AGENDA ITEM NO. 6

CITY OF HAWTHORNE
CITY COUNCIL
AGENDA BILL
For the meeting of August 22, 2017
Originating Departments: City Attorney/City Manager

City Manager: Arnold Shadbehr City Attorney: Russ Miyahira

SUBJECT

Resolution No. 7922, A Resolution of the City Council of the City of Hawthorne, California, Approving a Subsurface Easement Agreement to Allow The Boring Company to Construct and Operate a Test Tunnel for Zero Emission Subterranean Transportation Under Portions of Crenshaw Boulevard, the Hawthorne Municipal Airport and 120th Street, and Making a Determination of Exemption under the California Environmental Quality Act.

RECOMMENDATION

Approve Resolution No. 7922 (Attachment 1), direct the City Manager to obtain an appraisal of the value of the Subsurface Easement for confirmation by the City Council at a subsequent meeting, and authorize the Mayor to execute the Subsurface Easement Agreement (Attachment 2) upon the City Council’s confirmation of the appraised value and purchase price, and for City Staff to take other implementing actions.

EXECUTIVE SUMMARY

This agenda item is to review, hold a public hearing on, and then adopt Resolution No. 7922 approving a Subsurface Easement Agreement between the City and The Boring Company by which the City would allow the Boring Company to construct and operate a Test Tunnel for Zero Emission Subterranean Transportation under Portions of Crenshaw Boulevard, the Hawthorne Municipal Airport and 120th Street and to make a determination that the project is exempt from CEQA.

BACKGROUND

The Boring Company Corporation (TBC), in conjunction with its parent company, Space Exploration Technologies Inc. (SpaceX), is proposing to construct a subterranean tunnel that would provide for research and development and testing of a concept for an alternative travel option for personal vehicles and pedestrians that would use zero emissions and transport
passengers below ground. The project is known as “Test Tunnel for Zero Emission Subterranean Transportation” or simply the “Test Tunnel.” The City is asked to grant a subsurface easement to TBC to allow TBC to construct and operate the Test Tunnel underneath certain publicly controlled and owned property in the City.

A. Description of the Test Tunnel

The proposed Test Tunnel would extend from the parking structure opposite the existing SpaceX facility at 1 Rocket Road in the City of Hawthorne to a surface parking lot adjacent to commercial facilities at the intersection of 120th Street and Hawthorne Boulevard. The proposed route and location of the Test Tunnel is depicted on Attachment 3 to this Staff Report.

The City is being asked to approve the use of a defined subterranean area beneath certain portions of Crenshaw Boulevard, the Hawthorne Municipal Airport and 120th Street for the construction and operation of the Test Tunnel. The City is not asked to approve, and the City’s Subsurface Easement Agreement does not grant to TBC permission for, any surface excavations along the route of the Test Tunnel. The only excavations from the surface of the ground downward to the Easement Area will occur on private property at the beginning and ending points of the Test Tunnel.

The Test Tunnel would be approximately 2 miles long and located at a depth of between 22 feet and 44 feet below ground surface so as to avoid any identified utilities. The project would use a tunnel boring machine (TBM) that digs a tunnel with an exterior diameter of approximately 13.5 feet and interior diameter of approximately 12 feet.

The Test Tunnel would start on private parking lot owned by SpaceX that is opposite the existing SpaceX facility at 1 Rocket Road. It would run northerly underneath that parking lot and then arc underneath Crenshaw Boulevard at a point that is approximately 160 feet south of 120th Street, then continue underneath the northeasterly corner of land that is part of the Hawthorne Municipal Airport for a distance of approximately 150 feet and then westerly underneath 120th Street for approximately 7,721 feet to a terminus point approximately 100 feet west of Hawthorne Boulevard. The approximate 150 foot portion under the Hawthorne Municipal Airport would not be located underneath the runway of the Airport.

Of this 2 mile long Test Tunnel, approximately 8,600 linear feet of it would be located underneath publicly controlled or publicly owned property that is comprised of Crenshaw Boulevard, the Hawthorne Airport and 120th Street. At the western terminus point of the Test Tunnel, TBC would either make a surface excavation down to the tunnel’s terminus so as to remove those portions of the TBM that cannot be removed through the original starting point of the Test Tunnel or abandon the portions of the TBM in place that cannot be removed from the original starting point. If the first option is undertaken, TBC would acquire an approximately 30-foot by 20-foot “exit” point for the TBM and use this exit point to remove portions of the TBM. This exit point would be located on property acquired by Space X that currently is improved as a surface parking lot adjacent to commercial facilities on the westerly side of the intersection of 120th Street and Hawthorne Boulevard.
When the project is completed, the Test Tunnel would house a “skate” system that would be tested to prove the viability for transporting pedestrians or personal vehicles. The concept is that a vehicle would be drive onto the skate, the engine would be turned off and the vehicle and its passenger would be transported from one end of the Test Tunnel to the other. The Test Tunnel project would involve SpaceX engineers repeatedly testing and experimenting with personal vehicle types suitable for placement on the skates; refinement of the design and technology; and general data collection on performance, durability, and application. No public use of the Test Tunnel would occur, and no people would be occupying vehicles located on the skates as the skates are tested within the tunnel. All access for skates loading and testing would be from the SpaceX parking lot end of the tunnel.

B. Construction

Construction is anticipated to take approximately 5 months to complete. Construction would occur daily during the hours permitted by the City (7 a.m. to 7 p.m. Monday through Friday, and 9 a.m. through 5 p.m. Saturday and Sunday). Construction would progress from south to north, east to west, with all staging and the majority of truck activity at the southeast entry/exit point. The TBM would be plugged in to the grid and all other off-road construction equipment would meet or exceed the Environmental Protection Agency’s Tier 4 Final emissions standard or equivalent. All trucks would access/exit the I-105 freeway directly from the Crenshaw Boulevard off/on ramps. The Test Tunnel includes a fire prevention plan that identifies regulations and common industry safety practices designed to reduce risk of fire in the tunnel during construction and operation. A settlement monitoring plan is included in the permit application, which identifies automated real-time settlement monitoring and if exceedance of thresholds (one-half inch of settlement) is detected, construction is halted immediately. The Test Tunnel also includes implementation of established standard industry practices for testing soil and groundwater, including testing and, if contaminated, disposal at an authorized disposal facility in the unlikely event it is encountered. The Test Tunnel will also include a ventilation plan created by Professional California Engineer and all considerations for worker health and safety, including ventilation and fire procedures as well as encountering gas and the stability of excavation areas, shall be governed by the California Office of Health and Safety (CalOSHA) Division of Tunneling and Mining classifications permit. Construction of segments cannot progress without coverage of each portion from that CalOSHA permit.

C. Boring Process

Construction would consist of initial excavations and tunnel construction using the TBM to create the tunnel and install prefabricated concrete segments behind it. The TBM cuts at a rate of approximately 3 inches per minute, with a cycle of approximately equal amounts of cutting and cooling. It is anticipated that the TBM would achieve up to 60 feet of advancement daily. As the TBM advances, it passes excavated material onto a conveyor belt that deposits that material into a waiting truck for disposal at a suitable facility, most likely the same one as used for material disposal by Los Angeles (LA) Metro for the Regional Connector Transit Connector (RCTC) project. It is estimated that 40 trucks a day would haul away material from the entry site near 1 Rocket Road, assuming regular dump trucks with a capacity of approximately 15 cubic yards. The concrete segments would be approximately 5-foot-long segments and delivered by truck,
with up to 12 truck trips per day. An additional two trucks per day would deliver additional materials, such as soil binders. A total of 20 workers a day are expected for the boring.

D. FAA Review

On July 27, 2017, the Federal Aviation Administration (FAA) issued a Final Determination Letter. In that letter, the FAA stated that it does not object to the construction of the Test Tunnel provided the project is undertaken in compliance with several existing regulations required by the FAA. See copy of the FAA Letter attached hereto as Attachment 4 to this Staff Report.

E. Public and Private Utility Review

TBC and the City have been having ongoing communications with all known utility companies and entities have some improvements in, along or across the portions of the Test Tunnel route to make sure the Test Tunnel is designed to avoid and not impact any of those utilities and to address their concerns and issues.

APPROVALS FROM THE CITY

The City’s approval for the construction and operation of the Test Tunnel is required because of its proposed use of the subterranean area under property controlled or owned by the City. The City’s property that is affected includes a defined subterranean area within a portion of the public street right of way of Crenshaw Boulevard and 120th Street as well as approximately 150 feet under the northeast corner of the Hawthorne Municipal Airport. The Test Tunnel does not involve tunneling underneath private property except for the beginning of the tunnel on property owned by SpaceX. SpaceX or TBC may acquire a private parking lot at the proposed terminus of the Test Tunnel.

City staff and City consultants have determined that permission to use these subterranean areas requires two initial approvals from the City: (1) the grant of a subsurface easement through approval of a subsurface easement agreement; and (2) the issuance of an Encroachment Permit. The subsurface easement is required to allow for the permanent occupancy of defined portions of the public right of way under the surface of Crenshaw Boulevard and 120th Street and underneath a portion of the Hawthorne Municipal Airport. The Subsurface Easement Agreement has been submitted by City staff to the City Council for approval. The Encroachment Permit is required to allow for construction within the public right of way and is a ministerial permit approved by City Staff upon approval of the Subsurface Easement Agreement by the City Council. Upon completion of construction of the Test Tunnel, if TBC decides to excavate an exit point at the terminus of the Test Tunnel so as to remove the TBM, then an additional ministerial Excavation Permit would be processed and issued by City staff to allow for the excavation of that terminus point.

A. Subsurface Easement Agreement

The proposed Subsurface Easement Agreement ("Subsurface Easement" or "Easement") is Attachment No. 2 to this Staff Report and would allow for the construction and use of a subsurface area that is defined as having a circular diameter of 14 feet wide and approximately 8,600 feet long and located 22 to 44 feet beneath the surface of the ground. This is defined as the "Easement Area." Within that Easement Area, the Test Tunnel would have an exterior
diameter of approximately 13.5 feet and interior diameter of approximately 12 feet. This Easement Area is underneath a portion of Crenshaw Boulevard and 120th Street and the northeast corner of the Hawthorne Municipal Airport. The City is not representing or warranting title or condition of the Easement Area.

The Subsurface Easement Agreement allows for the construction and use of the Test Tunnel in the defined Easement Area. The construction and uses are described in Exhibit B to the Subsurface Easement Agreement. TBC is required to provide notice to and consult with all utilities to ensure that the Test Tunnel will not interfere with, or impair the use, operation or safety of, those utilities. (See Sections 4 (c), (g), Section 5). City staff will not issue an Encroachment Permit unless and until the City Engineer is satisfied that all steps to avoid or relocate utilities have been addressed. (See Section 4 (c)).

The Easement memorializes TBC’s commitment to monitor for potential subsidence caused by the boring process and to inform the City on a daily basis of the results of the monitoring process. In the event there is any subsidence of ½ inch or greater, TBC will stop the boring work until the subsidence is stopped and corrected. TBC will be responsible for the cost of any repair work required to address the impact of the boring process on public and private utilities and on the City’s street and property.

TBC is required to reimburse the City for all reasonable and documented costs and expenses incurred by the City in preparing and processing the Subsurface Easement Agreement, the City’s expert consultants, environmental review, and other related costs. In addition, TBC is to obtain a Letter of Credit from a City-approved institution providing funds that the City may draw upon for authorized costs that are not paid for by TBC (See Section 6 (b)). TBC is required to maintain specified types and levels of insurance and to indemnify the City for any and all type of claims, lawsuits and liabilities arising not only for the grant of the Subsurface Easement Agreement and Encroachment Permit but also for the damage and injuries resulting from the use or operation of the Test Tunnel.

Finally, TBC is required to compensate the City for the fair market value of the Subsurface Easement. The City is in the process of obtaining an appraisal of the fair market value of the Subsurface Easement. When that dollar amount is determined, City Staff will bring back an agenda item to confirm that appraised amount, to direct City Staff to insert that amount into the Easement Agreement prior to the execution and recordation of the Easement Agreement. In this way, the City Council will be permitted to move forward with the public hearing and agenda item with the assurance that the City Council will confirm the sales price of the Easement prior to file execution and recordation of the Easement.

B. City Council Determinations under the Hawthorne Municipal Code

Section 3.32.10 of the Hawthorne Municipal Code requires the City Council to make certain findings in connection with the sale of real property. Specifically, Subsection (F) of that Section requires the City Council to find that the property is being sold upon condition that it be used, maintained or developed in a specified manner for its fair market value or less, when the City Council, by not less than a three-fifths vote of all members thereof, determines that the public good and interest would be served by such sale or lease and adopts a resolution ordering the
same. The Easement Agreement will convey an easement interest in specified property under the ownership or control of the City that will allow for the construction of the Test Tunnel. The specific structure and uses that may be placed and used in the Test Tunnel are specified in the Easement. In addition, the Easement Agreement requires payment to the City for the fair market value of the grant of the Easement. That fair market value will be determined by an appraiser and confirmed by the City Council prior to execution of the Easement Agreement. Finally, a resolution is presented with this agenda item by which the City Council will approve the Easement and make findings that the public good and interest would be served by the conveyance of the Easement to TBC.

C. Encroachment Permit

Upon the City Council’s grant of the Subsurface Easement Agreement, City staff will continue to work with TBC to finalize the engineering drawings for construction, and after satisfaction that all construction issues have been addressed, the City Engineer will process and issue an Encroachment Permit allowing construction of the Test Tunnel in the Easement Area.

ENVIRONMENTAL REVIEW

City staff and consultants have evaluated the project and determined that the approval of the Subsurface Easement Agreement and issuance of an Encroachment Permit are exempt from review from the California Environmental Quality Act (CEQA) pursuant to the Class 32 Categorical Exemption for “In-Fill Development Projects” as provided in Sections 15332 of the State CEQA Guidelines (Title 14 of the California Code of Regulations) because the project satisfies the criteria for use of that exemption as more fully described in the Determination of Exemption document that was prepared in connection with the project and which is attached hereto as Attachment 5 to this Staff Report.

As described in the attached environmental documentation, the applicant provided environmental information regarding project, which was independently reviewed by the City’s environmental consultant. Upon completion of the independent review, the City’s consultant undertook the analysis of whether the project qualified for any of CEQA’s exemptions. Although various exemptions were considered, the determination was made that the project qualifies for the Class 32 categorical exemption for In-fill Development. Based on that conclusion, staff recommends that the City Council find the project exempt from CEQA pursuant to State CEQA Guidelines Section 15332, which is included in the draft resolution presented for Council consideration.

PUBLIC HEARING NOTICE

Public notice of tonight’s public hearing on this item was published in the Hawthorne Press Tribune on August 10, 2017. A copy of the published notice is attached as Attachment 6 to this Report.

NEXT STEPS/CONCLUSION

The City Council should open the public hearing, hear the staff presentation, take public testimony, close the public hearing, and adopt Resolution 7922 approving the Subsurface
Easement Agreement and authorizing additional actions in connection with the approval of the Test Tunnel. Pursuant to Resolution 7922 and the Subsurface Easement Agreement, the City Council will confirm the appraised value of the Subsurface Easement by subsequent action prior to the Execution and recordation of the Subsurface Easement Agreement.

**Attachments:**
1. Resolution 7922
2. Subsurface Easement Agreement (with Exhibits A and B)
3. Map Depicting Route of Test Tunnel
5. CEQA Environmental Determination (with Appendix A)
6. Notice of Public Hearing
RESOLUTION NO. 7922

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF
HAWTHORNE APPROVING A SUBSURFACE EASEMENT
AGREEMENT TO ALLOW THE BORING COMPANY TO
CONSTRUCT AND OPERATE A TEST TUNNEL UNDER
PORTIONS OF CRENSHAW BOULEVARD, THE HAWTHORNE
MUNICIPAL AIRPORT AND 120TH STREET AND MAKING A
DETERMINATION OF EXEMPTION UNDER THE CALIFORNIA
ENVIRONMENTAL QUALITY ACT

WHEREAS, in May, 2017, The Boring Company Corporation ("TBC"), in
conjunction with its parent company, Space Exploration Technologies, Inc.
("SpaceX"), submitted plans to the City of Hawthorne ("City") to construct and
operate a subterranean tunnel that would provide for research and development
and testing of a concept for an alternative travel option for personal vehicles and
pedestrians that would use zero emissions and transport passengers below
ground. The project is known as "Test Tunnel for Zero Emission Subterranean
Transportation" or simply the "Test Tunnel"; and

WHEREAS, TBC seeks a subsurface easement from the City to construct
and operate the Test Tunnel underneath portions of Crenshaw Boulevard and
120th Street and underneath a portion of the Hawthorne Municipal Airport. This
easement, as more fully described herein and in the Subsurface Easement
Agreement that is attached hereto as Exhibit A, is hereafter referred to as the
"Subsurface Easement" or "Easement"; and

WHEREAS, Chapter 3.32 of the Hawthorne Municipal Code requires the
City Council to make certain findings in connection with the sale of real property.
Specifically, Subsection (F) of that Section requires the City Council to find that
the property is being sold upon condition that it be used, maintained or
developed in a specified manner for its fair market value or less, when the City
Council, by not less than a three-fifths vote of all members thereof, determines
that the public good and interest would be served by such sale or lease and
adopts a resolution ordering the same; and

WHEREAS, the Test Tunnel would be approximately 2 miles long and
located at a depth of between 22 feet and 44 feet below ground surface so as to
avoid any identified utilities and would be created by a tunnel boring machine that
would dig a tunnel with an exterior diameter of approximately 13.5 feet and
interior diameter of approximately 12 feet; and

WHEREAS, the Test Tunnel would have its starting and entry point at a
private parking lot owned by SpaceX that located easterly of the existing SpaceX
facility at 1 Rocket Road. The Test Tunnel would run northerly underneath that
parking lot and then enter the Subsurface Easement where it would arc
underneath Crenshaw Boulevard at a point that is approximately 160 feet south
of 120th Street, then continue within the Subsurface Easement underneath the northeasterly corner of land that is part of the Hawthorne Municipal Airport for a distance of approximately 150 feet and then westerly within the Subsurface Easement underneath 120th Street for approximately 7,721 feet to a terminus point approximately 100 feet west of Hawthorne Boulevard. The approximate 150 foot portion under the Hawthorne Municipal Airport would not be located underneath the runway of the Airport; and

WHEREAS, Approximately 8,600 linear feet of the proposed 2 mile long Test Tunnel would be located underneath publicly controlled or publicly owned property that is comprised of Crenshaw Boulevard, the Hawthorne Municipal Airport and 120th Street and thus requires permission to locate underneath those City controlled and owned facilities by the approval of the Subsurface Easement; and

WHEREAS, the Subsurface Easement Agreement does not include or allow excavations from the ground surface along Crenshaw Boulevard, the Hawthorne Municipal Airport or 120th Street down to the Test Tunnel or the Subsurface Easement; and

WHEREAS, the Test Tunnel would house a “skate” system that would be tested to prove the viability for transporting pedestrians or personal vehicles. The concept is that a vehicle would be drive onto the skate, the engine would be turned off and the vehicle and its passenger would be transported from one end of the Test Tunnel to the other; and

WHEREAS, the Test Tunnel project would involve SpaceX engineers testing and experimenting with personal vehicle types suitable for placement on the skates; refinement of the design and technology; and general data collection on performance, durability, and application; and

WHEREAS, the Test Tunnel would not be used for public transportation purposes and no public use of the Test Tunnel would occur. However, the Test Tunnel would be used to develop a system of transportation that is planned to someday provide for public transportation in other areas of the region, state, country and the world, and thus providing an area for its testing and development would be helpful in finding new technologies for efficient, zero emissions forms of transportation that are needed for local, regional, state, national and international economic development; and

WHEREAS, the Easement Agreement will convey an easement interest in specified property under the ownership or control of the City that will allow for the construction of the Test Tunnel. The specific structure and uses that may be placed and used in the Test Tunnel are specified in the Easement. In addition, the Easement Agreement requires payment to the City for the fair market value of the grant of the Easement. That fair market value will be determined by an appraiser and confirmed by the City Council prior to execution of the Easement Agreement; and
WHEREAS, the Test Tunnel includes design features and project components that provide for: (i) construction during City permitted hours of construction; (ii) the use of off-road construction equipment that meets or exceeds the Environmental Protection Agency's Tier 4 Final emission standards or equivalent; (iii) the preparation and use of a fire prevention plan; (iv) the operation of a settlement monitoring plan which will provide for automated, real-time settlement monitoring and if thresholds of one-half inch are exceeded, then construction will stop and subsidence corrected; (v) standard testing for soil, gas and water and proper disposal of contaminated soil; (vi) compliance with excavation requirements imposed by the California Office of Health and Safety (CalOSHA); and (vii) appropriate haul routes to haul away soil to a suitable facility; and

WHEREAS, on July 27, 2017, the Federal Aviation Administration (FAA) issued a Final Determination Letter stating that it does not object to the Test Tunnel provided the project is undertaken with adherence to standard requirements and conditions; and

WHEREAS, City staff and TBC have had ongoing communications with all known utility companies and entities that have some improvements in, along or across the portions of the Test Tunnel route to make sure the Test Tunnel is designed to avoid and not impact any of their utilities and to address their concerns and issues, and no Encroachment Permit will be issued by the City until the City Engineer has determined that the construction will not conflict with or impair those utilities; and

WHEREAS, City staff and the City's environmental consultants have evaluated the project and determined that the grant of the Easement and issuance of an Encroachment Permit qualify for exemption from California Environmental Quality Act (CEQA) review pursuant to the Class 32 Categorical Exemption for "In-Fill Development Projects" as provided in Sections 15332 of the State CEQA Guidelines (Title 14 of the California Code of Regulations) because the project satisfies the criteria for use of that exemption as more fully described in the environmental documentation prepared in connection with review of the project, which information is included as attachments to the staff report that accompanies this Resolution; and

WHEREAS, notice of a public hearing on this item was published in the Hawthorne Press Tribune on August 10, 2017; and

WHEREAS, on August 22, 2017, the City Council held the public hearing on the proposed Easement Agreement and the determination of exemption from CEQA, and following the receipt of all testimony, closed the hearing.

NOW THEREFORE, BE IT RESOLVED by the City Council of the City of Hawthorne, California as follows:
Section 1. The City Council, after consideration of the Staff's and TBC's presentations, discussions, oral testimony, and written evidence presented to the City Council, hereby finds that the above recitals are true and correct and incorporate them herein.

Section 2. The City Council hereby makes the following determinations and findings with respect to the approval of the Subsurface Easement Agreement:

A. The Subsurface Easement Agreement shall serve as a means for the testing of the transportation of vehicles and pedestrians. It will serve both the private interest of TBC or SpaceX in the testing of a new transportation technology and the public interest in the development of a new transportation system that may speed future public transportation opportunities that will enhance the economy of the city and the region.

B. The Test Tunnel will be located in the right-of-way underneath portions of Crenshaw Boulevard and 120th Street and underneath a portion of the Hawthorne Municipal Airport on which the runway is not located. Construction of the Test Tunnel will not block, impair or otherwise affect the surface vehicular traffic on Crenshaw Boulevard or 120th Street because the Test Tunnel will be constructed using a subsurface boring machine with external excavations only required at the beginning and ending point of the Test Tunnel with both points to be located on private property owned by SpaceX or the TBC. There will be no excavations of the ground surface along the route of the Subsurface Easement except at the beginning and end of the Test Tunnel route and neither of those excavations will occur in the public right of way or on the Hawthorne Municipal Airport.

C. Based on the location of the Test Tunnel and the underground boring construction methods, the construction of the Test Tunnel will not impair street access to private properties. In addition, the tunnel boring and construction process is designed to maintain lateral and subsurface ground support of properties, improvements and structures located adjacent to the public right of way along the Test Tunnel route. A surface monitoring program will be operated to detect and stop additional boring if surface subsidence is detected.

D. The Test Tunnel includes design features and project components that provide for: (i) construction during City permitted hours of construction; (ii) the use of off-road construction equipment that meets or exceeds the Environmental Protection Agency's Tier 4 Final emission standards or equivalent; (iii) the preparation and use of a fire prevention plan; (iv) the operation of a settlement monitoring plan which will provide for automated, real-time settlement monitoring and if thresholds of one-half inch are exceeded, then construction will stop and subsidence will be corrected; (v) standard testing for soil, gas and water and proper disposal of contaminated soil; (vi) compliance with excavation requirements imposed by the California Office of Health and Safety (CalOSHA); and (vii) appropriate haul routes to haul away soil to a suitable facility.
E. The Test Tunnel is subject to a Determination Letter issued by the Federal Aviation Administration on July 27, 2017. Construction of the Test Tunnel underneath a portion of property within the boundaries of the Hawthorne Municipal Airport will be conducted in compliance with application FAA standards and regulations so as to have no impact on the operations or safety of the Hawthorne Municipal Airport.

F. Based on the elements of the Subsurface Easement Agreement and the protections in place as proposed by TBC, the project will serve the public interest in allowing for the development and testing of a potentially important transportation technology while protecting the City, the community, the Hawthorne Municipal Airport, nearby property owners and the public at large.

G. Pursuant to the requirements of Hawthorne Municipal Code Section 3.32.010, Subsection F, the City Council finds that the Easement Agreement will convey an easement interest in specified property under the ownership or control of the City that will allow for the construction of the Test Tunnel. The specific structure and uses that may be placed and used in the Test Tunnel are specified in the Easement. In addition, the Easement Agreement requires payment to the City for the fair market value of the grant of the Easement. That fair market value will be determined by an appraiser and confirmed by the City Council prior to the effective date of the Easement Agreement.

Section 3. Based on the findings contained in Section 2 and all other evidence presented to the Council in connection with this matter, the City Council finds, pursuant to Hawthorne Municipal Code Section 3.32.010 (F) that the public good and interest would be served by the conveyance of the Easement to TBC.

Section 4. The City Council hereby makes the following determinations and findings with respect to compliance with CEQA:

A. The Test Tunnel project has been environmentally reviewed pursuant to the California Environmental Quality Act (Public Resources Code Sections 21000, et seq. (“CEQA”), the State CEQA Guidelines (California Code of Regulations, Title 14, Sections 15000, et seq.), and the environmental regulations of the City.

B. The Project is exempt from CEQA pursuant to State CEQA Guidelines §15332 for In-Fill Development Projects because, as documented in the environmental documentation prepared for the project, and which is attached to the staff report that accompanies this Resolution, the project is: consistent with the City’s General Plan land use designations, policies, and zoning designations and regulations; on a site within the City’s city limits that is less than five acres and size and substantially surrounded by urban uses; on a site that has no value as habitat for endangered, rare or threatened species; will not result in any significant effects on the environment including traffic, noise/vibration, air quality,
and water quality; and is on a site that is adequately served by all required utilities and public services.

**Section 5.** Based on the findings contained herein, the City Council of the City of Hawthorne does hereby approve the Subsurface Easement Agreement, attached hereto as Exhibit A to this Resolution.

**Section 6.** Upon City Council confirmation of the fair market value of the Subsurface Easement and payment of that amount to the City, the Mayor is authorized to execute the Subsurface Easement Agreement in the form attached hereto. The City Manager and City Attorney are authorized to make minor non-substantive corrections and revisions to the Subsurface Easement Agreement prior to execution as they deem appropriate.

**Section 7.** The City Manager and City Staff are authorized to take implementing actions to carry out the approval of the Subsurface Easement Agreement, including but not limited to, obtaining an appraisal of the fair market value of the Easement Area and submitting to the City Council a report regarding the dollar amount to be paid in connection with the Grant of the Easement as provided in the Easement Agreement, and thereafter obtaining City Council consent to that dollar amount prior to effectiveness of the Easement.

**Section 8.** The City Manager is directed to file a Notice of Exemption from CEQA in connection with the approval of the Subsurface Easement Agreement with the Los Angeles County Clerk.

PASSED, APPROVED AND ADOPTED this 22ND day of August, 2017.

ATTEST:

ALEX VARGAS Mayor
City of Hawthorne, California

NORB HUBER, City Clerk
City of Hawthorne, California

APPROVED AS TO FORM:

RUSSELL MIYAHIRA,
City Attorney
City of Hawthorne, California
Exhibit A

Subsurface Easement

(Attached.)
RECORDING REQUEST BY,
AND WHENRecorded RETURN TO:

The Boring Company Corp.
c/o Space Exploration Technologies Corp.
1030 15th Street, NW, Suite 220E
Washington, DC 20005
Attn:  Steve Davis

With a copy to:

City of Hawthorne
4455 126th Street
Hawthorne, CA 90250
Attn:  City Clerk

SPACE ABOVE THIS LINE FOR RECORDER’S USE ONLY

Free Recording Requested per Government Code 27383.

SUBSURFACE EASEMENT

THIS SUBSURFACE EASEMENT (“Agreement”) is dated as of August 22, 2017 and is entered into by and between the CITY OF HAWTHORNE, a California municipal corporation and general law city (“City”), and THE BORING COMPANY CORP., a Delaware corporation (“TBC”). City and TBC are sometimes hereinafter referred to individually as “Party” and collectively as the “Parties.”

RECITALS

A.  TBC desires to construct an approximately 10,000 foot long test tunnel beneath certain real property in the City of Hawthorne, County of Los Angeles, State of California, under portions of Crenshaw Boulevard and 120th Street (“Street”) and under a portion of the Hawthorne Municipal Airport (“Airport”) in the City of Hawthorne, California below the area described on Exhibit “A” in an area that has a circular diameter of not more than fifteen (15) feet and is approximately thirty-six (36) feet deep at its east end and forty-four (44) feet deep at its west end (the “Easement Area”). The tunnel project and improvements are described on Exhibit “B” (“Improvements”).

B.  City believes it owns or has right of way or easement rights in the Easement Area but makes no representations or warranties in that regard, express or implied, it being understood that TBC may obtain title insurance at its cost.

C.  City agrees to provide to TBC an easement within the Easement Area for the subsurface installation, maintenance and operation of the Improvements subject to the terms and conditions hereinafter set forth. The easement granted herein does not include access to the Easement Area from the surface of the ground above the Easement Area.
D. The City’s public purposes in entering into this Agreement include facilitating the
development of transportation technology that may benefit the public, providing employment
opportunities resulting from the work to be performed by TBC, and obtaining compensation for
the easement interest granted herein equal to its fair market value, determined by a current
appraisal obtained by City (and such compensation shall become part of the general funds of the
City and in turn used for a public purposes).

E. The City has found and determined that this subsurface easement shall serve as a
means for the testing of the transportation of vehicles and pedestrians, that it will serve the
private interest of TBC or Space Exploration Technologies Corp. in the testing of a new
transportation technology and the public interest in the development of a new transportation
system that may speed future public transportation opportunities, and that by being located in the
right-of-way underneath portions of Crenshaw Boulevard, the Airport and 120th Street, will not
endanger or interfere with abutting property owners or the operation of the Airport.

AGREEMENT

1. Conditions Precedent. The effectiveness of this Agreement is conditioned upon
the issuance by the City of an encroachment permit and the payment by TBC of all permit fees
related thereto. TBC shall comply with all applicable requirements of Chapter 12.16
(Encroachments in Public Places) of the Hawthorne Municipal Code in connection with this
Agreement.

2. Grant of Easement. City hereby grants to TBC a perpetual easement in and
through the Easement Area for the purpose of installing, maintaining and operating the
Improvements, but with no right of access except through the Easement Area (it being
understood that Grantee has obtained legal rights to access one or both ends of the Easement
Area from other properties), subject to the limitations set forth herein and TBC’s fulfillment and
ongoing compliance with the terms and conditions set forth herein. The easement granted herein
does not include access to the Easement Area from the surface of the ground above the Easement
Area. The installation, maintenance, and any operation of the Improvements shall be subordinate
to any use and operations which City and other utility, franchise and easement holders may
conduct on an adjacent property owned or controlled by City, including the operation of the
Airport, the operation, repair and replacement of storm drains, sewer, water, gas, electrical,
telephone, cable television and other public and private utility lines and facilities. Except as
expressly authorized by this Agreement, TBC shall not cause any material delay or interference
with City’s or any public or private utility access to such adjacent property, and TBC shall not
interfere with the operations of City, the Airport, or of any public or private utility located above,
below, or adjacent to the Easement Area.

3. AS-IS. TBC accepts the Easement Area in its current “AS-IS” condition, without
representation or warranty, express or implied, and subject to all matters of record and all matters
that would be revealed by a diligent inspection of the Easement Area and adjacent property
(including, without limitation, Phase I and Phase II environmental reports). TBC also
acknowledges that City makes no representations, express or implied, as to the physical
condition of or title to the Easement Area or adjacent property. This Agreement does not
constitute, nor grant permission to use or occupy property not belonging to, or under the control
of City, and permission to use or occupy such property must be obtained from the owner or controller of such property, separate from and in addition to this Agreement.

4. **Authorized Improvements.** The rights of TBC to install, maintain, and operate the Improvements are subject to all applicable laws and permitting requirements and conditions (and the City does not waive any of its rights or powers in its governmental capacity in that regard), and are also subject to the following contractual limitations, and conditioned upon TBC implementing the following protective measures and physical construction standards in connection with the Improvements:

   a. Detailed design drawings prepared by a registered engineer depicting the Improvements shall be provided to, reviewed by, and approved by City prior to construction. The design drawings shall include an accurate depiction of the horizontal and vertical position of the Improvements. The detailed design drawings shall also depict the current and proposed location of all public and private utilities located within the Street, including the location and depth of all storm drains, sewer, water, gas, electrical, cable television, and public and private utility lines and facilities. The design of the Improvements must allow for immediate access to and under Street for purposes of inspecting, cleaning, maintaining, repairing, and replacing City’s existing improvements located on, in or under Street and/or installing additional improvements and appurtenances.

   b. The grant of the Easement does not include access to the Easement Area from the surface of the ground above the Easement Area. If, however, repair for potential subsidence of the ground surface or repair of damage to public or private property is required due to the construction or use of the Improvements, and such repair work will require the temporary or permanent closure of any portions of the surface of the Street, trenching of any portion of the Street, or the stockpiling of any soil to be excavated as part of the project, the drawings shall depict the specific areas affected, and shall include traffic control plans to address the traffic impacts of the closures or construction activity. A separate Encroachment Permit shall be required for such work. In addition, if the soil is to be transported to a stockpile area and then to an off-site location, detailed plans shall be provided describing and depicting the location of, and requirements for, the stockpiling and transport, including haul routes, for the transport of the soil.

   c. TBC shall inform all public and private utility entities having facilities within the Street of the Improvements and develop plans for the avoidance or relocation of all such utility lines or facilities. No permits for construction of the Improvements will be issued by City unless and until the City Engineer is satisfied that: (i) each affected utility entity has been informed of the location of the Improvements and had an adequate opportunity to provide information to TBC and the City as to any steps required for avoidance or relocation of their utility, and (ii) the City Engineer has determined that no relocation is required.

   d. City reserves the right, and TBC hereby acknowledges, that City may reject without liability the design drawings for any proposed Improvements and/or require any changes thereto if City determines, in its sole and absolute discretion, that such action is necessary to ensure City can adequately inspect, clean, maintain, repair, and replace City’s existing improvements located within the Street or Airport and/or installing additional improvements and appurtenances within the Street or Airport.
e. Upon City’s approval of the final design drawings for the Improvements, in its proprietary capacity under this Agreement and separately in its governmental capacity, TBC shall install and maintain the Improvements in strict compliance with the applicable permits, and approved final design drawings, and no material changes or deviations therefrom shall be permitted without TBC first obtaining the prior written consent of City, which may be granted or denied in the City’s sole and absolute discretion. For purposes of clarification and example, a material change or deviation shall include, but not be limited to, a modification to the Improvements that, in the opinion of the City Engineer, negatively affects the structural stability or integrity of the Improvements or utilities or structures above the Easement Area or alters the location of the Improvements in a manner that causes the Improvements to extend beyond the Easement Area.

f. TBC shall provide City with “as-built” drawings of the Improvements within thirty (30) days after completion of the Improvements.

g. TBC shall reimburse City for any and all reasonable and documented costs and expenses incurred by City for work to support or protect the Street, Airport and utilities, or to cure any failure of TBC to comply with the last sentence of Section 10 below. Such reimbursements or payments shall be made within thirty (30) business days after delivery by City of written demand and a statement from City detailing such costs. In the event TBC fails to perform work to support or protect the Street, Airport and utilities, or to cure any failure of TBC to comply with Section 10 below within thirty (30) business days after receiving written notice from City of such failure, or if City must immediately perform such work in the event of an emergency or to perform legally mandated duties, City may proceed with such work at the expense of TBC, and TBC shall reimburse City within thirty (30) business days after delivery by City of a written demand and a statement from City detailing the costs incurred by City. The obligations under the subsection shall survive the termination of this Agreement.

h. TBC shall be required to obtain all required licenses, permits and authorizations from City and from any other governmental agency with jurisdiction over the Improvements and to pay all fees and charges associated therewith prior to commencing any work on the Improvements.

i. TBC shall comply with all requirements and conditions of the Final Determination Letter from the Federal Aviation Administration dated July 27, 2017 and as it may be updated and revised for construction and use of the Improvements on Airport property.

j. TBC shall obtain and provide copies to City of its construction contract for the Improvements and payment and performance bonds for such contract/contractor.

k. The City acknowledges that the Improvements are designed to be constructed with construction activities (including transportation of soils) related to the Improvements that occur outside of the Easement Area, in compliance with Hawthorne Municipal Code Sections 15.14.010 (Erection of temporary fencing around construction sites) and 15.14.020 (Restrictions on hours of construction), to the extent applicable. Such project design features shall be maintained and complied with by TBC throughout the construction period of the Improvements.
I. TBC shall, on a daily basis during construction: (i) diligently and reasonably inspect the extent of any subsidence of the surface of the Street above the construction; (ii) within one (1) business day after inspection, deliver to City a reasonable written report describing the results of the inspection(s) for the previous day; and (iii) immediately halt all construction if subsidence exceeds one half of one inch at any point on the Street or abutting property. If any subsidence is detected that exceeds one-half inch, TBC shall undertake work, as reviewed and approved by the City, to correct the subsidence.

5. Repair of Damage. TBC shall obtain complete contact information for all owners of utilities ("Utility Owners") prior to the start of the work. Any damage caused directly or indirectly by TBC to the Street, Airport, City’s improvements therein, utilities or other property shall be declared by the TBC through sending proper notifications to the applicable Utility Owner and City as early as possible. If repair work needs to be conducted by the Utility Owner, it shall be paid or reimbursed in full by TBC without any delay; however, if damage is only to the Street or Airport pavement, then repair work will be conducted by the City at TBC’s sole cost and expense, or if authorized by City may be repaired by TBC at its sole cost and expense. If City elects to perform the repair work itself, TBC shall reimburse City for the full costs of the repair work within thirty (30) days after receiving written demand and a statement from City detailing such costs.

6. Backfilling Upon Abandonment and Termination of Easement. TBC shall diligently backfill the tunnel portion of the Improvements with cement slurry or clean imported soil to 90% compaction in the event the tunnel is abandoned by TBC, ceases to be used for testing or other authorized purposes for a continuous period of two years, or in the event that TBC or its successor in interest declares bankruptcy and is required to liquidate its assets. The backfilling work shall be completed within one year of the occurrence of any of the events specified in this Section. Upon completion of the backfilling work, as verified by the City Engineer, the Easement granted by this Agreement shall automatically terminate and be of no further force and effect, except that certain provisions contained herein shall survive the termination as specified herein.

7. Deposit; Reimbursement of City Costs; Letter of Credit.

a. TBC shall reimburse the City for the City’s actual out-of-pocket costs and expenses incurred by City: (i) in preparing this Agreement (including legal fees and costs); (ii) obtaining the appraisal used to determine the compensation described in Section 20 below; and (iii) complying with CEQA, and other consultant costs and expenses incurred by the City in processing the request for City approval of the Improvements (collectively, the “Reimbursable Costs”). City acknowledges that TBC has deposited with the City the sum of Forty Thousand and No/100 Dollars ($40,000.00) (the “Reimbursement Funds”). The Reimbursement Funds may be used and applied from time to time by the City to pay or reimburse itself for Reimbursable Costs not otherwise paid or reimbursed by TBC. Any Reimbursement Funds not applied shall be delivered to TBC (along with a final accounting of the City’s application of the Reimbursement Funds) within thirty (30) business days after the date of this Agreement.

b. In addition to the Reimbursement Funds, and in order to ensure payment to City for Reimbursable Costs not paid by the Reimbursement Funds, monetary obligations of
TBC under this Agreement, and damages incurred by City as a result of any failures by TBC to comply with the terms of this Agreement, TBC shall deliver to City on or before September 22, 2017, at no cost to City, a letter of credit in form and substance acceptable to City in the amount of $2,700,000.00 from a Qualified Issuer (herein defined). The letter of credit must provide that it is drawable upon presentation of the letter of credit with of a sight draft at a local (Los Angeles County) office of the issuer, and that shall automatically renew for sequential years and until six (6) years has elapsed from the termination date of the Easement as provided in Section 6 of this Agreement (“Letter of Credit Termination Date”) and that if not so renewed, the Qualified Issuer shall give at least 30 days’ prior written notice to the City as beneficiary, in which event City may draw in full. As used herein, the term “Qualified Issuer” shall mean a commercial bank acceptable to the City and (1) that is chartered under the laws of the United States, any State thereof or the District of Columbia, and which is insured by the Federal Deposit Insurance Corporation; (2) whose long-term, unsecured and unsubordinated debt obligations are rated in the highest category by at least two of Fitch Ratings Ltd. (Fitch), Moody’s Investors Service, Inc. (Moody’s) and Standard & Poor’s Ratings Services (S&P) or their respective successors (the Rating Agencies) (which shall mean AAA from Fitch, Aaa from Moody’s and AAA from Standard & Poor’s); and (3) which has a short term deposit rating in the highest category from at least two Rating Agencies (which shall mean F1 from Fitch, P-1 from Moody’s and A-1 from S&P) (collectively, the “LC Issuer Requirements”). If at any time the LC Issuer Requirements are not met, or if the financial condition of such issuer changes in any other materially adverse way, as determined by City, or if the issuer is placed into receivership or conservatorship by the FDIC or if a trustee, receiver or liquidator is appointed for the issuer, then TBC shall within five (5) business days after written notice from City deliver to City a replacement Letter of Credit which otherwise meets the requirements of this Section from an Issuer that meets the LC Issuer Requirements (and failure to timely deliver a letter of credit or replacement thereof in accordance with this Section shall entitle City to terminate this Agreement by written notice to TBC).

8. Waiver and Release. TBC, in perpetuity, expressly waives, releases and relinquishes any and all claims, causes of action, rights and remedies TBC may now or hereafter have against City, and its officials, officers, employees, consultants, attorneys and agents (collectively, “City Entities”), whether known or unknown, with respect to liability for any damage to or loss, upon, above, beneath, or across the Easement Area, or Street or adjacent property unless such damage or loss is caused by the sole active negligence or willful misconduct of City Entities. As a material part of City’s decision to approve this Agreement, TBC hereby assumes all risk of damage to the Improvements arising from any cause attributable to City’s exercising its rights hereunder or in, under to the Street, and TBC hereby waives all claims in respect thereto against City, except if caused by the sole active negligence or willful misconduct of City Entities.

TBC HEREBY ACKNOWLEDGES THAT IT HAS READ AND IS FAMILIAR WITH THE PROVISIONS OF CALIFORNIA CIVIL CODE SECTION 1542 (“SECTION 1542”), WHICH IS SET FORTH BELOW:

“A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF
KNOWN BY HIM MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR.”

BY INITIALING BELOW, TBC HEREBY WAIVES THE PROVISIONS OF SECTION 1542 SOLELY IN CONNECTION WITH THE MATTERS WHICH ARE THE SUBJECT OF THE FOREGOING WAIVERS AND RELEASES:

________________________
TBC’s Initials

The waivers and releases by TBC contained herein shall survive the expiration or earlier termination of this Agreement and shall be binding upon the assignees, transferees, and successors-in-interest of TBC.


   a. TBC acknowledges that the Street contains certain City-owned public facilities collectively and hereinafter referred to as “Public Improvements.” In order for City to exercise its rights with respect to the Public Improvements, City shall exercise good faith efforts to notify TBC either in writing or by telephone, of the need to gain access to, temporarily restrict the use of the Improvements, except in emergency situations when no advance notice by City shall be required. TBC hereby agrees that upon written or telephonic notice from City, TBC shall at its own cost and expense do one or more of the following as requested by City in the notice: (1) within twenty-four (24) hours after receiving notice, provide City access to the Improvements (or the appropriate portion thereof); and (2) within twenty-four (24) hours after delivery of written notice by City, temporarily restrict use of the Improvements for the reasonable period requested by City as may be necessary to allow City continuous access to the Improvements and unrestricted use of the Street and Airport. In the case of an emergency, City shall have immediate access to the Improvements (or the appropriate portion thereof) without written or telephonic notice to TBC or reimbursement to TBC. City shall provide notice of the emergency to TBC as soon as possible, and upon delivery of such notice TBC shall immediately cease all further use of the Improvements until the emergency has been mitigated. The term “emergency”, shall be considered as an unforeseen circumstance that calls for immediate action, as determined by the City Manager.

   b. TBC acknowledges that the Easement Area is beneath the Street, Airport and certain publicly and privately owned utilities, including storm drains, water, sewer, gas, electrical, cable television, fiber optics and other public and privately owned utilities and facilities. TBC shall develop plans, to the satisfaction of City, for required notice by TBC to the Airport and public or private utility entities when TBC’S access to the Easement Area or operation of its Improvements may have an impact to the other entity’s facilities.

10. Recovery of Costs and Attorneys’ Fees for Enforcement of Easement Terms. The terms of this Agreement may be enforced by City or its successors or assigns or successors-in-interest. In the event of any controversy, claim or dispute relating to this Agreement, or the breach thereof, the prevailing party shall be entitled to recover from the other party reasonable expenses, attorneys’ fees and costs.
11. **Damage to Public Improvements.** In addition to its obligations under Section 3g. above, TBC shall pay to City, within thirty (30) days after written notice from City and a statement detailing such costs and expenses, all reasonable costs and expenses which result from any damage to Public Improvements, where such damage is caused by the location, construction, maintenance, reconstruction, repair, use, or removal of the Improvements. In the event payment is not made within said sixty (60) day period, said payment shall include interest at a rate of ten percent (10%) per annum from the end of said sixty (60) day period until paid.

12. **Default; Termination.** City may terminate this Agreement in its sole and absolute discretion, if TBC fails to comply with this Agreement and then fails to cure the default with thirty (30) days after written notice from City; provided, however, that if the default is curable and the nature of the default is such that more than thirty (30) days is reasonably required to cure the default, City may not terminate this Agreement if TBC commences to cure the default during the thirty (30) day period after written notice of default and thereafter diligently prosecutes the cure to completion. Upon any such termination, the City Engineer shall determine in good faith what measures, if any, need to be taken to make the Improvements (and tunnel) safe and to comply with the then-“best practices” with respect to tunnels and tunnel improvements, and TBC shall then diligently comply with the City Engineer’s requirements at TBC’s cost and obtain and provide evidence of reasonable insurance for such activities.

13. **Hazardous Materials.**

   a. TBC covenants that it will not handle or transport Hazardous Materials in the Easement Area except for removal, transportation and disposal in compliance with laws regarding excavated soils that are or may be contaminated with Hazardous Materials. As used in this Agreement, the term “Hazardous Materials” means: (a) any substance, products, waste, or other material of any nature whatsoever which is or becomes listed, regulated, or addressed pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code Section 9601 et seq.; the Resources Conservation and Recovery Act, 42 United States Code Section 6901 et seq.; the Hazardous Materials Transportation Conservation and Recovery Act, 42 United States Code Section 1801 et seq.; the Clean Water Act, 33 United States Code Section 1251 et seq.; the Toxic Substances Control Act, 15 United States Code Section 2601 et seq.; the California Hazardous Waste Control Act, Health and Safety Code Section 25170.1 et seq.; California Health and Safety Code Section 25170.2 et seq.; the California Safe Drinking Water and Toxic Enforcement Act, Health and Safety Code Section 25249.5 et seq.; California Health and Safety Code Section 25280 et seq. (Underground Storage of Hazardous Substances); the California Hazardous Waste Management Act, Health and Safety Code Section 25170.1 et seq.; California Health and Safety Code Section 25501 et seq. (Hazardous Materials Release Response Plans and Inventory); or the California Porter-Cologne Water Quality Control Act, Water Code Section 13000 et seq., all as amended (the above cited California state statutes are hereinafter collectively referred to as “the State Toxic Substances Law”); or any other federal, state, or local statute, law, ordinance, resolution, code, rule, regulation, order or decree regulating, relating to, or imposing liability or standards of conduct concerning any Hazardous Substance, now or at any time hereinafter in effect; (b) any substance, product, waste or other material of any nature whatsoever which may give rise to liability under any of the above statutes or under any statutory or common law theory based on negligence, trespass, intentional tort, nuisance or strict liability or under any reported
decisions of a state or federal court; (c) petroleum or crude oil, other than petroleum and petroleum products which are contained within regularly operated motor vehicles; and (d) asbestos.

TBC further agrees that at City’s request it will furnish City with proof, satisfactory to City, that TBC is in compliance with all such laws, rules, regulations, orders, decisions and ordinances regarding Hazardous Materials.

b. Notwithstanding anything else contained in this Agreement and to the fullest extent permitted by law, TBC agrees to indemnify, defend and hold harmless City from and against any and all claims, liabilities, losses, damages, costs and expenses arising from or relating to injuries to any person, including wrongful death, or damage to property, including without limitation, property of City and TBC, or otherwise (including without limitation reasonable attorneys’ fees, investigators’ fees, litigation expenses, and mitigation costs resulting in whole or in part from TBC’s failure to comply with any Hazardous Materials Standards issued by any governmental authority concerning Hazardous Materials), provided, however, that the foregoing shall not apply to the extent of City Entities’ active negligence or willful misconduct. TBC agrees to reimburse City for all reasonable costs of any kind incurred as a result of the TBC’s failure to comply with this Section, including, but not limited to, judicial or administrative fines, penalties, clean-up and disposal costs, and legal costs incurred as a result of TBC’s handling, transporting, or disposing of Hazardous Materials on, over, or across the Improvements and or Street or adjacent property.

14. Standards; City Cure Rights. TBC shall comply with all statutes, ordinances, rules, regulations, orders and decisions (hereinafter referred to as “Standards”) issued by any federal, state or local governmental body or agency established thereby relating to TBC’s use of the Improvements and Easement Area hereunder. In its use of the Improvements and Easement Area, TBC shall at all times be in full compliance with all Standards, present or future, including, but not limited to, Standards concerning air quality, water quality, noise, and Hazardous Materials. In the event TBC fails to be in full compliance with Standards, City may, but shall not be obligated to, after giving notice of the failure to TBC, and if TBC, within fifteen (15) days of such notice, fails to correct such non-compliance, take whatever action it determines in its sole discretion to be necessary to protect the Public Improvements, Street, and adjacent property. TBC shall reimburse City for all reasonable documented and out of pocket costs (including but not limited to, consulting, engineering, clean-up and disposal, and reasonable legal costs) incurred by City as a result of TBC’s failure to comply with such Standards, and also such reasonable costs incurred by City in abating a violation of such Standards, protecting against a threatened violation of such Standards, defending any claim of violation of such Standards in any proceeding before any agency or court, and paying any fines or penalties imposed for such violations. TBC shall, to the extent permitted by law, assume liability for and shall save and hold harmless City from any claim of a violation of the Standards regardless of the nature thereof or the agency or person asserting such claim, which results from TBC’s use of the Improvements and Easement Area; provided, however, that the foregoing shall not apply to the extent of City Entities’ active negligence or willful misconduct. TBC, at its cost, shall assume the defense of all such claims.
15. **Tests and Inspections.** City shall have the right at any time to inspect the Improvements, Street, Airport and Public Improvements so as to monitor compliance with this Agreement. If, in City’s sole judgment, any installation, use, or condition of the Improvements may have an adverse effect on the Public Improvements, Airport, the Street, or City’s operations, City shall be permitted to, at its sole cost and expense, conduct any tests or assessments, including but not limited to environmental assessments as it determines to be necessary or useful to evaluate the condition of the Street or Public Improvements. TBC shall cooperate with City in any tests or inspections deemed necessary by City. TBC shall pay or reimburse City, as applicable, for all reasonable documented out-of-pocket costs and expenses incurred due to any necessary corrective work and inspections thereafter within thirty (30) days after a written request for payment and a statement detailing such costs and expenses.

16. **Insurance.**

a. **Type.** TBC shall obtain, and shall require any subcontractor to obtain insurance in the amounts described below unless specifically altered or waived by the City (“Required Insurance”). If any of the Required Insurance contains a general aggregate limit, such insurance shall apply separately to this License.

1. **Commercial General Liability Insurance** – TBC shall provide and maintain Commercial General Liability Insurance. Such insurance shall be written on an occurrence form and provide coverage not less than $5,000,000.00 per occurrence and an aggregate limit of not less than $10,000,000.00, applying separately to this License. Umbrella or Excess Liability coverage, on a following-form basis, may be used to supplement primary coverage to meet the required limits. The Commercial General Liability Policy must include coverage for the following:

   (A) Bodily Injury and Property Damage

   (B) Personal Injury/Advertising Injury

   (C) Premises/Operations Liability

   (D) Products/Completed Operations Liability. Coverage for Products and Completed Operations Liability shall not have a sub-limit or a reduction in the coverage or reporting periods.

   (E) Explosion, Collapse and Underground (UCX) exclusion deleted

   (F) Contractual Liability with respect to this Agreement

   (G) Broad Form Property Damage

   (H) Independent Contractor Coverage

2. **Commercial Automobile Liability Insurance** – TBC shall provide and maintain Commercial Automobile Liability Insurance which shall include coverage
for liability arising out of the use of owned, non-owned and hired vehicles for performance of the work described in this License. The Commercial Automobile Liability Insurance shall not have limits not less than $1,000,000.00, combined single limit per occurrence, shall be written on an occurrence form, and shall apply to all activities and operations of the TBC pursuant to this License.

3. **Workers’ Compensation Insurance** – TBC shall provide and maintain Workers’ Compensation Insurance covering all of the TBC’s employees in accordance with the laws of the State of California and including Employer’s Liability Insurance. The limit for Employer’s Liability Insurance shall be not less than $1,000,000.00 each accident and shall be a separate policy if not included with Workers’ Compensation coverage. Such insurance shall include a Waiver of Subrogation in favor of the City. Workers’ Compensation coverage may be self-insured by TBC, provided that the City is furnished with a copy of a currently-dated and manually-signed Certifications of Self-Insurance issued by the State of California authorizing the TBC to self-insure. TBC shall notify the City by “return receipt delivery” as soon as possible of the State withdrawing the authority to self-insure.

4. **Pollution Liability Insurance** – TBC shall provide and maintain Pollution Liability Insurance covering the TBC’s liability arising from Pollution or Environmental Damage or Liability caused during the execution of work performed pursuant to this Agreement. The Pollution Liability Insurance policy shall provide coverage for the total limits actually arranged by the TBC, but not less than $5,000,000.00 combined single limit and in the annual aggregate. Such policy/coverage shall be maintained for not less than one (1) year after the date of final acceptance and completion of the work performed pursuant to this Agreement. TBC may elect to carry such coverage as a sublimit on its Commercial General Liability Insurance.

5. **Umbrella Or Excess Liability Coverage** – TBC may use Umbrella or Excess Liability coverage to meet the coverage limits specified above. TBC shall require the carrier(s) for Umbrella or Excess Liability to properly schedule and identify the policies referenced herein, including Commercial General Liability, Commercial Automobile Liability and Pollution Liability.

b. **General Provisions**. The Commercial General Liability; Commercial Automobile Liability; Pollution Liability; and Umbrella or Excess Liability policies shall (1) name City, its officials, officers, employees and agents as additional insureds; (2) be endorsed to waive subrogation against City, its officials, officers, employees and agents as additional insureds; and (3) be primary and non-contributory. All Required Insurance herein shall contain standard separation of insureds provisions, and shall contain no special limitations on the scope of protection provided to City, its officials, officers, employees and agents.

c. **Certificates; Insurer Rating; Cancellation Notice**. Prior to conducting any work in the Easement Area, TBC shall furnish to City properly executed Certificates of Insurance which evidences all Required Insurance. TBC shall also furnish to City properly executed Additional Insurance Endorsements in favor of the City, its officials, officers, employees and agents for the insurance policies referenced in Paragraph 15b. Additional Insured
endorsement forms CG 20 12 05 09; CG 2010 04 13; and CG 2037 04 13 or such other form agreed upon in writing by the City shall be used.

TBC shall maintain the Required Insurance at all time while this Agreement is in effect, and shall replace any certificate, policy, or endorsement which will expire prior to that date. Each time TBC changes insurers or coverage periods and, in any event, fifteen (15) days prior to the expiration of such Required Insurance policy, TBC shall furnish City Certificates of Insurance evidencing the changes or renewals of such Required Insurance for the following renewal term. Unless approved in writing by City, TBC shall place the Required Insurance with insurers licensed to do business in the State of California and with a current A.M. Best rating of at least A-:VII.

d. **Waiver of Subrogation.** TBC releases City, its officials, officers, employees and agents from any claims for damage or harm to any person, the Easement Area, the Street, adjacent property, or the Improvements, caused by, or which result from, risks insured under any insurance policy carried by TBC at the time of such damage or harm. TBC shall cause each insurance policy required herein to provide a waiver of subrogation in favor of City, its officials, officers, employees and agents.

17. **Indemnity.** TBC hereby agrees to defend, indemnify and hold City and its officials, officers, agents, employees and contractors free and harmless from and against any and all claims, demands, causes of action, costs, liabilities, expenses, losses, damages or injuries of any kind in law or equity, to persons or property, including wrongful death, in any manner arising out of or incident to any acts, omissions or willful misconduct of TBC, its partners, affiliates, agents officials, officers, employees or contractors in performance of this Agreement, use of the Easement Area or the construction, use, or operation of the Improvements or the failure to pay (or failure of its contractors to pay) prevailing wages if required by California Labor Code Section 1720 et seq., including any claims under Labor Code Section 1781. TBC shall further defend, indemnify and hold harmless the City and its officials, officers, agents and employees from all claims, demands, lawsuits, writs of mandamus, and other actions or proceedings (brought against the City or its departments, commissions, agents, officers, officials, or employees to challenge, attack seek to modify, set aside, void or annul any City decision made in connection with this Agreement or TBC’s use of the Easement Area (based on noncompliance with the California Environmental Quality Act or otherwise). TBC shall defend, with counsel of City’s choosing and at TBC’s sole expense, any and all aforesaid suits, actions or proceedings, legal or affirmative, that may be brought or instituted against City, its officials, officers, agents, employees or contractors. TBC shall pay and satisfy any judgment, award or decree that may be rendered against City, its officials, officers, agents, employees or contractors. TBC shall reimburse such parties for any and all legal expenses and costs incurred by one or all of them in connection with this Agreement or the indemnity herein provided. TBC’s obligations hereunder shall survive termination or expiration of this Agreement, and shall not be restricted to insurance proceeds, if any, received by City or its officials, officers, agents or employees or contractors.

18. **Covenant Running With Land.** This Agreement shall be deemed a covenant running with the land with respect to the Easement Area. All of the covenants, obligations, and provisions of this Agreement shall be binding upon and inure to the benefit of successors, legal representatives, assigns and successors-in-interest to the Parties. Every person who now or
hereafter owns or acquires any right, title, or interest in and to any portion of the Easement Area shall be conclusively deemed to have notice of this Agreement, whether or not reference to this Agreement is contained in the instrument by which such person acquires an interest in the Easement Area. Therefore, each and every contract, deed or other instrument hereinafter executed, covering or conveying the Easement Area or any portion thereof or interest therein shall conclusively be deemed to have been executed, delivered and accepted subject to this Agreement.

19. Miscellaneous.

a. Notices. All notices permitted or required under this Agreement shall be given to the respective parties at the following address, or at such other address as the respective parties may provide in writing for this purpose:

TBC: The Boring Company Corp.
c/o Space Exploration Technologies Corp.
1030 15th Street, NW, Suite 220E
Washington, DC 20005
Attn: Steve Davis

City: City of Hawthorne
4455 126th Street
Hawthorne, CA 90250
Attn: Arnold Shadbehr, Interim City Manager & Director of Public Works/City Engineer

Such notice shall be deemed made when delivered by certified mail, return receipt requested, first class postage prepaid, or by reputable overnight messenger delivery service, and addressed to the party at its applicable address and shall be deemed delivered on the date of delivery or refusal to accept or inability to delivery shown on the return receipt, or one (1) business day after delivery to the messenger service for overnight delivery, as applicable.

b. Entire Understanding. This Agreement constitutes the entire understanding between the Parties, and supersedes all offers, negotiations and other agreements concerning the subject matter contained herein.

c. Invalidity. If any provision of this Agreement is invalid or unenforceable with respect to any Party, the remainder of this Agreement or the application of such provision to persons other than those as to whom it is held invalid or unenforceable, shall not be affected and each provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

d. Successors and Assigns. This Agreement shall be binding on and inure to the benefit of the successors of the respective parties. This Agreement may not be assigned by either Party without the prior written consent of the other Party.
e. **Consent to Jurisdiction and Venue.** This Agreement shall be construed in accordance with and governed by the laws of the State of California. Any legal action or proceeding brought to interpret or enforce this Agreement, or which in any way arises out of the Parties’ activities undertaken pursuant to this Agreement, shall be filed and prosecuted in the appropriate California State Court in the County of Los Angeles, California. Each Party waives the benefit of any provision of state or federal law providing for a change of venue to any other court or jurisdiction including, without limitation, a change of venue based on the fact that a governmental entity is a party to the action or proceeding, or that a federal right or question is involved or alleged to be involved in the action or proceeding. Without limiting the generality of the foregoing waiver, TBC expressly waives any right to have venue transferred pursuant to California Code of Civil Procedure Section 394.

f. **Exhibits.** All exhibits attached hereto form material parts of this Agreement.

g. **Time of Essence.** Time is of the essence of every provision hereof in which time is a factor.

h. **Survival.** All defense, indemnity and payment obligations of TBC that arise or relate to events occurring prior to the expiration or earlier termination of this Agreement shall survive such expiration or earlier termination.

20. **Compensation for Easement.** As a condition to the effectiveness of this Agreement, TBC shall pay to City as compensation for the easement and rights described herein, a sum determined by an appraisal obtained by the City and approved by the City Council to be at least the fair market value of the easement interest granted herein. City staff shall diligently obtain such appraisal and shall submit the appraisal value to the City Council for approval as soon as reasonably practicable.

21. **Possessory Interest.** In accordance with Revenue and Taxation Code Section 107.6, this Agreement may create a possessory interest subject to personal property taxation for which TBC shall be responsible.

**CITY:**

CITY OF HAWTHORNE
a California municipal corporation and general law city

By: ________________________________
Alex Vargas, Mayor

ATTEST:

______________________________
NORB HUBER, City Clerk
City of Hawthorne, California
APPROVED AS TO FORM:

________________________
RUSSELL MIYAHIRA,
City Attorney
City of Hawthorne, California

TBC:

THE BORING COMPANY CORP.,
a Delaware corporation

By: _______________________
Print Name: ________________
President

[NEED SECRETARY’S CERT. RE APPROVAL
BY BOARD/INCUMBENCY]
On _________________________, before me, _________________________ (insert name and title of the officer), Notary Public, personally appeared _________________________, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature_____________________________ (Seal)
State of California )
County of Los Angeles )

On _________________________, before me, ________________________ (insert name and title of the officer), Notary Public, personally appeared ____________________________________________, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

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WITNESS my hand and official seal.

Signature______________________________ (Seal)
EXHIBIT “A”

DESCRIPTION OF EASEMENT AREA

(Attached.)
EXHIBIT “B”

DESCRIPTION OF PROJECT/IMPROVEMENTS

The test tunnel would be approximately 2-miles long and provide testing for zero-emissions-driven skates capable of transporting personal vehicles. Testing may also include skates equipped with carriages to provide transportation for pedestrians. As the test tunnel would contain only zero-emissions motors and fans located at the entry to the test tunnel on the SpaceX property would provide sufficient ventilation. The entry point is the existing permitted excavation at the SpaceX parking facility. Approximately 4,500 square-feet of the SpaceX parking lot asphalt would be excavated and repaved to provide a ramp entry point for the test tunnel. The test tunnel would facilitate SpaceX engineers testing of the technology and making refinements to any and all components, as necessary, before application as an alternative transportation method. The test tunnel would be at a depth of approximately 30-40 feet. The project would use a TBM that digs a tunnel with an exterior diameter of approximately 13.5 feet and interior diameter of approximately 12 feet.

Operation

The test tunnel would house a “skate” system that would be tested to prove viability for transporting personal vehicles to drive on, turning off their engines or pedestrian carriages and transported from one end of the tunnel to the other. The test tunnel project would involve SpaceX engineers repeatedly testing personal vehicle types suitable for placement on the skates; refinement of the design and technology; and general data collection on performance, durability, and application. No public use of the test tunnel would occur, the skates would be moved back and forth within the tunnel, and there would be no people within the vehicles or carriages. All access for skates loading and testing would be from the SpaceX parking lot end of the tunnel.

Construction

Construction is anticipated to take approximately 5 months to complete, daily during the hours permitted by the City (7 a.m. to 7 p.m. Monday through Friday, and 9 a.m. through 5 p.m. Saturday and Sunday). Construction would progress from south to north, east to west, with all staging and the majority of truck activity at the southeast entry/exit point within the existing SpaceX parking facility. The TBM would be plugged in to the existing grid and all other off-road construction equipment would meet or exceed the Environmental Protection Agency’s Tier 4 Final emissions standard or equivalent. All trucks would access/exit the I-105 freeway directly from the Crenshaw Boulevard off/on ramps. The test tunnel includes a fire prevention plan that identifies regulations and common industry safety practices designed to reduce risk of fire in the tunnel during construction and operation (Attachment A). A settlement monitoring plan is included in the permit application, which identifies automated real-time settlement monitoring and if exceedance of thresholds is detected, construction is halted immediately. The test tunnel also includes implementation of established standard industry practices for testing soil and groundwater, including testing and, if contaminated, disposal at an authorized disposal facility in the unlikely event it is encountered. The test tunnel also includes a ventilation plan created by Professional California Engineer and all considerations for worker health and safety, including ventilation and fire procedures as well as encountering gas and the stability of excavation areas,
shall be governed by the California Office of Health and Safety (CalOSHA) Division of Tunneling and Mining classifications permit. Construction of segments cannot progress without coverage of each portion from that CalOSHA permit.

**Boring**

Construction would consist of excavations and tunnel construction using the TBM to create the tunnel and install prefabricated concrete segments behind it. The TBM cuts at a rate of approximately 3 inches per minute, with a cycle of approximately equal amounts of cutting and cooling. It is anticipated that the TBM would achieve up to 60 feet of advancement daily. As the TBM advances, it passes excavated material onto a conveyor belt that deposits that material into a waiting truck for disposal at a suitable facility, most likely the same one as used for material disposal by Los Angeles (LA) Metro for the Regional Connector Transit Connector (RCTC) project. It is estimated that 40 trucks a day would haul away material from the entry site near 1 Rocket Road, assuming regular dump trucks with a capacity of approximately 15 cubic yards. The concrete segments would be approximately 5-foot-long segments and delivered by truck, with up to 12 trucks per day. An additional two trucks per day would deliver additional materials, such as soil binders. A total of 20 workers a day are expected for the boring.

Approximately 1,500 square-feet of paving would be undertaken in the SpaceX parking lot to provide an access ramp to the tunnel. A total of 3 workers for a single day are expected for the paving.

At the west end of the alignment a temporary approximately 30-foot by 20-foot “exit” point for the TBM would be excavated. This excavation would facilitate extraction of a 25-foot portion of the approximately 200 foot TBM and be undertaken in accordance with all City and other applicable regulations. After extraction of the TBM, the hole would be filled and covered to match existing grade. The point where the TBM is removed would be on private property acquired by applicant. If the exit location is not acquired, the final portion of the TBM would not be extracted and would instead be left in place as the end wall of the test tunnel.

Excavations will include deployment of established standard practices for the monitoring of unknown cultural resources (archeological, paleontological). If previously unknown cultural resources are discovered the archaeological monitor shall have the authority to stop work, determine if work in other areas can continue, and evaluate the discovery. The archaeological monitor shall ensure appropriate treatment of human remains, if applicable, and coordinate Native American participation as needed. Monitoring will not occur of TBM activities.

Per State Health and Safety Code Section 7050.5, in the event of the discovery of human remains other than in a dedicated cemetery, no further excavation at the site or any nearby area suspected to contain human remains will occur until the County Coroner has been notified to determine if an investigation into the cause of death is required. Pursuant to California Public Resources Code (PRC) Section 5097.98, if the Coroner determines that the remains are Native American, then, within 24 hours, the Coroner must notify the Native American Heritage Commission, which in turn will notify the most likely descendant, who may recommend treatment of the remains and any grave goods. If the Native American Heritage Commission is unable to identify a most likely descendant, or the most likely descendant fails to make a recommendation within
24 hours after notification by the Native American Heritage Commission, or the landowner or his/her authorized agent rejects the recommendation by the most likely descendant and mediation by the Native American Heritage Commission fails to provide a measure acceptable to the landowner, then the landowner or his/her authorized representative will re-bury the human remains and grave goods with appropriate dignity at a location on the property not subject to further disturbances. Should human remains be encountered, a copy of the resulting County Coroner report noting any written consultation with the Native American Heritage Commission will be submitted as proof of compliance to the City’s Community Development Department. Monitoring will not occur of TBM activities.

The project includes implementation of established standard monitoring by a qualified paleontologist during excavation activities within sensitive geologic sediments (Quaternary alluvium below a depth of 5 feet below the ground surface, Quaternary older alluvium, and the San Pedro Formation (predicted at depth)). In the unlikely event that previously unknown paleontological resources are discovered, the paleontological monitor will have authority to temporarily divert grading away from exposed fossils to professionally and efficiently recover the fossil specimens and collect associated data. In the event fossils are recovered, recovered fossils shall be prepared to the point of curation, identified by qualified experts, and repositioned in a designated paleontological curation facility (such as the Natural History Museum of Los Angeles County). Monitoring will not occur of TBM activities.

Summary of Design Elements

- In accordance with the vision of the project for the commitment and promotion of reduced emissions, the applicant will set as a contract requirement for the construction contractor that all off-road construction equipment will meet or exceed the Environmental Protection Agency’s Tier 4 Final emissions standard or equivalent.

- The applicant has submitted a Settlement Instrumentation and Monitoring Plan as part of their application. The plan describes the monitoring system, which provides nearly real-time data through an automated system. If settlement thresholds are ever exceeded (or if unfavorable trends are observed before an exceedance), construction halts immediately in order to evaluate.

- The applicant has submitted a Fire Protection and Prevention Plan (Attachment A) that is designed to reduce risk of fire in the tunnel by abiding by regulations and common industry safety practices including the CalOSHA requirements for Fire Prevention and Control.

- The implementation will include adherence to all requirements set out in the Federal Aviation Administration (FAA) Final Determination dated July 27, 2017 (Attachment B), which include compliance with the requirements set forth in FAA Advisory Circular 150/5370-2, “Operational Safety on Airports During Construction.”, requirement to submit 7460’s for the construction equipment (30-45 days prior), and requirement to coordinate all associated activities with the
Airport Manager/Airport Traffic Control Tower (ATCT) 5 business days prior to the beginning of the project.
A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )
County of Los Angeles )

On ______________________, before me, ____________________________ (insert name and title of the officer), Notary Public, personally appeared ____________________________, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature ____________________________ (Seal)
A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California  
County of Los Angeles

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Notary Public, personally appeared ______________________, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature ______________________ (Seal)
EXHIBIT “A”

DESCRIPTION OF EASEMENT AREA

(Attached.)
EXHIBIT A
TUNNEL EASEMENT
15' WIDE

LEGAL DESCRIPTION

A STRIP OF LAND 15 FEET WIDE IN THE CITY OF HAWTHORNE, COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, THE CENTERLINE OF WHICH BEING DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT LYING ON THE EASTERLY LINE OF CRENSHAW BOULEVARD (100 FEET WIDE), THAT IS DISTANT 238.26 FEET SOUTHERLY AND 50.00 FEET EASTERLY FROM THE NORTHWEST CORNER OF PARCEL 1 OF AMENDED PARCEL MAP 26054, AS SHOWN BY MAP ON FILE IN BOOK 307 AT PAGES 33 THROUGH 37, INCLUSIVE, RECORDS OF LOS ANGELES COUNTY, SAID NORTHWEST CORNER BEING THE INTERSECTION OF CRENSHAW BOULEVARD AND 120TH STREET AS SHOWN ON SAID PARCEL MAP; SAID POINT OF BEGINNING BEING THE BEGINNING OF A NON–TANGENT CURVE CONCAVE SOUTH WESTERLY AND HAVING A RADIUS OF 530.00 FEET, TO WHICH BEGINNING OF CURVE A RADIAL LINE BEARS N 54°55'50" E, THROUGH A CENTRAL ANGLE OF 54°49'38", AN ARC DISTANCE OF 507.17 FEET TO A POINT THAT LIES WITHIN 120TH STREET (70 FEET WIDE), 13.56 FEET SOUTHERLY OF 120TH STREET CENTERLINE AND 16.44 FEET NORTHERLY OF SOUTHERLY RIGHT OF WAY; THENCE TANGENT TO SAID CURVE N89°53'48"W ALONG A LINE PARALLEL WITH AND DISTANT SOUTHERLY 13.56 FEET, MEASURED AT RIGHT ANGLES, FROM SAID CENTERLINE A DISTANCE OF 7,721.21 FEET TO A POINT OF TERMINUS.

THE SIDELINES OF SAID STRIP ARE TO TERMINATE EASTERLY ON THE EASTERLY LINE OF CRENSHAW BOULEVARD.

SEE EXHIBIT B ATTACHED HERE TO AND BY THIS REFERENCE MADE A PART HEREOF.

PREPARED UNDER MY SUPERVISION

ENGINEER: ZVI PLOTNIK

8/8/17

8/31/19

BY: PC/DH

JOB NO.: 298.40
EXHIBIT B
TUNNEL EASEMENT
15' WIDE

MATCH LINE - 1
AT STATION - 5+74.00
NEXT SHEET NUMBER: 1

PT: 5+07.17

C1
L=507.17'
A=54°49'38"
R=530'
STA 0+00 (R)=N54°55'50"E
STA 5+07.17 T=N89°53'48"W

MATCH LINE - 2
AT STATION - 12+24.00
NEXT SHEET NUMBER: 2

15'
13.56'
16.44'

Match line - 1
At station - 5+74.00
Previous sheet number: 1

Domínguez Channel

Parcel 1
Amended parcel
Map no. 20654
PMB 307/33-37

NWC of parcel 1
Of amended
PM 26054
PMB 307/33-37

Crenshaw Blvd.

N00°14'22"E
089°53'48"W

PMB 307/33-37

0 100' 200'

Plotnik & Associates
18626 S. Wilmington Ave., Suite 100
Rancho Dominguez, California 90220
Tel: (310) 605-6657
Fax: (310) 605-6658
www.plotnik.com

Civil Engineering • Land Surveying

EXHIBIT B
TUNNEL EASEMENT

Scale: 1"=100'
Page: 1/7
By: PC/DH
Job No.: 298.40
EXHIBIT “B”

DESCRIPTION OF PROJECT/IMPROVEMENTS

The test tunnel would be approximately 2-miles long and provide testing for zero-emissions-driven skates capable of transporting personal vehicles. Testing may also include skates equipped with carriages to provide transportation for pedestrians. As the test tunnel would contain only zero-emissions motors and fans located at the entry to the test tunnel on the SpaceX property would provide sufficient ventilation. The entry point is the existing permitted excavation at the SpaceX parking facility. Approximately 4,500 square-feet of the SpaceX parking lot asphalt would be excavated and repaved to provide a ramp entry point for the test tunnel. The test tunnel would facilitate SpaceX engineers testing of the technology and making refinements to any and all components, as necessary, before application as an alternative transportation method. The test tunnel would be at a depth of approximately 30-40 feet. The project would use a TBM that digs a tunnel with an exterior diameter of approximately 13.5 feet and interior diameter of approximately 12 feet.

Operation

The test tunnel would house a “skate” system that would be tested to prove viability for transporting personal vehicles to drive on, turning off their engines or pedestrian carriages and transported from one end of the tunnel to the other. The test tunnel project would involve SpaceX engineers repeatedly testing personal vehicle types suitable for placement on the skates; refinement of the design and technology; and general data collection on performance, durability, and application. No public use of the test tunnel would occur, the skates would be moved back and forth within the tunnel, and there would be no people within the vehicles or carriages. All access for skates loading and testing would be from the SpaceX parking lot end of the tunnel.

Construction

Construction is anticipated to take approximately 5 months to complete, daily during the hours permitted by the City (7 a.m. to 7 p.m. Monday through Friday, and 9 a.m. through 5 p.m. Saturday and Sunday). Construction would progress from south to north, east to west, with all staging and the majority of truck activity at the southeast entry/exit point within the existing SpaceX parking facility. The TBM would be plugged in to the existing grid and all other off-road construction equipment would meet or exceed the Environmental Protection Agency’s Tier 4 Final emissions standard or equivalent. All trucks would access/exit the I-105 freeway directly from the Crenshaw Boulevard off/on ramps. The test tunnel includes a fire prevention plan that identifies regulations and common industry safety practices designed to reduce risk of fire in the tunnel during construction and operation (Attachment A). A settlement monitoring plan is included in the permit application, which identifies automated real-time settlement monitoring and if exceedance of thresholds is detected, construction is halted immediately. The test tunnel also includes implementation of established standard industry practices for testing soil and groundwater, including testing and, if contaminated, disposal at an authorized disposal facility in the unlikely event it is encountered. The test tunnel also includes a ventilation plan created by Professional California Engineer and all considerations for worker health and safety, including ventilation and fire procedures as well as encountering gas and the stability of excavation areas,
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**Boring**

Construction would consist of excavations and tunnel construction using the TBM to create the tunnel and install prefabricated concrete segments behind it. The TBM cuts at a rate of approximately 3 inches per minute, with a cycle of approximately equal amounts of cutting and cooling. It is anticipated that the TBM would achieve up to 60 feet of advancement daily. As the TBM advances, it passes excavated material onto a conveyor belt that deposits that material into a waiting truck for disposal at a suitable facility, most likely the same one as used for material disposal by Los Angeles (LA) Metro for the Regional Connector Transit Connector (RCTC) project. It is estimated that 40 trucks a day would haul away material from the entry site near 1 Rocket Road, assuming regular dump trucks with a capacity of approximately 15 cubic yards. The concrete segments would be approximately 5-foot-long segments and delivered by truck, with up to 12 trucks per day. An additional two trucks per day would deliver additional materials, such as soil binders. A total of 20 workers a day are expected for the boring.

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24 hours after notification by the Native American Heritage Commission, or the landowner or his/her authorized agent rejects the recommendation by the most likely descendant and mediation by the Native American Heritage Commission fails to provide a measure acceptable to the landowner, then the landowner or his/her authorized representative will re-bury the human remains and grave goods with appropriate dignity at a location on the property not subject to further disturbances. Should human remains be encountered, a copy of the resulting County Coroner report noting any written consultation with the Native American Heritage Commission will be submitted as proof of compliance to the City’s Community Development Department. Monitoring will not occur of TBM activities.

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**Summary of Design Elements**

- In accordance with the vision of the project for the commitment and promotion of reduced emissions, the applicant will set as a contract requirement for the construction contractor that all off-road construction equipment will meet or exceed the Environmental Protection Agency’s Tier 4 Final emissions standard or equivalent.

- The applicant has submitted a Settlement Instrumentation and Monitoring Plan as part of their application. The plan describes the monitoring system, which provides nearly real-time data through an automated system. If settlement thresholds are ever exceeded (or if unfavorable trends are observed before an exceedance), construction halts immediately in order to evaluate.

- The applicant has submitted a Fire Protection and Prevention Plan (Attachment A) that is designed to reduce risk of fire in the tunnel by abiding by regulations and common industry safety practices including the CalOSHA requirements for Fire Prevention and Control.

- The implementation will include adherence to all requirements set out in the Federal Aviation Administration (FAA) Final Determination dated July 27, 2017 (Attachment B), which include compliance with the requirements set forth in FAA Advisory Circular 150/5370-2, “Operational Safety on Airports During Construction.”, requirement to submit 7460’s for the construction equipment (30-45 days prior), and requirement to coordinate all associated activities with the
Airport Manager/Airport Traffic Control Tower (ATCT) 5 business days prior to the beginning of the project.
July 27, 2017

TO: Boring Company
   Attn: Brett Horton
   1 Rocket Road
   Hawthorne, CA 90250
   brett.horton@spacex.com

CC: CITY OF HAWTHORNE
    CITY HALL, 4455 W 126 ST.
    HAWTHORNE, CA 90250
    ashadbehr@cityofhawthorne.org

CC: SpaceX
    Attn: Brett Horton
    1 Rocket Road
    Hawthorne, CA 90250
    brett.horton@spacex.com

RE: (See attached Table 1 for referenced case(s))
**FINAL DETERMINATION**

Table 1 - Letter Referenced Case(s)

<table>
<thead>
<tr>
<th>ASN</th>
<th>Prior ASN</th>
<th>Location</th>
<th>Latitude (NAD83)</th>
<th>Longitude (NAD83)</th>
<th>AGL (Feet)</th>
<th>AMSL (Feet)</th>
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<td>33-55-24.53N</td>
<td>118-19-36.50W</td>
<td>0</td>
<td>58</td>
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Description: This is a privately funded research and development tunnel for the Boring Company. See attached drawings for alignment and reference elevations at the noted site along with all known utility locations and elevations. Structure Height (AGL) entered references the approximate elevation of the top of the tunnel at the reference site (the top of the tunnel will be approx 23' below grade). The tunnel begins in the open SpaceX parking lot on the eastern side of Crenshaw Blvd, and runs under the northeast corner of the airport, then follows 120th st going west. The tunnel does not go under the runway.

We do not object with conditions to the construction described in this proposal provided:

You comply with the requirements set forth in FAA Advisory Circular 150/5370-2, "Operational Safety on Airports During Construction."

This case was reviewed for the tunnel at the above location submitted.

The proponent is required to submit 7460's for the construction equipment. (30-45 days prior)

The proponent is required to coordinate all associated activities with the Airport Manager/Airport Traffic Control Tower (ATCT) 5 business days prior to the beginning of the project.

This determination is subject to review if disruption to FAA Operations should occur.

Your proposal impacts the following National Airspace System (NAS) equipment:
The construction of the tunnel will require the proponent to coordinate in advance with Maurice Montoya, Acting Manager, FAA Los Angeles Environmental System Support Center (SSC) at 310-725-6950 or maurice.montoya@faa.gov to coordinate locations of buried service cables and any necessary service outages of HHR ODALS RW-25. Also coordinate with Malek Taweil, Manager, Jack Northrop Field/Hawthorne Municipal
Airports, at 310-349-1637 or mtaweil@cityofhawthorne.org. Prior to commencement of any excavation, the proponent shall coordinate all project work in the vicinity of underground power utility and communication cables in advance, preferably a minimum of two weeks, with the SSC Manager and Local Airport Authority.

The Airport sponsor shall notify the FAA's Air Traffic Organization (ATO) Planning and Requirements (P&R) Service Area office a minimum of 45 days prior to the "physical construction start date" for this project. Submit FAA Form entitled Airport Sponsor Strategic Event Submission Form including all date, time and/or duration changes via email to 9-AJV-SEC-WSA@faa.gov.

A separate notice to the FAA is required for any construction equipment, such as temporary cranes, whose working limits would exceed the height and lateral dimensions of your proposal.

This determination does not constitute FAA approval or disapproval of the physical development involved in the proposal. It is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground.

In making this determination, the FAA has considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, the effects it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA), and known natural objects within the affected area would have on the airport proposal.

This determination expires on January 27, 2019 unless:
(a) extended, revised or terminated by the issuing office.
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for the completion of construction, or the date the FCC denies the application.

NOTE: Request for extension of the effective period of this determination must be obtained at least 15 days prior to expiration date specified in this letter.

If you have any questions concerning this determination contact Lloyd E. Lewis (310) 725-3650 lloyd.e.lewis@faa.gov.

Lloyd E. Lewis
DivUser
Environmental Review and Class 32 Determination

Test Tunnel for Zero Emissions Subterranean Transportation Project

City of Hawthorne

August 2017
Review of Environmental Considerations and Class 32 Determination
Test Tunnel for Zero Emissions Subterranean Transportation Project
City of Hawthorne

Introduction

The following evaluation is based on information provided by the applicant, incorporated herein as Attachment A, which was independently reviewed by the City’s environmental consultant. The independent review concluded that the information provided utilized appropriate methodologies and standards and is therefore considered to be suitable for the City to consider when reaching its conclusions pursuant to the California Environmental Quality Act (CEQA).

As explained below, and based on the City’s environmental consultant’s review and the supplemental environmental information provided by the project applicant, the project qualifies for a Class 32 (Infill Development) categorical exemption pursuant to the State of California CEQA Guidelines (14 Cal. Code Regs. 15000 et seq.).

Test Tunnel Project

The Space Exploration Technologies Inc. (SpaceX), in conjunction with its subsidiary, The Boring Company (TBC) proposes to construct a two-mile subterranean tunnel that will be used for research and development (R&D) of an alternative travel mode using zero-emissions skates for transporting personal vehicles, and may also include skates equipped with carriages to provide transportation for pedestrians. The skate system will be tested for viability for transporting personal vehicles and pedestrian from one end of the tunnel to the other. SpaceX engineers will be repeatedly testing personal vehicle types suitable for placement on the skates; refining the design and technology; and collecting data about the system’s performance, durability, and application. There will be no public use of the test tunnel.

The test tunnel will be at a depth of approximately 30-40 feet, avoiding any identified utilities. The tunnel will have an exterior diameter of approximately 13.5 feet and interior diameter of approximately 12 feet. The tunnel will extend from the existing parking lot within the site of the SpaceX facility at 1 Rocket Road on the east, to the intersection of 120th Street and Hawthorne Boulevard on the west in City of Hawthorne. All access for skates loading and testing will be from the previously approved entry point facility at the SpaceX parking lot at the east end of the tunnel. An approximately 30-foot by 20-foot temporary exit point for the TBM, where approximately 25-foot long section of the boring machine will be is removed will be at the west end of the tunnel within the site.
acquired by the SpaceX. In the event that SpaceX does not acquire rights for the exit point on private property, the 25-foot section of the TBM will be abandoned in place.

Construction of the tunnel will proceed in accordance with the City’s regulations limiting the construction hours to 7 a.m. to 7 p.m. Monday through Friday, and 9 a.m. through 5 p.m. Saturday and Sunday. It is anticipated that the tunnel construction will be completed within approximately 5 months.

Environmental Considerations

Traffic: Tunnel construction activities will be primarily within entry point area at the SpaceX parking lot, and will involve approximately 40 trucks trips per day primarily hauling excavated soils for disposal. All trucks will access/exit the I-105 freeway directly from the Crenshaw Boulevard off/on ramps, and truck trips will be limited to off-peak traffic hours, i.e. hours outside the peak traffic hours of 7:30 – 8:30 a.m. and 4:30 – 5:30 p.m.1. The trips associated with up to 42 construction workers will also be limited to off-peak traffic hours. At the end of construction, a component of the TBM may be removed at the west end of the tunnel, and if removed, that process will be in accordance with a traffic control plan to ensure no conflicts with vehicular or pedestrian traffic.

No additional traffic will be generated during construction or operation of the test tunnel, and the project will not alter the existing roadway transportation network. Therefore, no significant traffic impact will result.

Noise: Testing of the skate system within the tunnel will not generate noise that is audible at the surface.

Construction noise will be limited to that associated with the tunnel’s east end entry point and the tunnel’s west end TBM exit point, with noise levels that will be generally consistent with the ambient noise levels of these existing industrial and commercial nature of these areas. The tunnel entry point is approximately 0.5-mile away from the nearest sensitive receptors, which are residences located on the south side of West El Segundo Boulevard. Between the tunnel entry point and those receptors are a number of intervening features, including a parking structure and busy roadways generating traffic noise. The test tunnel project contemplates an exit of the TBM in a commercial area which is adjacent to the area zoned for high density residential uses, or alternatively, an abandonment of a 25-foot section of the TBM in place at the end of the tunnel. Due to the depth of operation of the TBM, no noise will reach surface land uses when it is operating underground. Additionally, the TBM is slow moving and causes very little vibration and related ground-borne noise to the surrounding area. Given this range of potential vibration and the proposed depth of TBM usage, vibration produced by the TBM will be well below the Federal Transit Administration threshold for Category IV

1 Section 5.2, 2010 Congestion Management Program for Los Angeles County
buildings (those most susceptible to vibration damage) of 0.12 inches per second peak particle vibration (PPV).

While the noise levels generated by construction equipment and activities will be generally consistent with the ambient noise levels of these existing industrial and commercial areas, the construction hours will nonetheless be restricted to the City’s construction hours permitted within areas zoned for residential uses, i.e., 7 a.m. to 7 p.m. Monday through Friday, and 9 a.m. through 5 p.m. Saturday and Sunday, and no significant noise impact will result.

**Air Quality:** Testing of the zero-emission skate system within the tunnel will not generate air pollutant emissions.

Construction of the tunnel will consist of excavations and tunnel construction using the TBM to create the tunnel and install prefabricated concrete segments behind it. The TBM will be plugged into the existing electrical grid and all other off-road construction equipment will meet or exceed the Environmental Protection Agency’s (EPA) Tier 4 Final emissions standard or equivalent. With these project components, the daily construction emissions will not exceed the SCAQMD daily threshold amounts for air pollutants. Construction-related emissions will also be substantially below all site-specific SCAQMD localized significance thresholds with the use off-road equipment that meets or exceeds the EPA’s Tier 4 standards or equivalent, and will therefore will not result in a significant impact to the closest off-site sensitive receptors located approximately 300 feet northwest of the test tunnel site boundary. The construction of the test tunnel will also proceed in compliance with SCAQMD Rule 403 to control fugitive dust emissions generated during grading activities. The test tunnel venting will be located at the entry point location, and there are no other vents in the tunnel, such that there will be no venting impacts along the proposed alignment.

Therefore no significant air quality impact will result.

**Greenhouse Gases (GHG):** The estimated total GHG emissions during construction of the test tunnel will be short-term - lasting only for the duration of the construction period; will not represent a long-term source of GHG emissions, and the amortized construction emissions will be substantially below the SCAQMD guidance draft significance threshold. Therefore no significant GHG impact will result.

**Water Quality:** Runoff during construction will be routed to the existing underground storm drain systems and/or lined channels, thus reducing off-site erosion. In addition, applicable permits and waste discharge requirements will be obtained and adhered to in

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2 The emissions will be below the SCAQMD threshold amounts even under the theoretical worst case assumptions that overestimate number of trucks by approximately 30%.

3 Ibid
order to manage water quality. In compliance with existing laws and regulations, the project includes preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) to manage surface water quality from sedimentation and/or erosion during construction. The exit location of the test tunnel will be designed to divert away surface drainage during construction’s excavation and backfilling. In addition, design and construction will use Best Management Practices in accordance with the applicable National Pollutant Discharge Elimination System (NPDES) permit requirements.

In the event that groundwater is encountered, the construction of and tunnel design includes necessary seals and impermeable concrete grouting materials to prevent intrusion of groundwater into the tunnel and to reduce contaminant migration to the deeper groundwater basin, reducing potential effects to the groundwater resource. The test tunnel includes implementation of established standard industry practices for testing soil and groundwater, including testing and, if contaminated, disposal at an authorized disposal facility in the unlikely event it is encountered. The project will also comply with the Los Angeles Regional Water Quality Control Board dewatering permit that will be obtained for the project, and any contaminated groundwater will be properly treated prior to being discharged. Any uncontaminated groundwater collected during construction dewatering will be used on site for dust control purposes.

The test tunnel will be at depths that avoid any surface drainage features or subterranean water channels. The entry site at the east end is west of Dominguez Channel, avoiding the channel. The TBM exit location does not contain or exist near any hydrological or drainage features, and will be located at an existing paved surface parking lot.

The test tunnel is not located within a 100-year floodplain, as mapped by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps.

Therefore, no significant impact on water quality or hydrology will result.

Geology and Soils: The test tunnel is not located within an Alquist-Priolo Earthquake Fault Zone, and will not cross any known active faults identified on the Department of Conservation’s Fault Activity Map of California. Seismic analysis was completed as part of structural calculations and used to design the test tunnel components. According to the Seismic Hazard Evaluation of the Inglewood quadrangle, the test tunnel and the rest of the City are not located in a liquefaction hazard zone. Due to the underground nature of the test tunnel, landslides is not a concern because there is no slope on which landslides could occur. According to the Seismic Hazard Evaluation of the Inglewood quadrangle, the exit point of the TBM is not located in an Earthquake-Induced Landslide Zone. Excavation and tunneling activities will be conducted in accordance with and CalOSHA requirements to ensure stability of excavated areas. A soils settlement monitoring plan is included as part of the project, which identifies automated real-time settlement monitoring and in the event there is any subsidence of ½ inch or greater, the tunnel boring work will be halted until the subsidence is stopped and corrected.
Grading will be limited to the entry and exit points as part of development of the test tunnel. At these locations, erosion as a result of construction activities will be minimized through soil stabilization measures required by SCAQMD Rule 403 (Fugitive Dust), such as daily watering, and through the standard erosion control practices required pursuant to the National Pollution Discharge Elimination System (NPDES), such as silt fencing or sandbags.

Therefore, no significant impact on geology or soils will result.

**Hazards and Hazardous Materials:** The test tunnel includes a fire prevention plan that identifies regulations and industry safety practices designed to reduce risk of fire in the tunnel during construction and operation. A soils settlement monitoring plan is included in the project, which identifies automated real-time settlement monitoring. If exceedance of thresholds is detected, construction will be halted immediately. The tunnel also includes implementation of a ventilation plan submitted by Professional California Engineer. The depth (approximately 30-40 feet) of the test tunnel enables avoidance of contaminated surface soils, underground storage tanks, and subterranean pipelines for fuel and gas. The test tunnel alignment is not within 1,000 feet of a methane producing site, within, or adjacent to, a potential methane producing land fields, and will not be adjacent to either above ground or underground airport’s storage facilities. The construction of the tunnel will be in compliance with the California Office of Health and Safety (CalOSHA) Division of Tunneling and Mining classifications permit, which includes provisions to handle accidental release of construction-related hazardous materials, including encountering subsurface gases such as methane. The construction contractor will be required to implement BMPs for handling hazardous materials in compliance with existing regulations. The test tunnel does not contain and is not adjacent to any sites listed on the state Cortese List of hazardous materials sites.

All considerations for worker health and safety, including ventilation and fire safety, as well as for encountering gas and for the stability of excavation areas, will be governed by the CalOSHA permit. Construction of the tunnel will not progress without compliance with all requirements of the CalOSHA permit.

Hawthorne Municipal Airport is within two miles of the test tunnel’s entry point. However, the test tunnel will not involve any new aboveground structures, nor will the test tunnel result in a safety hazard for people residing or working in the test tunnel area. A determination of no hazard has been issued by the Federal Aviation Authority (FAA) for the test tunnel, and the project will comply with all applicable FAA regulations and guidance.

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The test tunnel will not change existing conditions with regard to transportation routes or evacuation plans. No public or private streets will be closed during or following construction of the test tunnel, and no changes to emergency access/evacuation will result.

The test tunnel will not include the use, transportation, or disposal of hazardous materials or waste as part of operations.

Therefore, no significant impact related to hazards or hazardous materials will result.

**Utilities and Public Services:** The test tunnel will be at the depth of approximately 30 – 40 feet, beneath existing infrastructure, including utility lines (gas, power, water, sewer), and roadway foundations (pilings), thus preventing the potential for conflict with subterranean utilities. The applicant will also provide a notice to, and will consult with, all utilities to ensure that the construction and operation of the tunnel will not interfere or impair the use, operation, or safety of those utilities. The operations of the tunnel will use electricity from the existing grid which has adequate capacity. No new fire stations or other capital improvements will need to be constructed, and no new fire personnel will be needed to maintain existing service ratios and response times, as the test tunnel will not increase population or the need to service them. In addition, the entry point within the SpaceX parking lot is located adjacent to the Los Angeles County Fire Station #162 which provides initial fire emergency response to the project and the project includes implementation of a fire prevention and control plan providing for adequate on-site fire protection.

The test tunnel will not increase residential population and will not require law enforcement or public safety services from the Hawthorne Police Department or create demand for local schools, libraries, or parks. No new police stations, parks, libraries, or other capital improvements will be required, and no new personnel will be needed to maintain existing service ratios and emergency response times.

Therefore, no significant impact related to utilities and public services will result.

**Cultural and Tribal Resources:** There are no known cultural or tribal resources within the city, including within the test tunnel alignment beneath the existing streets. In the unlikely event that cultural or tribal are inadvertently exposed during project-related surface ground disturbance at the east and west ends of the tunnel, the following procedures will be followed: (1) Established standard practices for treatment of unanticipated discoveries of archaeological resources and state requirements for human remains (Section 7050.5 of the California Health and Safety Code; California Public Resources Code, Section 5097.98) will be implemented as part of the project; (2) utilizing paleontological monitoring at the west end of the tunnel site, or where monitoring is not feasible, collecting and processing sediment samples for microvertebrate sampling; (3) the Gabrielino/Tongva San Gabriel Band of Mission
Indians and the Tongva Ancestral Territorial Tribal Nation will be contacted and asked to provide the services of a trained Native American consultant, agreeable to both groups, to monitor ground-disturbing work on an as-needed basis, in the area where the Native American cultural resources were inadvertently discovered; and (4) if human remains are inadvertently discovered, in compliance with State Health and Safety Code Section 7050.5 further disturbances and activities will stop in any area or nearby area suspected to overlie remains, and the County Coroner will be contacted. If the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission, which will then notify the most likely descendent. Further provisions of PRC 5097.98 will be followed as applicable.

Therefore, with compliance with these existing regulations and use of established procedures no significant impact will result.

**Cumulative Effects:** The test tunnel project will not contribute considerably to any cumulative impacts because, based on the information above, effects will be limited to short term temporary construction activities for which no additional related activities are foreseen to overlap either in location or timing.

**DETERMINATION**

**Consistency with Applicable Land Use Designations:** The test tunnel will be located beneath public streets, similar to other existing subterranean infrastructure, including water, sewer, and other utilities. The surface parking site at the east end of the tunnel which is the entry point for the tunnel is zoned M-2 General Industrial, and is adjacent to C-1 Freeway Commercial/Mixed Use and AMP Airport Master Plan zones. The test tunnel will exit within surface parking in an area zoned C-3 General Commercial, if the 25- section of the TBM is abandoned in place. No change in land use designations will result, and similar to the existing underground infrastructure, no inconsistency with the land use designations with result. The test tunnel project is consistent with the General Plan Land Use Goal 1 and Policy 1.5 for the City to continue to explore and adopt ways to use its assets to promote commercial activity within the city and Policy 3.1 that addresses the promotion of businesses that generate positive economic benefits to the community, including generating tax revenue, job creation and enhancing the quality of life for residents and visitors as the project will create employment, generate tax revenue, and support the public interest in the development of a new transportation system that may speed future public transportation opportunities, including such future opportunities for the City residents and visitors by facilitating the development of transportation technology that may benefit the public. Further, the project is consistent with Land Use Policy 3.6 regarding evaluating and updating land use regulations to “facilitate the attraction of high technology industries which will enhance the local economy and support Hawthorne’s image as aerospace research and development hub.” The project is also consistent with the goals in the City’s General Plan Economic Development Element, including to promote a sound local economy that attracts investment and creates
employment opportunities (Goal 1); and identifying key assets and using them for economic development while safeguarding the assets (Goal 8). In addition, the proposed use of the public rights-of-way are consistent with the General Plan Circulation Element’s street designations for Crenshaw Boulevard (an Arterial Street), and 120th Street (a Collector Street) in that those streets will continue to provide the surface transportation services that exist today without interruption.

**Location:** The test tunnel will be located underneath portions of Crenshaw Boulevard, the Airport, and 120th Street, within the City limits. The tunnel alignment and the sites of the entry and exist points for the tunnel boring machine comprise approximately 3.51 acres and are fully surrounded by urban uses.

**Habitat Value:** The tunnel will be beneath public streets within a fully developed urban area developed with pavement and structures, which has no value as habitat for rare, endangered, or threatened plant or animal species.

**Environmental Effects:** As discussed previously, the test tunnel project will not result in significant effects related to traffic, noise, air quality, or water quality.

**Utilities and Public Services:** As discussed previously, the test tunnel will be adequately served by all required utilities.

**Conclusion**

The results of the environmental evaluation as set forth above, and based in part on the Supplemental Environmental Information provided by the applicant and peer reviewed by the City’s environmental consultant, demonstrate that the proposed Test Tunnel for Zero Emissions Subterranean Transportation project qualifies as an infill project that is exempt from CEQA pursuant to CEQA Guidelines Section 15332, the Class 32 exemption for infill development.
Review Preparers

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Attachment A
Supplemental Environmental Information
Test Tunnel for Zero Emissions Subterranean Transportation
Submitted by the Applicant

to:

City of Hawthorne
4455 W. 126th Street
Hawthorne, California, 90250

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024
Contact: Matt Valerio

MAY 2017
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1 INTRODUCTION

The Boring Company is proposing a subterranean tunnel that would provide for research and development (R&D) and testing of a concept for an alternative travel option for personal vehicles and pedestrian carriages that would generate zero emissions and transport passengers below ground. The Boring Company is a separate entity that shares ownership with Space Exploration Technologies Inc. (SpaceX). The proposed test tunnel would extend from the parking structure opposite the existing SpaceX facility at 1 Rocket Road in the City of Hawthorne to the intersection of 120th Street and Hawthorne Boulevard. This applicant-prepared Supplemental Environmental Information provides environmental information for the City’s consideration.

2 PROJECT DESCRIPTION

Project Title

Test Tunnel for Zero Emissions Subterranean Transportation (Test Tunnel).

Project Location

The test tunnel would extend from existing permitted excavation at the parking facility of the existing SpaceX facility at 1 Rocket Road in the City of Hawthorne to the intersection of 120th Street and Hawthorne Boulevard as seen in Figure 1, Project Alignment Aerial Detail Overview. The point where the tunnel boring machine (TBM) is removed at the west end of the alignment would be on private property acquired by the applicant.

Project Description

The test tunnel would be approximately 2-miles long and provide testing for zero-emissions-driven skates capable of transporting personal vehicles. Testing may also include skates equipped with carriages to provide transportation for pedestrians. As the test tunnel would contain only zero-emissions motors and fans located at the entry to the test tunnel on the SpaceX property would provide sufficient ventilation. The entry point is the existing permitted excavation at the SpaceX parking facility. Approximately 4,500 square-feet of the SpaceX parking lot asphalt would be excavated and repaved to provide a ramp entry point for the test tunnel. The test tunnel would facilitate SpaceX engineers testing of the technology and making refinements to any and all components, as necessary, before application as an alternative transportation method. The test tunnel would be at a depth of approximately 30-40 feet. The project would use a TBM that digs a tunnel with an exterior diameter of approximately 13.5 feet and interior diameter of approximately 12 feet.
Operation

The test tunnel would house a “skate” system that would be tested to prove viability for transporting personal vehicles to drive on, turning off their engines or pedestrian carriages and transported from one end of the tunnel to the other. The test tunnel project would involve SpaceX engineers repeatedly testing personal vehicle types suitable for placement on the skates; refinement of the design and technology; and general data collection on performance, durability, and application. No public use of the test tunnel would occur, the skates would be moved back and forth within the tunnel, and there would be no people within the vehicles or carriages. All access for skates loading and testing would be from the SpaceX parking lot end of the tunnel.

Construction

Construction is anticipated to take approximately 5 months to complete, daily during the hours permitted by the City (7 a.m. to 7 p.m. Monday through Friday, and 9 a.m. through 5 p.m. Saturday and Sunday). Construction would progress from south to north, east to west, with all staging and the majority of truck activity at the southeast entry/exit point within the existing SpaceX parking facility. The TBM would be plugged in to the existing grid and all other off-road construction equipment would meet or exceed the Environmental Protection Agency’s Tier 4 Final emissions standard or equivalent. All trucks would access/exit the I-105 freeway directly from the Crenshaw Boulevard off/on ramps. The test tunnel includes a fire prevention plan that identifies regulations and common industry safety practices designed to reduce risk of fire in the tunnel during construction and operation (Attachment A). A settlement monitoring plan is included in the permit application, which identifies automated real-time settlement monitoring and if exceedance of thresholds is detected, construction is halted immediately. The test tunnel also includes implementation of established standard industry practices for testing soil and groundwater, including testing and, if contaminated, disposal at an authorized disposal facility in the unlikely event it is encountered. The test tunnel also includes a ventilation plan created by Professional California Engineer and all considerations for worker health and safety, including ventilation and fire procedures as well as encountering gas and the stability of excavation areas, shall be governed by the California Office of Health and Safety (CalOSHA) Division of Tunneling and Mining classifications permit. Construction of segments cannot progress without coverage of each portion from that CalOSHA permit.

Boring: Construction would consist of excavations and tunnel construction using the TBM to create the tunnel and install prefabricated concrete segments behind it. The TBM cuts at a rate of approximately 3 inches per minute, with a cycle of approximately equal amounts of cutting and cooling. It is anticipated that the TBM would achieve up to 60 feet of advancement daily. As the TBM advances, it passes excavated material onto a conveyor belt that deposits that material into a waiting truck for disposal at a suitable facility, most likely the same one as used for material
Supplemental Environmental Information

disposal by Los Angeles (LA) Metro for the Regional Connector Transit Connector (RCTC) project. It is estimated that 40 trucks a day would haul away material from the entry site near 1 Rocket Road, assuming regular dump trucks with a capacity of approximately 15 cubic yards. The concrete segments would be approximately 5-foot-long segments and delivered by truck, with up to 12 trucks per day. An additional two trucks per day would deliver additional materials, such as soil binders. A total of 20 workers a day are expected for the boring.

Approximately 1,500 square-feet of paving would be undertaken in the SpaceX parking lot to provide an access ramp to the tunnel. A total of 3 workers for a single day are expected for the paving.

At the west end of the alignment a temporary approximately 30-foot by 20-foot “exit” point for the TBM would be excavated. This excavation would facilitate extraction of a 25-foot portion of the approximately 200 foot TBM and be undertaken in accordance with all City and other applicable regulations. After extraction of the TBM, the hole would be filled and covered to match existing grade. The point where the TBM is removed would be on private property acquired by applicant. If the exit location is not acquired, the final portion of the TBM would not be extracted and would instead be left in place as the end wall of the test tunnel.

Excavations will include deployment of established standard practices for the monitoring of unknown cultural resources (archeological, paleontological). If previously unknown cultural resources are discovered the archaeological monitor shall have the authority to stop work, determine if work in other areas can continue, and evaluate the discovery. The archaeological monitor shall ensure appropriate treatment of human remains, if applicable, and coordinate Native American participation as needed. Monitoring will not occur of TBM activities.

Per State Health and Safety Code Section 7050.5, in the event of the discovery of human remains other than in a dedicated cemetery, no further excavation at the site or any nearby area suspected to contain human remains will occur until the County Coroner has been notified to determine if an investigation into the cause of death is required. Pursuant to California Public Resources Code (PRC) Section 5097.98, if the Coroner determines that the remains are Native American, then, within 24 hours, the Coroner must notify the Native American Heritage Commission, which in turn will notify the most likely descendant, who may recommend treatment of the remains and any grave goods. If the Native American Heritage Commission is unable to identify a most likely descendant, or the most likely descendant fails to make a recommendation within 24 hours after notification by the Native American Heritage Commission, or the landowner or his/her authorized agent rejects the recommendation by the most likely descendant and mediation by the Native American Heritage Commission fails to provide a measure acceptable to the landowner, then the landowner or his/her authorized representative will re-bury the human remains and grave goods with appropriate dignity at a location on the property not subject to further
disturbances. Should human remains be encountered, a copy of the resulting County Coroner report noting any written consultation with the Native American Heritage Commission will be submitted as proof of compliance to the City’s Community Development Department. Monitoring will not occur of TBM activities.

The project includes implementation of established standard monitoring by a qualified paleontologist during excavation activities within sensitive geologic sediments (Quaternary alluvium below a depth of 5 feet below the ground surface, Quaternary older alluvium, and the San Pedro Formation (predicted at depth)). In the unlikely event that previously unknown paleontological resources are discovered, the paleontological monitor will have authority to temporarily divert grading away from exposed fossils to professionally and efficiently recover the fossil specimens and collect associated data. In the event fossils are recovered, recovered fossils shall be prepared to the point of curation, identified by qualified experts, and repositioned in a designated paleontological curation facility (such as the Natural History Museum of Los Angeles County). Monitoring will not occur of TBM activities.

**Summary of Design Elements**

- In accordance with the vision of the project for the commitment and promotion of reduced emissions, the applicant will set as a contract requirement for the construction contractor that all off-road construction equipment will meet or exceed the Environmental Protection Agency’s Tier 4 Final emissions standard or equivalent.

- The applicant has submitted a Settlement Instrumentation and Monitoring Plan as part of their application. The plan describes the monitoring system, which provides nearly real-time data through an automated system. If settlement thresholds are ever exceeded (or if unfavorable trends are observed before an exceedance), construction halts immediately in order to evaluate.

- The applicant has submitted a Fire Protection and Prevention Plan (Attachment A) that is designed to reduce risk of fire in the tunnel by abiding by regulations and common industry safety practices including the CalOSHA requirements for Fire Prevention and Control.

- The implementation will include adherence to all requirements set out in the Federal Aviation Administration (FAA) Final Determination dated July 27, 2017 (Attachment B), which include compliance with the requirements set forth in FAA Advisory Circular 150/5370-2, "Operational Safety on Airports During Construction.", requirement to submit 7460's for the construction equipment (30-
45 days prior), and requirement to coordinate all associated activities with the Airport Manager/Airport Traffic Control Tower (ATCT) 5 business days prior to the beginning of the project.

3 INFORMATION

Land Use

The entry point for the TBM in Hawthorne is zoned M-2 General Industrial. The temporary TBM exit point is within private surface parking in an area zoned as C-3 General Commercial, in the City of Hawthorne. The alignment of the test tunnel is under 120th Street, and there would be no change in the land use at the surface or adjacent properties. No changes in existing or future land uses would result.

Transportation and Traffic

Construction of the test tunnel is estimated to take approximately 5 months using a TBM. Construction activities would create minimal time delays for surrounding roads at the construction launch point and the exit point. Construction would involve approximately four trucks in and out per hour, between the hours permitted by the City (7 a.m. to 7 p.m. Monday through Friday, and 9 a.m. through 5 p.m. Saturday and Sunday) daily (approximately 40 trucks total). The majority of these trips would result from the use of the TBM, which requires spoils to be hauled to off-site disposal locations. To further reduce traffic, truck haul trips will be scheduled during off-peak hours. Routes would include the most direct freeway access (i.e. the on/off ramps to I-105 at Crenshaw Blvd.). In addition, there would be trips associated with up to 42 daily construction workers, with shifts that will be timed to avoid peak traffic hours.

The test tunnel would provide for testing purposes only. No additional traffic would be generated at the TBM exit point, as it would not be a vehicle entry or exit point, and construction would be achieved primarily from the SpaceX parking lot. The exit of a 25-foot section of the TBM would require coordination with the City of Hawthorne to ensure that the equipment emerges and is taken away under a traffic control plan to ensure no conflicts with vehicular or pedestrian traffic.

The test tunnel would provide for testing purposes only, and no additional traffic would be generated from the test tunnel. The project would not alter the current transportation network.

Noise

There would be construction noise associated with the entry point and the west end TBM exit point. The test tunnel entry point is approximately 0.5 miles from the nearest sensitive receptors (residences located on the south side of W. El Segundo Boulevard), and there are intervening features, including a parking structure and busy roadways between the entry site and these
receptors. The test tunnel does include an exit point of the TBM in a site zoned for General Commercial The construction operations for the completion of the test tunnel, in particular where and when the TBM exits, would be required to within the permitted construction hours by the City (7 a.m. to 7 p.m. Monday through Friday, and 9 a.m. through 5 p.m. Saturday and Sunday). No additional noise sources would result during operation.

Potential noise from TBM operations at the entry point where bored material is hauled out and removed would include equipment such as excavators, dozers, cranes, and drill rigs that can generate noise levels of up to 90 A-weighted decibels (dBA). Noise levels generated would be generally consistent with the ambient noise levels of the existing industrial and commercial nature of the areas. The City only limits hours of construction for activities with areas zoned for residential, and the entry or launch site for the test tunnel is zoned industrial, and the TBM exit point is zoned commercial, not residential.

Because of the depth of operation of the TBM, no noise would reach surface land uses when it is operating underground. Additionally, the TBM is slow moving and causes very little vibration and related ground-borne noise to the surrounding area. The noise study for LA Metro’s RCTC¹ project identified two studies that measured peak particle vibration (PPV) from tunnel construction. One ranged from 0.0024 to 0.0394 inches per second PPV at a distance of 33 feet from the vibration source, the other ranged from 0.0157 to 0.0551 inches per second PPV at the same 33-foot distance from the source. Given this range of potential vibration and the proposed depth of TBM usage, vibration produced by the TBM would be well below the Federal Transit Administration threshold for Category IV buildings (those most susceptible to vibration damage) of 0.12 inches per second PPV.²

**Air Quality**

Construction of the test tunnel would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and volatile organic compound off-gassing) and off-site sources (i.e., on-road haul trucks, vendor trucks, and worker vehicle trips). Construction emissions can vary substantially from day to day, depending on the level of activity; the specific type of operation; and, for dust, the prevailing weather conditions. Details of the emissions calculations are provided in the attached Air Quality and Greenhouse Gas Emissions Memorandum, and attachments thereto (Attachment C).

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¹ Los Angeles County Metropolitan Transportation Authority. 2010. Regional Connector Transit Corridor Noise and Vibration Technical Memorandum.
Construction

Calculations included worst-case assumptions of construction activities 24-hours a day, which overestimated the number of trucks by approximately 30 percent. Table 1 presents the estimated theoretical worst-case maximum daily construction emissions that would be generated during construction of the test tunnel including the commitment to use off-road equipment that meets or exceeds EPA Tier 4 standards or equivalent.

Table 1
Estimated Theoretical Worst-Case Maximum Daily Construction Criteria Air Pollutant Emissions

<table>
<thead>
<tr>
<th></th>
<th>VOC</th>
<th>NOx</th>
<th>CO</th>
<th>SOx</th>
<th>PM10</th>
<th>PM2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tunnel Boring Machine</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Off-Road Equipment</td>
<td>2.70</td>
<td>12.08</td>
<td>155.51</td>
<td>0.22</td>
<td>0.30</td>
<td>0.26</td>
</tr>
<tr>
<td>Worker Vehicles</td>
<td>0.26</td>
<td>0.14</td>
<td>1.71</td>
<td>0.00</td>
<td>0.06</td>
<td>0.02</td>
</tr>
<tr>
<td>Vendor Trucks</td>
<td>0.05</td>
<td>1.55</td>
<td>0.25</td>
<td>0.00</td>
<td>0.03</td>
<td>0.01</td>
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<tr>
<td>Haul Trucks</td>
<td>0.60</td>
<td>17.67</td>
<td>2.90</td>
<td>0.04</td>
<td>0.29</td>
<td>0.16</td>
</tr>
<tr>
<td>Fugitive Dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.39</td>
<td>0.34</td>
</tr>
<tr>
<td>Asphalt Paving Off-Gassing</td>
<td>0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>3.66</td>
<td>31.45</td>
<td>160.37</td>
<td>0.27</td>
<td>2.06</td>
<td>0.79</td>
</tr>
<tr>
<td>SCAQMD Threshold</td>
<td>75</td>
<td>100</td>
<td>550</td>
<td>150</td>
<td>150</td>
<td>55</td>
</tr>
<tr>
<td>Threshold Exceeded?</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Notes: CO = carbon monoxide; NOx = oxides of nitrogen; PM10 = coarse particulate matter; PM2.5 = fine particulate matter; SCAQMD = South Coast Air Quality Management; SOx = sulfur oxides; VOC = volatile organic compound
The tunnel boring machine is assumed to run off grid-sourced electricity.
Fugitive dust emissions include on-road vehicle dust and truck loading emissions.
See Attachment C for complete results.

As shown in Table 1, daily construction emissions would not exceed the SCAQMD thresholds during construction. Additionally, the test tunnel would be required to comply with SCAQMD Rule 403 to control fugitive dust emissions generated during grading activities. Construction-generated emissions would be temporary and would not represent a long-term source of criteria air pollutant emissions.

Operation

Because the test tunnel would provide testing of zero-emissions-transport, no operational emissions would be generated.

The closest off-site sensitive receptors to the test tunnel site are residences located approximately 300 feet northwest of the TBM exit location however, no operational emissions would occur at this location. Residences adjacent to the alignment along 120th Street would not be subjected to
emissions as the project is subterranean. The maximum allowable daily emissions that would satisfy the SCAQMD localized significance thresholds for Source Receptor Area (SRA) 3 are presented in Table 2 and compared to the maximum theoretical worst-case daily on-site construction emissions. As shown in Table 2, construction activities would not generate emissions in excess of site-specific localized significance thresholds including the commitment to use off-road equipment that meets or exceeds the EPA’s Tier 4 standards or equivalent.

Table 2
Localized Significance Thresholds Analysis for Test Tunnel Construction

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Project Construction Emissions (pounds per day)</th>
<th>LST Criteria (pounds per day)</th>
<th>Exceeds LST?</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO₂</td>
<td>12.08</td>
<td>93</td>
<td>No</td>
</tr>
<tr>
<td>CO</td>
<td>155.51</td>
<td>785</td>
<td>No</td>
</tr>
<tr>
<td>PM₁₀</td>
<td>0.30</td>
<td>14</td>
<td>No</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>0.26</td>
<td>5</td>
<td>No</td>
</tr>
</tbody>
</table>

Source: SCAQMD 2009.
Notes: LST = localized significance threshold; NO₂ = nitrogen dioxide; CO = carbon monoxide; PM₁₀ = coarse particulate matter; PM₂.₅ = fine particulate matter
See Attachment C for detailed results.
Localized significance thresholds are shown for 1-acre project sites corresponding to a distance to a sensitive receptor of 50 meters for Source Receptor Area 3 (Southwest Coastal Los Angeles County).
These estimates reflect control of fugitive dust required by Rule 403.

Water Quality

Runoff during construction would be routed to the existing underground storm drain systems and/or lined channels, thus reducing off-site erosion. In addition, applicable municipal permits and waste discharge requirements would be obtained and adhered to in order to manage water quality. Compliance with federal, state, and local laws and regulations would be required for construction activities. A Storm Water Pollution Prevention Plan (SWPPP) would be prepared to manage surface water quality from sedimentation and/or erosion during construction. The TBM exit location would be designed to divert surface drainage away from the tunnel during construction. In addition, design and construction would use BMPs in accordance with the applicable NPDES.

In the event that groundwater is encountered, the construction of and tunnel design includes necessary seals and impermeable concrete grouting materials to prevent intrusion of groundwater into the tunnel and to reduce contaminant migration to the deeper groundwater basin, reducing potential effects to the groundwater resource. The test tunnel includes implementation of established standard industry practices for testing soil and groundwater, including testing and, if contaminated, disposal at an authorized disposal facility in the unlikely event it is encountered. A dewatering permit from the Los Angeles Regional Water Quality
Control Board would be obtained, and as required by that permit any contaminated groundwater would be properly treated prior to being discharged. As groundwater in general is not expected to be encountered, and if encountered likely in small quantities, any uncontaminated groundwater collected during construction dewatering would be used on site for dust control purposes.

The test tunnel would be at depths that avoid any surface drainage features or subterranean water channels. The entry site at the east end within the existing SpaceX parking facility is west of one mapped feature (Dominguez Channel), which would be avoided. The TBM exit location does not contain or exist near any hydrological or drainage features.

The test tunnel is not located within a 100-year floodplain, as mapped by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps.\(^3\)

The test tunnel is not subject to tsunami due to its distance from the ocean. None of Hawthorne, including the test tunnel site, is located within an area identified on a Tsunami Inundation Map. There are no significant hills, mountains, or washes in the immediate vicinity that could result in mudflows onto or from the test tunnel site.

\(^3\) FEMA Flood Insurance Rate Map. Los Angeles County, California. Map Number 06037C1790F. http://map1.msc.fema.gov/idms/IntraView.cgi?ROT=0&O_X=7204&O_Y=5179&O_ZM=0.077234&O_SX=1112&O_SY=799&O_DPI=400&O_TH=6383953&O_EN=6429031&O_PG=1&O_MP=1&CT=0&D1=0&WD=14408&HT=10358&JX=1912&JY=942&MPT=0&MPS=0&ACT=1&KEY=6383699&ITEM=1&PICK_VIEW_CENTER.x=1005&PICK_VIEW_CENTER.y=627&R1=VIN.
INTENTIONALLY LEFT BLANK
FIGURE 2

Project Alignment Utilities and CNDDB Occurrences

Proposed Project Alignment
- R&D Tunnel
- Gas Lines
- Transmission Lines
- CNDDB Occurrences
- FRAP Vegetation Type

SOURCE: Bing Maps (Accessed 2017); LA County GIS

Date: 8/14/2017  -  Last saved by: rstrobridge  -  Path: Z:\Projects\j1000401\MAPDOC\DOCUMENT\Internal\Figure2_ConstraintsOverview.mxd
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Aesthetics

During construction there would be the presence of construction vehicles and equipment at the entry point and the TBM exit point in industrial or commercial areas and not in areas of high scenic value or containing identified scenic resources. The majority of construction would take place underground, and would not be visible or alter the aesthetic environment.

The test tunnel site is not adjacent to a designated state scenic highway or eligible state scenic highway, as identified on the California Scenic Highway Mapping System.\(^4\) The Hawthorne General Plan does not identify any scenic resources within the City.\(^5\)

Biological Resources

The test tunnel area is entirely urbanized and provides little opportunity for biological resources. The test tunnel would be constructed approximately 30-40 feet underground, and thus would not have the potential to affect migration routes, fish passage, or wildlife corridors, nor would the test tunnel result in habitat fragmentation. There is no riparian habitat, wetlands, native resident or migratory fish or wildlife species along the test tunnel alignment. A search of the California Natural Diversity Database (CNDDB) yielded no results of biological resources in the locations, or immediate vicinity, of the entry and TBM exit point for the tunnel, as shown in Figure 2, Utilities and CNDDB Occurrences.

The test tunnel site is not within the planning area of any Habitat Conservation Plan\(^6\) or a Natural Community Conservation Plan area,\(^7\) or other approved local, regional, or state habitat conservation plan.

Cultural Resources

Dudek completed a records search of the test tunnel site and surrounding 0.25-mile search buffer at the South Central Coastal Information Center (SCCIC), California State University Fullerton (Attachment D).

As discussed in Attachment D, the SCCIC records indicate that no resources have been recorded within the test tunnel alignment or the 0.25-mile search buffer, while 19 previous cultural resources technical investigations have been conducted within 0.25-mile of the test tunnel alignment between 1975 and 2013. Of these 19 studies, six have been conducted within the test

\(^4\) http://www.dot.ca.gov/design/lap/livability/scenic-highways/index.html
\(^5\) http://www.cityofhawthorne.org/general-plan/
tunnel alignment while the remaining 13 are within 0.25-mile (402 m). No cultural resources have been previously recorded within the vicinity of the test tunnel alignment or elsewhere in the City.

Established standard practices for monitoring and treatment of unanticipated discoveries of archaeological resources and state requirements for human remains (Section 7050.5 of the California Health and Safety Code; California Public Resources Code, Section 5097.98) will be implemented as part of the project for test tunnel excavation activities. Monitoring will not occur of TBM activities.

A paleontological records search was requested from the Natural History Museum of Los Angeles County (LACM). The LACM reported no vertebrate fossil localities within the proposed alignment or within the approximately 1-mile buffer. Nearby localities were reported from the same deposits that occur along the test tunnel alignment (McLeod 2017), although at different depths. The younger Quaternary alluvium is generally too young to contain significant fossil vertebrates, especially in the surficial layers; however, McLeod (2017) stated that older Quaternary deposits likely underlie the younger Quaternary alluvium at a relatively shallow depth in the northern project area, where the younger Quaternary alluvium is mapped on the surface.

The LACM recommends paleontological monitoring of substantial excavations (6 feet deep or greater) into younger Quaternary alluvium, and any excavations into areas that are mapped as having older Quaternary alluvium on the surface. Where monitoring is not feasible, it is recommended that sediment samples be collected and processed for microvertebrate sampling. Established standard practices for treatment of unanticipated discoveries of archaeological resources shall be followed as part of the test tunnel implementation. In the event, any fossils are collected during the paleontological monitoring, those fossils should be accessioned into an accredited and permanent scientific repository. Monitoring will be conducted for excavations of the test tunnel entry and the TBM exit site; it will not be feasible to monitor TBM activities.

If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities must stop in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to California Public Resources Code (PRC) Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission, which will then notify the most likely descendent. Further provisions of PRC 5097.98 are to be followed as applicable.

Geology and Soils

The test tunnel is located in seismically active Southern California, the test tunnel site is not located within an Alquist-Priolo Earthquake Fault Zone. The test tunnel would not cross any known active faults according to the Department of Conservation’s Fault Activity Map of California.

Seismic analysis was completed as part of structural calculations and the results of that analysis have been used to design the test tunnel components. According to the Seismic Hazard Evaluation of the Inglewood quadrangle, the test tunnel and the rest of the City are not located in a liquefaction hazard zone. Due to the underground nature of the test tunnel, landslides is not a concern because there is no slope on which landslides to occur. According to the Seismic Hazard Evaluation of the Inglewood quadrangle, the exit point of the TBM is not located in an Earthquake-Induced Landslide Zone. Sidewall and banking stability associated with the excavation and tunneling activities will be conducted in accordance with the Los Angeles County Metropolitan Transportation Authority (LACMTA) design methods to ensure stability of excavated areas.

Topsoil is used to cover surface areas for the establishment and maintenance of vegetation due to its high concentrations of organic matter and microorganisms. Little, if any, native topsoil is likely to occur within the test tunnel site, since the test tunnel area are covered with roads, airport paved property, and associated parking and landscaping. The test tunnel site is currently paved and developed for commercial and industrial purposes. The test tunnel alignment is underlain by fill material due to previous development and, therefore, development of the tunnel would not affect native topsoil. Grading would be limited to the entry and exit points as part of development of the test tunnel. At these locations, erosion as a result of construction activities would be minimized through soil stabilization measures required by SCAQMD Rule 403 (Fugitive Dust), such as daily watering, and through the City’s standard erosion control practices required pursuant to the National Pollution Discharge Elimination System (NPDES), such as silt fencing or sandbags.

The test tunnel site is located on two quaternary geologic deposits: Alluvium, lake playa, and terrace deposits; and older alluvium, lake playa, and terrace deposits. Expansive soils are those that expand when exposed to water and contract when water is not present. Due to the absence of any natural channel within or near the test tunnel site, the potential for lateral spread occurring

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would be unlikely. Soil conditions at the test tunnel site would be identified and considered as part of the design process. A settlement monitoring plan is included in the permit application, which identifies automated real-time settlement monitoring and if exceedance of thresholds is detected, construction is halted immediately. Development and operation of the test tunnel would not require use of septic tanks.

**Greenhouse Gas Emissions**

**Construction Emissions**

Construction of the test tunnel would result in GHG emissions, primarily associated with use of off-road construction equipment, on-road vendor and haul trucks, and worker vehicles. The SCAQMD recommends that construction emissions be amortized over a 30-year project lifetime; the total construction GHG emissions were calculated, amortized over 30 years, and then compared to the SCAQMD operational GHG significance threshold of 3,000 metric tons (MT) of carbon dioxide equivalent (CO₂E) per year.

A spreadsheet-based model was used to calculate the annual GHG emissions based on the construction scenario described in Attachment C. Construction of the test tunnel is anticipated to commence in 2017, lasting approximately 5 months. On-site sources of GHG emissions would include off-road equipment that meets or exceeds EPA Tier 4 standards or equivalent; off-site sources would include on-road vehicles (haul trucks, vendor trucks, and worker vehicles). Table 3 presents construction GHG emissions for the test tunnel from on-site and off-site emissions.

**Table 3**

<table>
<thead>
<tr>
<th></th>
<th>CO₂</th>
<th>CH₄</th>
<th>N₂O</th>
<th>CO₂E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tunnel Boring Machine</strong></td>
<td>1,309.29</td>
<td>0.06</td>
<td>0.01</td>
<td>1,314.61</td>
</tr>
<tr>
<td><strong>Off-Road Equipment</strong></td>
<td>3,973.84</td>
<td>1.06</td>
<td>0.47</td>
<td>4,141.52</td>
</tr>
<tr>
<td><strong>Worker Vehicles</strong></td>
<td>66.76</td>
<td>0.00</td>
<td>0.00</td>
<td>68.14</td>
</tr>
<tr>
<td><strong>Vendor Trucks</strong></td>
<td>66.61</td>
<td>0.00</td>
<td>0.00</td>
<td>66.66</td>
</tr>
<tr>
<td><strong>Haul Trucks</strong></td>
<td>758.41</td>
<td>0.00</td>
<td>0.00</td>
<td>758.93</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6,174.92</td>
<td>1.12</td>
<td>0.49</td>
<td>6,349.86</td>
</tr>
</tbody>
</table>

**Annualized Emissions over 30 Years** — 211.66

**SCAQMD Threshold** — 3,000

**Exceed Threshold** — No

**Notes:** CH₄ = methane; CO₂ = carbon dioxide; CO₂E = carbon dioxide equivalent; N₂O = nitrous oxide. The TBM estimated electrical use was used to calculate associated CO₂ emissions, these are not CO emissions generated locally. See Attachment C for complete results.
As shown in Table 3, the estimated total GHG emissions during construction would be approximately 6,350 MT CO$_2$E per year over the full construction period. Estimated test tunnel-generated construction emissions amortized over 30 years would be approximately 212 MT CO$_2$E per year. As with test tunnel-generated construction air quality pollutant emissions, GHG emissions generated during construction of the test tunnel would be short-term, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions. As shown in Table 3, the amortized construction emissions do not exceed the SCAQMD guidance significance threshold of 3,000 MT CO$_2$E per year.

Once operational, skates within the tunnel would be zero emission electric powered, which would avoid emissions associated with the operation.

**Hazards and Hazardous Materials**

The depth (approximately 30-40 feet) of the test tunnel enables avoidance of contaminated surface soils, underground storage tanks, and subterranean pipelines for fuel and gas. The test tunnel alignment is not within a “Methane Zone” identified by Los Angeles as emanating from certain ground conditions.$^{12}$ A permit from CalOSHA is required that includes requirements to handle accidental release of construction-related hazardous materials, including encountering subsurface gases such as methane. The construction contractor would be required to implement BMPs for handling hazardous materials in compliance with existing regulations.

The closest operational school is Purche Elementary School, located approximately 0.6 mile southeast of the proposed entry point within the existing SpaceX parking facility. The test tunnel would not include the use, transportation, or disposal of hazardous materials or waste as part of operations within 0.5 mile of this school.

The test tunnel does not contain sites, nor is it adjacent to any sites, listed on the state Cortese List, a compilation of various sites throughout the state that have been compromised due to soil or groundwater contamination from past uses.$^{13}$

Based on review of the Cortese List, along or adjacent to the alignment of the test tunnel is not:

- Listed as a hazardous waste and substance site by the Department of Toxic Substances Control (DTSC)$^{14}$
- Listed as a leaking underground storage tank site by the SWRCB$^{15}$

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$^{13}$ California Environmental Protection Agency Cortese List. www.calepa.ca.gov/SiteCleanup/CorteseList/.


Supplemental Environmental Information

- Listed as a hazardous solid waste disposal site by the SWRCB\textsuperscript{16}
- Currently subject to a Cease and Desist Order or a Cleanup and Abatement Order as issued by the SWRCB\textsuperscript{17}
- Developed within a hazardous waste facility subject to corrective action by the DTSC\textsuperscript{18}

The test tunnel would not be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

Hawthorne Municipal Airport is within 2 miles of the test tunnel site. However, the test tunnel would not involve any new aboveground structures, nor would the test tunnel result in a safety hazard for people residing or working in the test tunnel area. A determination of no hazard has been issued by the FAA for the test tunnel. FAA conditional provisions consist of adherence to all requirements set out in their Final Determination dated July 27, 2017, which include compliance with the requirements set forth in FAA Advisory Circular 150/5370-2, "Operational Safety on Airports During Construction.", requirement to submit 7460's for the construction equipment (30-45 days prior), and requirement to coordinate all associated activities with the ATCT 5 business days prior to the beginning of the project.

The test tunnel would not change existing conditions with regard to transportation routes or evacuation plans. No public or private streets would be closed during or following construction of the test tunnel, and no changes to emergency access/evacuation would result.

Public Services

No new fire stations or other capital improvements would need to be built, and no new fire personnel would need to be hired in order to maintain existing service ratios and response times, as the test tunnel would not increase population or the need to service them. In addition, the entry/exit in the SpaceX parking facility is located adjacent to Los Angeles County Fire Station #162. A fire suppression system would be implemented to address on-site fire protection (see Attachment A, Fire Prevention and Control Plan).

The test tunnel would not increase residential population or employment numbers, and would not require law enforcement or public safety services from the Hawthorne Police Department or demand for local schools, libraries, or parks. No new police stations, parks, libraries, or other capital improvements would be required, and no new personnel would need to be hired in order


\textsuperscript{17} California State Water Resources Control Board. List of Active Cease and Desist Order or a Cleanup and Abatement Order. www.calepa.ca.gov/SiteCleanup/CorteseList/CDOCAOList.xls.

\textsuperscript{18} California Department of Toxic Substances Control. Hazardous Facilities Subject to Corrective Action.
to maintain existing service ratios and emergency response times, as the proposed would not increase the population or the need to service them.

**Tribal Cultural Resources**

No known tribal cultural resources have been identified within the City. In the unlikely event that Native American cultural resources (i.e., prehistoric or ethnohistoric-period artifacts, food remains, or features associated with Native Americans) are exposed during project-related ground disturbance, the Gabrielino/Tongva San Gabriel Band of Mission Indians and the Tongva Ancestral Territorial Tribal Nation should be contacted. These groups would be asked to provide the services of a trained Native American consultant, agreeable to both groups, to monitor ground-disturbing work in the area containing the Native American cultural resources. This monitoring would occur on an as-needed basis, and would be intended to ensure that Native American concerns are taken into account during the construction process.

**Utilities and Service Systems**

The test tunnel would be designed to be approximately 30-40 feet underground to avoid existing infrastructure, including utility lines (gas, power, water, sewer), and roadway foundations (pilings), thus it would prevent conflicts with subterranean utilities drainage, as seen in Figure 2, Utilities and CNDDB Occurrences. The test tunnel would test zero-emissions transport and would require electrical service for skates charging and for general lighting purposes, which would be high-efficiency LED lighting. No new or additionally expanded facilities would be needed to service energy demands of the test tunnel. Due to the size and nature of the test tunnel, the test tunnel would not result in a substantial increase in demand for water, wastewater, or solid waste removal services. The test tunnel would test a zero-emissions transport alternative for pedestrian carriages and personal vehicles, and would not increase the number of residents.

4 SUMMARY

The test tunnel would not degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory.

The test tunnel would allow for testing for the development of a subterranean tunnel that would provide a travel option for personal vehicles and pedestrian carriages, using zero-emissions transport. The project would not contribute considerably to any cumulative impacts because, based on the information above, effects would be from short term temporary
construction activities, for which no additional related activities are foreseen to overlap in geography or timing.

Based on the information above, there is no indication that this project could result in substantial adverse effects on human beings. The project is an underground facility in an industrial area consistent with the City’s General Plan and applicable zoning designations and regulations. The project site is entirely within the City’s limits with site disturbance of less than five acres entirely surrounded by urban uses. The project site has no value as habitat for endangered, rare, or threatened species. The site is adequately served by all required utilities and public services. The site is not designated or mapped to contain an environmental resource of hazardous or critical concern. The site is not within a designated scenic highway, on a hazardous waste site, nor any historic resources. The information provided herein and attached identify that no significant impacts would result from implementation of the test tunnel, including to traffic, air quality, noise, or water quality.
ATTACHMENT A

Fire Prevention and Control Plan
Fire Prevention & Control Plan

SpaceX Headquarters Test Tunnel

Tuesday, August 15, 2017

THE BORING COMPANY

Kelley Engineered Equipment, LLC
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Introduction

The following fire prevention plan is for the Test Tunnel at the Spacex Headquarters in Hawthorne, California. This fire prevention plan is designed to reduce risk of fire in the tunnel by abiding by regulations and common industry safety practices.

General Arrangement – Pit and Test Tunnel

The Launch Pit and Test Tunnel consist of a 25 foot deep open pit with a 15% grade access ramp that ends at the beginning of the test tunnel. The test tunnel is 12 foot inside segment lining diameter tunnel behind a Lovat RME167SE Tunnel Boring Machine. For these two phases, the ventilation fans will be located on surface above ground at launch pit with normal operation on suction. Phase 1 ventilation is the initial plan which consists of two surface fans, for a maximum tunnel length of 2,300ft attained until the next phase begins. See Figure 1 below.

![Figure 1 – Tunnel Normal Flow Directions, Phase 1](image)

Phase 2 ventilation is the subsequent plan which consists of six surface fans, for a maximum tunnel length of 5,100ft achievable. See Figure 2 below.
Phase 3 ventilation is the final construction plan which consists of four surface fans, five booster fans mounted inline with the duct in the tunnel at station 2,380, and four booster fans mounted inline with the duct in the tunnel at station 6,080. The tunnel will be up to 10,580ft long during this phase. See Figure 3 below.
Regulatory Requirements

The following are California OSHA requirements for Fire Prevention and Control under Subchapter 20, Article 14.

§8445(a) Combustible structures shall not be erected over shafts or tunnel openings.

Exception: Head frames, bins, and doors or hatches required for closing the opening.

§8445(b) All shafts and tunnel openings used as a normal means of access and egress or as the main intake of fresh air for underground workings shall be constructed of noncombustible material or designed with a fire-resistance rating of 1 1/2 hours or more.

§8445(c) Combustible framing sheds, storage buildings or change houses shall not be located within 100 feet of any tunnel opening, shaft house, hoisting engine house or ventilating fan house.

Temporary stockpiles of timber, or buildings that are as fire resistant as a change house with concrete floor, wood frame and corrugated iron sheathing may be located within the 100-foot limit if they are as far as practicable from the tunnel opening. Other combustible material shall not be stored or permitted within 100 feet of any tunnel opening.

§8445(d) Fire protection shall be provided in accordance with Title 8, Group 27 of the General Industry Safety Orders commencing with Section 6150.

§8445(e) Oils and other dangerous flammable material shall be stored at least 100 feet from any shaft or tunnel opening, or building over a tunnel opening, and at least one hundred feet from any powder magazine. Where oils are stored in buildings, such buildings shall not be used for other purposes. LPG storage tanks shall be located away from tunnel openings to prevent the contents from flowing into the tunnel.

Tanks and drums containing flammable or combustible liquids shall be so located that the escaping liquid cannot run over the surface from such tank to any powder magazine or to any building, within 100 feet of any tunnel opening. Under no circumstances shall oxygen or any flammable gas be stored in proximity to oil.

§8445(f) Lubricating oils, greases and rope dressings taken underground shall be in closed metal containers that will not permit the contents to leak out or spill. When taken underground, they shall be stored in a fire resistant secluded place at least 100 feet from shafts, winzes, hoists, and tunnel timbers and at least 300 feet from powder magazines and stored in such manner that the oil from a ruptured or overturned container will not flow from its storage place. Quantities of oil and grease underground shall be limited to a one-day supply.

§8445(g) Welding, cutting, and other hot work shall be conducted in accordance with Title 8, Article 4 and Article 32 of the Construction Safety Orders. Where welding, cutting and other hot work operations are employed, and when such operations may cause fires, suitable shields shall
be provided to isolate flammable materials. Appropriate fire extinguishers shall be provided and maintained. Thorough inspections for fire hazards shall be made immediately after welding, cutting and other hot work is completed and a fire watch maintained at the location for at least one hour.

§8445(h) No petroleum based product shall be taken underground for illuminating or heating purposes.

§8445(i) The use of volatile solvents (below 100° F flash point) such as gasoline underground are prohibited.

§8445(j) No more than the amount of acetylene and oxygen cylinders necessary to perform welding, cutting or other hot work during any 24-hour period shall be permitted underground.

§8445(k) Noncombustible barriers shall be installed below welding, cutting, or other hot work being done over a shaft or deep excavation associated with a tunnel.

§8445(l) All oily waste or rags used underground shall be stored in metal receptacles with secure covers. The contents of the receptacles shall be sent to the surface every week or when the receptacle is full.

§8445(m) Waste materials for which no underground storage facilities are provided shall be promptly removed from the tunnel. Leaks and spills of flammable or combustible fluids shall be cleaned up immediately.

§8445(n) Fire resistant hydraulic fluids shall be used in hydraulically-actuated underground machinery and equipment unless such equipment is protected by a fire suppression system or by a multi-purpose fire extinguisher(s) rated at a sufficient capacity for the type and size of hydraulic equipment involved, and rated at least 4A:40B:C.

§8445(o) A fire extinguisher of at least 4A:40B:C rating or other equivalent extinguishing means shall be provided at the head pulley and at the tail pulley of underground belt conveyors and at 300 foot intervals along the belt line.

§8445(p) Fires which may cause serious injury to employees or threatening occupied tunnel workings shall be reported to the Division within 24 hours.

§8445(q) Suitable fire extinguishers or other fire protection equipment shall be provided at appropriate locations. Such equipment shall be inspected monthly and maintained in operating condition.

§8445(t) Readily visible sign prohibiting smoking and open flames shall be posted in areas having fire or explosive hazards.
Resistance of Tunnel Liner to Fire

Monofilament polypropylene fibers will be added to the concrete mix used to cast the segmental tunnel lining. The addition of these fibers will prevent concrete spalling and limit damage to the lining under a fire event. The use of this fiber type in concrete mixes is well documented and has been used locally on similar tunnel projects in Los Angeles, such as the Crenshaw Corridor, Regional Connector, and Westside Extension I and II. These fibers will comply with California OSHA Subchapter 20, Article 14, Section 8445(b).

Self-Rescue Device Compliance

In the event of a tunnel fire, a 1 hour self-rescue device (commonly referred to as a W-65) should be utilized as required by each person. Compliance with the following regulations in Subchapter 20, Article 10, will be met.

§8430(f) A 1-hour self-rescue device approved by MSHA shall be provided and be immediately available for each person underground. Where a person works on or around mobile equipment, self-rescue devices may be placed in a readily accessible location on such equipment.

§8430(g) In tunnels classified as Gassy or Extrahazardous, self-rescue devices shall be worn or carried by each person underground at all times.

§8430(h) All self-rescue devices shall be inspected, tested and maintained in accordance with the manufacturer's requirements. Particular attention shall be given to insure the established service life is not exceeded.

§8430(i) Each person shall be trained in the proper inspection, use and limitations of the self-rescue device before being permitted to go underground and at least every three months thereafter. Records of this training shall be maintained on the job site in accordance with Section 3203(b) of the General Industry Safety Orders.

Mobile Equipment

Currently, the mobile equipment used in this tunnel will be a GIA DHD 25 locomotive. The loci will be outfitted with a multi-purpose fire extinguisher to comply with §8445(n) in the CalOSHA regulations. The manufacturers specification sheet is shown in Appendix A. Any other future equipment to be used shall be verified to comply with §8445(n) CalOSHA regulations before use in the tunnel.

Tunnel Boring Machine

The tunnel boring machine is a Lovat model RME167SE previously used by Super Excavators on the Sunnydale Auxiliary Sewer Project. The TBM will use fire-resistant hydraulic fluid, and be outfitted with
multi-purpose fire extinguishers to comply with §8445(n) in the CalOSHA regulations. The manufacturers specification sheet is shown in Appendix B.

**Multi-Purpose Fire Extinguisher**

According to §8445(n), a multi-purpose fire extinguisher will be placed on all hydraulically powered machinery underground. It will be sufficient capacity for the type and size of hydraulic equipment involved, and rated at least 4A:40B:C. The manufactures specification sheet for the fire extinguisher is shown in Appendix C.

**Ventilation Controls**

A full ventilation plan for construction has been submitted under a different cover. The vent system will operate in a normal direction as shown in Figures 1, 2 and 3. In the event of a fire, the ventilation fans can be stopped and reversed to provide airflow in the opposite direction. In the event of an explosion, an explosion relief mechanism is placed at the portal in the ventilation ducting. This mechanism will relieve the pressure in the duct, allowing it to remain intact during the event.
Appendix A – GIA Locomotive Specification Sheet
EC-DECLARATION OF CONFORMITY

Directive 98/37/EC, Annex A

Manufacturer:

Gia Industri AB
Box 59
SE-772 22 Grängesberg

Declare under our sole responsibility that the product

Machine: Locomotive
Type: DHD25
Serial no.: 2544
Year of manufacture: 2005

Is in conformity with the provisions of the Machinery Directive

Directive 98/37/EEC

And furthermore declares that:
the following (parts/clauses of) harmonized standards have been applied

EN12100-1, EN12100-2, EN1889-2:2003, 60204-1

The air pressure vessel and pressure safety relief valve is approved for use in Canada and have a CRN number for use the province of British Colombia.

To have the locomotive approved for use in the European Union the air pressure vessel and the safety relief valve is to be replaced with equipment approved for use in the European Union.

Notified Body:

SMP Svensk Maskinprovning (No. 0404)
Fyrisborgsgatan 3
SE-754 50 Uppsala
Certifikat No.: 404/99/650

Grängesberg 2005-10-12

Signature
Roger Karlsson, Managing Director
GIA DHD 25

Technical specification

ENGINE

Deutz BF6M1013CP. The engine is of type 6 cylinders in straight.

Flywheel capacity: 184 kW at 2300 rpm
Effect class DIN / ISO 3046 IFN
Piston displacement: 7,146 dm³
Compression rate: 17.5 : 1
Air compressor displacement: 0.6 dm³

ELECTRIC SYSTEM

Voltage: 24 V
Battery capacity: 2 x 180 Ah
Generator capacity: 28 V 55 A
Lighting: 4 pcs 70 W lamps
Loud-tone horn: 1 pc 60 W

AIR PRESSURE SYSTEM

The air pressure system consists of the engine driven compressor with two cylinders supplying compressed air into the air receiver (pressure vessel). The approx. compressor capacity is 500L/min at 700 rpm and 8 bar or 1 300L/min at 2000 rpm and 8 bar; the compressor is set to discharge at 7.3 bar.

The air receiver volume is 30 imp gallons (135 litres) and the maximum allowed pressure in the air receiver is 200 psi (13.7 bar) and the safety relief valve is set to 200 psi. The air receiver and the pressure relief valve have a valid CRN and is approved for use in Canada province British Colombia.
TRANSMISSION

Clark 36000 series full power shift transmission with torque converter and gear box with 2 stages forward respectively reverse. Gear changing through hydraulic wet disc clutches. Converter with Lockup-function gives good high speed performance and good engine brake.

Speeds forward/reverse, gear 1 : 0 - 17 km/h (4.7 m/s)

          gear 2 : 0 - 29 km/h (8.0 m/s)

WHEEL AXLES

GIA type 366

The main reduction unit is to parts:
- lower half housing
- upper half housing
These two parts are fixed together by recessed hexagonal-head screws.
Clamps for anti-rotation or anti-torque support are provided in the upper half housing.
On the upper half housing there is also a lid covering an opening through which internal inspection of the reduction can be performed.
Drive torque is transmitted to the axle by a “Gleason” spiral bevel gear set. This is used to give the same kinematics characteristics in both directions.
The gearing and the bearings, as well as partial oil bath lubrication, also uses oil splash lubrication during operation.
Oil level checking must be carried out by observing that the oil reaches middle of the level cap at view.
The seals are of type cassette-sealing.

Exchange gear reduction: 1:3.66

AXLE BOXES

The wheel axle is carried in spherical roller bearings in the axle boxes. The bearing is tightened with labyrinth and sleeve cover.
Axle suspension with service free rubber element of “Chevron type” mounted directly on axle box.
WHEELS

Wheels of "solid wheel type", rolled steel design, the wheel is shrinkage fit by the axle. Wheels tread and flange flame-hardened.

Wheel diameter: 660 mm
Track gauge standard: 750 mm

BRAKES

The locomotive is equipped with tree separately independently brakes.

- Engine service brake is the "exhaust brake" acting via transmission on the wheels. When you apply the "exhaust brake" the transmission lock-up function is at the same time activated to get satisfactory brake effort.

- Air service brake system with cast iron brake shoes acting directly on all wheels.

- Spring applied parking-emergency brake of "maxi brake type". The emergency brake is automatically activated when the air pressure in the air receiver is less then 4,5 bar.

FRAME

Chassis and cabin are made of heavy-duty steel plate joint with seamless welds for max fatigue strength.

End plates of very thick steel plates for adaptable to most frequented couple variants.

Hood plates of thick bent steel plate with hood hinge for good availability at service and repair.

CABIN

The cabin is made of heavy-duty steel plate joint with seamless welds for max fatigue strength. It is also made for biggest possible safety and comfort for the driver.

FIRE EXTINGUISHER

For fire extinguishing there is an onboard automatic fire extinguisher system with fire trace detector and one hand fire extinguisher placed in the cabin. Read the instruction on the hand fire extinguisher very carefully. See the locomotive instruction book regarding the automatic fire extinguisher system.
DIMENSIONS AND WEIGHTS

Total length excluding couplers: 6 690 mm
Width: 1 200 mm
Track gauge: 750 mm
Total height from rail: 1 706 mm
Weight: 25 000 kg

CAPACITY

Fuel tank: 250 l
Engine oil: 21 l
Engine coolant: approx 17 l
Transmission oil: approx 40 l
Axle gear: 2 x 14 l
Sand tank: 2 x 34 l
Appendix B – Tunnel Boring Machine Specification Sheet
LOVAT Inc.

Technical Summary, Pricing and Commercial Terms

TBW MODEL: LOVAT RME167SE
PREPARED FOR: SUPER EXCAVATORS INC.
PROJECT: Consolidation of Pogues Run CSO (CS-31-002B)
Outfalls 034 & 035, Indianapolis, IN, USA
DATE: APRIL 8, 2005
DOCUMENT NO.: L2-05010030 Rev.A

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SECTION 1: PROJECT SUMMARY

Project Name: Consolidation of Pogues Run CSO (CS-31-002B) Outfalls 034 & 035
Location: Marion County, Indianapolis, Indiana, USA
Setting: Urban
Owner (Client): City of Indianapolis, Dept of Public Works
Project Engineers: ?
Geotechnical Consultant: ?
Purpose: Sewer
Contractor: SUPER EXCAVATORS INC.
Contract Information: Awarded
Tunnel Characteristics: 1,640 ft of 144" ID concrete sewer
Proposed Tunnel Lining: (See Appendix 'A')
  Segment Type: Prefab. Reinforced Concrete
  Configuration: 6 piece (universal ring)
  Inside Diameter: 144" (12')
  Outside Diameter: 162" (13'-6'"
  Thickness: 9"
  Length: 60"
Grouting Method: Through the segments.
Alignment: The tunnel alignment begins at a central shaft.
Geology: See Appendix 'B'

Note: Super Excavators must supply Lovat with the complete geotechnical information of the project including the GBR, GDR and associated documents.
SECTION 2: TECHNICAL SPECIFICATIONS

The TBM will be designed and manufactured with a New Cuttinghead, Forward Shell, Stationary Shell and Trailing Shield; but will contain second hand refurbished components from another TBM that has recently completed a tunnel project, in Los Angeles, CA, USA.

The TBM will be a Lovat RME167SE Earth Pressure Balance (EPB) machine.

BASIC DIMENSIONS:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut Diameter</td>
<td>167.98 Nominal</td>
</tr>
<tr>
<td>Bore Diameter</td>
<td>166.98&quot; Nominal</td>
</tr>
<tr>
<td>Shield Diameter</td>
<td>166.48&quot; Nominal</td>
</tr>
<tr>
<td>TBM Length</td>
<td>30 ft Nominal</td>
</tr>
<tr>
<td>TBM + Back-up Length</td>
<td>150 ft Nominal (pending final layout)</td>
</tr>
<tr>
<td>TBM Weight</td>
<td>136 ton, Approximately</td>
</tr>
<tr>
<td>TBM + Back-up Weight</td>
<td>226 ton, Approximately</td>
</tr>
</tbody>
</table>

PROPOSED TUNNEL LINING DETAILS (As per Appendix ‘A’)

Prefabricated Concrete Segments

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Diameter</td>
<td>144&quot;</td>
</tr>
<tr>
<td>Outside Diameter</td>
<td>162&quot;</td>
</tr>
<tr>
<td>Segment Thickness</td>
<td>9&quot;</td>
</tr>
<tr>
<td>Standard Length</td>
<td>60&quot;</td>
</tr>
<tr>
<td>Segment Configuration</td>
<td>6 Piece Universal Doweled Ring</td>
</tr>
</tbody>
</table>
NEW CUTTINGHEAD

Face Design Features

Mixed Face Cuttinghead

4 No. Spoke Design

8 No. Flood Doors (flood doors independently operated c/w position indicators)

Abrasion Resistant Chromium Carbide Plate on Cutting Face and Rim

3 No. Injection Ports located on the Cuttinghead Face

1 No. Injection Port located on the Cuttinghead Rim

1 No. Probe Drill port/position through cuttinghead face

New Cutting Tools  (*Quantities and configuration pending final engineering design*)

1 No. Center Nose Cutter c/w carbide inserts

17 No. Backloading Lovat Ripper Teeth, interchangeable with Backloading Disc Cutters*

13 No. Individual Backloading Ripper Teeth

90 No. Lovat Scraper Teeth c/w carbide inserts

*Note: Disc Cutters are to be supplied by the client from the 129/9600 TBM.

Cuttinghead Structure

Cantilever Type Cuttinghead Design

Bi-Directional with Full Electric Power and Variable Speed

1 No. Rotary Fluid Joint
New Forward Shell and Chamber Features

New Forward Shell Structure

Motorplate (refurbished)

Triple Roller Main Bearing (second-hand -inspected)

1 No. Access Hatch (access to cuttinghead chamber for tool changes, etc...)

Active Articulation System:

- Articulation Angle of up to 2° in any direction
- Articulation Seals, replaceable from within the TBM
- 12 cylinders* x 180 ton / cylinder @ 5000 psi

*8 No. refurbished/repacked cylinders; 4 No. new cylinders

Abrasion Resistant Chromium Carbide Plate in high-wear locations of the plenum

4 No. Injection Ports in the Cuttinghead Chamber

4 No. Earth Pressure Sensors

1 No. Probe Drill Ports through the motorplate, parallel to the tunnel axis

2 No. Caliper Doors, for isolating cuttinghead chamber when screw is retracted

Probe Ports around the perimeter; ports are fitted with valves.
CUTTINGHEAD DRIVE

Cuttinghead Power System (refurbished)

4 x 200 Hp (150 kW) Electric Water-cooled Motors coupled to Gear Reducers

Variable Frequency Drive (VFD) system

Total Available Power: 800 Hp (600 kW)

Cuttinghead Drive System @ 100% Efficiency (as per 152/208-21000)

Maximum Torque: 265 t.m of torque @ 1.93 rpm

Minimum Torque: 106 t.m of torque @ 4.82 rpm

Cuttinghead operation is Bi-Directional with full electric power and variable speed

Triple Roller Main Bearing (second-hand -inspected):

Pressurized Lubrication System

Replaceable from within the tunnel

External Gear

Pinions (second-hand -inspected):

Integral to gearbox shaft

Supported by outboard bearing

Sealing System:

Positively pressurized automatic system controlled by the PLC input from EPB sensors

Seals manufactured by Merkel
SHIELD PROPULSION (located in NEW Stationary Shell)

Propulsion Cylinders: 16 No. x 125 ton / cylinder @ 5000 psi
Total Maximum Thrust: 2000 ton @ 5000 psi
Propulsion Stroke: 88" (2.250 m)

Extensometers

Constant Thrust with Variable Speed

Proportional Pressure Control of individual cylinders

Thrust cylinders shall not exert force when idle but shall resist displacement

Thrust interlock / bearing safeguard protection system

Self Aligning Propulsion Shoes c/w polyurethane pads
UNITIZED SCREW CONVEYOR (refurbished)

Nominal Diameter: 24"

Primary / Front Section:
  Speed: 0 to 22 rpm, Variable and Reversible
  Length: 40 ft

Horizontal / Trailing Section:
  Speed: 0 to 22 rpm, Variable and Reversible
  Length: 60 ft (pending final design)

Capacity: 300 yd³/hr @ 22 rpm

Max. Boulder Size: ~7.5" Ø

Shaft Type
Hydraulically Driven

Two drive motors – one for the primary (front) auger section and one at the discharge end

Sectional Design
Retractable from cuttinghead

1 No. Articulation joint

2 No. Caliper Doors:
  - For sealing of the cuttinghead chamber when screw is retracted
  - 2 No. Hydraulic cylinders, mounted on bulkhead (chamber side)

Guillotine Door at Rear Discharge
Replaceable auger tip

2 No. Inspection Hatches

Injection Ports along the screw conveyor casing

3 No. Earth Pressure Sensors along the screw conveyor casing

Gantry Supported
TRAILING BELT CONVEYOR (Client Supplied)

Width: 24"
Length: 137 ft
Speed: 0 to 328 ft / min, Variable and Reversible

Hydraulic Belt Tensioning
Sectional Design
Frame Mesh Guard beneath conveyor
Conveyor Alarm
Gantry Supported

Note: Any additional items, rework, or repairs that the client supplied belt conveyor may require will be quoted at a later date.
The trailing gantry will support the required length of the client supplied belt conveyor, for a four [4] car muck train (approx. 14 ft long / each muck car)
BACK-UP GANTRY SYSTEM (refurbished)

Structural Steel Gantry Sections

10 ft long sections

Bogie Wheel Supported

Supports: conveyors, transformer, VFD controllers, ancillary equipment, etc...

Cable Basket

Space on Gantry will be available for client supplied:

- Ground Conditioning System

*The final configuration of the trailing gantry will be customized according to the Buyer's requirements and muck removal system adopted.*

Railing Up System (refurbished)

Storage area for rail beam section

Telescopic movement of rail, created by advancing TBM

New rail inserted and bolted in gap created by TBM advance

24" Rail Gauge (confirmed by client)
SEGMENT ERECTING EQUIPMENT (refurbished)

Segment Erector c/w Mechanical Ball & Cup type gripping mechanism

Mounted directly on bulkhead # 3 (New bearing will be installed)

Rotary Hose Reel

Hydraulic Proportional Control of all functions

1 No. Operating Station

Working Platforms and Handrails, for Segment Bolting

**Design Parameters**

<table>
<thead>
<tr>
<th>Continuous Operation:</th>
<th>130% of W (W = weight of heaviest segment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing:</td>
<td>200% of W (Safety factor: 2)</td>
</tr>
<tr>
<td>Yield Point:</td>
<td>500% of W</td>
</tr>
</tbody>
</table>

The Erector can be actuated in the axial, radial and circumferential directions and in the 3 articulation angles corresponding to the 6° of freedom

**Segment Transport Monorail**

Single Segment Lift Operation c/w Ball and Cup type snatch block assembly

Audio Alarm

Hydraulic Control of all functions

**Segment Unloader**

Hydraulically operated, controls located at first gantry section

2 No. Segment Car Capacity

Bogie Wheel mounted

Segment Feeder, hydraulically operated

**Segment Cars (client supplied)**

Segment cars (modifications to the segment cars will be quoted at a later date).
OPERATOR CONTROL CENTER

Located within the TBM Stationary Shell

1 No. Key Start

2 No. Emergency Stops, one in the TBM and the other at the conveyor discharge

PROGRAMMABLE LOGIC CONTROLLER (PLC)

The TBM is equipped with a PLC (Programmable Logic Controller). The PLC is used to control the machine and record information from sensors. Any information in the PLC is sent to and displayed with HMI software (Human Machine Interface). The HMI software, which is run on a PC (Windows), can also record the information.

INTEGRATED LOVAT DATA LOGGING SYSTEM

The system features one terminal in the TBM (LCD display). The terminal in the TBM will display data in real-time; a computer on the surface/office (not supplied) can display data in real-time as well as historic modes and can record it on its hard drive. From the computer in the office, TBM data can be printed or copied to disc. The surface computer is for display and storage of TBM data only.

The data acquisition and logging system will monitor and record information from the following points/systems of the TBM:

- Cuttinghead RPM
- Cuttinghead Torque
- Cuttinghead Direction
- Articulation Cylinder Extension
- Articulation Angle
- Flood Control Door Opening
- Propulsion Cylinder Extension
- Propulsion Cylinder Extension Speed
- Propulsion Cylinder Pressure
- Center of Thrust
- Trailing Belt Conveyor Drive Hydraulic Pressure
- Screw Conveyor RPM
- Screw Conveyor Torque
- Screw Conveyor Internal Pressure
- Screw Conveyor Guillotine Door
- Main Drive Motor Electric Current Draw
- Total TBM Electric Current Draw
- Hydraulic Oil Temperature and Level
- Main Bearing Lubrication Flow and Pressure
- Sealing Systems Lubrication Flow & Pressure
- Earth Pressure Sensor Output
- Ground Conditioning System Output*
- Gas Monitoring
- Grout Injection Pressure
- Grout Injection Flow Rate
- Guidance System Output*

*if applicable

The system is expandable to accommodate the addition of more monitoring capacity.

LAPTOP COMPUTER FOR PLC SYSTEM INTERFACE AND DIAGNOSTICS

A laptop computer (software included) will be supplied for interfacing with the TBM PLC system for diagnostics, configuration changes and troubleshooting.
ELECTRICAL

Summary of Total Installed Power

Cuttinghead: 800 Hp
Screw Conveyor: 200 Hp
Belt Conveyor: 150 Hp (power-packs are client supplied)
Erector / Propulsion / Articulation: 150 Hp
Boost / Auxiliary Pumps: 100 Hp
Total Installed Power 1400 Hp

Electrical Power Equipment

1450 kVA Transformer (second-hand), low profile mining type; will comply with the National Electric Code (edition 96), Articles 500 (hazardous locations) and Article 501 (Class 1 locations), released by the National Fire Protection Association under NFPA 70.

Explosion Proof Motors, Enclosures and 3 Phase Power Distribution in the shield.

Primary Voltage 13,200 V (confirmed by client)
Secondary Voltage: 600 V
A.C. Frequency: 60 Hz
Power Take Off: 120 V 1PH
480 V 3PH
Lighting: 120 V 1PH

Key Start

High Voltage Cable Tray for 1000 ft of cable (cable not included)
ADDITIONAL TBM FEATURES

1 No. Stabilizer Fin located in Stationary Shell
Hydraulic Oil Coolers, Water to Oil Type
Methane Gas Detector
Automatic Tilt Control
1 No. Hydraulic Winch c/w Tow Cable and Hook
Anti-roll bars in the lower half of the forward and stationary shells

Auxiliary Ventilation Equipment:
- 1 No. Electric Fan, Bi-directional, 20 Hp
- Fan Silencer, Supply & Exhaust ducting

NEW Trailing Shield:
- Triple (3) Row of Wire Brush Tail Seals, innermost row replaceable
- Articulation Seals
- Bolt on shield
- Tail Seal Grease Injection System c/w 6 lines / chamber
ADDITIONAL ACCESSORIES

Supply of 1 No. Peristaltic type Grout Injection System, described as follows:

**Tank:**

1 No. Accellerator Tank, 150 gal (568 litres) complete with:

- 2 No. Ultra Sonic level indicators
- Ball Valve for water input (water to be supplied by Client)

Note: Grout will be pumped in directly from the surface (client supplied)

**Peristaltic Pumps for Grout:**

- 2 No. Peristaltic Pumps (Watson-Marlow-Bredel)
- 7.5 Hp / 1,750 rpm / 480V / 60 Hz / 3 Ph – VFD DRIVEN
- 2 No. "PIG" ports/pump (2No. cleaner loader / 2No. cleaner collector)
- 1 No. "PIG" port (cleaner collector) @ input of system (from surface)
- 1 No. Magnetic Flowmeter / line
- 1 No. Static Mixer (Grout & Accellerant)

**Peristaltic Pumps for Accellerator:**

- 2 No. Peristaltic Pumps (Watson-Marlow-Bredel)
- 1 Hp / 1,750 rpm / 480V / 60 Hz / 3 Ph – VFD DRIVEN
- 1 No. Magnetic Flowmeter / line
- 1 No. Static Mixer (Grout & Accellerant)

1 No. Pendant Control, located at or near first gantry section, c/w panel view touch screen.

The Grout Injection System is PLC controlled.

All Engineering and Labour to Design, Manufacture, and install the system is included.

The Grout Injection System is gantry mounted.
## ESTIMATED SHIPPING WEIGHTS AND DIMENSIONS

<table>
<thead>
<tr>
<th>Component</th>
<th>Estimated Dimensions [inches]</th>
<th>No. of Pieces</th>
<th>Estimated Shipping Weight [ton]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuttinghead, Forward Shell and Motor Plate</td>
<td>167&quot; Ø x 130&quot; L</td>
<td>1</td>
<td>68</td>
</tr>
<tr>
<td>Stationary Shell</td>
<td>167&quot; Ø x 145&quot; L</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Trailing Shield and Segment Erector</td>
<td>167&quot; Ø x 140&quot; L</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Estimated TBM Shipping Weight [ton]</td>
<td></td>
<td></td>
<td>136</td>
</tr>
<tr>
<td>Flat Bed Legal Loads</td>
<td>39' L x 8.5' H x 8.5' W</td>
<td>5</td>
<td>90</td>
</tr>
<tr>
<td><strong>Total Estimated Shipping Weight [ton]</strong></td>
<td></td>
<td></td>
<td>226</td>
</tr>
</tbody>
</table>
Appendix C – Fire Extinguisher Specification Sheet
Amerex Corporation

RUGGED
- 12 Year Warranty
- Hot Dip Galvanized Drawn Steel Cylinders
- High Gloss Polyester Powder Paint
  (Best corrosion protection available)
- All Metal Valve Construction
- Gauge Guards - Chrome Plated Brass
- Protective Rubber Foot Rings
- Superior Range (Vertical & Horizontal)
- High (240 PSI) Operating Pressure
- Temperature Range -65°F to 120°F

CHOICE OF CHEMICALS:
- ABC Multi Purpose, Regular, Purple K

SELECT FAST FLOW FOR:
- High Flow Rate
- Fast Discharge
- Quicker Knockdown
- More Operator Protection

SELECT COMPLIANCE FLOW FOR:
- Long Range
- Highest UL Ratings

USER FRIENDLY
- Wide Grip Allows Clearance for Gloved Hand
- Large Loop Stainless Steel Pull Pin
- Bar Coded and Bi-lingual Labels

OPTION
- USCG Approved with Bracket Listed on UL Label
- Hot dip galvanized USCG brackets available

Available in 125 and 250 lb. Wheeled and Stationary extinguishers

HIGH PERFORMANCE extinguishers are the ultimate choice in fire extinguishers for high hazard, frequent use and extreme environment applications. Economical - less initial cost, lower maintenance costs and greater reliability than cartridge operated extinguishers.

<table>
<thead>
<tr>
<th>AGENT TYPE</th>
<th>ABC DRY CHEMICAL</th>
<th>REGULAR DRY CHEMICAL</th>
<th>PURPLE K DRY CHEMICAL</th>
<th>ABC DRY CHEMICAL</th>
<th>PURPLE K DRY CHEMICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERFORMANCE</td>
<td>FAST FLOW</td>
<td>COMPLIANCE FLOW</td>
<td>FAST FLOW</td>
<td>COMPLIANCE FLOW</td>
<td>FAST FLOW</td>
</tr>
</tbody>
</table>

Lower initial cost and lower costs to maintain

Manufactured and Tested to ANSI/UL Standards
Complies with NFPA 10 Standard
ISO-9001 / ISO-14001 Certified
UL LISTED

CONFORMS TO TEST STANDARDS:
CAN/ULC-S504 - ANSI/UL299 &
CAN/ULC-S508 - ANSI/UL711
ATTACHMENT B

FAA Final Determination
RE: (See attached Table 1 for referenced case(s))

**FINAL DETERMINATION**

Table 1 - Letter Referenced Case(s)

<table>
<thead>
<tr>
<th>ASN</th>
<th>Prior ASN</th>
<th>Location</th>
<th>Latitude (NAD83)</th>
<th>Longitude (NAD83)</th>
<th>AGL (Feet)</th>
<th>AMSL (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017-AWP-1946-NRA</td>
<td></td>
<td>HAWTHORNE, CA</td>
<td>33-55-24.53N</td>
<td>118-19-36.50W</td>
<td>0</td>
<td>58</td>
</tr>
</tbody>
</table>

Description: This is a privately funded research and development tunnel for the Boring Company. See attached drawings for alignment and reference elevations at the noted site along with all known utility locations and elevations. Structure Height (AGL) entered references the approximate elevation of the top of the tunnel at the reference site (the top of the tunnel will be approx 23' below grade). The tunnel begins in the open SpaceX parking lot on the eastern side of Crenshaw Blvd, and runs under the northeast corner of the airport, then follows 120th st going west. The tunnel does not go under the runway.

We do not object with conditions to the construction described in this proposal provided:

You comply with the requirements set forth in FAA Advisory Circular 150/5370-2, "Operational Safety on Airports During Construction."

This case was reviewed for the tunnel at the above location submitted.

The proponent is required to submit 7460's for the construction equipment. (30-45 days prior)

The proponent is required to coordinate all associated activities with the Airport Manager/Airport Traffic Control Tower (ATCT) 5 business days prior to the beginning of the project.

This determination is subject to review if disruption to FAA Operations should occur.

Your proposal impacts the following National Airspace System (NAS) equipment:

The construction of the tunnel will require the proponent to coordinate in advance with Maurice Montoya, Acting Manager, FAA Los Angeles Environmental System Support Center (SSC) at 310-725-6950 or maurice.montoya@faa.gov to coordinate locations of buried service cables and any necessary service outages of HHR ODALS RW-25. Also coordinate with Malek Taweil, Manger, Jack Northrop Field/Hawthorne Municipal
Airport, at 310-349-1637 or mtaweil@cityofhawthorne.org. Prior to commencement of any excavation, the proponent shall coordinate all project work in the vicinity of underground power utility and communication cables in advance, preferably a minimum of two weeks, with the SSC Manager and Local Airport Authority.

The Airport sponsor shall notify the FAA's Air Traffic Organization (ATO) Planning and Requirements (P&R) Service Area office a minimum of 45 days prior to the "physical construction start date" for this project. Submit FAA Form entitled Airport Sponsor Strategic Event Submission Form including all date, time and/or duration changes via email to 9-AJV-SEC-WSA@faa.gov.

A separate notice to the FAA is required for any construction equipment, such as temporary cranes, whose working limits would exceed the height and lateral dimensions of your proposal.

This determination does not constitute FAA approval or disapproval of the physical development involved in the proposal. It is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground.

In making this determination, the FAA has considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, the effects it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA), and known natural objects within the affected area would have on the airport proposal.

This determination expires on January 27, 2019 unless:
(a) extended, revised or terminated by the issuing office.
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for the completion of construction, or the date the FCC denies the application.

NOTE: Request for extension of the effective period of this determination must be obtained at least 15 days prior to expiration date specified in this letter.

If you have any questions concerning this determination contact Lloyd E. Lewis (310) 725-3650 lloyd.e.lewis@faa.gov.

Lloyd E. Lewis
DivUser
ATTACHMENT C
Air Quality and Greenhouse Gas Emissions Calculations
Dudek is pleased to submit this air quality and greenhouse gas (GHG) emissions assessment to assist Space Exploration Technologies, Inc. (SpaceX) with initial environmental planning requirements for the proposed Los Angeles Tunnel Boring Project (Boring Project or the proposed project) located in Los Angeles County (County), California.

This memorandum estimates criteria air pollutant and GHG emissions from construction of the proposed project and evaluates potential air quality and GHG emissions impacts resulting from project construction.

The contents and organization of this memorandum are as follows: project description; general analysis and methodology; threshold of significance and an impact analysis for the air quality assessment and GHG emissions assessment; conclusions; and references cited.

1 PROJECT DESCRIPTION

Construction of an underground zero emissions vehicle testing and development tunnel of approximately 2 miles from the parking structure opposite the existing SpaceX facility at 1 Rocket Road in the City of Hawthorne to a location 2 miles west at West 120th Street and Hawthorne Boulevard. The tunnel would be at a depth of approximately 30-40-feet below the surface and would not affect utilities or transportation infrastructure above. The project is expected to take up to five months to complete. The project would test movement of vehicles up to the size of a full-size car on electric “Skates”.

2 GENERAL ANALYSIS AND METHODOLOGY

The project is located within the South Coast Air Basin (SCAB) and is within the jurisdictional boundaries of the SCAQMD, which has jurisdiction over Los Angeles County. A spreadsheet
Based model and emissions factors from the CARB Mobile Source Emissions Inventory Model (EMFAC; version 2014), CARB Off-road Emissions Inventory Model (OFFROAD2011), and the U.S. Environmental Protection Agency (EPA) AP-42 factors were used. Emission calculations were based on assumptions derived from SpaceX, the Regional Connector Transit Connector (RCTC) Environmental Impact Statement/Environmental Impact Report (EIS/EIR), and/or best available engineering judgement.

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. Criteria air pollutants that are evaluated include volatile organic compounds (VOCs; also referred to as reactive organic gases (ROGs)), oxides of nitrogen (NOx), carbon monoxide (CO), sulfur oxides (SOx), particulate matter with an aerodynamic diameter less than or equal to 10 microns in size (PM10), and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns in size (PM2.5). VOCs and NOx are important because they are precursors to ozone (O3). Criteria air pollutant emissions associated with construction of the proposed project were estimated for the following emission sources: operation of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles.

GHGs are gases that absorb infrared radiation in the atmosphere. The greenhouse effect is a natural process that contributes to regulating the Earth’s temperature. Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect. Principal GHGs include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), O3, and water vapor. If the atmospheric concentrations of GHGs rise, the average temperature of the lower atmosphere will gradually increase. Globally, climate change has the potential to impact numerous environmental resources though uncertain impacts related to future air temperatures and precipitation patterns. Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. Climate change is already affecting California: average temperatures have increased, leading to more extreme hot days and fewer cold nights; shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year; sea levels have risen; and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010).

The effect each GHG has on climate change is measured as a combination of the mass of its emissions and the potential of a gas or aerosol to trap heat in the atmosphere, known as its global warming potential (GWP), which varies among GHGs. Total GHG emissions are expressed as a function of how much warming would be caused by the same mass of CO2. Thus, GHG emissions are typically measured in terms of pounds or tons of CO2 equivalent (CO2E). The CO2E for a gas is derived by multiplying the mass of the gas by the associated GWP, such that metric tons (MT) of CO2E = (MT of a GHG) × (GWP of the GHG). CalEEMod assumes that the
GWP for CH\textsubscript{4} is 25, which means that emissions of 1 MT of CH\textsubscript{4} are equivalent to emissions of 25 MT of CO\textsubscript{2}, and the GWP for N\textsubscript{2}O is 298, based on the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report.

GHG emissions associated with construction of the proposed project were estimated for the following emission sources: operation of off-road construction equipment, on-road hauling and vendor trucks, and worker vehicles. The detailed project construction assumptions are included in Attachment A for the Project.

3 **AIR QUALITY ASSESSMENT**

3.1 **Thresholds of Significance**

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.). In addition, Appendix G of the CEQA Guidelines indicates that where available, the significance criteria established by the applicable air district may be relied upon to determine whether the proposed project would have a significant impact on air quality. This analysis focuses on addressing the potential for the project to violate any air quality standard or contribute substantially to an existing or projected air quality violation, which is determined by comparing estimated project-generated construction emissions to numeric thresholds established by the SCAQMD.

The SCAQMD has adopted thresholds to address the significance of air quality impacts resulting from a proposed project. A project would result in a substantial contribution to an existing air quality violation of the NAAQS or CAAQS for O\textsubscript{3}, which is a nonattainment pollutant, if the project’s construction emissions would exceed the SCAQMD VOC or NO\textsubscript{x} thresholds shown in Table 1. These emission-based thresholds for O\textsubscript{3} precursors are intended to serve as a surrogate for an “ozone significance threshold” (i.e., the potential for adverse O\textsubscript{3} impacts to occur) because O\textsubscript{3} itself is not emitted directly, and the effects of an individual project’s emissions of O\textsubscript{3} precursors (VOC and NO\textsubscript{x}) on O\textsubscript{3} levels in ambient air cannot be determined through air quality models or other quantitative methods.
Table 1
SCAQMD Air Quality Significance Thresholds

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Construction Criteria Pollutants Mass Daily Thresholds (pounds per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOCs</td>
<td>75</td>
</tr>
<tr>
<td>NOx</td>
<td>100</td>
</tr>
<tr>
<td>CO</td>
<td>550</td>
</tr>
<tr>
<td>SOx</td>
<td>150</td>
</tr>
<tr>
<td>PM10</td>
<td>150</td>
</tr>
<tr>
<td>PM2.5</td>
<td>55</td>
</tr>
<tr>
<td>Lead</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: SCAQMD 2015.

Notes: CO = carbon monoxide; NOx = oxides of nitrogen; PM10 = coarse particulate matter; PM2.5 = fine particulate matter; ppm = parts per million; SCAQMD = South Coast Air Quality Management District; SOx = sulfur oxides; VOC = volatile organic compounds

GHG emissions thresholds for industrial projects, as added in the March 2015 revision to the SCAQMD Air Quality Significance Thresholds, were not included in Table 1 as they are addressed within the GHG emissions analysis in Section 4 and are shown in Tables 7 and 8.

The phaseout of leaded gasoline started in 1976. Since gasoline no longer contains lead, the project is not anticipated to result in impacts related to lead; therefore, it is not discussed in this analysis.

In addition to the emission-based thresholds listed in Table 1, the SCAQMD also recommends the evaluation of localized air quality impacts to sensitive receptors in the immediate vicinity of the project as a result of construction activities. Such an evaluation is referred to as a LST analysis. The LST analysis focuses on construction equipment and does not include mobile sources. Therefore, the LST analysis only applies to the construction equipment onsite, not the worker vehicles, vendor trucks, or hauling trucks. For project sites of 5 acres or less, the SCAQMD LST Methodology (2009) includes lookup tables that can be used to determine the maximum allowable daily emissions that would satisfy the localized significance criteria (i.e., the emissions would not cause an exceedance of the applicable concentration limits for NO2, CO, PM10, and PM2.5) without performing project-specific dispersion modeling. The project would disturb less than 5 acres in 1 day, as discussed in detail in the following text, so it is appropriate to use the lookup tables for the LST evaluation.

The LST significance thresholds for NO2 and CO represent the allowable increase in concentrations above background levels in the vicinity of a project that would not cause or contribute to an exceedance of the relevant ambient air quality standards, while the threshold for PM10 represents compliance with Rule 403 (Fugitive Dust). The LST significance threshold for PM2.5 is intended to ensure that construction emissions do not contribute substantially to existing exceedances of the PM2.5 ambient air quality standards. The allowable emission rates depend on the following parameters:

- Source-receptor area (SRA) in which the project is located
Memorandum — Air Quality and Greenhouse Gas Emissions Assessment
Test Tunnel

- Size of the project site
- Distance between the project site and the nearest sensitive receptor (e.g., residences, schools, hospitals)

The project site is located in SRA 3 (Southwest Coastal Los Angeles County). The SCAQMD provides guidance for applying California Emissions Estimator Model (CalEEMod) to the LSTs. LST pollutant screening level concentration data is currently published for 1-, 2-, and 5-acre sites for varying distances. The maximum number of acres disturbed on the peak day was estimated using the “Fact Sheet for Applying CalEEMod to Localized Significance Thresholds” (SCAQMD 2011), which provides estimated acres per 8-hour day for crawler tractors, graders, rubber tired dozers, and scrapers. Based on the SCAQMD guidance, and assuming an excavator can grade 0.5 acres per 8-hour day (similar to graders, dozers, and tractors), it was estimated that the maximum acres on the project site that would be disturbed by off-road equipment would be 1 acre per day. Because the SCAQMD does not provide lookup table values for sites less than 1 acre, the LST values for a 1 acre within SRA 3 were used.

The nearest sensitive-receptor land uses (a residence) is located approximately 300 feet north-west of the project site exit (West 120th Street and Hawthorne Boulevard). As such, the LST receptor distance was assumed to be 164 feet (50 meters). The LST values from the SCAQMD lookup tables for SRA 3 (Southwest Coastal Los Angeles County) for a 1-acre project site and a receptor distance of 50 meters are shown in Table 2.

Table 2
Localized Significance Thresholds for Source Receptor Area 3
(Southwest Coastal Los Angeles County)

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Threshold (pounds/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO\textsubscript{2}</td>
<td>93</td>
</tr>
<tr>
<td>CO</td>
<td>785</td>
</tr>
<tr>
<td>PM\textsubscript{10}</td>
<td>14</td>
</tr>
<tr>
<td>PM\textsubscript{2.5}</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: SCAQMD 2009.
Notes: CO = carbon monoxide; NO\textsubscript{2} = nitrogen dioxide; PM\textsubscript{10} = coarse particulate matter; PM\textsubscript{2.5} = fine particulate matter; ppm = parts per million
LST thresholds were determined based on the values for 1-acre site at a distance of 50 meters from the nearest sensitive receptor.
3.2 Impact Analysis

Construction Emissions

Construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and VOC off-gassing) and off-site sources (i.e., on-road haul trucks, vendor trucks, and worker vehicle trips). Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts. The project is committed to reducing its impact on air quality and GHG as much as possible and thus has committed to requiring all off-road construction equipment to meet or exceed the EPA Tier 4 Final emissions standard or equivalent and the use of an electric tunnel boring machine (TBM). Table 3 presents the estimated maximum daily construction emissions generated during construction of the project. Details of the emission calculations are provided in Attachment A. Calculations included worst-case assumptions of construction activities 24-hours a day, which overestimated the number of trucks by approximately 30 percent.

Table 3
Estimated Maximum Daily Construction Criteria Air Pollutant Emissions

<table>
<thead>
<tr>
<th></th>
<th>VOC</th>
<th>NOx</th>
<th>CO</th>
<th>SOx</th>
<th>PM₁₀</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pounds per day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tunnel Boring Machine</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Off-Road Equipment</td>
<td>2.70</td>
<td>12.08</td>
<td>155.51</td>
<td>0.22</td>
<td>0.30</td>
<td>0.26</td>
</tr>
<tr>
<td>Worker Vehicles</td>
<td>0.26</td>
<td>0.14</td>
<td>1.71</td>
<td>0.00</td>
<td>0.06</td>
<td>0.02</td>
</tr>
<tr>
<td>Vendor Trucks</td>
<td>0.05</td>
<td>1.55</td>
<td>0.25</td>
<td>0.00</td>
<td>0.03</td>
<td>0.01</td>
</tr>
<tr>
<td>Haul Trucks</td>
<td>0.60</td>
<td>17.67</td>
<td>2.90</td>
<td>0.04</td>
<td>0.29</td>
<td>0.16</td>
</tr>
<tr>
<td>Fugitive Dust</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.39</td>
<td>0.34</td>
</tr>
<tr>
<td>Asphalt Paving Off-Gassing</td>
<td>0.05</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3.66</td>
<td>31.45</td>
<td>160.37</td>
<td>0.27</td>
<td>2.06</td>
<td>0.79</td>
</tr>
</tbody>
</table>

SCAQMD Threshold

<table>
<thead>
<tr>
<th>SCAQMD Threshold</th>
<th>VOC</th>
<th>NOx</th>
<th>CO</th>
<th>SOx</th>
<th>PM₁₀</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>75</td>
<td>100</td>
<td>550</td>
<td>150</td>
<td>150</td>
<td>55</td>
</tr>
</tbody>
</table>

| Threshold Exceeded? | No | No | No | No | No | No |

Notes: CO = carbon monoxide; NOx = oxides of nitrogen; PM₁₀ = coarse particulate matter; PM₂.₅ = fine particulate matter; SCAQMD = South Coast Air Quality Management; SOx = sulfur oxides; VOC = volatile organic compound

The tunnel boring machine is assumed to run off grid-sourced electricity.

Fugitive dust emissions include on-road vehicle dust and truck loading emissions.

See Attachment A for complete results.

As shown in Table 3, the project would not exceed any of the SCAQMD significance thresholds, even with the overestimation, and therefore would have a less than significant impact. In
addition, construction-generated emissions would be temporary and would not represent a long-term source of criteria air pollutant emissions.

Sensitive Receptors

Sensitive receptors are those individuals more susceptible to the effects of air pollution than the population at large. People most likely to be affected by air pollution include children, the elderly, and people with cardiovascular and chronic respiratory diseases. According to the SCAQMD, sensitive receptors include residences, schools, playgrounds, childcare centers, long-term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes (SCAQMD 1993). Residential land uses are located to the west of the proposed project exit location. The closest off-site sensitive receptors to the project site include residences located approximately 300 feet north-west of the project site boundary.

Construction activities associated with the project would result in temporary sources of on-site fugitive dust and construction equipment emissions. Off-site emissions from vendor trucks, haul trucks, and worker vehicle trips are not included in the LST analysis, as described in the SCAQMD Final LST Methodology (SCAQMD 2008a). The maximum allowable daily emissions that would satisfy the SCAQMD localized significance criteria for SRA 3 are presented in Table 4 and compared to the maximum daily on-site construction emissions, which are rounded up to the nearest whole number.

**Table 4**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Project Construction Emissions (pounds/day)</th>
<th>LST Criteria (pounds/day)</th>
<th>Exceeds LST?</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO₂</td>
<td>12.08</td>
<td>93</td>
<td>No</td>
</tr>
<tr>
<td>CO</td>
<td>155.51</td>
<td>785</td>
<td>No</td>
</tr>
<tr>
<td>PM₁₀</td>
<td>0.30</td>
<td>14</td>
<td>No</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>0.26</td>
<td>5</td>
<td>No</td>
</tr>
</tbody>
</table>

*Source: SCAQMD 2009.*  
*Notes:*  
VOC = volatile organic compound; NOₓ = oxides of nitrogen; CO = carbon monoxide; SOₓ = sulfur oxides; PM₁₀ = coarse particulate matter; PM₂.₅ = fine particulate matter; SCAQMD = South Coast Air Quality Management District. See Appendix A for detailed results.  
Localized significance thresholds are shown for 1-acre project sites corresponding to a distance to a sensitive receptor of 50 meters for SRA 3 (Southwest Coastal Los Angeles County).  
These estimates reflect control of fugitive dust required by Rule 403.

As shown in Table 4, the project LST would not exceed any of the significance thresholds and thus would not result in a significant impact.
4 GREENHOUSE GAS EMISSIONS ASSESSMENT

4.1 Thresholds of Significance

The State of California has developed guidelines to address the significance of GHG emissions impacts based on Appendix G of the CEQA Guidelines. This analysis focuses on addressing the potential for the project to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. This analysis applies the recommended SCAQMD numeric GHG emissions thresholds to determine the potential for the project to generate GHG emissions that would have a significant impact on the environment.

The SCAQMD has not adopted recommended numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development projects. In October 2008, SCAQMD presented to the Governing Board the Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold (2008). The guidance document was not adopted or approved by the Governing Board. This document, which builds on the previous guidance prepared by the California Air Pollution Control Officers Association, explored various approaches for establishing a significance threshold for GHG emissions.

The SCAQMD formed a GHG CEQA Significance Threshold Working Group to work with SCAQMD staff on developing GHG CEQA significance thresholds until statewide significance thresholds or guidelines are established. In December 2008, the SCAQMD adopted an interim 10,000 MT CO₂E per year screening level threshold for stationary source/industrial projects for which the SCAQMD is the lead agency. From December 2008 to September 2010, the SCAQMD hosted working group meetings and revised the draft threshold proposal several times, although it did not officially provide these proposals in a subsequent document. The SCAQMD has continued to consider adoption of significance thresholds for residential and general land use development projects. The most recent proposal, issued in September 2010, uses the following tiered approach to evaluate potential GHG impacts from various uses (SCAQMD 2010):

**Tier 3** Consider whether the project generates GHG emissions in excess of screening thresholds for individual land uses. The 10,000 MT CO₂E per year threshold for industrial uses would be recommended for use by all lead agencies. Under option 1, separate screening thresholds are proposed for residential projects (3,500 MT CO₂E per year), commercial projects (1,400 MT CO₂E per year), and mixed-use projects (3,000 MT CO₂E per year). Under option 2, a single numerical screening threshold of 3,000 MT CO₂E per year would be used for all non-industrial projects. If the project generates emissions in excess of the applicable screening threshold, move to Tier 4.
Because the project consists of a testing facility, the recommended SCAQMD threshold to apply to the project is the 3,000 MT CO₂E per year for mixed-use projects. It should be noted that the SCAQMD does not have a construction-only significance threshold for GHGs. Per the SCAQMD guidance, construction emissions should be amortized over the operational life of the project, which is assumed to be 30 years for typical projects (SCAQMD 2008b). This impact analysis, therefore, amortizes construction emissions over 30 years and then compares emissions to the SCAQMD operational threshold of 3,000 MT CO₂E per year.

4.2 Impact Analysis

Construction Emissions

Construction of the project would result in GHG emissions, which are primarily associated with use of off-road construction equipment, on-road vendor and haul trucks, and worker vehicles. As stated above, the SCAQMD recommends that construction emissions be amortized over a 30-year project lifetime; therefore, the total construction GHG emissions were calculated, amortized over 30 years, and then compared to the SCAQMD operational GHG significance threshold of 3,000 MT CO₂E per year.

A spreadsheet-based model was used to calculate the annual GHG emissions based on the construction scenario described in Attachment A. Construction of the project is anticipated to commence in Summer 2017, lasting a total of approximately five months. On-site sources of GHG emissions include off-road equipment and off-site sources include on-road vehicles (haul trucks, vendor trucks, and worker vehicles). Table 5 presents construction GHG emissions for the project from on-site and off-site emission sources.

Table 5
Estimated Annual Construction GHG Emissions

<table>
<thead>
<tr>
<th></th>
<th>CO₂</th>
<th>CH₄</th>
<th>N₂O</th>
<th>CO₂E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>metric tons per year</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Tunnel Boring Machine</td>
<td>1,309.29</td>
<td>0.06</td>
<td>0.01</td>
<td>1,314.61</td>
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<tr>
<td>Off-Road Equipment</td>
<td>3,973.84</td>
<td>1.06</td>
<td>0.47</td>
<td>4,141.52</td>
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<tr>
<td>Worker Vehicles</td>
<td>66.76</td>
<td>0.00</td>
<td>0.00</td>
<td>68.14</td>
</tr>
<tr>
<td>Vendor Trucks</td>
<td>66.61</td>
<td>0.00</td>
<td>0.00</td>
<td>66.66</td>
</tr>
<tr>
<td>Haul Trucks</td>
<td>758.41</td>
<td>0.00</td>
<td>0.00</td>
<td>758.93</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6,174.92</strong></td>
<td><strong>1.12</strong></td>
<td><strong>0.49</strong></td>
<td><strong>6,349.86</strong></td>
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Annualized Emissions over 30 Years

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<tr>
<th></th>
<th>CO₂</th>
<th>CH₄</th>
<th>N₂O</th>
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<tr>
<td><strong>Annualized Emissions over 30 Years</strong></td>
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</table>

SCAQMD Threshold

<table>
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<tr>
<th></th>
<th>CO₂</th>
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</table>

Exceed Threshold

<table>
<thead>
<tr>
<th></th>
<th>CO₂</th>
<th>CH₄</th>
<th>N₂O</th>
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<tr>
<td><strong>Exceed Threshold</strong></td>
<td>—</td>
<td>—</td>
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</tr>
</tbody>
</table>
Notes: CH₄ = methane; CO₂ = carbon dioxide; CO₂E = carbon dioxide equivalent; N₂O = nitrous oxide. The GHG emissions from the TBM was calculated based on the estimated power used and emissions from electricity. See Attachment A for complete results.

As shown in Table 5, the estimated total GHG emissions during construction of would be approximately 6,350 MT CO₂E per year over the construction period. Estimated project-generated construction emissions amortized over 30 years would be approximately 212 MT CO₂E per year. As with project-generated construction air quality pollutant emissions, GHG emissions generated during construction of the project would be short-term in nature, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions. Because there is no separate GHG threshold for construction, the evaluation of significance is determined by comparing the amortized construction emissions to the operational threshold. As shown in Table 5, the amortized construction emissions do not exceed the SCAQMD significance threshold of 3,000 MT CO₂E per year and therefore would not result in a significant impact.

5 CONCLUSIONS

Emissions generated during construction of the proposed project would not exceed the SCAQMD’s significance thresholds for criteria air pollutants and thus would not result in a significant impact. The project would also not exceed the LST threshold for sensitive receptors and thus would have a less than significant impact.

Estimated total GHG emissions generated during construction would be below the SCAQMD’s bright-line threshold of 3,000 MT CO₂E per year. The project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs as there are currently no mandatory GHG regulations or finalized agency guidelines that would apply to implementation of this project. Accordingly, potential cumulative GHG impacts would be less than significant.

6 REFERENCES


Memorandum — Air Quality and Greenhouse Gas Emissions Assessment
Test Tunnel


ATTACHMENT A

Air Quality and Greenhouse Gas Emissions Calculations
### Hawthorne Tunnel Project Construction Emissions

<table>
<thead>
<tr>
<th>Emission Source</th>
<th>VOC</th>
<th>NOX</th>
<th>CO</th>
<th>SO2</th>
<th>PM10</th>
<th>PM2.5</th>
<th>CO2</th>
<th>CH4</th>
<th>N2O</th>
<th>CO2E</th>
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</thead>
<tbody>
<tr>
<td><strong>lb/day</strong></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>MT/year</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>Tunnel Boring Machine</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<td>0.00</td>
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</tr>
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<td><strong>Fugitive Dust</strong></td>
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<td>On-Road</td>
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<td>1.38</td>
<td>0.34</td>
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<td><strong>Subtotal</strong></td>
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<td>1.39</td>
<td>0.34</td>
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<tr>
<td><strong>Paving</strong></td>
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<tr>
<td><strong>Total</strong></td>
<td>3.66</td>
<td>31.45</td>
<td>160.37</td>
<td>0.27</td>
<td>2.06</td>
<td>37,296.83</td>
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<td>150</td>
<td>55</td>
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<td>-</td>
<td>-</td>
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</tr>
<tr>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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</tbody>
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**Notes:** Assumes tunnel boring machine operates off grid-sourced power and Tier 4 final off-road equipment.
Diameter: 14 ft, Max Height: 8.9 ft, Min Height: 5.8 ft, Width: 10.5 ft
<table>
<thead>
<tr>
<th></th>
<th>E=EFxA</th>
<th>6.67 lb VOC</th>
<th>0.05 lb VOC/day</th>
<th>0.00 VOC ton/year</th>
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</thead>
<tbody>
<tr>
<td>EF=</td>
<td>2.62</td>
<td>lb/acre</td>
<td></td>
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<tr>
<td>A=</td>
<td>110880</td>
<td>sqft</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.55</td>
<td>acre</td>
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**Notes:**
C based on SCAQMD Rule 1113.
Architectural emissions equations from CalEEMod Users Guide, Appendix A.
### On-Road PM Emissions

#### Paved Road Fugitive Dust Emission Factors

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>sL (g/m²)</th>
<th>Average Weight (tons)</th>
<th>PM10 Emission Factor (lb/VMT)</th>
<th>PM2.5 Emission Factor (lb/VMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worker Vehicles and Delivery Trucks</td>
<td>0.03</td>
<td>9.42</td>
<td>0.00089</td>
<td>0.000219</td>
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</table>

1. Emission factors from AP-42, Section 13.2.1 (Paved Roads).
   
   \[ E = k \times (sL)^{0.31} \times (W)^{1.02} \times (1 - P/4N) \text{ [annual]} \]

2. Silt loading from California Air Resources Board, Areawide Source Methodologies, Section 7.9, Entrained Paved Road Dust, Paved Road Travel (July 1997).


   Silt loading is for freeways, major, and collector roads in Los Angeles County.

#### Truck Loading Emissions

**Truck Loading/Unloading/Drops**

\[ EF = k \times (0.0032) \times (U/5)^{1.3} \times (M/2)^{1.4} \]

<table>
<thead>
<tr>
<th>PM10</th>
<th>PM2.5</th>
<th>Tons/Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>U=</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>M=</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>k=</td>
<td>0.35</td>
<td>0.053</td>
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<tr>
<td>EF (lb/ton)=</td>
<td>1.43E-05</td>
<td>2.17E-06</td>
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</table>

**Notes:** Emissions equation from AP-42, Section 13.2.4 (Aggregate Handling and Storage Piles)

**Source:** Crenshaw/LAX Transit Corridor Advanced Conceptual Engineering Preliminary Geotechnical Report, October 2010

### Other Estimates

<table>
<thead>
<tr>
<th>Other Estimates</th>
<th>One-Way Distance (miles)</th>
<th>Daily (miles)</th>
<th>Annual (miles)</th>
<th>Total (miles)</th>
<th>Vehicle Weight (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of workers per day (tunnelling)</td>
<td>30</td>
<td>6.65</td>
<td>399</td>
<td>50,972</td>
<td>50,972</td>
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<tr>
<td>Number of workers per day (filling/paving)</td>
<td>12</td>
<td>6.65</td>
<td>160</td>
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<td>Number of Vendor Trucks per day (tunnelling)</td>
<td>2</td>
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<td>40</td>
<td>5,110</td>
<td>5,110</td>
</tr>
<tr>
<td>Number of Vendor Trucks per day (paving)</td>
<td>2</td>
<td>10</td>
<td>40</td>
<td>5,110</td>
<td>5,110</td>
</tr>
<tr>
<td>Number of Haul Trucks per day (tunnelling)</td>
<td>61</td>
<td>10</td>
<td>1,220</td>
<td>155,855</td>
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<td>Number of Haul Trucks per day (paving)</td>
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<td>10</td>
<td>40</td>
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**Composite Vehicle Weight:** 9.42

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<th>Ft³</th>
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## Emissions Benefit

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<th>SO2</th>
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<th>PM2.5</th>
<th>CO2</th>
<th>CH4</th>
<th>N2O</th>
<th>CO2E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lb/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MT/year</td>
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<td>0.03</td>
<td>0.03</td>
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<td>695.86</td>
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<td>Tunnel Skate</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100.29</td>
<td>0.00</td>
<td>0.00</td>
<td>100.70</td>
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<tr>
<td>Amortized Construction Emissions</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>211.66</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
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<tr>
<td><strong>Net Benefit of Skate</strong></td>
<td><strong>0.34</strong></td>
<td><strong>1.09</strong></td>
<td><strong>12.96</strong></td>
<td><strong>0.00</strong></td>
<td><strong>0.03</strong></td>
<td><strong>0.03</strong></td>
<td><strong>595.53</strong></td>
<td><strong>0.00</strong></td>
<td><strong>0.00</strong></td>
<td><strong>383.50</strong></td>
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</table>

**Notes:** *Green* = Net Benefit; *Red* = Net Impact

- 120 cars per hour
- Model S is largest size
- 6 kWh per skate per trip
- 120 cars per hour
- 2,880 cars per day
- 5,760 miles per day
- 40 kW per hour
- 960 kWh per day
- 350,400 kWh per year
ATTACHMENT D

Test Tunnel Project Cultural Memorandum
Subject: Cultural Resources Constraints Memorandum for the Test Tunnel Project, Los Angeles County, California.

Dear Mr. Davis:

This memorandum summarizes the results of a cultural records search completed in order to establish the presence of any previously recorded cultural resources within the southern alignment adjustment for the Test Tunnel project (project) alignment. No cultural resources surveys or archival research was conducted under the current scope of work.

Situated on the U.S. Geological Survey (USGS) Inglewood, California 7.5-minute topographic quadrangle map, the project alignment extends north along Crenshaw Boulevard from Rocket Road, turns west along 120th Street for approximately 2 miles to Hawthorne Boulevard.

METHODOLOGY

Records Search

Dudek completed a records search that included the project alignment and surrounding 0.25-mile (402 meter [m]) search buffer at the South Central Coastal Information Center (SCCIC), California State University Fullerton, on April 6, 2017. This search included mapped prehistoric, historical, and built-environment resources; Department of Parks and Recreation (DPR) site records; technical reports; archival resources; and ethnographic references. Additional consulted sources included the NRHP; CRHR; and listed Office of Historic Preservation Archaeological Determinations of Eligibility, California Points of Historical Interest, California Historical Landmarks, and California Department of Transportation Bridge Survey information.
Mr. Steve Davis  
Subject: Results of a Cultural Resources Constraints Analysis for the Test Tunnel Project, Los Angeles County, California.

RESULTS

Previously Conducted Archaeological Resources Studies

Dudek completed a records search that included the project alignment and surrounding 0.25-mile (402 m) search buffer at the SCCIC, California State University Fullerton, on February 16, 2017. The SCCIC records indicate that no resources have been recorded within the test tunnel project alignment or the 0.25-mile (402 m) search buffer, while 19 previous cultural resources technical investigations have been conducted within 0.25-mile (402 m) of the test tunnel project alignment between 1975 and 2013 (Appendix A: Figure A-1). Of these 19 studies, six (6) have been conducted within the project alignment while the remaining 13 are within 0.25-mile (402 m).

The results of previously conducted technical investigations are typically considered relevant for no more than 5 years. This ensures that all newly conducted investigations and newly identified resources are incorporated. Of the 19 studies that have overlapped with the adjusted southern project alignment, none have been completed within the last five years. All 19 technical investigations are summarized in Appendix A: Table A-1.

SUMMARY AND RECOMMENDATIONS

This analysis indicates that no cultural resources have been previously recorded within the vicinity of the project alignment. The current project, however, would involve substantial ground disturbance. Therefore, in the unlikely event that such archaeological or historic resources are uncovered, compliance with State regulations and established standard practices would ensure that potential archaeological/paleontological resources impacts would be less than significant.

If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities must stop in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to California Public Resources Code (PRC) Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission, which will then notify the most likely descendent. Further provisions of PRC 5097.98 are to be followed as applicable.
Mr. Steve Davis  
Subject: Results of a Cultural Resources Constraints Analysis for the Test Tunnel Project, Los Angeles County, California.

If you have any questions regarding this letter report, please do not hesitate to contact me at (626) 375-7682, or edenniston@dudek.com.

Sincerely,

Liz Denniston, M.A., RPA  
Archaeologist

Attachments:  
Appendix A: Previously Conducted Archaeological Resources Studies
Mr. Steve Davis
Subject: Results of a Cultural Resources Constraints Analysis for the Test Tunnel Project, Los Angeles County, California.
APPENDIX A

Previously Conducted Archaeological Resources Studies
### Table A-1

**Previous Technical Studies Within the 0.25-Mile Search Buffer**

<table>
<thead>
<tr>
<th>Report Number (LA-)</th>
<th>Authors</th>
<th>Date</th>
<th>Title</th>
<th>Proximity</th>
</tr>
</thead>
<tbody>
<tr>
<td>00078</td>
<td>Rosen, Martin D.</td>
<td>1975</td>
<td>Evaluation of the Archaeological Resources and Potential Impact of the Proposed Construction of Route 105 Freeway From El Segundo to Norwalk</td>
<td>Within</td>
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<tr>
<td>02904</td>
<td>Stickel, Gary E.</td>
<td>1993</td>
<td>Draft Report a Phase I Cultural Resources Literature Search for the West Basin Water Reclamation Project</td>
<td>General Overview</td>
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<tr>
<td>03289</td>
<td>Davis, Gene</td>
<td>1990</td>
<td>Mobil M-70 Pipeline Replacement Project Cultural Resource Survey Report for Mobil Corporation</td>
<td>Intersects</td>
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<tr>
<td>04836</td>
<td>Unknown</td>
<td>2000</td>
<td>Phase I Archaeological Survey Along Onshore Portions of the Global West Fiber Optic Cable Project</td>
<td>Adjacent</td>
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<tr>
<td>05499</td>
<td>Smith, Philomene C.</td>
<td>2000</td>
<td>Negative Archaeological Survey Report: to Cold Plane the Existing Pavement on Route 405 and Overlay With 30mm of Rubberized Asphalt Concrete at Selected On/off-ramps</td>
<td>Adjacent</td>
</tr>
<tr>
<td>06037</td>
<td>Duke, Curt</td>
<td>2002</td>
<td>Cultural Resource Assessment at &amp; T Wireless Services Facility No. 05173a Los Angeles County, California</td>
<td>Outside</td>
</tr>
<tr>
<td>07687</td>
<td>Bonner, Wayne H.</td>
<td>2005</td>
<td>Cultural Resources Records Search Results and Site Visit for T-mobile Candidate La03361a (pipe Tech) 12600 Chadron Avenue, Hawthorne, Los Angeles County, California</td>
<td>Outside</td>
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<tr>
<td>07695</td>
<td>Bonner, Wayne H.</td>
<td>2005</td>
<td>Cultural Resources Records Search Results and Site Visit for T-mobile Candidate La03360b (eucalyptus Park), 12100 Inglewood Avenue, Hawthorne, Los Angeles County, California</td>
<td>Outside</td>
</tr>
<tr>
<td>08255</td>
<td>Arrington, Cindy and Nancy Sikes</td>
<td>2006</td>
<td>Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project State of California: Volumes I and II</td>
<td>Outside</td>
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<tr>
<td>10160</td>
<td>Harper, Caprice D. and Francesca Smith</td>
<td>2008</td>
<td>Preliminary Cultural Resources Survey for the Formation of the Wiseburn Unified School District Project, Cities of El Segundo and Hawthorne, and Unincorporated Los Angeles County, CA</td>
<td>Within</td>
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<tr>
<td>10197</td>
<td>Rosen, Martin D.</td>
<td>2001</td>
<td>Negative Archaeological Survey Report: Erosion Control Measures at Various Locations Between La Cienega and Vermont on/off ramps on LA405.</td>
<td>Outside</td>
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</tbody>
</table>
## Table A-1
### Previous Technical Studies Within the 0.25-Mile Search Buffer

<table>
<thead>
<tr>
<th>Report Number (LA-)</th>
<th>Authors</th>
<th>Date</th>
<th>Title</th>
<th>Proximity</th>
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<tr>
<td>10857</td>
<td>Smith, Brian F.</td>
<td>2005</td>
<td>Final - LAX Master Plan Mitigation Monitoring &amp; Reporting program- Archaeological Treatment Plan</td>
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<tr>
<td>11150</td>
<td>Maxwell, Pamela</td>
<td>2003</td>
<td>West Basin Municipal Water District Harbor/South Bay Water Recycling Project</td>
<td>Within</td>
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<td>11973</td>
<td>Unknown</td>
<td>2011</td>
<td>Crenshaw/LAX Transit Corridor Project Final Environmental Impact Report/Final Environmental Impact Statement</td>
<td>General Overview</td>
</tr>
<tr>
<td>12360</td>
<td>Bonner, Wayne</td>
<td>2013</td>
<td>Cultural Resources Records Search and Site Visit Results for AT&amp;T Mobility, LLC Candidate LA0144 (Eucalyptus Park), 12100 1/2 Inglewood Avenue, Hawthorne, Los Angeles County, California</td>
<td>Adjacent</td>
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