

**CITY OF EMERYVILLE**  
**INDEPENDENT FEASIBILITY AND CONSTRUCTABILTY**  
**STUDY**  
**PARTIAL WIDENING OF**  
**POWELL STREET OVERHEAD**



- A. WIDENING RELATING TO ACCESS TO 'SITE -B', AND**
- B. WIDENING RELATED TO ADDING LEFT TURN LANE TO  
PEWELL STREET AT CHRISTIE AVENUE**

**JUNE 15, 2009**

**SUBMITTED BY:**



**MARK THOMAS & CO. INC.**  
**ENGINEERS - PLANNERS - SURVEYORS**





**MARK THOMAS & COMPANY, INC.**

*Providing Engineering, Surveying and Planning Services*

**1960 Zanker Rd**

**San Jose, CA 95112**

**PHONE (408) 453-5373**

**FAX (408) 453-5393**

June 15, 2009

File: 58-0227B

Mr. Maurice Kaufman  
Public Works Director/City Engineer  
**City of Emeryville**  
1333 Park Avenue  
Emeryville, CA 94608

**RE: INDEPENDENT FEASIBILITY & CONSTRUCTABILITY STUDIES AND  
PRELIMINARY ESTIMATIONS FOR:**

- A. WIDENING OF EXISTING POWELL STREET OVERHEAD BRIDGE  
(PARTIAL) FOR ACCESS TO 'SITE B – BAY STREET' (Developer's Project).**
- B. LEFT TURN LANE ADDITION ON POWELL STREET EAST OF CHRISTIE  
AVENUE (City's Project).**

Dear Mr. Kaufman:

Per your request, Mark Thomas and Company, Inc. (MTCO) is pleased to submit this report to include independent feasibility and constructability studies, preliminary cost estimations and our recommendations for the Subject Projects independent of each other.

The scope of this report, as we understand, includes the following reviews and studies, make constructability recommendations and provide independent cost estimation of each project separately:

1. Review the structural design criteria, design approach, structural calculation and proposed recommendations originally prepared by Sierra Engineering Group (SEG) for a limited south side widening at a few spans of the subject bridge (Powell Street Overhead structure) for adding a right turn lane up to the entrance to the 'Site B – Bay Street Project'.
2. Also, review the structural impact of continuing widening of the bridge structure to facilitate the right turn for east bound traffic coming out of the parking structure of the same 'Site B – Bay Street Project'.
3. Further, with the same aspects of the bridge widening, study the feasibility of adding a left turn lane on Powell Street east of Christie Avenue and merging on the bridge

(Powell Street Overhead) structure over/near Shellmound Street. This alternate will include improvement of on ground intersection of Powell Street and Christie Avenue.

4. Reviews the constructability of elements originally proposed by SEG for the limited scope then and later revised scope of adding a right turn lane in item 2 above and make recommendations.

In addition to our quick field visit for verifications of visible as-built conditions, the following documents were available for review:

- Conceptual Structural Engineering and Preliminary Cost Estimation Report prepared by SEG dated May 8, 2007.
- Geotechnical Investigation (42 page text report without the referenced attachments) by Kleinfelder for 'Site - B Bay Street' Development, Emeryville California, dated January 25, 2006,
- Powell Street Overhead structure's as-built plans, sheet 22 through 44, dated August 1966, prepared by George Nolte Consulting Civil Engineers, Inc.
- Powell Street Overhead Earthquake Retrofit Project's Structural as-built plans, sheet 1 through 20, dated May 1993, prepared by MTCO.
- Sewer Relocation Plans (sheet S2 & S3) prepared in October 1993 for Earthquake Retrofit Project, prepared by City of Emeryville - Department of Public Works.

## SUMMARY

Based on review of the documents, it is our opinion that both the projects - the widening of the bridge structure on Powell Street for planned limited lane addition for access to 'Site B' and adding a left turn lane east of Christie Avenue - are feasible. To simplify the design, construction and, hence to economize, MTCO recommends following features to be considered:

- a. Design the structure widening as standalone widened structure with only pinned connections from existing to the widening bent cap.
- b. Use Standard design and construction methods for widening for first four spans of the Powell Street Overhead structure (primarily for Project B').
- c. Design & construct right girders of spans 5 through 10 to compensate the lost capacity of existing right girders due to reduction in structure depth by the removal of existing curb (primarily for Project A).

- d. Shore up the exterior girders at span 5 through 10 for existing stress releases and temporarily support (these shored up girders) until the widening superstructure concrete is cured (primarily for Project A).
- e. Do not cut or discontinue existing retrofitted bent reinforcing bars to keep retrofit structural integrity intact.
- f. Locate columns near middle of widening for more efficient structural design; by not increasing the loading on the existing cantilevering bents.
- g. Evaluate all remaining existing concrete barriers beyond the extent of the proposed widening for Caltrans new safety requirements and replace them, if necessary.

Expected design and construction of the widening shall be a routine widening type with special designs and construction measures as stated above. Columns and footing shall also be of standard construction with some utility relocation. Full layout plans of the project and attaching ramp location are warranted prior to the undertaking of the structure widening.

Our findings, discussions and recommendations are as follows:

1. Based on review of available information, the original bridge was constructed during 1966-67 and was retrofitted around 1993 using California Transportation Department's (Caltrans) Seismic Design Criteria prevalent in that time frame. Since then, Caltrans has modified/upgraded the seismic structural design approaches, methods of analyses, seismic design forces, etc. Analysis and design methods like Displacement Ductility checks for columns, etc. which are more sophisticated and stringent now than they used to be in the 1990s. In eighties, Caltrans used Demand-To-Capacity (D/C) ratios for adequacy checks for various structural elements like bent caps, columns, footings, piles, their reinforcing bars, concrete strengths, etc. Currently, columns and bent caps are being evaluated by 'Ductility Displacement Methods' and similar more complex approaches which are relatively more accurate. Comparisons of the Site Specific Response Spectrum Charts of 1990's and 2008, it is apparent that peak acceleration values are 1.52g versus 1.10g respectively, indicating approximately 38 percent increase in the seismic design forces, see '*Exhibit C*'. Use of new charts by SEG's analysis, in general, the results of the bridge bent to column inter-phase, and other similar bridge elements have indicated comparable and somewhat larger ratios, leading to similar retrofit measures of a slightly higher magnitude.
2. The design criteria, methods, references and approaches used by SEG, in general, are reasonable and as per standard bridge design practices for this type of project. For the level of studies SEG performed, the structural calculations and evaluations of D/C Ratios of various bridge elements included in their report per standard practice, are adequate and acceptable. Their analysis of the as-built structure with the 1993 retrofit

and proposed partial widening and their conclusions of the adequacy of existing retrofit without further evaluation of the existing structure for this widening, is reasonable.

3. The widening of the first four spans where existing span girders are parallel to the traffic direction will be a standard widening with new span joists, either PC/PS or CIP Concrete girders with CIP concrete bent cap and column on pile foundation. Widening bent cap will be connected to the existing cap with drill & bond dowels to suit. The removal of the existing 8" high curb over these four spans, not being a structural element, would not have any ill-effect on the widening designs or the construction. The deck will be refinished at the removal curb width.
4. For spans 5 through 10, the span joists being perpendicular to traffic direction and the outer girders are their primary supports. Required removal of existing 8" high curb, which is an integral structural part of the outer girders, will partially impair the existing structural capacity of the girder. This partial loss of capacity will be picked up by planning attaching girders to perform similarly and to compensate for the deficit. This will require shoring up of the existing girders to relieve the existing stresses and to make widening girders combined with the existing girders fully effective. This temporary shoring will remain in place until the entire widening superstructure is cured. Proposed locations of columns as suggested by SEG, will lead to sizable load transfer to the existing bent caps and columns, requiring enhancement of the existing caps and footings. However, the same can be minimized or eliminated by executing the recommendations in the following item. The deck at curb removal will similarly be refinished to match.
5. In 'Typical Section at Widening' as proposed by SEG, has column located at the end of the new cap. SEG may have tried to maintain the exterior look of the structure to match the existing, which is too simple looking and less appealing. Even by designing a new bent to column connection extremely rigid, in the given configuration, there would still be a relatively large vertical load transfer to end of the existing cap. MTCO recommends shifting the exterior girders and columns inward with a conventional deck overhangs providing a more pleasing appearance without additional cost to the superstructure. Having the column close to the middle of the widening will minimize the gravity load transfer to the existing bent cap, eliminating enhancement of the existing footings. By bringing the column in the middle of the width of the widening, new column footing may interfere, however designing conventional rectangular or trapezoidal shape footing may eliminate the issue. This configuration also keeps the footings within foot print of the bridge superstructure. Conceptual Bridge General Plan and Typical Section sheets are attached in '*Exhibit A*'.
6. SEG proposed widening overlooked the need for merging distance requirements for the traffic coming out of 'Site B' and turning right to eastbound traffic lanes on Powell Street. Addition of this merging distance also warrants extending widening of the bridge

further on span 11 and perhaps the part of span 12, depending upon the actual location of the ramp structure on 'Site B'. SEG proposed scheme requires only a partial span length widening of the 11<sup>th</sup> span over railroad tracks. It is unconventional for the given structural configuration and arrangements of the joints. A proper consideration must be given to help decide the extent of this widening. If required, a full span widening may be reviewed to facilitate the merging distance to east bound traffic.

7. On SEG's widening scheme, at Bent 11 a concrete corbel and cantilevering bent cap have been proposed instead of conventional column and footing. Without the full set of all development plans, it is not clear why the column and footings are not proposed. Ten feet cantilevering bent from the existing end of the retrofit bent cap seem to be too excessive, especially for cap supporting a large reaction from a span girders of the widening. A shallow corbel from a retrofitted column with steel casing is also unconventional. Extension of flexural reinforcing bars into existing bent cap top by removing and replacing only the top few inches of concrete is also unusual and less reliable. All of these can be constructed but are not foolproof with the given conditions. If required, a full depth corbel from footing to underneath the bent cap could be considered along with existing footing with sizable retrofit to already retrofitted footing. Alternatively, if possible, the extension of Bent 11 with corbel (see Elevation - Bent 11 on attached pan sheet no 2 - '*Exhibit A*') should be substituted with conventional column and footing, to keep them simple and economical.
8. For left turn lane addition on Powell Street east of Christie Avenue will also involve redesigning of that intersection, adding a lane on south side on grade and partially on the bridge structure. Construction of retaining wall and partial (first five or six spans) widening of Powell Street Overhead will be required. These widening on grade as well as partial bridge widening as described above would be of standard construction, see '*Exhibit B*'.
9. Irrespective of the extent of the bridge widening, the remaining existing traffic barrier on both sides of the bridge structure must be evaluated for Caltrans' current safety standards and be replaced with a new barrier, if found necessary.
10. The utility relocations at new pile and footing construction will be dealt with on an individual basis by either relocating utilities or the piles and column or both. We recommend identifying and locating all existing utilities either by pot-holing or any other non-destructive method prior to designing the footings in the areas.

In general, MTCO recommends studying of full development plans for both the projects - 'Project-A' and 'Project-B' - independently to include traffic plans and signals. Also, to make the bridge structural widening compatible to the access structure to 'Site B - Bay Street', the

access ramp structure should be laid out, including all incoming and outgoing lanes. This will help decide the extent of bridge widening on span 11 and the fate of column and footing requirements at Bent 11 and Bent 12. Any widening construction over railroad jurisdiction will have to be coordinated with the railroad agency. All effected utilities will require coordination with respective utility companies.

As the scope and the extent of the civil engineering work for both the projects are not fully established at this point, we have prepared separate preliminary estimations for 'Project A' and Project B' to include 14'-6" uniform bridge widening to the extent shown on plans in each exhibits, using 15% contractor's profit & overhead, 10% mobilization and 25% contingencies. The planning level estimated cost of the bridge widening are about 3.87 million and 4.79 million for 'Project A – the developer's project' and 'Project B – the City's Project', as attached in '*Exhibit A*' and '*Exhibit B*', respectively.

Should you have any question, please feel free to call.

Sincerely yours,

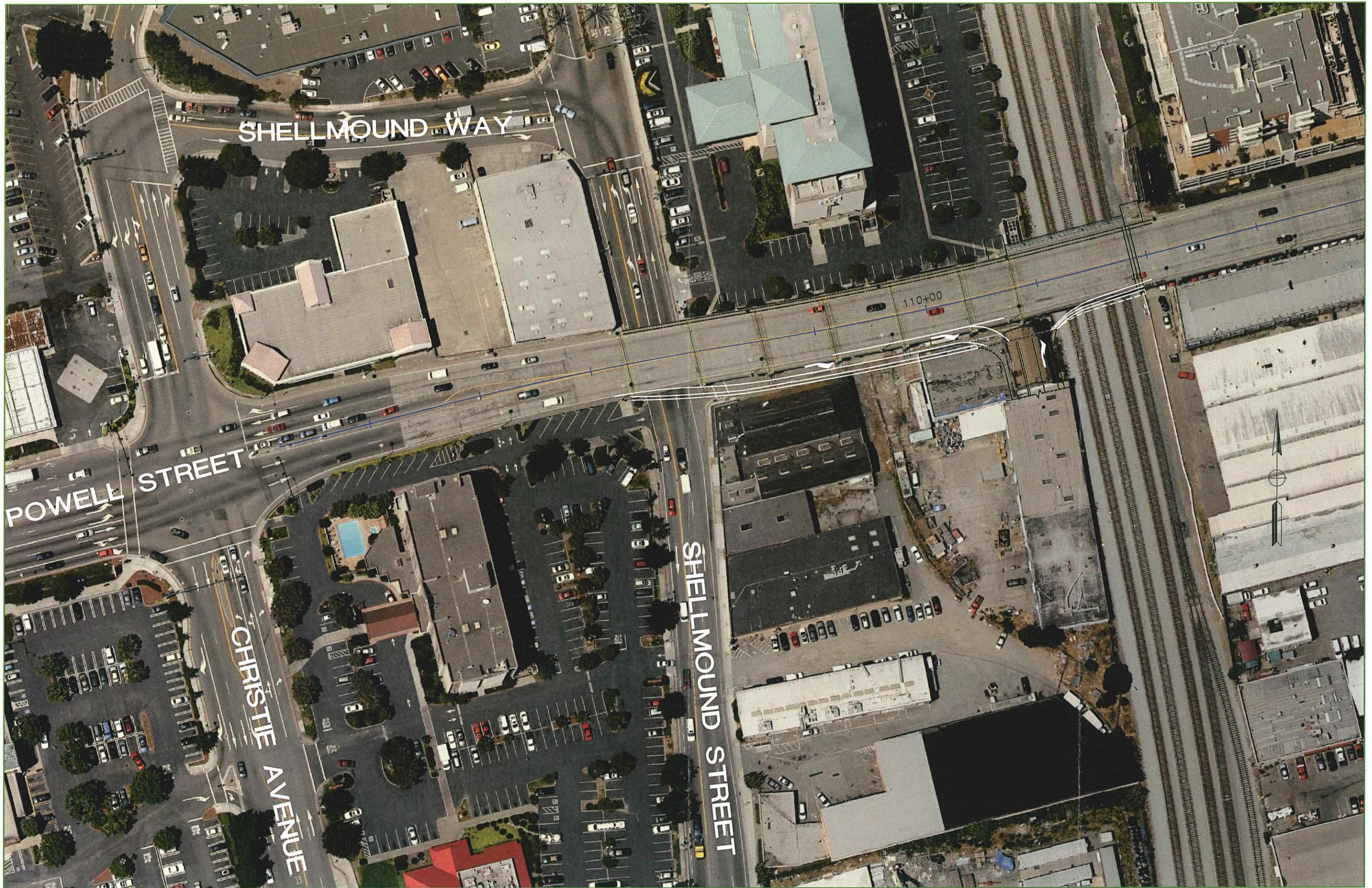
**MARK THOMAS & COMPANY, INC.**

Po Kang Chen, SE  
Structures Division Manager

**EXHIBIT A**

City of Emeryville - Powell Street OH Widening: Right Turn Lane Addition to parking structure:  
Preliminary Project Cost Estimate (DEVELOPER'S PROJECT) Feb 3, 2009

| Roadway Items:                                   | quantity        | unit        | unit cost        | extended        | total               |
|--------------------------------------------------|-----------------|-------------|------------------|-----------------|---------------------|
| Roadway Excavation                               | -               | CY          | \$ 25            | \$ -            |                     |
| Import Borrow                                    | -               | CY          | \$ 15            | \$ -            |                     |
| Asphalt Concrete                                 | -               | TON         | \$ 85            | \$ -            |                     |
| Aggregate Base                                   | -               | CY          | \$ 50            | \$ -            |                     |
| Storm Drain                                      | -               | LS          | \$ 90,000        | \$ -            |                     |
| Erosion Control                                  | -               | FT2         | \$ 0.50          | \$ -            |                     |
| Minor Concrete (sw, curb & gutter)               | -               | CY          | \$ 900           | \$ -            |                     |
| Minor Concrete (textured paving)                 | -               | FT2         | \$ 10            | \$ -            |                     |
| Retaining Walls                                  | -               | FT2         | \$ 65            | \$ -            |                     |
| Concrete Barrier (Type 732A)                     | -               | FT          | \$ 400           | \$ -            |                     |
| Concrete Barrier (Type 26 Modified)              | -               | FT          | \$ 300           | \$ -            |                     |
| Concrete Barrier (Type 60E)                      | -               | FT          | \$ 150           | \$ -            |                     |
| Metal Beam Guardrail                             | -               | FT          | \$ 40            | \$ -            |                     |
| Sound Walls                                      | -               | FT2         | \$ 35            | \$ -            |                     |
| Pedestrian Fence                                 | -               | FT          | \$ 40            | \$ -            |                     |
| Landscaping & Irrigation                         | -               | FT2         | \$ 4             | \$ -            |                     |
| Lighting Modifications                           | 1               | LS          | \$ 90,000        | \$ 90,000       |                     |
| Permanent Signing & Striping                     | 1               | LS          | \$ 12,000        | \$ 12,000       |                     |
| Traffic Control during Construction              | 1               | LS          | \$ 75,000        | \$ 75,000       |                     |
| Traffic Signal Modifications                     | -               | LS          | \$ 100,000       | \$ -            |                     |
| Traffic Management Plan                          | 1               | LS          | \$ 10,000        | \$ 10,000       |                     |
| Temporary Pavement Delineation                   | 1               | LS          | \$ 4,000         | \$ 4,000        |                     |
| Utility Relocation                               | 1               | LS          | \$ 200,000       | \$ 200,000      |                     |
| Hazardous Material Removal & Clean Up            | 1               | LS          | \$ 100,000       | \$ 100,000      |                     |
| Retaining Wall Aesthetic Treatment               | -               | FT2         | \$ 15            | \$ -            |                     |
| Minor Roadway Items                              | 15%             |             |                  | \$ 74,000       |                     |
| <b>Roadway Subtotal</b>                          |                 |             |                  |                 | <b>\$ 565,000</b>   |
| <b>Structure Items:</b>                          | <b>quantity</b> | <b>unit</b> | <b>unit cost</b> | <b>extended</b> | <b>total</b>        |
| Bridge Removal (Portion)                         | 1               | LS          | \$ 50,000        | \$ 50,000       |                     |
| Structure Excavation (Bridge)                    | 192             | CY          | \$ 100           | \$ 19,200       |                     |
| Structure Backfill (Bridge)                      | 103             | CY          | \$ 120           | \$ 12,360       |                     |
| Furnish and Install Micro-Piles                  | 45              | EA          | \$ 10,500        | \$ 472,500      |                     |
| Structural Concrete Bridge                       | 403             | CY          | \$ 1,250         | \$ 503,750      |                     |
| Concrete Barrier (Type 732)                      | 1,083           | LF          | \$ 90            | \$ 97,470       |                     |
| Drill and Bond Dowels                            | 1,180           | LF          | \$ 40            | \$ 47,200       |                     |
| Bar Reinforcing Steel                            | 75,000          | LB          | \$ 1.20          | \$ 90,000       |                     |
| Joint Seal                                       | 44              | LF          | \$ 100           | \$ 4,400        |                     |
| Temporary Shoring of Superstructure              | 1               | LS          | \$ 120,000       | \$ 120,000      |                     |
| <b>Structure Subtotal</b>                        |                 |             |                  |                 | <b>\$ 1,417,000</b> |
| <b>Roadway and Structure Subtotal</b>            |                 |             |                  |                 | <b>\$ 1,982,000</b> |
| <b>Mobilization</b>                              | 10%             |             |                  |                 | <b>\$ 198,000</b>   |
| <b>Subtotal (Roadway+Structure+Mobilization)</b> |                 |             |                  |                 | <b>\$ 2,180,000</b> |
| <b>Contingencies</b>                             | 25%             |             |                  |                 | <b>\$ 545,000</b>   |
| <b>Construction Cost Estimate</b>                |                 |             |                  |                 | <b>\$ 2,725,000</b> |
| <b>Soft Costs</b>                                |                 |             |                  |                 |                     |
| City's Admin/Environmental                       | 16%             |             |                  | \$              | 436,000             |
| Design                                           | 12%             |             |                  | \$              | 327,000             |
| Construction Mgmt                                | 12%             |             |                  | \$              | 327,000             |
| Construction Staking                             | 2%              |             |                  | \$              | 55,000              |
| <b>Soft Cost Subtotal</b>                        |                 |             |                  |                 | <b>\$ 1,145,000</b> |
| <b>Grand Total</b>                               |                 |             |                  |                 | <b>\$ 3,870,000</b> |



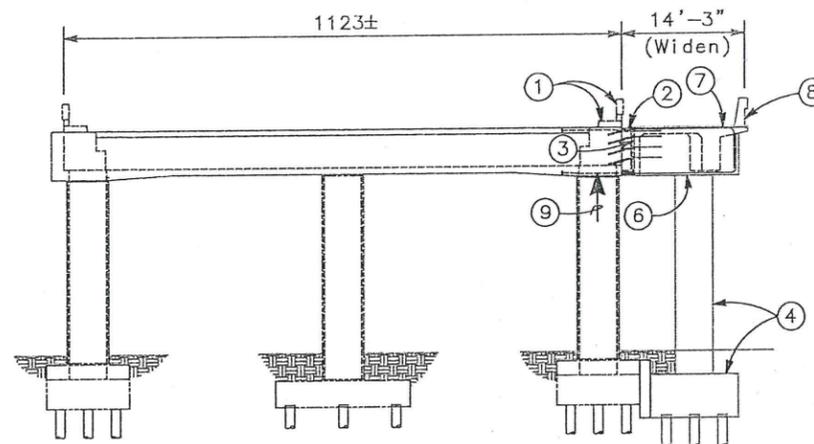
**MARK THOMAS & COMPANY, INC.**  
Providing Engineering, Surveying, and Planning Services

1960 Zanker Road  
San Jose, CA 95112 (408)453-5373  
DATE: 01/29/09

**POWELL STREET OH WIDENING**  
DEVELOPER'S PROJECT  
EMERYVILLE, CA

**LEGEND:**

- ① Remove Existing Barrier And Curb Above Deck Level & Refinish.
- ② Remove Concrete (portion) @ Outriggers & Connect Bentcap Extension At Bents 5,6,7,8,9,10 And 11 As Shown.
- ③ Retrofit Existing Exterior Girder.
- ④ Construct New Column And Footing.
- ⑤ Construct Conc Corbel And Retrofit Footing @ Bent 11 Only.
- ⑥ Construct New Bentcap.
- ⑦ Construct New Deck Slab & Girders.
- ⑧ Construct New Concrete Barrier (Type 732).
- ⑨ Temporary shoring during construction.
- ⑩ Evaluate for safety & construct new barrier, if required.



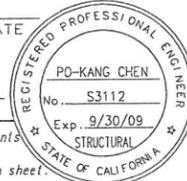
**TYPICAL SECTION**  
No Scale

REGISTERED STRUCTURAL ENGINEER DATE \_\_\_\_\_

PLANS APPROVAL DATE \_\_\_\_\_

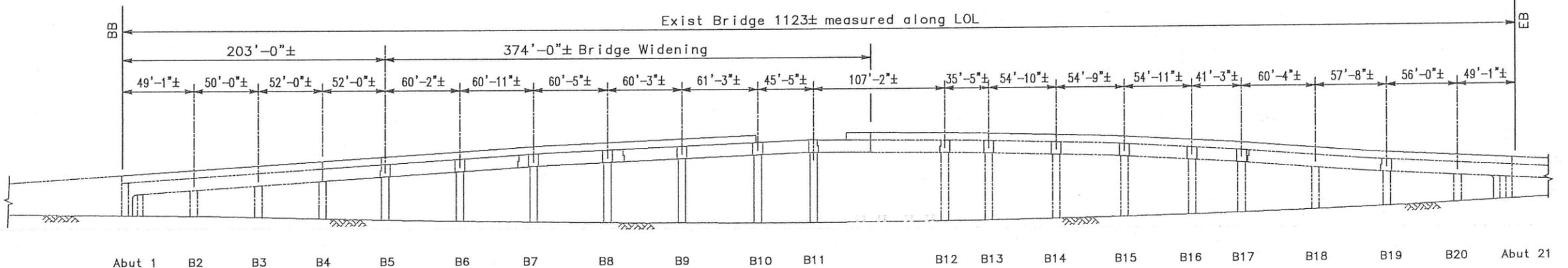
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SAN JOSE, CA 95112

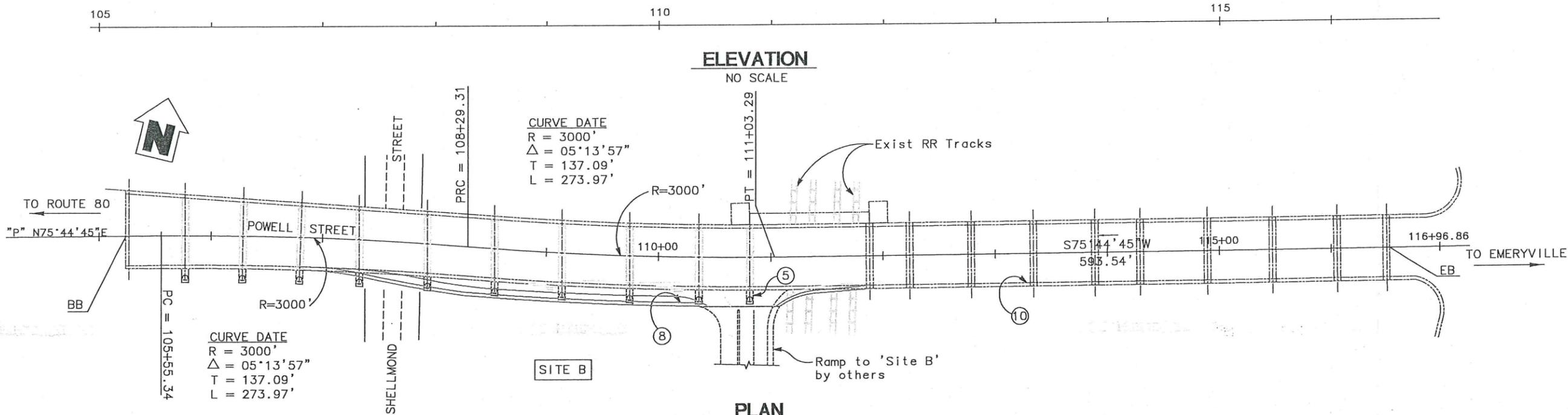


**APPROXIMATE BRIDGE QUANTITIES**

|                                       |        |    |
|---------------------------------------|--------|----|
| BRIDGE REMOVAL (PORTION)              | 1      | LS |
| STRUCTURE EXCAVATION (BRIDGE)         | 192    | CY |
| STRUCTURE BACKFILL (BRIDGE)           | 103    | CY |
| FURNISH AND INSTALL MICROPILES        | 45     | EA |
| STRUCTURAL CONCRETE, BRIDGE           | 375    | CY |
| CONCRETE BARRIER (TYPE 732)           | 1083   | LF |
| DRILL AND BOND DOWELS                 | 1,180  | LF |
| BAR REINFORCING STEEL (BRIDGE)        | 75,000 | LB |
| TEMPORARY SHORING OF SUPERSTRUCTURE   | 1      | LS |
| HAZARDOUS MATERIAL REMOVAL & CLEAN UP | 1      | LS |



**ELEVATION**  
NO SCALE



**PLAN**  
NO SCALE

|                  |                     |                 |                     |                          |                               |                                         |                                                                         |
|------------------|---------------------|-----------------|---------------------|--------------------------|-------------------------------|-----------------------------------------|-------------------------------------------------------------------------|
| DESIGN OVERSIGHT | DESIGN BY H. MISIRY | CHECKED P. CHEN | LOAD FACTOR DESIGN  | BY H. MISIRY             | CHECKED P. CHEN               | BRIDGE NO. 336-183                      | <b>GENERAL PLAN</b><br><b>POWELL STREET OVERHEAD (PARTIAL WIDENING)</b> |
| SIGN OFF DATE    | DETAILS BY          | CHECKED         | LAYOUT BY H. MISIRY | CHECKED P. CHEN          | PROJECT ENGINEER PO-KANG CHEN | POST MILES                              |                                                                         |
|                  | QUANTITIES BY       | CHECKED         | SPECIFICATIONS BY   | PLANS AND SPECS COMPARED | CU EA                         | REVISION DATES (PRELIMINARY STAGE ONLY) |                                                                         |

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

REVISION DATES (PRELIMINARY STAGE ONLY): 10/30/08

SHEET 1 OF 3

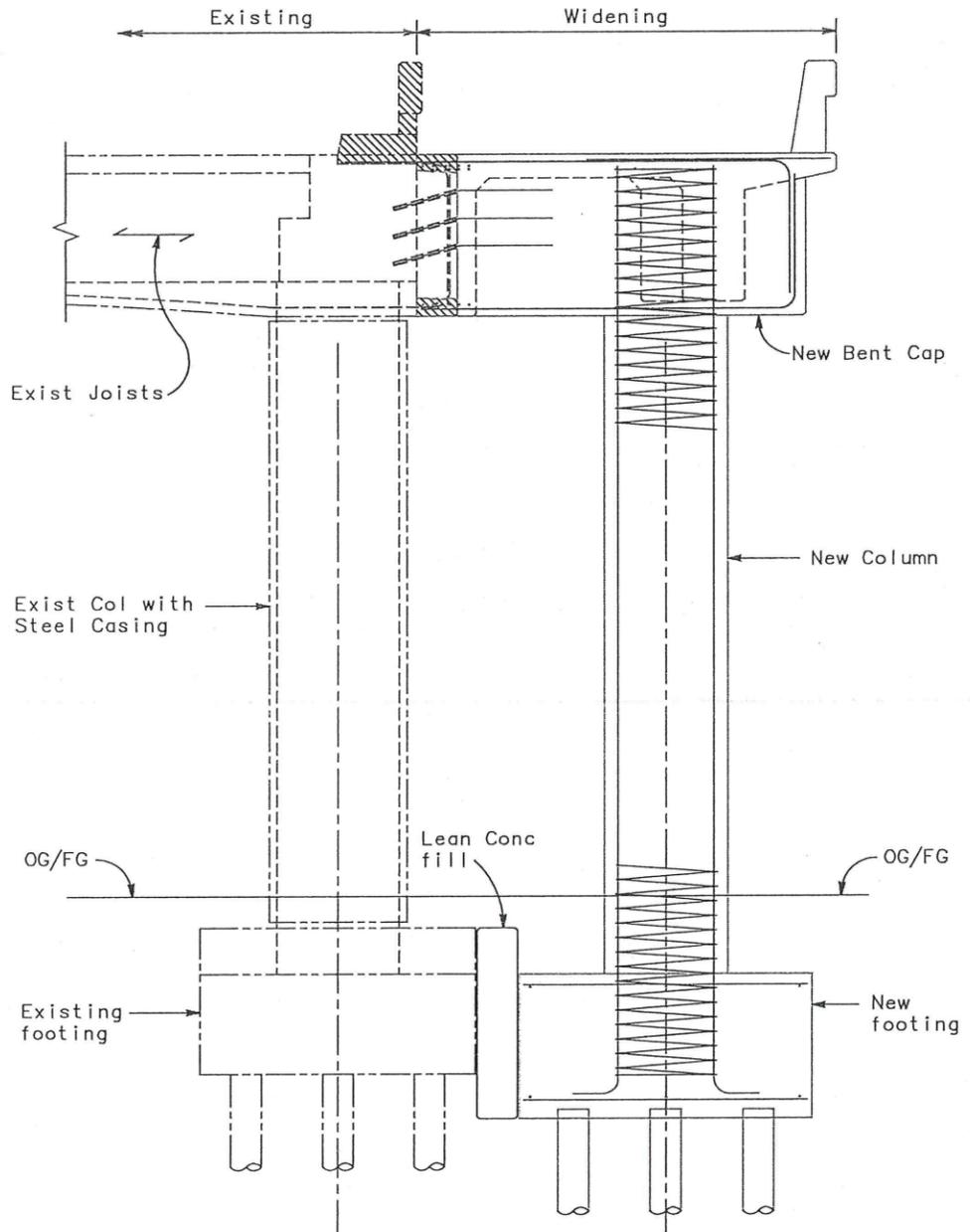
| DIST | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No | TOTAL SHEETS |
|------|--------|-------|--------------------------|----------|--------------|
| 04   | ALA    | EMV   |                          |          |              |

REGISTERED STRUCTURAL ENGINEER DATE \_\_\_\_\_  
 PO-KANG CHEN  
 No. S3112  
 Exp. 9/30/09  
 STATE OF CALIFORNIA

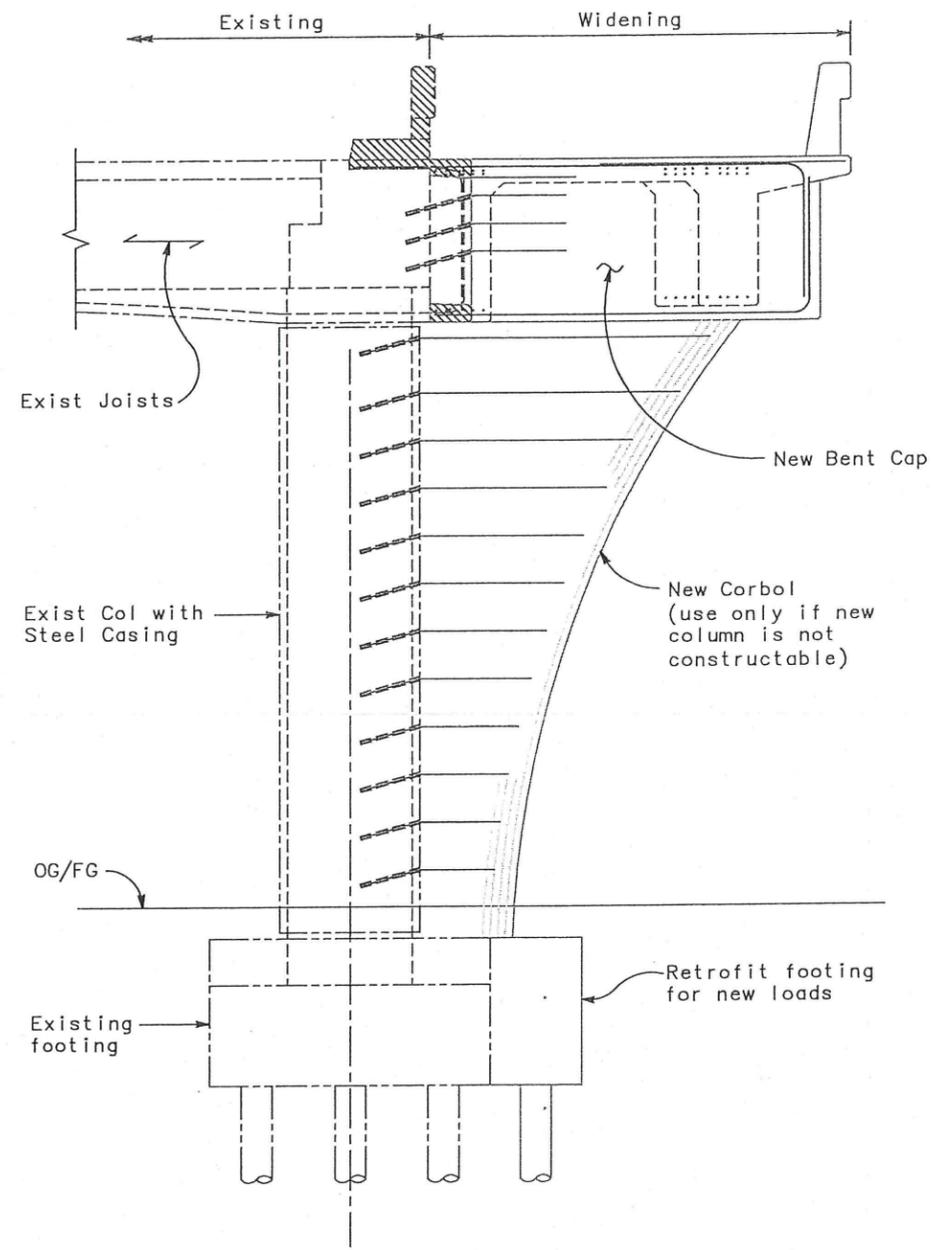
PLANS APPROVAL DATE \_\_\_\_\_  
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 SAN JOSE, CA 95112

**LEGEND:**  
 - - - - - Indicates existing structure  
 \_\_\_\_\_ Indicates new construction  
 ▨ Indicates removal of existing structure (portion)



**ELEVATION - BENT 6-10**  
 No Scale



**ELEVATION - BENT 11**  
 No Scale

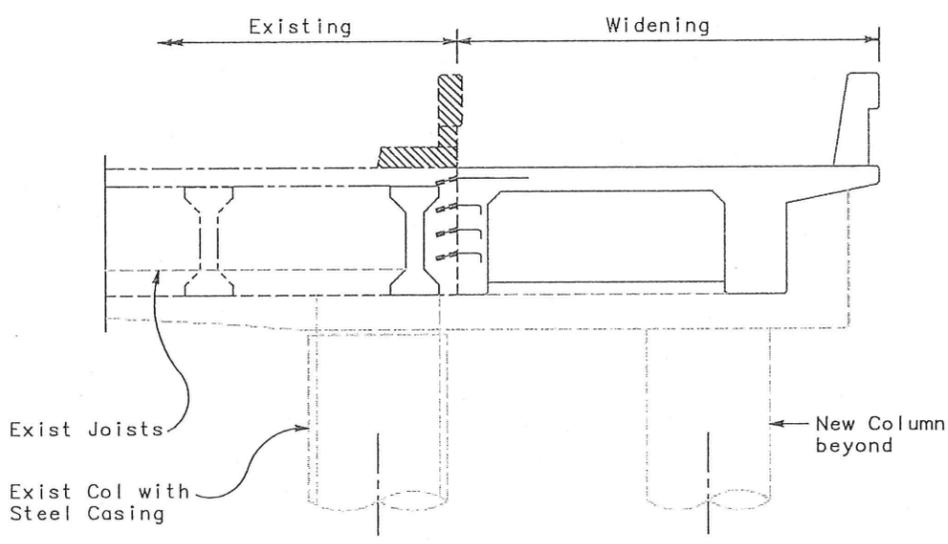
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|------------------|---------------------|-----------------|-------------------------------------------------------------------|-------------------------------|-----------------------------------------|--------------------------------------------------|------|
| DESIGN OVERSIGHT | DESIGN BY H. MISTRY | CHECKED P. CHEN | PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION | PROJECT ENGINEER PO-KANG CHEN | BRIDGE NO. 336-183                      | <b>BENTCAPS AT WIDENING</b>                      |      |
| SIGN OFF DATE    | DETAILS BY          | CHECKED         |                                                                   |                               | POST MILE                               | <b>POWELL STREET OVERHEAD (PARTIAL WIDENING)</b> |      |
|                  | QUANTITIES BY       | CHECKED         | ORIGINAL SCALE IN INCHES FOR REDUCED PLANS                        | CU EA                         | REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET 2                                          | OF 3 |
|                  |                     |                 | 0 1 2 3                                                           |                               | 10/30/08                                |                                                  |      |

| DIST | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No | TOTAL SHEETS |
|------|--------|-------|--------------------------|----------|--------------|
| 04   | ALA    | EMV   |                          |          |              |

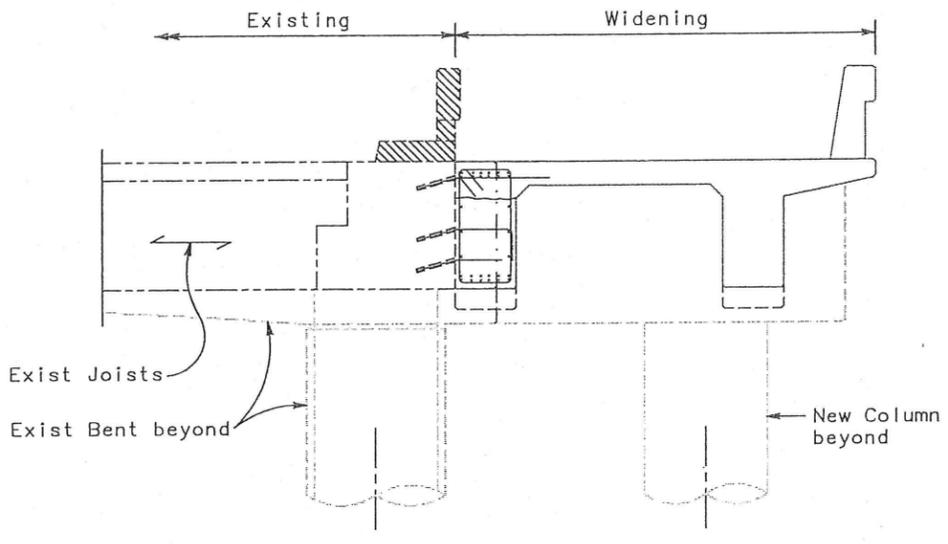
REGISTERED STRUCTURAL ENGINEER DATE \_\_\_\_\_  
 REGISTERED PROFESSIONAL ENGINEER  
 PO-KANG CHEN  
 No. S3112  
 Exp. 9/30/09  
 STRUCTURAL  
 STATE OF CALIFORNIA

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 SAN JOSE, CA 95112



**SECTION - SPAN 1 TO 4 (& PART 11)**  
 No Scale



**SECTION - SPAN 5 TO 10**  
 No Scale

**LEGEND:**  
 - - - - - Indicates existing structure  
 ———— Indicates new construction  
 ▨ Indicates removal of existing structure (portion)

|                                            |                     |                 |                                                                   |                                                 |                                                                              |
|--------------------------------------------|---------------------|-----------------|-------------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------|
| DESIGN OVERSIGHT                           | DESIGN BY H. MISTRY | CHECKED P. CHEN | PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION | BRIDGE NO. 336-183                              | <b>SUPERSTRUCTURE AT SPANS<br/>POWELL STREET OVERHEAD (PARTIAL WIDENING)</b> |
| SIGN OFF DATE                              | DETAILS BY          | CHECKED         | PO-KANG CHEN PROJECT ENGINEER                                     | POST MILE                                       |                                                                              |
|                                            | QUANTITIES BY       | CHECKED         | CU EA                                                             | REVISION DATES (PRELIMINARY STAGE ONLY)         | SHEET 3 OF 3                                                                 |
| ORIGINAL SCALE IN INCHES FOR REDUCED PLANS |                     |                 | 0 1 2 3                                                           | DISREGARD PRINTS BEARING EARLIER REVISION DATES | 10/30/08                                                                     |

# EXHIBIT B

City of Emeryville - Powell Street Left Turn Lanes Addition At Christie Ave: Preliminary Project  
 Cost Estimate (CITY'S PROJECT) Feb 3, 2009

| Roadway Items:                        | quantity | unit | unit cost  | extended   | total               |
|---------------------------------------|----------|------|------------|------------|---------------------|
| Roadway Excavation                    | 140      | CY   | \$ 25      | \$ 3,500   |                     |
| Import Borrow                         | 600      | CY   | \$ 15      | \$ 9,000   |                     |
| Asphalt Concrete                      | 190      | TON  | \$ 85      | \$ 16,150  |                     |
| Aggregate Base                        | 170      | CY   | \$ 50      | \$ 8,500   |                     |
| Storm Drain                           | 1        | LS   | \$ 90,000  | \$ 90,000  |                     |
| Erosion Control                       | -        | FT2  | \$ 0.50    | \$ -       |                     |
| Minor Concrete (sw, curb & gutter)    | 35       | CY   | \$ 900     | \$ 31,500  |                     |
| Minor Concrete (textured paving)      | 3,500    | FT2  | \$ 10      | \$ 35,000  |                     |
| Retaining Walls                       | 800      | FT2  | \$ 65      | \$ 52,000  |                     |
| Concrete Barrier (Type 732A)          | 100      | FT   | \$ 400     | \$ 40,000  |                     |
| Concrete Barrier (Type 26 Modified)   | -        | FT   | \$ 300     | \$ -       |                     |
| Concrete Barrier (Type 60E)           | -        | FT   | \$ 150     | \$ -       |                     |
| Metal Beam Guardrail                  | -        | FT   | \$ 40      | \$ -       |                     |
| Sound Walls                           | -        | FT2  | \$ 35      | \$ -       |                     |
| Pedestrian Fence                      | -        | FT   | \$ 40      | \$ -       |                     |
| Landscaping & Irrigation              | -        | FT2  | \$ 4       | \$ -       |                     |
| Lighting Modifications                | 1        | LS   | \$ 60,000  | \$ 60,000  |                     |
| Permanent Signing & Striping          | 1        | LS   | \$ 12,000  | \$ 12,000  |                     |
| Traffic Control during Construction   | 1        | LS   | \$ 125,000 | \$ 125,000 |                     |
| Traffic Signal Modifications          | 1        | LS   | \$ 100,000 | \$ 100,000 |                     |
| Traffic Management Plan               | 1        | LS   | \$ 10,000  | \$ 10,000  |                     |
| Temporary Pavement Delineation        | 1        | LS   | \$ 4,000   | \$ 4,000   |                     |
| Utility Relocation                    | 1        | LS   | \$ 200,000 | \$ 200,000 |                     |
| Hazardous Material Removal & Clean Up | 1        | LS   | \$ 100,000 | \$ 100,000 |                     |
| Retaining Wall Aesthetic Treatment    | 800      | FT2  | \$ 15      | \$ 12,000  |                     |
| Minor Roadway Items                   | 15%      |      |            | \$ 134,000 |                     |
| <b>Roadway Subtotal</b>               |          |      |            |            | <b>\$ 1,043,000</b> |

| Structure Items:                    | quantity | unit | unit cost | extended   | total               |
|-------------------------------------|----------|------|-----------|------------|---------------------|
| Bridge Removal (Portion)            | 1        | LS   | \$ 40,000 | \$ 40,000  |                     |
| Structure Excavation (Bridge)       | 198      | CY   | \$ 100    | \$ 19,800  |                     |
| Structure Backfill (Bridge)         | 118      | CY   | \$ 120    | \$ 14,160  |                     |
| Furnish and Install Micro-Piles     | 49       | EA   | \$ 10,500 | \$ 514,500 |                     |
| Structural Concrete Bridge          | 424      | CY   | \$ 1,250  | \$ 530,000 |                     |
| Concrete Barrier (Type 732)         | 1,123    | LF   | \$ 90     | \$ 101,070 |                     |
| Drill and Bond Dowels               | 1,200    | LF   | \$ 40     | \$ 48,000  |                     |
| Bar Reinforcing Steel               | 84,000   | LB   | \$ 1.20   | \$ 100,800 |                     |
| Joint Seal                          | 20       | LF   | \$ 100    | \$ 2,000   |                     |
| Temporary Shoring of Superstructure | 1        | LS   | \$ 75,000 | \$ 75,000  |                     |
| <b>Structure Subtotal</b>           |          |      |           |            | <b>\$ 1,445,000</b> |

**Roadway and Structure Subtotal** **\$ 2,488,000**

**Mobilization** 10% **\$ 249,000**

**Subtotal (Roadway+Structure+Mobilization)** **\$ 2,737,000**

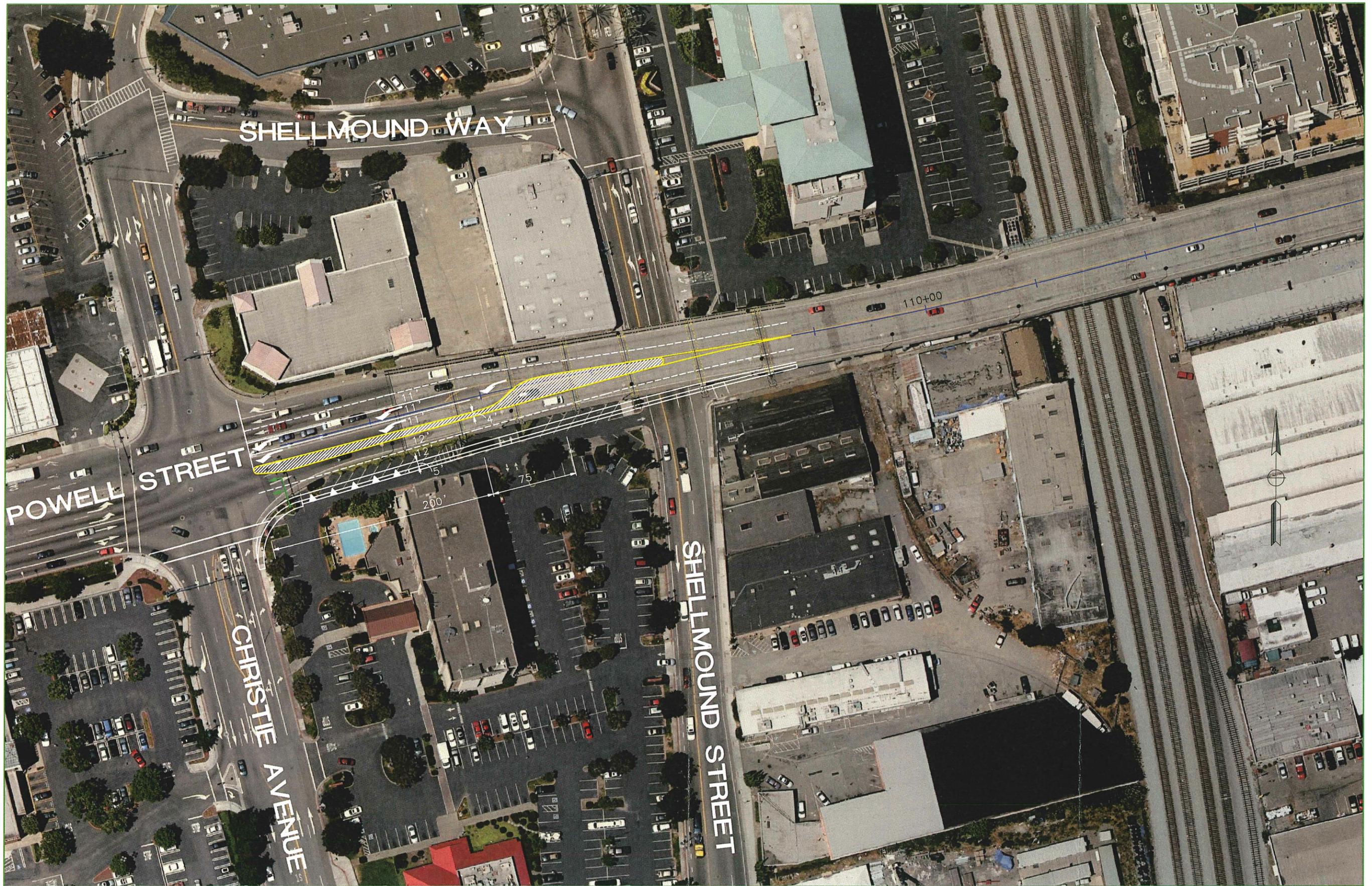
**Contingencies** 25% **\$ 684,000**

**Construction Cost Estimate** **\$ 3,421,000**

**Soft Costs**

|                            |     |                     |
|----------------------------|-----|---------------------|
| City's Admin/Environmental | 14% | \$ 479,000          |
| Design                     | 12% | \$ 411,000          |
| Construction Mgmt          | 12% | \$ 411,000          |
| Construction Staking       | 2%  | \$ 68,000           |
| <b>Soft Cost Subtotal</b>  |     | <b>\$ 1,369,000</b> |

**Grand Total** **\$ 4,790,000**



**MARK THOMAS & COMPANY, INC.**  
Providing Engineering, Surveying, and Planning Services

1960 Zanker Road  
San Jose, CA 95112 (408)453-5373  
DATE: 01/29/09

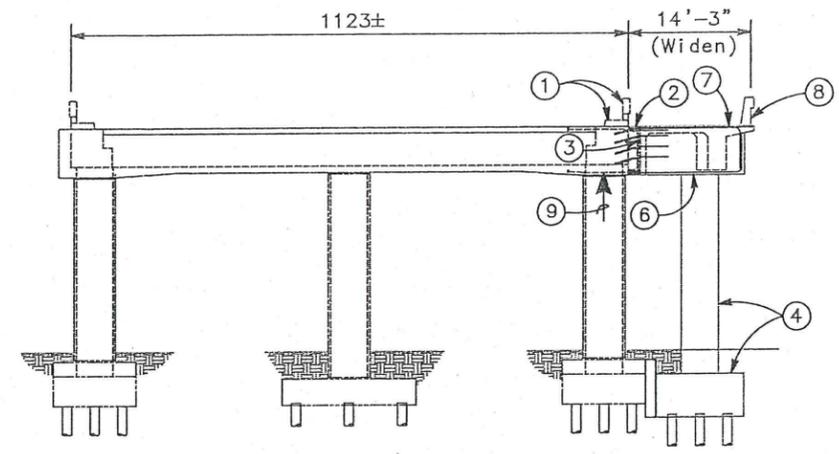
**POWELL STREET OH WIDENING**

**CITY'S PROJECT  
EMERYVILLE, CA**

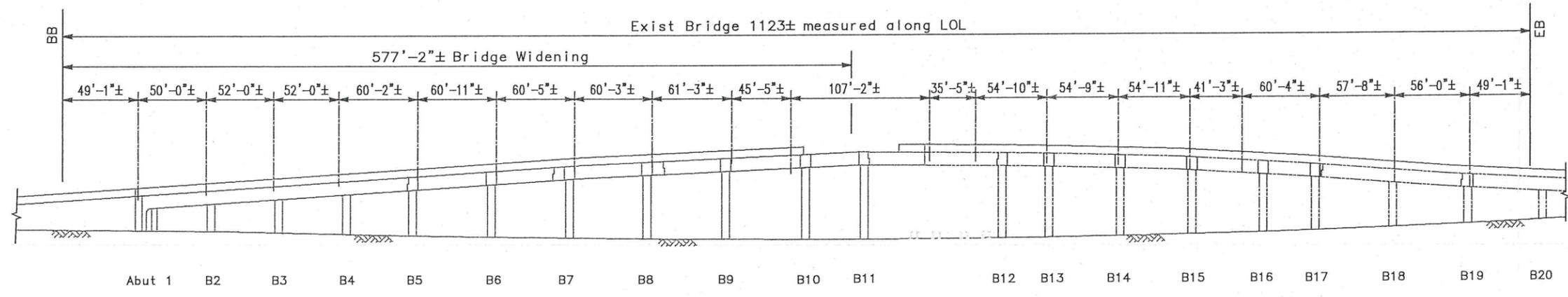
| DIST | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No | TOTAL SHEETS |
|------|--------|-------|--------------------------|----------|--------------|
| 04   | ALA    | EMV   |                          |          |              |

**LEGEND:**

- ① Remove Existing Barrier And Curb Above Deck Level & Refinish.
- ② Remove Concrete (portion) @ Outriggers & Connect Bentcap Widening from Abut 1 to Bent 7.
- ③ Retrofit Existing Exterior Girder.
- ④ Construct New Column And Footing.
- ⑤ Construct Conc Corbel And Retrofit Footing @ Bent 7 Only.
- ⑥ Construct New Bentcap.
- ⑦ Construct New Deck Slab & Girders.
- ⑧ Construct New Concrete Barrier (Type 732).
- ⑨ Temporary shoring during construction.
- ⑩ Evaluate for safety & construct new barrier, if required.



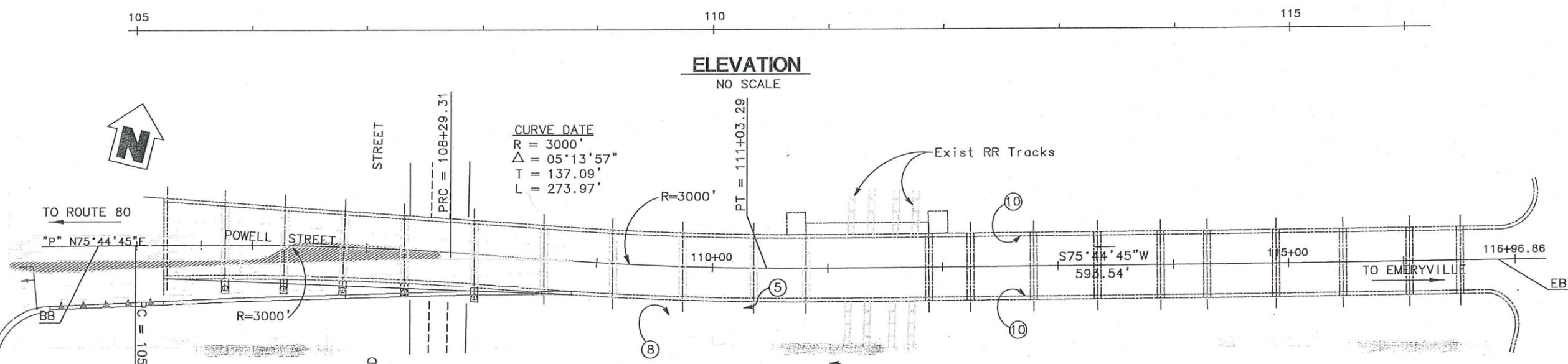
**TYPICAL SECTION**  
No Scale



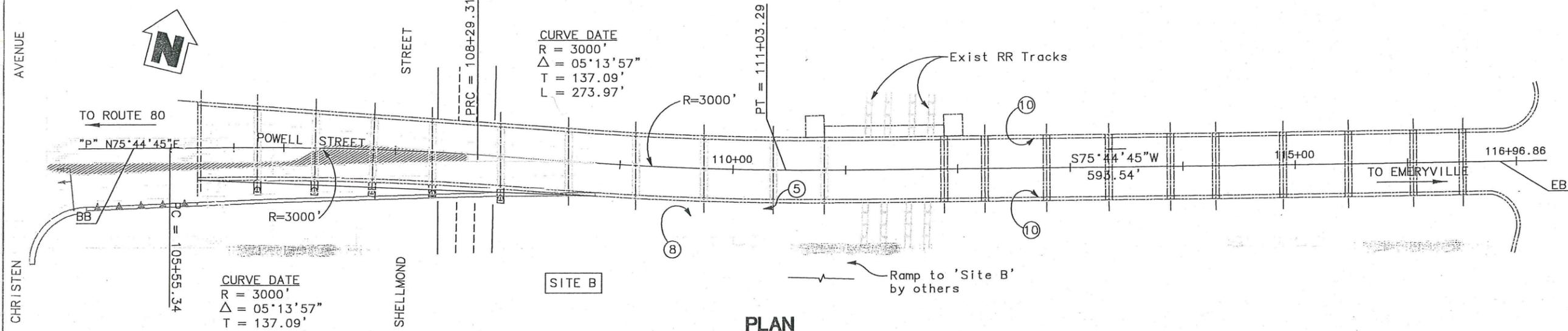
**APPROXIMATE BRIDGE QUANTITIES**

|                                          |        |    |
|------------------------------------------|--------|----|
| BRIDGE REMOVAL (PORTION)                 | 1      | LS |
| STRUCTURE EXCAVATION (BRIDGE)            | 198    | CY |
| STRUCTURE BACKFILL (BRIDGE)              | 118    | CY |
| FURNISH AND INSTALL MICROPILES           | 49     | EA |
| STRUCTURAL CONCRETE, BRIDGE              | 424    | CY |
| CONCRETE BARRIER (TYPE 732)              | 1123   | LF |
| DRILL AND BOND DOWELS                    | 1200   | LF |
| BAR REINFORCING STEEL (BRIDGE)           | 84,000 | LB |
| <UTILITY RELOCATIONS>CIVIL               | 1      | LS |
| <TRAFFIC CONTROL>CIVIL                   | 1      | LS |
| <ELECTROLIERS - REMOVE & REINSTALL>C     | 1      | EA |
| JOINT SEAL                               | 20     | LF |
| <SITE RESTORATION>CIVIL                  | 1      | LS |
| TEMPORARY SHORING OF SUPERSTRUCTURE      | 1      | LS |
| <HAZARDOUS MATERIAL REMOVAL & CLEAN UP>C | 1      | LS |

**ELEVATION**  
NO SCALE



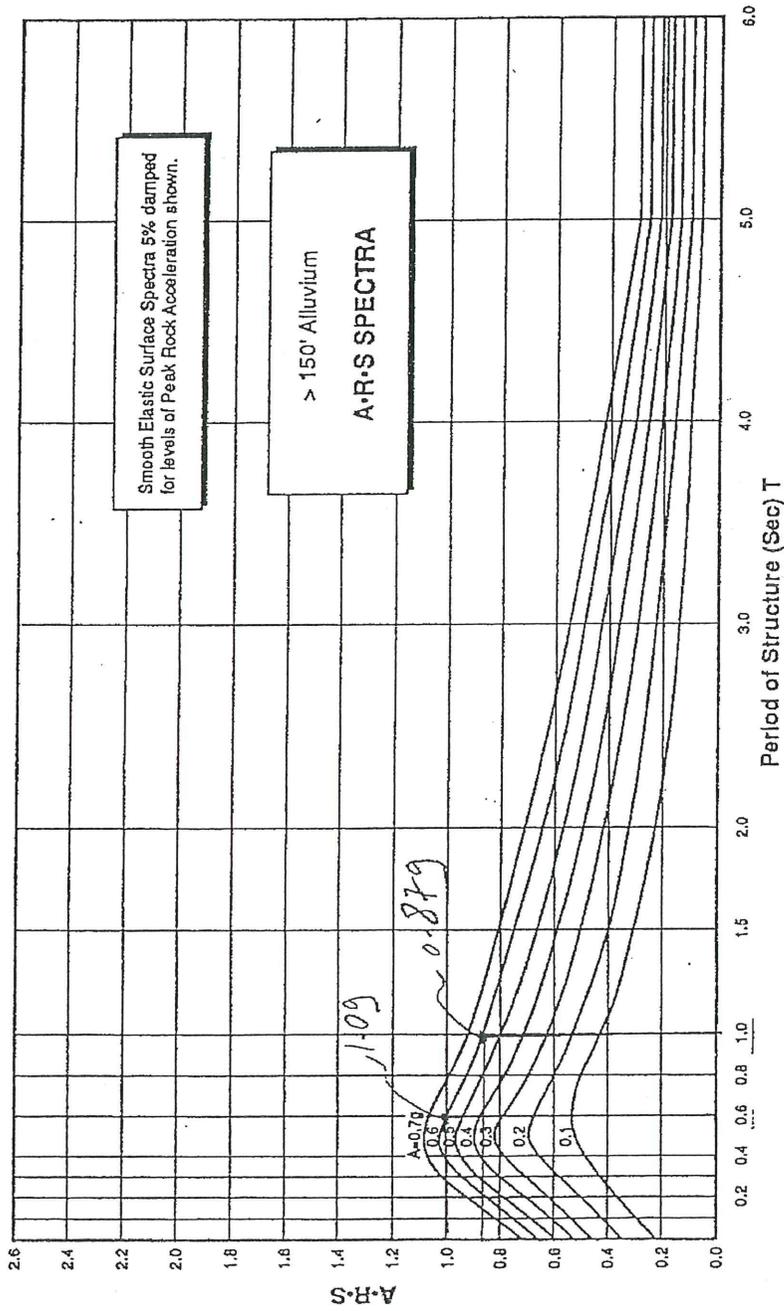
**PLAN**  
NO SCALE



|                  |              |                 |                    |                                                                   |                    |                                                                                                      |
|------------------|--------------|-----------------|--------------------|-------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------|
| DESIGN OVERSIGHT | BY H. MISTRY | CHECKED P. CHEN | LOAD FACTOR DESIGN | PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION | BRIDGE NO. 336-183 | <b>GENERAL PLAN</b>                                                                                  |
| DETAILS          | BY H. MISTRY | CHECKED P. CHEN | LAYOUT             | PROJECT ENGINEER                                                  | POST MILES         | POWELL STREET OVERHEAD (PARTIAL WIDENING) LEFT TURN LANES ADDITION AT CHRISTEN AVE ( CITY'S PROJECT) |
| SIGN OFF DATE    |              | CHECKED P. CHEN | SPECIFICATIONS     |                                                                   |                    | REVISION DATES (PRELIMINARY STAGE ONLY)                                                              |
|                  |              |                 |                    |                                                                   |                    | 10/30/08                                                                                             |
|                  |              |                 |                    |                                                                   |                    | SHEET 1 OF 1                                                                                         |

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

# EXHIBIT C



ASSUME ARS CURVED USED BY RETRAFIT DESIGNER

Figure 3.21.4.3D

+++++

# Site Specific Response Spectra (Kleinfelder)

