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Project name:
Metro Red/Purple Line Core Capacity
Improvements Project

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Technical Memorandum

Subject: LA Metro, Metro Red/Purple Line Core Capacity Improvements Project, Air Quality and Greenhouse Gas Emissions Analysis

1 Introduction

This technical memorandum describes the potential air quality and greenhouse gas (GHG) emissions associated with construction of the proposed Core Capacity Portal Widening (project). The Los Angeles County Metropolitan Transportation Authority (Metro) proposes to widen the portal and install new tracks and switches for the Metro Red/Purple Line in and adjacent to the Metro Red/Purple Line Maintenance Yard located southeast of Union Station. A widened portal and new tracks and switches would improve the new turn-back facility and allow for an increase in train speeds while ensuring reliability and operational safety. This technical memorandum has been prepared to supplement the air quality and greenhouse gas sections of the Initial Study/Mitigated Negative Declaration (IS/MND).

This technical memo documents that the project will have no significant adverse impacts related to air quality or greenhouse gas emissions.

2 Methodology

Construction-related emissions associated with typical construction activities were modeled using the California Emissions Estimator Model (CalEEMod), Version 2016.3.1. The use of off-road equipment, haul trucks, size of the construction workforce, and construction phase lengths were estimated using CalEEMod defaults. CalEEMod uses emission factors from widely-accepted models and is combined with conservative default data for use in the absence of project- and/or site-specific information. The default estimates include sources such as the United States Environmental Protection Agency (USEPA) AP-42, Compilation of Air Pollutant Emission Factors, California Air Resources Board (ARB) vehicle emission models (OFFROAD2011 and EMFAC2014), and studies commissioned by California agencies such as the California Energy Commission (CEC), and CalRecycle.

The South Coast Air Quality Management District (SCAQMD) significance thresholds were used to assess regional and localized emissions during construction of the project. Localized emissions of air pollutants were assessed in accordance with SCAQMD's local significance thresholds (LST) guidance (SCAQMD 2008). Using the CalEEMod default equipment and the maximum daily soil disturbance possible for each type of equipment according to SCAQMD Fact Sheet for Applying CalEEMod to Localized Significance Thresholds (SCAQMD Fact Sheet 2016), the maximum daily acreage disturbed would be less than five acres. As such, peak daily localized emissions were estimated using LST tables in general accordance with the SCAQMD guidance (SCAQMD 2008).

Operation of the project would not increase the generation or use of on-road motor vehicles or off-road equipment relative to existing conditions. The project would allow for an increase in train speeds and ensure the reliability of operations, thereby potentially increasing ridership and reducing emissions associated with motor vehicle trips. Thus, operational emissions were evaluated qualitatively (i.e. operational emissions were not estimated).

3 Model Results and Analysis

The following sections present and answer the Environmental Checklist Form questions for Air Quality and GHG Emissions found in Appendix G of the CEQA Guidelines.

3.1 Air Quality

The SCAQMD monitors air quality within the project area and the South Coast Air Basin (SCAB), which includes Orange County and portions of Los Angeles, Riverside, and San Bernardino counties. The Basin is bounded by the Pacific Ocean to the west; the San Gabriel, San Bernardino and San Jacinto mountains to the north and east; and the San Diego County line to the south.

(a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

Air quality plans describe air pollution control strategies to be implemented by a city, county, or regional air district. The primary purpose of an air quality plan is to bring an area that does not attain the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS) into compliance with those standards pursuant to the requirements of the Clean Air Act and California Clean Air Act. Six air pollutants have been identified by the USEPA and the ARB as being of concern both on a nationwide and statewide level: ozone; carbon monoxide (CO); nitrogen dioxide (NO₂); sulfur dioxide (SO₂); lead; and particulate matter (PM), which is subdivided into two classes based on particle size: PM equal to or less than 10 micrometers in diameter (PM₁₀) and PM equal to or less than 2.5 micrometers in diameter (PM_{2.5}). The SCAB is currently designated as a non-attainment area for the 8-hour ozone and PM_{2.5} NAAQS. The applicable Air Quality Management Plan (AQMP) for the project is prepared by SCAQMD in partnership with the ARB, USEPA, and the Southern California Association of Governments (SCAG).

The most recent AQMP was adopted by the SCAQMD in December 2012. The 2012 AQMP is the legally enforceable blueprint for how the region will meet and maintain state and federal air quality standards. The 2012 AQMP identifies control measures needed to achieve attainment of the federal 24-hour standard for PM_{2.5} in the SCAB. The 2012 AQMP also provides updates on progress towards meeting the 8-hour ozone standard by 2023 and an attainment demonstration for the revoked 1-hour ozone standard. The 2016 AQMP has been released and is expected to be submitted for approval in February 2017.

Consistency with the AQMP is determined through evaluation of project-related air quality impacts and demonstration that project-related emissions would not increase the frequency or severity of existing violations, or contribute to a new violation of the NAAQS. The project would involve construction-related activities, which are short-term and temporary in nature. Assumptions surrounding off-road equipment emissions in the 2012 AQMP were developed based on hours of activity and equipment population reported to CARB for rule compliance. The project would be consistent with the assumptions regarding equipment activity and emissions in the 2012 AQMP.

The project site is currently zoned as Heavy/Light Manufacturing and is identified as a transit priority area. Because the project improves an existing portal and installs new tracks and switches to enhance the transport network of the Metro Red/Purple Line, the project is consistent with the zoning designation and existing urban land uses on the project site. Since the project is consistent with the existing planning documents and operation of the project would potentially reduce the generation and use of on-road motor vehicles, operational emissions have been accounted for in the 2012 AQMP.

In addition, the SCAQMD has established thresholds of significance that are designed to identify significant levels of air pollution. As shown in Table 1 and discussed in more detail in subsection (b) below, the project

would generate temporary emissions that would not exceed SCAQMD's allocated emissions threshold for a construction project and that would not substantially impede achieving the air quality goals of the region. Therefore, the impact would be less than significant.

(b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Construction emissions are described as "short-term" or temporary in duration; however, they have the potential to represent a significant impact with respect to air quality. Construction of the project would result in the temporary generation of volatile organic compounds (VOC) and oxides of nitrogen (NO_x) (VOC and NO_x are precursors of ozone), CO, PM₁₀, and PM_{2.5} emissions. VOC, NO_x, and CO emissions are primarily associated with mobile equipment exhaust, including off-road construction equipment and on-road motor vehicles. This would include heavy-duty off-road equipment, worker trips, and hauling trips associated with portal widening and construction of the new tracks and switches. Fugitive PM emissions are primarily associated with site preparation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and miles traveled by construction vehicles.

Construction of the project is expected to begin in the fall of 2018 and extend approximately 12 to 18 months; it was assumed that all construction sub-phases would take place consecutively (e.g. demolition would not occur at same time as construction or paving). The construction of the project will include the demolition of the tow yard buildings with an approximate building square footage of 4,000 feet. After demolition, it was assumed that the project site would be balanced and would not require the import/export of materials.

The project would be required to comply with SCAQMD Rule 403 Best Available Control Measures (BACM) to reduce fugitive dust emissions during construction activities. Therefore, the emission estimates include reductions associated with implementation of BACM consistent with Rule 403.

As shown in Table 1, construction emissions for the project would result in maximum daily emissions of approximately 37.43 pounds of VOC, 59.61 pounds of NO_x, 36.17 pounds of CO, 10.91 pounds of PM₁₀ (combined exhaust and fugitive dust) and 6.89 pounds of PM_{2.5}. Additional modeling assumptions and details are provided in Attachment A.

Table 1. Maximum Daily Regional Construction Emissions

	Estimated Emissions (pounds/day)				
	VOC	NO _x	CO	PM ₁₀	PM _{2.5}
Maximum Daily Emissions	37.43	59.61	36.17	10.91	6.89
Significance Threshold ¹	75	100	550	150	55
Exceed Significance?	NO	NO	NO	NO	NO

Source: ¹SCAQMD Air Quality Significance Thresholds (2015). Modeled by AECOM in 2016.

As shown in Table 1, the estimate of maximum daily emissions for the construction of the project would not exceed any of the SCAQMD's construction thresholds of significance.

Localized emissions were assessed in accordance with SCAQMD's LST guidance. Based on the SCAQMD Fact Sheet, Table 2 demonstrates the maximum number of acres disturbed for a day of construction activity. During the construction of this project, the maximum emissions would occur during the site preparation and grading phases and would result in a disturbance of 4 acres.

Table 2. Daily Maximum Number of Acres Disturbed During Grading Phase

Equipment Type	Quantity	Acres/8-hour day ¹	Acres Disturbed
Graders	1	0.5	0.5
Rubber Tired Dozers	1	0.5	0.5
Scrapers	2	1	2
Tractors/Loaders/Backhoes	2	0.5	1
Total			4

Source: ¹SCAQMD Fact Sheet (2016).

Table 3 presents the localized emissions based on the maximum daily soil disturbance activity and the receptor distance to the nearest residence. Although the project is located in a primarily industrial area, the nearest residential sensitive receptors are located immediately adjacent at the southwest corner of the project site, in the One Santa Fe apartment building. According to SCAQMD's LST guidance, projects with boundaries located closer than 25 meters to the nearest receptor should use the LSTs for receptors located at 25 meters. As such, this analysis assumes a sensitive receptor distance of 25 meters for a daily maximum acreage disturbance of 4 acres. In addition, typically only on-site emissions are considered in LST analysis; off-site emissions, such as haul trucks and worker commutes, are not included. Table 3 presents the maximum emissions for the maximum on-site construction-related emission sources associated with the project.

Table 3. Maximum Daily Localized Construction Emissions

	Estimated Emissions (pounds/day)			
	NO _x	CO	PM ₁₀	PM _{2.5}
Maximum Daily Emissions	5.09	59.52	10.71	6.84
Significance Threshold ¹	143	1,590	13	7
Exceed Significance?	NO	NO	NO	NO

Notes: Assumes watering two times per day consistent with SCAQMD Rule 403. Emissions do not include reductions associated with compliance with Metro's Green Construction Policy which would result in additional reductions in NO_x and PM emissions.

Emissions included in the table are on-site emissions for the Site Preparation and Grading phases, which have the highest maximum daily emissions.

Source: ¹ Appendix C Mass Rates Look-up Tables, Source Receptor Area 1. Assumes 25 meter distance. LST interpolated for 4 acre project site. Modeled by AECOM 2016.

After construction, operation of the project would not require or result in trips or activities for operations and maintenance beyond existing conditions. Therefore, no new emissions would be generated by the project. Furthermore, the speed, reliability, and safety of trains would improve as a result of this project; thereby potentially reducing emissions from motor vehicles.

Based on the information provided, modeling conducted and emission estimates discussed above, construction and operational emissions would not violate an ambient air quality standard or contribute substantially to an existing violation. In addition, Metro requires implementation of Best Management Practices (BMPs) consistent with the Green Construction Policy adopted in 2011 and Sustainability Plans. Accordingly, this impact would be less than significant.

(c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

The SCAQMD cumulative analysis focuses on whether a specific project would result in cumulatively considerable increase in emissions. By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development within the SCAB, and this regional impact is cumulative rather than being attributable to any one source. Per CEQA Guidelines Section 15064(h) (4), the existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the project's incremental effects are cumulatively considerable.

As discussed in 3.1.b. above, the project would result in the generation of criteria air pollutant emissions, but at levels that do not exceed any of the SCAQMD regional and localized thresholds for construction and operational activities. These thresholds are designed to identify those projects that would result in significant levels of air pollution and to assist the region in attaining the applicable state and federal ambient air quality standards. Projects that would not exceed the thresholds of significance would be considered not to contribute a considerable amount of criteria air pollutant emissions to the region's emission profile and not impede attainment and maintenance of ambient air quality standards. Accordingly, the project's construction and operational emissions would not result in a cumulatively considerable contribution to the region's air quality. Therefore, this impact would be less than significant.

(d) Would the project expose sensitive receptors to substantial pollutant concentrations?

Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects. These people include children, older adults, and persons with pre-existing respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. According to SCAQMD, sensitive receptors include residences, schools, playgrounds, child care centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes.

The project site is located in a primarily industrial area within the Arts District of Los Angeles. The nearest residential sensitive receptors are located immediately adjacent at the southwest corner of the project site, in the One Santa Fe apartment building.

The greatest potential for toxic air contaminant (TAC) emissions would be related to diesel PM emissions associated with heavy-duty construction equipment activity. The Office of Environmental Health Hazard Assessment (OEHHA) developed a Guidance Manual for the Preparation of Health Risk Assessments (OEHHA 2015). According to OEHHA methodology, health effects from carcinogenic TACs are usually described in terms of individual cancer risk, which is based on a 30-year lifetime exposure to TACs. Construction activities are anticipated to last approximately 18 months and would cease following completion of the project. Therefore, the total exposure period for construction activities would be five percent of the total exposure period used for typical residential health risk calculations (i.e. 30 years).

Although residential sensitive receptors are located adjacent to the southwestern portion of the project site, construction activities and associated emissions would be dispersed over the total 10 acre project site. Therefore, emissions would be generated at distances from 25 to more than 500 meters from sensitive receptors. Given the construction schedule, varying buffer distance to the nearest sensitive receptors, and the highly dispersive nature of diesel PM emissions, construction of the project would not expose sensitive receptors to substantial TAC concentrations. In addition, project operations would not be anticipated to generate additional localized criteria pollutant or TAC emissions. Accordingly, air quality impacts on sensitive receptors would be less than significant.

(e) Would the project create objectionable odors affecting a substantial number of people?

The occurrence and severity of odor impacts depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. While offensive odors

rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies.

Potential sources that may emit odors during construction activities include exhaust from diesel construction equipment. However, due to the substantial distance to the nearest sensitive receptors and the highly diffusive properties of diesel exhaust, nearby receptors would not be affected by diesel exhaust odors associated with project construction. The project would utilize typical construction techniques, and the odors would be typical of most construction sites and temporary in nature. Operation of the project would not add any new odor sources beyond existing conditions. As a result, the project would not create objectionable odors affecting a substantial number of people. Accordingly, odor impacts would be less than significant.

3.2 Greenhouse Gas Emissions

Certain gases in the earth's atmosphere, classified as greenhouse gases (GHG), play a critical role in determining the earth's surface temperature. A portion of the solar radiation that enters earth's atmosphere is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. Infrared radiation (i.e., thermal heat) is absorbed by GHGs; as a result, infrared radiation released from the earth that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the "greenhouse effect," is responsible for maintaining a habitable climate on Earth.

GHGs are present in the atmosphere naturally, are released by natural sources, and are formed from secondary reactions taking place in the atmosphere. The following are GHGs that are widely seen as the principal contributors to human-induced global climate change:

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF₆)

Global warming potential (GWP) is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to CO₂. The GWP of a GHG is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time (i.e., lifetime) that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to CO₂, the most abundant GHG. GHGs with lower emissions rates than CO₂ may still contribute to climate change because they are more effective at absorbing outgoing infrared radiation than CO₂ (i.e., high GWP). The concept of CO₂-equivalents (CO₂e) is used to account for the different GWP potentials of GHGs to absorb infrared radiation.

(a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Heavy-duty off-road equipment, materials transport, and worker commutes during construction of the project would result in exhaust-related GHG emissions. GHG emissions generated by construction would be primarily in the form of CO₂. Although emissions of other GHGs, such as CH₄ and N₂O, are important with respect to global climate change, the emission levels of these other GHGs from on- and off-road vehicles used during construction are relatively small compared with CO₂ emissions, even when factoring in the relatively larger global warming potential of CH₄ and N₂O.

The SCAQMD has adopted a significance threshold of 10,000 metric tons per year for industrial projects where SCAQMD is the lead agency. SCAQMD recommends that construction emissions be amortized over a 30-year project lifetime and added to the operational emissions of the project. Operation of the project would be similar to existing conditions. The total GHG emissions resulting from construction of the project would be 1,497 MT CO₂e. The amortized construction emissions were estimated at 50 MT CO₂e (1,497 MT CO₂e divided by 30 years).

Thus, the total and amortized project-related construction GHG emissions are less than the SCAQMD annual threshold of 10,000 MT CO₂e for industrial projects. Therefore, impacts related to GHG emissions would be less than significant.

(b) Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

In September 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32; California Health and Safety Code Division 25.5, Sections 38500, et seq.). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. It requires that statewide GHG emissions be reduced to 1990 levels by 2020. In 2008, the CARB approved its Climate Change Scoping Plan (Scoping Plan), which is the state's plan to achieve the GHG reductions in California required by AB 32 (ARB 2008).

CARB is required to update the Scoping Plan every five years to evaluate progress and develop future inventories that may guide this process. ARB approved the first update to the Climate Change Scoping Plan: Building on the Framework in June 2014 (ARB 2014). The Scoping Plan update includes a status of the 2008 Scoping Plan measures and other federal, state, and local efforts to reduce GHG emissions in California, and potential actions to further reduce GHG emissions by 2020.

None of the measures listed in the Scoping Plan update directly relate to construction activity. While the Scoping Plan update does include some measures that would indirectly address GHG emissions levels associated with construction activity, including the phasing in of cleaner technology for diesel engine fleets (including construction equipment) and the development of a Low Carbon Fuel Standard, successful implementation of these measures will predominantly depend on the development of future laws and policies at the state level, rather than separate actions by individual agencies or local governments. Thus, it is assumed that those policies formulated under the mandate of AB 32 that are applicable to construction-related activity, either directly or indirectly, would be implemented during construction of the project if those policies and laws are developed before the commencement of project construction. Therefore, it is assumed that project construction would not conflict with the Scoping Plan update.

Metro has developed and approved several plans that address GHG emissions. In 2010, Metro developed the Greenhouse Gas Emissions Cost Effectiveness Study (Study) to evaluate current and potential future sustainability strategies for their costs and impacts on GHG emissions reduction (Metro 2010). The Study primarily focuses on discussing the strategies and benefits of improving transit service for the reduction of GHG emissions. As explained in the Study, strategies were categorized into four groups: promotion of alternative travel modes; transit service; vehicle technology; and facility energy use. Through portal widening and installation of new tracks and switches, Metro can continue to operate a safe and reliable service to meet the anticipated ridership and provide sufficient capacity to serve future passengers. As a result, the project would promote the use of existing transit and expand transit service; thus, enhancing the reduction of GHG emissions by reducing the amount of vehicle miles traveled by motor vehicles, and the number of cars that operate in congested traffic conditions (Metro 2010).

In 2012, Metro approved the Climate Action and Adaptation Plan (Plan), which (1) creates a framework to evaluate and prioritize areas to reduce GHG emissions from operations and (2) presents an approach for responding to the likely impacts of climate change on Metro's system (Metro 2012). Metro released the 2016 Energy and Resource Report (Report), a yearly report that analyzes the sustainability and environmental performance of its operational activities (Metro 2016). Both the Plan and the Report discuss how Metro displaces more emissions than it produces by offering alternatives to driving and fostering sustainable communities. The project is consistent with the goals of the 2012 Plan and the 2016 Report as it would increase the speed of trains; thus, promoting an increase in ridership and reducing the use of motor vehicles.

Additionally, Southern California Association of Government's (SCAG) 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) is a plan that integrates land use and transportation in efforts for the region to grow sustainably. Among the strategies for improving air quality and reducing GHG emissions, expanding the regional transit system and optimizing the performance of the transportation system are major initiatives.

As discussed above, the project would not conflict with existing California legislation and GHG reduction plans adopted to reduce statewide GHG emissions. The project would also not conflict with plans and policies approved by Metro to reduce GHG emissions. Furthermore, the project is consistent with the 2016 RTP/SCS as the project is a means for optimizing the performance of the Red/Purple Line. The project would not conflict with any applicable plan, policy, or regulation for the purpose of reducing GHG emissions. Therefore, impacts would be less than significant.

4 References

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5 List of Attachments

The following attachments are included for reference.

Attachment A: CalEEMod 2016.3.1 Computer Model Output

