

CO# 82016

cc 2729

9-21-82 #298

23 September 1982

Mr. Robert Leigh
City of Sacramento
5730 24th Street
Sacramento, California 95822

Subject: Sidewalk Failure - Various Downtown Locations

Dear Mr. Leigh:

In response to your request for quotation, we propose to shore the sidewalks at the addresses listed below on a time and material basis, total cost to the Owner not to exceed \$20,000.00.

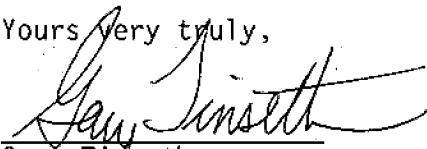
J Street - 701-707½, 801, 812, 826, 830
South side of Merchant Street from park to 8th Street
8th Street, east side from J Street south to alley
9th Street, 1004½ and building adjacent to south
1017 10th Street

The sites were checked with Mr. Bill Seeber of the Street Maintenance Department on June 16, 1982.

Our proposal includes the installation of two (2) parallel rows of 6 x 8 beams supported by 6 x 6 posts (spaced 8' maximum) with 2 x 4 lateral bracing; temporary lighting; barricades as needed; supervision and clean up.

We estimate that the work can be accomplished in approximately two to three weeks assuming no interruptions beyond our control.

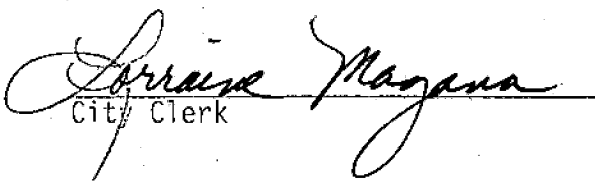
Yours very truly,


Gary Tinseth
GT:eg

CITY OF SACRAMENTO


City Manager

ATTEST:


City Clerk

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CITY OF SACRAMENTO

CITY MANAGER'S OFFICE
RECEIVED
SEP 3 1982

DEPARTMENT OF ENGINEERING
915 I STREET SACRAMENTO, CALIFORNIA 95814
CITY HALL ROOM 207 TELEPHONE (916) 449-5281

J.F. VAROZZA
CITY ENGINEER
M.H. JOHNSON
ASSISTANT CITY ENGINEER

September 14, 1982

City Council
Sacramento, California

Honorable Members in Session:

SUBJECT: Resolutions Authorizing Transfer of Funds, Suspending Competitive Bidding and Execution of an Agreement with Zenith Construction Company for Shoring of Hollow Sidewalks in the Downtown Area

SUMMARY:

Submitted herewith are resolutions authorizing the transfer of \$20,000, suspending competitive bidding and authorizing the City Manager to enter into an agreement, not to exceed \$20,000, with Zenith Construction Company for the shoring of hollow sidewalks in the downtown area. It is recommended that the resolutions be adopted.

BACKGROUND:

The City Council previously approved a study of the hollow sidewalks in the downtown area, which this office had proposed because of concern over the deteriorated condition of some of these sidewalks. A report on the study is now completed and the text is attached. Copies of the report, including all appendices, are available at the office of the City Engineer for loan or review. While the report does not indicate as severe a problem as was originally anticipated, the consultant does recommend that certain sidewalks (see attached report) be shored as soon as possible. Consequently, staff has obtained an estimate from Zenith Construction Company, a firm which is very experienced in this type of work, for the required shoring. It is staff's opinion that this work should be done as soon as possible and that it is in the best interest of the City to waive formal bidding procedures and enter into an agreement with Zenith Construction Company for this work.

The consultant also indicated that there are two buildings on J Street which could be a potential hazard. The Building Inspections Division has notified the owners of these buildings and they indicated that they have retained their own structural engineers for further analysis.

FINANCIAL:

The most appropriate source of funding for the sidewalk shoring work is Gas Tax. At this time, we do not anticipate using all of the Gas Tax funds budgeted for the

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By the City Council
Office of the City Clerk
Cont. to
9-21-82
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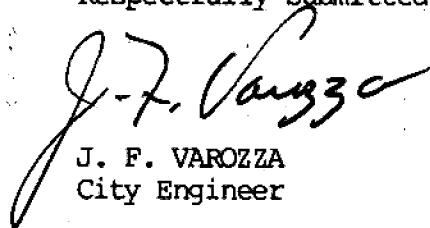
CO 82016

2nd Avenue Extension project. Therefore, it is proposed that \$20,000 of Gas Tax Funds be transferred from that project for the shoring of hollow sidewalks in the downtown area. The Budget and Finance Committee approved staff's recommendation at their September 14, 1982 meeting.

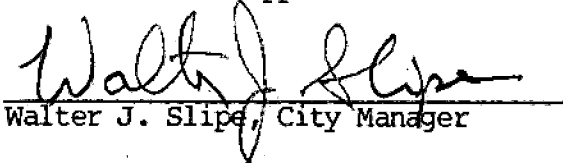
RECOMMENDATION:

It is recommended that \$20,000 of Gas Tax funds be transferred from the 2nd Avenue Extension project, competitive bidding procedures be suspended and that the City Manager be authorized and directed to enter into an agreement with Zenith Construction Company for a not to exceed figure of \$20,000, by passage of the attached resolutions.

Respectfully submitted,


J. F. VAROZZA
City Engineer

Recommendation Approved:


Walter J. Slipe, City Manager

F/Ref.
C.C. 2729

RESOLUTION NO. 82-670

ADOPTED BY THE SACRAMENTO CITY COUNCIL ON DATE OF

September 14, 1982

A RESOLUTION AMENDING THE CITY BUDGET FOR F.Y.
1982/83 FOR THE SHORING OF HOLLOW SIDEWALKS
IN THE DOWNTOWN AREA

BE IT RESOLVED BY THE COUNCIL OF THE CITY OF SACRAMENTO:

- 1. It has been determined that certain hollow sidewalks in the downtown area are in need of shoring and funds are necessary to perform this work.
- 2. The City Budget for Fiscal Year 1982/83 is hereby amended by transferring \$20,000 from the 2nd Avenue Extension project (2-02-2600-2415-4820) to the Hollow Sidewalks - Downtown Area project (2-02-2600-2729-4820) for the purpose stated in paragraph 1 above.

MAYOR

ATTEST:

CITY CLERK

APPROVED
BY THE CITY COUNCIL
SEP 21 1982
OFFICE OF THE
CITY CLERK

RESOLUTION NO. 82-671

ADOPTED BY THE SACRAMENTO CITY COUNCIL ON DATE OF

September 14, 1982

RESOLUTION SUSPENDING COMPETITIVE BIDDING AND AUTHORIZING THE CITY MANAGER TO ENTER INTO AN AGREEMENT WITH ZENITH CONSTRUCTION COMPANY FOR THE SHORING OF HOLLOW SIDEWALKS IN THE DOWNTOWN AREA

BE IT RESOLVED BY THE COUNCIL OF THE CITY OF SACRAMENTO:

That pursuant to the Code of the City of Sacramento Section 58.401(d), the City Council finds and determines that it is in the best interest of the City to suspend competitive bidding for the shoring of hollow sidewalks in the downtown area and,

Further resolved, that the City Manager and City Clerk are authorized and directed to enter into an agreement, not to exceed \$20,000, with Zenith Construction Company for the shoring of hollow sidewalks in the downtown area.

MAYOR

ATTEST:

CITY CLERK

APPROVED
BY THE CITY COUNCIL
SEP 21 1982
OFFICE OF THE
CITY CLERK

Report on
DOWNTOWN SACRAMENTO
"HOLLOW SIDEWALKS"

Prepared For
CITY OF SACRAMENTO
JOHN F. VAROZZA
City Engineer

Prepared By
BARRISH, ALDRICH AND SCHROETER
Consulting Structural Engineers

August 11, 1982

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- B. PROPOSED REPAIR/REPLACEMENT METHODS
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I INTRODUCTION AND PURPOSE

This study is the result of a contract authorized by the City Council at the request of the City Engineer. The purpose of the study is to investigate the hollow sidewalks in downtown Sacramento which resulted from the raising of the street level in the 1860's.

Numerous instances of distress have become visible in the sidewalks and several minor failures have occurred. As a result, the City Engineer desires a more complete investigation of the sidewalks together with repair schemes responsive to the various possible utilizations of the space beneath. In addition, we are requested to prepare cost estimates for the various methods.

II HISTORICAL BACKGROUND

The hollow sidewalks with which the study is concerned were almost all constructed in the decade between 1860 - 1870. Serious flooding had plagued Sacramento up to that point and it became obvious further development of the City could not occur under these conditions. Several solutions to the problem were proposed. Some thought that strengthening the existing levee system along the Sacramento and American Rivers would be an adequate solution. Others proposed building a cutoff levee along 15th and R Street to prevent the flood waters from backing into the City. Still others proposed moving the location of the City to higher ground to the northeast or south.

Raising the streets and buildings of downtown Sacramento, referred to as "High Grading", was another alternative and became a major political issue in Sacramento in the early 1860's. While levee building would be accomplished on a financial basis that would distribute the cost over all the residents of the area, "High Grading" was to be accomplished by assessments based on frontage on the affected streets plus costs of raising the buildings.

In February, 1863, an election was held in which the cutoff levee was defeated and "High Grading" approved, and the project got under way in late 1863.

The City advertised for bids and let contracts for the actual filling of the streets, but the construction of the required retaining walls and sidewalks and the raising of the buildings were the responsibility of the individual property owners. The filling proceeded on a block by block basis initiated by petition from the property owners on a particular block. This, of course, resulted in changes of elevation of the streets and sidewalks of up to 10 feet where a raised block abutted one which hadn't been raised.

II Historical Background Cont'd.

Downtown Sacramento must have been an interesting place for pedestrians and others to negotiate in the six year period during which the filling took place. By 1870 the work was complete and the center of Sacramento from I Street to L Street and extending from the river to approximately 12th Street had been raised.

III DESCRIPTION OF STRUCTURES

While construction of the individual retaining walls in front of each property was the responsibility of the owner, there is considerable similarity in their construction throughout. They occur directly under the street side curb and typically consist of horizontal brick arches, 2 wythes (8") thick, spanning between buttresses. The buttress spacing varies between 4 and 8 feet. Plates 1, 2 and 3 give plan and section views of a typical portion. In some areas the arches are replaced by flat wall sections, also 8" thick brick and supported by buttresses. Floor slabs were not typically provided in the original construction but have been added in many areas. In quite a few areas, mass concrete has more recently been placed against the inside of the retaining walls to a depth of two or three feet.

Sidewalk construction systems associated with the retaining walls are generally one of the following:

1. Shallow brick arches spanning between wrought iron beams with a concrete topping. Beams are generally supported at streetside by the retaining wall and at the rear by the building. Wrought iron rods tied the bottom of the arches in some locations.

2. Concrete arches formed on corrugated metal and supported by wrought iron beams. Beams are generally supported on the retaining wall at the street side and the building at the rear. Tie-rods were also sometimes present.

3. Concrete topping over wood deck supported by wood purlins spanning to wood beams. Beams are generally supported at the streetside by the retaining wall and at the rear by the building.

4. Numerous systems involving reinforced concrete flat slabs spanning to either concrete beams or encased steel beams. These are normally supported on the retaining walls at the street. At the rear they are sometimes supported on the building but often on independent pilasters or columns. These are generally of a later date than types 1, 2 and 3 above and include the sidewalks associated with new buildings and the sidewalks which were recently redone in Old Sacramento.

III Description of Structures Cont'd.

The age of the sidewalk systems is indeterminate, but most of them are not as old as the retaining walls.

The sidewalks are supported by the adjacent buildings in several different ways. In some cases the front wall or columns are corbeled out to produce a ledge on which the sidewalk supports sit. In other cases the front building columns are constructed in a T-shape with the outstanding leg either supporting the sidewalk supports or supporting a member which supports them. A third configuration is cast iron brackets projecting from the brick building columns and supporting a railroad rail which picks up the sidewalk supports. The cast iron brackets are especially susceptible to loss of support by deterioration of the brickwork.

IV CONDITION OF THE EXISTING STRUCTURES

In the case of the older sidewalks, the undersidewalk areas have remained almost continually damp. In many areas, no floor slabs exist and the damp soil is exposed. In most areas, the retaining walls have badly inadequate waterproofing, if any. The brick is almost continually wet and seepage occurs in those areas adjacent to earth with a high water content. In most areas, distress in the sidewalks has caused sufficient cracking so that considerable leakage occurs during rainy periods. The result is that the materials of construction have been exposed to very damp conditions over a considerable length of time.

The materials used in the construction of the sidewalks and retaining walls such as soft-fired "salmon" brick, lime mortar, wrought iron and reinforced concrete with inadequate coverage of the reinforcing are all subject to severe deterioration over a relatively short period of time in humid conditions. The "salmon" brick have eroded in some cases to as little as 50% of their original dimensions and consequently have fallen from their positions in the walls and arches. The lime mortar, in the worst cases, has been reduced to a fluffy powder that lies in drifts along the bottom of the walls where it has fallen from the joints. The deterioration of brick and mortar has made it possible to remove bricks at random from some of the walls and arches with bare hands and very little effort.

The wrought iron beams have delaminated and corroded to the point that it is possible to reach up and pull off entire sections of the lower flange in some areas. In other areas, it is already missing. The tie-rods which were intended to take the thrust of the brick and concrete arches are completely missing in some areas and in many other areas are so badly corroded that they have no real capacity. Partial failure of retaining walls is visible from above in several areas as unevenness at the curb line and depressed

IV Condition of the Existing Structures Cont'd

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areas in the street adjacent to the curb. In several cases the curbstone itself has rotated as the top of the walls has been forced in by the surcharge of heavy trucks and busses.

V ANALYSIS

Our analysis indicates that the old retaining walls are badly deficient under present loads and current methods of engineering analysis. Even assuming that the materials of construction maintained their original integrity, the walls have inadequate factors of safety against sliding, overturning and material stress. In the many areas where floor slabs have been added, the sliding problem is no longer critical. In the areas where mass concrete has been placed against the inside of the retaining walls to a height of several feet, there is a reduced overturning problem but most of the distress we have found in the walls occurs above this level and would not be affected.

The sidewalks, in many cases, no longer have their intended support members, and would not be able to carry the superimposed live loads considered normal for new work. They are, however, carrying present pedestrian traffic and their own dead load except in those cases where emergency shoring is supporting them.

After reviewing the construction of the sidewalks and retaining walls and their present condition, the obvious question arises as to why they have stood as long as they have and why, in general, they are continuing to support the imposed loadings.

We feel that the current stability of the sidewalks and retaining walls is due almost entirely to secondary modes of behavior of the components involved. The sidewalks, retaining walls, buildings and separation walls work as an interdependent system, mutually supporting one another. This, of course, greatly complicates any repair of a single component. If, for instance, the sidewalk is necessary to provide lateral support for the front wall of the adjacent building; then its removal for replacement purposes might jeopardize the building itself.

The retaining walls apparently were originally designed to be free standing. We believe that their current stability, in many cases, is due to their thrusting against the sidewalks at the top and the sidewalks either transferring this reaction to the building directly or to the separation walls through a form of diaphragm action in the sidewalk. The stability of the walls is also aided by the superimposed load of the sidewalks and earth which creates a compression in the wall which helps to offset the tension produced by the soil loadings. In addition, the thrust in the sidewalk induces compression which improves the load capacity of the sidewalk.

V Analysis Cont'd.

The absence of the tie-rods in the sidewalk vaulted arches indicates that the thrust must be taken by the abutting sidewalk bays on either side. There is evidence of this in arches which have buckled upward after being weakened by cutting access holes, etc. Except for a few of the weakened sections, this secondary thrust in the adjacent bays does not appear to present a problem but will have to be considered when sections are removed for replacement.

VI CONCLUSIONS

Determining priorities for repair is made difficult by the lack of precision in our knowledge as to the relative importance of the various factors involved in the stability of the existing walls.

Soil conditions, quality of brickwork, wall geometry and vertical load on and behind the wall all are factors in the wall's stability.

We do not believe that the retaining walls are likely to fail in a manner which would endanger human life. It is more likely that the failure would be gradual and that distress in street paving and changes in wall geometry would give warning and allow remedial steps to be taken. While the possibility of a complete and sudden collapse does exist, we feel that its likelihood is such that other items should be considered first in developing priorities.

With respect to the sidewalks, we believe that a sudden and complete collapse of some areas is a distinct possibility and that such an event could have serious consequences. An inadvertent wheel loading on the sidewalk could cause an immediate collapse of a considerable section endangering any pedestrian in that area. In addition there is a distinct possibility that a sidewalk collapse could result in the collapse of the adjacent building. Where concrete or masonry arch construction with a concrete topping slab poured directly to the building wall abuts and is supported by a store front of deteriorated brick construction, there is a good possibility that the rotation of the sidewalk at the building, which would occur during sidewalk failure, would be sufficient to collapse the brick columns supporting the building.

While investigation of the buildings abutting the hollow sidewalks was not a part of our contract, our investigations of the sidewalk support made at least a cursory examination inevitable. It is our opinion that a very serious problem exists in a number of areas. Deterioration of the brick columns supporting the rear side of the sidewalk and the front of the buildings has proceeded to such an extent that the immediate collapse of some storefront supports under currently imposed vertical loadings would not be surprising.

VI Conclusions Cont'd.

We strongly urge the City to establish a systematic survey of these buildings to more fully assess the risk and institute remedial action as quickly as possible.

In many areas, the existing sidewalk may be a major factor in the stability of the front wall of the existing building and the deteriorated conditions of the brick walls and columns of many of the buildings will be a major factor in any project to repair the sidewalks. Replacement of the existing sidewalks in some areas may necessarily be concurrent with significant rehabilitation work on the adjacent buildings.

VII RECOMMENDATIONS

1. Sidewalks — Immediate shoring of the sidewalks on the following list (where it has not already been accomplished) to be followed by replacement when possible.

J. Street

- 701 - 707-1/2 J Street
- 801 - J Street - Brick arches
- 805 - J Street
- 807 - J Street - Concrete arches - shored during preparation of report.
- 812 - J Street
- 826 - J Street
- 830 - J Street

Merchant Street

South side from park to 8th Street

8th Street

East side from J Street south to alley — wood structure — several shoring attempts in past.

9th Street

1004-1/2 and building adjacent to south — distress on surface unable to examine interior due to finishes.

2. Retaining Walls

- 1) Keep watch on those showing movement and watch for distress indicating initiation of movement in other areas.

VII Recommendations Cont'd

- 2) Replace or repair as required in conjunction with work on adjacent sidewalks, buildings, and utilities.
- 3) Restrict locations of bus stops and loading zones.
- 4) Replace or shore those showing significant movement which is obviously recent. A partial list of areas showing distressed walls is as follows.

120 I Street

Ramona Hotel, 6th Street side.

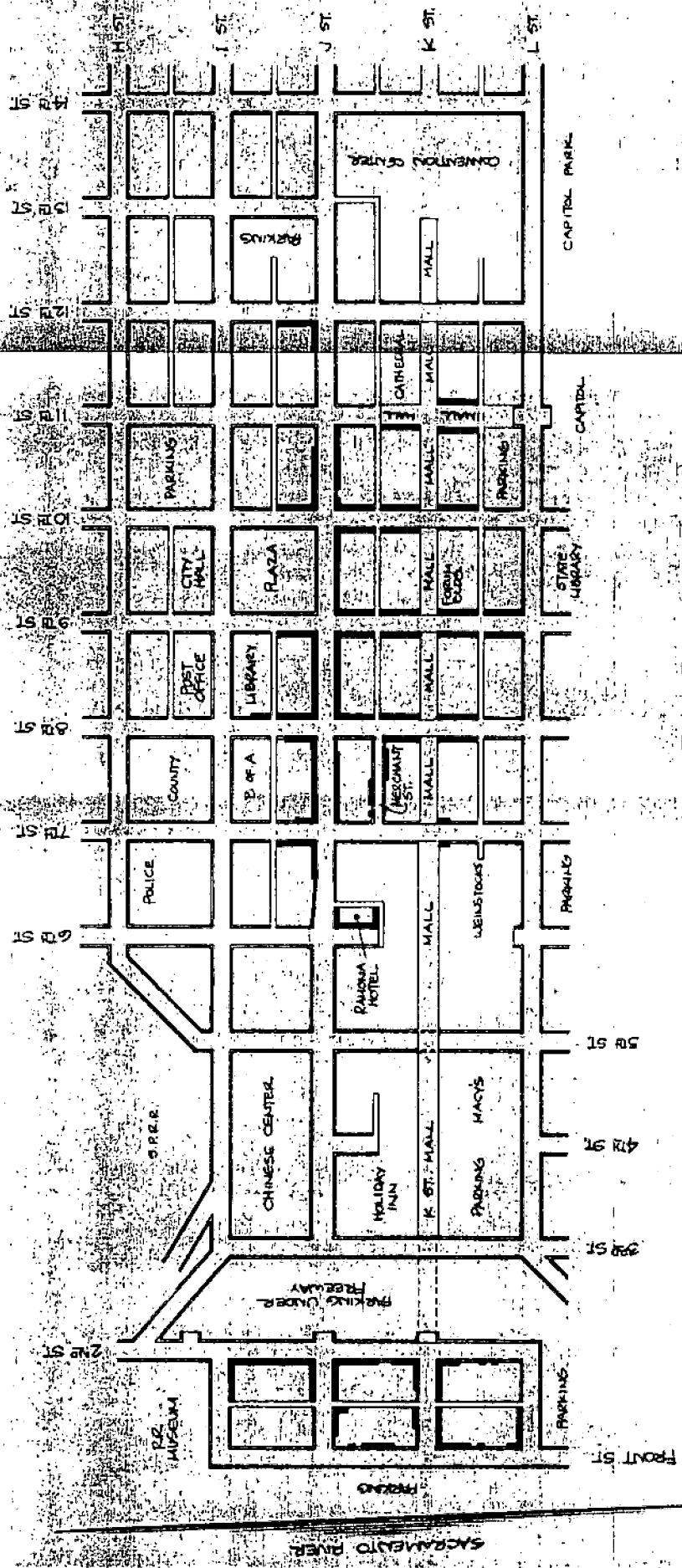
East side of 8th Street, from J to alley on North.

Front Street at West side Firehouse parking.

900 J Street.

3. Adjacent buildings

- 1) The City should establish a system for the thorough investigation of the old masonry structures in downtown Sacramento. We believe that at least two of the buildings involved are potential hazards. These are 807 and 830 J Street, both of which are supported at the sidewalk on loose piles of brick. We believe further study should be made of these buildings and that all the old brick buildings, especially in the area between 7th and 10th on J Street, should receive fairly intensive investigation.



DOWNTOWN CITY SIDEWALKS

NO SCALE

— INDICATES ASSUMED "HOLLOW" SIDEWALKS.

APPENDIX A

8-2-82