Pain	Property Damage Only	Total
All	0	1	13	0	35	49

Annual Benefit	$75,100
Life Benefit	$1,502,000
Cost	$ 162,240
B/C Ratio	9.26

• Convert signal to mast arm (from pedestal-mounted)

CM Number	Project Type	Crash Type	CRF	Life
S7	Signal Mod	All	30	20

Crash Type	Fatality (Death)	Severe Injury	Injury - Other Visible	Injury - Complaint of Pain	Property Damage Only	Total
All	0	0	5	0	9	14

Annual Benefit	$23,080
Life Benefit	$461,600
Cost	$ 87,360
B/C Ratio	5.28

3. Benefit Cost Result

Total Benefit	$1,963,600
Total Cost	$249,600
B/C Ratio	7.87

Signature: Danea Romanelli

By signing this B/C Calculation Result, you are attesting to your authority / responsibility at your local agency for this work and you are attesting to the accuracy of the values on this page and that they have been entered into the HSIP Application Form correctly, **DO NOT SIGN** if any of this is not the case.

Detailed Engineer's Estimate - PROJECT 1

For Construction Items Only

Agency: **CITY OF CONCORD** | **Application ID:** **04-CONCORD-1** | **Date:** 07/10/2012

Project Description: **At intersections of Farm Bureau Road (1B), Clayton Way (1C) and West Street (1D), replace existing "combined permissive/protected" left-turn phases and signal heads for both directions on Concord Blvd. with "protected" left-turn phases and signal heads on existing poles and mast arms. Also install second through-lane signal head on existing mast arms for Concord Blvd.**

At intersection of Sixth St. (1A), remove existing poles and mast arms for both directions of Concord Blvd. and install "protected" phases and signal heads for existing left-turn pockets, plus second through-lane signal heads, on new poles and mast arms. Remove existing pedestal poles and signal heads for both directions of Sixth St. and install "protected" phases and signal heads for existing left-turn pockets, plus through-lane signal heads, on new poles and mast arms.

Project Location: **Concord Blvd. @ intersections of Sixth Street (1A), Farm Bureau Road (1B), Clayton Way (1C) and West Street (1D).**

Prepared by: **G. Halladay**

Item No.	Item Description	Quantity	Units	Unit Cost	Total	% to CM #1 %	% to CM #1 $	% to CM #2 %	% to CM #2 $	% to CM #3 %	% to CM #3 $
1	Mobilization	1	LS		$7,500	80	$6,000	20	$1,500		
2	Traffic Control	1	LS		$18,500	73	$13,500	27	$5,000		
3	Remove exist. pole, mast arm, signal heads, ped heads and street light.	2	Ea	$4,100	$8,200	100	$8,200				
4	Remove exist. pedestal pole and signal head.	2	Ea	$1,800	$3,600			100	$3,600		
5	Remove exist. 5-lense LT signal head, install 3-lense LT signal head on exist. mast arm.	5	Ea	$1,000	$5,000	100	$5,000				
6	Remove exist. 5-lense LT signal head, install 3-lense LT signal head on exist. pedestal pole.	5	Ea	$950	$4,750	100	$4,750				
7	Install 3-lense signal head on existing mast arm.	5	Ea	$800	$4,000	100	$4,000				
8	Install pole, 40' mast arm, five signal heads, ped heads and street light.	2	Ea	$18,350	$36,700	100	$36,700				
9	Install pole, 20' mast arm, four signal heads, ped heads and street light.	3	Ea	$10,850	$32,550			100	$32,550		
10	Install R10-5 on new mast arm.	4	Ea	$400	$1,600	50	$800	50	$800		
11	Remove R10-12, install R10-5, on exist. mast arm.	3	Ea	$500	$1,500	100	$1,500				
12	Install SR39A sign on new mast arm.	2	Ea	$400	$800			100	$800		
13	Remove R10-12 & R3-18 signs, install SR39A on exist. mast arm.	2	Ea	$500	$1,000	100	$1,000				
14	Install 3" conduits with conductors.	300	LF	$60	$18,000	50	$9,000	50	$9,000		
15	Rewire new poles/mast arms	1	LS		$8,000	50	$4,000	50	$4,000		
16	Relocate existing D3-1 sign	4	EA	$300	$1,200	50	$600	50	$600		
17	Misc. Concrete	1	LS		$4,000	50	$2,000	50	$2,000		
18	Upgrade exist. non-ADA-compliant access ramp	7	Ea	$750	$5,250	100	$5,250				
19											
	Sub Total of Construction Items:				**$162,150**		$102,300		$59,850		
	Construction Item Contingencies (% of Con Items) :			**20**	$32,430	63%	CM #1	37%	CM #2		CM #3
	Total Construction Items:				**194,580**		S6		S7		

Note:
1. "Preliminary Engineering", "Right of Way", and "Construction Engineering" costs are accounted for in the Application Form.
2. See the Application Instructions for more details on the requirement that all Countermeasures (CM) used in the Benefit / Cost ratio calculations represent a minimum of 20% of the total cost of the Construction Items. The Engineer's Estimate will be used to verify this.

Detailed Engineer's Estimate
For Construction Items Only

Agency:	CITY OF CONCORD	Application ID: 04-CONCORD-1.1	Date: 07/10/2012
Project Description:	Remove existing poles and mast arms for WB and EB Concord Blvd. and install "protected" phases and signal heads for existing left-turn pockets, plus through-lane signal heads, on new poles and mast arms. Relocate existing signal heads for NB and SB Sixth St. and install signal heads for existing left-turn pockets, plus through-lane signal heads, on new poles and mast arms.		
Project Location:	Concord Blvd. @ Sixth St. (1A)		
Prepared by:	G. Halladay		

Item No.	Item Description	Quantity	Units	Unit Cost	Total	% to CM #1 %	% to CM #1 $	% to CM #2 %	% to CM #2 $	% to CM #3 %	% to CM #3 $
1	Mobilization	1	LS		$3,000	50	$1,500	50	$1,500		
2	Traffic Control	1	LS		$10,000	50	$5,000	50	$5,000		
3	Remove exist. pole, mast arm, signal heads, ped heads and street light.	2	Ea	$4,100	$8,200	100	$8,200				
4	Remove exist. pedestal pole and signal head.	2	Ea	$1,800	$3,600			100	$3,600		
4	Install pole, 40' mast arm, five signal heads, ped heads and street light.	2	Ea	$18,350	$36,700	100	$36,700				
5	Install pole, 20' mast arm, four signal heads, ped heads and street light.	3	Ea	$10,850	$32,550			100	$32,550		
6	Install R10-5 on new mast arm.	4	Ea	$400	$1,600	50	$800	50	$800		
7	Install SR39A sign on new mast arm.	2	Ea	$400	$800			100	$800		
8	Install 3" conduits with conductors.	300	LF	$60	$18,000	50	$9,000	50	$9,000		
9	Rewire new poles/mast arms	1	LS		$8,000	50	$4,000	50	$4,000		
10	Relocate existing D3-1 sign	4	EA	$300	$1,200	50	$600	50	$600		
11	Misc. Concrete	1	LS		$4,000	50	$2,000	50	$2,000		
12											
13											
14											
15											
16											
	Sub Total of Construction Items:				$127,650		$67,800		$59,850		
	Construction Item Contingencies (% of Con Items) :			20	$25,530	53%	CM #1	47%	CM #2		CM #3
	Total Construction Items:				153,180		S6		S7		

Note:
1. "Preliminary Engineering", "Right of Way", and "Construction Engineering" costs are accounted for in the Application Form.
2. See the Application Instructions for more details on the requirement that all Countermeasures (CM) used in the Benefit / Cost ratio calculations represent a minimum of 20% of the total cost of the Construction Items. The Engineer's Estimate will be used to verify this.

Exhibit 6.1 - DETAILED ENGINEER'S ESTIMATE

Detailed Engineer's Estimate
For Construction Items Only

Agency: CITY OF CONCORD | Application ID: 04-CONCORD-1.2 | Date: 07/10/2012

Project Description: Replace existing "combined permissive/protected" left-turn phases and signal heads with "protected" left-turn phases and signal heads on existing poles and mast arms for WB and EB Concord Blvd. Install 2nd through-lane signal head on existing mast arms for Concord Blvd.

Project Location: Concord Blvd. @ Farm Bureau Road (1B)

Prepared by: G. Halladay

Item No.	Item Description	Quantity	Units	Unit Cost	Total	% to CM #1 %	% to CM #1 $	% to CM #2 %	% to CM #2 $	% to CM #3 %	% to CM #3 $
1	Mobilization	1	LS		$1,500	100	$1,500				
2	Traffic Control	1	LS		$3,000	100	$3,000				
3	Remove exist. 5-lense LT signal head, install 3-lense LT signal head on exist. mast arm.	2	Ea	$1,000	$2,000	100	$2,000				
4	Remove exist. 5-lense LT signal head, install 3-lense LT signal head on exist. pedestal pole.	2	Ea	$950	$1,900	100	$1,900				
5	Install 3-lense signal head on existing mast arm.	2	Ea	$800	$1,600	100	$1,600				
6	Remove R10-12 left-turn sign, install R10-5, on exist. mast arm.	2	Ea	$500	$1,000	100	$1,000				
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
	Sub Total of Construction Items:				$11,000		$11,000				
	Construction Item Contingencies (% of Con Items) :			20	$ 2,200	100%	CM #1		CM #2		CM #3
	Total Construction Items:				13,200		S6				

Note:
1. "Preliminary Engineering", "Right of Way", and "Construction Engineering" costs are accounted for in the Application Form.
2. See the Application Instructions for more details on the requirement that all Countermeasures (CM) used in the Benefit / Cost ratio calculations represent a minimum of 20% of the total cost of the Construction Items. The Engineer's Estimate will be used to verify this.

Exhibit 6.2 - DETAILED ENGINEER'S ESTIMATE

Detailed Engineer's Estimate
For Construction Items Only

Agency: CITY OF CONCORD | Application ID: 04-CONCORD-1.3 | Date: 06/25/2012

Project Description: Replace existing "combined permissive/protected" left-turn phases and signal heads with "protected" left-turn phases and signal heads on existing poles and mast arms for WB and EB Concord Blvd. Install 2nd through-lane signal head on existing mast arms for Concord Blvd.

Project Location: Concord Blvd. @ Clayton Way (1C)

Prepared by: G. Halladay

Item No.	Item Description	Quantity	Units	Unit Cost	Total	% to CM #1 %	% to CM #1 $	% to CM #2 %	% to CM #2 $	% to CM #3 %	% to CM #3 $
1	Mobilization	1	LS		$1,500	100	$1,500				
2	Traffic Control	1	LS		$3,000	100	$3,000				
3	Remove exist. 5-lense LT signal head, install 3-lense LT signal head on exist. mast arm.	2	Ea	$1,000	$2,000	100	$2,000				
4	Remove exist. 5-lense LT signal head, install 3-lense LT signal head on exist. pedestal pole.	2	Ea	$950	$1,900	100	$1,900				
5	Install 3-lense signal head on existing mast arm.	2	Ea	$800	$1,600	100	$1,600				
6	Remove R10-12 & R3-18 signs, install SR39A on exist. mast arm.	2	Ea	$500	$1,000	100	$1,000				
7	Upgrade exist. non-ADA-compliant access ramp	4	Ea	$750	$3,000	100	$3,000				
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
	Sub Total of Construction Items:				$14,000		$14,000				
	Construction Item Contingencies (% of Con Items) :			20	$2,800	100%	CM #1		CM #2		CM #3
	Total Construction Items:				16,800		S6				

Note:
1. "Preliminary Engineering", "Right of Way", and "Construction Engineering" costs are accounted for in the Application Form.
2. See the Application Instructions for more details on the requirement that all Countermeasures (CM) used in the Benefit / Cost ratio calculations represent a minimum of 20% of the total cost of the Construction Items. The Engineer's Estimate will be used to verify this.

Exhibit 6.3 - DETAILED ENGINEER'S ESTIMATE

Detailed Engineer's Estimate
For Construction Items Only

Agency: CITY OF CONCORD | Application ID: 04-CONCORD-1.4 | Date: 06/25/2012

Project Description: Replace existing "combined permissive/protected" left-turn phase and signal head with "protected" left-turn phase and signal head on existing poles and mast arm for WB Concord Blvd. Install 2nd through-lane signal head on existing mast arm for WB Concord Blvd.

Project Location: Concord Blvd. @ West St. (1D)

Prepared by: G. Halladay

Item No.	Item Description	Quantity	Units	Unit Cost	Total	% to CM #1 %	% to CM #1 $	% to CM #2 %	% to CM #2 $	% to CM #3 %	% to CM #3 $
1	Mobilization	1	LS		$1,500	100	$1,500				
2	Traffic Control	1	LS		$2,500	100	$2,500				
3	Remove exist. 5-lense LT signal head, install 3-lense LT signal head on exist. mast arm.	1	Ea	$1,000	$1,000	100	$1,000				
4	Remove exist. 5-lense LT signal head, install 3-lense LT signal head on exist. pedestal pole.	1	Ea	$950	$950	100	$950				
5	Install 3-lense signal head on existing mast arm.	1	Ea	$800	$800	100	$800				
6	Remove R10-12, install R10-5, on exist. mast arm.	1	Ea	$500	$500	100	$500				
7	Upgrade exist. non-ADA-compliant access ramp	3	Ea	$750	$2,250	100	$2,250				
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
	Sub Total of Construction Items:				$9,500		$9,500				
	Construction Item Contingencies (% of Con Items) :			20	$1,900	100%	CM #1		CM #2		CM #3
	Total Construction Items:				11,400		$6				

Note:
1. "Preliminary Engineering", "Right of Way", and "Construction Engineering" costs are accounted for in the Application Form.
2. See the Application Instructions for more details on the requirement that all Countermeasures (CM) used in the Benefit / Cost ratio calculations represent a minimum of 20% of the total cost of the Construction Items. The Engineer's Estimate will be used to verify this.

Exhibit 6.4 - DETAILED ENGINEER'S ESTIMATE