Menlo Park Grade Separation

Feasibility Study Supplement

for

Ravenswood Avenue, Oak Grove, Glenwood, and Encinal Avenues

September 2, 2004

Prepared by

BKF Engineers
540 Price Avenue
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BKF

CITY OF MENLO PARK

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ENGINEERS
SURVEYORS
PLANNERS

September 2, 2004
BKF Job No. 20020032

Kent Steffens
Director of Public Works
City of Menlo Park
701 Laurel Street
Menlo Park, CA 94025

Subject: Menlo Park Grade Separations

Dear Mr. Steffens:

The attached report supplements that information that was presented in our June 5, 2004 report titled, "*Report to City Council on Menlo Park Grade Separations & New Station Feasibility Study*". Per the Councils request, in their meeting of September 9, 2004, we have further developed the Underpass and Split alternatives and developed preliminary plans for the station for both alternatives.

The information contained in this supplement is intended to provide additional information for the council and the residence of the City to determine if grade separations are appropriate for the City and if so the most appropriate way to create them.

Very truly yours,
BKF Engineers

REGISTERED PROFESSIONAL ENGINEER
DAVID P. EVANS
21539
9-30-05
CIVIL
STATE OF CALIFORNIA

David P. Evans
Principal/ Vice President

Introduction

BKF Engineers was retained by the City of Menlo Park to prepare alternatives for grade separating the four existing grade crossings in Menlo Park at Ravenswood, Oak Grove, Glenwood and Encinal Avenues. The results of the study were contained in a report titled, "***Report to City Council on Menlo Park Grade Separations & New Station Feasibility Study***" dated June 5, 2003. The report investigated four alternatives for grade separating the crossings. They were:

- **Trench Option**– Keeping the tracks at their present grade and depressing the tracks 30-feet in the ground.
- **Overpass Option**– Keeping the tracks at their present grade and reconstructing the roadway on 30-foot high structures.
- **Underpass Option**– Keeping the tracks at grade and depressing the roadways 20-feet below the grade of the tracks. (This alternative is also referred to as the Depressed Street & Elevated Tracks Alternative.)
- **Split Option**– Partially lowering the road crossings and partially raising the tracks to create a 20-foot differential between the track elevation and the roadways.

On June 10, 2003, a study session was held to review the alternatives presented in the report. On September 9, 2003, the City Council reviewed and considered the findings of the study in which staff-recommended a split-level preferred design alternative. Upon conclusion of its deliberations, the Council directed staff to do the following:

1. Continue to consider the deep underpass alternative as well as the staff recommended split-level alternative.
2. Consider the practicality of closing Encinal Avenue and Glenwood Avenue at the railroad tracks to possibly reduce the scale of the project.
3. Evaluate aesthetic considerations to make the project visually unobtrusive.
4. Conduct further public outreach.
5. Prepare more tangible examples and graphic materials for presentation to the public.

This supplemental report addresses items 1 and 5 of the Councils request.

Grade Separation Alternatives

The major differences between the Underpass and Split alternatives are:

- The impact on the existing road circulation patterns.
- Impacts on the properties near the existing grade crossings.
- The visual impact of a raise track through the community.

We have attempted to demonstrate the differences in the circulation patterns and impacts on properties by preparing side by side comparisons of each of the four crossings. These graphics are contained in Appendix A.

There is a separation of 20-feet required in order to provide the needed vertical clearance between the rail lines and the railroad tracks. The track and road can be raised or lowered in any combination as long as the needed 20-foot separation is maintained. On one extreme the track can be kept at its present elevation and the roadway lowered 20 feet. This is the Underpass alternative. With this option, and the need to maintain a maximum 6% grade on the roadway as it approaches the crossing, the existing road needs to start being lowered 350-feet from the crossing. Where additional right of way exists, the banks can be sloped. There appears to be an option to have sloped banks at the Ravenswood crossing. The crossing could be similar in appearance to the Jefferson Avenue crossing in Redwood City. See Photo 1. The one major difference is that there are no roads constructed parallel to the tracks at Jefferson.

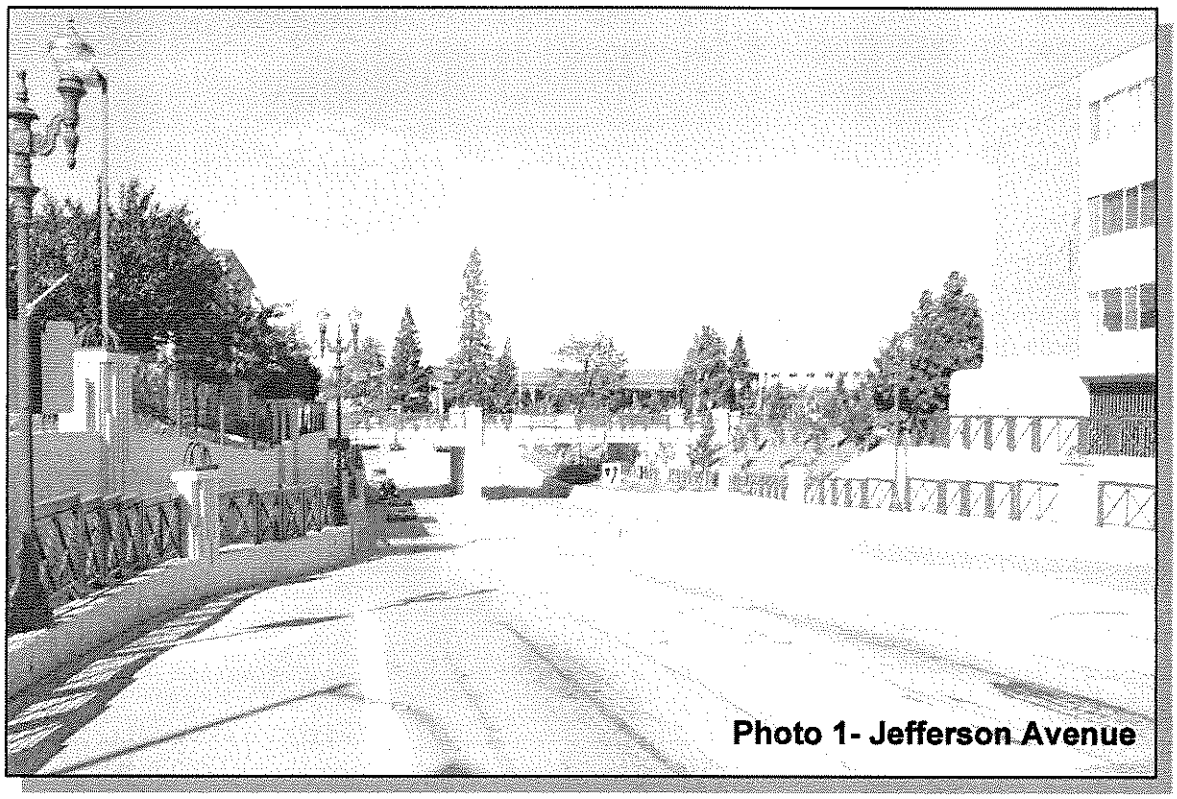


Photo 1- Jefferson Avenue

For the Glenwood, Oak Grove, and Encinal crossing, however, there is no additional right of way available. Therefore retaining walls, ranging in height from 2-feet to 25-feet would be required along the sides of the roads. This will create a very narrow tunnel effect with the width of the road about the same as the height of the walls. The Condition would be similar to the underpass at Page Mill Road in Palo Alto, except the road will be two lane wide rather than four lanes. See Photo 2.

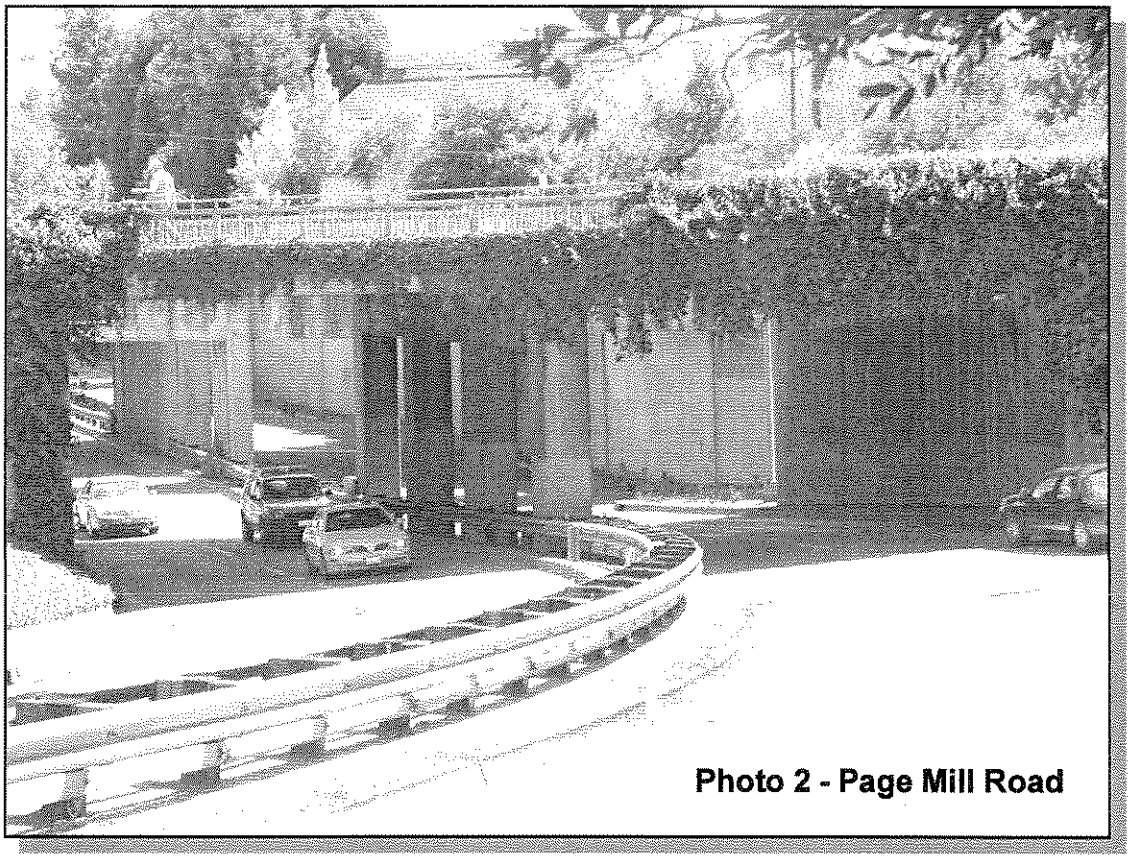


Photo 2 - Page Mill Road

These deep underpasses make it difficult to maintain access to the properties on either side of the roadways, resulting in the need to construct steep driveways in some locations and the total loss of access to some parcels in other locations.

For the Split Alternative we have assumed the track would be raised 10-feet and the road lowered 10-feet for our studies. This is the split combination at Holly Street in San Carlos. As stated earlier, there are any number of slit combinations. The 10/10 split was chosen because it is a good balance, requiring only 3 to 4-foot retaining walls for the properties along Alma and Garwood. Photo 3 shows the walls at the Old County Road Holly intersection in San Carlos. If something other than a 10/10 slip were used the wall height will vary. For each foot that the roadway is raised, the height of the wall will decrease by the same amount. For each foot that the roadway is lowered, the height of the wall will increase by the same amount.

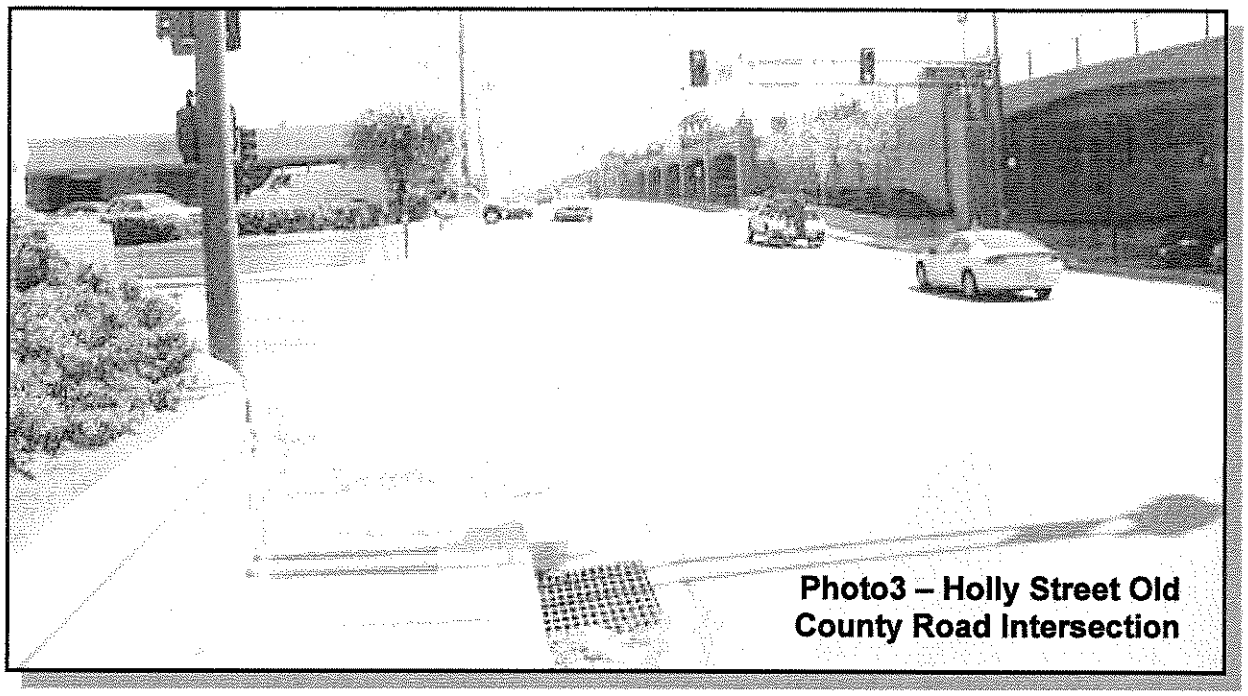


Photo3 – Holly Street Old County Road Intersection

Effect on surrounding Properties

The diagrams in Appendix A show the impact that the "Underpass" alternative and the "Split" alternative will have on the surrounding properties.

The property crosshatched in BLUE will experience **minor impacts**, but the existing use of the property will be able to be maintained. There may be a need to regrade one or more driveways, and the property may not have frontage on depressing street, but the use will be able to be maintained.

Property crosshatched in ORANGE will experience **significant impacts**. The property will no longer be able to be used for its current use, but could be used for something else. An example would be the 7-11 at the corner of Alma and Oak Grove. With the Slit Alternative it would still have frontage on Alma and Oak Grove, but the driveway would need to be regraded. For the Underpass alternative however, the 7-11 would not have the visibility or vehicle access it currently has and, as a result, most likely could no longer function as a 7-11. However, the property could be used for a small apartment or office building.

Property crosshatched in RED will experience **major impact**s due to disruption of access.

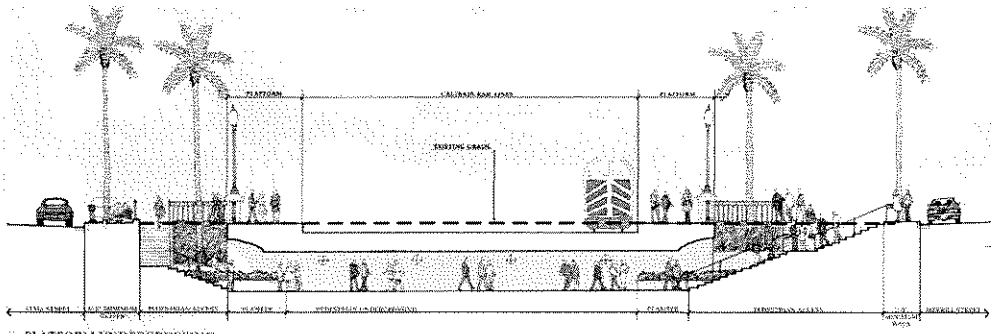
You will note that the impact on properties around the existing at grade crossings will be affected to a much greater extent with the Underpass Alternative. ***It needs to be pointed out, however, that the property impacts shown are based on the current feasibility plan and assumptions, and may vary based on final design***.

New Station Design

In the previous report the fact that the existing station would need to be changed to accommodate the new track configuration was discussed but there were no studies done to evaluate how the station would change. In response to the Council's request for developing more tangible graphics, Callander Associates was retained to develop a station layout for both the Underpass and the Split Alternatives. The results of their work are presented in Appendix B, for the Underpass - Alternative 1 and for the Split - Alternative 2.

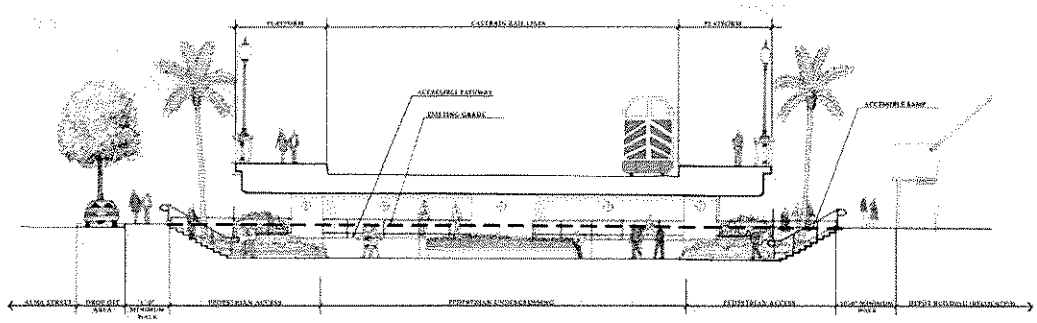
In both instances the plans call for the relocation of the three existing structures on the site. The main Depot building would be moved closer to Santa Cruz Avenue to establish a focal point for the station that could be seen from the Downtown area. The Model Railroad building would be moved to the north next to Oak Grove Avenue, away from the more heavily traveled areas, while the Bike Shelter would be moved slightly south but basically kept at its present location.

If the tracks are kept at their present elevation, the passageway from one side of the tracks to the other would need to be depressed about 15-feet in order to provide a 10-foot high opening. The passageway would have little natural light, and require artificial lighting 24 hours a day.



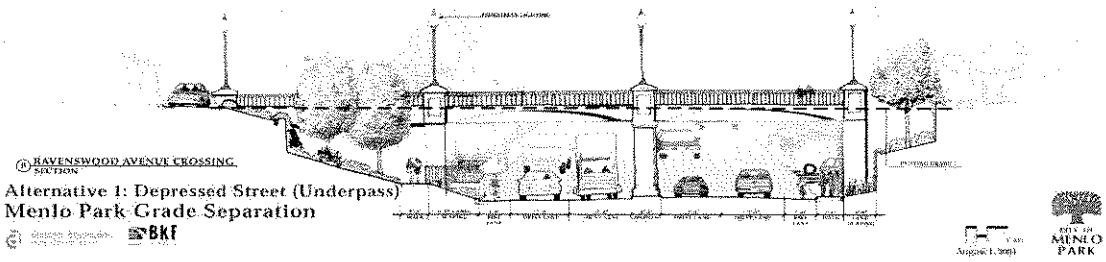
A PLATFORM UNDERCROSSING SECTION

With the Split Alternative, the tracks and bridge structure would be higher resulting in a more open concourse under the tracks. This will allow more natural light allowing for plant growth in the concourse area.

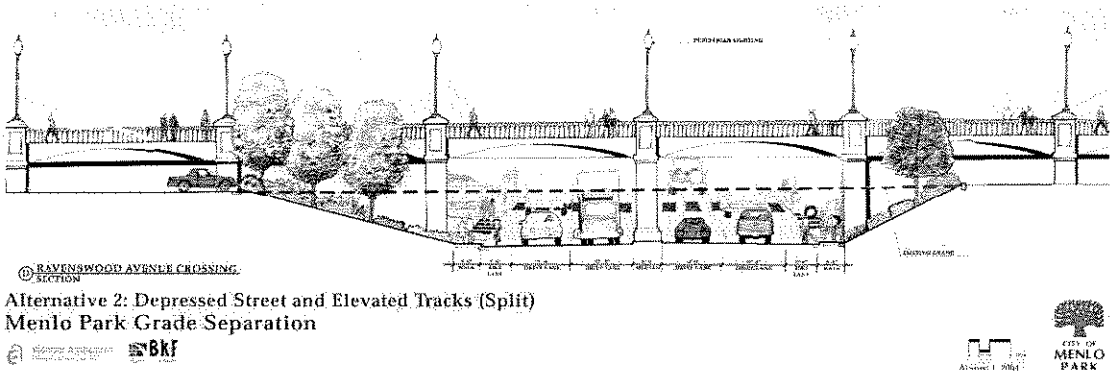


C PLATFORM UNDERCROSSING SECTION

The Ravenswood Grade Separation could have a very similar appearance whether the Split or Underpass option is chosen. Note that with Alternate 1, the Underpass, the excavation is deeper (note heavy dashed line representing the original ground level). This option requires more retaining walls as well as longer approach ramps.



The Split Alternative raises the crossing, reducing the depth of excavation and reducing the number and height of retaining walls.



Traffic Circulation

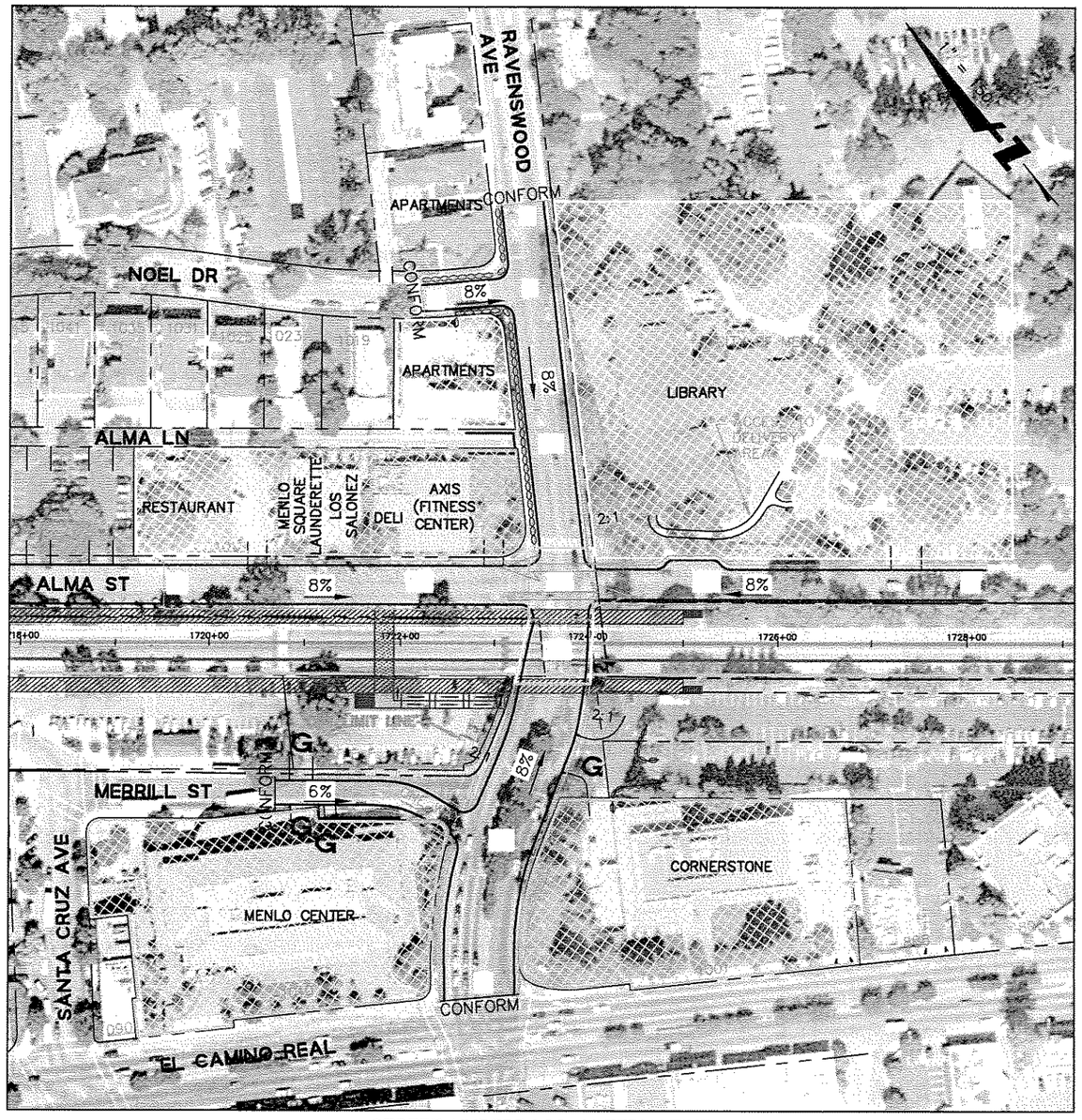
Depending on the alternative chosen traffic patterns will need to be modified to accommodate the option. The Underpass alternative will have the greatest impact on traffic. Depending on which roads are depressed and which north/south roads cross the east/west roads on bridges, road patterns will need to accommodate the needs of the residences in the area. The changing road patterns will have either minor or possibly major impacts on both businesses and residences in the area.

Appendix A

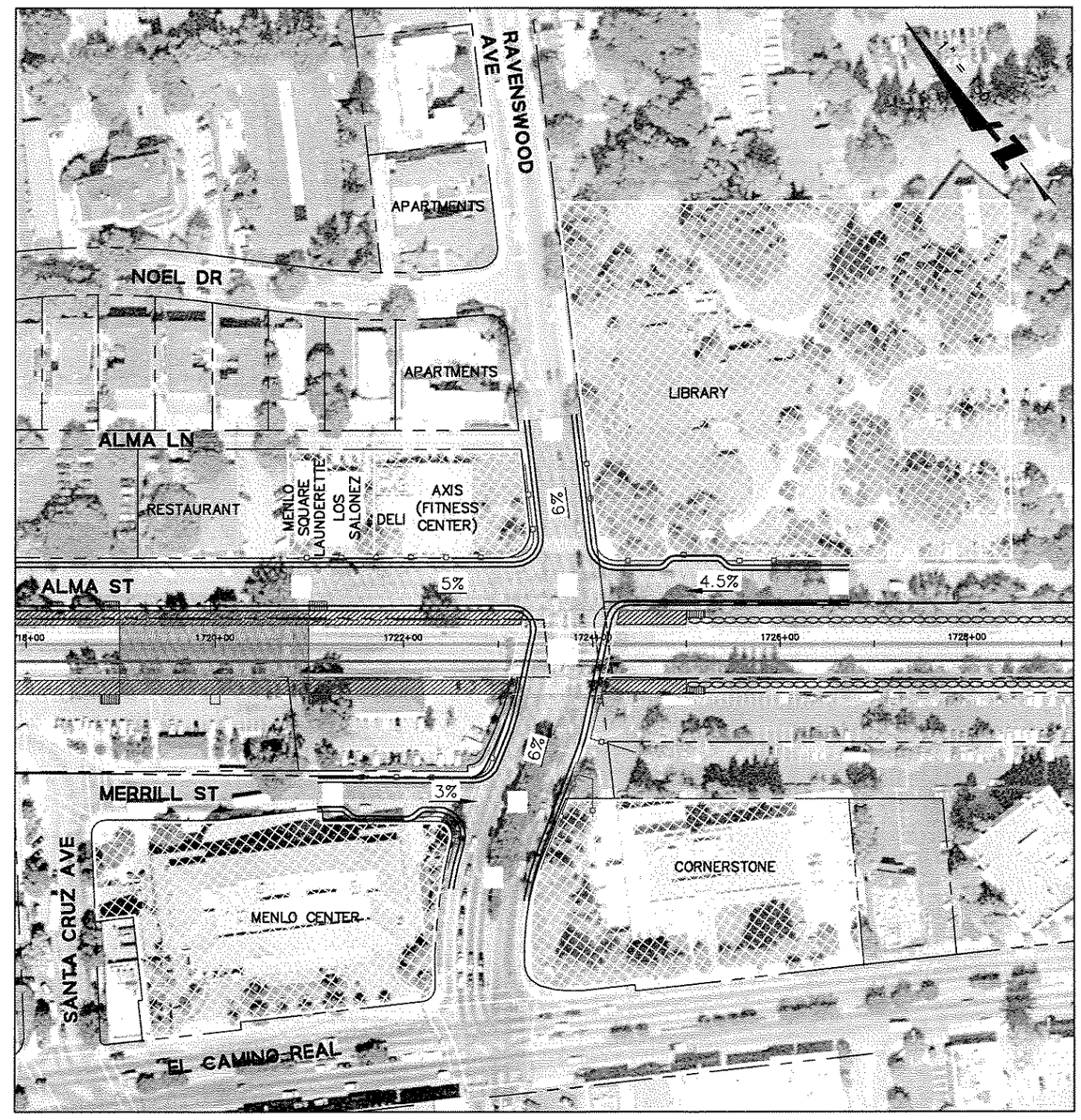
This Appendix contains side by side comparisons of the Street Underpass Alternative, and the Depressed Street and Elevated Track or "Split" Alternative. The extent to which properties would be affected as a result of the construction of the grade separations are shown with red, orange and blue hatch patterns. These plans also indicate the roadway regarding and modifications to traffic flows as a result of the grade separation construction.

LEGEND

DEPRESSED STREET
RETAINING WALL
EXISTING STREET CLOSED OFF
TRAFFIC CIRCULATION (GENERAL)
EXISTING DRIVEWAY TO BE RELOCATED
SIGNIFICANT IMPACT ON PROPERTY OR USE
BRIDGE STRUCTURE
ACCESS ROAD
TRAFFIC CIRCULATION OVER DEPRESSED STREET
X EXISTING DRIVEWAY CLOSED OFF
G EXISTING DRIVEWAY TO BE REGRADED
MAJOR IMPACT ON PROPERTY OR USE
MINOR IMPACT ON PROPERTY OR USE



STREET UNDERPASS ALTERNATIVE
"UNDERPASS" ALTERNATIVE 1



DEPRESSED STREET AND ELEVATED TRACK ALTERNATIVE
"SPLIT" ALTERNATIVE 2

REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED
DRAWN
CHECKED
IN CHARGE
DATE

BKF ENGINEERS / SURVEYORS / PLANNERS
APPROVED

Caltrain
1250 San Carlos Avenue
San Carlos, CA 94070

CHIEF ENGINEER
PROJECT MANAGEMENT
STRUCTURES
TRACK/CIVIL

PENINSULA CORRIDOR JOINT POWERS BOARD

MENLO PARK GRADE SEPARATION AND NEW STATION

ALTERNATIVE COMPARISON
RAVENSWOOD AVENUE

CADD FILE NO 020032
CADD DATE 8-10-04
SCALE 1"=150'
CONTRACT NO
MILEPOST
DWG NO
REV
PAGE NO 1

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CITY: MENLO PARK
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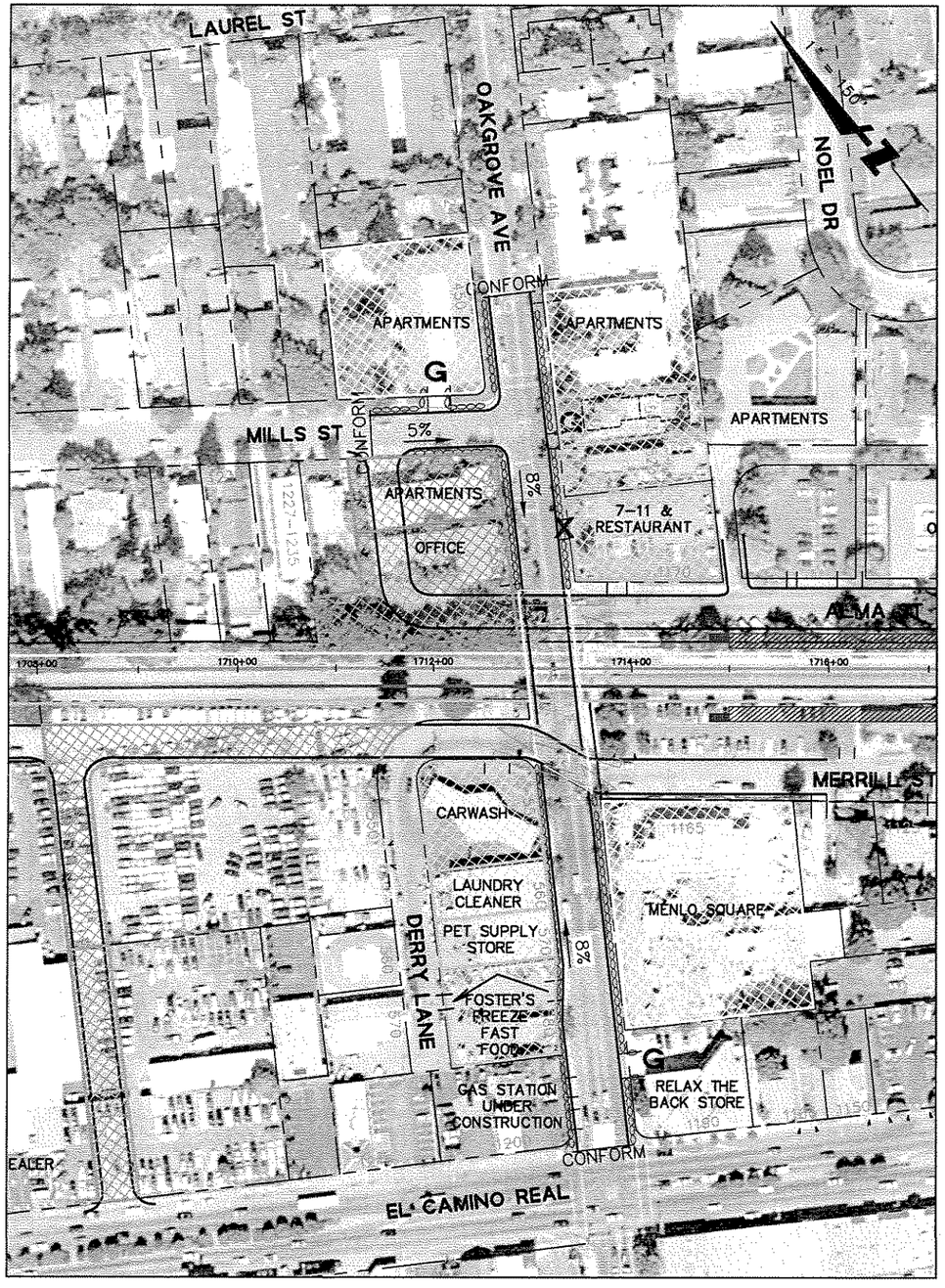
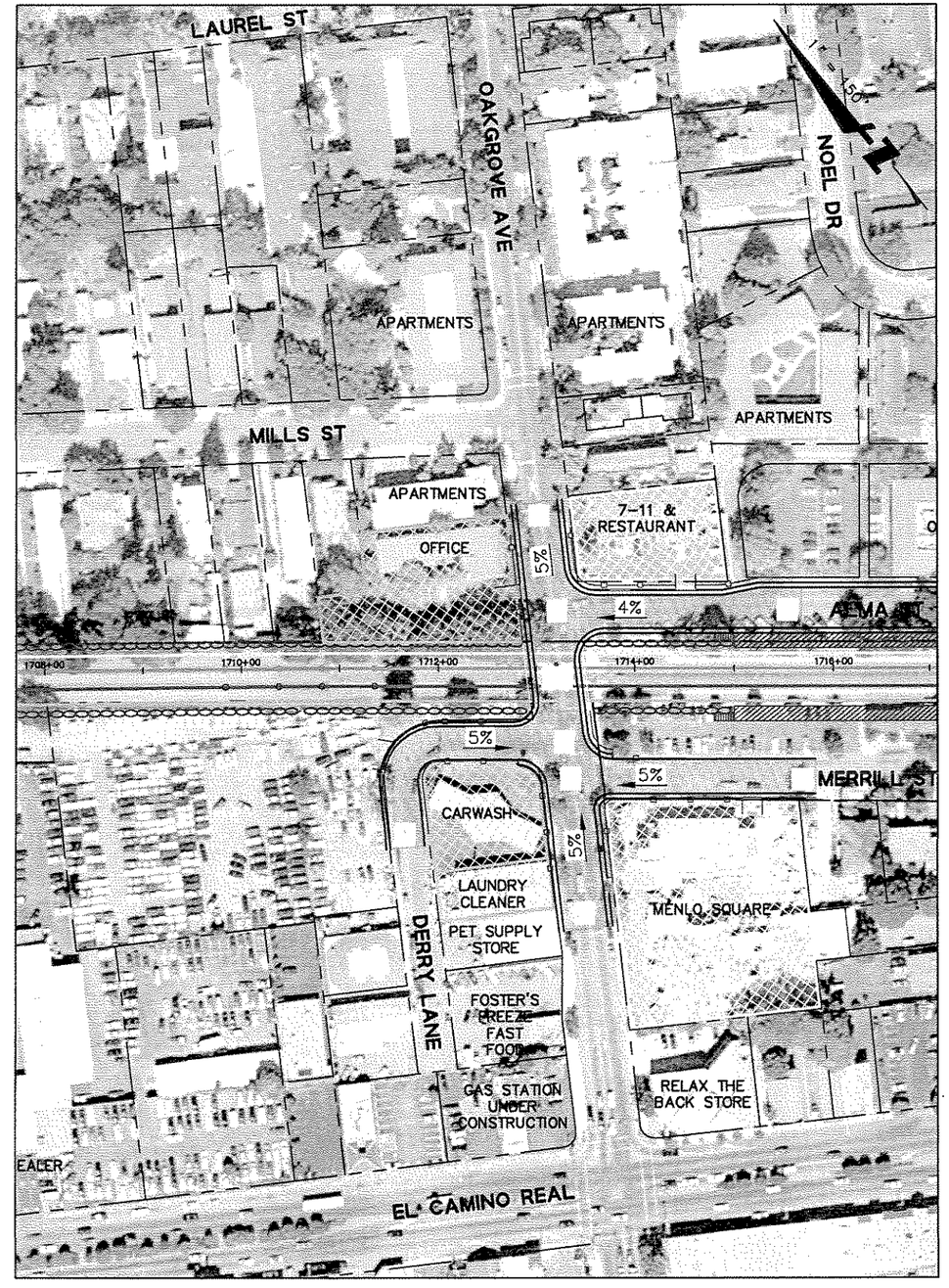


STREET UNDERPASS ALTERNATIVE
"UNDERPASS" ALTERNATIVE 1



DEPRESSED STREET AND ELEVATED TRACK ALTERNATIVE
"SPLIT" ALTERNATIVE 2

LEGEND

- DEPRESSED STREET
- BRIDGE STRUCTURE
- RETAINING WALL
- ACCESS ROAD
- EXISTING STREET CLOSED OFF
- TRAFFIC CIRCULATION OVER DEPRESSED STREET
- TRAFFIC CIRCULATION (GENERAL)
- X — EXISTING DRIVEWAY CLOSED OFF
- G — EXISTING DRIVEWAY TO BE REGRADED
- EXISTING DRIVEWAY TO BE RELOCATED
- MAJOR IMPACT ON PROPERTY OR USE
- SIGNIFICANT IMPACT ON PROPERTY OR USE
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MENLO PARK GRADE SEPARATION AND NEW STATION

ALTERNATIVE COMPARISON
OAKGROVE AVENUE

CADD FILE NO 020032
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CITY: MENLO PARK
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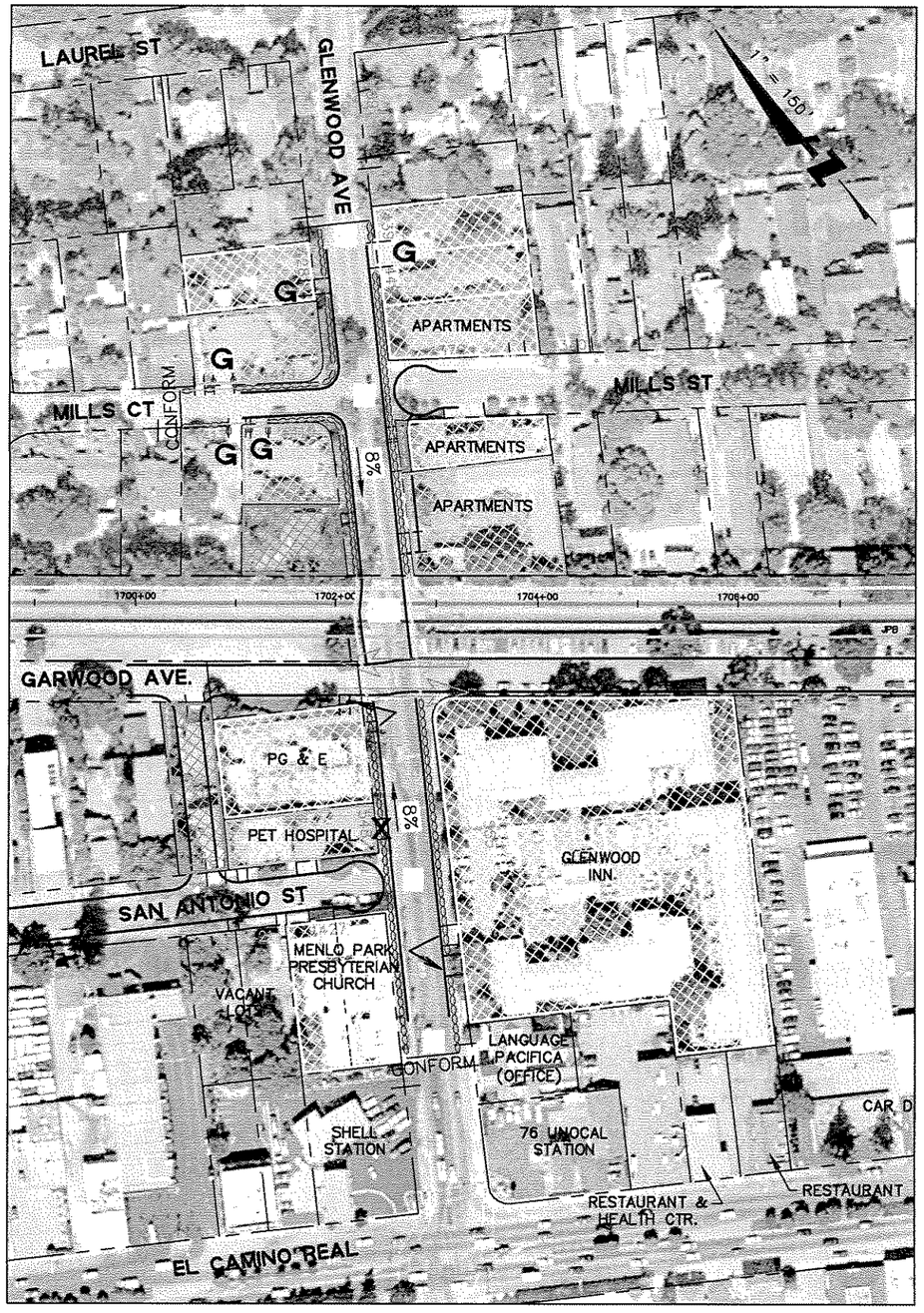

STREET UNDERPASS ALTERNATIVE
"UNDERPASS" ALTERNATIVE 1

DEPRESSED STREET AND ELEVATED TRACK ALTERNATIVE
"SPLIT" ALTERNATIVE 2

LEGEND

- DEPRESSED STREET
- BRIDGE STRUCTURE
- RETAINING WALL
- ACCESS ROAD
- EXISTING STREET CLOSED OFF
- TRAFFIC CIRCULATION OVER DEPRESSED STREET
- TRAFFIC CIRCULATION (GENERAL)
- X — EXISTING DRIVEWAY CLOSED OFF
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MENLO PARK GRADE SEPARATION AND NEW STATION

ALTERNATIVE COMPARISON
GLENWOOD AVENUE

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CITY: MENLO PARK
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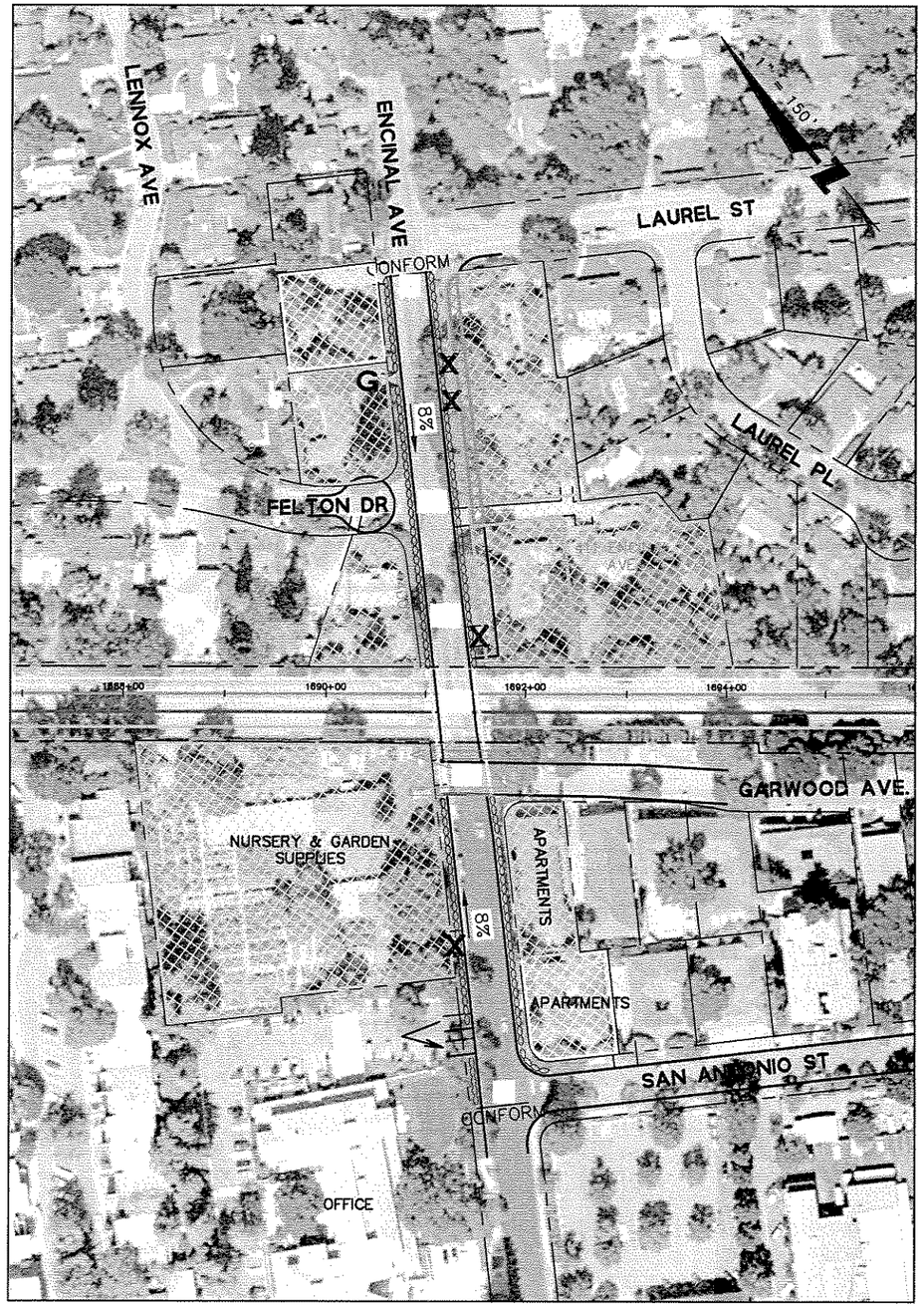
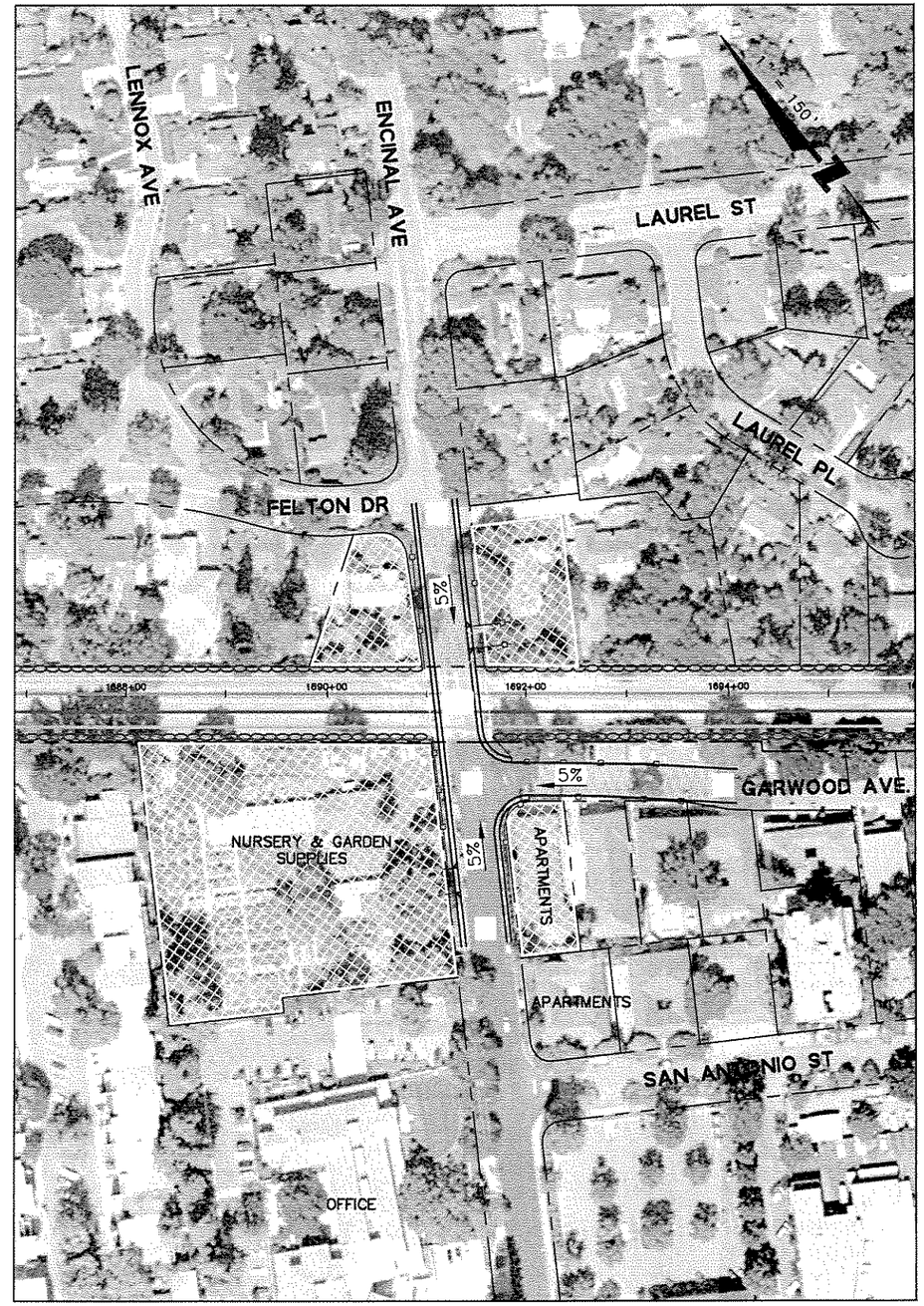


STREET UNDERPASS ALTERNATIVE
"UNDERPASS" ALTERNATIVE 1



DEPRESSED STREET AND ELEVATED TRACK ALTERNATIVE
"SPLIT" ALTERNATIVE 2

LEGEND

- DEPRESSED STREET
- BRIDGE STRUCTURE
- RETAINING WALL
- ACCESS ROAD
- EXISTING STREET CLOSED OFF
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MENLO PARK GRADE SEPARATION AND NEW STATION

ALTERNATIVE COMPARISON
ENCINAL AVENUE

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CONTRACT NO	MILEPOST
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COUNTY: SAN MATEO | CITY: MENLO PARK | CONTROL POINT:

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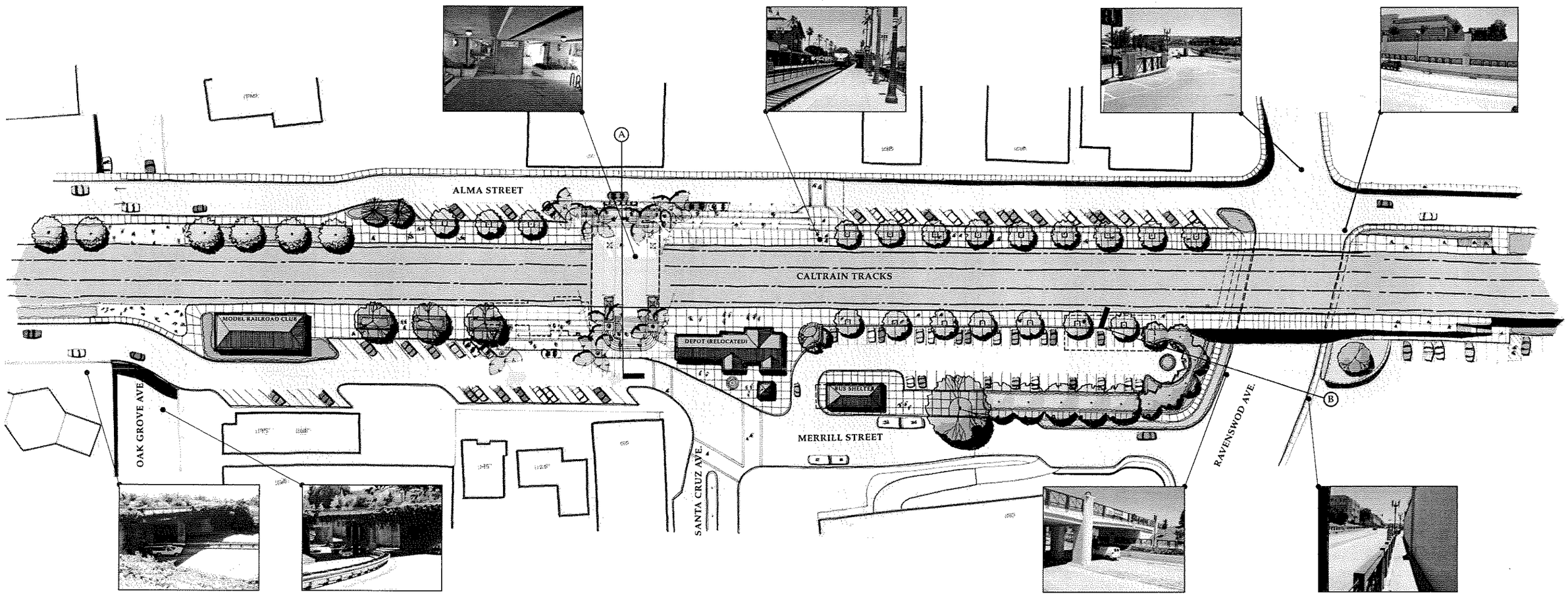
Appendix B

This Appendix contains layouts for the Menlo Park Station for the Underpass and Split alternatives. It also contains section showing the platform access and elevations of the Ravenswood crossing.



Alternative 1: Depressed Street (Underpass)

Menlo Park Grade Separation

Callander Associates Landscape Architecture, Inc.

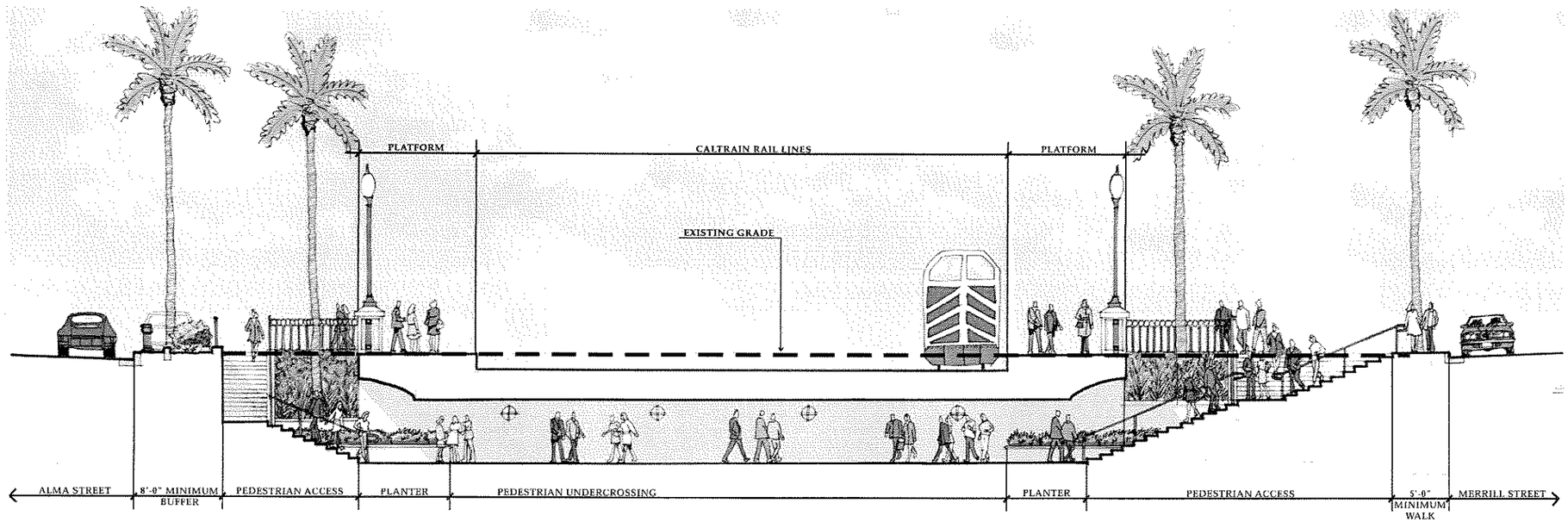
BKF

0 10 20 40 FEET

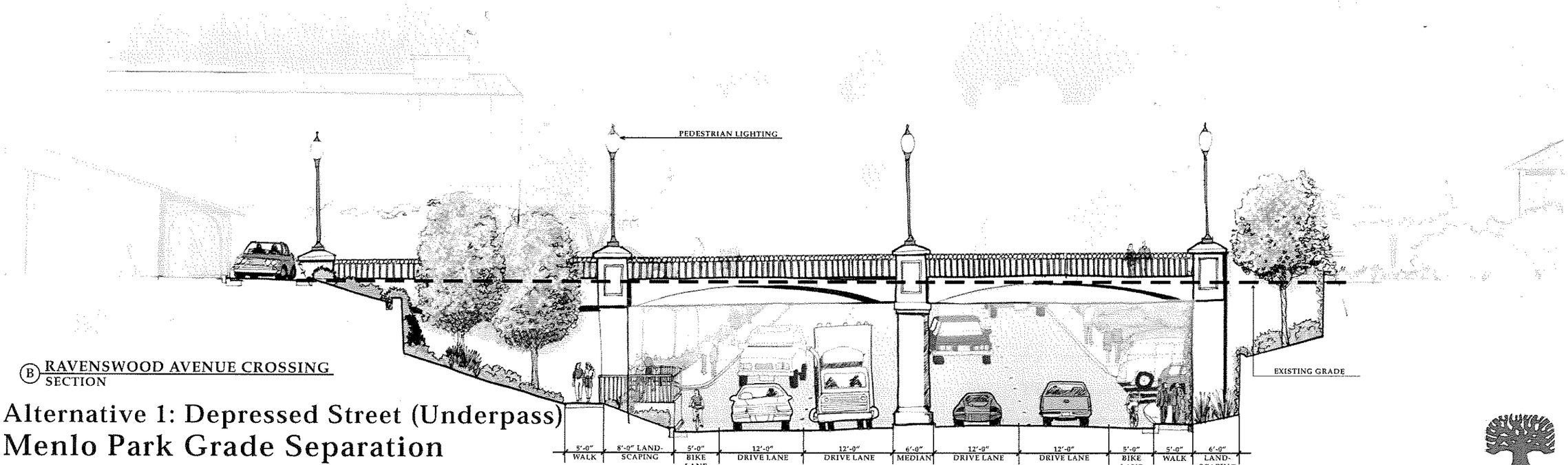
NORTH

August 1, 2004

CITY OF MENLO PARK



Ⓐ PLATFORM UNDERCROSSING
SECTION



Ⓑ RAVENSWOOD AVENUE CROSSING
SECTION

Alternative 1: Depressed Street (Underpass)
Menlo Park Grade Separation

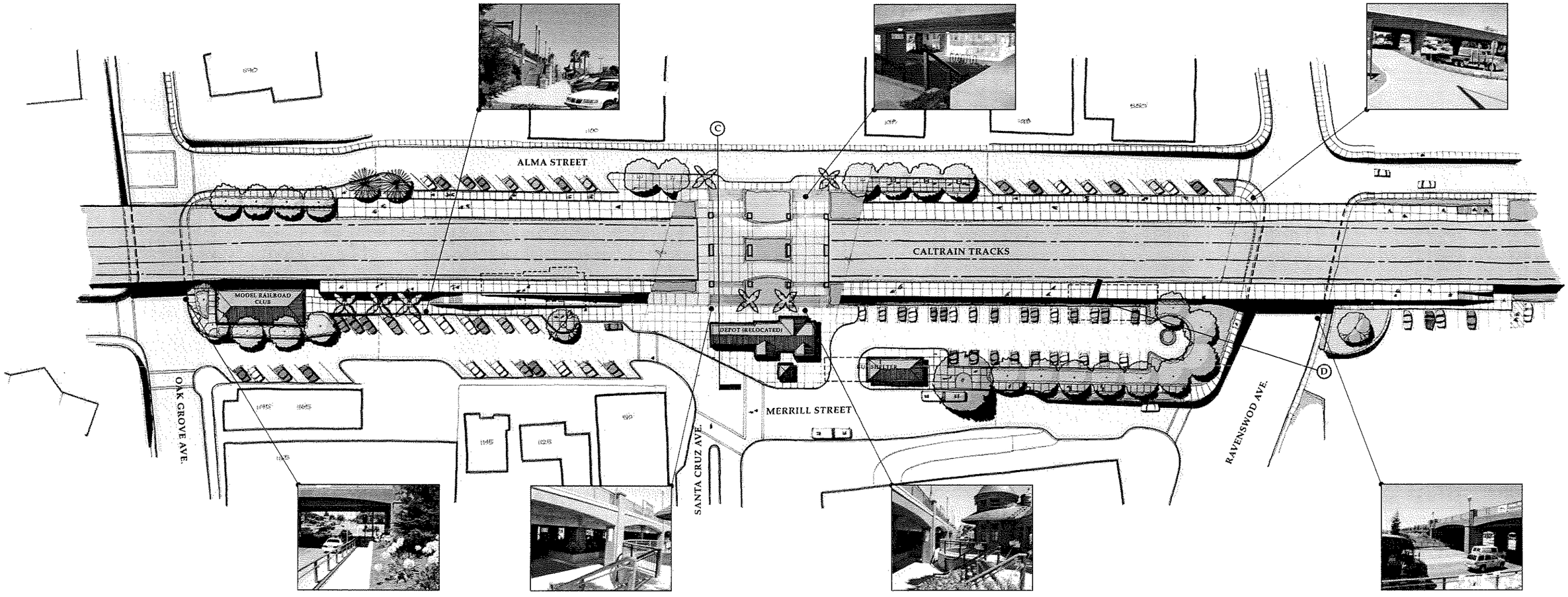
Callander Associates Landscape Architecture, Inc.

BKF

0 2 4 8 FEET

August 1, 2004

CITY OF MENLO PARK



Alternative 2: Depressed Street and Elevated Tracks (Split)

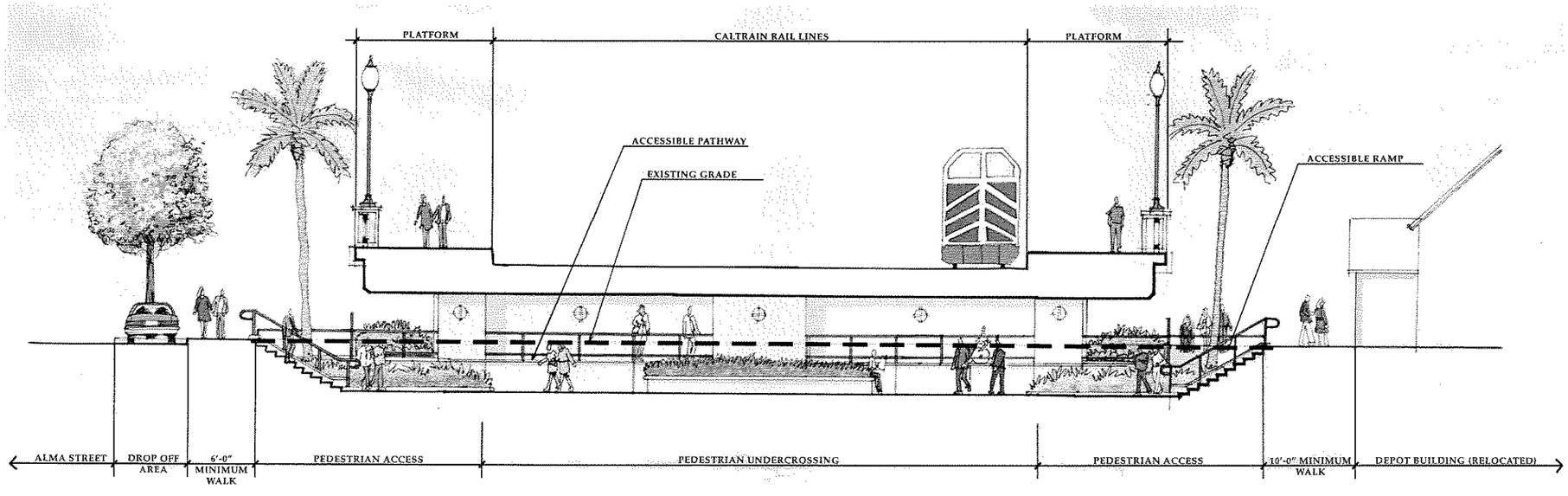
Menlo Park Grade Separation

Callander Associates

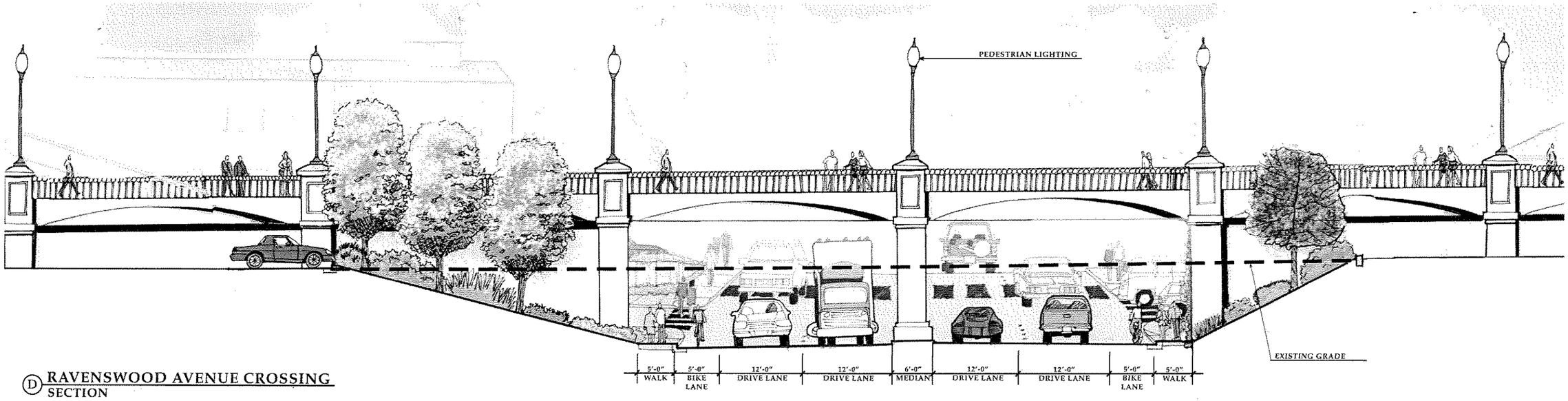
BKF

August 1, 2004

CITY OF MENLO PARK



Ⓒ PLATFORM UNDERCROSSING
SECTION



Ⓓ RAVENSWOOD AVENUE CROSSING
SECTION

Alternative 2: Depressed Street and Elevated Tracks (Split)
Menlo Park Grade Separation

Callander Associates Landscape Architecture, Inc.

BKF

0 2 4 8 FEET

August 1, 2004

CITY OF MENLO PARK