AGENDA REPORT

Meeting Date: October 18, 2010

Item Number: E-2

To: Honorable Mayor & City Council

From: Susan Healy Keene, AICP, Director of Community Development

David Gustavson, Director of Public Works

Subject: DISCUSSION OF METRO WESTSIDE SUBWAY EXTENSION DRAFT ENVIRONMENTAL IMPACT STATEMENT/DRAFT ENVIRONMENTAL IMPACT REPORT PROPOSED COMMENT LETTER

Attachments:

1. Draft Comment Letter and Attachments on the DEIS/DEIR
2. Letter to Metro dated October 8 from Mayor Delshad on Behalf of the City Council
3. Staff Report from the October 5, 2010 Study Session
4. Metro Staff Report with Recommendations on Westside Subway Extension
5. Geotechnical Engineering Report – Shannon and Wilson

RECOMMENDATION

Review and comment on the draft comment letter on the Westside Subway Extension environmental report and direct staff to submit the comment letter to Metro.

INTRODUCTION

On October 5, 2010, the City Council discussed the Westside Subway Extension Draft Environmental Impact Statement/ Draft Environmental Impact Report (DEIS/ DEIR). As a result of that meeting a letter (Attachment 2.) was sent to Metro re-iterating the City's support for the subway project and indicating that a follow up letter would be provided to Metro with the City's comments on the environmental report. This is an opportunity to consider the content of that letter.

DISCUSSION

On October 5, a Council Subcommittee was also appointed by the Mayor to review the draft letter. Council members Brien and Mirisch met on October 8. The content of the

letter was discussed by the Council members with the direction to substantiate the City's comments on station location and potential alignments with information drawn from the environment report. In addition to the comments provided in the draft letter, City staff and the geological consultant hired by the City, Shannon and Wilson, have reviewed the data and conclusions provided in the document and have provided comments on the scope and breath of analysis (provided as attachments to the letter).

Metro staff have released their recommendations on the Westside Subway Extension (Attachment 4). Metro is recommending the following (Excerpted from the Metro Staff Report (Attachment 4)):

La Cienega Station and Connections

- East Station
- Delete West Hollywood Connection Structure

Century City Station and Alignments

- Santa Monica Boulevard and Constellation Station Options carried forward for further study
- Constellation North and Santa Monica Boulevard Alignment Options between Beverly Hills and Century City carried forward for further study

With the City Council's direction, the draft comment letter will be finalized and sent to Metro. Comments provided in the letter will be addressed in the final environmental report.

FISCAL IMPACT

There is no immediate fiscal impact associated with this report.

Susan Healy Keene, AICP
Director of Community Development

Approved By

ATTACHMENT 1

Draft Comment Letter and Attachments on the DEIS/DEIR

DRAFT

October 19, 2010

David Mieger
Los Angeles County Metropolitan Transportation Authority - Metro
One Gateway Plaza, MS 99-22-3
Los Angeles, CA 90012-2952

Subject: Comments on the Metro Westside Subway Extension Draft Environmental Impact Statement/Draft Environmental Impact Report, State Clearing House No. 2009031083

Dear Mr. Mieger,

The City of Beverly Hills City Council strongly supports the Westside Subway Extension and has, on every opportunity, formally endorsed extension of the subway through the City of Beverly Hills under Wilshire Boulevard and Santa Monica Boulevards. Although strongly supportive of the Westside Subway Extension, the City has significant concerns about the "Constellation North" and "Constellation South" alignment alternatives outlined in the Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIS/DEIR) that would tunnel under residential properties and Beverly Hills High School.

The City of Beverly Hills also expresses support for the 30/10 plan that would provide for construction of the entire Westside Subway Extension in one phase. This plan would bring critical mass transit to the entire Westside within a reasonable timeframe, promote job creation, and minimize construction impacts.

On August 4, 2009, the City Council, by Resolution No. 12692, unanimously adopted the recommendations of the citizen based Beverly Hills Mass Transit Committee supporting the Westside Subway Extension, including:

- Support of the Wilshire alignment preferably with the alignment at the west end of Beverly Hills continuing under Wilshire Boulevard and then veering southwest under Santa Monica Boulevard to Century City rather than under commercial or residential properties.
- Support of two stations within Beverly Hills near Beverly Drive and Wilshire Boulevard and near La Cienega Boulevard

On January 12, 2010, the City Council, by Resolution No. 10-R-12725, unanimously adopted amendments to the City's General Plan which included policies to support extension of the subway through Beverly Hills along the Wilshire Boulevard/Santa Monica Boulevard alignment with stations at La Cienega Boulevard and Beverly/Rodeo Drive.

The City of Beverly Hills with the assistance of its consultant, the firm Shannon & Wilson, Inc., has reviewed the DEIS/DEIR and is providing the following broad comments on the options studied in the document. In addition to these comments, a list of specific comments and technical questions is attached.

Alignment to Century City

Of critical importance to the City of Beverly Hills is that the "Base" alignment from the Wilshire/Rodeo station (which tunnels under Wilshire and Santa Monica Boulevards) be selected as the preferred route.

The Westside Subway Extension alignment only deviates from Wilshire Boulevard to specifically provide transit service to Century City. The City of Beverly Hills agrees that the Westside Subway Extension should have a station to serve the employment densities of Century City but not at the expense or risk of tunneling under Beverly Hills High School and residential properties. According to the DEIS/DEIR, a "Constellation station" would cost $56 million more than the "Base" Santa Monica Boulevard Century City station. We find no evidence in the DEIS/DEIR that a "Constellation" station would result in significantly higher ridership than the "Base" Santa Monica Boulevard station.

The alternative alignments in the DEIS/DEIR deviate from tunneling under Wilshire and Santa Monica Boulevards to provide mass transit to Century City. The City of Beverly Hills believes that the "Base" Santa Monica Boulevard station accomplishes the goal of providing a station to Century City. A station would provide a direct transit link to buses that operate along Santa Monica Boulevard. Pedestrian amenities and/or transit circulators could provide connections to the employment centers in Century City.

The two "Constellation" alignments would involve tunneling under residential properties, the Beverly Hills High School, and the site of the Beverly Hills Oil Field. Of paramount importance is the safety and well being the High School's students and faculty. There has not been adequate identification of 'wild cat' or 'capped' oil wells at this site. The attached comments address the City's specific concerns, request additional studies and identification of all mitigations required for this tunneling, before any further consideration of these alternate alignments. The City of Beverly Hills sees no reason to risk tunneling under Beverly Hills High School when Century City can be provided a "Base" station on Santa Monica Boulevard. In reviewing the DEIS/DEIR, the City finds no conclusive evidence that proves the Santa Monica alignment not to be feasible because of seismic impact. If, however, the identified location of the "Base" Santa Monica Boulevard station is indeed determined to be problematic after further seismic study, the City of Beverly Hills strongly requests that Metro explore alternatives that do not involve tunneling under Beverly Hills High School or residential properties.

Station Locations

The City of Beverly Hills finds the DEIS/DEIR consistent with the City of Beverly Hills formally adopted recommendations with respect to the station locations at La Cienega Boulevard and Beverly/Rodeo Drives.

The City agrees that the "Base" station on the east side of La Cienega Boulevard is the preferred location to facilitate transfers to the north/south bus lines on La Cienega Boulevard. Also, the east side of La Cienega Boulevard is preferred because it is closer to the multiple family residential areas and has more viable staging and portal locations than the west side. To reduce pedestrian crossings at the highly congestion intersection at La Cienega/Wilshire Boulevard, the City requests that portals be placed both on the north and south sides of the street.

The City also concurs with the "Wilshire/Rodeo" station proposed in the DEIS/DEIR. Due to the large concentration of commercial businesses on both sides of Wilshire Boulevard, including South Beverly Drive, it is essential that portals be located both on the north and south sides of Wilshire Boulevard.

Conclusion

Thank you for the opportunity to comment on the Westside Subway Extension DEIS/DEIR. The City of Beverly Hills continues to strongly support the Westside Subway Extension and will work actively with Metro to resolve these critical issues.

Sincerely,

Jimmy Delshad, Mayor
City of Beverly Hills

Attachment A: City staff comments

Attachment B: Shannon & Wilson comments

Attachment A

The City of Beverly Hills has reviewed the Draft Environmental Impact Statement/ Draft Environmental Impact Report (DEIS/DEIR) and is providing the following comments to be addressed in the Final report along with the comments provided in the cover letter.

1) ***CONSISTENCY WITH EXISTING ENVIRONMENTAL REPORTS***- Environmental Impact Reports were conducted for projects near Santa Monica Boulevard and Avenue of the Stars, and near Avenue of the Stars and Constellation Boulevard in 2006 and 2004 respectively. The environmental findings in this report should not be inconsistent with the findings in those reports, and if inconsistencies do exist, a full explanation regarding the inconsistent conclusions should be provided. Specific information regarding the EIRs follows:
    a. Environmental Impact Report for the New Century City Plan associated with properties located at 10250 Santa Monica Blvd, 1801 Avenue of the Stars, and 1930 Century Park West (City of Los Angeles: ENV-2006-1914-EIR)
    b. Environmental Impact Report for properties located at 10131 Constellation Blvd (City of Los Angeles: ENV-2004-6269-EIR)
2) ***LOCATION OF THE BEVERLY HILLS LINEAMENT*** – The Alternatives Screening and Refinement Following Environmental Scoping Report (page 4-15) suggests that the location of the West Beverly Hills lineament has been identified. However, prior to concluding that the location of this lineament is understood, additional analysis is necessary including the analysis recommendations provided by the City of Beverly Hills' Geological/ Geotechnical Consultant (Attachment B).
3) ***CENTURY CITY STATION AND ALIGNMENT*** –
    a. ***Santa Monica Station*** - If the Century City Station were to be located on Santa Monica Boulevard with an alignment along Wilshire and Santa Monica Boulevards, additional geological and geotechnical study is necessary, as has been detailed in the attached geological/ geotechnical comments.
    b. ***Constellation Station*** - If the Century City Station were to be located on Constellation Boulevard, further study of the a "Constellation North" and "Constellation South" alignments as described in the report including additional geological and geotechnical study would be required and must include the following:
        i. Location of the Beverly Hills Lineament –
            1. Additional geologic and geotechnical studies must be conducted as required above for the Santa Monica Blvd. station and alignment.
        ii. Study of Abandoned Oil Wells –
            1. The location of abandoned oil wells on the Beverly Hills High School property, and other properties near the alignment must be exhaustively researched and analyzed, with all potential impacts fully disclosed and mitigated to the extent feasible. Nonetheless, the City strongly maintains that an alignment that goes under the High School is unacceptable.
            2. Means and methods of addressing abandoned wells within and near the potential subway tunneling area must be fully disclosed.

iii. Further, the Final EIS/ EIR should analyze the effect on property values in and near the potential subway alignment during construction and thereafter.

iv. Further study of potential noise and vibration impacts from operation of the subway underneath residences and the High School is necessary to fulfill CEQA's mandate to disclose the Project's potential impacts

v. The EIS/EIR, at page 2-4, states that seven goals were established to screen out alternatives and identify those carried forward into the Draft EIS/EIR. The Alternatives that would traversed under Beverly Hills residential neighborhoods and the Beverly Hills High School do not meet several of these goals including Goals C and D (Cost effectiveness and Project Feasibility): These alternatives would have increased costs due to the need to acquire easements under private property, and invite additional risks in the event of any subsidence or damage to existing development. Further, as to Goal G (Public Acceptance), the City of Beverly Hills, the Beverly Hills Unified School District, and hundreds, if not thousands, of Beverly Hills residents and property owners oppose the alignments under the Beverly Hills High School site.

vi. While the City of Beverly Hills strongly objects to any alignments that traverse under its residential neighborhoods and High School, the City is not opposed to the Constellation station location, provided the alignment from the Wilshire/Rodeo station stays under Wilshire and Santa Monica Boulevards in Beverly Hills.

4) ***ROBERTSON CONNECTION BOX*** –The Final Noise and Vibration Technical Report indicates that the connection structure would be located west of the Wilshire/ Robertson intersection (page 5-14); however Appendix A indicates that the structure may be located within the intersection itself. If the connection box is to be constructed, the box should be located on either side of the Wilshire/ Robertson intersection but not located within the intersection, to avoid closing both Wilshire and Robertson during initial construction. Additionally, please provide more information about the connection box with respect to the following:

   a. Venting. The potential ventilation shaft studied in alternatives 1-5 and MOS 2 (temporary termination at Century City) for the connection structure, including the vent's location, purpose, and potential air emissions resulting.

   b. Property acquisitions. Appendix C "Acquisitions" indicates that properties at the northeasterly corner of the Wilshire and Robertson intersection would be acquired (page C-3). These properties have been identified as "Acquisitions 34 and 35". The report indicates that these properties are currently under construction. Given that a new building with subterranean parking is being constructed on the sites, alternative sites should be identified in the event that the West Hollywood alignment is considered and the link between the West Hollywood line to the Wilshire line is located near Robertson Blvd.

   c. If the Robertson Connection Box is installed, it would likely foreclose consideration of alternate locations in the future, such as a connection at the La Cienega station location, which would provide better ability for transfer between future rail lines. The City prefers

that the connection occur at La Cienega rather than installing the stand-alone connection box at Robertson. Before any final decision is made as to the Robertson Connection box, further study of the potential future connection in this area must be undertaken because the decision would likely foreclose other options.

5) ***MITIGATION MONITORING PLAN*** – The mitigation monitoring plan needs to include the following:
   a. Additional study and analysis is needed for economic losses during construction, potential construction related impacts and specific effective mitigation measures to address potential construction related effects on visual quality, air quality, noise and vibration, exposure to hazardous substances and other construction related aspects.
   b. The Final Construction and Mitigation Technical Report should not be considered final at this time. Estimations for construction related impacts cannot be truly validated 20 plus years in advance of actual construction; therefore, construction impacts and mitigation need to be revisited and be re-certified within 4 or 5 years prior to the actual start of construction. Impacted intersections (both en-route and diverted), arterial street segments and local street segments should be identified at that time and re-counted for latest volume and speed data. Local thresholds and calculation methods in effect at that future time should be used to conduct the analysis. Further, potential mitigation measures proposed to address potential impacts that could occur within the City of Beverly Hills should be identified, designed in coordination with the City of Beverly Hills staff, and eventually be approved by the Beverly Hills City Council. This process shall continue when the actual date and schedule of construction is identified and a construction task force for Beverly Hills is formed.
   c. The DEIS/DEIR must identify a means of maintaining the state of residential neighborhoods, and addressing any economic or operational impacts to the human environment that may occur in the commercial/ retail areas during construction of the station boxes. Of particular concern to the City of Beverly Hills are impacts that would result in unnecessarily high traffic volume in residential neighborhoods, or impacts that cause substantial business interruptions or closures, and thus result in a substantial loss of revenue for local businesses. Careful consideration of potential impacts must occur along with coordination with the City of Beverly Hills, in the development of construction phase planning and project design, including the location of construction management plans and implementation of various mitigation measures intended to address construction impacts. Related activities such as staging areas, haul routes, generators, construction parking and other necessary activities during the construction phase must be considered in subsequent plans.
   d. Groundwater in the Hollywood basin is not contaminated and every effort should be taken to preserve water quality. The City of Beverly Hills has reverse osmosis treatment plant and processes water from the basin for beneficial use. Ground water needs to be addressed in one of three ways: 1. Pay the City for replacement water, 2. Inject the water back into the basin, or 3. Make beneficial use of the water. For further information please refer to the Beverly Hills Municipal Code Title 9, Chapter 4, Section 610.

6) ***CONSTRUCTION PHASE*** – The DEIS/DEIR includes draft design details for station location and design, track alignment and design, ancillary equipment and facilities, and construction related temporary facilities and operations. As the project proceeds into the preliminary engineering phase and forward to final engineering plans, the City requests the opportunity to review and comment on all design and engineering drawings and plans, construction plans and operational plans including but not limited to the following:
    a. All construction activity; truck routes, tunnel/dig activity, detours, lighting, and timing (p.3-69) in the City of Beverly Hills.
    b. All lane closures, detour routes and means of local access, closure timing and length of closures, in the City of Beverly Hills.
    c. Construction hours, work schedules and ancillary support requirements (lighting, materials delivery, hauling), for work in the City of Beverly Hills
    d. Community outreach and notification alerting residents and businesses within and near the construction zone of land closures, timing of construction activity, etc., for work in the City of Beverly Hills.
    e. Any plans for other construction related activities and facilities that may be planned for within the City and all necessary information on related environmental effects, such as traffic delays. Such construction related activities and facilities would include a slurry plant if planned within the City.

    The intent of the requested City review is to allow City input on ways to minimize impact on the City's residences, businesses, and circulation systems.

7) ***STAGING LOCATIONS*** – The City acknowledges the challenges of identifying suitable staging locations at the two locations within the City of Beverly Hills. The City will work with Metro to select the most appropriate staging location. A mitigation plan will need to be developed to reduce the impact of station construction and operation to neighboring businesses, including hotels adjacent to the Beverly Rodeo station. Mitigation plans should address noise, times of construction, and economic impacts, including compensation for businesses directly impacted during the construction phase.
8) ***OPERATION*** –
    a. A number of ancillary equipment and facilities would be installed or constructed to support the subway. In the Final Noise and Vibration Technical Report, the Wilshire/ La Cienega station is not included on the list of stations that would have an emergency electrical power generator (page 5-13); however the Final Traffic Impact Analysis Report indicates that the station would have a generator (page 2-5). Please clarify if this station would have a generator or not. If the station would have a generator, please provide additional information on the generator, as well as any other generators that may be contemplated in the Beverly Hills segment. The Final Traffic Impact Analysis Report indicates that an emergency generator is proposed at the Wilshire/La Cienega station requiring approximately 50'x100' of off-street space (page 2.5, section 2.5.2). The report indicates that this would require property acquisition. Where is this generator planned? Is it to be located within the station space, or is additional land required? Please define

the location, and potential air quality, noise and vibration effects on any potential sensitive receptors in the area. If mitigation is necessary, please include any necessary mitigation in the mitigation monitoring program.

b. The West Los Angeles area has not constructed one new fire station in 60 years, while the regional population has increased geometrically over that time. The DEIR/DEIS needs to study the ability for local emergency responders to effectively triage, transport and treat patients in the event of an accident or disaster on the subway system in the context of this increased population, lack of increase in emergency protection facilities and with consideration to the closure of nearby regional hospitals (Century City and Midway Hospitals). Additionally, the DEIS/DEIR and project must address fire suppression within the subway and protecting passengers from hazardous toxic fumes as a result of a fire.

c. The DEIR/DEIS should provide information on how Metro will ensure that there is sufficient liability coverage to recover costs and damages incurred by persons, property, businesses and other entities in the event of a subway disaster

d. Emergency Response. The Parklands and Other Community Facilities Technical Report (page 4-2) considers typical response times for local jurisdictions emergency responders (police and fire). The report, however, does not indicate if the local jurisdictions would be the first responders. Please clarify if local jurisdictions would be the first responders, or if this a function of county emergency services.

e. Emergency Response Times. Typical response times are provided for the local jurisdictions in the Parklands and Other Community Facilities Technical Report (page 4-2), however if the local jurisdictions are the first responders (police and fire) the report needs to study any potential for increases in the number of calls that may affect the current response times and local work force needed to maintain current response times.

9) ***NOISE AND VIBRATION.*** Please confirm that the analyses and conclusions presented in the Final Noise and Vibration Technical Report (page 6.2) are consistent with the City of Beverly Hills General Plan standards. The Beverly Hills General Plan establishes the following noise level standards:

> ***N 1.5 Noise Mitigation Measures.*** Require noise mitigation measures for noise-sensitive receptors when a significant noise impact is identified. A significant noise impact occurs when there is an increase in CNEL, as shown in the table below. (Imp. 1.3, 2.1, 2.2)

CNEL (dBA)	*dBA Increase*
55	3
60	2
65	1
70	1
Over 75	1

> ***Community Noise Equivalent Level (CNEL)***—*A 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 P.M. to 7:00 A.M. and an additional 5 dBA weighting during the hours of 7:00 P.M. to 10:00 P.M. to account for noise sensitivity in the evening and nighttime.*

10) ***VENTING*** – According to the DEIS/DEIR (page s-23), mid-segment venting will be required for segments that exceed 6,000 feet. At present, it appears that there will be no need for mid-segment vent shafts in Beverly Hills, since segment lengths are less than 6,000 feet. (See. Final Construction and Mitigation Technical Report (page 4-50). In the event that there are changes that require vent shafts, full disclosure an analysis of any potential impacts would need to be undertaken.
11) ***TRAFFIC ANALYSIS*** – The Traffic Impact Analysis Report analyzes potential traffic effects during construction and once the subway extension is operating. The following analysis should be conducted and the results addressed in the final report:
    a. Thresholds (page 5-2). New Traffic Threshold of Significance criteria have been developed for the City of Beverly Hills for estimating impacts on traffic. The estimation of traffic impacts should be reanalyzed using these new criteria (Attachment C).
    b. Review any changes resulting from changes to LOS "D" at signalized intersections and changes to residential ADT ranges. Of the 192 intersections studied, only one intersection produces any impacts along the proposed subway corridor. The Final Traffic Analysis Impact Report (page 3-15, section 3.2.2) states "the affected jurisdictions for the Westside...consider LSO D the minimum acceptable LOS. Therefore; LOS D will serve as the minimum acceptable standard for the Westside Extension Transit Corridor project." The City recently changed the criteria at signalized intersections from 4% to a 3% threshold, thus approximately 19 intersections operating at LOS D, E and F with the Beverly Hills project area should be analyzed for impacts. Additionally, the criteria for residential streets impacts was also amended and require application of the new threshold levels (1-2,000 volume per day (vpd): 16% daily and peak hour; 2,001-4,000vpd: 12% daily and peak hour; 4,001-6,750vpd: 8% daily and peak hour; greater than 6,750vpd: 6.25% daily and peak hour.
    c. The Level of Service (LOS) Analysis for selected intersections is based on using the HCM signalized intersection Capacity analysis software. City of Beverly Hills uses the ICU method for the LOS calculations. Basic assumptions are different in these two methods. For example, ideal flow per lane is assumed to be 1700 (vphpl) for HCM method and 1600 for ICU method. This yields different results for the LOS calculations. However, this is an inter-jurisdictional project and it is not appropriate to use the same method of the LOS calculations for the entire study area. Particularly, when the future (2035) LOS for the project is only compared with the "No Built" scenario of year 2035. In that perspective the HCM method of the LOS calculations for the purpose of the project impact evaluations as presented. But for evaluation of potential construction impacts which would be a primarily a local issue, staff requests that the ICU method of the LOS calculations be provided for Beverly Hills intersections and City's thresholds of

significance criteria be used for such evaluations. Further, certain residential streets shall be evaluated for potential construction impacts. (Page 5-2)

d. The report refers to a forecasting process used to develop Year 2035 AM and PM hour VISUM models for the No Build and each Build Alternative based on the Existing Conditions calibrated/validated VISUM model. It is not clear what assumptions were used in the development of this model. For example, what growth factor was used for the next 25 plus years? Did the Metro Regional Travel Demand Model that was used for origin-destination trips prove to be accurate of the study area, or did its trend disagree with the original assumptions? Although, the assumptions may have been noted here and there in the DEIS/DEIR; a collective and clear explanation of the basic assumptions used for developing the year 2035 model needs to be included. (page 4.3)

e. The report states (Chapter 3, page 3.1.4 – Programmed Roadway Improvements), that "local jurisdictions are not planning any major roadway expansion projects through 2035" due to build-out conditions and high density. Although the City does not plan any widening efforts, the Santa Monica Blvd Improvement project will involve a major street reconstruction within the next 3 years to improve the physical road conditions and traffic signals/synchronization; the improved conditions will contribute to improved (existing and future) bus transit and connectivity at the SMB/Ave of the Stars in Century City, thus supporting the SMB station location. Consider any potential construction issues (street level and underground) if the 30/10 plan is pursued.

f. The Final Traffic Impact Analysis Report (page 3-2) should include Burton Way/S Santa Monica Boulevard as an arterial street, even though it is not technically classified as an arterial. The street functions as an arterial, carrying over 30,000 vehicles daily. The traffic analysis should take into account Burton Way/ S. Santa Monica Boulevard.

g. In the Final Traffic Impact Analysis Report (page 3-8), the traffic impact analysis must be revised to include the N Santa Monica Boulevard Improvement project and improved public transit/bus interface on N Santa Monica Boulevard between Century City, Beverly Hills, and West Hollywood. The analysis should include benefits to regional connectivity on Santa Monica Blvd, thus retaining the Santa Monica Boulevard alignment and station in Century City.

12) ***GENERAL COMMENTS*** – The following corrections and clarifications should be made to the final report:

a. The DEIS/DEIR indicates that the City of Beverly Hills does not have a bicycle plan, however, the City adopted a preliminary bicycle plan in 1977 and is currently in the process for updating and formalizing that plan for implementation. (Chapter 3, pages 3-19, 3-21).

b. It should be noted both in the text on page 3-19 and on the map on 3-20 that these are "existing" volumes of pedestrian activity. (Chapter 3, pages 3-19, 3-20).

c. Please clarify what is meant by "A majority of the new trips would come from autos." (Chapter 3, page 3-30). Is this for all scenarios tested?

d. Population – Beverly Hills – The DEIS/DEIR states the City of Beverly Hills population to be 35,000. This is the resident population. The City of Beverly Hills General Plan

Technical Background Report (2005) estimated the City's daytime population to be as high as approximately 294,000 people, with up to an additional 46,000 people in transit through the City during the evening peak commute hours (Chapter 4, page 4-27).

e. The Community and Neighborhood Technical Report (page 3.3, section 3.3.3), provides a summary of the Beverly Hills general plan. That summary should be corrected to state that: "Amendments to the city's general plan were adopted on January 12, 2010. The city's amended general plan includes the required elements for Land Use, Open Space, Circulation, Conservation, Noise, Safety, and housing and also includes optional elements for Historic Preservation, Economic Sustainability and Public Services. The City's bicycle master plan has been made free standing to facilitate future updating. Applicable policies from the City of Beverly Hills General Plan are:

- ***LU 3.1 Conservation.*** Conserve existing residential neighborhoods, and non-residential areas where new development builds on and enhances the viability of existing business sectors that are the City's strengths, promotes transit accessibility, is phased to coincide with infrastructure funding and construction, and designed to assure transitions and compatibility with adjoining residential neighborhoods. (Imp. 1.3, 2.1, 2.2)
- ***LU 14.1 City Form.*** Accommodate a balanced mix of land uses and encourage development to be located and designed to enable residents access by walking, bicycling, or taking public transit to jobs, shopping, entertainment, services, and recreation, thereby reducing automobile use, energy consumption, air pollution, and greenhouse gases. (Imp. 1.2, 2.1)
- ***LU 17.2 Regional Coordination.*** Cooperate with adjoining and regional agencies to jointly plan land uses, transportation, and infrastructure that provide a cohesive and integrated strategy to accommodate growth that is environmentally, economically, and socially sustainable. (Imp. 7.1, 7.2)
- ***ES 3.3 Multi-modal Transportation.*** Encourage and promote the use of existing public transportation to link these areas with the Triangle while developing alternative means of public transportation to ease congestion and facilitate successful, high-quality development throughout the City. (Imp. 3.7)
- ***CIR 2.1 Metro Subway Extension.*** Support the extension of the Metro subway extension through the City along Wilshire Boulevard with stations at Beverly/Rodeo and La Cienega to enhance transit service and increase transit ridership within the City and the West LA region. Explore other stops as appropriate. (Imp. 3.7)
    - ***CIR 2.1a Linking Transit and Development.*** Encourage appropriate development that may include parking for local transit riders, local-serving retail, high-end retail, restaurant and supporting uses in and around transit stops and stations. (Imp. 3.7)

- ***CIR 2.2 Multi-modal Transit.*** Consider a variety of transit services including rail, light rail transit, bus rapid transit, trolleys (streetcars), enhanced buses, express buses, local buses, school buses, and neighborhood shuttles to meet the needs of residents, workers, and visitors. (Imp. 3.7)
- ***CIR 2.3 Transit Design.*** Support a well-designed transit system and stations to meet the mobility needs of residents and visitors, including seniors, the disabled and transit-dependent persons. (Imp. 3.7)
- ***CIR 2.4 Inter-jurisdictional Cooperation.*** Work collaboratively with regional agencies and adjacent jurisdictions to improve transit service, accessibility, frequency, and connectivity, and to encourage increased ridership and fewer personal automobile trips. (Imp. 7.1)
- ***CIR 2.5 Transit Frequency.*** Support increased-frequency transit service and capital investments to serve high-density employment, commercial, residential, or mixed-use areas and activity centers. (Imp. 3.7)
- ***CIR 2.6 Transit Priority Measures.*** Consider improvements in transit efficiency and travel times by implementing transit priority measures to help bypass congested areas. Such measures may include transit signal priority, queue bypass lanes, and exclusive transit lanes. (Imp. 3.7)
- ***CIR 2.10 Interconnected Transit System.*** Create or collaborate on an interconnected transportation system that allows a shift in travel from private passenger vehicles to alternative modes, including public transit, ride sharing, car-sharing, bicycling, and walking. Before funding transportation improvements that increase vehicle miles traveled, consider alternatives such as increasing public transit or improving bicycle or pedestrian travel routes. (Imp. 3.7)

f. The Final Geotechnical and Hazardous Materials Technical Report includes a reference to the City of Beverly Hills General Plan Technical Background Report and indicates that it was released in 2008. Please correct the reference to list the report as being released in 2005.

g. Headings in the Final Noise and Vibration Technical Report, section 2 and section 5, are illegible. In the same report, Figure 5-4 (Vibration Sensitive Locations) is blurry and the numbered locations presented on the map are difficult to read, especially for numbers located near Beverly Drive and Robertson Drive.

h. The Parklands and Other Community Facilities Technical Report references the City of Beverly Hills general plan (page R-1). Please correct the reference to read as follows. The correct reference is, "The City of Beverly Hills General Plan was amended on 1/12/2010 and is available at: http://www.beverlyhills.org/services/planning_division/general_plan/genplan.asp"

i. The Parklands and Other Community Facilities Technical Report includes a list of policies (page 3-3) pulled from the City of Beverly Hills general plan. That list should be replaced with the City of Beverly Hills general plan policies as follows:

- LU 2.2 ***Public Streetscapes and Landscape.*** Maintain and enhance the quality and health of the "green infrastructure" that contributes to the City's identity and quality of life, including its street trees, landscaped medians and parkways, parks, and open spaces, while seeking to conserve water resources. (Imp. 3.1, 3.6)
- LU 5.4 ***Complete Neighborhoods.*** Maintain, improve, and, where necessary, expand parklands and community facilities to serve the City's neighborhoods. (Imp. 3.1, 6.1)
- LU 13.1 ***Adequate Community-Supporting Uses.*** Seek to ensure that adequate public and private community-supporting facilities and services are located throughout the City. (Imp.3.1, 6.1)
- LU 13.5 ***Expansion of Existing Community Facilities.*** Consider opportunities for the expansion of existing, and the development of new, parklands, recreational facilities, schools, lifelong learning, cultural, and other public and quasi-public facilities, provided that such improvements are cohesively integrated with, are complementary to, and are compatible with, existing development and adjoining land uses. (Imp. 3.1, 6.1)
- LU 13.8 ***Residential Care Facilities.*** Encourage the development of senior daycare facilities, assisted living facilities, hospice, child care, and other residential care facilities in appropriate areas throughout the City. (Imp. 2.2)
- LU 13.9 ***Assembly Facilities.*** Encourage and support the development of assembly facilities for social, cultural, educational, and religious organizations in appropriate locations of the City. (Imp. 2.1, 7.3)
- ***LU 13.10 Parks and Open Spaces.*** Seek to expand the City's parklands, greenways, and open spaces as land becomes available or as existing buildings are demolished. Consider alternative prototypes and standards for park development in urban areas where available land is limited. (Imp. 3.1, 6.1)
- ***OS 8.***1 ***Park and Open Space Standards.*** Strive to meet National Recreation and Park standards for the provision of parks space based on the community's park needs and the number of residents. (Imp. 2.1)
- OS 8.4 ***Parkland Acquisition Criteria.*** Assess opportunities to acquire additional land at appropriate locations for the development or expansion of parks. Use the following criteria when considering acquisition for parkland:
  a. City's identified current and projected needs for recreation and sports facilities
  b. City's needs for recreation facilities based on location of existing facilities
  c. The preservation of natural resources and historic and cultural areas
  d. Ease of accessibility

e. Usability of proposed parklands considering topography and other landform constraints
f. Fiscal impact on the General Fund for any immediately needed refurbishments and ongoing maintenance
g. The existence of a deficiency in a particular sector of the City.
h. Potential to improve the aesthetics along a street or in a neighborhood, or to enhance the City's garden quality in general. (Imp. 1.3, 6.1)

- OS 8.5 ***Urban Parks.*** Encourage and allow opportunities for new development to provide small plazas, pocket parks, civic spaces, and other gathering places that are available to the public to help meet recreational demands. (Imp. 2.1, 2.2)
- OS 8.7 ***Recreational Parkland Replacement.*** Protect parkland from non-recreational uses that result in loss of acreage used for recreational purposes; any loss of park land shall be replaced with acreage suitable for comparable uses so that the City's current park land acreage is not decreased. (Imp. 1.3, 2.1)
- S 3.3 ***Fire Protection Services.*** Require that new development and re-development of structures provide adequate fire safety features and responder access so as not to cause a reduction of fire protection services below acceptable, safe levels. (Imp. 2.4)

Attachment B

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON

October 14, 2010

City of Beverly Hills
345 Foothill Road
Beverly Hills, California 90210

Attn: Mr. Aaron Kunz

RE: GEOTECHNCIAL ENGINEERING COMMENTS LETTER, WESTSIDE SUBWAY EXTENSION (WSE), REVIEW OF DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR), BEVERLY HILLS, CALIFORNIA

We understand the City of Beverly Hills (City) will submit this letter with their DEIR comments to the Los Angeles Metropolitan Transportation Authority (Metro). The purpose of this letter is to summarize our review findings from our Geotechnical Engineering Report dated October 13, 2010 (Report) and provide a brief statement of qualifications regarding our tunneling experience.

COMMENTS ON WSE DEIR

The following comments are based on the recommendations provided in our Report. Refer to this Report for details on these comments for the WSE DEIR:

General: The appendices for the DEIR Geotechnical Report were not included on the Metro website. The appendices include subsurface profiles and an environmental database search of the alignment. These appendices should be made available to the public.

Fault Rupture: Given the uncertainty of the Santa Monica Fault and West Beverly Hills Lineament, further evaluation to identify fault traces should be completed prior to final location of the Santa Monica base station. The Santa Monica Fault could have one or more distinct fault traces that could impact the station location. The trace(s) would be identified during the geotechnical investigation of the project using a combination of geophysical techniques, subsurface explorations, and/or trenching (where possible). If a trace is discovered passing through the proposed station, then the station would likely need to be relocated.

Ground Shaking: We noted a discrepancy in the design earthquake probabilities for the Maximum Design Earthquake (MDE). The peak ground acceleration and recurrence interval values stated in the DEIR for the MDE are consistent with a design earthquake having a 2 percent probability of exceedance in 50 years. However, the DEIR defines the MDE as having a

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TDD 1-800-833-6388
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1 percent probability of exceedance in 100 years. Please review and correct the MDE information.

Liquefaction: Without additional geotechnical studies, we disagree with the DEIR assumption that liquefaction would not impact the tunnels or station foundations. The liquefaction depth should be investigated to at least 20 feet below the lowest expected foundation elevation, in this case the tunnel invert and station foundation. If liquefiable soils are still present at these depths, the explorations should extend at least 10 feet deeper.

Subsidence: Surface settlement monitoring, with closely spaced survey points on streets, utilities, and buildings, as well as ground deformation monitoring instrumentation placed in boreholes, will be needed to assess ground behavior during and after tunneling. Areas susceptible to potentially large ground losses, resulting in unacceptable settlements, are curved alignment and cross passages. In the City, the West Hollywood Connection alignments and Constellation alignments are curved. Cross passages typically connect the twin tunnel every 700 to 800 feet.

Hazardous Subsurface Gases: Perhaps the greatest risk of gas infiltration into a tunnel or subsurface station may be associated with earthquakes, either through cracking of liners or walls, offset of gasketed tunnel liner joints, and/or disabling the ventilation system. The earthquake risk should be highlighted and discussed in the final report.

Hazardous Waste and Materials: We recommend additional research of properties that are in close proximity to the proposed stations and connection structure, as the potential for soil and groundwater contamination would impact these facilities. Additional studies to confirm the presence or absence of known and unknown oil wells should be performed.

Noise and Vibration: Operational noises and vibrations are generally not noticeable with the exception of businesses requiring precision measuring devices. Special mitigation measures, including vibration isolation measures for foundations, could be needed in these cases. During construction, tunneling and cut-and-cover station excavation-induced vibrations are typically on par with bus and trash truck noise and vibrations. Noise and vibrations are the most noticeable at night, when background noises are at a minimum. Additional mitigation measures, such as utilizing sound walls, sound proofing, mufflers, and modifications to safety warning devices, should be evaluated. Nevertheless, some residents and hotels could notice nighttime noise and vibration during construction. This could sometimes be reduced by installing multiple pane windows, wall insulation, and other sound-reducing measures for affected residences.

Staging Areas and Construction Traffic: We recommend that the City and Metro begin evaluating the potential locations for staging areas within a couple blocks of the Wilshire/La Cienega base and option stations, the connection structure, and the Wilshire/Rodeo station. Significant construction traffic should be anticipated in the vicinity of these areas for soil disposal, backfill, concrete, and other construction material deliveries.

Public Awareness/Outreach: We suggest a public relations campaign be coordinated with the pre-construction surveys and utility relocation. The City should coordinate these efforts with Metro to provide as much notice as possible during these early stages of the project.

Dewatering: The EIR/EIS should evaluate the potential for disposal of large quantities of water into the City's wastewater systems from the possible excavations at the Wilshire/La Cienega base and option stations, the connection structure, and the Wilshire/Rodeo station. Further, consideration should be given to beneficial use of any extracted water, in accordance with the codes and policies of the City.

Excavation and Tunneling Obstructions: Significant project disruptions due to encounters with underground obstructions (abandoned tiebacks, oil well casings, etc.) could be greatly reduced by performing the necessary literature research, case history evaluations and site investigations to determine what if any obstructions are likely to be present and in what quantities. This should be completed during the EIR/EIS phase so that the potential for environmental impacts and potential mitigation measures associated with obstruction along the various alignment alternatives is analyzed and disclosed.

STATEMENT OF QUALIFICATIONS

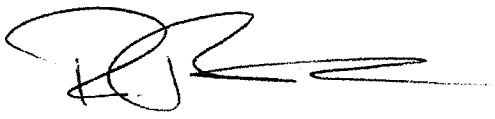
Over the last 30 years, Shannon & Wilson's current underground staff has provided geotechnical services for tunneling on over 900 projects. Our experience encompasses all phases of underground engineering from conceptual design, through design and specification, to construction support. We have state-of-the-practice experience in evaluating and choosing the right tunneling technology for subsurface and construction conditions. Our experience includes working under "live" road conditions and with minimal impact on the environment. Shannon & Wilson's tunneling experience and expertise includes:

- Exploration using a wide range of mapping, geophysical and boring techniques suitable for the various soil and rock conditions at different sites
- Groundwater evaluations to assess dewatering requirements, impacts of dewatering on adjacent structures, and the potential for moving contamination towards the excavation
- Soil and rock property evaluations from field and laboratory tests to provide reliable input for design
- Prediction of soil and rock loads on shafts, tunnels and underground openings using both empirical and computer techniques such as finite difference codes
- Estimation of likely impacts of underground construction on adjacent facilities
- Preparation of technical specifications and plans such as: tunnel excavation, tunnel support, dewatering, portal shoring, and geotechnical instrumentation
- Implementation of field instrumentation systems to measure the loads, stresses, deformations, and groundwater levels associated with underground construction

Shannon & Wilson is experienced in a wide range of tunnel excavation methods and the impacts of geotechnical conditions, including: drill and blast excavation, earth pressure and slurry pressure balance tunnel boring machines, jack and bore tunnels, microtunneling, horizontal directional drilling and pipe ramming. We have been involved in the geotechnical aspects of tunnel liner support systems including: grouted dowels and shotcrete, cast-in-place reinforced concrete, bolted and gasketed precast concrete segments, welded and snap together steel pipe sections, gasketed concrete pipe sections, and fiberglass pipe sections. We have worked on trenchless projects ranging from 8-inch diameter horizontal directional drill conduits for utility lines, jack and bore and microtunnels ranging from 24-inch to 16-feet diameter, to the world's largest diameter soft ground tunnel with an outside diameter of 85 feet.

Sincerely,

SHANNON & WILSON, INC.



R. Travis Deane, P.E., G.E.
Associate

RTD/rtd

Attachment C

CITY OF BEVERLY HILLS
EXHIBIT "A"

Beverly Hills Traffic Thresholds of Significance

The following is the recommended traffic thresholds of significant impact for 4 different scenarios:

1. **Threshold of Impacts at Signalized Intersections:**

Calculation Methodology: Intersection Capacity Utilization (ICU), using criterion similar to Congestion Management Program (CMP). Selected lane capacity of 1,600 vehicles per hour.

An impact will be considered significant if traffic generated by a project causes an increase of:

- 0.020 or more on V/C at the final LOS "F"
- 0.020 or more on V/C at the final LOS "E"
- 0.030 or more on V/c at the final LOS "D" or better

2. **Threshold of Impacts at Unsignalized (all-way stop) Intersections:**

Calculation Methodology: Based on the most current edition of Highway Capacity Manual.

An impact will be considered significant if the following increase of average total delay per vehicle results in:

- 3.0 seconds or more average total delay at the final LOS "F"
- 3.0 seconds or more average total delay at the final LOS "E"
- 4.0 seconds or more average total delay at the final LOS "D"

3. Threshold of Impacts at Unsignalized (2-way stop) Intersections:

Calculation methodology: Highway Capacity Manual (latest edition):

Significant Impact: A Change in level of service (comparison of cumulative plus without project, to cumulative plus with project) on any direction of travel:

- LOS D or better to LOS E or worse
- LOS E to LOS F
- LOS F to LOS F (resulting in increase of 10 or more average total delay (sec/veh) on any direction.

4. Threshold of Impacts at Residential (Local) Streets:

Significant Impact:

I. ADT less than 2,000 volume per day (vpd): project increases ADT by 16%, or increases peak hour by 16% or both.

II. ADT greater than 2,001 but less than 4,000 vpd: project increases ADT by 12% or more, or increases peak hour by 12% or more or both.

III. ADT greater than 4,001 but less than 6,750 vpd: project increases ADT by 8% or more, or increases peak hour by 8% or more or both

IV. ADT greater than 6,750 vpd: project increases ADT by 6.25% or more, or increases peak hour by 6.25% or more or both

ATTACHMENT 2

Letter to Metro dated October 8 from Mayor Delshad on Behalf of the City Council

Jimmy Delshad, Mayor

October 8, 2010

Honorable Don Knabe
Chair, Metro Board of Directors
Los Angeles County Metropolitan Transportation Authority - Metro
One Gateway Plaza, MS 99-22-3
Los Angeles, CA 90012-2952

RE: Support of Westside Subway Extension

Dear Supervisor Knabe:

I am sending this letter on behalf of the Beverly Hills City Council. The City is currently reviewing the Draft Environmental Impact Statement/ Draft Environmental Impact Report for the Westside Subway Extension and will be submitting a comment letter to Metro in regards to the options studied, and on the analysis in the draft report. The City remains very concerned about tunneling under residential properties and especially under the Beverly Hills High School and the forthcoming letter will include comments, among others, on the possible track alignment options between the Wilshire/ Rodeo station and the Century City station. In advance of the comment letter, the City would like to re-iterate its support for the Westside Subway Extension Project, and its strong preference for alignment through the City of Beverly Hills and to Century City along Wilshire Boulevard and Santa Monica Boulevard.

Sincerely,

Jimmy Delshad

Jimmy Delshad, Mayor
City of Beverly Hills

Cc: Beverly Hills City Council
Jeff Kolin, City Manager

ATTACHMENT 3

Staff Report for the October 5 Study Session

CITY OF BEVERLY HILLS
STAFF REPORT

Meeting Date: October 5, 2010

To: Honorable Mayor & City Council

From: Susan Healy Keene, AICP, Director of Community Development
David Gustavson, Director of Public Works

Subject: Metro Westside Subway Extension Draft Environmental Impact Statement/ Draft Environmental Impact Report (DEIS/DEIR)

Attachments:

INTRODUCTION

Metro has released a combined Draft Environmental Impact Statement/ Draft Environmental Impact Report (DEIS/DEIR) for the Westside Subway Extension with proposed stops in Beverly Hills near Wilshire/La Cienega, and Wilshire/Beverly (referred to as Wilshire/Rodeo in the document), and a proposed station near Beverly Hills in Century City. The City Council last discussed the Westside Subway Extension as part of the study session on August 3. This report frames a discussion of the greater policy considerations relating to the proposed subway station locations and potential rail alignments in and near the City of Beverly Hills.

City staff, along with the geological consulting firm Shannon & Wilson, Inc. are reviewing the DEIS/DEIR. A comment letter outlining the City's position on options studied in the document is being drafted. This letter, along with a list of technical comments on the environmental analysis will be sent to Metro. Direction provided during this study session will inform the final letter, which will be provided to the City Council in the October 19 meeting packet, and submitted to Metro on October 20.

On Monday, September 27, Metro held a public meeting at Roxbury Park to hear comments on the environmental document including the proposed station location and alignment options. The meeting was attended by approximately 200 residents who overwhelmingly supported a track alignment on Wilshire and Santa Monica between the Wilshire/Rodeo station and the Century City station and did not support a track alignment that would place the subway line beneath the Beverly Hills High School or residential property.

On October 28, the Metro Board plans to select a "locally preferred alternative". This alternative will be one of the five alternatives outlined in the DEIS/DEIR. While the overall alignment will be selected as part of the "locally preferred alternative," the Metro Board may chose to select more than one option for station location and track alignment

in specific areas to be included in the FEIS/FEIR and studied further in the preliminary engineering process. This would defer the final selection of certain station locations until additional study and analysis has been conducted.

DISCUSSION

The Westside Subway Extension DEIS/DEIR studies alternatives for extending the existing Purple Line subway from the existing Wilshire/ Western station through the City of Beverly Hills. Five alternatives, two segmented build-outs, and a series of options for station locations and track alignments were studied in the report.

City staff and the geological consulting firm Shannon & Wilson are reviewing the combined draft document, with the City's consultant focusing on geological aspects of the project such as tunneling technology, seismic issues, and noise and vibration. The consultant's report will be available before the October 19 meeting.

Alternatives Studied

All five alternatives analyzed in the report would follow the same general alignment through Beverly Hills, with stations proposed in the City at Wilshire/La Cienega, and Wilshire/Rodeo. These proposed station locations are consistent with City's Mass Transit Committee recommendations adopted by the City Council in August 2009. All alignments analyzed assume that the track alignment would be located underneath Wilshire Boulevard from the City limit on the east, through the City and then veer southward and follow Santa Monica to the Century City station that would be located at Santa Monica and Avenue of the Stars. An additional line is proposed in two of the alternatives (Alternatives 4 & 5) that would connect the Westside Subway Extension (near La Cienega Blvd) to the Red Line at the Hollywood/Highland Station.

Alternatives Studied in the DEIS/DEIR

	Name	Description
	No Build Alternative	No new infrastructure or transit service.
	Transportation Systems Management (TSM) Alternative	More frequent bus service and existing subway service.
Alternative 1	Wilshire/Western to Westwood/UCLA Extension	Extends Purple Line from Wilshire/Western to Westwood/UCLA along Wilshire Blvd.
Alternative 2	Wilshire/Western to VA Hospital Campus Extension	Extends Purple Line from Wilshire/Western to VA Hospital Campus along Wilshire Blvd.
Alternative 3	Wilshire/Western to Santa Monica Extension	Extends Purple Line from Wilshire/Western to Santa Monica along Wilshire Blvd.
Alternative 4	West Hollywood Extension and Wilshire/Western to Westwood/UCLA Extension	Extends the Purple Line from Wilshire/Western to Westwood/UCLA along Wilshire Blvd and adds a line connecting the Red Line at Hollywood/Highland to the Purple Line in Beverly Hills.
Alternative 5	West Hollywood Extension and Wilshire/Western to Santa Monica Extension	Extends the Purple Line from Wilshire/Western to Santa Monica and adds a line connecting the Red Line at Hollywood/Highland to the Purple Line in Beverly Hills.

Possible Build Segments

In addition to the final subway extension lengths considered in the DEIS/DEIR, the document considers two scenarios in which Alternative 1 is built in segments. These two interim scenarios are studied to determine which would be the best terminus for an initial phase of implementation in the event that the project must be built in phases over time (page S-32). The first, MOS 1, would stop east of Beverly Hills at Fairfax, and the second, MOS 2, would extend through the City to Century City.

Build Segments Studied in the DEIS/DEIR

	Name	Description
MOS 1	Minimal Operating Segment 1	Considers a scenario in which Alternative 1 is built in segments. This segment would end at Wilshire/Fairfax.
MOS 2	Minimal Operating Segment 2	Considers a scenario in which Alternative 1 is built in segments. This segment would end at Century City.

Options for Stations and Track Alignments

Within the five alternatives, options are analyzed for alignments and station locations. This section summarizes options studied for stations in and near Beverly Hills. A single option for the Wilshire/ Rodeo station was studied in the document; however two possible location options were studied for both the Century City station and the La Cienega station:

- Wilshire/La Cienega Station – Options are to locate station on the eastside, or the westside of the intersection.
- Wilshire/Rodeo Station – One option is proposed. This option is consistent with past community support
- Century City Station – Options are to locate station at Santa Monica Boulevard, or at Constellation Avenue. If located at Constellation Avenue, two options were studied for aligning the tracks between the Wilshire/Rodeo station and this station. Both alignments would place the subway beneath the Beverly Hills High School property. One alignment ("Constellation South") also places the subway beneath homes.

Wilshire/La Cienega Station

Options Studied	*Description*
Station East of La Cienega Entrances on north and south sides of Wilshire (Alternatives 1, 2, 3, 4, & 5)	Locates the proposed station on Wilshire at La Cienega on the east side of the Wilshire/La Cienega intersection. The West Hollywood line would connect to the Purple Line via a junction box to be located beneath the Wilshire/Robertson Blvds intersection. Transfers along the line would occur at the Wilshire/Rodeo Station.

Station West of La Cienega Entrances on north side of Wilshire ("Option 3 - La Cienega Station West of La Cienega with Transfer")	Locates the proposed station on Wilshire at La Cienega on the west side of the Wilshire/La Cienega intersection rather than the eastside. Connects the West Hollywood line proposed in Alternative 4 and Alternative 5 directly into the La Cienega station and avoids a junction box at Wilshire/ Robertson.

Considerations: On November 4, 2009, Metro held a station planning meeting at Beverly Hills City Hall. The meeting was well attended and achieved strong consensus that the station should be located on the east side of La Cienega Boulevard due to higher concentration of commercial buildings and multiple family residences. Locating the station on the eastside of the La Cienega intersection, with proposed station entrances on both the north and south sides of Wilshire Boulevard (considered in the document) is consistent with the outcome of this community meeting.

Locating the below ground loading platform on the western side of the intersection would allow transfers between a potential West Hollywood line without a connecting structure at Robertson Boulevard, and would also reduce the number of residential properties that the possible West Hollywood line (Alternatives 4 & 5) would need to go beneath. At this time the West Hollywood line is unfunded and has not been included in Metro's Long Range Transportation Plan.

Wilshire/Rodeo Station

Option Studied	*Description*
Station located beneath Wilshire between Beverly and Camden Drives Entrances on all sides of the Wilshire/Beverly intersection (Alternatives 1, 2, 3, 4, & 5)	A single option is studied in the environmental document. This location is consistent with the recommendation of the Mass Transit Committee and past City Council support.

Considerations: This station is proposed consistent with past community support. Once the subway project enters the preliminary engineering phase of the process it is anticipated that considerations for this station area will involve construction aspects, such as staging areas, construction hours, haul routes, detours, and other construction phase related issues.

Century City Station

Options Studied	*Description*
Santa Monica Boulevard (Alternatives 1, 2, 3, 4, & 5)	Locate station on Santa Monica Blvd at Avenue of the Stars. Train tracks would be aligned beneath existing roadways and commercial properties.
Constellation Avenue (Option 4)	Locate station at Constellation Avenue and Avenue of the Stars (Option 4). Two possible train track alignments were studied for this option. Both alignments would be located beneath the Beverly

Hills High School property, and the "Constellation South" alignment would be located beneath residential properties in the Beverly Hills.

- "Constellation North" Alignment – (Constellation via Lasky Drive) Aligns the train tracks from the Wilshire/Rodeo Station to the Constellation Station via Lasky Drive.
- "Constellation South" Alignment – Aligns the train tracks from the Wilshire/Rodeo Station to the Constellation Station following a direct route.

The DEIS/DEIR presents two different options for the Century City station location. The first option would locate the station at Santa Monica and Avenue of the Stars, with the rail alignment following the Wilshire and Santa Monica Boulevard roadways. The second option would locate the station at Constellation Avenue and Avenue of the Stars. This second option would require the train tracks to run below the Beverly Hills High School, and depending on the alignment, potentially beneath residential properties in the City of Beverly Hills.

The DEIS/DEIR states that locating the station at Constellation would save $4.1 million in costs for building the station. The amount of track needed to reach the Constellation location however would be greater and therefore a station at Constellation could increase the overall capital cost by $60.4 million (Page S-62).

The DEIS/DEIR does not consider differences in ridership between the two station location options for Century City. Ridership counts are estimated for a station located at Santa Monica Boulevard and Avenue of the Stars for Alternative 5 (where the extension reaches City of Santa Monica, and the West Hollywood line is built), and for Alternative 1 (where the extension reaches Westwood/UCLA and the West Hollywood line is not built) but under a scenario where the subway extension must be built in phases (Minimal Operating Segments, or "MOS") and the subway extension temporarily ends at Century City (MOS 2) (Pages 3-52 & 3-53)

Considerations. There are several aspects to consider regarding the location of the Century City station and the alignment of the tracks between that station and the Wilshire/ Rodeo station in Beverly Hills. Aspects include the following:

- Safety
- Property Values
- Potential for Noise and Vibration
- Potential Limitations to Future Development
- Use of Beverly Hills High School during Emergencies

The Beverly Hills High School is designated as a potential shelter in the City's Emergency Operations Plan; however the school is one of several possible shelter sites (all schools and recreation and parks facilities are designated shelters). Use of a site as a shelter after a disaster is based on many variables, including the type and magnitude of the disaster and the shelter needs of the community.

NEXT STEPS

Staff will finalize the letter being drafted based on direction from the City Council and will provide that letter in the October 19 meeting packet before submitting it to Metro on October 20. On October 28, the Metro Board plans to select a "locally preferred alternative". This is the alternative that will be further studied in the Final environmental document (FEIS/FEIR) and that will enter the preliminary engineering phase of the project. The locally preferred alternative will include one of the five alternatives studied in the DEIS/DEIR, one of the two Minimal Operating Segments (MOS) studied in case the Westside Subway Extension is not able to be built all at once, and one or more of the options considered for specific station areas. Including more than one option for station location and track alignment in the locally preferred alternative would defer final selection of certain station locations until additional study and analysis has been conducted.

Once the project enters the preliminary engineering phase more detailed analysis of the station areas will be conducted, including entrance locations, materials staging, and construction hours. The City will continue to work with Metro to assure that stations are designed for the community and to assure that construction related issues are addressed and impacts to the community are limited to the greatest extent possible. In the preliminary engineering phase the City has the opportunity to plan the above ground portions of the stations collaboratively with Metro.

CITY POSITION

The following positions on key concerns are recommended for inclusion in the letter to Metro on the Westside Subway Extension:

- The City Strongly Supports the Westside Subway Extension. On several occasions the City Council has endorsed the extension of the subway through the City of Beverly Hills along Wilshire Boulevard with stations at Wilshire/ La Cienega and Wilshire/Beverly-Rodeo.

- Extend the Subway through the City in the Initial Phase. Staff recommends that the letter state "if the subway project must be built in phases that the initial phase be built to Century City".

- Santa Monica Blvd Track Alignment to Century City. The City's adoption of the Mass Transit Committee recommendations includes a preference for the Santa Monica Boulevard alignment. Staff proposes that the letter strongly support the Santa Monica Boulevard alignment and oppose the Constellation South alignment. Staff recommends that the letter indicate that further studies should be conducted for a Constellation North alignment, in the event that the Metro Board chooses to analyze two options as part of the FEIS/FEIR.

- Concerns Regarding Tunneling Under Residential Properties. Noise, vibration, property values

- Concerns Regarding Tunneling Under the Beverly Hills High School. Emergency response, liability, potential future site development

- Eastside of Intersection Station Location, Station Entrances on North and South side of Wilshire at LA Cienega. There is community support for locating the

station on the east side of La Cienega Boulevard with station entrances on both the north and south sides of Wilshire Boulevard.

- Station Entrances on North and South side of Wilshire at Rodeo (Beverly) Station.

- Robertson Connection Box not Located in the Wilshire/Robertson Intersection. If the West Hollywood line were constructed, and the Wilshire/ La Cienega station loading platform was located on the eastside of the La Cienega intersection, a below ground connection structure would need to be built to connect the West Hollywood line to the Purple Line in Beverly Hills. The DEIS/DEIR locates this structure beneath the intersection of Wilshire and Robertson Boulevards. Staff is concerned that construction of the structure may close both Robertson and Wilshire Boulevards for certain periods of time, and proposes a recommendation that if the structure is needed, to locate it under Wilshire, on one side, or the other, of the intersection with Robertson.

- Minimize Potential Construction Impacts during Construction. Construction of the stations will require materials staging, and in the initial phase of construction will require street closures. Staff recommends that the letter state that "the City will continue to work with Metro to assure that potential impacts to the community during construction are minimized."

FISCAL IMPACT

There is no immediate fiscal impact associated with this report.

RECOMMENDATION

Consider the options proposed in the draft environmental document, the considerations discussed in this report, and provide direction for finalizing the City's comment letter to Metro.

Susan Healy Keene, AICP
Director of Community Development
Approved By

Meeting Date: October 18, 2010

ATTACHMENT 4

Metro Staff Report with Recommendations on Westside Subway Extension

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

PLANNING AND PROGRAMMING COMMITTEE
OCTOBER 20, 2010

MEASURE R PROJECT DELIVERY COMMITTEE
OCTOBER 21, 2010

SUBJECT: WESTSIDE SUBWAY EXTENSION

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATIONS

A. Approve the Westside Subway Extension Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR). Attachment A contains the Executive Summary. The full Draft EIS/EIR is available upon request;

B. Approve Draft EIS/EIR Alternative #2, a 9-mile extension of the existing Metro Purple Line subway with seven stations from its current terminus at the Wilshire/Western Station to a Westwood/VA Hospital Station as the Locally Preferred Alternative (LPA) (Attachment B) for further study in the Final Environmental Impact Statement/Report (Final EIS/EIR) with the following recommended station/alignment options and rail support facilities:

1. Wilshire/Crenshaw Station
   - Delete station

2. Wilshire/Fairfax Station
   - East Station

3. La Cienega Station and Connections
   - East Station
   - Delete West Hollywood Connection Structure

4. Century City Station and Alignments
   - Santa Monica Boulevard and Constellation Station Options carried forward for further study

- Constellation North and Santa Monica Boulevard Alignment Options between Beverly Hills and Century City carried forward for further study
- East Alignment only between Century City and Westwood carried forward for further study

5. Westwood/UCLA Station
   - Westwood/UCLA On-Street and Off-Street Station Options carried forward for further study

6. Westwood/VA Hospital Station
   - Westwood VA Hospital North and South Station Options carried forward for further study

7. Rail Storage & Maintenance Facility
   - Expansion of existing Division 20

8. Other Support Facilities:
   - Provision of necessary ancillary facilities including special track work (crossovers, tail tracks, etc), Traction Power Substations, Emergency Generators, Vent Shafts as identified in the Draft EIS/EIR Volume 2 – Alternative 2 LPA Advanced Conceptual Engineering Drawings.

C. Authorize the Chief Executive Officer (CEO) to:

1. Exercise Options #2 and #3 to Contract No. PS 4350-2000 with PB Americas Inc. (PB Americas) to prepare the Final EIS/EIR (Option 2) and continue Advanced Conceptual Engineering (ACE) and complete Preliminary Engineering (PE) Design (Option 3) once approval is received from the Federal Transit Administration (FTA), in the amount of $48,394,203 increasing the total contract amount from $22,272,286 to $70,666,489;

2. Exercise Option #2 to Contract No. PS-4350-1995 with The Robert Group to conduct the facilitation of community outreach in support of the Final EIS/EIR and PE in the amount of $864,000 increasing the total contract amount from $1,913,051 to $2,777,051;

3. Increase the FY11 budget to include $5,000,000 in State Repayment of Capital Project Loan dollars in Cost Center 8510, Project No. 865518 to support PE design; and

4. Establish Contract Modification Authority for 15% of the not-to-exceed value of each Option, and authorize the CEO execute individual Contract Modifications within and up to the Board approved Contract Modification Authority.

The procurement summaries and small business participation summaries are provided in Attachments C for the FEIS/FEIR/PE contract and in Attachment D for the Facilitation of Community Outreach contract.

RATIONALE

The adopted Long Range Transportation Plan (LRTP) includes the Westside Subway Extension in the Constrained Element with a phased delivery in three construction segments for completion in the following years:

-Fairfax Extension (2019)
-Century City Extension (2026)
-Westwood Extension (2036)

In April 2010, the Board adopted the 30/10 Initiative which directs that the Westside Subway Extension be delivered in one phase to Westwood.

The current environmental study to extend transit to the Westside was initiated in June 2007. The AA Study (Phase 1) was completed in January 2009. After a review of many alignment and modal options, five "Build Alternatives" in addition to the No Build and Transportation System Management (TSM) Alternatives were carried forward for further environmental analysis in the Draft EIS/EIR.

The Draft EIS/EIR contains the technical analysis to form the basis for selection of a LPA, which is the project that will be carried forward for final environmental clearance. An ongoing public participation process supported the technical analysis. Upon approval of the LPA, we will submit a request to the Federal Transit Administration (FTA) to enter the PE phase of the New Starts program. This is a necessary step in order to receive a rating for the project that will advance opportunities for the Board adopted 30/10 schedule. Action on PB Americas contract Options 2 and 3, and The Robert Group's Option 2 are necessary to complete both the Final EIS/EIR and PE, as well as to continue the community outreach in support of these efforts. These actions will allow us to complete the project's environmental clearance and obtain a rating from the FTA to be eligible for New Starts federal funding.

Alternative Recommended for Approval

All of the five build alternatives studied would provide significant countywide benefits as the project would serve as a primary connector between the residential communities throughout the county where people live and the very dense regional job centers on the Westside (Westwood, Century City and Beverly Hills). Only Alternatives 1 and 2 are affordable within the adopted LRTP and between them, Alternative 2 provides significantly higher ridership and somewhat improved cost effectiveness over Alternative 1. Extending one additional station to the Westwood/VA Hospital Station would serve this major regional center and provide an important access point to the regional transit system that is located west of the I-405 Freeway.

Options Recommended for Approval

- Option 2- Wilshire/Fairfax Station- This Station is recommended to be located at the east location adjacent to the cluster of cultural institutions surrounding the Los Angeles County Museum of Art. There is strong community support for locating this station farther to the east so that better access and land use integration can be provided to this regional center.

- Option 3- La Cienega Station- This station is recommended to be located at the east location between La Cienega and San Vicente Boulevards. This is the preferred location for the City of Beverly Hills because it is located farther from homes in a denser, more commercial area than the other station location to the west of La Cienega. This location also provides excellent connections to two major north-south arterials, La Cienega and San Vicente Boulevards.

- Option 4- Century City to Westwood Alignment- The East Alignment is recommended to be carried forward and the Central and West Alignments are recommended for deletion. The West alignment is significantly longer than the other two, and would increase travel time between Century City and Westwood by more than two minutes. This, in turn, would lead to somewhat lower ridership and user benefits, and to fewer air quality and energy conservation benefits. The West Alignment Option would also increase capital costs by $122-142 million in comparison to the East Alignment Option. Between the Central and East Alignment Options, both have similar performance characteristics and costs. The East Alignment, however, passes under significantly fewer homes. Therefore, the East Alignment Option is recommended to be carried forward.

Options Not Recommended for Approval

- Option 1, Wilshire/Crenshaw Station- This station is not recommended for inclusion in the LPA. This station would be located in the Park Mile section of Wilshire Boulevard adjacent to lower density land uses that are not planned for future growth in the adopted Community Plan and Park Mile Specific Plan. The potential station site is only ½ mile from the existing Wilshire/Western Station and does not serve a major north south intersection as Crenshaw Boulevard terminates at Wilshire Boulevard and does not extend to the north. Because this is a comparatively lower ridership station with a cost of $153 million, deleting the station improves the cost-effectiveness of Alternative #2 from $33.58 to $31.96 (lower is better). This would help the project come closer to the $31.00 FTA New Starts Program threshold for cost-effectiveness. Furthermore, future connections from the Westside Subway stations along Wilshire Boulevard to the planned Crenshaw/LAX LRT project to the south have been recommended to take place at La Brea, La Cienega or San Vicente rather than at Wilshire/Crenshaw.

- Option 3- West Hollywood Connection Structure- This structure would be located near Wilshire/Robertson in Beverly Hills and would preserve the option for a

future heavy rail connecting line through West Hollywood. This structure is not recommended for inclusion in the LPA. The cost of $135 million is not within the available funding reserved through the LRTP for the project. Additionally, the heavy rail option for the West Hollywood line did not perform as well as anticipated when evaluated against FTA New Starts criteria in the DEIS/DEIR. As such, the high cost of the connection structure is not sufficiently justified when there may be alternative, less costly, solutions to serve the route through West Hollywood. While the DEIS/DEIR identifies that the West Hollywood line has very high potential as a transit corridor, further study is needed to determine if a more cost-effective transit alternative such as light rail subway may provide a project that would be more competitive under federal funding criteria. If such an alternative were selected in the future, there would not be the need for a heavy rail connection structure.

Options Recommended for Further Study

- Option 4- Century City Station- Both the Santa Monica Boulevard and Constellation Station Options are recommended to be carried forward for further study before a preferred station location is selected. The DEIS/DEIR geotechnical studies determined that the station option at Santa Monica Boulevard/Avenue of the Stars would be located directly above a seismic fault. Because this fault had not been fully mapped in the past, extensive additional geotechnical borings and testing have been conducted as a part of the DEIS/DEIR to better understand the characteristics of this fault. The analysis completed by the release date of the DEIS/DEIR has not led to a conclusive recommendation regarding the feasibility of a station at this location. The Santa Monica/Avenue of the Stars Station has been strongly supported by the City of Beverly Hills. The Constellation Station Option is located away from the seismic fault and was supported by the majority of commenters in meetings held outside of Beverly Hills. It is, however, strongly opposed by Beverly Hills because the alignments between Beverly Hills and Century City would need to pass beneath the Southwest Beverly Hills Homeowners Association and Beverly Hills High School. Further analysis along the route of the Constellation Station Option is required to more specifically address the concerns of this community.

- Option 4- Beverly Hills to Century City Alignments- Of the two alignments that serve the Constellation Station, the Constellation North alignment is recommended for further study and the Constellation South alignment is recommended for deletion. The Constellation North alignment would pass beneath four residential properties while the Constellation South alignment would pass beneath 23 residential properties and the Good Shepherd School. Both alignments have similar performance characteristics and costs. Therefore, the route that passes under fewer properties is recommended to be carried forward for further study. The alignment that follows Wilshire Boulevard and Santa Monica Boulevard is also recommended to be carried forward for further study.

- Option 5- Westwood/UCLA Station- Both the On-Street and Off-Street Station Options are recommended to be carried forward for further study. The Off-street Station Option was initially preferred as it would allow construction to occur in a secure construction site off-street in the UCLA owned Lot 36 on the north side of Wilshire Boulevard between Veteran and Gayley Avenues. Off street construction would reduce traffic impacts that would occur if the station were to be constructed under Wilshire Boulevard. New development projects in Westwood Village, however, have made the proposed Off Street Station Option route along Lindbrooke Drive more difficult and could add significantly to the costs of this option. At this time, land use issues are pending that would need to be resolved in the project's favor, if the off-street station option were to remain affordable within the LRTP budget. Therefore, it is recommended that both options be carried forward until outstanding land use issues are decided.

- Option 6- Westwood/VA Hospital Station- Both the North and South Station Options are recommended to be carried forward for further study. Although the South Station Option is immediately adjacent to the VA Hospital and would provide better access to this important regional center, concerns have been expressed by the Department of Veterans Affairs that a station at this location would generate impacts to the hospital and increase activity and congestion in this already heavily used portion of the VA property. The South Station Option is $92 million less expensive than the North Station Option and provides a straighter, more direct route for the subway line. Further study is therefore recommended to more fully address these concerns and to develop more detailed plans to demonstrate how a transit station on the VA campus can support the mission of that facility.

Contract Actions

In June 2007, the Board approved the award of the contracts with PB Americas and The Robert Group to prepare the necessary engineering, environmental and community outreach for environmental clearance of this transit corridor extension. The contracts contained a base scope of work for the AA Study and several options for subsequent phases of the work. Option 1 for PB America's contract for the Draft EIS/EIR and Advanced Conceptual Engineering as well as Option 1 for The Robert Group's contract for facilitation of community outreach were exercised in January 2009.

The Draft EIS/EIR contracted work is now complete and the subsequent options listed below need to be exercised to complete environmental clearance, PE and the facilitation of community outreach in support of these activities.

PB Americas, Inc
Option #2- Final EIS/EIR
Option #3-Ongoing Advanced Conceptual Engineering & Preliminary Engineering

The Robert Group
Option #2 – Community Facilitation and Outreach for Final EIS/EIR and PE

Draft EIS/EIR Environmental Process and Community Participation

The Draft EIS/EIR was initiated in March 2009 with the publication of the Notice of Intent (NOI) in the Federal Register and the Notice of Preparation (NOP) being sent to the California State Clearinghouse on March 24, 2009.

The Public Scoping Period extended until May 7, 2009 during which time six scoping meetings were held, which were attended by 342 people. We also conducted an ongoing series of community updates in August and October 2009, and April and June 2010 on various topics.

In total more than 2,500 people have attended community meetings during the Draft EIS/EIR phase of the project and provided input into the ongoing refinement of project alternatives. The Project Team reached out to the media in anticipation of the public meetings and held a media briefing via a web-based conference system for newspapers, print, broadcast, and digital media. In addition, meeting notifications were posted to the Westside Subway Extension Facebook group.

The 45-day Public Comment Period for the Draft EIS/EIR extended from September 3rd through October 18th. Five Public Hearings on the Draft EIS/EIR were held between September 20-29, 2010. More than 550 people attended the hearings held throughout the study area with 115 people providing verbal testimony and an additional 29 written comments received. All written and online comments received during that time as well as the verbal Public Hearing testimony will be summarized in the oral briefing to the Board this cycle and responded to in the Final EIS/EIR.

Project Management

Countywide Planning continues to lead the environmental work and manage the effort to obtain a Record of Decision from the FTA. Construction will lead the Preliminary Engineering, Final Design and Construction phases. Countywide Planning will continue their support to ensure that the requirements of the environmental document are carried through the project's design and construction phases.

FINANCIAL IMPACT

The Options will cost approximately $49,281,447 of which $20,000,000 in State Repayment of Capital Project Loans is included in the FY11 budget in Cost Center 4350 (Westside Area Team), Project 465518 (Westside Subway Extension) Account 50316 (Services Professional/Technical). The FY11 Budget will be amended to add

$5,000,000 in State Repayment of Capital Project Loans to Project # 865518 (Westside Subway Extension), in Cost Center 8510 (Construction Project Management), and Account 50316 (Services Professional/Technical). These funds will be used to commence PE upon FTA authorization. Since Project 465518 is a multi-year project, it will be the responsibility of the cost center manager and the Executive Director, Countywide Planning for budgeting expenditures in future years. Budgeting in future years for Project 865518 is the responsibility of the cost center manager and the Deputy Chief Capital Management Officer.

Impact to Bus and Rail Operating and Capital Budget

The funding for these options is our State Repayment of Capital Project Loans account which are funds derived from previous reimbursements to us from State Letters of No Prejudice agreements on various capital projects, which we are free to use on other capital projects. Although eligible for bus and rail operating and capital expenditures, these funds were assumed in the LRTP for the Westside Subway Extension since this project is not eligible for Propositions A and C funding (due to the proposed tunneling element of the project) and is not eligible for Measure R funding at this time. Other potentially eligible sources (TDA Article 4 and State Transit Assistance) are used for bus and rail operations and were, therefore, not considered.

ALTERNATIVES CONSIDERED

The Board could consider:

1. Choosing not to approve Alternative 2 with the options and alignments recommended for further study in the Final EIS/EIR as the designated LPA and instead select a different alternative or a different set of station and alignment options for further study;

2. Choosing not to award the contract options to proceed with the next phase of engineering design, environmental clearance and outreach.

These options are not recommended because the technical analysis and community outreach conducted to date reflects that the recommended LPA meets the criteria for entry into the FTA New Starts Phase of Project Development, is affordable under the LRTP, and has a high degree of public support. Moving forward with the Final EIS/EIR will allow us to conduct the technical studies necessary to determine more defined project costs, impacts, and benefits. Deferral of further study would delay the project, would preclude further efforts to qualify for state and federal funding grants, and would not meet the schedule set forth in the 30/10 Initiative.

Alternatives Not Selected

During the Draft EIS/EIR and the earlier AA Study, we evaluated a possible further westward extension of the Subway beyond Westwood into Santa Monica, as well as an alignment from the Metro Red Line Hollywood/Highland station through West Hollywood along Santa Monica Boulevard, turning south to serve the Beverly Center area and joining the Wilshire portion of the Westside Subway Extension near La Cienega.

The Project Team found that both of these corridors performed very well in our analysis, demonstrating strong potential to be successful rail transit lines in the future. Additionally, there is significant public support for these extensions. Both are included in the Strategic Element of the 2009 LRTP. Therefore, further study could occur should funding be identified and secured for them in the future.

NEXT STEPS

Upon Board approval, Alternative #2 with the recommended station and alignment options identified in the LPA will be included for environmental analysis in the Final EIS/EIR and PE. We will continue our strong community outreach efforts during these phases. Additionally, we will submit our request for authorization to enter the PE phase of New Starts Project Development to the FTA. As the Final EIS/EIR progresses, we will provide periodic Board updates.

ATTACHMENTS

A. Draft EIS/EIR Executive Summary
B. Recommended Locally Preferred Alternative
C. PB Americas Procurement and Small Business Participation Summaries- Final EIS/EIR/PE contract
D. The Robert Group Procurement and Small Business Participation Summaries- Facilitation of Community Outreach contract

Prepared by: David Mieger, Deputy Executive Officer- Planning
Jody Feerst Litvak, Community Relations Manager
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Renee Berlin, Executive Officer, Transportation Development and Implementation

Martha Welborne, FAIA
Executive Director, Countywide Planning

K.N. Murthy, P.E.
Deputy Chief Capital Management Officer

for Arthur T. Leahy
Chief Executive Officer

ATTACHMENT 5

Geotechnical Engineering Report – Shannon and Wilson

Geotechnical Engineering Report
Westside Subway Extension
Review of Draft Environmental Impact Report
Beverly Hills, California

October 13, 2010

SHANNON & WILSON, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Excellence. Innovation. Service. Value.
Since 1954.

Submitted To:
Mr. Aaron Kunz
City of Beverly Hills
345 Foothill Road
Beverly Hills, CA 90210

By:
Shannon & Wilson, Inc.
706 W. Broadway, Suite 201
Glendale, California 91204

51-1-10024-001

EXECUTIVE SUMMARY

A summary of our review of geotechnical and tunneling aspects of the WSE DEIS/DEIR is provided below. Details of our findings are provided in the report in the following sections below. The following are issues we believe are of importance (and ranked below) to the City:

Construction Traffic (Sections 3.4.2, 3.4.7. 4.7, and 4.11): The City should evaluate the potential staging areas locations near stations and the connection structure during the construction phase as significant construction traffic is expected.

Fault Rupture (Sections 3.2.2 and 4.3): Additional studies to resolve the fault rupture potential at the Santa Monica Station, which according to the DEIS/DEIR, is the primary reason for the Constellation options.

Subsidence (Sections 3.2.5 and 4.6): Some ground loss and resulting settlement is inevitable during tunneling and station construction; thus, an extensive monitoring program should be in place before excavation of the project commences.

Dewatering (Sections 2.6, 3.2.7, 3.4.5, 4.7, and 4.8): Large quantities of groundwater may be disposed of into the City's wastewater systems during dewatering. Dewatering could potentially move contamination plumes towards the alignment and beneath adjacent structures.

Noise and Vibration (Sections 3.2.8): Construction noise and vibration are anticipated and could be minimized by using sound proofing materials, equipment, and other measures. Nevertheless, some residents could notice nighttime noise and vibration.

Hazardous Waste and Materials (Sections 3.2.7, 4.7, and 4.8): Documented and undocumented wells could be a hazard from cutting through any abandoned oil wells that releases methane and/or hydrogen sulfide.

Obstructions (Section 3.4.6): TBMs do very poorly with obstructions such as de-tensioned tiebacks, wood (timber piles and logs), steel oil well casings, nests of boulders, etc. Provisions should be made before excavation to deal with these obstructions.

Hazardous Subsurface Gas (Section 3.2.6): Earthquakes are a risk for gas release, either through cracking of liners or walls, offset of gasketed tunnel liner joints, and/or disabling the ventilation system.

Liquefaction (Sections 3.2.4 and 4.5): We recommend that the potential depth of liquefaction be investigated in more detail to at least 20 feet below the lowest expected tunnel invert or foundation elevation.

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FIGURES

APPENDICES

ABBREVIATIONS AND ACRONYMS

BHHS	Beverly Hills High School
CDF	Controlled Density Fill
CY	Cubic Yards
DEIR	Draft Environmental Impact Report
DEIS	Draft Environmental Impact Statement
DMG	California Division of Mines and Geology
DOGGR	State Division of Oil, Gas and Geothermal Resources
EDR	Environmental Data Resources, Inc.
EPBMs	Earth Pressure Balance Machines
FEIR	Final Environmental Impact Report
FEIS	Final Environmental Impact Statement
GPM	Gallons Per Minute
MDE	Maximum Design Earthquake
ODE	Operating Design Earthquake
PGA	Peak Ground Acceleration
ROWs	Right of Ways
SPBMs	Slurry Pressure Balance Machines
TBMs	Tunnel Boring Machines
USGS	U.S. Geological Survey
WSE	Westside Subway Extension

GEOTECHNICAL ENGINEERING REPORT
WESTSIDE SUBWAY EXTENSION
REVIEW OF DRAFT ENVIRONMENTAL IMPACT REPORT
FOR THE CITY OF BEVERLY HILLS, CALIFORNIA

1.0 INTRODUCTION

1.1 General

This report presents the results of our review of geotechnical and tunneling aspects of the Westside Subway Extension (WSE) Draft Environmental Impact Statement (DEIS) and Draft Environmental Impact Report (DEIR). The DEIS/DEIR was prepared by the Los Angeles County Metropolitan Transportation Authority (Metro) and was released to the public via the Metro website on September 3, 2010.

There is a 45-day period for review and comment of the project DEIS/DEIR. The City of Beverly Hills (City) requested our technical review of the DEIS/DEIR for the WSE alignment for the geotechnical and tunneling aspects of the project within the city limits. The limits are shown in Vicinity Map, Figure 1. These technical comments will be incorporated into the City's response to the DEIS/DEIR. The following sections present a brief description of the entire WSE project followed by our scope of services.

1.2 Overall Project Description

The proposed WSE will be a heavy-rail subway connecting to the existing Wilshire/Western station at the Red Line. The proposed alignment travels west along Wilshire Boulevard through Beverly Hills and westward into the Century City and Westwood areas of Los Angeles. Ultimately, the new subway will extend into Santa Monica. A second branch line called the West Hollywood Connection is under consideration starting from the existing Red Line at the Hollywood/Highland station, passing through West Hollywood along Santa Monica Boulevard, and connecting to the Wilshire Boulevard alignment in eastern Beverly Hills.

1.3 Scope of Services

Our geotechnical scope of services is presented in our proposal dated September 16, 2010. The purpose of our services is to evaluate the DEIS/DEIR from a geotechnical and tunneling perspective and provide technical review comments to the City. We completed the following scope of services for the project alignment within the City:

- Review the adequacy of soil, geotechnical, and tunneling safety chapters/sections of the Westside Subway Extension DEIS/DEIR. Specific area of interest include tunneling under Beverly Hills High School (BHHS) and constructing a station on Santa Monica Boulevard in Century City, adjacent to the west City limit and an active fault;
- Review the geologic hazards;
- Review City documents relating to oil wells located under BHHS;
- Identified potential impacts to the City from the tunneling and potential mitigation measures, including noise and vibrations and hazardous materials;
- Provided recommendations for additional studies for the Final Environmental Impact Statement/Report (FEIS/FEIR),
- Identified areas of further study, surveys, testing, soil borings, etc. for Metro to conduct as part of the final DEIS/DEIR;
- Summarize our reviews, technical comments for the City's response to the DEIR/DEIS, and other findings in this report, and;
- Present our findings at two meetings.

2.0 PROJECT STUDY AREA

2.1 General

This section describes the project routing and alternates within the City. The DEIR describes a "base" alignment and stations shown as red in Figure 1. Alternate alignments, shown as blue in Figure 1, and stations are also under consideration. Aerial photographs of the base and alternate alignments and stations through the City are shown in Figure 2. Our descriptions follow the project stationing from east to west, and Sheet references below are for Figure 2.

We also completed a brief site reconnaissance of the alignment and reviewed the geology of the City, including potential faults. We also reviewed the City's hazard information published in 2004.

2.2 Base Alignment and Stations

Within the City, the base alignment follows Wilshire Boulevard from San Vicente Boulevard (Sheet 1 of Figure 2) west to Santa Monica Boulevard (Sheet 6). The alignment then turns southwest on Santa Monica Boulevard and continues westward into Century City (Sheet 7). The base alignment largely occupies the Wilshire and Santa Monica Boulevards right-of-ways (ROWs).

The base alignment for the West Hollywood Connection enters the City in a southerly direction near the intersection of Clifton Way and Doux Road (Sheet 2). The alignment curves westward beneath residential areas bounded by Clifton Way, Doux Road, Wilshire Boulevard, and Robertson Boulevard (Sheets 2 and 3). The base alignment of the West Hollywood Connection joins the Wilshire Boulevard base alignment at a connection structure between Robertson Boulevard and Swall Drive (Sheet 3).

The base stations include the Wilshire/La Cienega Station (Sheet 1) and the Wilshire/Rodeo Station (Sheet 5). Both stations are within the Wilshire Boulevard ROW.

2.3 Alignment and Station Options

2.3.1 Wilshire/La Cienega Station Option

An option to the Wilshire/La Cienega base station located east of the La Cienega Boulevard intersection is on the west side of this intersection (Sheet 1). For this option, the West Hollywood Connection enters the City in a southerly direction near the San Vicente Boulevard and Gale Drive intersection (Sheet 2). The alignment curves westward beneath mixed residential and commercial areas south of this intersection between San Vicente and La Cienega Boulevards (Sheets 1 and 2). The West Hollywood Connection joins the Wilshire Boulevard base alignment at the east end of the Wilshire/La Cienega Station Option (Sheet 1).

2.3.2 Constellation Station Option

West of the City are two alternatives for the Century City Station. Along the base alignment, the base station is at the intersection of Santa Monica Boulevard and Avenue of the Stars in Century City. The Constellation Station option is located at Constellation Boulevard and Avenue of the Stars. For the Constellation Station option, there are two alignment options that approach from the east: Constellation North and South. Both alignment options deviate southward from the base alignment on Wilshire Boulevard in the City (Sheet 6).

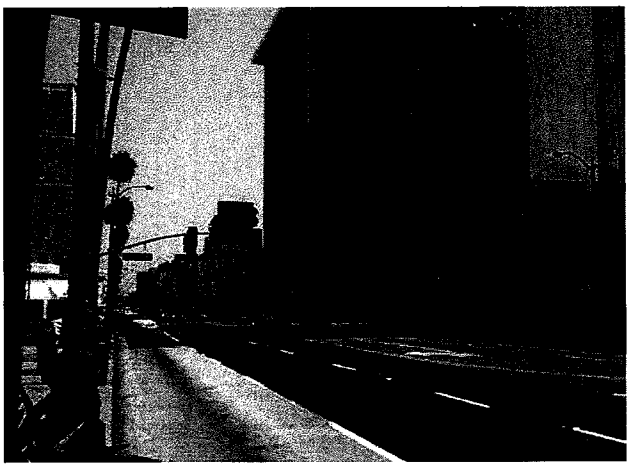
The Constellation North option curves south from Wilshire Boulevard near the Linden Drive intersection to Lasky Drive at the Charleville Boulevard intersection (Sheet 6). The alignment then curves southwestward south of the Robbins Drive intersection. The alignment crosses the BHHS campus immediately south of the Moreno and Young Drives intersection (Sheet 8) to join the Constellation Boulevard alignment in Century City.

The Constellation South option curves southwestward from Wilshire Boulevard at the Bedford Drive intersection (Sheet 6). This alignment maintains this direction and crosses the BHHS campus at the Moreno and Young Drives intersection (Sheet 8) to join the Constellation Boulevard alignment in Century City.

Both alignment options cross beneath commercial and residential areas. These areas are roughly bounded by Lasky Drive, Wilshire Boulevard, Bedford Drive, Gregory Way, and the BHHS campus.

2.4 Site Reconnaissance

As part of our study, a site reconnaissance was performed along the WSE alignment through the City on September 18, 2010. Particular attention was paid in the areas near the proposed Wilshire/La Cienega and Wilshire/Rodeo stations and the proposed connection structure at Wilshire and Robertson. Brief observations were made of the buildings in these areas and the distances from edge of sidewalk to edge of sidewalk (essentially property line to property line) were measured across Wilshire Boulevard at these locations. In general, distances from edge to edge of sidewalk were approximately 95 feet (measured by pace) perpendicular to Wilshire Boulevard. Buildings appear to date back to the early 1920's based on construction type and architecture. Newer construction was present along various locations including buildings that were constructed within the last decade. In most cases the building fronts extend to the edge of the sidewalks with little if any setback. Photographs 1 through 3 below show typical development along various portions of the base alignment.



Photograph 1 – View of Wilshire and Beverly Boulevards intersection looking east in the area of the proposed station.

Photograph 2 – Intersection of Robertson and Wilshire Boulevards looking east in the area of the proposed connection structure.

Photograph 3 – Intersection of La Cienega and Wilshire Boulevards looking east in the area of the Wilshire/La Cienega Station.

2.5 Study Area Geology

Within the City portion of the WSE alignment, the subway will transect primarily alluvial deposits of Recent to Older Quaternary age as shown in the Geologic Map, Figure 3. Based on readily available maps, The DEIR, and our experience in the area, the surficial geologic units include three principal units from young to old: young alluvial fan deposits, alluvial fan deposits, older alluvial fan deposits. At depth, the alignment is likely to cut through older alluvial deposits and Lakewood Formation.

In general, these deposits were created during uplift of the Santa Monica Mountains and are derived from sediments that were shed during uplift events and subsequent erosion from the local streams that drain the south flank of the Hollywood Hills. These drainages include Benedict, Franklin, Coldwater and Laurel Canyons. Sediments of the young alluvial units are likely composed of sand silt and gravel with trace amounts of clay. Density of the younger near surface materials is likely to be relatively loose with an increase in density as depth increases. The Older Alluvium and Lakewood Formation are typically composed of relatively dense materials having settled over a period of hundreds of thousands of years.

2.6 Groundwater

From our experience in the City, the soils on the east side of the City (in the vicinity of Robertson Boulevard) are mostly clays and water infiltration into an excavation is slow. These soils could be difficult to dewater. The alluvial soils on the west side of Beverly Hills are very sandy, highly permeable and large quantities of groundwater (on the order of several hundred gallons per minute) are developed during dewatering. The Santa Monica and Hollywood faults (described below) are known groundwater barriers. Significant variations in the depths to groundwater occur on either side of the faults. The groundwater is typically shallow on the north side and deep on the south side of the faults.

Based on the geologic sections in the DEIR, groundwater ranges from approximately 10 feet below ground surface on the eastern side of the City alignment to approximately 50 feet below ground surface near Rodeo Drive.

2.7 Faults

Known faults that could affect the WSE alignment within or nearby the city include the Santa Monica fault zone and possibly the West Beverly Hills Lineament (which may be related to the Newport-Inglewood fault zone). The WSE alignment is crossed by these poorly defined fault zones as shown in Figure 4. Another nearby fault is the Hollywood fault zone, although as currently interpreted it would not intersect the alignment. The Santa Monica and Hollywood Faults are located along the southern flank of the Santa Monica Mountains and cut the recent and older alluvial deposits that will be penetrated by the WSE alignment. Both the Hollywood and Santa Monica faults are thought to be a part of the larger Malibu-Santa Monica-Hollywood-Raymond Hill fault zone, which extends from Malibu to east Pasadena.

Within the area of the City's WSE alignment, the Hollywood Fault and Santa Monica Fault are thought to be offset from one another by a northwest trending structure known as the West Beverly Hills Lineament. The West Beverly Hills lineament has been inferred as the northernmost segment of the active Newport-Inglewood fault zone. The lineament acts as a segment boundary for the active left-lateral Santa Monica–Hollywood fault system and bounds the Hollywood basin to the west (Tsutsumi and others, 2001). The Hollywood and Santa Monica faults are separated by approximately 1.5 to 2 km along this lineament. Based on a limited internet search, there appears to be relatively little, if any conclusive field data (i.e. trenching, outcrop) that displays the location of a fault representing the West Beverly Hills Lineament. Based on the maps prepared for the Draft EIR the location West Beverly Hills Lineament should cross the base alignment between Stations 310+00 and 330+00. If the fault does indeed exist within the sediments that will be tunneled, additional trenching should be completed prior to the final design to determine the location and potential amount of seismic event offset.

It should be noted that these only represent the known faults. Evidence of additional faulting may be revealed during the more detailed explorations needed for the preliminary and final design work. During explorations for the Metro Goldline Eastside Extension, a potentially active thrust fault was discovered in the vicinity of the planned station at First and Soto Streets (Habimana, Elioff, and Moriwaki, 2006). This fault is thought to be coincident with what is now called the Coyote Pass Escarpment, a low linear ridge that trends roughly east-west through east Los Angeles.

2.8 City Hazard Information

We reviewed the City of Beverly Hills "Hazard Mitigation Plan" (City Plan) that was last updated in September 2004. Section 6 of the City Plan describes earthquakes including a recent Magnitude (M) 4.2 earthquake near the City on September 9, 2001. This earthquake appears to have occurred on the north end of the Newport-Inglewood fault. The West Beverly Hills Lineament may be a northerly extension of this fault. Other recent, larger earthquakes that affected the City include the 1994 Northridge (M 6.7) and 1987 Whittier Narrows (M 5.9) earthquakes. The 1994 Northridge earthquake resulted in several red-tagged buildings in the City.

The City Plan identifies three faults that are considered a "potential danger" to the City:

- The Newport/Inglewood Fault;
- The Santa Monica Fault, and;

- The Hollywood Fault.

In addition to the past earthquakes and faults in the City, the City Plan describes other hazards associated with earthquakes hazards including ground shaking, landslides, and liquefaction. Ground shaking from a large, nearby earthquake would likely be felt throughout the City, with the potential for damage higher in weak and/or thick deposits of soil when compared to bedrock. The alignment passes through similar soil deposits. The potential for landslides is likely confined to steep slopes, well to the north of the alignment. Liquefaction zones affect about 1,000 buildings in the City and are shown in the eastern portion of the City. The zone includes the WSE base alignment on Wilshire Boulevard largely east of Robertson Boulevard.

3.0 TECHNICAL REVIEW

3.1 Reviewed Reports

For our technical review, we completed a brief review of the pertinent documents contained on the Metro website for the DEIS/DEIR. The documents include an executive summary, eight chapters and a reference section, six appendices, and nine technical reports. Of these documents, we obtained relevant technical information from:

- The DEIR Executive Summary;
- Chapter 4 titled "Environmental Analysis, Consequences, & Mitigation" (DEIR Chapter 4);
- Appendix A titled "Plans, Profile, and Typical Sections" (DEIR Appendix A);
- Appendix B titled "Station Site Plan Report" (DEIR Appendix B), and;
- Appendix E titled "Construction Methods" (DEIR Appendix E);

In the "Visual Aesthetics Resources Impact Technical Reports" section:

- No. 11 "Noise and Vibration Technical Report" (DEIR Noise and Vibration Report), and;
- No. 13 "Geotechnical and Hazardous Materials Technical Report" (DEIR Geotechnical Report).

The appendices for the DEIR Geotechnical Report were not included on the Metro website. We received a copy of the appendices electronically from Metro on September 21, 2010. The appendices include subsurface profiles for the WSE alignment. We have included a portion of these subsurface profiles within the City in Appendix A of this report. The second appendix is

the Environmental Data Resources, Inc. (EDR) database search that is part of the Hazardous Waste and Materials section of the DEIR Geotechnical Report. Because of the large volume of this document, we have not included this report as an appendix. However, we could provide an electronic copy of the EDR report, if requested.

3.2 Environmental Impacts

3.2.1 General

The following sections present environmental impacts from the DEIS/DEIR that are relevant to the geotechnical and tunneling studies through the City. For each environmental impact identified below, we provide the relevant information to the City and source in the DEIS/DEIR, and our opinion of the mitigation measures presented in the DEIS/DEIR. The impacts are listed in the order they appear in Tables S-5 and S-6 of the DEIR Executive Summary. For purposes of brevity, we have combined the operational and construction impacts that are presented separately in the DEIR. We have noted our opinions and possible errors within the DEIR that should be conveyed to Metro for preparation of the FEIS/FEIR.

3.2.2 Surface Fault Rupture

Surface fault rupture, described in the "Seismic" section of Table S-5 of the DEIR Executive Summary, is separated from ground shaking (next section below). The DEIR Executive Summary describes the WSE alignment crossing the Santa Monica Fault and the West Beverly Hills Lineament. For the latter, the crossing is in "the vicinity of the intersection of Moreno Drave (sic) and Santa Monica Boulevard" which is at the west city limit. Additional details for surface faults are provided in:

- Part 3 of DEIR Chapter 4 pages 4-148, 4-149, and 4-161, and;
- Sections 3.2.4, 3.2.6, 4.4.1, and 5.1.1 of the DEIR Geotechnical Report.

The DEIR Geotechnical Report indicates that the Santa Monica Fault runs approximately along Santa Monica Boulevard from about Avenue of the Stars westward (Figure 4). This report also describes the uncertainty as to the presence, characteristics, and activity of the West Beverly Hills Lineament. The report states that the Santa Monica Fault has not been included in the State of California Alquist-Priolo Special Studies Zone (A-P Zone) due to "the absence of well-defined fault traces." Further evaluation of both faults (including location, width of fault zone,

and expected offset) will be performed during the design study. Surface fault rupture during operations is a significant impact for the project and a remote impact for construction.

The DEIR states that based on geophysical studies being completed by the geotechnical consultant, a strand of the Santa Monica Fault extends from Avenue of the Stars west to Westwood Boulevard essentially along the WSE alignment of Santa Monica Boulevard. If the eastern terminus of this strand (as identified at Avenue of the Stars) is truncated by the West Beverly Hills Lineament, then surface fault rupture from the Santa Monica Fault within Beverly Hills should be limited to that portion of the fault which is west of the lineament. The DEIR indicates that there is a current geophysical study that is aimed at identifying the location of the western strand of the Santa Monica fault.

The West Beverly Hills Lineament has been theorized as a tear fault between the Santa Monica and Hollywood faults. Based on mapping included in the DEIR, and by Pratt and others (1998), the fault or lineament trends parallel to, and along, the western City limit. Based on the current information, the lineament would cross the main alignment immediately west of the City, approximately 1600 feet west of the intersection of Santa Monica Boulevard and Wilshire Boulevard. However, the location of this fault (if it exists) has not been well defined. Based on this uncertainty, it may be that an actual rupture zone could physically lie within the extreme western edge of the City boundaries. The DEIR indicates that further evaluation of the lineament will be completed during the forthcoming design level investigation for the project. This work should be targeted on identifying the exact location of the fault, if it exists, and the potential for rupture.

Mitigation measures for the subway alignment include a "Seismic Section" which could include an oversized tunnel section, flexible liners, monitoring systems, and easily repairable support systems for the trackwork across the fault. The DEIR Executive Summary notes that operational safety from surface fault rupture "cannot be entirely mitigated." For the stations, avoidance of the fault zone is described as a practical means in DEIR Chapter 4.

We concur with the mitigation measures for the tunnels and stations presented in the DEIR for surface fault rupture. The Santa Monica Fault is not included in an A-P Zone. The nearby Hollywood Fault has been zoned as active by the City of West Hollywood. Given the uncertainty of the Santa Monica Fault and West Beverly Hills Lineament, evaluation of these

structures is critical to the geotechnical design of the project. For the City, this is of particular concern for the base station at Santa Monica Boulevard in Century City.

On page S-62 of the DEIR Executive Summary, the Constellation Station option is "farther from the (Santa Monica) fault and would have a lower seismic risk" than the Santa Monica base station. The potential for the Santa Monica fault to cross through the Santa Monica base station is the primary reason given in the DEIR for consideration of the Constellation station and alignment options.

3.2.3 Seismic Ground Shaking

Under "Seismic," Table S-5 of the DEIR Executive Summary states that structural elements would be designed and constructed to resist or accommodate site-specific ground motions. The section also states that Metro Design Standards include an Operating Design Earthquake (ODE) and Maximum Design Earthquake (MDE). Additional details for ground shaking are provided in:

- Part 3 of DEIR Chapter 4 pages 4-149, 4-150, 4-161, and 4-167, and;
- Sections 3.2.6, 4.4.2, 5.1.1, 5.1.2, and 5.2.1 of the DEIR Geotechnical Report.

In the DEIR Chapter 4, the project would have no adverse impact on ground shaking generated from earthquakes, nor would it exacerbate pre-existing seismic conditions. Peak ground acceleration (PGA), a measurement of ground shaking, is used to define the Metro Design Standards shaking levels. The ODE has a 50 percent chance of exceeding a specified PGA in 100 years and the MDE has a 1 percent chance of exceeding a specified PGA in 100 years. For the entire alignment, the PGA associated with the ODE ranges from 0.26g to 0.32g (g = acceleration from gravity) and the MDE ranges from 0.81g to 0.98g. The DEIR Geotechnical Report notes that the PGA between 0.40g and 0.60g has a 10 percent chance of exceedance in 50 years along the alignment.

Mitigation measures for the subway alignment include designing to the ODE and MDE per the Metro Design Standards. The DEIR Geotechnical Report also recommends that site-specific ground motions conform to this code as well as all applicable federal, state, and local building codes. This report also states that "Metro is currently developing ground motion response spectra suitable for design of the project facilities." Once mitigated, collapse from seismic ground shaking is not expected for the project.

We concur with the mitigation measures for the tunnels and stations presented in the DEIR for ground shaking. We reviewed the PGA's for the various DEIR design earthquake levels within the City based on the U.S. Geological Survey (USGS) website (Petersen, 2008):

- For 50 percent probability of exceedance in 100 years (ODE): PGA is 0.24g with an approximate recurrence interval of 144 years.
- For 10 percent probability of exceedance in 50 years: PGA ranges from 0.44g to 0.45g with an approximate recurrence interval of 475 years
- For 1 percent probability of exceedance in 100 years (MDE): PGA ranges from 1.20g to 1.37g with an approximate recurrence interval of 9,950 years.

We noted a discrepancy in the design earthquake probabilities for the MDE. The PGA and recurrence interval values stated in DEIR Chapter 4 for the MDE are consistent with a design earthquake having a 2 percent probability of exceedance in 50 years. For the alignment within the City, this results in a PGA ranging from 0.82g to 0.89g with an approximate recurrence interval of 2,475 years. These values are consistent with the MDE information provided in DEIR Chapter 4 and, based on our experience, are typically used by other agencies to calculate the maximum credible earthquake (e.g., International Building Code). Therefore, the 1 percent probability of exceedance in 100 years for the MDE described in DIER Chapter 4 is likely an error.

For these various design earthquake levels, the source of the earthquake event is typically generated by a fault that is between about 1 and 15 kilometers (about 0.5 to 9 miles) distant and is capable of generating an earthquake with a Magnitude ranging from 6.7 to 6.9. Typically, the larger earthquake magnitude coupled with a closer source distance will generate a higher PGA associated with the more extreme probabilities (MDE in this case). Nearby faults that could be capable of generating these earthquakes include the Santa Monica, Hollywood, and Newport-Inglewood Faults (with the possible northward extension of the West Beverly Hills Lineament).

3.2.4 Liquefaction

Table S-5 of the DEIR Executive Summary states that the upper portions of some station walls would be impacted by liquefaction. Additional details for liquefaction are provided in:

- Part 3 of DEIR Chapter 4 pages 4-150, 4-162, and 4-164, and;
- Sections 3.2.6, 4.4.4, 5.1.1, and 5.1.2 of the DEIR Geotechnical Report.

An enlarged portion of the liquefaction map presented in DEIR Chapter 4 (Figure 4-48) is provided for the City portion as Figure 5. The tunnels within the City are proposed to be below potentially liquefiable soils, which the DEIR limits to Holocene-deposited (last 11,000 years) soil. However, liquefaction could impact the upper walls at the Wilshire/La Cienega base and option stations. The DEIR Geotechnical Report notes that "cohesionless granular sediment" in the upper 30 feet is most susceptible to liquefaction, but liquefaction is possible to 50 feet below the ground surface. The report states that "...tunnels will be driven below the potentially liquefiable Holocene section and into the underlying Pleistocene alluvium and Pleistocene Lakewood and San Pedro Formation sediments..." Settlement of stations from liquefaction is also unlikely given their depth (same as the tunnels), and because the alignment traverses relatively level terrain, lateral spreading is also not considered an impact. Also, the DEIR Geotechnical Report notes that the potential for liquefaction during station construction is "considered extremely remote."

Mitigation measures for the liquefaction include increasing the lateral loads to the upper walls at the Wilshire/La Cienega stations to compensate for the increased earth pressures from liquefaction. No mitigation measures are proposed for the tunnels from liquefaction.

We concur with the mitigation measures for the station walls presented in the DEIR for liquefaction. However, we disagree that liquefaction would not impact the tunnels or station foundations without additional geotechnical studies to conclude this assumption in the DEIR. In the "Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Liquefaction in California," the liquefaction depth is traditionally 50 feet (Martin and Lew, 1999). However, this report states that liquefaction has been known to occur at depth greater than 50 feet and that "there are situations where this depth may not be sufficiently deep." This report recommends that the liquefaction depth should be investigated to at least 20 feet below the lowest expected foundation elevation, in this case the tunnel invert and station foundation. If liquefiable soils are still present at these depths, the explorations should extend at least 10 feet deeper.

We reviewed the subsurface profiles through the City prepared in the DEIR (Appendix A). The profiles show older alluvium (Qalo symbol in profiles) and Lakewood Formation underlying the tunnels and station foundations. We concur that these geologic unit is generally denser and therefore less susceptible to liquefaction. However, the liquefaction potential in this

and other geologic units should be confirmed to at least 20 feet below the tunnel invert and station foundation.

3.2.5 Subsidence

Table S-5 of the DEIR Executive Summary states that "...Subsidence is not considered an impact during operations." Additional details for ground shaking are provided in:

- Part 3 of DEIR Chapter 4 pages 4-150, 4-162, and 4-163;
- Part 5 of DEIR Chapter 4 pages 4-270 through 4-274;
- Sections 3.2.6, 4.4.5, 5.1.1, and 5.1.2 of the DEIR Geotechnical Report, and;
- DEIR Appendix E.

In the DEIR Chapter 4, subsidence problems from petroleum or groundwater extraction in the WSE alignment vicinity have not been identified. The DEIR Geotechnical Report notes that subsidence from oil production in the Beverly Hills Oil Field was recorded between 1967 and 1969. The Beverly Hills Oil Field is shown in Figure 6. However, this subsidence is closely monitored and a water pumping program has arrested the subsidence.

The DEIR notes that subsidence due to tunneling and station dewatering during construction is a potential impact. Underground excavations less than 60 feet deep have been performed in the study area with minimal dewatering, while other areas have groundwater near the surface and potentially artersian conditions. DEIR Appendix E describes the potential for ground settlement from lateral movement of temporary excavation walls.

Mitigation measures for subsidence during construction from tunneling and station excavations include pre-construction surveys along the proposed alignment to document existing conditions of buildings and instrumentation to monitor subsidence during construction. The project recommends pressurized-face tunnel boring machines (TBMs) be used for tunnel construction and lining and ground injection installed immediately behind the TBM. For settlement from dewatering, the DEIR Chapter 4 notes that the soils in the corridor have previously undergone numerous cycles of groundwater fluctuations and therefore significant additional settlement from dewatering is not anticipated. This assumption would be confirmed during the geotechnical design phase, and additional mitigation measures would be employed should settlement from construction dewatering be an issue.

Where settlement from tunneling and/or dewatering is an issue, ground improvement measures or underpinning could be employed. If settlement during construction exceeds limits set by the construction documents, the work would be reassessed and modifications to the construction methods would be required. For shallow tunnels close to or below sensitive structures or other improvements, ground improvement measures could be required prior to tunneling, as was accomplished on the Metro Goldline. Lateral deflection of temporary excavation walls will require survey monitoring of the walls and adjacent ground surface.

We concur with the mitigation measures for the tunnels and stations presented in the DEIR for subsidence. Some degree of ground loss and resulting settlement is inevitable during tunneling and station construction. An illustration to estimate ground movement is shown in Figure 7. As most of the WSE base alignment along Wilshire Boulevard is shown from curb-to-curb, the settlement trough could extend under the buildings from the street.

Current tunnel construction methods utilizing closed-face TBMs (slurry pressure balance machines [SPBMs] and earth pressure balance machines [EPBMs]), when correctly used by experienced contractors and in consistent and favorable geologic conditions, are capable of stabilizing and supporting the ground so that settlements of less than 0.25 inch are possible, as exemplified by EPBM tunneling on the Gold Line Eastside Extension (Choueiry, Elioff, Richards, and Robinson, 2007). However, abrupt changes in geologic conditions, obstructions such as tiebacks or boulders, inexperienced TBM operators, and equipment problems could result in more adverse ground behavior causing excessive ground losses and unacceptable surface settlements above EPBM tunnels.

Although modern tunneling methods are a vast improvement over tunneling methods used as little as 20 years ago, excessive ground losses, and even sink holes, have been reported in discrete portions of several recent tunnel projects constructed with closed-face TBMs. Excessive ground losses have resulted in excessive surface settlements amounting to several inches as well as localized sinkholes amounting to several hundred cubic yards (CY) (Erwin, K. 2009, Heim, K. 2009, need a couple references – preferably for ECIS or NEIS in LA). Surface settlement monitoring, with closely space survey points on streets, utilities, and buildings, as well as ground deformation monitoring instrumentation placed in boreholes, will be needed to assess ground behavior during and after tunneling.

Another area for potentially large ground losses, resulting in unacceptable settlements, occurs as the TBM enters, proceeds through and leaves sections of curved alignment. Tunneling through curved alignment sections could result in steering problems with larger ground losses and resulting potential for surface settlement. In the City, this is the case for both West Hollywood Connection alignments and Constellation alignments.

Also, cross passages will likely be required at intervals of approximately 700 to 800 feet to meet federal safety standards. The excavation of cross passages will generally contribute to the ground loss and surface settlements. Cross passages are typically excavated with backhoes or similar excavators, through soils that could be stabilized prior to excavation by a variety of methods (dewatering, freezing, grouting, and/or pre-support). The resulting openings are incrementally supported with sprayed-on concrete (shotcrete) and reinforcing steel. Excavation of the cross passages is labor intensive, and ground movements or losses are a function of the effectiveness of the pre-support, experience of the labor force, and sequence and speed of the application of ground support. Consequently, there are abundant opportunities in layered, potentially wet and flowing soils to get excessive loss of ground and large surface settlements over the cross passages.

With proper construction methods that limit ground losses to acceptable limits, relatively small surface settlements of less than 1 inch could typically occur within 6 months of excavation being completed within 100 feet of a subject area. However, if poor, inadequate construction methods are utilized then larger, longer term settlements may occur. In rare instances, tunneling induced ground losses may lead to settlements that occur a year or more after excavation has been completed in the vicinity. Also, the use of timber lagging or backpacking left in place behind the final concrete liner may lead to excessive settlements as the timber deteriorates and compresses over a period of several years. In areas of loose or soft soils, permanent dewatering systems may also lead to long-term settlements as the soils consolidate under the increased effective soil pressures resulting from dewatering.

The use of closed-face tunneling methods substantially improved the mitigation of tunneling-induced ground losses and excessive surface settlements in variable soil conditions below the groundwater table. However, as discussed above, variations in soil conditions, TBM operation issues, and a lack of trained and experienced construction personnel could lead to excessive ground losses. Mitigations should include an identification of settlement sensitive

structures, monitoring of surface settlements, monitoring of subsurface ground losses with borehole instrumentation, monitoring of surface structure behavior, careful monitoring of excavated soil volumes, and implementation of ground improvement both prior to and during construction of the tunnels.

3.2.6 Hazardous Subsurface Gases

Table S-5 of the DEIR Executive Summary identifies methane and hydrogen sulfide gas from the subsurface as hazards during construction and operation. Additional details for subsurface gases are provided in:

- Part 3 of DEIR Chapter 4 pages 4-153, 4-154, 4-165, and 4-202;
- Part 5 of DEIR Chapter 4 pages 4-255, 4-265, and 4-274;
- Sections 3.2.5, 3.2.6, 4.4.6, 5.1.1, and 5.1.2 of the DEIR Geotechnical Report.

In the City, the alignment passes through or near the Beverly Hills Oil Field as shown in Figure 6. Naturally occurring methane and/or hydrogen sulfide gases are typically contained in the soil, rock, and groundwater overlying the oil fields. Many abandoned and some operating oil wells are also common in the oil fields, some of which are shown in Figure 6. Hydrogen sulfide is toxic when inhaled in sufficient concentrations, and both gases are explosive. The concentrations of both gases were also significantly high in the soils and groundwater in areas of tar pits east of the City, generally east of South La Jolla Avenue (about one block east of City Limits). The DEIR Chapter 4 refers to the City of Los Angeles Potential Methane Zones (Figure 4-50 of the DEIR) which shows the alignment within a methane zone throughout the City.

Metro has experience with subsurface gases for other tunneling projects on the Red and Gold Lines. The DEIR Geotechnical Report presents a history of tunneling projects in gassy ground which reference the Red Line, Mid-City Subway Alignment Studies, Red Line Eastside Extension, Gold Line Eastside Extension, and North East Interceptor Sewer Tunnels. Given the advancement in tunnel technology, this report concludes that tunnel construction is gassy ground appears feasible.

Mitigation measures for subsurface gases include a redundant protection system including physical barriers, monitoring and detection systems, and special ventilation equipment. Construction of the stations could include slurry walls or similar sealing methods. Flexible sealants would also be used as well as secondary station walls to provide an active barrier

system, such as a double gasket system developed for the Gold Line. The DEIR Chapter 4 also lists numerous options that would be considered in the tunnel and station designs. Some options include detection systems with alarms, emergency ventilation systems, automatic equipment shut-off, and personnel training.

During construction, the DEIR Chapter 4 suggests slurry-face TBMs would be utilized with a fully enclosed system to transport excavated soil to the ground surface. The segmental concrete segment liner installed as the TBM advances would be sealed with neopreme gaskets to preclude the inflow of groundwater and gases. To protect construction personnel, a combination of ventilation, personal protective equipment, and monitoring would be used. The DEIR Geotechnical Report also suggests using zinc oxide in the slurry mixes for tunnels and station construction to neutralize hydrogen sulfide.

We concur with the mitigation measures for the tunnels and stations presented in the DEIR for hazardous subsurface gases. Perhaps the greatest risk of gas infiltration into a tunnel or subsurface station may be associated with earthquakes, either through cracking of liners or walls, offset of gasketed tunnel liner joints, and/or disabling the ventilation system. In additional to the options listed to seal the tunnels, the use of neoprene gaskets in the tunnel liners has also proven to be effective at reducing gas intrusion on the Goldline. Also note that hazardous subsurface gases could also emanate from human activity, such as landfills or other hazardous waste sites described in the next section.

3.2.7 Hazardous Wastes and Materials

Table S-5 of the DEIR Executive Summary identifies hazardous wastes and materials as having a low or negligible impact given that the tunnel is expected to be below contaminated soils. Additional details for hazardous wastes and materials are provided in:

- Part 3 of DEIR Chapter 4 pages 4-168 through 4-178;
- Part 5 of DEIR Chapter 4 pages 4-274 and 4-275;
- Sections 1.3.2, 3.3, 4.4.7, 5.1.1, 5.2.2., and 5.3.2 of the DEIR Geotechnical Report, and;
- DEIR Appendix E.

DEIR Chapter 4 describes hazardous materials in the urban environment as including "petroleum products from gasoline stations and automotive service areas, cleaning solvents from

dry cleaning operations, and various other hazardous materials at manufacturing and storage properties." The report reviewed "historic topographic maps, aerial photos, fire insurance maps, and city directories; searches of environmental databases; and site reconnaissance." The research did not include interviews with property owners or reconnaissance on private properties. Based on these reviews, groundwater contamination is considered highly likely along the alignment.

The potential exists to encounter oil wells and oil production-related equipment on properties shown in Figure 6. The locations shown on Figure 6 utilize the State Division of Oil, Gas, and Geothermal Resources (DOGGR) online mapping system as used in the DEIR Geotechnical Report. These locations should be considered approximate. Oil exploration and natural oil seeps were identified on Wilshire Boulevard east of La Cienega Boulevard at the eastern edge of the City.

Mitigation measures for hazardous waste and material include analyzing soil samples suspected of contamination. If contaminated, the soils would be removed and disposed of in an approved location. Special health and safety training procedures would be implemented for construction personnel. Mitigation of hazardous materials impacting the tunnel include: file reviews, removal and disposal of impacted soil, reuse of properly treated soil, treatment and handling of contaminated groundwater, asbestos and/or lead abatement of demolished or modified buildings, and emergency response measures. Contaminated groundwater encountered during construction dewatering would be treated on site before disposal. The tunnel should be aligned to minimize encounters with abandoned oil wells.

We concur with the mitigation measures for the tunnels and stations presented in the DEIR for hazardous wastes and materials. Historic gasoline stations listed in the City (Table 3.4 of DEIR Geotechnical Report) include three within the Wilshire/La Cienega area. An EDR database search also resulted in listings of properties with potential impacts (Table 3-11 of DEIR Geotechnical Report) in the City include:

- On Wilshire Boulevard: 6500, 8302, 8383, 8484, 8567, 8621, 8624, 8692, 8767, 8833, 8930, 9022, 9045, 9055, 9090, and 9100;
- 165 South Beverly Drive;
- 151 South El Camino Drive;

- 225 North Canon Drive, and;
- On Santa Monica Boulevard: 9860, 9925, and 9975.

Gasoline stations with known or suspected hydrocarbon contamination include properties located at 8567, 9815, and 9988 Wilshire Boulevard. Additional research of these properties that are in close proximity to the proposed stations and connection structure is recommended, as the potential for soil and groundwater contamination would impact these facilities.

For oil wells, the locations of wells shown in Figure 6 are approximate and only include oil wells identified in the DOGGR database. Undocumented oil wells (also known as "wildcat" wells) could be present in or around the oil fields within the City. Additional studies to confirm the presence or absence of the DOGGR oil wells and wildcat wells should be performed during the design study.

3.2.8 Noise and Vibration

Table S-6 of the DEIR Executive Summary states that noise and vibration as a potential impact during construction. Additional details for noise and vibration are provided in:

- Part 2 of DEIR Chapter 4 pages 4-106 through 4-135;
- Part 5 of DEIR Chapter 4 pages 4-267 through 4-269, 4-299, 4-300, and 4-305;
- DEIR Appendix E, and;
- The DEIR Noise and Vibration Report.

DEIR Chapter 4 presents a detailed analysis of noise and vibration thresholds and ambient levels along the WSE alignment for operations and construction. Noise measurements were taken at two locations in the City (Figure 4-37 of DEIR Chapter 4): near the Wilshire/La Cienega and Wilshire/Rodeo stations. Noise and vibration receivers were also placed at vibration sensitive locations in the City as shown in Figures 4-44 and 4-45 of DEIR Chapter 4. Predicted "ground-borne noise impacts" are noted for several structures along the West Hollywood Connection and Constellation alignments. Sensitivity of vibrations for certain buildings is also discussed, including residential neighborhoods in the City and the BHHS Auditorium.

Noise levels were also recorded along the Metro Red and Purple Lines. Noise generated from the subway trains include "interaction of train wheels on track, motive power, signaling and

warning systems, plus the operation of traction power substations." Noise from above ground portions of the stations is a potential impact, but the DEIR concluded the impact is insignificant. Vent shafts are known to generate noise from trains and fans, and are proposed on Wilshire Boulevard between Willaman Drive and Carson Road (Sheet 3 of Figure 2).

During construction, noise impacts "...near stations, tunnel access portals, and construction laydown areas..." will likely be adverse. Noise from construction is generated by "demolition, station construction, worker travel, hauling of soils and debris for disposal, deliveries of materials, and other related tasks...." including ventilation for tunnel construction, backup bells and horns for dump trucks and concrete mixers, transfer of excavated soils into trucks, crane operation alarm, pile driving, dewatering pumps, and operation of a slurry plant in gassy areas throughout the City.

A vibration test to simulate train operations was conducted at a site along the alignment in Century City where the soil profile is representative of the stratigraphy found elsewhere along the alignment. Vibrations from passing trains are considered to have a small potential for being felt at the ground surface.

Construction vibrations are anticipated to be more noticeable. Construction vibrations and noise produced from equipment used for demolition and station construction will likely be disruptive to local occupants. Driven piles, which generate noise and vibration during construction, would be avoided for station construction. Vibrations during tunnel construction, anticipated to be a 24-hour operation, could be "felt" at night at residential structures. Studies performed during construction of the Metro Red Line tunnels indicated that "intrusive low level ground-borne vibration at areas above the tunnel when the mining is at that location" were detectable. Non-damaging, low level ground-borne vibrations have been reported by residents directly over or very close to tunnel construction alignments around the U.S. as the TBMs progressed beneath their houses. Sensitivity of individual residents varies widely, and the vibrations are normally only felt for a week or two as the TBM advances at an average rate of 30 to 60 feet per day. Reportedly, the Metro Gold Line tunnel construction did not have complaints.

Mitigation measures for noise generated by the vent shafts include acoustic treatment to the shaft's interior surface to dampen the noise. Mitigation measures for vibrations generated by the subway beneath sensitive facilities include installing high resiliency direct fixation rail

fasteners as part of the trackwork design below these areas. Otherwise, measures are not necessary to mitigate operational impacts from noise and vibrations.

The DEIR Appendix E describes the likely construction scenario for the project, with construction beginning at several locations simultaneously and overlapping construction for certain project elements. A construction sequence is provided in Table E-1 of this appendix. Hours of construction activity would be in accordance with the City codes, which are "8 a.m. to 6 p.m. on Monday through Friday and 9 a.m. to 5 p.m. on Saturday" with no construction allowed on Sundays and holidays. Several mitigation measures for construction noise are listed in DEIR Chapter 4, including "temporary noise barriers and sound-control curtains"

We concur with the mitigation measures for the tunnels and stations presented in the DEIR for noise and vibrations. While tunneling at relatively shallow depths of 100 feet or less, minor levels of noise and vibration may be experienced, particularly when little or no background noise is present. Tunneling and cut-and-cover station excavation induced vibrations are typically on par with bus and trash truck noise and vibrations. Noise and vibrations are the most noticeable at night, when background noises are at a minimum. In several major cities, such a Baltimore, Seattle, and Washington D.C., vibrations from operating subways have been a significant issue for existing and future businesses and research groups dealing with precision measurement systems. (Yang, Y. and Hung, H., 2008) In some instances, vibration isolation systems beneath floating slabs have been installed during construction to minimize vibrations that could be transmitted through the ground to highly sensitive research and development laboratories during normal subway operation.

Construction noise and vibration could be minimized by utilizing sound walls, sound proofing around compressors and generators, appropriate and well maintained mufflers on mobile equipment, and backup lights and crane operation lights instead of bells and horns on night shift. Nevertheless, some residents could notice nighttime noise and vibration during construction. This could sometimes be reduced by installing multiple pane windows, wall insulation, and other sound-reducing measures for affected residences.

3.3 Other Operational Impacts

3.3.1 General

This section discusses other environmental impacts that could impact project operations. In most instances, these impacts may not have been considered significant and therefore were not brought forward into the DEIR Executive Summary. Similar to the previous section, we identify the impact location in the DEIR, summarize the DEIR impact and mitigation measures, and provide our opinion of the DEIR conclusion specific to the City. The following operational impacts are from Section 3.2.6 of the DEIR Geotechnical Report.

3.3.2 Expansive Soils

Expansive soils typically generated from fine-grained, clay-rich soil deposits could undergo volume changes from variations in moisture content of the soil. The report states most soils in the alignment are relatively coarse-grained and have a relatively low clay content. If encountered, expansive soils would be removed and replaced with engineered fill and foundations would extend below the depth of seasonal moisture variations. Expansive soils are not considered a significant impact.

We concur with the conclusions of the DEIR. The soil underlying the City is typically fill and alluvial soil near the surface. While these soils could contain clay, the clay is generally not widespread and typically mixed with sand, silt, and gravel.

3.3.3 Collapsible Soils

Collapsible soil will settle upon wetting, regardless of additional loading. Collapsible soil is typically mitigated through removal and replacement with engineered fill and foundations would extend below the depth of collapsible soils. Collapsible soils are not considered a significant impact.

We concur with the conclusions of the DEIR. Collapsible soil is commonly found in alluvial fans, windblown deposits, or colluvium. The latter two are unlikely within the City's portion of the alignment. Non-engineered fill (fill placed without compaction records) could be susceptible to soil collapse and could be present in the City. The geotechnical design should consider non-engineered fill, in addition to alluvial fans, as another source of collapsible soils during their exploration program.

3.3.4 Corrosive Soils

Highly corrosive soils could result in deterioration of concrete and steel elements in contact with the soil. Laboratory testing during the geotechnical design phase is proposed to identify corrosive soils. Based on the results, selection of construction materials to resist soil corrosion would be recommended. Corrosive soils are therefore not considered a significant impact.

We concur with the conclusions of the DEIR. From our projects in the City, the underlying soils were generally found mildly to moderately corrosive to steel, corrosive to copper piping, and negligible for sulfate and chloride exposure of concrete.

3.3.5 Landslides

Landslides typically associated with steeper slope inclinations are not present along the project alignment. The DEIR reviewed available landslide maps of the alignment that did not indicate landslide activity. Landslides are not considered a significant impact.

We concur with the conclusions of the DEIR. Through the City, the relatively level topography along Wilshire Boulevard and the alternate alignments would appear to preclude landslide potential. We are also not aware of mapped landslides in the area.

3.4 Other Construction Impacts

3.4.1 General

This section highlights potential construction impacts noted elsewhere in the DEIR but largely absent in the DEIR Executive Summary. The format is the same as in the previous sections. Unless otherwise noted, the following sections are from the DEIR Appendix E.

3.4.2 Staging Areas

Staging areas will be required for construction of the cut-and-cover stations, connection structure, and tunnels. These staging areas would likely require temporary easements for portions of sidewalks, traffic lanes, parking areas, and/or entire streets. Demolition of some buildings is anticipated along the alignment to accommodate staging areas and other construction activities.

Staging areas will be required at each station and the connection structure in the City. The staging areas will need to be sized to provide enough room to undertake construction of the walls, excavation of soils, and construction of the final interior structures. The contractors will need to park construction equipment, store construction materials, provide construction equipment repair and maintenance facilities, setup engineering and management offices, provide drive throughs or turn arounds for material deliveries, excavated soil temporary storage, loading and haulage, etc.

Staging areas will be needed at the launching points (cut and cover stations or temporary shafts) for delivery, setup, and insertion of TBM components, operation, and extraction of TBMs along with work areas for excavated tunnel spoils, temporary storage of tunnel-lining segments, and tunnel support utilities (e.g., power, fans, drain water treatment, separation plants for slurry pressure balance TBM, etc.). A typical tunnel staging area is approximately 1 to 2 acres in size. A contractor may be able to work with a smaller staging area, but the operations may be less efficient and could require a remotely-located secondary staging area. The type of TBM and the length of tunnel to be excavated from a particular launching area will influence the preferred size of the tunnel staging area

A much smaller staging area, just large enough to accommodate two cranes and a flat-bed truck, would be required at the target pit end of the tunnel. The TBM would likely be dismantled in place, and hoisted in pieces from a shaft or the cut-and-cover structure.

Mitigation measures would include limiting TBM oversize deliveries to nights and weekends, avoiding retrieval of the TBM from the street, and limiting excavated soil removal to off traffic hours.

The exact locations and size of the staging areas depend on the construction sequencing, that is, where the TBM will be started. We would anticipate that at least one of the three cut-and-cover excavations in the City would include a tunnel staging area in the immediate vicinity. We recommend that the City begin evaluating the potential locations for staging areas within a couple blocks of the Wilshire/La Cienega base and option stations, the connection structure, and the Wilshire/Rodeo station.

3.4.3 Pre-Construction Surveys

Pre-construction surveys include review of existing conditions, preparation of traffic control plans, local business surveys, geotechnical explorations, cultural resource investigations, and structure and building analyses. Utility relocations would also require "potholing" to confirm the presence and type of underground utilities. Most of these activities would require short-duration traffic lane closures to accommodate the surveys prior to construction.

The pre-construction surveys, while less disruptive than the actual construction, would be an early indicator of future construction activity to the public. We suggest a public relations campaign be coordinated with the pre-construction surveys. The City should coordinate these efforts with Metro to provide as much notice as possible during these early stages of the project.

3.4.4 Utility Relocations

Utility relocations would be performed prior to and during construction of the project. The relocations would necessitate closures in the utility ROW, typically streets, and temporary service interruptions for utility customers. The relocations are planned for nights and weekends to mitigate these impacts. Hazardous high-pressure gas and water lines would be relocated temporarily during construction or permanently, if possible.

Similar to the pre-construction surveys, public awareness of these disruptions would benefit the future construction work for the project.

3.4.5 Dewatering

Dewatering using sump pits to pump the groundwater out of the excavation using a limited number of deep wells. The water would be treated on site and then discharged into the local storm drain or sewer systems, assuming sufficient capacity is available. Contaminated water would require specialized treatment and disposal. The dewatering systems for the stations would be temporary as the station walls would be designed to be watertight.

We recommend the City evaluate the potential for disposal of large quantities of water into their wastewater systems from the possible excavations at the Wilshire/La Cienega base and option stations, the connection structure, and the Wilshire/Rodeo station. With non-watertight shoring systems, based on local construction experience, site dewatering could produce flows of

several hundred gallons per minute (gpm). With tight shoring systems and a grouting program, groundwater flows into sumps would likely be less than 100 gpm at each excavation.

3.4.6 Existing Tiebacks, Foundations, and Other Obstructions

Stations and tunnels located adjacent to existing deep basements could encounter abandoned tiebacks that could interfere with construction. The report notes that existing tieback locations could be "reasonably well established." For stations, depending on the wall type used for the temporary excavations, wall elements such as soldier piles could be spaced to avoid the tiebacks. For tangent pile, secant pile, or slurry wall construction, "...specialized methods and equipment to de-tension and cut the tiebacks may be used..."

Where station walls abut existing foundations, the walls would be designed to accommodate the additional building load. Underpinning could be required to provide additional support to the building foundations.

Abandoned tiebacks encountered during tunneling could wrap around and damage the TBM cutter-head and stop advance of the tunnel. If large quantities of tiebacks are anticipated within the tunnel horizon, then the alignment may need to be altered to pass below or around the zone of tiebacks. If a few tiebacks are anticipated along the alignment, then it could be possible to temporarily support the soil face and cut and remove individual tiebacks. Tiebacks are generally encountered in buildings with deep basements constructed after the early 1960's. If a large number of tiebacks are anticipated in a discrete zone, then a cut-and-cover excavation could be used to remove the tiebacks within the tunnel alignment, and then controlled density fill (CDF) could be poured to replace the soil.

In addition to tiebacks, the closed-face (either EPB or SPB) TBMs do very poorly with obstructions such as wood (timber piles and logs), steel oil well casings, nests of boulders, etc. If the TBM encounters steel or massive wood, the contractor will likely have to stop, stabilize the face with compressed air, grout, and/or dewater, then excavate out the obstructions by hand. If boulders are anticipated, larger than about 18 inches in largest dimension, then the contractor should be required to include disc cutters in addition to drag picks on the cutterhead. The contractor may be able to cut up some boulders with the disc cutters, but if a buried stream or river channel with abundant cobbles and boulders is encountered, then difficulties in advancing

the TBM could occur. Old landfills could also pose a challenge due to the possible presence of steel and concrete debris.

Mitigation of the risks of significant project disruptions due to encounters with obstructions can be greatly reduced by performing the necessary literature research, case history evaluations and site investigations to determine what if any obstructions are likely to be present and in what quantities. Researching and defining these obstructions should be part of the geotechnical design of the project.

3.4.7 Soil Disposal and Backfill

Large quantities of soil will be excavated from the station excavations and tunnels and must be hauled off site to appropriate disposal areas. Typically the soils will be hauled in tandem dump trucks, capable of hauling 20 CY per trip.

Soil excavated from a typical station would occur over an approximately eight-month period and generate approximately 135,000 CY of soil to be removed (assuming 30 percent soil bulking). One station excavation would generate about 7,000 truck loads with an average 50 to 60 truck trips per day during station excavation. Contaminated soil, identified during the excavation process, would need to be segregated on site and properly disposed of in compliance with applicable regulations.

Additionally, some backfill would be required between the station top and the street. This would require approximately 20,000 CY of imported soil for backfill, equivalent to about 1,000 truck trips. Peak backfill times would likely require 50 to 100 truck trips per day. In some cases, the excavated soil could be reused for backfill. However, slurry used for station excavation could limit the re-use of excavated soil, and may limit disposal options for some of the station soils.

For tunnel construction, the spoils generated by tunneling would be about 50 to 100 CY per hour. If two TBMs are launched from the same station, the spoil generation would be double. For twin tunnels, disposal of the spoils would require truck off-haul at a rate of about 5 to 10 tandem trucks an hour, or one truck every 6 to 10 minutes. With stockpiling in adequate staging areas, truck trips could be deferred to nights and weekends. For EPB tunneling, the spoils may be semi-fluid due to the inflow of groundwater and the addition of soil conditioners,

such as bentonite clay, surfactants (soap), and/or polymers. Although the use of conditioners may limit disposal site options for the tunnel spoils.

Significant construction traffic should be anticipated in the vicinity of the proposed stations and connection structure for the excavations. Depending on the tunnel construction staging, additional traffic could be generated to dispose of tunnel spoils.

Mitigation measures would include traffic studies and route assessments to determine the least disruptive and quickest routes for trucks delivering to and hauling soil spoils from the various construction sites. Additional traffic control may also be required to minimize disruptions to local traffic.

3.4.8 Dust Control

Dirt and dust are a normal by-product of below ground construction. Even with wheel wash facilities for trucks that leave the construction site to travel on main streets and highways, some dirt and dust will be transported off site. Periodic (daily to weekly) street cleaning and possibly window and wall washing for neighboring houses and commercial buildings may be needed.

3.4.9 Finished Structures

Poured-in-place concrete would be used to construct the stations over a period of 24 to 32 months. Each station would require approximately 30,000 CY of concrete, requiring about 3,000 concrete truck trips. Typically, about 5 to 10 concrete truck trips per day would be used, with occasional large pours requiring 30 to 40 truck trips per day. The precast concrete liners for the tunnel would be delivered by flat bed truck to the site. Typically one liner ring consists of 7 to 9 precast segments, and comprise one truck load. Depending on the tunneling rate, 6 to 20 liner rings per day would be required to support the tunnel.

Mitigation measures may include performing the large pours at night to minimize traffic impacts and facilitate concrete deliveries. However, coupled with the traffic generated from the soil disposal, backfill, and tunnel construction at some stations and the connection structure, this traffic should be included in the overall construction impact for neighborhoods surrounding these locations.

4.0 DESIGN AND CONSTRUCTION CONSIDERATIONS

4.1 General

This section presents our recommendations to the City for issues related to geotechnical and tunneling aspects of the project that should be addressed in the FEIS/FEIR and/or design phase of the project. The intent of this section is to highlight the issues outlined in the previous section that the City should monitor during the subsequent design phases of the project.

4.2 DEIS/DEIR References

Most of the information presented in the DEIS/DEIR and related documents that we reviewed appears to be based on readily available published documents by others (e.g., Figure 3-1 of the DEIR Geotechnical Report), but the source is not shown. This should be corrected for the FEIS/FEIR.

4.3 Additional Fault Studies

The Santa Monica Fault and West Beverly Hills Lineament are poorly understood. The additional studies being conducted as described in the DEIR are critical to resolve the potential for fault rupture through the proposed Santa Monica Station. Geotechnical exploration and geophysical means should be employed during the design phase to confirm the presence or absence of a fault trace through the proposed station. In addition, the nature and location of the West Beverly Hills Lineament is poorly documented. If this lineament is an active fault it could cause rupture of the tunnel where it crosses the alignment. As indicated in the DEIR, additional studies should be completed to determine the nature of the lineament. Trenching to confirm a fault trace detected by these methods should be considered, though the urban development in the area would present challenges.

As previously discussed, faults such as the Santa Monica Fault are often barriers for groundwater. From the DEIR subsurface profiles provided in Appendix A, abrupt groundwater level differences along the alignment were noted near the western City limit (about Station 330+00) and near the east end of the Wilshire/Rodeo Station (about Station 268+00). The explanation for these abrupt groundwater changes should be part of the geotechnical design of the project.

4.4 Ground Shaking

The requirements of the Metro Design Standards should be reviewed by the City for conformance with City building codes. Also, the discrepancy in the MDE described in Section 3.2.3 should be resolved for the FEIS/FEIR.

4.5 Liquefaction

The assumption of a 50-foot depth limit for liquefaction is reasonable for most surface structures. However, the depth of explorations to confirm the presence or absence of liquefaction should be deepened to at least 20 feet below the tunnel invert or station foundations. While the subsurface profiles in Appendix A and our experience in the City suggest that liquefaction is unlikely below 50 feet, the liquefaction assumptions of the DEIR should be confirmed.

4.6 Subsidence

As provided in the DEIS and our review, there are several sources for subsidence on the project:

- Natural subsidence due to oil well extraction;
- Dewatering of stations and other project elements;
- Excavation of the tunnels, and;
- Lateral movement of temporary walls during excavation of the stations and connection structure.

The cumulative settlement from these various sources should be considered in the geotechnical design. Settlement should be anticipated along the alignment, resulting in damages that range from slight cosmetic damage to significant distress, depending on the ground conditions encountered, the contractor's means and methods, the condition of the affected structure, and other factors. We recommend an extensive monitoring program, including instrumentation, surveys, and detailed reviews of affected structures, be in place before excavation of the project commences.

The City should review and approve the monitoring program. The City should also review the settlement survey data, borehole instrumentation data, and instrumentation on building structures, as near "real time" as possible to note potential settlement issues and alert Metro to arrest the settlement.

4.7 Hazardous Subsurface Gases

While the City's WSE Alignment is mapped entirely within a methane zone, the concentration levels of methane and hydrogen sulfide increase in the oil fields and tar sands. According to the DEIR, the tar sands terminate about a block east of the City limits. The geotechnical explorations should assess methane and hydrogen sulfide concentrations in soils and groundwater, confirm the limits of the tar sands within the depth of the tunnel alignment to confirm that the tar sands do not extend into the City, and locate abandoned oil wells.

The WSE base alignment passes through oil fields and near oil wells as shown in Figure 6. However, the West Hollywood Connection and Constellation alignment options are in close proximity to mapped oil wells along the east and west City limits. Also, "wildcat" wells, and related drilling mud sumps, that are not mapped should be anticipated in and around the oil fields. While striking a well with a TBM would cause impacts for construction as previously described in Section 3.4.6, the potential for oil to be released is low. The greater hazard from cutting through an abandoned oil well is the release of methane and/or hydrogen sulfide. The geotechnical explorations and literature search should attempt to locate mapped and "wildcat" wells using aerial photographs, historic records, geophysics and other subsurface explorations. Also, contingency plans should be in place during construction when a well is struck.

4.8 Hazardous Waste and Materials

The City should review evaluations of potential hazardous waste and materials prepared during the design phase of the project. Of particular concern to the project and City are properties located near proposed excavation sites at the stations and connection structure, including properties that are hydraulically upgradient from the project alignment. While the potential for oil spilling from a cut well is low, there is the potential to encounter oil-generated contamination in mapped oil fields from the previous oil production in these areas. Dewatering during construction could potentially move contamination plumes towards the alignment and beneath adjacent structures. Consequently the identification of areas of contamination may impact the design and implementation of construction dewatering efforts.

4.9 Noise and Vibrations

While noise and vibration generated during operations is expected to be minimal, construction related noise and vibration could have a major impact on the City, particularly near stations and the connection structure. To prepare businesses, private residences, and other citizens for the noise and vibrations associated with construction, and also address the other construction

impacts described in Section 3.4, we recommend an aggressive public relations campaign initiated by Metro be monitored by the City. Disruptions during construction are inevitable for this scale of project and the impacts on the public working and living along the alignment should not be underestimated.

While the City should expect Metro and their design and construction team to mitigate the construction issues to the standards outlined in the DEIS/DEIR, the City should be prepared for complaints from citizens and claims of lost business, particularly in the vicinity of the stations and connection structure. The City should also review and approve the construction sequencing and staging plans for the project, and notify the public of the project construction schedule as early as possible.

4.10 Additional Subsurface Explorations

4.10.1 General

The subsurface profiles provided in Appendix A appear to largely be soil borings from previous projects that were implemented for adjacent buildings and utilities and were likely not tailored to the design needs of the Project. The depths, spacing, type of explorations, associated laboratory testing, and other data from these explorations may not be relevant to design of the project. Therefore, additional subsurface explorations should be performed for the project as described below.

4.10.2 Tunnel Alignment

For transportation tunnels constructed in an urban environment, subsurface geotechnical explorations are typically spaced at intervals of between 200 and 500 feet. The depth of explorations should be at least one tunnel-diameter or about 20 feet below tunnel invert for the deepest tunnel option. However, actual spacings will depend on the variability of the ground conditions. The presence of irregular soil contacts, variable groundwater depths, suspected faults, soil and groundwater contamination, presence of tar sands, and other variables may require additional borings in order to adequately resolve the location and extent of these conditions.

4.10.3 Stations

We recommend at least six subsurface explorations be performed at the stations and connection structure, preferably at corners and middle sections. The depths of the explorations should extend at least 30 feet below the station foundations. As noted above, additional borings may be appropriate to resolve anomalies and variations between borings. Also, for areas where dewatering is planned, pump tests should be performed to model the groundwater behavior and drawdown during the geotechnical design phase.

4.11 Construction Traffic

Along with the impacts of noise and vibration, the City should consider the traffic generated during construction of the stations and connection structure. The truck trips generated during construction described in the DEIR Appendix E could include:

- Contaminated water from dewatering could require specialized treatment and disposal by truck (number unknown).
- Excavation of one station would generate 5,000 to 7,000 truck trips, with an average 50 to 60 truck trips per day.
- Imported soil for backfill over the station would generate about 1,000 truck trips. Peak backfill times would likely generate 50 to 100 trucks per day.
- For stations where tunneling is initiated, the tunnel spoils would require truck off-haul at a rate of about 5 to 10 truck trips an hour, or one truck trip every 6 to 12 minutes.
- Also at tunnel-launching stations, the precast concrete liners delivered by truck to the site would range from about six to twenty liner rings per day, with one ring per flat-bed truck.
- Each station and the connection structure would require about 3,000 concrete truck trips during the finishing stages. Typically, about 5 to 10 concrete truck trips per day would be used, with occasional large pours of 30 to 40 trucks per day.
- Other material deliveries including reinforcing steel and construction equipment.

Most of the truck trips above would likely not occur during the same construction period, but would be spread over the expected construction duration. The City should review and approve the launching station(s) for the TBM, the proposed haul routes, and the hours of hauling operations. Selection of the staging area location, while constrained to close proximity to the stations and connection structure, should consider the volume of construction traffic. Also, haul

routes should consider night and weekend construction traffic patterns, which is a key mitigation measure in the DEIR.

4.12 State of Tunneling Practice

The state of the practice in underground design and construction has experienced major changes and improvements over the last 20 to 30 years, resulting in more efficient, lower risk, and in some cases, less costly underground construction techniques. Significant changes in shaft and cut-and-cover station excavations have included the introduction of a variety of wall excavation methods that result in water-tight, rigid, diaphragm wall that limits the need to dewater, reduced deformations of adjacent soils and structures, and reduced potential for long-term soil movements related to the rotting out of wood components in the temporary supports. Likewise, in the tunnel industry, there have been numerous innovations within the last 20 to 30 years that lower the risk of excessive ground loss and surface settlements, while accommodating a safer and more efficient tunneling process with the introduction of equipment and techniques such as closed-face TBMs, precast segmental liners, soil conditioners and additives, compact slurry separation plants, and new forms of specialized ground improvement techniques.

For deep cut-and-cover excavations in a variety of soils above and below the groundwater table, and where excavation will be close to buildings, it is typically important to minimize noise, vibration and ground deformations. Recent wall construction techniques such as slurry walls, concrete secant pile walls, and soil-mix walls, have been used to provide relatively water-tight and rigid wall systems that greatly reduce the amount of dewatering and the ground deformations related to wall construction. These rigid walls may be supported with either temporary tiebacks or interior bracing, depending in part on the ROW limitations and presence of basements or other structures to either side of the cut.

A whole host of innovations and improvements have been developed and introduced into tunnel construction to make tunneling a lower risk, safer, less costly construction method. Rather than utilizing open-face digger shields, preceded by aerial dewatering, as were used on nearly all of the tunnels constructed in the Los Angeles area prior to 2000, many projects are now being constructed with closed-face TBMs, that require minimal to no dewatering or ground improvement, and are capable of excavating a variety of rock and soil materials with groundwater depths of up to 200 or more feet. The two primary categories of closed-face soil tunnel boring machines include slurry pressure balance TBMs, and earth pressure balance TBMs. Both types of machines consist of a steel cylinder or "can" or shield, with a rotating cutterhead backed by a submarine-style bulkhead that closes off the forward part of the TBM and allows

pressure to be maintained against the excavated soil face as the TBM is shoved forward off a segmental concrete liner.

The slurry pressure balance TBMs utilize a bentonite or polymer based slurry to provide pressure to stabilize and seal the soil face, reduce friction and wear on the cutterhead, and carry excavated soil cuttings via a slurry pipeline back to the ground surface where the soil is separated from the slurry, and the cleaned slurry is then recycled back to the rotating cutterhead of the TBM. A disadvantage of the slurry pressure balance TBM is the size of the processing plant needed to separate the cuttings from the slurry, and the disposal requirements of the slurry. Also, this type of TBM is less adept at transporting and separating clayey soils, since the slurry is generally a bentonite clay, and it is difficult, although not impossible, to separate the clay soils from the clay slurry. On the other hand, the closed pipeline conveyance of the soil and slurry is almost ideal for containing toxic methane and hydrogen sulfide gases until the pipeline reaches ground surface.

The earth pressure balance TBMs utilize soils conditioners or additives such as water, bentonite slurry, surfactant (soap foam) and polymers to stabilize the excavated soil in the cutterhead to a putty-like consistency, maintain pressure against the excavated soil face to counterbalance groundwater and soil pressures, and transfer the conditioned soil out of the cutterhead via a cased screw auger. As the conditioned soils are disgorged from the cased auger about 40 to 120 feet back from the cutterhead and deposited onto a conveyor belt/muck train combination, any entrained methane or hydrogen sulfide gases are likely to escape into the tunnel atmosphere, and consequently a high volume ventilation system is often required in potentially gassy ground.

Both types of TBM are capable of limiting tunnel excavation ground losses and the resulting surface settlements to very low amounts, if the machines are operated and maintained correctly, and if the soil conditions are correctly predicted by the project owner and anticipated by the contractor. Ground losses and settlements are minimized through the correct operation and maintenance of these TBMs, and by adjusting the advance rates, slurry density or soil conditioning, excavated soil removal rates, cutterhead rotation rates, and maintained face pressures to accommodate the anticipated range of soils along the alignment. Rapid variations in soil type can challenge the TBM operator to adjust the various operational parameters. Case history experience with these closed-face TBMs indicates that an experienced construction staff can limit ground losses and settlements to less than 1 percent, which translates into about 1 to 2 inches of surface settlement above twin subway tunnels excavated at a depth of about 50 feet. Smaller ground losses of less than 0.25 percent and correspondingly lower surface settlements have been documented on many projects.

However, on some of these same projects, poor operation and maintenance of the TBM, coupled with variable soil conditions has occasionally resulted in much larger ground losses and settlements, which occasionally are manifested as multi-cubic yard sink holes. These excessive ground losses are typically coupled to poor operation of the TBM, and the inherent inability to measure excavated soil volumes to any better than about 10 percent of the actual volume. Fortunately surface surveys coupled with borehole instruments pre-installed down to just above tunnel crown and monitored as the TBMs move forward can be used to monitor and calibrate operation of the TBM.

Both categories of TBM can be challenged when encountering obstructions. Special cutter teeth and disc cutters can be added to the rotating cutterhead to excavate through limited quantities of boulders, and even bedrock. However, neither TBM is capable of excavating through steel pipes, steel cables or other metallic debris. Likewise, neither TBM can effectively excavate through quantities of timber piles, logs, etc., but may be able to excavate through an isolated timber pile or log, if wood has been anticipated during the design phase of the project.

Most closed-face TBMs projects utilize precast concrete segments that are bolted together to form a "one pass liner" that is installed as the tunnel progresses forward. Each 4- to 6-foot long ring is comprised of 7 to 9 segments that are assembled within the tale-skin of the advancing TBM. As the TBM advances a 3- to 6-inch wide annular gap remains between the outside of the lining and the excavated soil surface, which must be immediately filled with a thick grout. Incomplete filling of this annular gap, or delayed filling that allows the soils to collapse into the gap, can result in larger ground losses and surface settlements.

Other innovations that have enhanced the tunneling processes include the use of laser guidance systems; a variety of monitoring systems within the TBM to measure loads, pressures, temperatures, rotational speed, etc.; all of which can be monitored via computer at remote locations; improved ground improvements and modifications systems such as compaction, compensation and jet grouting to improve otherwise troublesome soils in selected locations, and in some case counteract excessive ground losses beneath or adjacent to sensitive structures.

5.0 LIMITATIONS

This report was prepared for the exclusive use of the City of Beverly Hills for specific application to this project. This report is a review of information provided in the DEIR.

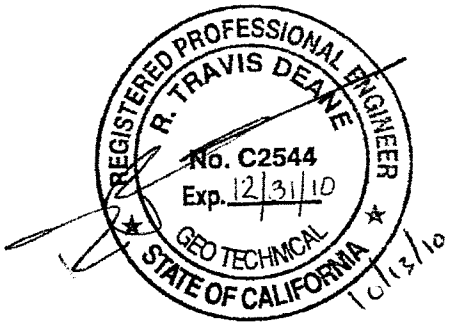
The analyses, conclusions, and recommendations contained in this report are based on information provided in the DEIR and our experience in the project vicinity. We assume that the

exploratory borings provided in Appendix A are representative of the subsurface conditions throughout the project alignment (i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the explorations).

Within the limitations of the scope, schedule, and budget, the analyses, conclusions, and recommendations presented in this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practices in this area at the time this report was prepared. We make no other warranty, either express or implied. These conclusions and recommendations were based on our understanding of the project as described in this report and the site conditions as interpreted from the DEIR explorations.

Shannon & Wilson, Inc. has prepared the document, "Important Information About Your Geotechnical Report," in Appendix B to assist you and others in understanding the use and limitations of this report.

SHANNON & WILSON, INC.



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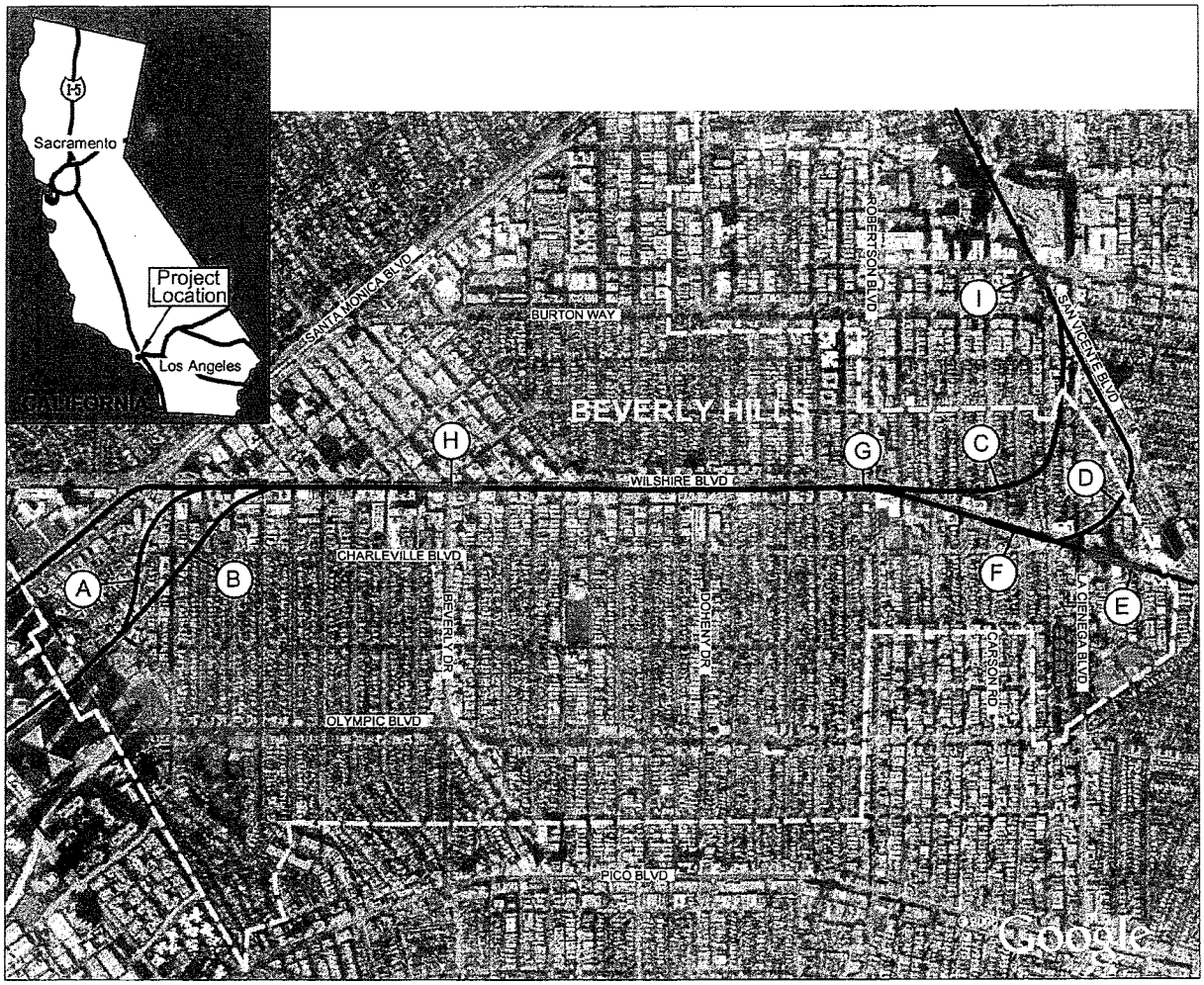


LEGEND

- Proposed Base Alignment
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Metro Station Option
- Proposed Connection Structure
- City Boundary

(A) Constellation North Alignment

(B) Constellation South Alignment

(C) West Hollywood Connection - Base Station

(D) West Hollywood Connection - Station Option

(E) Wilshire/La Cienega Base Station

(F) Wilshire/La Cienega Station Option

(G) Connection Structure

(H) Wilshire/Rodeo Station

(I) Beverly Center Area Station

0 1000 2000 4000

SCALE: 1"=2000'

NOTE

Map adapted from aerial imagery provided by Google Earth Pro, reproduced by permission granted by Google Earth ™ Mapping Service.

Westside Subway Extension Review
Beverly Hills, California

VICINITY MAP

October 2010 51-1-10024-001

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1

Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\Vicinity Map.dwg Date: 10-13-2010 Login: Louis Larios

LEGEND

- Proposed Base Alignment
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Connection Structure
- Proposed Metro Station Option
- Vent

N

1 inch = 200 feet

0 100 200 400 Feet

REFERENCE: ESRI_IMAGERY_WORLD_2D SERVER 2009

Westside Subway Extension Review
Beverly Hills, California

ALIGNMENT PLAN

October 2010 51-1-10024-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 1 of 8

Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\plot plan.mxd Date:september 17, 2010 (LOL)

LEGEND

- Proposed Base Alignment
- Vent
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Connection Structure
- Proposed Metro Station Option

N

1 inch = 200 feet

0 100 200 400 Feet

REFERENCE: ESRI_IMAGERY_WORLD_2D SERVER 2009

Westside Subway Extension Review
Beverly Hills, California

ALIGNMENT PLAN

October 2010 51-1-10024-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 2 of 8

Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\plot plan.mxd Date:september 17, 2010 (LOL)

LEGEND

- Proposed Base Alignment
- Vent
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Connection Structure
- Proposed Metro Station Option

N

1 inch = 200 feet

0 100 200 400 Feet

REFERENCE: ESRI_IMAGERY_WORLD_2D SERVER 2009

Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\plot plan.mxd Date:september 17, 2010 (LOL)

Westside Subway Extension Review
Beverly Hills, California

ALIGNMENT PLAN

October 2010 51-1-10024-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 3 of 8

LEGEND

- Proposed Base Alignment
- Vent
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Connection Structure
- Proposed Metro Station Option

N

1 inch = 200 feet

0 100 200 400 Feet

REFERENCE: ESRI_IMAGERY_WORLD_2D SERVER 2009

Westside Subway Extension Review
Beverly Hills, California

ALIGNMENT PLAN

October 2010 51-1-10024-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 4 of 8

Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\plot plan.mxd Date:september 17, 2010 (L.O.L)

WILSHIRE BOULEVARD

280+00

BASE ALIGNMENT

BEVERLY DR.

270+00

WILSHIRE BOULEVARD

260+00

PECK DR

RODEO DR

Wilshire/Rodeo Station

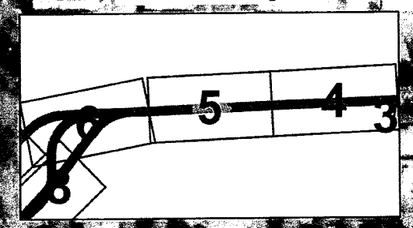
REEVES DR

CANON DR

CRESCENT DR

REXFORD DR

Sheet Map



LEGEND

- Proposed Base Alignment
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Connection Structure
- Proposed Metro Station Option
- Vent

N

1 inch = 200 feet

0 100 200 400 Feet

REFERENCE: ESRI_IMAGERY_WORLD_2D SERVER 2009

Westside Subway Extension Review
Beverly Hills, California

ALIGNMENT PLAN

October 2010

51-1-10024-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 5 of 8

Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\plot plan.mxd Date:september 17, 2010 (LOL)

LEGEND

- Proposed Base Alignment
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Connection Structure
- Proposed Metro Station Option
- Vent

N

1 inch = 200 feet

0 100 200 400 Feet

REFERENCE: ESRI_IMAGERY_WORLD_2D SERVER 2009

Sheet Map

Westside Subway Extension Review
Beverly Hills, California

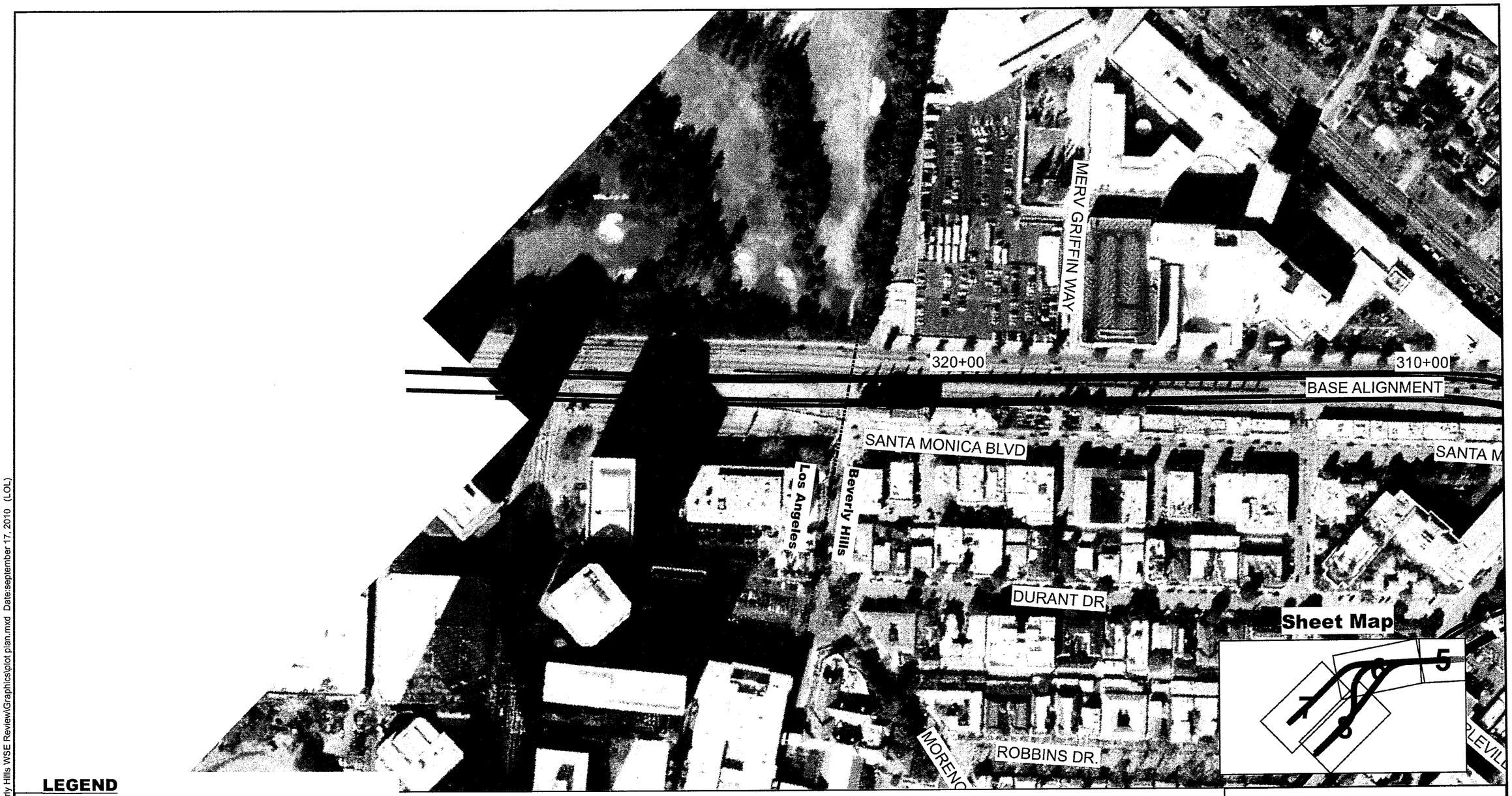
ALIGNMENT PLAN

October 2010 51-1-10024-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 6 of 8

Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\plot plan.mxd Date:september 17, 2010 (LOL)



LEGEND

- Proposed Base Alignment
- Vent
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Connection Structure
- Proposed Metro Station Option

1 inch = 200 feet

0 100 200 400 Feet

REFERENCE: ESRI_IMAGERY_WORLD_2D SERVER 2009

Westside Subway Extension Review
Beverly Hills, California

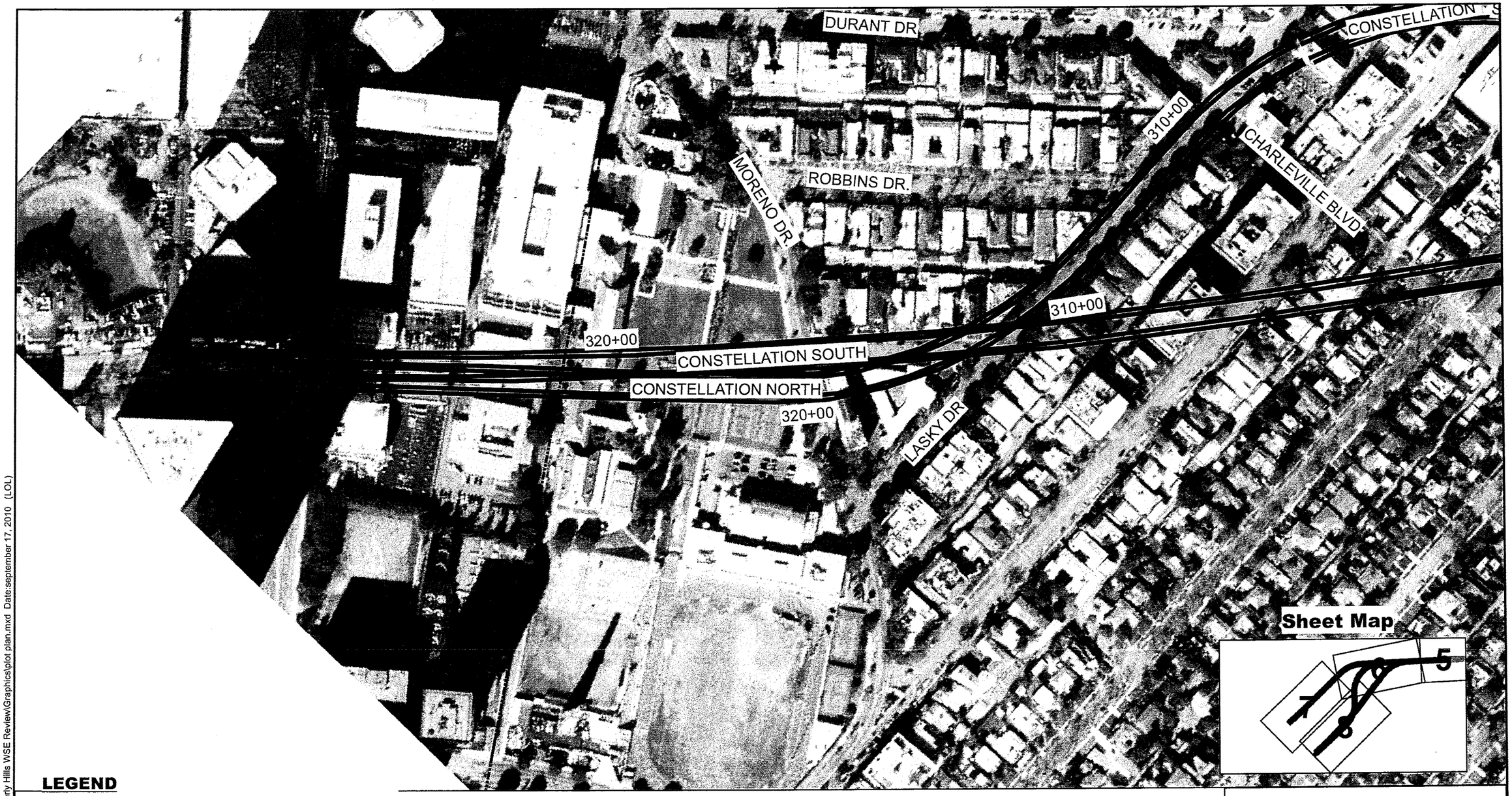
ALIGNMENT PLAN

October 2010 51-1-10024-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 7 of 8

Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\plot plan.mxd Date:september 17, 2010 (LOL)



LEGEND

- Proposed Base Alignment
- Vent
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Connection Structure
- Proposed Metro Station Option

N

1 inch = 200 feet

0 100 200 400 Feet

REFERENCE: ESRI_IMAGERY_WORLD_2D SERVER 2009

Westside Subway Extension Review
Beverly Hills, California

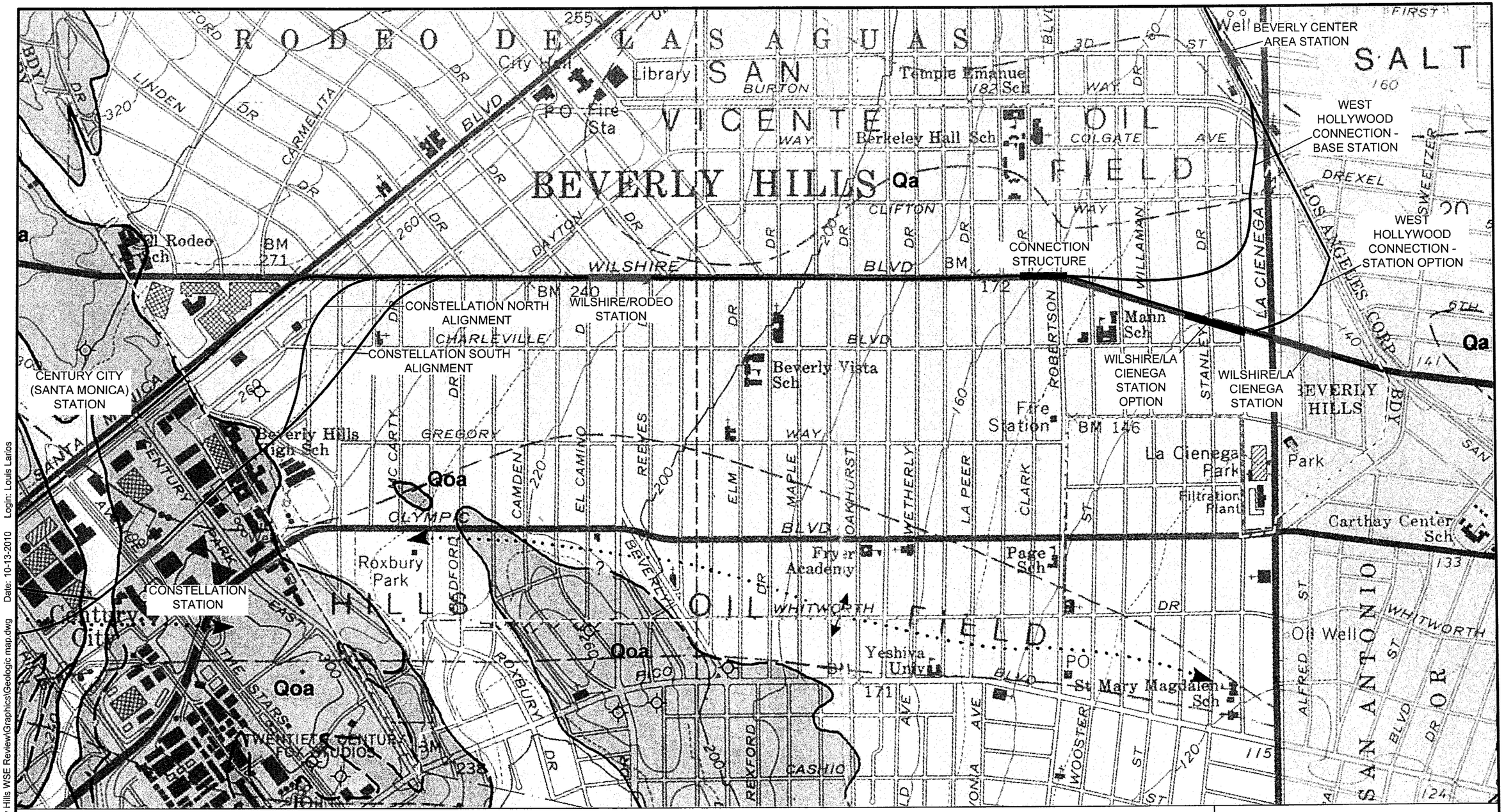
ALIGNMENT PLAN

October 2010 51-1-10024-001

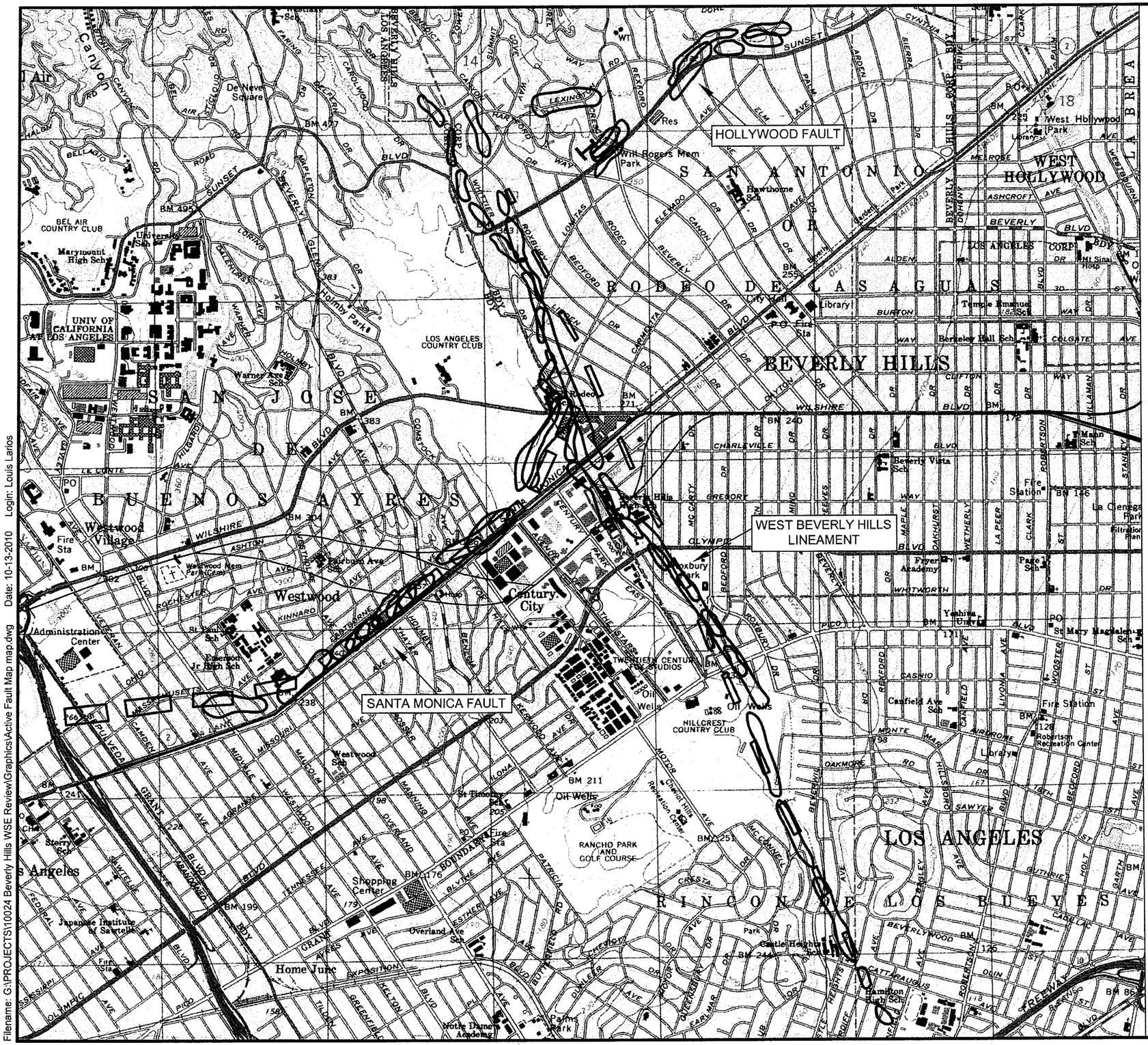
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 8 of 8

Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\plot plan.mxd Date:september 17, 2010 (LOL)



Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\Geologic map.dwg Date: 10-13-2010 Login: Louis Larios



LEGEND

- Proposed Base Alignment
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Metro Station Option
- Proposed Connection Structure
- City Boundary

Fault And Lineament Trace

- DEIR, 2010
- Dolan and others, 2000
- Tsutsumi, 1996

N

0 1000 2000 4000

SCALE: 1"=2000'

NOTE

Fault and lineament traces shown at approximate location. Width of zone based on scale of original source, and does not accurately represent fault zone.

Base map adapted from USGS Map of Beverly Hills, CA quadrangle, dated 1995.

Westside Subway Extension Review
Beverly Hills, California

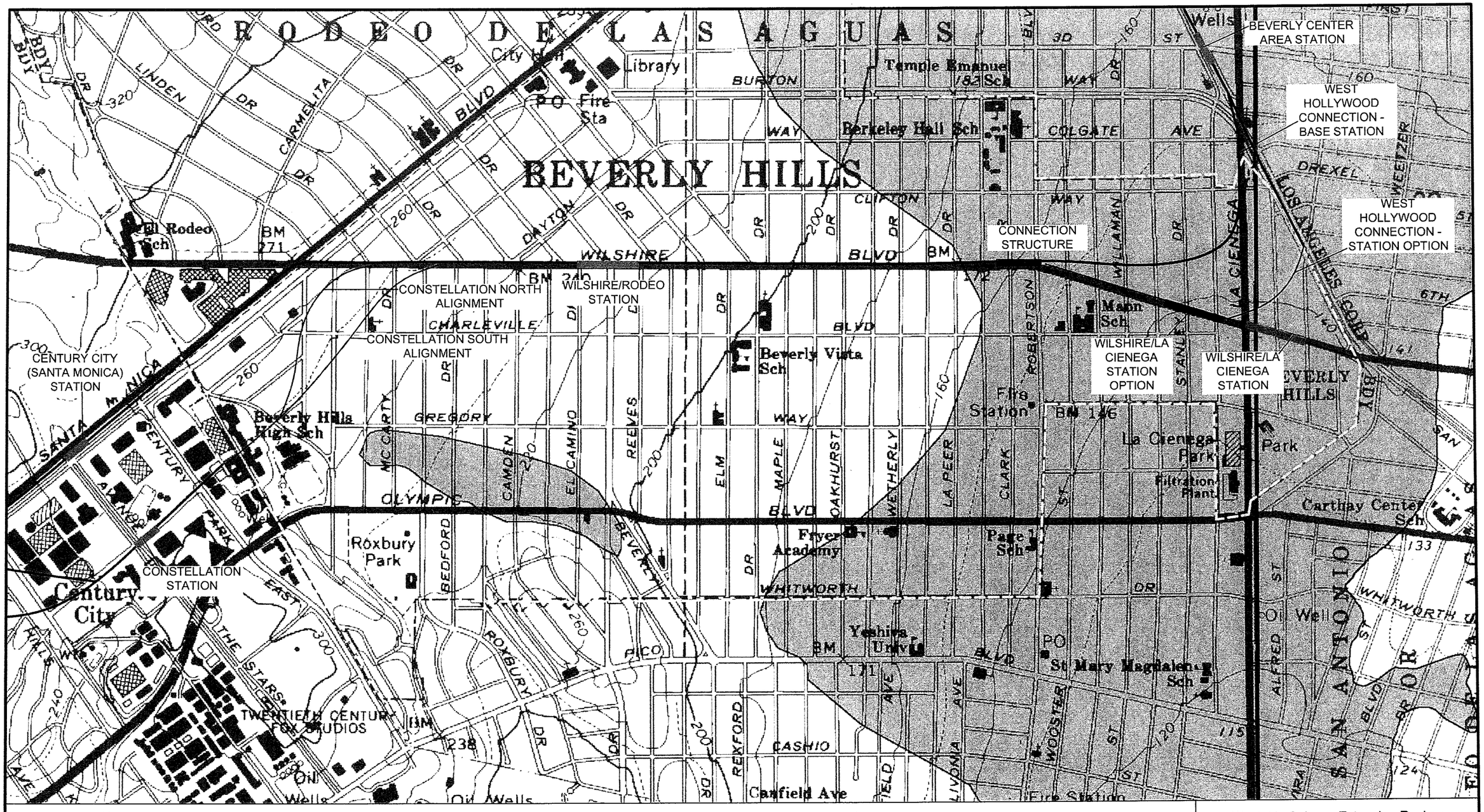
POTENTIALLY ACTIVE FAULT MAP

October 2010 51-1-10024-001

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 4

Filename: G:\PROJECTS\10024 Beverly Hills WSE Review\Graphics\Active Fault Map map.dwg Date: 10-13-2010 Login: Louis Larios



NOTE

Map adapted from Seismic Hazard Zones Map, Beverly Hills and Hollywood Quadrangles by Devision of Mines and Geology Dated 1999.

Westside Subway Extension Review
Beverly Hills, California

LIQUEFACTION POTENTIAL MAP

October 2010 51-1-10024-001

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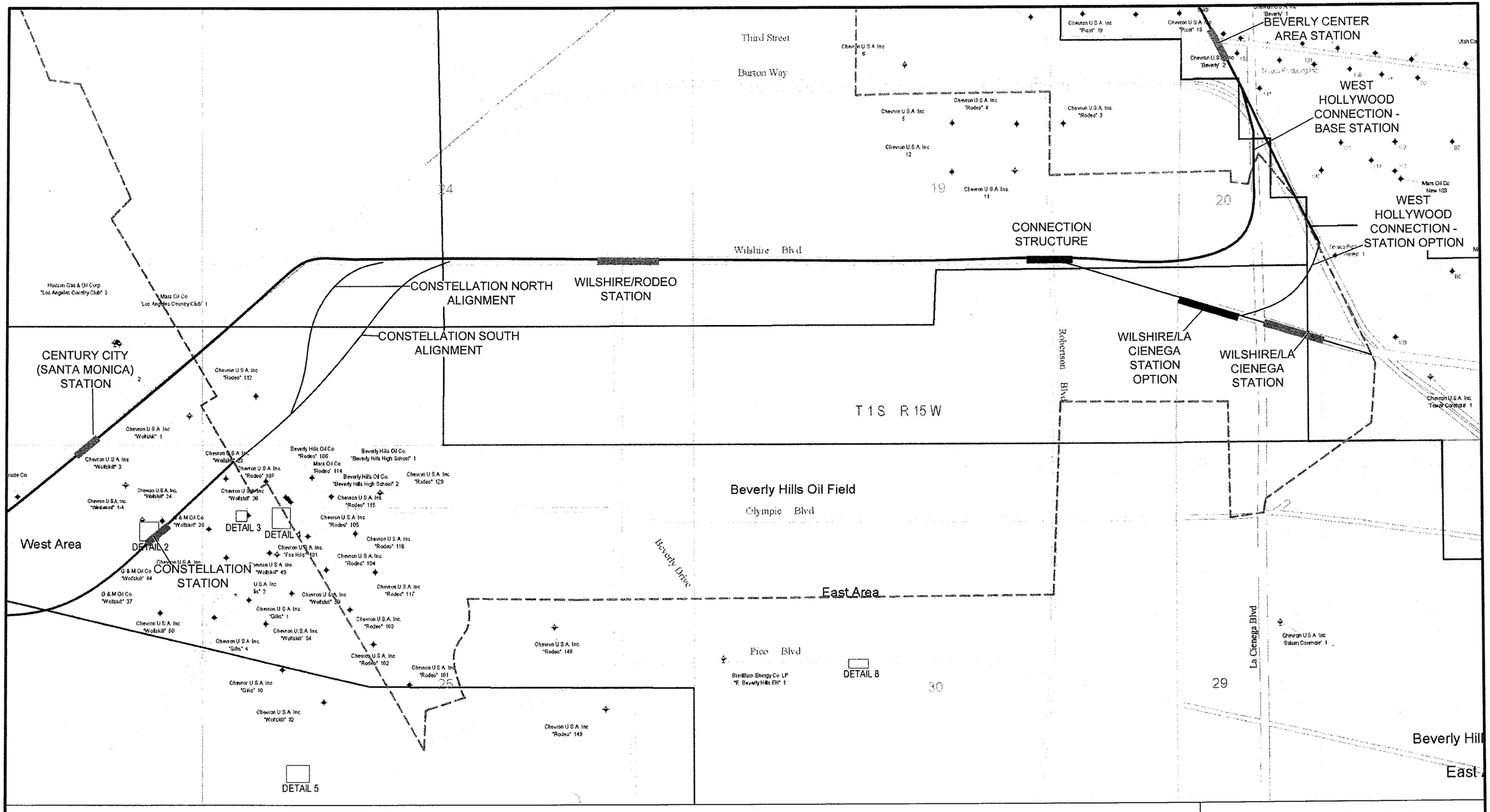
FIG. 5



LEGEND

- Proposed Base Alignment
- Proposed Optional Alignment
- Proposed Metro Base Station
- Proposed Metro Station Option
- Proposed Connection Structure
- City Boundary
- Oil Well - Plugged and abandoned - Dry Hole
- Oil Well - Plugged and abandoned - Oil
- Oil Field Boundary

0 500 1000 2000

SCALE: 1"=1000'

N

NOTE

Map adapted from Oil Well and Field Map, Sheets 118 and 117 by Department of Conservation

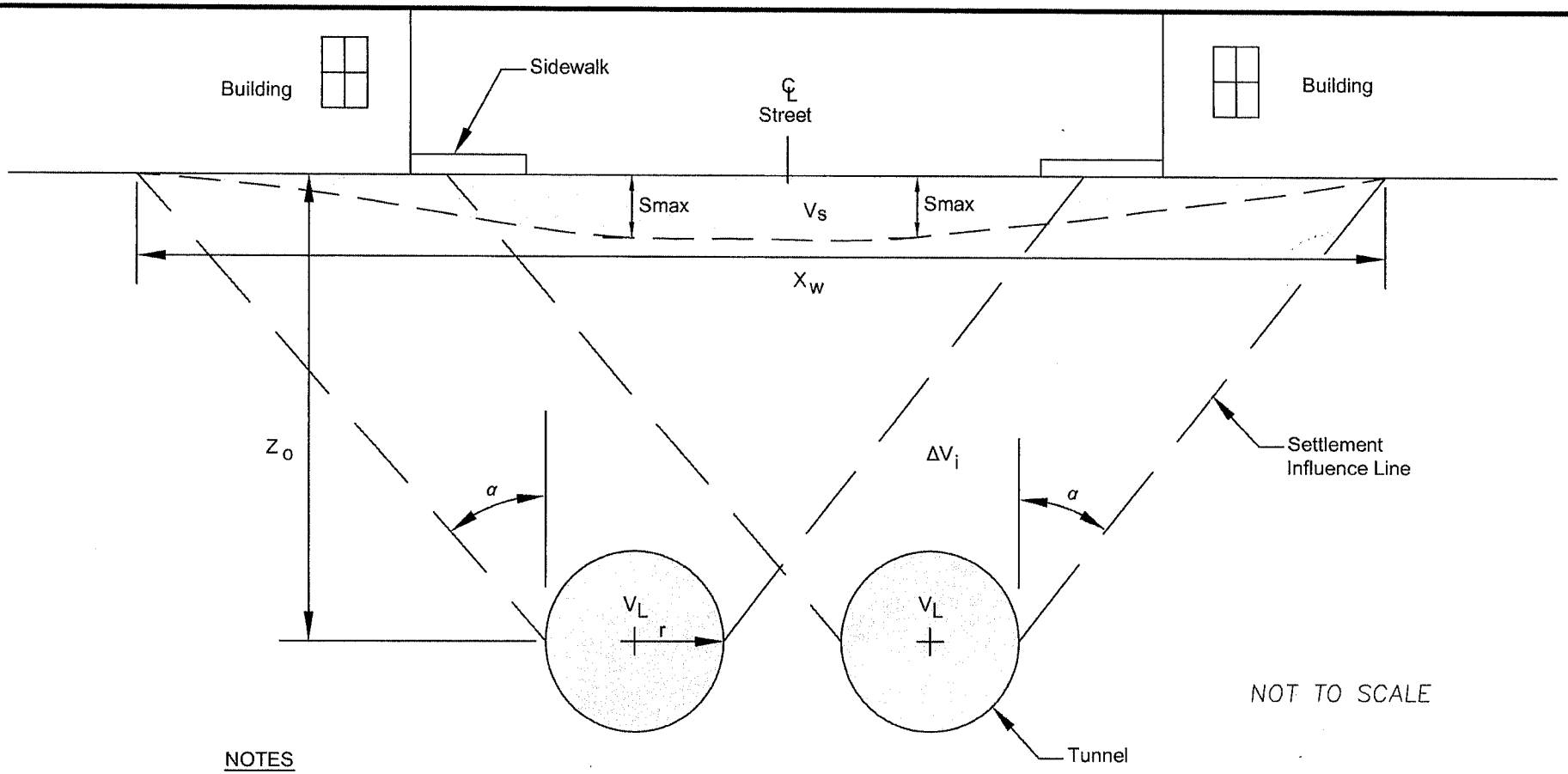
Westside Subway Extension Review
Beverly Hills, California

OIL FIELD AND WELLS MAP

October 2010 51-1-10024-001

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 6



NOTES

1. V_L = Volume loss from excess excavated from tunnel (Generally percentage of ideal tunnel volume)
2. ΔV_i =Bulking Factor (Decreases volume loss over tunnel)
3. V_S =Surface Volume ($V_S=V_L-\Delta V_i$)
4. X_W=Settlement Trough width centered on tunnels
5. Smax = Maximum surface settlement
6. α = Trough limits (Typically 30-45° from edge tunnel)

Westside Subway Extension Review
Beverly Hills, California

ILLUSTRATIVE GROUND SETTLEMENT

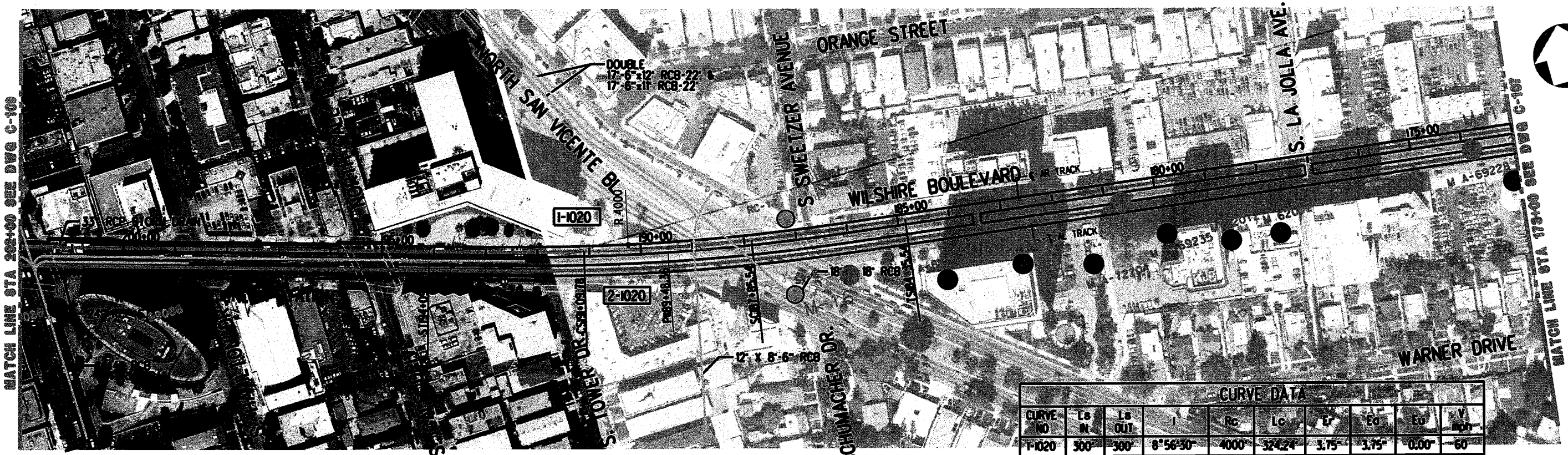
October 2010 51-1-10024-001

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 7

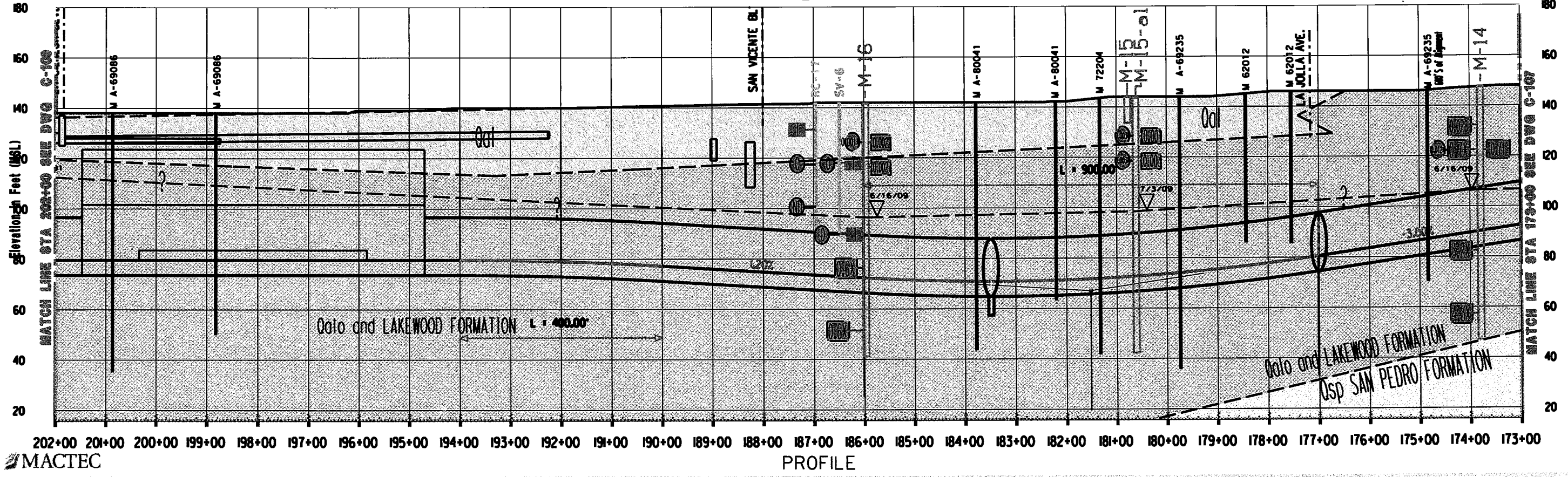
APPENDIX A

WESTSIDE SUBWAY EXTENSION ADVANCED CONCEPTUAL ENGINEERING (SELECTED PLAN & PROFILE)



CURVE NO	Ls IN	Ls OUT	I	Rc	Lc	Er	Ea	Eu	V mph
1-1020	300'	300'	8°56'30"	4000'	324.24'	3.75"	3.75"	0.00"	60
2-1020	300'	300'	8°56'29"	4039'	330.32'	3.75"	3.75"	0.00"	60

PLAN



PROFILE

MACTEC

PER
DLP/HP
MBH
FEB 10 2010

Metro

PB

PROJECT MANAGER _____

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

WESTSIDE SUBWAY EXTENSION
ADV. CONCEPTUAL ENGINEERING

PLAN & PROFILE
STATION 173+00 TO 202+00
ALTERNATIVE 1, 2, 3, 4 & 5

Plate 1.8
1"=200'

MACTEC

PER
DLP/HP
MBH
FEB 10 2010

Metro

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PROJECT MANAGER _____

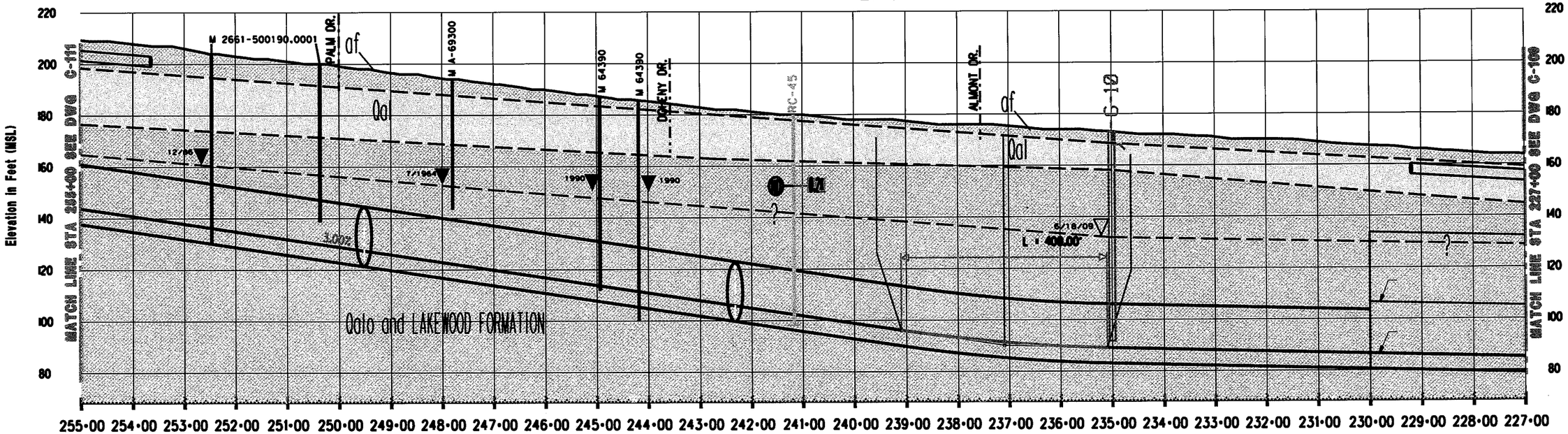
WESTSIDE SUBWAY EXTENSION
ADV. CONCEPTUAL ENGINEERING

PLAN & PROFILE
STATION 202+00 TO 227+00
ALTERNATIVE 1, 2, 3, 4 & 5

Plate 1.9
1"=200'

CURVE DATA									
CURVE NO	Ls IN	Ls OUT	I	Rc	Lc	Er	Eg	Eu	V mph
1-1040	0'	0'	0°13'27"	40000'	156.48'	0.75"	0"	0"	75
2-1040	0'	0'	0°13'27"	40000'	156.49'	0.75"	0"	0"	75

PLAN



PROFILE

MACTEC

PER
DLP/HP
MBH
FEB 10 2010

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

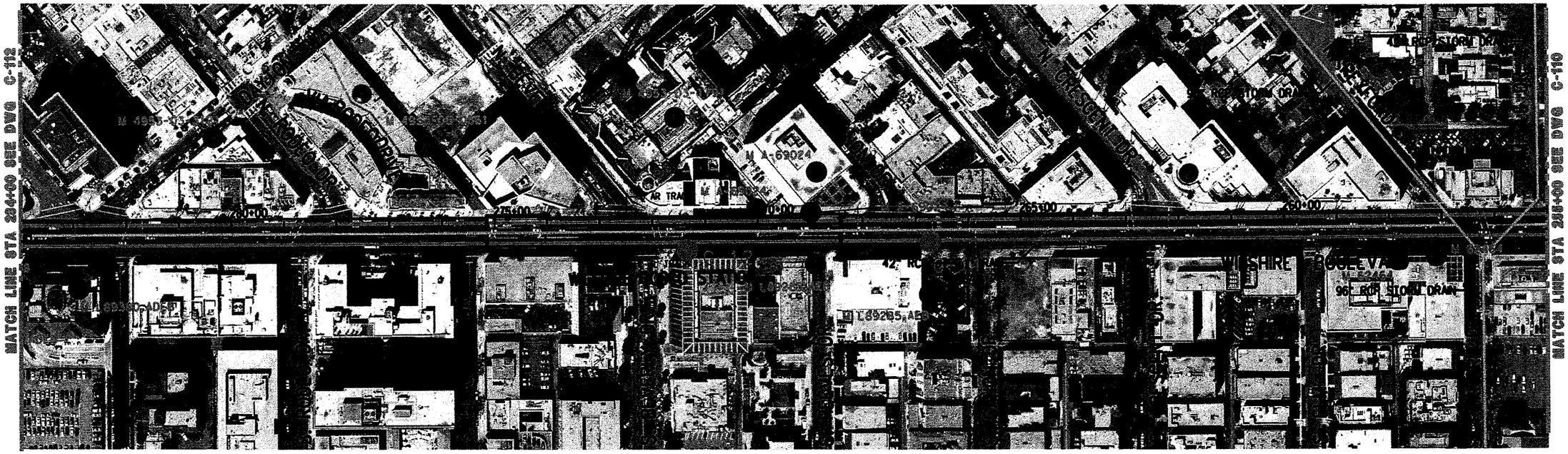
Metro

PROJECT MANAGER _____

WESTSIDE SUBWAY EXTENSION
ADV. CONCEPTUAL ENGINEERING

PLAN & PROFILE
STATION 227+00 TO 255+00
ALTERNATIVE 1, 2, 3, 4 & 5

Plate 1.10
1"=200'



PLAN

PROFILE

MACTEC

PER	
DLP/HP	
MBH	
FEB 10 2010	

Metro

PB

PROJECT MANAGER _____

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

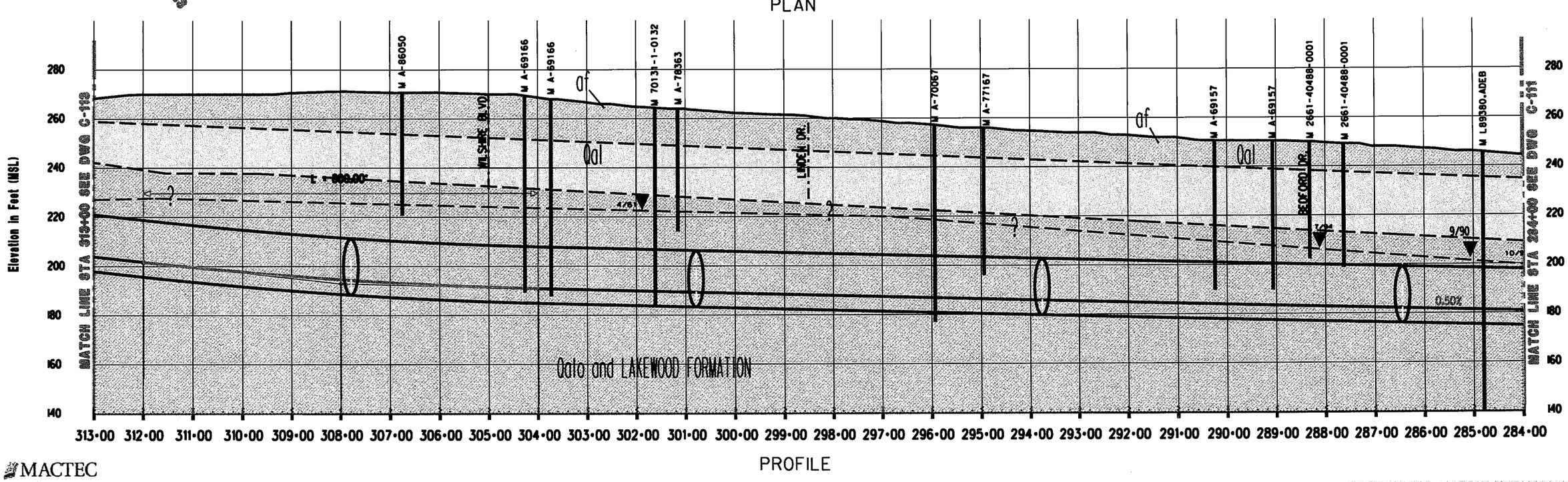
WESTSIDE SUBWAY EXTENSION
ADV. CONCEPTUAL ENGINEERING

PLAN & PROFILE
STATION 255+00 TO 284+00
ALTERNATIVE 1, 2, 3, 4 & 5

Plate 1.11

1"=200'

PLAN



PROFILE

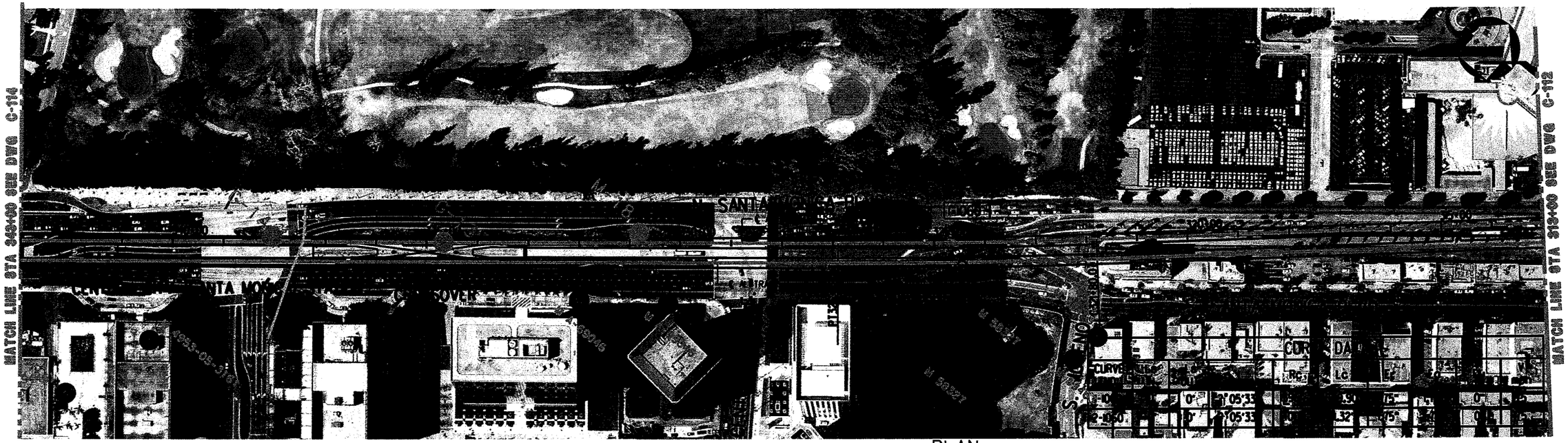
MACTEC

	PER DLP/HP MBH FEB 10 2010	LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY Metro PB PROJECT MANAGER _____

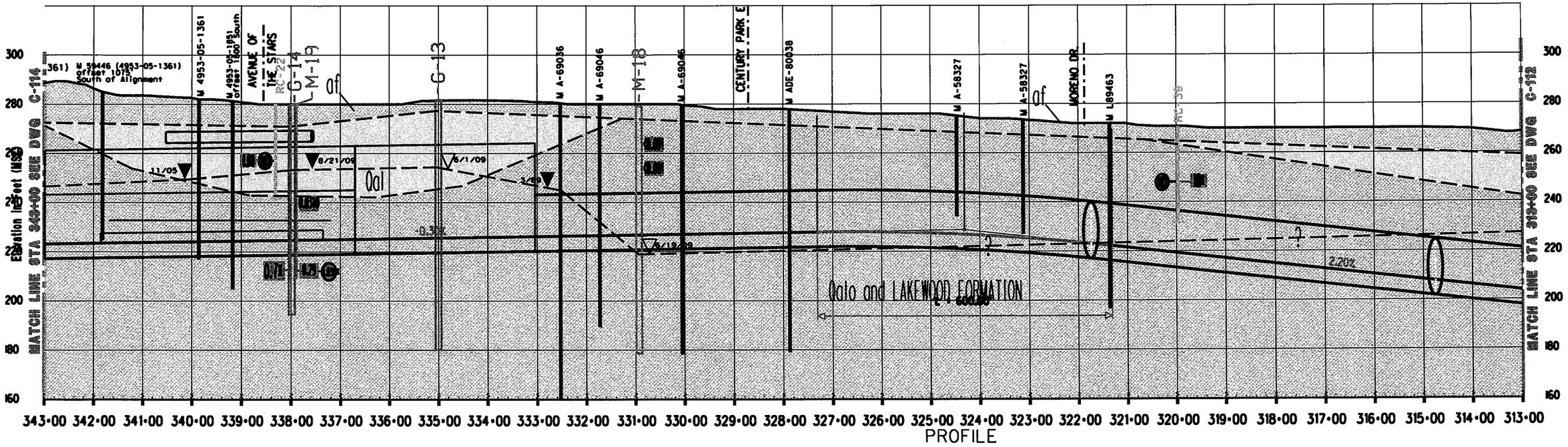
WESTSIDE SUBWAY EXTENSION
ADV. CONCEPTUAL ENGINEERING

PLAN & PROFILE
STATION 284+00 TO 313+00
ALTERNATIVE 1, 2, 3, 4 & 5

Plate 1.12
1"=200'



PLAN



PROFILE

MACTEC

PER
DLP/HP
MBH
FEB 10 2010

Metro

PB

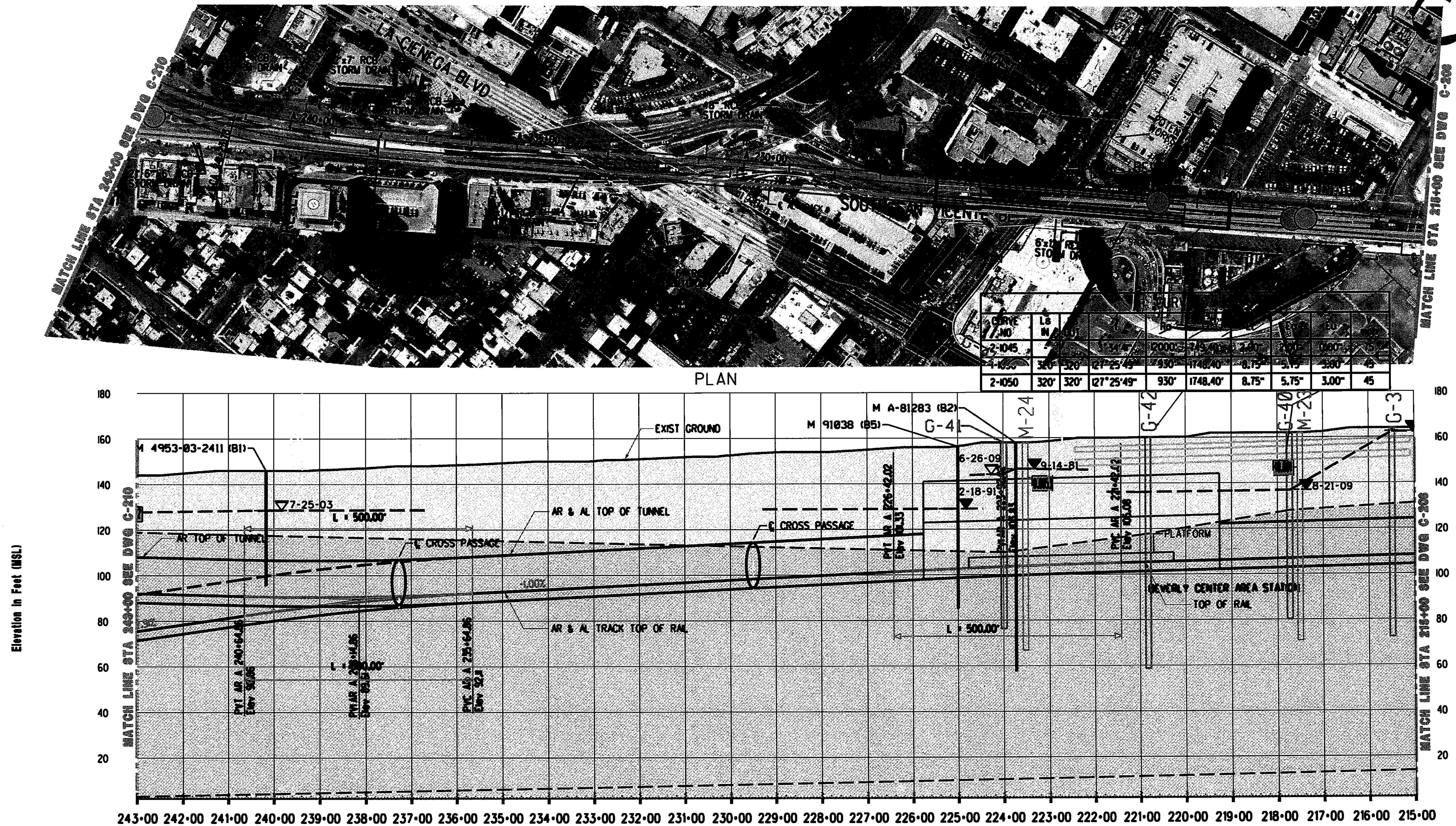
PROJECT MANAGER _____

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

WESTSIDE SUBWAY EXTENSION
ADV. CONCEPTUAL ENGINEERING

PLAN & PROFILE
STATION 313+00 TO 343+00
ALTERNATIVE 1, 2, 3, 4 & 5

Plate 1.13
1"=200'



PROFILE

MACTEC

PER
DLP/HP
MBH
FEB 10 2010

Metro

PB

PROJECT MANAGER

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

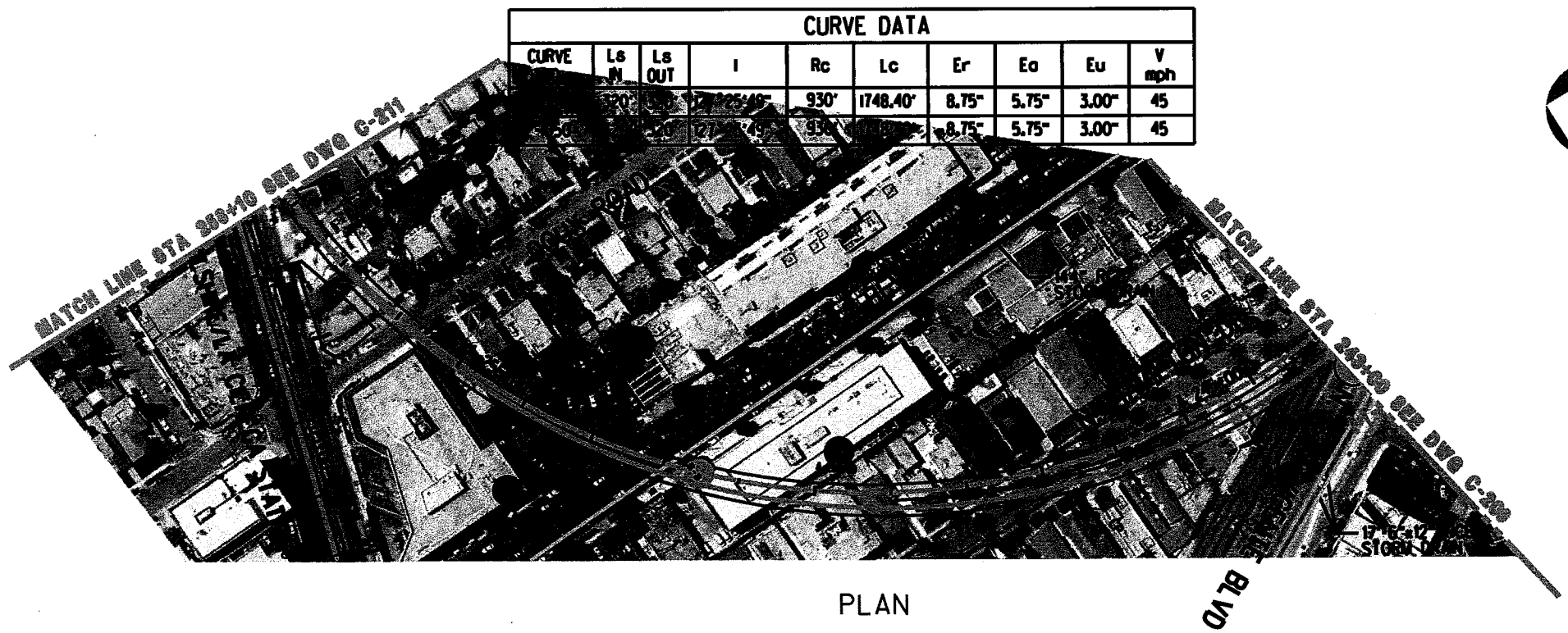
WESTSIDE SUBWAY EXTENSION
ADV. CONCEPTUAL ENGINEERING

PLAN & PROFILE
STATION 215+00 TO 243+00
ALTERNATIVE 4 & 5

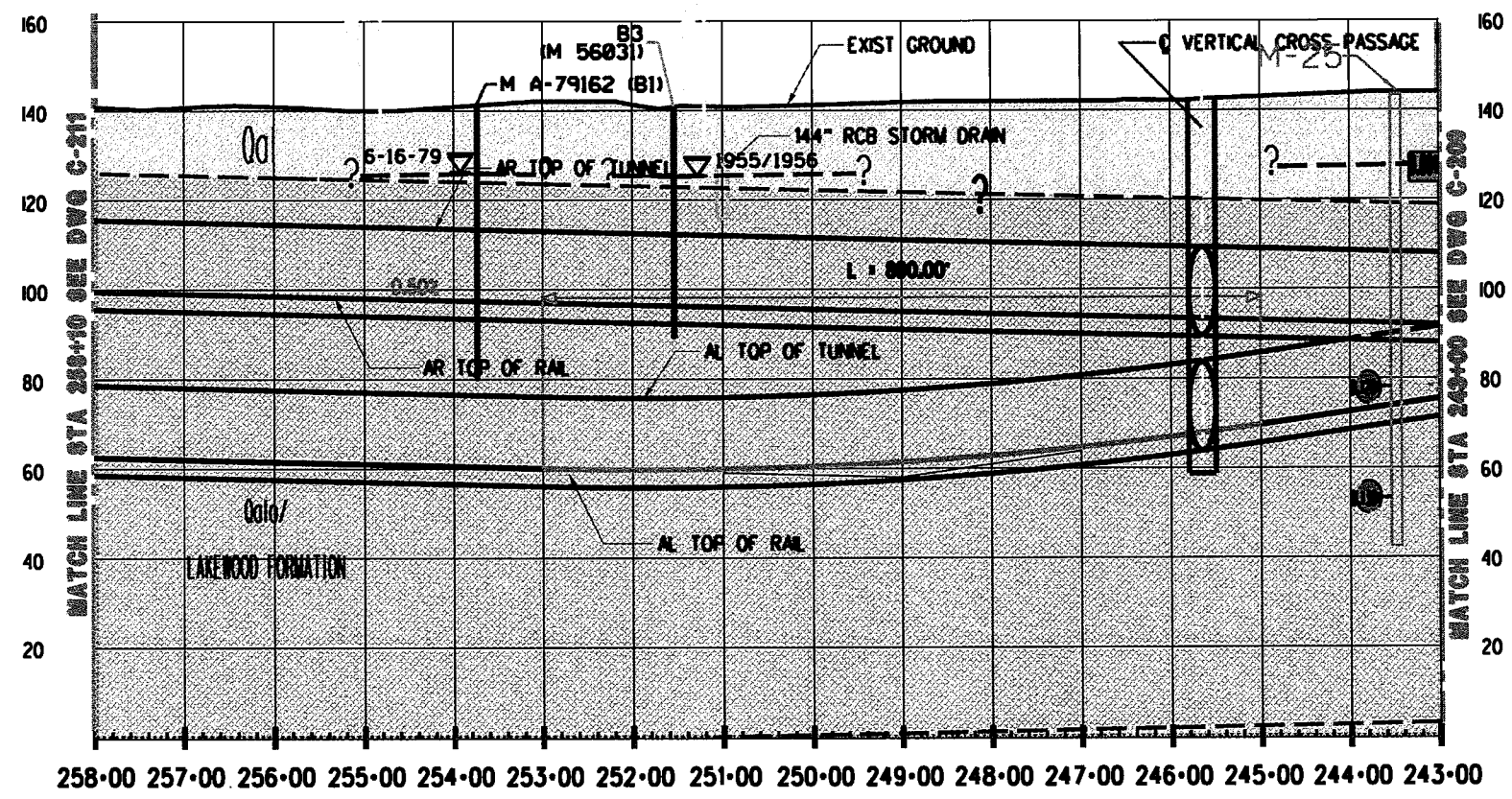
Plate 1.34

1"=200'

CURVE DATA									
CURVE	Ls IN	Ls OUT	I	Rc	Lc	Er	Ea	Eu	V mph
				930'	1748.40'	8.75"	5.75"	3.00"	45
				930'		8.75"	5.75"	3.00"	45



PLAN



PROFILE

MACTEC

PER	
DLP/HP	
MBH	
FEB 10 2010	

Metro

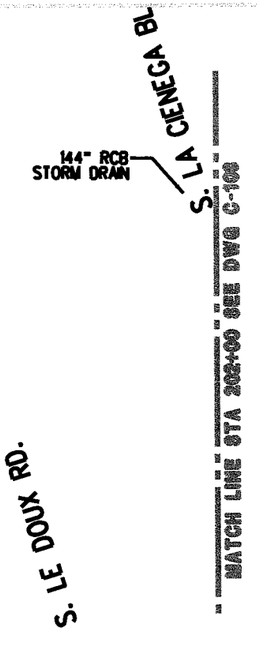
PROJECT MANAGER _____

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

WESTSIDE SUBWAY EXTENSION
ADV. CONCEPTUAL ENGINEERING

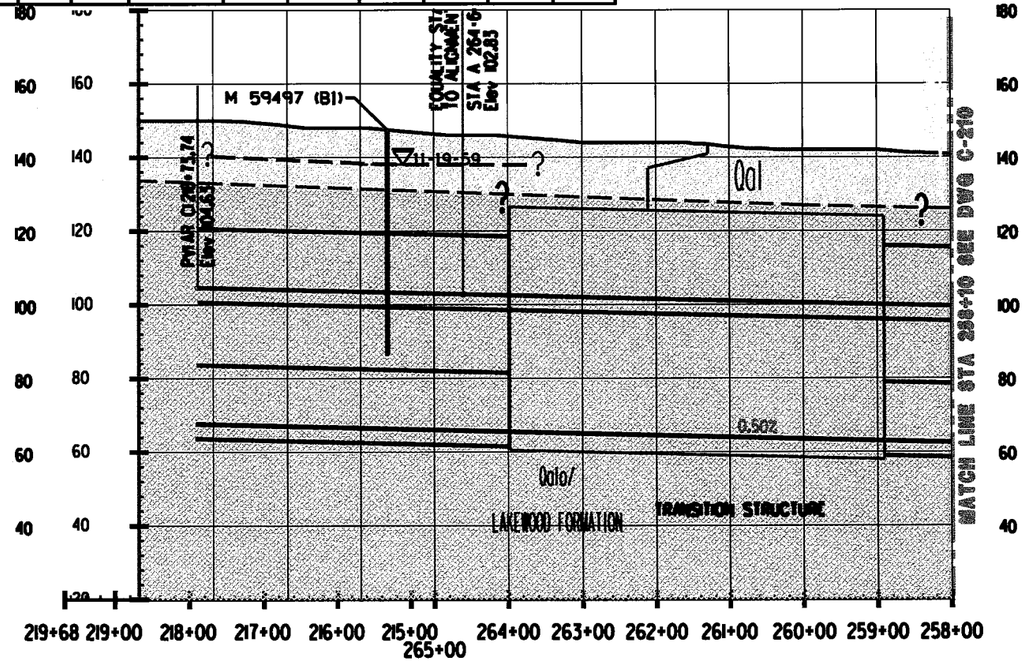
PLAN & PROFILE
STATION 243+00 TO 258+10
ALTERNATIVE 4 & 5

Plate 1.35
1"=200'



PLAN

CURVE DATA									
CURVE NO	Ls IN	Ls OUT	I	Rc	Lc	Er	Ea	Eu	V mph
1-1030	300'	300'	16°34'14"	1839'	231.86'	7.85"	4.00"	3.85"	60
2-1030	300'	300'	16°34'14"	1800'	220.58'	8.02"	4.25"	3.77"	60



PROFILE

MACTEC

PER
DLP/HP
MBH
FEB 10 2010

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

Metro

PB

PROJECT MANAGER

WESTSIDE SUBWAY EXTENSION
ADV. CONCEPTUAL ENGINEERING

PLAN & PROFILE
STATION 200+00 TO 227+00
ALTERNATIVE 4 & 5

Plate 1.36
1"=200'

APPENDIX B

IMPORTANT INFORMATION ABOUT YOUR REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 51-1-10024-001

Date: October 13, 2010
To: City of Beverly Hills
Attn: Mr. Aaron Kunz

Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors, which were considered in the development of the report, have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based on interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland