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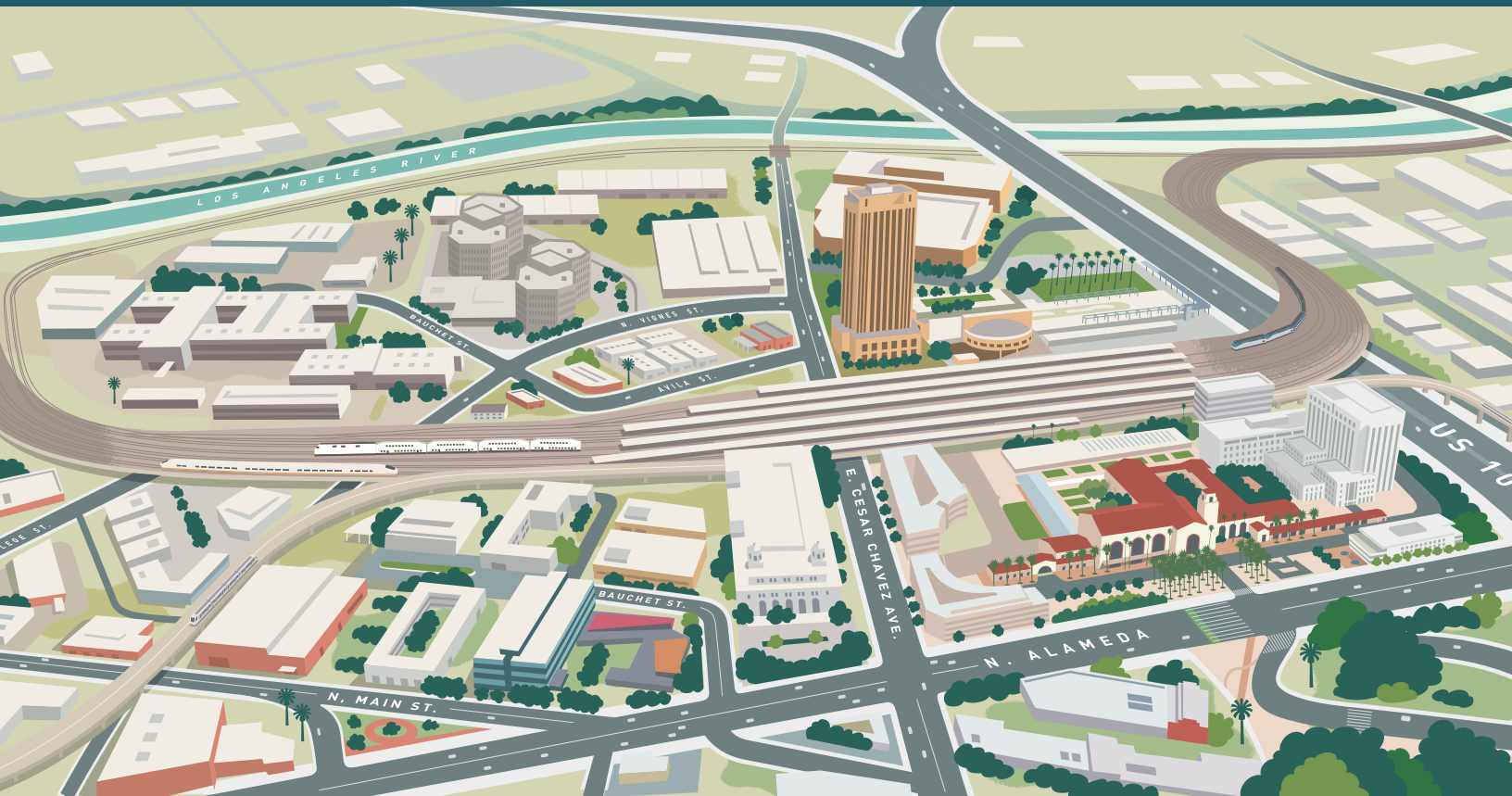
## Appendix A: Rail Planning Technical Memorandum

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# Link Union Station

Rail Planning Technical Memorandum

*June 2019*



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**ACRONYMS**

Caltrans	California Department of Transportation
CHSRA	California High-Speed Rail Authority
FRA	Federal Railroad Administration
HSR	High-Speed Rail
LAUS	Los Angeles Union Station
Link US	Link Union Station
LOSSAN	Los Angeles-San Diego-San Luis Obispo
Metro	Los Angeles County Metropolitan Transportation Authority
project	Link Union Station project
SCORE	Southern California Optimized Rail Expansion
SCRRA	Southern California Regional Rail Authority
TIRCP	Transit and Intercity Rail Capital Program

## 1.0 Introduction

The Federal Railroad Administration (FRA) and the Los Angeles County Metropolitan Transportation Authority (Metro) are proposing the Link Union Station project (Link US or project) to transform Los Angeles Union Station (LAUS) from a “stub-end tracks station” into a “run-through tracks station” with a new passenger concourse that would improve the efficiency of the station and accommodate future growth and transportation demands in the region.

The purpose of this memorandum is to provide an estimate of daily train movements (i.e., train counts) for all Metrolink, Pacific Surfliner, Amtrak, and High-Speed Rail (HSR) trains that are planned to pass through LAUS for 2016 and future horizon years anticipated to be considered in the Link US environmental documentation (2026<sup>1</sup>, 2031, and 2040). Improvements to the Gold Line and/or Regional Connector are not considered in this memorandum. Although both Gold Line and the Regional Connector light rail trains will use LAUS, all operational aspects and train movements through LAUS are addressed through separate Metro documentation<sup>2</sup>. The information contained within this memorandum was prepared solely to provide a conservative estimate of the number of trains planned to pass through LAUS to facilitate evaluation of potential localized traffic, air quality and noise and vibration impacts that may result from project-related capacity enhancements proposed at LAUS and in the surrounding area in the Link US environmental documentation. The environmental impacts resulting from increased train activity at LAUS is addressed in the Link US Draft Environmental Impact Report (HDR 2019).

The information contained within this memorandum represents an estimate of future train movements through LAUS to provide a basis for the environmental evaluation only, and is not intended in any way to indicate future rail operational scenarios or stakeholder consensus on future service levels for shared train operations at LAUS. The findings from ongoing operational analyses, if significantly different from the estimated service levels described in this memorandum, could be incorporated into the environmental documentation at a later date at the discretion of the lead agencies.

## 1.1 Project Background and Concurrent Operational Analysis

### 1.1.1 Project Background

In parallel with project implementation, the Southern California Regional Rail Authority (SCRRA) is currently developing the Southern California Optimized Rail Expansion (SCORE) Program, a \$10 billion plan that identifies the need for substantial investments in rail infrastructure in the Southern California region to upgrade the Metrolink system and meet the current and future needs of the traveling public. The project is

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<sup>1</sup> The 2026 horizon year was added to reflect Metrolink’s growth plans under Phase 1 of the Transit and Intercity Rail Capital Program; although the ability of LAUS to accommodate increased off-peak services during construction has not been tested.

<sup>2</sup> Regional Connector Transit Corridor, Final Environmental Impact Statement/Environmental Impact Report, Metro 2012

a critical component of the SCORE Program, providing capacity enhancements to fulfill the program objectives.

Localized environmental impacts resulting from project-related infrastructure improvements and forecasted increases in train movements at LAUS will be evaluated in the Link US environmental documentation. The Link US project operational scenarios for 2026, 2031, and 2040 are influenced by statewide and regional plans for service increases and other required off-site infrastructure (i.e., SCORE program). The operational scenarios represent a conservative estimate of the forecasted increases in regional/intercity rail trips and new HSR train trips that could occur at LAUS.

Infrastructure improvements outside of the project study area that are required to implement system-wide efficiencies and changes in regional/intercity operations from implementation of the SCORE Program are not part of the project, and are the responsibility of Southern California Regional Rail Authority and other agency partners. Furthermore, the operational aspects of the planned HSR system and the associated environmental impacts are not evaluated in the Link US environmental documentation because operation of the planned HSR system and the associated impacts are addressed separately in the environmental documentation being prepared by the FRA and California High-Speed Rail Authority for the Burbank to Los Angeles and Los Angeles to Anaheim Project Sections.

### **1.1.2 Concurrent Operational Analysis**

Although general operational planning information and background data are presented in this memorandum, this document is not intended to be a detailed rail operations technical memorandum.

The reader should note that there are ongoing rail operations modeling activities concurrently underway by the California High-Speed Rail Authority (CHSRA).

In addition to CHSRA's work, Metrolink is currently in the process of creating a comprehensive operations plan to help independently analyze the optimal infrastructure design and service plan for the LAUS terminal, with or without the project, which is necessary for the successful implementation of the SCORE Program. Lastly, Metro's project team will continue to perform operational analyses of LAUS infrastructure and service alternatives.

## 1.2 Project Location and Study Area

LAUS is located at 800 Alameda Street in the City of Los Angeles, California. LAUS is bounded by US-101 to the south, Alameda Street to the west, Cesar Chavez Avenue to the north, and Vignes Street to the east. The project study area, as depicted on Figure 1-1, encompasses the extent of environmental study associated with potential direct, indirect, and cumulative impacts from implementation of the project and includes three main segments (Segment 1: Throat Segment, Segment 2: Concourse Segment, and Segment 3: Run-Through Segment). The existing conditions within each segment are summarized below, from north to south.

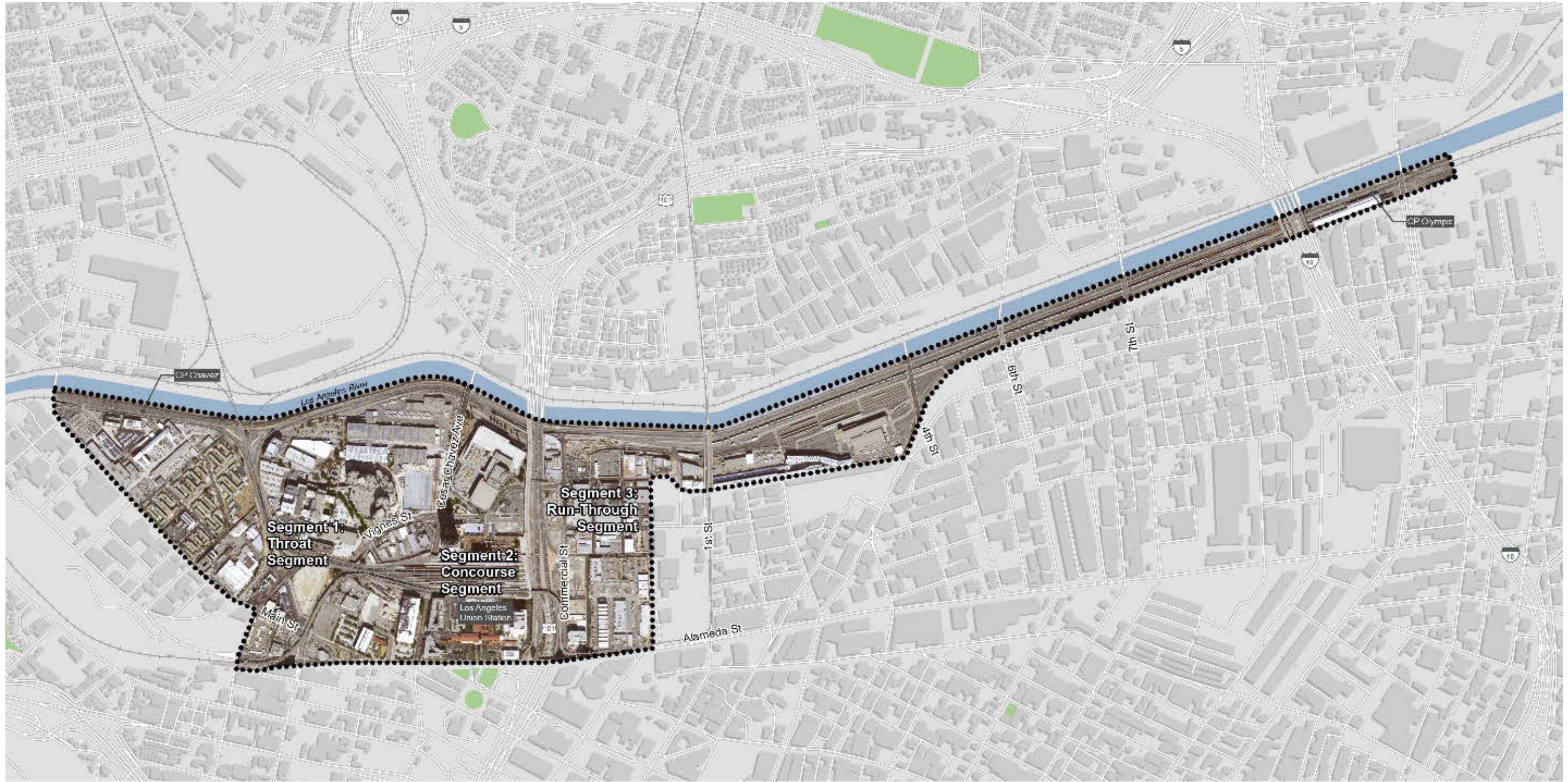
- **Segment 1: Throat Segment** – This segment, known as the LAUS throat, includes the area north of the platforms, from Control Point Chavez and Mission Tower at the north to Cesar Chavez Avenue at the south. In the throat segment, all arriving and departing trains traverse five lead tracks into and out of the rail yard, except for one location near the Vignes Street Bridge where the tracks reduce to four lead tracks. Currently, special track work consisting of multiple turnouts and double-slip switches are used in the throat to direct trains into and out of the appropriate assigned terminal platform tracks.
- **Segment 2: Concourse Segment** – This segment is between Cesar Chavez Avenue and US-101; and includes LAUS, the rail yard, the Garden Tracks, the East Portal Building, the baggage handling building with aboveground parking areas and access roads, the ticketing/waiting halls, and the pedestrian passageway with connecting ramps and stairways below the rail yard.
- **Segment 3: Run-Through Segment** – This segment is south of LAUS and extends east/west from Alameda Street to the west bank of the Los Angeles River and north/south from Keller Yard to Control Point Olympic. This segment includes US-101, the Commercial Street/Ducommun Street corridor, Metro Red and Purple Lines Maintenance Yard (Division 20 Rail Yard), BNSF West Bank Yard, Keller Yard, the main line tracks on the west bank of the Los Angeles River, from Keller Yard to Control Point Olympic, and the “Amtrak Lead Track” connecting the main line tracks with Amtrak’s Los Angeles Maintenance Facility. Businesses within the run-through segment are primarily industrial and manufacturing related.

The project study area has a dense street network ranging from major highways to local city streets. The roadways within the project study area include the El Monte Busway, US-101, Bolero Lane, Leroy Street, Bloom Street, Cesar Chavez Avenue, Commercial Street, Ducommun Street, Jackson Street, East Temple Street, Banning Street, First Street, Alameda Street, Garey Street, Vignes Street, Aliso Street, Avila Street, Bauchet Street, and Center Street.

Figure 1-2 depicts the existing LAUS track and platform layout as well as other key facilities in and around LAUS.

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Figure 1-1. Project Study Area

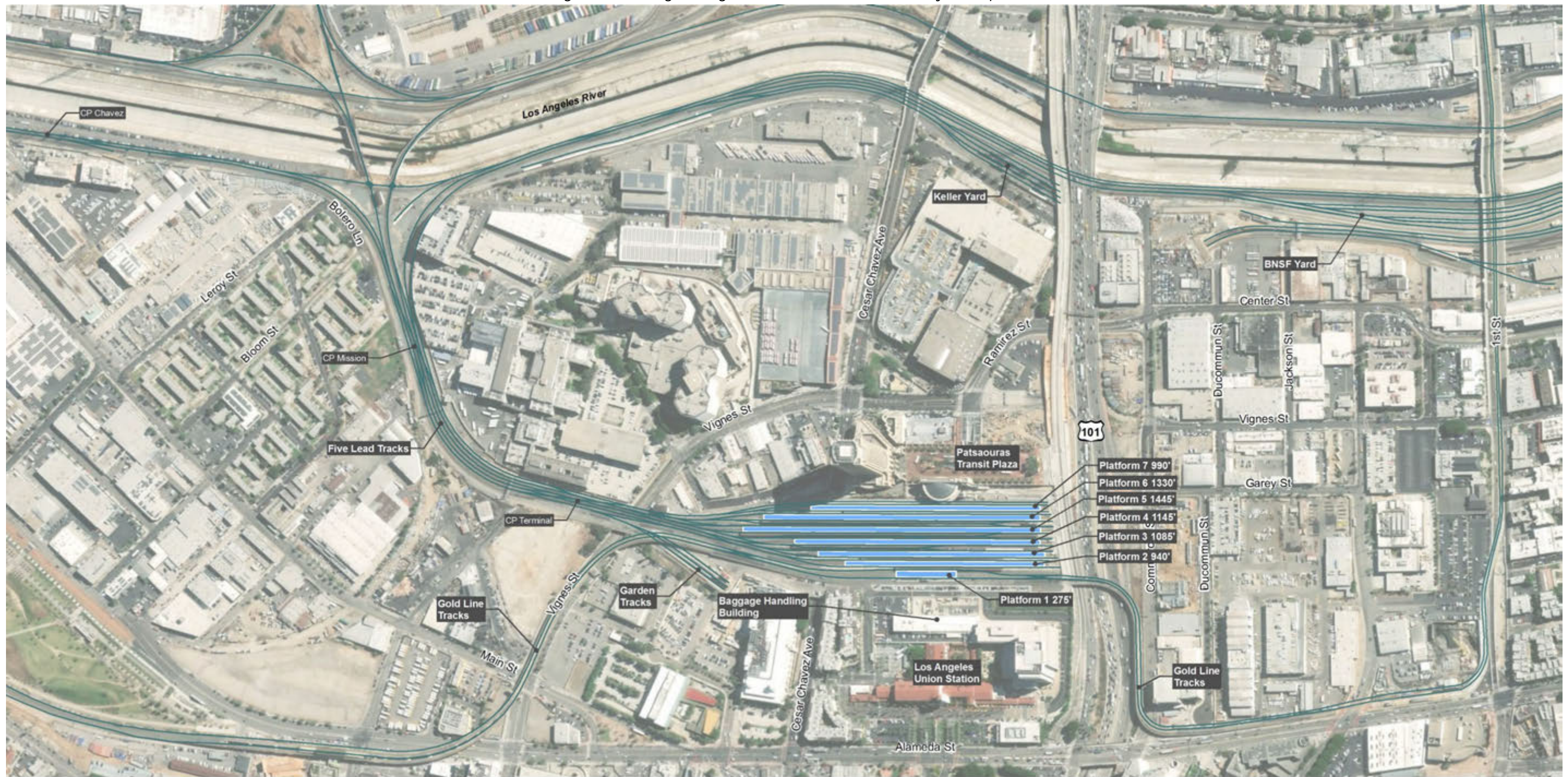


**LEGEND**  
Project Study Area



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Figure 1-2. Existing Los Angeles Union Station Track and Platform Layout



**LEGEND**  
 — Existing Track  
 ■ Existing Platforms

0 Feet 500  
 [North Arrow]

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## 1.3 Project Components

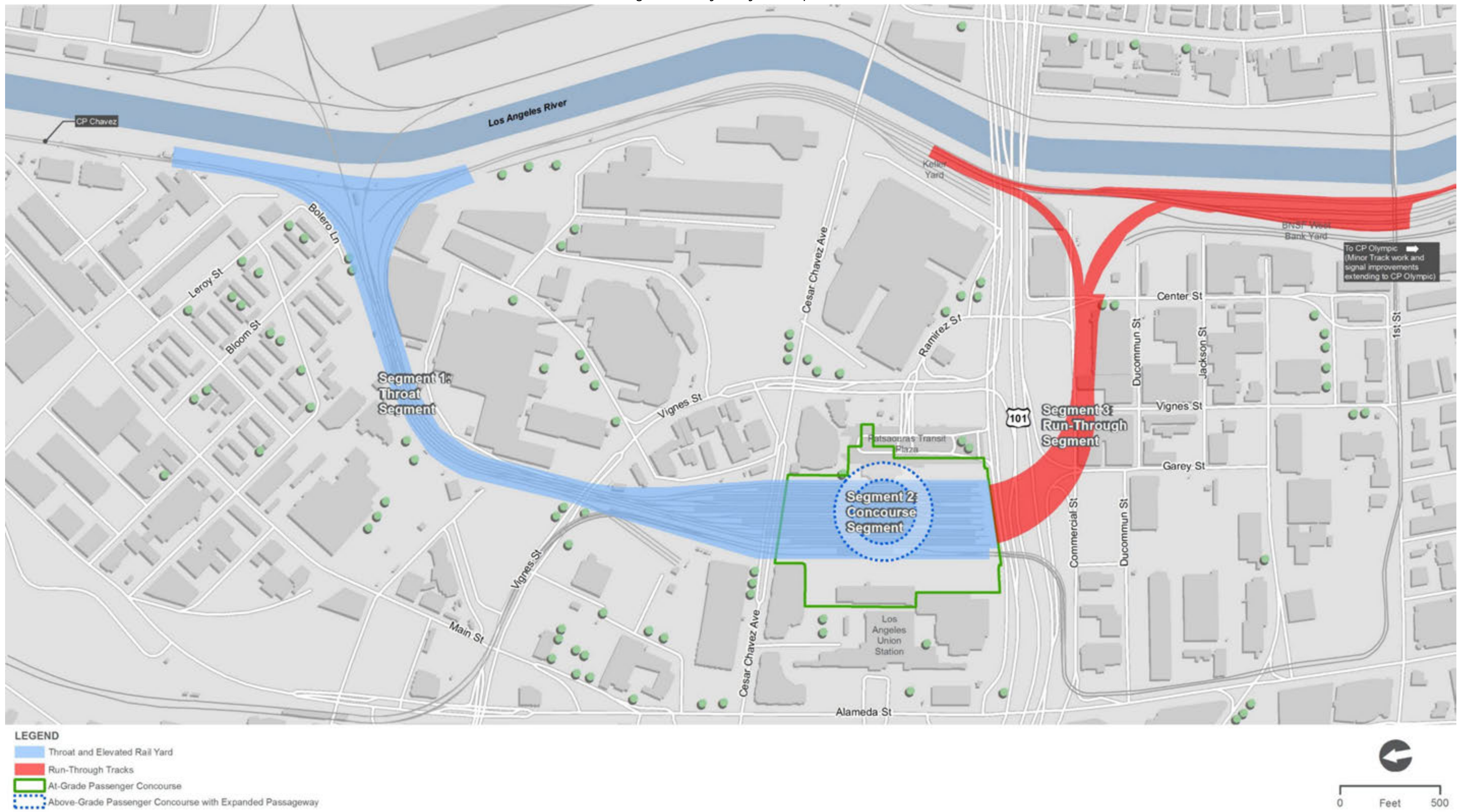
The project includes the following major components, as depicted on Figure 1-3 and summarized below, from north to south.

- **Throat and Elevated Rail Yard** – The project includes subgrade, signal, and structural improvements in the throat segment (Segment 1) to increase the elevation of the tracks leading to the rail yard in the concourse segment (Segment 2). The throat would be reconstructed with up to seven lead tracks north of LAUS to facilitate enhanced operations for regional/intercity rail service providers (Metrolink/Amtrak) and an entrance to LAUS for the planned HSR system. The project also includes new passenger platforms and canopies on the elevated rail yard.
- **New Passenger Concourse** – The project includes a new passenger concourse in Segment 2 that would include space dedicated for passenger circulation and waiting areas with ancillary support functions (back-of-house uses, baggage handling, etc.), transit-serving retail, office/commercial uses, and open spaces and terraces. The new passenger concourse would create an opportunity for an outdoor, community-oriented space and enhance Americans with Disabilities Act accessibility at LAUS with new vertical circulation elements, such as stairs, escalators, and elevators. The new passenger concourse would be constructed below or above the elevated rail yard.
- **Run-Through Tracks** – The project includes up to 10 new run-through tracks south of US-101 (including the possibility of a loop track) under US-101 to facilitate connections for regional/intercity rail trains and HSR trains to the main line tracks on the west bank of the Los Angeles River in Segment 3. As early as 2026, regional/intercity rail run-through track infrastructure would be constructed, including a “common” viaduct/deck over US-101 and embankment south of US-101 from Vignes Street to Center Street that would be built wide enough to support future run-through track infrastructure for the planned HSR system. The remaining run-through track infrastructure for the planned HSR system could be constructed as early as 2033.

The project would also require modifications to two existing bridges at Vignes Street and Cesar Chavez Avenue for new elevated tracks; modifications to US-101 and local streets (including potential street closures, geometric modifications, and parking improvements); railroad signal, positive train control, and communications-related improvements; modifications to the Gold Line light rail platforms and tracks; modifications to the Amtrak lead track between LAUS and Amtrak’s Los Angeles Maintenance Facility; new access roadways to the railroad right-of-way; additional right-of-way; new utilities; utility relocations, replacements, and abandonments; and new drainage facilities/water quality improvements. The project will be constructed in phases to facilitate the continued operation of rail services at LAUS with minimal impacts on service.

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Figure 1-3. Major Project Components



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## 1.4 Build Alternatives and Design Options

Based on the results of the Alternatives Analysis Report, the Link US environmental documentation will include an evaluation of two track alignment Build Alternatives. Build Alternative 1 includes up to 10 new run-through tracks and accommodates future HSR trains on shared lead tracks in the throat segment (Segment 1). Build Alternative 2 includes up to 10 new run-through tracks and accommodates future HSR trains on dedicated lead tracks in the throat segment. Based on the results of the Concourse Study (appendix to the Alternatives Analysis Report), the Link US environmental documentation also includes an evaluation of two passenger concourse design options: Design Option A (At-Grade Passenger Concourse) and Design Option B (Above-Grade Passenger Concourse with New Expanded Passageway). Both track alignment alternatives and passenger concourse design options are being environmentally cleared because either concourse could be implemented with either Build Alternative.

The two Build Alternatives include the infrastructure associated with the maximum planned capacity of the rail yard, concourse, and run-through track infrastructure south of US-101 to serve future regional/intercity rail trains (Metrolink/Amtrak) and HSR trains at LAUS. The two Build Alternatives are summarized below to provide context for project-related capacity enhancements described in this memorandum.

- **Alternative 1 (Up to 10 Run-Through Tracks – Shared Tracks)** – Alternative 1 includes the addition of 1 new lead track for a total of 6 lead tracks in the throat north of LAUS (with regional/intercity and HSR trains sharing the 2 western lead tracks), multiple track and platform configuration options in the rail yard, and up to 10 run-through tracks that would extend south of LAUS over US-101, and connect to the main line tracks on the west bank of the Los Angeles River.
- **Alternative 2 (Up to 10 Run-Through Tracks – Dedicated Tracks)** – Alternative 2 includes the addition of 2 new lead tracks for a total of 7 lead tracks in the throat north of LAUS (with future HSR trains and some express/intercity services using the 2 western dedicated lead tracks and most regional/intercity trains using the 5 eastern lead tracks), multiple track and platform configuration options in the rail yard, and up to 10 run-through tracks that would extend south of LAUS over US-101 and connect to the main line tracks on the west bank of the Los Angeles River.

The new passenger concourse would facilitate enhanced passenger flow through LAUS while meeting Americans with Disabilities Act requirements and the forecasted increase in passengers. The two design options are described below.

- **Design Option A (At-Grade Passenger Concourse)** – This design option includes placement of the new passenger concourse below the elevated rail yard, with new plazas east and west of the elevated rail yard (East and West Plazas). Amtrak ticketing and baggage check-in services would occur at a centralized location at the concourse level. This design option also includes a grand canopy that would extend approximately up to 70 feet above the elevated rail yard and West Plaza.
- **Design Option B (Above-Grade Passenger Concourse with New Expanded Passageway)** – This design option includes placement of the new passenger concourse above the elevated rail yard, with new plazas east and west of the elevated rail yard (East and West Plazas). Amtrak ticketing and baggage check-in service would occur at two locations at the east and west ends of LAUS. This design option includes a canopy over the West Plaza up to 70 feet in height, with individual canopies over each platform. The new expanded passageway would be located below the rail yard to provide additional passenger travel-path convenience and options.

## 2.0 Objective of the Memorandum

The objective of this memorandum is to document the existing rail operating conditions and characteristics at LAUS (2016 baseline condition for National Environmental Policy Act Notice of Intent/California Environmental Quality Act Notice of Preparation) and estimate future train movements through LAUS for three horizon years (2026, 2031 and 2040) with appropriate service planning assumptions to facilitate the environmental evaluation of the project-related impacts of capacity enhancements in the Link US environmental documentation. The 2026 and 2031 years correspond to the two major phases of project implementation (interim condition and full build-out condition). 2040 corresponds to the horizon years and corresponding service goals and objectives of multiple statewide plans and mandates:

- 2026: Two new regional/intercity rail run-through tracks from Platform 4 at LAUS (interim condition)
- 2031: Construction of all regional/intercity rail improvements at LAUS including the reconstructed throat, elevated rail yard and new passenger concourse (full build-out condition)
- 2040: Full operation of HSR service at LAUS

Available estimates and projections from applicable agencies and stakeholders were used to estimate the future train movements. This memorandum will be utilized to prepare applicable environmental technical studies (i.e., traffic, air quality, noise, and vibration) in support of the Link US environmental documentation.

The service planning and operating characteristics considered in this memorandum include the following:

- Total number of train movements into and out of LAUS per day, revenue, and deadhead (2016, 2026, 2031, and 2040). Each inbound and outbound train movement counts as a separate movement. A run-through train, for example, would count as two train movements - one inbound and one outbound movement.
- Total number of train movements during the two 3-hour AM and PM peak operating periods (2016, 2026, 2031, and 2040)
- Train “consist” size, frequency of service, types of locomotives and dwell time for each carrier

The project-related capacity enhancements are required to enable Metrolink and Amtrak to meet regional/intercity rail growth projections and to facilitate CHSRA’s implementation of the planned HSR system at LAUS.

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### 3.0 Existing Rail Operating Conditions and Characteristics

LAUS is the focal point of passenger rail travel in Southern California, serving Metrolink commuter trains; Amtrak Pacific Surfliner intercity and long-distance trains; and Metro Red, Purple, and Gold Line trains<sup>3</sup>. In addition to revenue trains, there are numerous non-revenue train movements at the LAUS terminal to service passenger train equipment and position equipment at the station platforms for revenue service. For Metrolink, non-revenue train movements occur between LAUS and the Central Maintenance Facility. For Amtrak, through trains and non-revenue train movements occur for Pacific Surfliner and Amtrak Long-Distance trains (Southwest Chief, Sunset Limited/Texas Eagle, Coast Starlight) between LAUS and Amtrak's Los Angeles Maintenance Facility.

Consistent with the existing year used for the Link US environmental documentation, available 2016 schedules for Metrolink and Amtrak Pacific Surfliner and long-distance trains, existing rail operating characteristics at LAUS were determined by counting the total number of existing train movements per day and number of train movements at LAUS during the two 3-hour AM and PM peak operating periods (6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM). For both Metrolink and Amtrak, a comparison between the 2016 and 2018 schedules showed no substantial addition to train movements at LAUS. The comparison revealed 1 additional round trip Pacific Surfliner train between LAUS and San Diego, as well as 1 additional Metrolink round trip between LAUS and Burbank Airport.

The following schedules were reviewed to determine the existing rail operating characteristics and are provided as Appendix A:

- Metrolink All Lines Timetable, dated June 6, 2016
- Amtrak Pacific Surfliner Schedules, effective June 6, 2016
- Amtrak Coast Starlight Schedule, effective June 6, 2016
- Amtrak Southwest Chief Schedule, effective June 9, 2014
- Amtrak Sunset Limited Schedule, effective June 9, 2014

### 3.1 Existing Metrolink Trains

LAUS is the hub for Metrolink operations and provides connections between the following Metrolink lines:

- 91/Perris Valley Line
- Antelope Valley Line
- Orange County Line
- Riverside Line

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<sup>3</sup> For the purpose of this memorandum, Metro trains are not considered because Metro's light rail and heavy rail operations are not anticipated to substantially affect other regional/intercity operations or operation of the planned HSR system.

- San Bernardino Line
- Ventura County Line

As of April 2016, Metrolink operates 139 revenue trains per weekday into and out of LAUS on several train lines, including the Ventura County Line (31 trains per weekday), Antelope Valley Line (30), San Bernardino Line (38), Riverside Line (12), 91/Perris Valley Line (9), and Orange County Line (19). Metrolink also operates 46 non-revenue trains between LAUS and the Central Maintenance Facility. During the two 3-hour AM and PM peak operating periods (AM and PM combined), 80 Metrolink trains (39 in the AM and 41 in the PM) pass through LAUS.

### **3.2 Existing Amtrak Trains**

As of April 2016, Amtrak operates 28 revenue trains per weekday into and out of LAUS, which includes 14 Pacific Surfliner trains originating or terminating at LAUS; 9 Pacific Surfliner “through trains” that travel the entire extent of the Pacific Surfliner route (Los Angeles – San Diego – San Luis Obispo, or LOSSAN corridor) north and south of LAUS (counted as 18 total trains in Table 5-1 below); and an average of 5 long-distance trains including the Coast Starlight (2 trains daily), the Southwest Chief (2 trains daily), and the Texas Eagle/Sunset Limited, which is a combined train that operates 3 times per week. Amtrak / LOSSAN also operate 11 non-revenue trains between LAUS and Amtrak’s Los Angeles Maintenance Facility (6 Pacific Surfliner and 5 Amtrak long-distance trains). During the two 3-hour AM and PM peak operating periods (AM and PM combined), 13 (6 in the AM and 7 in the PM) Amtrak / LOSSAN revenue and non-revenue train movements pass through LAUS.

## 4.0 Future Service Planning Assumptions and Data Sources

The project would accommodate a substantial increase in rail operational capacity for the region, reducing train idling (dwell) time and improving on-time performance for trains using LAUS. The estimate of train movements that could occur through LAUS aligns with the service goals, horizon years, and corresponding goals and objectives of multiple statewide plans and mandates as described below.

### California Transportation Plan

The *California Transportation Plan 2040* Vision calls for a transportation system that is safe, sustainable, universally accessible, and globally competitive while meeting the State's greenhouse gas emission reduction goals. The project-related capacity enhancements would allow for future train operations to address this vision.

### 2018 California State Rail Plan (Caltrans 2018)

For the purpose of this memorandum, future train movements for Metrolink and Amtrak trains are based on the *2018 California State Rail Plan*.

- For Metrolink, in late 2017, future service plans were developed consistent with the *2018 California State Rail Plan* (see Section 4.1 below).
- For Amtrak, the *2018 California State Rail Plan* (Caltrans 2018) was referenced to determine future train counts for Pacific Surfliner trains (see Section 4.2 below).

The estimated train movements and resulting benefits correlate with the service goals and improvements for the Los Angeles Urban Mobility Corridor, and coincides with the 2027 mid-term plan statewide goals. The *2018 California State Rail Plan* calls for the following service enhancements for Metrolink:

- By 2028
  - Provide run-through service at LAUS as part of Link US
  - Half-hourly all-day service on the San Bernardino Line between Los Angeles and San Bernardino, and
  - Half-hourly peak-rail service on the 91/Perris Valley Line.
- By 2040
  - Very frequent service between LAUS and Burbank
  - On the Ventura County Line, half-hourly express service between LAUS and Oxnard, and half-hourly local service between LAUS and Chatsworth
  - Half-hourly local service between LAUS and Santa Clarita

- o Very frequent service between LAUS and Fullerton
- o Half-hourly express rail services connecting Riverside, San Bernardino, and Ontario with Los Angeles

### **2018 Business Plan (CHSRA 2018)**

Future HSR train movements into and out of LAUS (revenue and non-revenue train movements) was provided by CHSRA for inclusion in this memorandum, and are consistent with the goals of the *2018 California State Rail Plan*, the service levels in the 2018 Business Plan (CHSRA 2018), and the ridership and revenue forecasting methodology<sup>4</sup> and technical supporting documents<sup>5</sup>.

### **2016 Regional Transportation Plan/Sustainable Communities Strategy (SCAG 2016)**

The *2016 Regional Transportation Plan/Sustainable Communities Strategy* was prepared pursuant to Senate Bill 375, to reduce GHG emissions from vehicles through better-integrated regional transportation, land use, and housing planning strategies to provide more access to jobs, services, public transit and active transportation options. The project would indirectly contribute to cumulative benefits for the region, including a regional reduction of greenhouse gas emissions and vehicle miles traveled, as demonstrated by the operational analysis provided in the *2016 Regional Transportation Plan/Sustainable Communities Strategy* (Program EIR Table 3.3.4-4) (Southern California Association of Governments 2016).

## **4.1 Metrolink**

In October 2018, Metrolink provided daily train counts for the 2031 and 2040 horizon years (full Metrolink SCORE Program operations consistent with the *2018 California State Rail Plan*), but not for the 2026 horizon year. In the absence of 2026 service plans that correlate to the SCORE Program, Metrolink's Transit and Intercity Rail Capital Program Funding Application was used to estimate the number of trains anticipated to pass through LAUS, including non-revenue train movements for the 2026 horizon year. A breakdown of the 2026, 2031, and 2040 forecasts of Metrolink trains by train line is provided in Appendix B and information is summarized in Table 5-1.

### **4.1.1 Equipment Turn Time**

An equipment turn is the act of changing the train's operating end and allowing the train to move in the reverse direction. Operational experience to date indicates that Metrolink crews can turn revenue trains at terminals, including changing of operating ends, checking the train consist for passengers and initialization of positive train control, within 15 minutes. Although it is possible that technology improvements may allow for a future reduction in equipment turn times, the rail operators agreed that for the purposes of this analysis a 15-minute turnaround is assumed for all Metrolink trains requiring a change of operating ends at LAUS.

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<sup>4</sup> [http://www.hsr.ca.gov/docs/about/business\\_plans/2018\\_Business\\_Plan\\_Ridership\\_Revenue\\_Forecasting.pdf](http://www.hsr.ca.gov/docs/about/business_plans/2018_Business_Plan_Ridership_Revenue_Forecasting.pdf)

<sup>5</sup> [http://www.hsr.ca.gov/docs/about/business\\_plans/2018\\_Business\\_Plan\\_Service\\_Plan\\_Methodology.pdf](http://www.hsr.ca.gov/docs/about/business_plans/2018_Business_Plan_Service_Plan_Methodology.pdf)

## 4.1.2 Dwell Time

Dwell time is defined as the amount of time a particular train is scheduled to be stationary at a station platform to accommodate passenger entraining and detraining, baggage handling, train servicing, crew changes, etc. For purposes of this analysis, the following dwell times are assumed:

- Year: 2026: 7 minutes
- Years 2031 and 2040: 5 minutes

## 4.1.3 Service Hours by Train Line

Scheduling details of the proposed service hours for each train line serving LAUS were not included in the Metrolink Transit and Intercity Rail Capital Program application. In the absence of this information, existing service hours were used in the development of future operational scenarios at 30-minute frequencies throughout the day with service extended during evening hours to at least 10:00 PM.

## 4.2 Pacific Surfliner and Amtrak

The *2018 California State Rail Plan* (Caltrans 2018) was referenced to determine future train counts for Pacific Surfliner trains. FRA, Caltrans, and the Riverside County Transportation Commission are analyzing the feasibility of operating regional rail service between LAUS and the Coachella Valley. The study is ongoing but includes a concept of two daily round trips between LAUS and Indio or Coachella. This potential new service was added to the 2026, 2031, and 2040 Pacific Surfliner train counts. A breakdown of the 2026, 2031, and 2040 forecasts of Amtrak trains is provided in Appendix B, and information is summarized in Table 5-1.

Amtrak has no current plans to alter existing long-distance trains currently serving LAUS.

### 4.2.1 Equipment Turn Time and Dwell Time

Currently, the operating practice for a Pacific Surfliner through train involves a crew change at LAUS as well as a change in train operating ends. The amount of time in the schedule varies from 15 to 33 minutes. In addition, trains often arrive before their scheduled arrival time, extending the amount of time the train dwells at a platform by as much as 15 minutes. With the construction of run-through tracks, it is anticipated that the time required to change operating ends will no longer be necessary, but that adequate time will still be needed for detraining and entraining passengers and baggage as well as the crew change. Based upon feedback from LOSSAN and participating agencies, a dwell time of 10 minutes will be used.

For Amtrak long-distance trains, entraining or detraining passengers, along with baggage handling, takes much longer than it does for a typical Pacific Surfliner train. In addition, Amtrak may keep the train at the station for as long as 3 hours, based more upon operational convenience (yard crew availability) than necessity. Amtrak recognizes that a significant reduction in long-distance station dwell time will be needed to facilitate platform capacity enhancements and service expansion at LAUS. For the purposes of this analysis, a dwell time of 30 minutes will be used.

## **4.3 California High-Speed Rail Authority**

### **4.3.1 Service Hours**

HSR service would operate at LAUS from 6:00 AM through midnight, 7 days per week.

### **4.3.2 Equipment Turn Time and Dwell Time**

Per CHSRA, dwell time for trains operating through LAUS is estimated to be 5 minutes. For trainsets that are turning at LAUS, it is estimated that 20 minutes will be required for detraining, sweeping the train, changing operating ends, entraining, and departure. This time would be reduced to 5-minute dwells each upon arrival and departure if a proposed HSR turn facility south of LAUS is constructed.

## **4.4 Train Consists**

Train consist (cars and locomotives) data was gathered from Metrolink and Amtrak and are presented in Table 4-1. A hypothetical HSR consist is also included in Table 4-1 but may be subject to change based upon final design of the planned HSR system.

Table 4-1. Train Consist by Operator			
Operator	Number of Cars	Number of Locomotives	Locomotive Types Used Per Service (manufacturer)
<b>Metrolink</b>			
Metrolink 4-Car Set (18 in daily service)	4	1	F59 PH (EMD) F59 PHI (EMD)
Metrolink 5-Car Set (9 in daily service)	5	1	F40PH (EMD)
Metrolink 6-Car Set (6 in daily service)	6	1	MP36 PH-C (Motive Power Industries)  All horizon year consists will use EMD F-125 Spirit locomotives, which started to enter service in 2018.
<b>Amtrak - Pacific Surfliner</b>			
6-Car Set (bi-level)	6	1	F59 PH (EMD)
7-Car Set (single-level)	7	1	P42DC (General Electric)  All horizon year consists will use Siemens Charger locomotives, which started entering service in 2017.
<b>Amtrak - Long Distance Trains</b>			
Southwest Chief	10	2	P42DC (General Electric)
Sunset Limited	9	2	P32-8BWH (General Electric)
Coast Starlight	11	2	All horizon year consists will use Siemens Charger locomotives.
<b>CHSRA - High Speed Train (2033)</b>			
AGV High-Speed Trainset (France)*	6	2	Power cars in integrated trainset

Sources: Metrolink, Amtrak: SCRRRA 2012

**Notes:**

\*This is a hypothetical trainset. The actual trainsets used for CHSRA service have not yet been procured.

CHSRA=California High-Speed Rail Authority

### 4.4.1 Emerging Train Consist Technology

The 2040 Vision in the 2018 California State Rail Plan calls for the use of “greener” technology for locomotives and train consists as the technology becomes commercially available, and includes a recommendation for electrifying/deploying zero-emission vehicle technologies on as much of the passenger rail network as possible, and specifically calls out electrified electric multiple unit (EMU) systems,

diesel multiple units (DMUs), battery-hybrid multiple units, renewable diesel, and other alternative fuels (pgs. 10 and 110)

- Goal 6: Practice Environmental Stewardship, Policy 1: Integrate Environmental Considerations in All Stages of Planning indicates - The Rail Plan provides a program-level platform from which more detailed service and environmental analysis must be conducted by the State and rail operators as the 2040 Vision is implemented.
- Goal 6: Practice Environmental Stewardship, Policy 4: Transform to a Clean and Energy Efficient Transportation System indicates - The intent of the 2040 Vision is to accommodate additional demand for trips, and grow the rail network in a manner that incorporates substantial electrification of the state network, with improvements possible on additional corridors where there is support to do so... These include more stringent standards for remanufactured locomotives; and a Tier 5 standard for new locomotives that would require capability for zero-emission operation in designated areas, such as disadvantaged and high-traffic regions, to better protect the health of those residents.

Although these emerging technologies exist today, for the purposes of this analysis which is to document train counts/movements, this Rail Planning Technical Memorandum focuses on the use of existing equipment/technology and the most currently known and available information relating to future equipment/technology.

## 5.0 Future Daily Train Movements at Los Angeles Union Station

Based upon available data, as well as valuable input from the rail operators, Table 5-1 summarizes the estimated total daily train movements (revenue and non-revenue) through LAUS and the total trips during the two 3-hour AM and PM peak operating periods for 2016 and future horizon years 2026, 2031, and 2040. Revenue trains operating through LAUS, such as existing Pacific Surfliner and future Metrolink run-through trains, count as two movements - one inbound and one outbound.

Transit Operator	Frequency	2016	2026	2031	2040
Metrolink (Regional Rail)	<b>Total Daily</b>	<b>185</b>	<b>410</b>	<b>690</b>	<b>690</b>
	<i>Revenue Trains</i>	139	370	678	678
	<i>Non-Revenue Trains<sup>1</sup></i>	46	40	12	12
	<b>6-hour peak</b>	80	144	250	250
Amtrak / LOSSAN	<b>Total Daily<sup>2</sup></b>	<b>48</b>	<b>68</b>	<b>80</b>	<b>140</b>
	<i>Pacific Surfliner</i>	32	48	56	112
	<i>Long-Distance Trains</i>	5	5	5	5
	<i>Non-Revenue Trains<sup>3</sup></i>	11	15	19	23
	<b>6-hour peak</b>	13	21	21	39
CHSRA	<b>Total Daily</b>	—	—	—	<b>272</b>
	<i>Non-Revenue Trains<sup>4</sup></i>	—	—	—	50
	<b>6-hour peak</b>	—	—	—	132

Source: Appendix A (Existing Condition); Caltrans 2018 California State Rail Plan (Amtrak and Pacific Surfliner), Metrolink SCORE Application (Regional Rail) and CHSRA-provided data (HSR).

**Notes:**

- <sup>1</sup> This includes all deadhead equipment movements between LAUS and the Central Maintenance Facility
- <sup>2</sup> This includes through trains on the Los Angeles – San Diego – San Luis Obispo corridor as well as proposed Coachella Valley Service starting in 2026
- <sup>3</sup> This includes deadhead equipment movements for Pacific Surfliner and Amtrak Long Distance-trains (Southwest Chief, Sunset Limited/Texas Eagle, Coast Starlight) between LAUS and Amtrak Los Angeles Maintenance Facility
- <sup>4</sup> This includes deadhead equipment movements for HSR trains between LAUS and HSR Los Angeles Maintenance Facility

HSR = High-Speed Rail, LAUS=Los Angeles Union Station , LOSSAN= Los Angeles – San Diego – San Luis Obispo

While the project would provide the largest possible “operating envelope” to increase capacity within the existing station footprint, considering the environmental and constructability constraints, actual operational scenarios and service levels at LAUS are dependent on future service plans, negotiations between the service operators, and available operating funding.

A summary of the projected train movements for the 2026, 2031, and 2040 horizon years is provided below by rail operator:

### **Metrolink**

For 2026, it is estimated that Metrolink would operate 410 train movements per day (inclusive of 40 non-revenue train movements) between LAUS and the Central Maintenance Facility. During the two 3-hour AM and PM peak operating periods, 144 total train movements (72 each in the AM and PM) are anticipated to operate within LAUS. As stated earlier, the ability of LAUS to accommodate the higher Metrolink service levels during phases of construction has not been tested or validated. For 2031, Metrolink estimates that 690 train movements would occur per day. It is assumed that Metrolink’s 2031 SCORE service plan would represent a full build-out of Metrolink services for the foreseeable future, so the train counts remain the same for 2040.

### **Amtrak and LOSSAN**

For 2026, it is estimated that Amtrak / LOSSAN would operate 68 train movements per day within LAUS. During the two 3-hour AM and PM peak operating periods, 21 total train movements are anticipated to operate within LAUS. For 2031 and 2040, daily train movements would increase to 80 and 140 movements, respectively. Non-revenue movements for 2026, 2031, and 2040 are rough estimates, as future equipment cycles to support LOSSAN growth plans have not yet been developed.

### **High-Speed Rail**

CHSRA is anticipated to commence operation of the planned HSR system as early as 2033, and plan to operate 272 train movements per day at LAUS by 2040. Of these, 148 would originate from or terminate at LAUS, and 74 would operate through LAUS to-and-from Anaheim. There would also be 50 daily deadhead equipment movements. During the two 3-hour peak AM and PM operating periods, CHSRA would operate 132 train movements. Of these, 88 would originate from or terminate at LAUS, and 44 would operate through LAUS to-and-from Anaheim.

## 6.0 Conclusion

Metro estimates the project-related capacity enhancements would reduce dwell time at LAUS and contribute to other cumulative benefits for the region, including a regional reduction of greenhouse gas emissions and vehicle miles traveled. Future service scenarios will depend on ongoing negotiations between the railroad operators, available infrastructure (corridor, maintenance facility, etc.), and available operating funding. The project, by itself, does not enable regional/intercity rail providers to meet their service goals, primarily because other infrastructure improvements on the entire system are required to meet the forecasted service levels by 2040.

Based on the results of this memorandum, the Link US environmental documentation will be prepared to include an analysis of potential environmental impacts associated with implementation of the two Build Alternatives, in consideration of the existing and future train movements through LAUS that could occur as a result of the project-related capacity enhancements.

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## 7.0 References

California Department of Transportation (Caltrans). 2018. *2018 California State Rail Plan*.  
[http://www.dot.ca.gov/californiarail/docs/CSRP\\_Final.pdf](http://www.dot.ca.gov/californiarail/docs/CSRP_Final.pdf)

Southern California Association of Governments. 2016. *2016 Regional Transportation Plan/Sustainable Communities Strategy*. <http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf>.

Southern California Regional Rail Authority. 2012. *Metrolink Fleet Plan 2012-2017*.  
[http://metrolink.granicus.com/DocumentViewer.php?file=metrolink\\_0e45aa65088f01bf84c11a7cb31dab4b.pdf&view=1](http://metrolink.granicus.com/DocumentViewer.php?file=metrolink_0e45aa65088f01bf84c11a7cb31dab4b.pdf&view=1)

——— 2018a. Metrolink Transit and Intercity Rail Capital Program 2018 Funding Application.

——— 2018b. Email exchange with HDR. October 2018.

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## Appendix A: Existing Metrolink and Amtrak Train Schedules

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**ALL LINES**

**METROLINK®**

# **TIMETA:BLE**

**E F F E C T I V E   J U N E   6   2 0 1 6**



**VC**

**AV**

**SB**

**RIV**

**91/  
PVL**

**OC**

**IEOC**

**metrolinktrains.com**

# METROLINK COMMUTER RAIL SYSTEM



PACIFIC OCEAN

LAX Airport

Redondo Beach

Long Beach



# METROLINK

- Antelope Valley Line
- Inland Empire-Orange County Line
- Orange County Line
- Riverside Line
- San Bernardino Line
- Ventura County Line
- 91/Perris Valley Line
- Future Station
- Station Served by Multiple Lines
- Amtrak Pacific Surfliner
- Metro Rail/Metro Bus
- LAX FlyAway Bus
- Coaster Oceanside to San Diego
- Sprinter Oceanside to Escondido

[metrolinktrains.com](http://metrolinktrains.com)

Effective June 6, 2016



MAP NOT TO SCALE

## MONDAY THROUGH FRIDAY

Metrolink Service No.	100	900	102	104	106	902	108	MA A768	110	112	116	904	906	150	118	910
Ventura - East			5:25	6:03	6:42											
Oxnard ★			5:39	6:17	6:56			7:43								
Camarillo ★			5:49	6:27	7:06			7:54								
Moorpark ★	5:04		6:00	6:38	7:17			8:08	8:25		<b>2:18</b>					<b>4:57</b>
Simi Valley ★	5:17		6:13	6:51	7:30			8:23	8:38		<b>2:31</b>					<b>5:10</b>
Chatsworth ★	5:28		6:24	7:02	7:41		8:25	8:40	8:49	10:50	<b>2:42</b>			<b>4:40</b>	<b>5:27</b>	
Northridge	5:33		6:29	7:07	7:46		8:30	8:46	8:54	10:55	<b>2:47</b>			<b>4:45</b>	<b>5:32</b>	
Van Nuys ★	5:41		6:37	7:15	7:54		8:38	8:56	9:02	11:03	<b>2:55</b>			<b>4:53</b>	<b>5:45</b>	
Burbank/Bob Hope Airport ★	5:49	6:13	6:45	7:23	8:02	8:35	8:46	9:04	9:10	11:11	<b>3:03</b>	<b>3:37</b>	<b>4:15</b>	<b>5:05</b>	<b>5:53</b>	<b>8:30</b>
Burbank - Downtown	5:55	6:17	6:52	7:30	8:08	8:39	8:52	9:09	9:16	11:17	<b>3:09</b>	<b>3:41</b>	<b>4:19</b>	<b>5:10</b>	<b>5:59</b>	<b>8:35</b>
Glendale ★	6:02	6:23	6:59	7:37	8:15	8:45	8:59	9:16	9:23	11:26	<b>3:16</b>	<b>3:47</b>	<b>4:25</b>	<b>5:16</b>	<b>6:06</b>	<b>8:40</b>
L.A. Union Station ★	6:15	6:38	7:14	7:50	8:30	9:02	9:17	9:35	9:42	11:40	<b>3:33</b>	<b>4:00</b>	<b>4:40</b>	<b>5:30</b>	<b>6:20</b>	<b>8:55</b>

AM times **PM** times

**NOTES:** See page 3

# MONDAY THROUGH FRIDAY

Metrolink Service No.	901	101	103	MA A761	903	905	907	107	109	909	155	115	117	119	121	123	911
L.A. Union Station ★	5:38	6:52	7:15	7:35	8:00	8:30	8:55	9:50	<b>12:43</b>	<b>2:50</b>	<b>3:15</b>	<b>3:35</b>	<b>4:33</b>	<b>5:10</b>	<b>5:55</b>	<b>6:40</b>	<b>7:45</b>
Glendale ★	5:48	7:01	7:25	7:48	8:10	8:40	9:05	10:00	<b>12:53</b>	<b>3:00</b>	<b>3:25</b>	<b>3:45</b>	<b>4:43</b>	<b>5:20</b>	<b>6:05</b>	<b>6:50</b>	<b>7:55</b>
Burbank - Downtown	5:54	7:07	7:31	↓	8:16	8:46	9:11	10:06	<b>12:59</b>	<b>3:06</b>	<b>3:31</b>	<b>3:51</b>	<b>4:49</b>	<b>5:26</b>	<b>6:11</b>	<b>6:56</b>	<b>8:01</b>
Burbank/Bob Hope Airport ★	6:01	7:12	7:36	8:00	8:25	8:55	9:20	10:11	<b>1:04</b>	<b>3:15</b>	<b>3:36</b>	<b>3:56</b>	<b>4:54</b>	<b>5:31</b>	<b>6:16</b>	<b>7:01</b>	<b>8:10</b>
Van Nuys ★		7:23	7:43	8:10				10:19	<b>1:11</b>		<b>3:43</b>	<b>4:03</b>	<b>5:01</b>	<b>5:38</b>	<b>6:23</b>	<b>7:08</b>	
Northridge		7:31	8:00	8:19				10:28	<b>1:19</b>		<b>3:51</b>	<b>4:11</b>	<b>5:09</b>	<b>5:46</b>	<b>6:31</b>	<b>7:16</b>	
Chatsworth ★		7:38	8:10	8:32				10:35	<b>1:26</b>		<b>4:05</b>	<b>4:18</b>	<b>5:16</b>	<b>5:53</b>	<b>6:38</b>	<b>7:23</b>	
Simi Valley ★		7:52		8:45					<b>1:38</b>			<b>4:30</b>	<b>5:28</b>	<b>6:05</b>	<b>6:50</b>	<b>7:35</b>	
Moorpark ★		8:10		8:57					<b>1:58</b>			<b>4:47</b>	<b>5:40</b>	<b>6:17</b>	<b>7:08</b>	<b>7:47</b>	
Camarillo ★				9:10									<b>5:51</b>	<b>6:28</b>		<b>7:58</b>	
Oxnard ★				9:21									<b>6:01</b>	<b>6:38</b>		<b>8:14</b>	
Ventura - East													<b>6:20</b>	<b>6:57</b>		<b>8:37</b>	

AM times **PM** times

**NOTES:** See page 3

# VENTURA COUNTY LINE • AMTRAK SERVICE Oxnard to L.A.

# L.A. to Oxnard

All Metrolink ticket holders (including One-Way, Round-Trip, 7-Day or Monthly Pass) may, within the origin and destination of their ticket or pass, ride ANY Amtrak Pacific Surfliner train between Los Angeles and Burbank/Bob Hope Airport at no additional cost as part of the Rail 2 Rail® program. Holiday blackout dates may apply, and schedules subject to change. For details, please visit [metrolinktrains.com/rail2rail](http://metrolinktrains.com/rail2rail)

\* **A768** stops at Northridge and Burbank - Downtown Monday-Friday only.

## DAILY

Amtrak Service No.	A768*	A774	A784	A790	A1790	A796
Ventura - East						
Oxnard ★	7:43	10:18	<b>2:57</b>	<b>5:07</b>	<b>5:35</b>	<b>7:51</b>
Camarillo ★	7:54	10:35	<b>3:08</b>	↓	↓	<b>8:02</b>
Moorpark ★	8:08	↓	<b>3:20</b>	<b>5:36</b>	<b>6:04</b>	↓
Simi Valley ★	8:23	11:02	<b>3:35</b>	<b>5:54</b>	<b>6:20</b>	<b>8:38</b>
Chatsworth ★	8:40	11:14	<b>3:52</b>	<b>6:12</b>	<b>6:33</b>	<b>8:50</b>
Northridge	8:46	↓	↓	↓	↓	↓
Van Nuys ★	8:56	11:28	<b>4:14</b>	<b>6:31</b>	<b>6:45</b>	<b>9:06</b>
Burbank/Bob Hope Airport ★	9:04	11:35	<b>4:22</b>	<b>6:39</b>	<b>6:53</b>	<b>9:13</b>
Burbank - Downtown	9:09	↓	↓	↓	↓	↓
Glendale ★	9:16	11:45	<b>4:32</b>	<b>6:50</b>	<b>7:04</b>	<b>9:23</b>
L.A. Union Station ★	9:35	<b>12:15</b>	<b>4:50</b>	<b>7:10</b>	<b>7:20</b>	<b>9:45</b>

**AMTRAK TRAINS FOR MONTHLY PASS HOLDERS ONLY**

M-F Sa-Su

## DAILY

Amtrak Service No.	A761	A1761	A763	A769	A777	A785
L.A. Union Station ★	7:35	7:50	9:20	<b>12:30</b>	<b>3:05</b>	<b>7:15</b>
Glendale ★	7:48	8:02	9:32	<b>12:42</b>	<b>3:17</b>	<b>7:27</b>
Burbank - Downtown	↓	↓	↓	↓	↓	↓
Burbank/Bob Hope Airport ★	8:00	8:12	9:42	<b>12:52</b>	<b>3:27</b>	<b>7:37</b>
Van Nuys ★	8:10	8:21	9:52	<b>1:02</b>	<b>3:37</b>	<b>7:47</b>
Northridge	8:19	↓	↓	↓	↓	↓
Chatsworth ★	8:32	8:33	10:04	<b>1:14</b>	<b>3:49</b>	<b>7:59</b>
Simi Valley ★	8:45	8:45	10:16	<b>1:26</b>	<b>4:01</b>	<b>8:11</b>
Moorpark ★	8:57	8:57	↓	<b>1:39</b>	↓	↓
Camarillo ★	9:10	9:10	10:40	<b>1:54</b>	<b>4:27</b>	<b>8:35</b>
Oxnard ★	9:21	9:21	10:53	<b>2:05</b>	<b>4:38</b>	<b>8:46</b>
Ventura - East						





**AMTRAK TRAINS FOR MONTHLY PASS HOLDERS ONLY**

M-F Sa-Su

AM times **PM** times

**NOTES:** See page 3

**MONDAY THROUGH FRIDAY**






Metrolink Service No.	200	202	204	282	206	208		210	212		214	216	218	220		222		224	226
Lancaster	3:58	4:55	5:20		6:10	6:52			9:00			11:35		<b>1:40</b>					<b>6:05</b>
Palmdale	4:07	5:04	5:29	6:07	6:19	7:01	7:50		9:09	10:30		11:44		<b>1:49</b>	<b>2:00</b>		<b>4:00</b>		<b>6:15</b>
Vincent Grade/Acton	4:18	5:15	5:40	↓	6:30	7:12	↓		9:20	↓		11:55		<b>2:00</b>	↓		↓		↓
Via Princessa	4:50	5:49	6:14	↓	7:04	7:46	↓	9:03	9:54	↓	11:25	<b>12:29</b>	<b>1:45</b>	<b>2:34</b>	↓	<b>3:15</b>	↓		<b>7:12</b>
Santa Clarita	4:56	5:55	6:20	6:53	7:10	7:52	↓	9:09	10:00	↓	11:31	<b>12:35</b>	<b>1:51</b>	<b>2:40</b>	↓	<b>3:21</b>	↓	<b>5:05</b>	<b>7:18</b>
Newhall	5:03	6:02	6:27	↓	7:17	7:59	8:40 >	9:16	10:08	11:20 >	11:38	<b>12:42</b>	<b>1:57</b>	<b>2:47</b>	2:50 >	<b>3:28</b>	4:50 >	<b>5:13</b>	<b>7:25</b>
<b>12</b> Sylmar/San Fernando	5:16	6:16	6:41	7:12	7:32	8:13		9:30	10:23		11:57	<b>12:57</b>	<b>2:11</b>	<b>3:02</b>		<b>3:42</b>		<b>5:27</b>	<b>7:39</b>
Sun Valley	5:23	6:23	6:57	↓	7:40	8:20		9:37	10:31		<b>12:04</b>	<b>1:10</b>	<b>2:21</b>	<b>3:14</b>		<b>3:49</b>		<b>5:34</b>	<b>7:46</b>
Burbank - Downtown	5:30	6:31	7:03	7:25	7:48	8:27		9:45	10:38		<b>12:11</b>	<b>1:17</b>	<b>2:28</b>	<b>3:22</b>		<b>3:56</b>		<b>5:41</b>	<b>7:54</b>
Glendale ★	5:37	6:38	7:09	↓	7:55	8:33		9:54	10:44		<b>12:17</b>	<b>1:24</b>	<b>2:34</b>	<b>3:29</b>		<b>4:02</b>		<b>5:48</b>	<b>8:00</b>
L.A. Union Station ★	5:53	6:55	7:26	7:42	8:15	8:55		10:11	11:05		<b>12:40</b>	<b>1:45</b>	<b>2:50</b>	<b>3:50</b>		<b>4:20</b>		<b>6:10</b>	<b>8:25</b>

 North County TRANSPorter bus service.

 AM times **PM** times

**NOTES:** See page 3

# MONDAY THROUGH FRIDAY

Metrolink Service No.	201	203		205	207		209	211	213		215	217		219	285	221	223	225	227
L.A. Union Station ★	6:30	7:30		8:25	9:40		11:15	<b>12:00</b>	<b>1:55</b>		<b>3:40</b>	<b>4:00</b>		<b>4:45</b>	<b>5:35</b>	<b>5:50</b>	<b>6:30</b>	<b>7:40</b>	<b>9:25</b>
Glendale ★	6:41	7:40		8:36	9:50		11:25	<b>12:11</b>	<b>2:05</b>		<b>3:50</b>	<b>4:10</b>		<b>4:55</b>	↓	<b>6:00</b>	<b>6:40</b>	<b>7:50</b>	<b>9:35</b>
Burbank - Downtown	6:47	7:46		8:42	9:56		11:31	<b>12:17</b>	<b>2:11</b>		<b>3:56</b>	<b>4:16</b>		<b>5:01</b>	<b>5:49</b>	<b>6:06</b>	<b>6:46</b>	<b>7:56</b>	<b>9:41</b>
Sun Valley	6:52	7:52		8:48	10:02		11:37	<b>12:23</b>	<b>2:17</b>		<b>4:02</b>	<b>4:22</b>		<b>5:07</b>	↓	<b>6:12</b>	<b>6:52</b>	<b>8:02</b>	<b>9:47</b>
Sylmar/San Fernando	6:59	8:00		8:56	10:10		11:45	<b>12:32</b>	<b>2:25</b>		<b>4:11</b>	<b>4:30</b>		<b>5:15</b>	<b>6:02</b>	<b>6:20</b>	<b>7:00</b>	<b>8:10</b>	<b>9:55</b>
Newhall	7:18	8:17	▶ 8:50	9:10	10:23	▶ 10:35	11:59	<b>12:45</b>	<b>2:38</b>	▶ 2:50	<b>4:24</b>	<b>4:43</b>	▶ 5:00	<b>5:34</b>	↓	<b>6:33</b>	<b>7:13</b>	<b>8:23</b>	<b>10:08</b>
Santa Clarita	7:25	8:24	↓	9:18	10:31	↓	<b>12:07</b>	<b>12:52</b>	<b>2:45</b>	↓	<b>4:31</b>	<b>4:55</b>	↓	<b>5:41</b>	<b>6:22</b>	<b>6:41</b>	<b>7:20</b>	<b>8:31</b>	<b>10:15</b>
 Via Princessa	7:31	8:43	↓	9:24	10:50	↓	<b>12:14</b>	<b>1:06</b>	<b>3:00</b>	↓	<b>4:37</b>		↓	<b>5:48</b>	↓	<b>6:47</b>	<b>7:26</b>	<b>8:37</b>	<b>10:21</b>
Vincent Grade/Acton	8:10		↓	10:05		↓	<b>12:52</b>			↓	<b>5:14</b>		↓	<b>6:25</b>	↓	<b>7:21</b>	<b>8:03</b>	<b>9:12</b>	<b>10:58</b>
Palmdale	8:20		9:40	10:15		11:25	<b>1:02</b>			<b>3:40</b>	<b>5:25</b>		<b>5:50</b>	<b>6:35</b>	<b>7:08</b>	<b>7:32</b>	<b>8:13</b>	<b>9:21</b>	<b>11:08</b>
Lancaster	8:40			10:45			<b>1:20</b>				<b>5:50</b>			<b>6:55</b>		<b>8:00</b>	<b>8:32</b>	<b>9:40</b>	<b>11:25</b>

 North County TRANSPORTER bus service.

Northbound TRANSPORTER bus stops at the Vincent Grade/Acton Metrolink station by request only.

AM times **PM** times

**NOTES:** See page 3

# ANTELOPE VALLEY LINE

Lancaster to L.A.

L.A. to Lancaster

## SATURDAY AND SUNDAY

MetroLink Service No.	260	262	264	266	268	270
Lancaster	6:25	8:55	11:10	<b>12:40</b>	<b>2:25</b>	<b>6:15</b>
Palmdale	6:34	9:05	11:19	<b>12:49</b>	<b>2:34</b>	<b>6:24</b>
Vincent Grade/Acton	6:45	9:16	11:30	<b>12:59</b>	<b>2:45</b>	<b>6:35</b>
Via Princessa	7:19	9:53	<b>12:04</b>	<b>1:32</b>	<b>3:19</b>	<b>7:12</b>
Santa Clarita	7:25	10:00	<b>12:10</b>	<b>1:38</b>	<b>3:25</b>	<b>7:18</b>
Newhall	7:32	10:07	<b>12:17</b>	<b>1:45</b>	<b>3:32</b>	<b>7:25</b>
Sylmar/San Fernando	7:46	10:21	<b>12:34</b>	<b>1:59</b>	<b>3:46</b>	<b>7:39</b>
Sun Valley	7:53	10:28	<b>12:41</b>	<b>2:06</b>	<b>3:53</b>	<b>7:46</b>
Burbank - Downtown	8:00	10:35	<b>12:48</b>	<b>2:13</b>	<b>3:59</b>	<b>7:53</b>
Glendale ★	8:07	10:42	<b>12:55</b>	<b>2:20</b>	<b>4:05</b>	<b>8:00</b>
L.A. Union Station ★	8:25	11:00	<b>1:15</b>	<b>2:40</b>	<b>4:30</b>	<b>8:20</b>

## SATURDAY AND SUNDAY

MetroLink Service No.	261	263	265	267	269	271
L.A. Union Station ★	8:45	11:40	<b>2:15</b>	<b>3:50</b>	<b>5:25</b>	<b>8:55</b>
Glendale ★	8:55	11:50	<b>2:25</b>	<b>4:00</b>	<b>5:35</b>	<b>9:05</b>
Burbank - Downtown	9:02	11:57	<b>2:32</b>	<b>4:07</b>	<b>5:42</b>	<b>9:12</b>
Sun Valley	9:08	<b>12:03</b>	<b>2:38</b>	<b>4:13</b>	<b>5:48</b>	<b>9:18</b>
Sylmar/San Fernando	9:16	<b>12:11</b>	<b>2:46</b>	<b>4:21</b>	<b>5:56</b>	<b>9:26</b>
Newhall	9:30	<b>12:25</b>	<b>3:00</b>	<b>4:35</b>	<b>6:10</b>	<b>9:40</b>
Santa Clarita	9:38	<b>12:33</b>	<b>3:08</b>	<b>4:43</b>	<b>6:18</b>	<b>9:48</b>
Via Princessa	9:44	<b>12:39</b>	<b>3:13</b>	<b>4:49</b>	<b>6:24</b>	<b>9:54</b>
Vincent Grade/Acton	10:25	<b>1:23</b>	<b>3:52</b>	<b>5:27</b>	<b>7:02</b>	<b>10:32</b>
Palmdale	10:36	<b>1:33</b>	<b>4:01</b>	<b>5:38</b>	<b>7:14</b>	<b>10:43</b>
Lancaster	10:55	<b>1:50</b>	<b>4:20</b>	<b>5:55</b>	<b>7:25</b>	<b>11:00</b>

AM times **PM times**

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**MONDAY THROUGH FRIDAY**

Metrolink Service No.	301	303	305	307	309	311	313	315	317	319	321	323	325	327	329	331	333	335	337
San Bernardino	3:48	4:21	4:40	5:12	5:38	6:00	6:28	6:53	7:59	8:49	9:59	11:33	<b>12:28</b>	<b>1:35</b>	<b>3:12</b>	<b>4:00</b>	<b>5:16</b>	<b>6:14</b>	<b>7:49</b>
Rialto	3:59	4:32	4:50	5:23	5:49	6:11	6:38	7:04	8:10	9:01	10:09	11:44	<b>12:38</b>	<b>1:45</b>	<b>3:22</b>	<b>4:10</b>	<b>5:27</b>	<b>6:25</b>	<b>8:00</b>
Fontana	4:06	4:38	4:57	5:30	5:56	6:17	6:45	7:11	8:17	9:06	10:16	11:53	<b>12:47</b>	<b>1:52</b>	<b>3:31</b>	<b>4:17</b>	<b>5:34</b>	<b>6:34</b>	<b>8:06</b>
Rancho Cucamonga	4:14	4:47	5:06	5:38	6:04	6:26	6:54	7:19	8:25	9:17	10:25	<b>12:02</b>	<b>12:56</b>	<b>2:01</b>	<b>3:40</b>	<b>4:26</b>	<b>5:43</b>	<b>6:54</b>	<b>8:15</b>
Upland	4:22	4:54	5:13	5:46	6:12	6:34	7:01	7:27	8:33	9:24	10:33	<b>12:09</b>	<b>1:03</b>	<b>2:09</b>	<b>3:47</b>	<b>4:33</b>	<b>5:51</b>	<b>7:02</b>	<b>8:23</b>
Montclair	4:28	5:00	5:19	5:52	6:18	6:39	7:07	7:33	8:39	9:30	10:39	<b>12:15</b>	<b>1:09</b>	<b>2:15</b>	<b>3:53</b>	<b>4:39</b>	<b>5:57</b>	<b>7:08</b>	<b>8:28</b>
Claremont	4:31	5:04	5:23	5:55	6:21	6:43	7:11	7:36	8:42	9:33	10:43	<b>12:18</b>	<b>1:13</b>	<b>2:19</b>	<b>3:56</b>	<b>4:42</b>	<b>6:01</b>	<b>7:11</b>	<b>8:32</b>
Pomona - North	4:36	5:09	5:28	6:00	6:26	6:48	7:15	7:41	8:47	9:38	10:47	<b>12:23</b>	<b>1:17</b>	<b>2:23</b>	<b>4:01</b>	<b>4:49</b>	<b>6:11</b>	<b>7:17</b>	<b>8:37</b>
Covina	4:47	5:20	5:39	6:11	6:37	6:59	7:27	7:52	8:58	9:49	10:58	<b>12:34</b>	<b>1:29</b>	<b>2:35</b>	<b>4:12</b>	<b>5:00</b>	<b>6:23</b>	<b>7:28</b>	<b>8:48</b>
Baldwin Park	4:54	5:27	5:46	6:18	6:44	7:06	7:34	7:59	9:05	9:56	11:05	<b>12:41</b>	<b>1:35</b>	<b>2:41</b>	<b>4:19</b>	<b>5:12</b>	<b>6:30</b>	<b>7:35</b>	<b>8:55</b>
El Monte	5:04	5:37	5:56	6:28	6:54	7:16	7:43	8:09	9:15	10:06	11:15	<b>12:51</b>	<b>1:45</b>	<b>2:51</b>	<b>4:32</b>	<b>5:22</b>	<b>6:48</b>	<b>7:52</b>	<b>9:05</b>
Cal State L.A.	5:15	5:48	6:08	6:39	7:05	7:27	7:56	8:20	9:28	10:17	11:28	<b>1:04</b>	<b>1:57</b>	<b>3:03</b>	<b>4:45</b>	<b>5:35</b>	<b>6:59</b>	<b>8:03</b>	<b>9:17</b>
L.A. Union Station ★	5:26	5:59	6:19	6:50	7:16	7:38	8:07	8:31	9:39	10:28	11:39	<b>1:15</b>	<b>2:07</b>	<b>3:13</b>	<b>4:55</b>	<b>5:47</b>	<b>7:10</b>	<b>8:14</b>	<b>9:27</b>

 AM times **PM** times

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# MONDAY THROUGH FRIDAY

Metrolink Service No.	300	302	304	306	308	310	312	314	316	318	320	322	324	326	328	330	332	334	336
L.A. Union Station ★	5:46	7:34	9:05	10:17	11:05	<b>12:41</b>	<b>1:55</b>	<b>3:01</b>	<b>3:33</b>	<b>3:55</b>	<b>4:22</b>	<b>4:58</b>	<b>5:12</b>	<b>5:35</b>	<b>6:05</b>	<b>6:24</b>	<b>7:28</b>	<b>8:39</b>	<b>9:46</b>
Cal State L.A.	5:59	7:48	9:18	10:30	11:19	<b>12:55</b>	<b>2:08</b>	<b>3:15</b>	<b>3:47</b>	<b>4:09</b>	<b>4:35</b>	<b>5:11</b>	<b>5:25</b>	<b>5:52</b>	<b>6:19</b>	<b>6:37</b>	<b>7:41</b>	<b>8:52</b>	<b>10:00</b>
El Monte	6:16	8:07	9:35	10:41	11:36	<b>1:11</b>	<b>2:20</b>	<b>3:26</b>	<b>3:58</b>	<b>4:20</b>	<b>4:52</b>	<b>5:22</b>	<b>5:42</b>	<b>6:03</b>	<b>6:30</b>	<b>6:48</b>	<b>7:52</b>	<b>9:04</b>	<b>10:11</b>
Baldwin Park	6:29	8:19	9:45	10:51	11:46	<b>1:22</b>	<b>2:30</b>	<b>3:36</b>	<b>4:08</b>	<b>4:30</b>	<b>5:02</b>	<b>5:32</b>	<b>5:52</b>	<b>6:13</b>	<b>6:40</b>	<b>6:58</b>	<b>8:02</b>	<b>9:14</b>	<b>10:21</b>
Covina	6:36	8:26	9:53	10:59	11:53	<b>1:29</b>	<b>2:37</b>	<b>3:43</b>	<b>4:15</b>	<b>4:37</b>	<b>5:10</b>	<b>5:40</b>	<b>6:00</b>	<b>6:22</b>	<b>6:48</b>	<b>7:06</b>	<b>8:10</b>	<b>9:21</b>	<b>10:28</b>
Pomona - North	6:50	8:40	10:06	11:12	<b>12:06</b>	<b>1:42</b>	<b>2:50</b>	<b>3:56</b>	<b>4:29</b>	<b>4:50</b>	<b>5:23</b>	<b>5:53</b>	<b>6:13</b>	<b>6:35</b>	<b>7:01</b>	<b>7:19</b>	<b>8:23</b>	<b>9:34</b>	<b>10:42</b>
Claremont	6:55	8:45	10:11	11:17	<b>12:11</b>	<b>1:47</b>	<b>2:55</b>	<b>4:01</b>	<b>4:34</b>	<b>4:56</b>	<b>5:28</b>	<b>5:58</b>	<b>6:18</b>	<b>6:40</b>	<b>7:06</b>	<b>7:24</b>	<b>8:28</b>	<b>9:39</b>	<b>10:47</b>
Montclair	7:06	8:49	10:15	11:21	<b>12:15</b>	<b>1:51</b>	<b>2:59</b>	<b>4:05</b>	<b>4:38</b>	<b>5:00</b>	<b>5:32</b>	<b>6:02</b>	<b>6:22</b>	<b>6:44</b>	<b>7:10</b>	<b>7:28</b>	<b>8:32</b>	<b>9:43</b>	<b>10:51</b>
Upland	7:12	8:54	10:21	11:27	<b>12:21</b>	<b>1:57</b>	<b>3:05</b>	<b>4:11</b>	<b>4:43</b>	<b>5:05</b>	<b>5:38</b>	<b>6:08</b>	<b>6:28</b>	<b>6:50</b>	<b>7:16</b>	<b>7:34</b>	<b>8:38</b>	<b>9:49</b>	<b>10:56</b>
Rancho Cucamonga	7:19	9:02	10:28	11:34	<b>12:28</b>	<b>2:04</b>	<b>3:12</b>	<b>4:25</b>	<b>4:51</b>	<b>5:12</b>	<b>5:45</b>	<b>6:15</b>	<b>6:35</b>	<b>6:57</b>	<b>7:23</b>	<b>7:41</b>	<b>8:45</b>	<b>9:56</b>	<b>11:04</b>
Fontana	7:31	9:17	10:39	11:45	<b>12:39</b>	<b>2:15</b>	<b>3:23</b>	<b>4:36</b>	<b>5:01</b>	<b>5:23</b>	<b>5:55</b>	<b>6:26</b>	<b>6:46</b>	<b>7:07</b>	<b>7:33</b>	<b>7:52</b>	<b>8:56</b>	<b>10:07</b>	<b>11:14</b>
Rialto	7:39	9:23	10:45	11:51	<b>12:45</b>	<b>2:21</b>	<b>3:29</b>	<b>4:42</b>	<b>5:07</b>	<b>5:34</b>	<b>6:02</b>	<b>6:32</b>	<b>6:52</b>	<b>7:14</b>	<b>7:40</b>	<b>8:05</b>	<b>9:02</b>	<b>10:13</b>	<b>11:21</b>
San Bernardino	7:48	9:32	10:54	<b>12:00</b>	<b>12:54</b>	<b>2:30</b>	<b>3:38</b>	<b>4:51</b>	<b>5:16</b>	<b>5:43</b>	<b>6:11</b>	<b>6:41</b>	<b>7:01</b>	<b>7:23</b>	<b>7:49</b>	<b>8:14</b>	<b>9:11</b>	<b>10:22</b>	<b>11:29</b>

AM times **PM** times

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# SAN BERNARDINO LINE • 300 SERIES

# San Bernardino to L.A.

## SATURDAY

## SUNDAY

Metrolink Service No.	351	353	357	359	363	367	369	373	377	379
San Bernardino	7:00	8:25	9:50	11:30	<b>1:05</b>	<b>2:07</b>	<b>3:35</b>	<b>4:55</b>	<b>6:30</b>	<b>9:15</b>
Rialto	7:07	8:32	9:57	11:37	<b>1:12</b>	<b>2:14</b>	<b>3:42</b>	<b>5:02</b>	<b>6:37</b>	<b>9:22</b>
Fontana	7:12	8:37	10:02	11:42	<b>1:17</b>	<b>2:19</b>	<b>3:47</b>	<b>5:07</b>	<b>6:42</b>	<b>9:27</b>
Rancho Cucamonga	7:21	8:46	10:11	11:50	<b>1:26</b>	<b>2:28</b>	<b>3:56</b>	<b>5:16</b>	<b>6:51</b>	<b>9:36</b>
Upland	7:28	8:53	10:20	11:59	<b>1:35</b>	<b>2:36</b>	<b>4:04</b>	<b>5:25</b>	<b>7:00</b>	<b>9:45</b>
Montclair	7:34	8:59	10:26	<b>12:05</b>	<b>1:41</b>	<b>2:42</b>	<b>4:10</b>	<b>5:31</b>	<b>7:06</b>	<b>9:51</b>
Claremont	7:37	9:02	10:29	<b>12:08</b>	<b>1:44</b>	<b>2:45</b>	<b>4:13</b>	<b>5:34</b>	<b>7:09</b>	<b>9:56</b>
Pomona - North	7:41	9:06	10:34	<b>12:13</b>	<b>1:49</b>	<b>2:49</b>	<b>4:18</b>	<b>5:39</b>	<b>7:14</b>	<b>10:00</b>
Covina	7:51	9:16	10:44	<b>12:23</b>	<b>1:59</b>	<b>2:59</b>	<b>4:28</b>	<b>5:49</b>	<b>7:24</b>	<b>10:10</b>
Baldwin Park	7:57	9:21	10:50	<b>12:29</b>	<b>2:05</b>	<b>3:05</b>	<b>4:39</b>	<b>5:55</b>	<b>7:30</b>	<b>10:16</b>
El Monte	8:07	9:35	11:01	<b>12:43</b>	<b>2:19</b>	<b>3:14</b>	<b>4:49</b>	<b>6:09</b>	<b>7:44</b>	<b>10:30</b>
Cal State L.A.	8:19	9:48	11:14	<b>12:55</b>	<b>2:32</b>	<b>3:27</b>	<b>5:01</b>	<b>6:22</b>	<b>7:56</b>	<b>10:42</b>
L.A. Union Station ★	8:35	10:05	11:30	<b>1:15</b>	<b>2:50</b>	<b>3:40</b>	<b>5:15</b>	<b>6:40</b>	<b>8:15</b>	<b>10:55</b>

351	357	359	361	367	369	377
7:00	9:50	11:30	<b>12:30</b>	<b>2:07</b>	<b>3:35</b>	<b>6:30</b>
7:07	9:57	11:37	<b>12:36</b>	<b>2:14</b>	<b>3:42</b>	<b>6:37</b>
7:12	10:02	11:42	<b>12:41</b>	<b>2:19</b>	<b>3:47</b>	<b>6:42</b>
7:21	10:11	11:50	<b>12:49</b>	<b>2:28</b>	<b>3:56</b>	<b>6:51</b>
7:28	10:20	11:59	<b>12:56</b>	<b>2:36</b>	<b>4:04</b>	<b>7:00</b>
7:34	10:26	<b>12:05</b>	<b>1:01</b>	<b>2:42</b>	<b>4:10</b>	<b>7:06</b>
7:37	10:29	<b>12:08</b>	<b>1:04</b>	<b>2:45</b>	<b>4:13</b>	<b>7:09</b>
7:41	10:34	<b>12:13</b>	<b>1:08</b>	<b>2:49</b>	<b>4:18</b>	<b>7:14</b>
7:51	10:44	<b>12:23</b>	<b>1:17</b>	<b>2:59</b>	<b>4:28</b>	<b>7:24</b>
7:57	10:50	<b>12:29</b>	<b>1:23</b>	<b>3:05</b>	<b>4:39</b>	<b>7:30</b>
8:07	11:01	<b>12:43</b>	<b>1:32</b>	<b>3:14</b>	<b>4:49</b>	<b>7:44</b>
8:19	11:14	<b>12:55</b>	<b>1:43</b>	<b>3:27</b>	<b>5:01</b>	<b>7:56</b>
8:35	11:30	<b>1:15</b>	<b>2:00</b>	<b>3:40</b>	<b>5:15</b>	<b>8:15</b>

AM times **PM times**

**NOTES:** See page 3

## SATURDAY

## SUNDAY

Metrolink Service No.	352	354	358	362	364	366	368	372	376	378
L.A. Union Station ★	6:15	9:00	10:35	<b>12:10</b>	<b>1:45</b>	<b>4:00</b>	<b>5:35</b>	<b>7:10</b>	<b>9:00</b>	<b>11:30</b>
Cal State L.A.	6:25	9:10	10:46	<b>12:21</b>	<b>1:56</b>	<b>4:11</b>	<b>5:46</b>	<b>7:21</b>	<b>9:10</b>	<b>11:40</b>
El Monte	6:35	9:20	10:57	<b>12:32</b>	<b>2:07</b>	<b>4:21</b>	<b>5:57</b>	<b>7:32</b>	<b>9:21</b>	<b>11:50</b>
Baldwin Park	6:43	9:30	11:07	<b>12:42</b>	<b>2:17</b>	<b>4:29</b>	<b>6:07</b>	<b>7:42</b>	<b>9:31</b>	<b>11:58</b>
Covina	6:51	9:38	11:15	<b>12:50</b>	<b>2:25</b>	<b>4:38</b>	<b>6:15</b>	<b>7:50</b>	<b>9:39</b>	12:05
Pomona - North	7:02	9:50	11:27	<b>1:02</b>	<b>2:36</b>	<b>4:49</b>	<b>6:27</b>	<b>8:02</b>	<b>9:50</b>	12:16
Claremont	7:06	9:54	11:31	<b>1:06</b>	<b>2:40</b>	<b>4:54</b>	<b>6:31</b>	<b>8:06</b>	<b>9:54</b>	12:20
19 Montclair	7:10	9:58	11:35	<b>1:10</b>	<b>2:44</b>	<b>4:58</b>	<b>6:35</b>	<b>8:10</b>	<b>9:58</b>	12:24
Upland	7:15	10:03	11:40	<b>1:15</b>	<b>2:50</b>	<b>5:04</b>	<b>6:40</b>	<b>8:16</b>	<b>10:04</b>	12:29
Rancho Cucamonga	7:24	10:14	11:51	<b>1:26</b>	<b>2:58</b>	<b>5:15</b>	<b>6:51</b>	<b>8:23</b>	<b>10:11</b>	12:36
Fontana	7:33	10:23	<b>12:00</b>	<b>1:35</b>	<b>3:07</b>	<b>5:24</b>	<b>7:00</b>	<b>8:32</b>	<b>10:20</b>	12:45
Rialto	7:39	10:29	<b>12:06</b>	<b>1:41</b>	<b>3:13</b>	<b>5:30</b>	<b>7:06</b>	<b>8:38</b>	<b>10:26</b>	12:51
San Bernardino	7:54	10:45	<b>12:22</b>	<b>2:00</b>	<b>3:30</b>	<b>5:45</b>	<b>7:22</b>	<b>8:54</b>	<b>10:40</b>	1:05

354	356	362	364	366	368	376
9:00	10:10	<b>12:10</b>	<b>1:45</b>	<b>4:00</b>	<b>5:35</b>	<b>9:00</b>
9:10	10:21	<b>12:21</b>	<b>1:56</b>	<b>4:11</b>	<b>5:46</b>	<b>9:10</b>
9:20	10:31	<b>12:32</b>	<b>2:07</b>	<b>4:21</b>	<b>5:57</b>	<b>9:21</b>
9:30	10:40	<b>12:42</b>	<b>2:17</b>	<b>4:29</b>	<b>6:07</b>	<b>9:31</b>
9:38	10:48	<b>12:50</b>	<b>2:25</b>	<b>4:38</b>	<b>6:15</b>	<b>9:39</b>
9:50	10:59	<b>1:02</b>	<b>2:36</b>	<b>4:49</b>	<b>6:27</b>	<b>9:50</b>
9:54	11:03	<b>1:06</b>	<b>2:40</b>	<b>4:54</b>	<b>6:31</b>	<b>9:54</b>
9:58	11:07	<b>1:10</b>	<b>2:44</b>	<b>4:58</b>	<b>6:35</b>	<b>9:58</b>
10:03	11:12	<b>1:15</b>	<b>2:50</b>	<b>5:04</b>	<b>6:40</b>	<b>10:04</b>
10:14	11:19	<b>1:26</b>	<b>2:58</b>	<b>5:15</b>	<b>6:51</b>	<b>10:11</b>
10:23	11:28	<b>1:35</b>	<b>3:07</b>	<b>5:24</b>	<b>7:00</b>	<b>10:20</b>
10:29	11:40	<b>1:41</b>	<b>3:13</b>	<b>5:30</b>	<b>7:06</b>	<b>10:26</b>
10:45	11:52	<b>2:00</b>	<b>3:30</b>	<b>5:45</b>	<b>7:22</b>	<b>10:40</b>

AM times **PM** times

NOTES: See page 3

# RIVERSIDE LINE

## Riverside to L.A.

## L.A. to Riverside

### MONDAY THROUGH FRIDAY

Metrolink Service No.	401	403	405	407	409	411
Riverside - Downtown	4:47	5:42	6:15	6:50	8:10	<b>3:07</b>
Pedley	4:58	5:53	6:26	7:01	8:21	<b>3:18</b>
Ontario - East	5:08	6:03	6:36	7:11	8:31	<b>3:28</b>
Pomona - Downtown	5:20	6:15	6:48	7:23	8:43	<b>3:40</b>
Industry	5:29	6:24	6:57	7:32	8:52	<b>3:49</b>
Montebello/Commerce	5:47	6:42	7:15	7:50	9:10	<b>4:07</b>
L.A. Union Station ★	6:10	7:07	7:35	8:15	9:35	<b>4:35</b>

### MONDAY THROUGH FRIDAY

Metrolink Service No.	402	404	406	408	410	412
L.A. Union Station ★	<b>1:20</b>	<b>4:15</b>	<b>5:00</b>	<b>5:30</b>	<b>6:00</b>	<b>6:30</b>
Montebello/Commerce	<b>1:37</b>	<b>4:32</b>	<b>5:17</b>	<b>5:47</b>	<b>6:17</b>	<b>6:47</b>
Industry	<b>1:55</b>	<b>4:50</b>	<b>5:35</b>	<b>6:05</b>	<b>6:35</b>	<b>7:05</b>
Pomona - Downtown	<b>2:04</b>	<b>4:59</b>	<b>5:44</b>	<b>6:14</b>	<b>6:44</b>	<b>7:14</b>
Ontario - East	<b>2:16</b>	<b>5:12</b>	<b>5:56</b>	<b>6:26</b>	<b>6:56</b>	<b>7:26</b>
Pedley	<b>2:28</b>	<b>5:24</b>	<b>6:08</b>	<b>6:38</b>	<b>7:08</b>	<b>7:38</b>
Riverside - Downtown	<b>2:48</b>	<b>5:42</b>	<b>6:27</b>	<b>6:58</b>	<b>7:25</b>	<b>7:57</b>

Check 91 Line schedule for additional trains to Riverside - Downtown via Fullerton.

AM times **PM** times

**NOTES:** See page 3

# 91/PERRIS VALLEY LINE

Perris to L.A.

L.A. to Perris

## MONDAY THROUGH FRIDAY

Metrolink Service No.	701	703	705	731	733	735	707
Perris - South	4:37	5:06	5:42	7:45	11:30	<b>2:45</b>	
Perris - Downtown	4:45	5:13	5:50	7:51	11:36	<b>2:51</b>	
Moreno Valley/March Field	4:58	5:25	6:03	8:08	11:53	<b>3:08</b>	
Riverside - Hunter Park/UCR	5:09	5:36	6:14	8:23	<b>12:08</b>	<b>3:23</b>	
Riverside - Downtown	5:27	5:56	6:32	8:35	<b>12:20</b>	<b>3:35</b>	<b>6:07</b>
Riverside - La Sierra	5:37	6:04	6:42				<b>6:17</b>
Corona - North Main	5:45	6:12	6:50				<b>6:25</b>
Corona - West	5:51	6:18	6:56				<b>6:31</b>
Fullerton ★	6:16	6:43	7:21				<b>6:54</b>
Buena Park	6:23	6:50	7:29				<b>7:00</b>
Norwalk/Santa Fe Springs	6:31	6:58	7:36				<b>7:06</b>
L.A. Union Station ★	7:05	7:32	8:10				<b>7:45</b>

## MONDAY THROUGH FRIDAY

Metrolink Service No.	700	732	734	736	702	704	706	708
L.A. Union Station ★	5:45				<b>3:35</b>	<b>4:20</b>	<b>5:30</b>	<b>6:50</b>
Norwalk/Santa Fe Springs	6:06				<b>3:56</b>	<b>4:41</b>	<b>5:51</b>	<b>7:11</b>
Buena Park	6:12				<b>4:03</b>	<b>4:47</b>	<b>5:57</b>	<b>7:17</b>
Fullerton ★	6:19				<b>4:09</b>	<b>4:54</b>	<b>6:04</b>	<b>7:24</b>
Corona - West	6:43				<b>4:35</b>	<b>5:18</b>	<b>6:28</b>	<b>7:48</b>
Corona - North Main	6:50				<b>4:41</b>	<b>5:25</b>	<b>6:35</b>	<b>7:55</b>
Riverside - La Sierra	6:59				<b>4:50</b>	<b>5:34</b>	<b>6:44</b>	<b>8:04</b>
Riverside - Downtown	7:15	9:10	<b>1:00</b>	<b>4:30</b>	<b>5:03</b>	<b>5:45</b>	<b>6:55</b>	<b>8:25</b>
Riverside - Hunter Park/UCR		9:23	<b>1:13</b>	<b>4:43</b>	<b>5:16</b>	<b>5:58</b>	<b>7:08</b>	
Moreno Valley/March Field		9:36	<b>1:26</b>	<b>4:57</b>	<b>5:29</b>	<b>6:11</b>	<b>7:16</b>	
Perris - Downtown		9:55	<b>1:45</b>	<b>5:16</b>	<b>5:48</b>	<b>6:30</b>	<b>7:35</b>	
Perris - South		10:05	<b>1:55</b>	<b>5:25</b>	<b>6:00</b>	<b>6:40</b>	<b>7:50</b>	

Check Orange County Line and Inland Empire-Orange County Line schedules for additional trains along this corridor.  
Check Riverside Line schedule for additional trains to Riverside-Downtown.

AM times **PM** times

**NOTES:** See page 3

## SATURDAY AND SUNDAY

Metrolink Service No. 751 753

Riverside - Downtown	7:50	9:00
Riverside - La Sierra	8:00	9:10
Corona - North Main	8:08	9:18
Corona - West	8:14	9:24
Fullerton ★	8:39	9:49
Buena Park	8:46	9:56
Norwalk/Santa Fe Springs	8:54	10:04
L.A. Union Station ★	9:30	10:40

## SATURDAY AND SUNDAY

Metrolink Service No. 752 754

L.A. Union Station ★	3:15	7:12
Norwalk/Santa Fe Springs	3:36	7:33
Buena Park	3:42	7:39
Fullerton ★	3:49	7:46
Corona - West	4:13	8:10
Corona - North Main	4:20	8:17
Riverside - La Sierra	4:29	8:26
Riverside - Downtown	4:52	8:52

Check Orange County Line and Inland Empire-Orange County Line schedules for additional trains along this corridor.

AM times **PM** times

**NOTES:** See page 3

91/PERRIS VALLEY LINE

Riverside to L.A.

L.A. to Riverside

**MONDAY THROUGH FRIDAY**

Metrolink Service No.	681	601	603	605	683	607	685	687	633	635	641	609	689	643	707	645
Oceanside ★		4:43	5:16	5:42		6:34					2:59	3:26				
San Clemente Pier ★		↓	↓	↓		↓					↓	↓				
San Clemente		5:06	5:38	6:04		6:56					3:21	3:48				
San Juan Capistrano ★		5:15	5:47	6:13		7:05					3:31	3:57				
Laguna Niguel/Mission Viejo	4:05	5:22	5:53	6:19		7:11	8:03	8:43	8:58	11:30	3:39	4:04		5:55		8:50
Irvine ★	4:15	5:32	6:03	6:29	7:10	7:22	8:13	8:54	9:08	11:40	3:50	4:15	5:17	6:05		9:00
Tustin	4:21	5:38	6:09	6:36	7:16	7:28	8:19	9:00	9:14	11:46	3:57	4:22	5:23	6:11		9:06
Santa Ana ★	4:27	5:44	6:16	6:43	7:22	7:34	8:25	9:06	9:20	11:52	4:04	4:29	5:29	6:17		9:12
Orange	4:32	5:52	6:21	6:49	7:27	7:39	8:30	9:11	9:25	11:57	4:09	4:34	5:34	6:22		9:17
Anaheim ★	4:36	5:57	6:26	6:55	7:32	7:44	8:35	9:16	9:29	12:01	4:14	4:39	5:39	6:27		9:22
Fullerton ★	4:43	6:04	6:35	7:02	7:41	7:51	8:42	9:25	9:41	12:15	4:24	4:46	5:46	6:40	6:54	9:35
Buena Park	4:49	6:10	6:41	7:08	7:47	7:57	8:48	9:30				4:52	5:52		7:00	
Norwalk/Santa Fe Springs	4:57	6:18	6:49	7:16	7:55	8:05	8:56	9:37				5:00	6:00		7:06	
Commerce	↓	↓	7:00	7:26	↓	8:19	9:08	↓				↓	↓		↓	
L.A. Union Station ★	5:25	6:45	7:20	7:45	8:19	8:40	9:26	10:04				5:26	6:27		7:45	

Check 91 Line and Inland Empire-Orange County Line schedules for additional trains along this corridor.

AM times    PM times

**NOTES:** See page 3

## MONDAY THROUGH FRIDAY

Metrolink Service No.	682	600	632	634	684	602	686	640	604	688	606	608	708	642	644
L.A. Union Station ★	6:50	7:58			2:11	3:19	3:47		4:30	4:50	5:46	6:40	6:50		
Commerce	↓	↓			↓	3:33	4:01		4:44	↓	6:00	↓	↓		
Norwalk/Santa Fe Springs	7:12	8:20			2:33	3:43	4:12		4:55	5:12	6:10	7:03	7:11		
Buena Park	7:19	8:27			2:40	3:50	4:19		5:03	5:19	6:17	7:10	7:17		
Fullerton ★	7:25	8:33	10:00	1:40	2:46	3:56	4:25	4:55	5:10	5:25	6:23	7:16	7:24	7:35	10:10
Anaheim ★	7:32	8:40	10:07	1:47	2:54	4:03	4:33	5:02	5:17	5:33	6:31	7:23		7:43	10:18
Orange	7:38	8:45	10:12	1:52	2:59	4:08	4:38	5:07	5:22	5:39	6:37	7:28		7:47	10:23
25 Santa Ana ★	7:44	8:50	10:17	1:57	3:05	4:13	4:43	5:12	5:27	5:45	6:42	7:33		7:52	10:27
Tustin	7:51	8:56	10:23	2:03	3:12	4:19	4:49	5:18	5:33	5:52	6:48	7:39		7:58	10:33
Irvine ★	8:00	9:04	10:31	2:11	3:21	4:27	5:02	5:26	5:41	6:01	6:56	7:47		8:05	10:41
Laguna Niguel/Mission Viejo	8:15	9:14	10:44	2:25	3:36	4:40		5:40	5:51	6:15	7:06	7:58		8:20	10:51
San Juan Capistrano ★		9:20				4:46			5:57		7:12	8:04			10:58
San Clemente		9:30				4:59			6:06		7:22	8:17			11:07
San Clemente Pier ★		↓				↓			↓		↓	↓			↓
Oceanside ★		10:01				5:28			6:37		7:54	8:46			11:35

Train 644 may be held for special events in Anaheim. Please visit [metrolinktrains.com](http://metrolinktrains.com) for details.

Check 91 Line and Inland Empire-Orange County Line schedules for additional trains along this corridor.

AM times **PM** times

NOTES: See page 3

### SATURDAY AND SUNDAY

Metrolink Service No.	660	662	664	666
L.A. Union Station ★	8:40	10:50	<b>2:00</b>	<b>4:40</b>
Commerce	↓	↓	↓	↓
Norwalk/Santa Fe Springs	9:02	11:12	<b>2:22</b>	<b>5:02</b>
Buena Park	9:09	11:19	<b>2:29</b>	<b>5:09</b>
Fullerton ★	9:15	11:25	<b>2:35</b>	<b>5:15</b>
Anaheim ★	9:22	11:32	<b>2:42</b>	<b>5:22</b>
Orange	9:27	11:37	<b>2:47</b>	<b>5:27</b>
Santa Ana ★	9:32	11:42	<b>2:52</b>	<b>5:32</b>
Tustin	9:38	11:48	<b>2:58</b>	<b>5:38</b>
Irvine ★	9:46	11:56	<b>3:06</b>	<b>5:46</b>
Laguna Niguel/Mission Viejo	9:56	<b>12:06</b>	<b>3:16</b>	<b>5:56</b>
San Juan Capistrano ★	10:01	<b>12:13</b>	<b>3:21</b>	<b>6:01</b>
San Clemente	10:12	<b>12:25</b>	<b>3:34</b>	<b>6:15</b>
San Clemente Pier ★	10:15	<b>12:28</b>	<b>3:36</b>	<b>6:18</b>
Oceanside ★	10:52	<b>1:00</b>	<b>4:15</b>	<b>6:55</b>

AM times **PM** times

### SATURDAY AND SUNDAY

Metrolink Service No.	661	663	665	667
Oceanside ★	8:15	11:24	<b>1:24</b>	<b>5:36</b>
San Clemente Pier ★	8:35	11:48	<b>1:43</b>	<b>5:55</b>
San Clemente	8:38	11:50	<b>1:46</b>	<b>5:58</b>
San Juan Capistrano ★	8:50	<b>12:00</b>	<b>2:00</b>	<b>6:11</b>
Laguna Niguel/Mission Viejo	8:58	<b>12:08</b>	<b>2:07</b>	<b>6:19</b>
Irvine ★	9:08	<b>12:19</b>	<b>2:17</b>	<b>6:29</b>
Tustin	9:14	<b>12:25</b>	<b>2:23</b>	<b>6:35</b>
Santa Ana ★	9:20	<b>12:31</b>	<b>2:29</b>	<b>6:41</b>
Orange	9:25	<b>12:36</b>	<b>2:34</b>	<b>6:46</b>
Anaheim ★	9:30	<b>12:41</b>	<b>2:39</b>	<b>6:51</b>
Fullerton ★	9:37	<b>12:48</b>	<b>2:46</b>	<b>6:58</b>
Buena Park	9:43	<b>12:54</b>	<b>2:52</b>	<b>7:04</b>
Norwalk/Santa Fe Springs	9:51	<b>1:02</b>	<b>3:00</b>	<b>7:12</b>
Commerce	↓	↓	↓	↓
L.A. Union Station ★	10:30	<b>1:37</b>	<b>3:39</b>	<b>7:56</b>

**NOTES:** See page 3

AMTRAK SCHEDULE - 2014/2016

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Train Number ▶	5804	5818	562	564	1566	566	768	768
Normal Days of Operation ▶	Daily	Daily	Daily	Daily	SaSuHo	Mo-Fr	SaSu	Daily
Will Also Operate ▶					9/5,11/24, 12/26,1/2		*See Note	
Will Not Operate ▶						9/5,11/24, 12/26,1/2		*See Note
On Board Service ▶								
<b>SAN LUIS OBISPO, CA</b>								
-Cal Poly	0	○	Dp					
-Amtrak Station		●						
Grover Beach, CA	12	○						
Santa Maria, CA-IHOP	24	○						
Guadalupe-Santa Maria, CA	25	○						
Lompoc-Surf Station, CA	51	○						
Lompoc, CA-Visitors Center	67	○						
Solvang, CA	68	○						
Buellton, CA-Opposite Burger King	72	○						
Goleta, CA	110	○						
<b>SANTA BARBARA, CA</b>	119	●	Ar					
			Dp					
Carpinteria, CA	129	○						
Ventura, CA	145	○						
Oxnard, CA	155	●						
Camarillo, CA	165	○						
Moorpark, CA	175	○						
Simi Valley, CA	186	○						
Chatsworth, CA	194	○						
Van Nuys, CA-Amtrak Station	203	●						
Burbank-Bob Hope Airport, CA ✈	209	○						
Glendale, CA	216	○						
<b>LOS ANGELES, CA ✈</b>	222	●	Ar					
			Dp					
Fullerton, CA	248	●						
Anaheim, CA (Disneyland®)	253	●						
Santa Ana, CA	258	●						
Irvine, CA	268	●						
San Juan Capistrano, CA	280	●						
San Clemente Pier, CA	288	○						
Oceanside, CA (LEGOLAND) 🏰	309	●						
Carlsbad (Village), CA	312	○						
Carlsbad (Poinsettia), CA	316	○						
Encinitas, CA	321	○						
Solana Beach, CA	325	●						
Sorrento Valley, CA	332	○						
San Diego (Old Town), CA	347	○						
<b>SAN DIEGO, CA ✈</b>	350	●	Ar					
(Tijuana)								

\*This train operates only on Saturdays and Sundays, July 16 through September 4, and September 5.

\*This train does NOT operate on Saturdays or Sundays, July 16 through September 4, nor September 5.

PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16

Service on Pacific Surfliner®

- Coaches: Unreserved.
- Reserved.
- Pacific Business class:** Reserved seat service with complimentary beverages, light snacks and newspaper. Amtrak Metropolitan Lounge is available in Los Angeles for Pacific Business class passengers.
- Café:** Sandwiches, snacks and beverages.
- Checked baggage at select stations; size restriction for carry on luggage is 28" x 22" x 11". Consult Amtrak.com for latest baggage policies.
- Wi-Fi available.
- Connection between Thruway bus and train at Los Angeles.
- Connection between Thruway bus and train at Santa Barbara.
- Metrolink commuter train connection available. Separate ticket required. Call Metrolink at (800) 371-LINK for exact departure times.
- LEGOLAND is located 8 miles from Oceanside station. Transfers may be made by taxi at passenger's expense.
- Checked baggage service at this location available on weekends only.
- Thruway bus connection at San Luis Obispo Amtrak Station arrives Atascadero at 9:05 p.m. and Paso Robles at 9:25 p.m.

- 66 Connection between Thruway bus and train at San Luis Obispo Amtrak Station.
- 76 Thruway bus connects to San Joaquin trains at Bakersfield.
- 90 Travel on this bus is reserved and must be part of an itinerary involving a train trip in one direction or the other. Also, the Los Angeles ticket office is open 30 minutes ahead of departure for night buses 5804 and 5818.
- 91 Travel on this bus is reserved and must be part of an itinerary involving a train trip in one direction or the other. Since most stations are unstaffed at the hours the buses operate, advance reservations can be made and tickets purchased online at Amtrak.com, at Metrolink Ticket Vending Machines or Amtrak Quik-Trak kiosks located at most stations. Reserved, ticketed customers have priority seating. Unreserved, ticketed passengers are carried on a space-available basis. The ticket office is open at Los Angeles, San Diego and Oceanside 30 minutes before the departure of the bus.

Smoking is prohibited on trains and only permitted in designated areas at stations.

**Bicycles:** Most Pacific Surfliner trains have racks for seven bicycles located in the cab car, at the opposite end of the train from the locomotive. These slots are available by reservation only and are offered without charge. Passengers must properly secure their bicycles in the racks. For some train departures and on Thruway buses, reservations are not available and only a limited number of bicycles can be carried. When space is available, unboxed bicycles may be put in the baggage bin under connecting Thruway buses. Amtrak disclaims liability for loss or damage. Passengers connecting to Trains 2, 4 and 14 must send their bicycles as checked baggage. There is a \$10 fee, and the bicycle must be boxed; if needed, a bicycle box can be purchased from Amtrak for \$15.

SYMBOLS KEY

- A Time Symbol for A.M.
- P Time Symbol for P.M.
- N Time Symbol for Noon.
- D Stops only to discharge passengers; train may leave before time shown.
- R Stops only to receive passengers.
- M Meal stop
- Thruway Bus stop
- ✈ Airport connection
- QT Quik-Trak self-serve ticketing kiosk
- Unstaffed station
- Staffed Station with ticket office; may or may not be open for all train departures.
- ♿ Station wheelchair accessible; no barriers between station and train.
- ♿ Station wheelchair accessible; not all station facilities accessible.

Train Number ▶	572	572	774	580	582	784	790	1790	796
Normal Days of Operation ▶	SaSu	Daily	Daily	Daily	Daily	Daily	Mo-Fr	SaSuHol	Daily
Will Also Operate ▶	*See Note							9/5,11/24, 12/26,1/2	
Will Not Operate ▶		*See Note					9/5,11/24, 12/26,1/2		
On Board Service ▶									
<b>SAN LUIS OBISPO, CA</b>	Mile	Symbol	▼						
-Cal Poly	0	○	Dp						
-Amtrak Station		●	Ar						
Grover Beach, CA	12	○	Ar						
Santa Maria, CA-IHOP	24	○	Ar						
Guadalupe-Santa Maria, CA	25	○	Ar						
Lompoc-Surf Station, CA	51	○	Ar						
Lompoc, CA-Visitors Center	67	○	Ar						
Solvang, CA	68	○	Ar						
Buellton, CA-Opposite Burger King	72	○	Ar						
Goleta, CA	110	○	Ar						
<b>SANTA BARBARA, CA</b>	119	○	Ar						
Carpinteria, CA	129	○	Ar						
Ventura, CA	145	○	Ar						
Oxnard, CA	155	○	Ar						
Camarillo, CA	165	○	Ar						
Moorpark, CA	175	○	Ar						
Simi Valley, CA	186	○	Ar						
Chatsworth, CA	194	○	Ar						
Van Nuys, CA-Amtrak Station	203	○	Ar						
Burbank-Bob Hope Airport, CA ✈	209	○	Ar						
Glendale, CA	216	○	Ar						
<b>LOS ANGELES, CA ✈</b>	222	○	Ar						
Fullerton, CA	248	○	Ar						
Anaheim, CA (Disneyland®)	253	○	Ar						
Santa Ana, CA	258	○	Ar						
Irvine, CA	268	○	Ar						
San Juan Capistrano, CA	280	○	Ar						
San Clemente Pier, CA	288	○	Ar						
Oceanside, CA (LEGOLAND) 🎡	309	○	Ar						
Carlsbad (Village), CA	312	○	Ar						
Carlsbad (Poinsettia), CA	316	○	Ar						
Encinitas, CA	321	○	Ar						
Solana Beach, CA	325	○	Ar						
Sorrento Valley, CA	332	○	Ar						
San Diego (Old Town), CA	347	○	Ar						
<b>SAN DIEGO, CA ✈</b>	350	○	Ar						
(Tijuana)									

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PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16

**Pacific Surfliner Thruway Bus Connections**

Fullerton • Palm Springs • Indio			Connecting Train Number		769/572	785/784
768/572/769	784/785		Thruway Number		4969	4985
Daily	Daily	▼	Days of Operation		▲	Daily
12 05P	6 25P	Dp	Fullerton, CA-Trans. Ctr.		Ar	11 15A
D12 55P	D7 10P	↓	Riverside, CA-Metrolink Station		Ar	R10 20A
D1 35P	D7 50P	↓	Cabazon, CA-Morongo Casino		Ar	R9 30A
		↓	Palm Springs, CA		Ar	R3 35P
		↓	-Downtown SunLine Transit		Ar	R9 00A
D2 00P	D8 20P	↓	Palm Springs, CA-Airport ✈		Ar	R8 55A
2 10P	D8 25P	↓	Palm Desert, CA-SunLine Transit		Ar	R8 25A
	D8 55P	↓	La Quinta, CA-SunLine Transit		Ar	R8 10A
	D9 05P	↓	Indio, CA-Hwy. 111 at Monroe		Ar	8 00A
	9 15P	Ar				

NOTE—All Pacific Surfliner Thruway Bus Connections above require reservations.

SHADING KEY		
Daytime train	Connecting train	Thruway and connecting services

See page 4 for Connecting Transit Services, page 5 for Airport Connections, and page 8 for Route Map.

**See in San Diego**

**How to get there from San Diego's Santa Fe Depot & Old Town Transit Center**  
**Balboa Park and San Diego Zoo:** MTS Rapid Bus Route 215 from Kettner Blvd. adjacent to Santa Fe Depot  
**SeaWorld San Diego:** From Old Town take MTS Route 9 (west side of station); From Santa Fe Depot take Green Line to Old Town and transfer to MTS Bus Route 9  
**International Border at San Ysidro (for Tijuana):** From Santa Fe Depot cross Kettner Blvd. to America Plaza Station to MTS Blue Line Trolley  
**Petco Park:** MTS Green Line Trolley from Santa Fe Depot (or Old Town) to Gaslamp Quarter (headsign will read "Imperial")  
**Qualcomm Stadium:** MTS Green Line Trolley from Old Town (or Santa Fe Depot) to Qualcomm Stadium (headsign may read "Santee")  
**San Diego Cruise Terminal/International Airport:** MTS Route 992 bus runs from the Santa Fe Depot to the airport every 15 minutes during the weekday and every 30 minutes on the weekend. Board on the corner of Broadway and Kettner (near Starbucks). The trip to the airport takes only 10 minutes. Exact change one-way fare is \$2.25. The Cruise Terminal is also served by Route 992, but is only a three block walk from Santa Fe Depot.

Train Number ▶	5801	5811	761	1761	763	565	1567	567	769	573
Normal Days of Operation ▶	Daily	Daily	Mo-Fr	SaSuHo	Daily	Daily	SaSuHo	Mo-Fr	Daily	Daily
Will Also Operate ▶				9/5,11/24, 12/26,1/2			9/5,11/24, 12/26,1/2			
Will Not Operate ▶			9/5,11/24, 12/26,1/2					9/5,11/24, 12/26,1/2		
On Board Service ▶	R	R	B ☕ 🚶 🚲	B ☕ 🚶 🚲	B ☕ 🚶 🚲	B ☕ 🚶 🚲	B ☕ 🚶 🚲	B ☕ 🚶 🚲	B ☕ 🚶 🚲	B ☕ 🚶 🚲
	Mile	Symbol	▼							
<b>SAN DIEGO, CA</b> 🚶 (Tijuana)	0	●●QR	Dp							
San Diego (Old Town), CA	3	○🚶QR								
Sorrento Valley, CA	19	○								
Solana Beach, CA	26	●●QR								
Encinitas, CA	30	○								
Carlsbad (Poinsettia), CA	34	○								
Carlsbad (Village), CA	38	○								
Oceanside, CA (LEGOLAND) 🚶	41	●●QR								
San Clemente Pier, CA	63	○								
San Juan Capistrano, CA	70	●●QR								
Irvine, CA	83	●●QR								
Santa Ana, CA	92	●●QR								
Anaheim, CA (Disneyland®)	97	●●QR								
Fullerton, CA	102	●●QR								
<b>LOS ANGELES, CA</b> 🚶	128	●●QR	Ar Dp							
Glendale, CA	134	○🚶								
Burbank-Bob Hope Airport, CA 🚶	142	○●QR								
Van Nuys, CA—Amtrak Station	147	●●QR								
Chatsworth, CA	157	○🚶								
Simi Valley, CA	164	○🚶								
Moorpark, CA	175	○🚶								
Camarillo, CA	186	○🚶								
Oxnard, CA	195	●●QR								
Ventura, CA	205	○●QR								
Carpinteria, CA	221	○●QR								
<b>SANTA BARBARA, CA</b>	232	●●QR	Ar Dp							
Goleta, CA	241	○🚶QR								
Solvang, CA	267	○🚶								
Buellton, CA—Opposite Burger King	271	○								
Lompoc, CA—Visitors Center	284	○🚶								
Lompoc-Surf Station, CA	300	○								
Guadalupe-Santa Maria, CA	326	○●QR								
Santa Maria, CA—IHOP	327	○🚶								
Grover Beach, CA	338	○●QR								
<b>SAN LUIS OBISPO, CA</b>	350	●●QR	Ar							
—Amtrak Station		○	Ar							
—Cal Poly		○	Ar							

PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16

Connecting Transit Services in Southern California

**Metrolink** provides commuter rail service radiating from Los Angeles Union Station to the Antelope Valley, downtown Burbank, Oxnard, Riverside, San Bernardino and Orange County. It supplements *Pacific Surfliner* service between Oxnard and Oceanside. (800) 371-5465; metrolinktrains.com. *Rail 2 Rail*: The Rail 2 Rail program offers *Pacific Surfliner* monthly pass holders access to Metrolink and COASTER commuter trains within the station limits of their pass.

**Los Angeles County Metropolitan Transportation Authority** provides bus, subway, and light rail services in the Los Angeles area; Metro's Red, Purple and Gold lines originate at Union Station and provide rail connections to Hollywood, Universal City and Pasadena. 323.GO.METRO; metro.net

**North County Transit District** operates the COASTER commuter rail service which supplements *Pacific Surfliner* service between San Diego and Oceanside including additional stops at Sorrento Valley, Solana Beach, Encinitas and Carlsbad. The Sprinter operates frequent rail service between Oceanside, Vista, San Marcos and Escondido. The Breeze also provides bus service at many *Pacific Surfliner* stations. (760) 966-6500; www.gonctd.com.

**San Diego Metropolitan Transit System** operates bus and the San Diego Trolley service. Direct service to San Diego's Santa Fe Depot and Old Town stations. (619) 233-3004; sdmts.com.

**Orange County Transportation Authority** provides bus transit service throughout Orange County including *Pacific Surfliner* stations in Fullerton, Anaheim, Santa Ana, Irvine, San Juan Capistrano and San Clemente. (714) 636-7433; www.octa.net.

**Santa Barbara Metropolitan Transit District** provides bus transit service in Santa Barbara County, including connections to the Downtown and Waterfront shuttles serving State Street, the Santa Barbara Zoo and Santa Barbara Harbor. (805) 963-3366; sbmtd.gov.

**Anaheim Resort Transit** provides convenient bus connections from the Anaheim station to the Disneyland Resort and Anaheim Convention Center. (888) 364-2787; www.rideart.org

For a complete list of connecting public transit providers, visit PacificSurfliner.com

NEW!  
Transit Transfer Program

The *Pacific Surfliner* Transit Transfer Program provides free transfers to connecting transit providers at most stations. Simply show your Amtrak *Pacific Surfliner* paper ticket or e-Ticket when you board the bus or shuttle. You can also purchase a discounted one-day transit pass for Metro (Los Angeles) and MTS (San Diego) in the Café car. Visit PacificSurfliner.com for details.

SHADING KEY

- Daytime train
- Connecting train
- Thruway and connecting services

See pages 2-3 for Services, Symbols and Reference Marks; and page 8 for Route Map.

Train Number ▶	777	579	583	583	785	591	591	595	5809			
Normal Days of Operation ▶	Daily	Daily	Daily	SaSu	Daily	Daily	SaSu	Daily	Daily			
Will Also Operate ▶				*See Note			*See Note					
Will Not Operate ▶			*See Note			*See Note						
On Board Service ▶												
<b>SAN DIEGO, CA</b>	0	●●QT	Dp	●11 57A	●1 36P	●2 47P	●3 05P	●3 58P	●6 50P	●6 50P	●8 59P	●9 45P
(Tijuana)												
San Diego (Old Town), CA	3	○●QT				R2 54P	R3 12P	R4 05P	R6 57P	R6 57P	R9 06P	
Sorrento Valley, CA	19	○									9 28P	
Solana Beach, CA	26	●●QT		12 32P	2 11P	3 28P	3 50P	4 36P	7 28P	7 33P	9 39P	●9 10 15P
Encinitas, CA	30	○									9 45P	
Carlsbad (Poinsettia), CA	34	○									9 51P	
Carlsbad (Village), CA	38	○									9 57P	
Oceanside, CA (LEGOLAND)	41	●●QT		●12 47P	2 27P	●3 45P	●4 06P	●4 53P	7 44P	7 49P	10 03P	●9 10 45P
San Clemente Pier, CA	63	○				4 07P	4 30P	5 19P				
San Juan Capistrano, CA	70	●●QT		1 19P	2 59P	4 22P	4 51P	5 34P	8 17P	8 22P	10 35P	●9 11 20P
Irvine, CA	83	●●QT		1 33P	3 14P	4 38P	5 09P	5 49P	8 32P	8 43P	10 49P	●9 11 35P
Santa Ana, CA	92	●●QT		●1 44P	3 25P	●4 51P	●5 24P	●6 00P	8 43P	8 54P	11 01P	●9 11 55P
Anaheim, CA (Disneyland®)	97	●●QT		●1 53P	3 34P	●5 01P	●5 36P	6 10P	8 52P	9 03P	11 10P	
Fullerton, CA	102	●●QT		●2 01P	●3 42P	●5 10P	●5 48P	●6 20P	●9 00P	●9 13P	●11 18P	●9 12 15A
<b>LOS ANGELES, CA</b>	128	●●QT	Ar	●2 40P	●4 17P	●5 45P	●6 28P	●6 55P	●9 35P	●9 54P	●11 52P	●9 1 00A
Glendale, CA	134	○●	Dp	●3 05P	44	44		●7 15P	●7 15P	●7 15P		●9 1 15A
Burbank-Bob Hope Airport, CA	142	○●QT		3 17P	44	44		7 27P	●10 05P	●10 25P		●9 1 30A
Van Nuys, CA—Amtrak Station	147	●●QT		●3 37P	44	44		●7 47P	●10 30P	●10 50P		●9 1 45A
Chatsworth, CA	157	○●		3 49P	44	44		7 59P	●D10 50P	●D11 10P		
Simi Valley, CA	164	○●		4 01P	44	44		8 11P	●D11 10P	●D11 30P		
Moorpark, CA	175	○●			44	44			●D11 25P	●D11 45P		
Camarillo, CA	186	○●		4 27P	44			8 35P	●D11 35P	●D11 55P		
Oxnard, CA	195	●●QT		●4 38P	44			●8 46P	●D11 45P	●D12 05A		
Ventura, CA	205	○●QT		4 57P				9 00P	●D11 59P	●D12 20A		
Carpinteria, CA	221	○●QT		5 21P				9 22P	●D12 15A	●D12 35A		
<b>SANTA BARBARA, CA</b>	232	●●QT	Ar	●5 40P				●D9 50P	●D12 35A	●D12 55A		
Goleta, CA	241	○●QT	Dp	5 55P				10 03P	●12 50A	●1 10A		
Solvang, CA	267	○●						●D10 40P				
Buellton, CA—Opposite Burger King	271	○						●D10 45P				
Lompoc, CA—Visitors Center	284	○●										
Lompoc-Surf Station, CA	300	○		7 01P								
Guadalupe-Santa Maria, CA	326	○●QT		7 37P								
Santa Maria, CA—IHOP	327	○●							●D11 25P			
Grover Beach, CA	338	○●QT		7 54P					●11 50P			
<b>SAN LUIS OBISPO, CA</b>	350	●●QT	Ar	●8 35P				●12 15A				
—Amtrak Station		○	Ar	●8 45P				●12 30A				
—Cal Poly												

PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16

Pacific Surfliner Thruway Bus Connections

Los Angeles • Long Beach • San Pedro

573/774	777	583/784	591/796/11	Connecting Train Number				566/761/1761	572/769	777	580/785
5702	5712	5714	5716	Thruway Number				5713	5715	5717	5703
Daily	Daily	Daily	Daily	Days of Operation				Daily	Daily	Daily	Daily
2 50P	4 35P	6 50P	10 00P	Dp	Los Angeles, CA—Union Station	Ar	7 20A	10 25A	12 45P	2 45P	
D3 45P	D5 30P	D7 45P	D10 55P	Ar	Long Beach, CA—Transit Gallery	Dp	R6 00A	R9 20A	R11 45A	R1 45P	
D4 00P	D5 45P	D8 00P	D11 10P	Ar	San Pedro, CA—Catalina Terminal	Dp	R5 45A	R9 05A	R11 30A	R1 30P	
4 15P	6 00P	8 15P	11 25P	Ar	—Library	Dp	5 35A	8 55A	11 20A	1 20P	

NOTE—All Pacific Surfliner Thruway Bus Connections above require reservations.

Airport Connections

Los Angeles International Airport

FlyAway bus service operates directly from Los Angeles Union Station to all terminals of Los Angeles International Airport. Buses depart on the half-hour from 5:00 a.m.-1:00 a.m., then at 2:00 a.m., 3:00 a.m. and 4:00 a.m. Travel time is 40-45 minutes. Reservations are not required. Tickets are available on board buses departing throughout the day from berth 9 of the Patsaouras Transit Plaza on the east side of Union Station. Credit and debit cards only are accepted, no cash. For further information, including purchasing tickets online, limited service from Van Nuys and Westwood (UCLA), etc., go to lawa.org/flyaway or call (866) 435-9529.

Burbank-Bob Hope Airport

The Burbank-Bob Hope Airport train station/Thruway bus stop is one short block from the main air terminal. Shuttle service between the rail station and airport terminal is available on call from the courtesy telephone on the sidewalk by the Empire Avenue crosswalk. Rental car agencies are located between the rail station and airport.



Book Your Bike!

Bicycle reservations are required on all Pacific Surfliner trains. Reservations are complimentary and can be obtained on-line at Amtrak.com (click the "Add Bike to Trip" tab after selecting your departure and class of service), at Quik-Trak kiosks, from station ticket agents, or by calling 1-800-USA-RAIL. Bike reservations are required for each travel segment and must accompany a valid Amtrak ticket. Amtrak Multi-Ride Ticket holders (10-trip or Monthly Pass) may obtain bike reservations only through station ticket agents or by calling 1-800-USA-RAIL. Passengers are required to properly secure bicycles in bike racks. Book early, as bike space is limited and may not be available on all trains or departures.

Train Name ▶			Capitol Corridor	Capitol Corridor	Pacific Surfliner	Capitol Corridor	Capitol Corridor	Coast Starlight	Capitol Corridor	Capitol Corridor	Capitol Corridor
Train Number ▶			549/768	749/768	784	523/790	723/1790	11/796	527/796	727/796	537/737
Normal Days of Operation ▶			Mo-Fr <sup>74</sup>	SaSuHo <sup>74</sup>	Daily	Mo-Fr	SaSuHo	Daily	Mo-Fr	SaSuHo	Daily
On Board Service ▶											
	Mile	Symbol									
<b>SACRAMENTO, CA</b>	0	●●●	Dp	6 55P	7 35P		5 30A	6 10A	7 00A	8 10A	12 10P
Davis, CA	13	●●●		7 10P	7 50P		5 45A	6 25A	7 15A	8 25A	12 25P
Suisun-Fairfield, CA	40	○●●		7 34P	8 14P		6 09A	6 49A	7 39A	8 49A	12 49P
Martinez, CA	57	●●●		7 54P	8 34P		6 29A	7 09A	7 59A	9 09A	1 09P
Richmond, CA	76	○●●		8 20P	9 00P		6 55A	7 35A	8 25A	9 35A	1 35P
Berkeley, CA	82	○●●		8 28P	9 08P		7 03A	7 43A	8 33A	9 43A	1 43P
Emeryville, CA	84	●●●		8 35P	9 15P	●●R6 05A	7 10A	7 50A	8 40A	9 50A	1 50P
<b>OAKLAND, CA</b>	89	●●●	Ar	D8 51P	9 33P		7 21A	8 01A	8 35A	9 51A	10 01A
—Jack London Square			Dp	●●10 00P	●●10 00P	●●R5 55A	●●7 10A	●●7 40A	●●8 50A	●●9 55A	●●10 00P
Oakland Coliseum, CA.	94	○●●					7 32A	8 12A		9 02A	10 12A
San Francisco, CA—Transbay Term.		●●●		●●10 45P	●●10 45P	●●R6 35A	●●R7 40A	●●R8 10A		●●R10 30A	●●R10 30A
Hayward, CA	102	○●●					7 43A	8 23A		9 13A	10 23A
Fremont-Centerville, CA	114	○●●					7 59A	8 39A		9 29A	10 39A
Santa Clara, CA—Great America	125	○●●					8 16A	8 56A		9 46A	10 56A
Santa Clara, CA—University Station	128	○					8 24A	9 04A		9 54A	11 04A
<b>SAN JOSE, CA</b>	132	●●●	Ar	●●11 55P	●●11 55P	●●7 30A	8 38A	9 18A	9 55A	10 13A	11 18A
Salinas, CA	203	●●●	Dp	●●11 59P	●●11 59P	●●R7 35A	●●R9 05A	●●R9 25A	●●10 07A	●●11 35A	●●11 35A
King City, CA—McDonald's		○●●		●●1 15A	●●1 15A	●●R8 45A	●●R10 10A	●●R10 30A	●●11 48A	●●12 40P	●●12 40P
Paso Robles, CA	300	○●●		●●M2 10A	●●M2 10A	●●M9 40A	●●M11 15A	●●M11 35A		●●M1 40P	●●M1 40P
Atascadero, CA—Transit Center	310	○●●		●●3 10A	●●3 10A	●●10 40A	●●12 15P	●●12 35P	1 38P	●●2 40P	●●2 40P
San Luis Obispo, CA—Cal Poly	334	○								●●2 55P	●●2 55P
<b>SAN LUIS OBISPO, CA</b>	335	●●●	Ar	●●3 50A	●●3 50A	●●R10 10A	●●12 50P	●●1 10P		●●3 15P	●●3 15P
Grover Beach, CA	348	○●●	Dp	●●3 50A	●●3 50A	●●10 25A	●●1 10P	●●1 30P	3 07P	●●3 30P	●●3 30P
Santa Maria, CA—IHOP	360	○●●		●●4 15A	●●4 15A	●●10 30A	●●1 35P	●●2 00P	●●3 20P	●●3 40P	●●3 40P
Guadalupe-Santa Maria, CA	361	○●●		●●4 40A	●●4 40A	●●R11 20A				●●4 35P	●●4 35P
Lompoc-Surf Station, CA	388	○					2 11P	2 36P			
Lompoc, CA—Visitors Center	404	○●●				●●R12 05P	2 51P	3 16P			
Solvang, CA—Solvang Park	436	○●●		●●5 15A	●●5 15A	●●R12 35P				●●5 10P	●●5 10P
Buellton, CA—Opposite Burger King		○		●●5 20A	●●5 20A	●●R12 40P				●●5 15P	●●5 15P
Goleta, CA	447	○●●		6 35A	6 35A	1 50P	3 57P	4 22P		6 45P	6 45P
<b>SANTA BARBARA, CA</b>	456	●●●	Ar	●●6 30A	●●6 30A	●●1 45P	●●4 09P	●●4 37P	●●5 55P	●●6 40P	●●6 40P
Carpinteria, CA	466	○●●	Dp	●●6 49A	●●6 49A	●●2 04P	●●4 12P	●●4 40P	●●6 02P	●●6 59P	●●6 59P
Ventura, CA	482	○●●		7 04A	7 04A	2 19P	4 27P	4 55P		7 15P	7 15P
Oxnard, CA	492	●●●		7 29A	7 29A	2 41P	4 49P	5 21P		7 37P	7 37P
Camarillo, CA	502	○●●		7 43A	7 43A	2 57P	4 57P	5 35P	●●D7 05P	●●7 51P	●●7 51P
Moorpark, CA	512	○●●		7 54A	7 54A	3 08P				8 02P	8 02P
Simi Valley, CA	523	○●●		8 08A	8 08A	3 20P	5 36P	6 04P			
Chatsworth, CA	531	○●●		8 23A	8 23A	3 35P	5 54P	6 20P	D7 48P	8 38P	8 38P
Van Nuys, CA—Amtrak Station	540	○●●		8 40A	8 40A	3 52P	6 12P	6 33P		8 50P	8 50P
Burbank-Bob Hope Airport, CA	546	○●●		8 56A	8 56A	4 14P	6 31P	6 45P	●●D8 22P	●●9 06P	●●9 06P
Glendale, CA	553	○●●		9 04A	9 04A	4 22P	6 39P	6 53P	D8 31P	9 13P	9 13P
<b>LOS ANGELES, CA</b>	559	●●●	Ar	9 16A	9 16A	4 32P	6 50P	7 04P		9 23P	9 23P
Fullerton, CA	585	●●●	Dp	●●9 35A	●●9 35A	●●4 50P	●●7 10P	●●7 20P	●●9 00P	●●9 45P	●●9 45P
Anaheim, CA (Disneyland*)	590	●●●		●●9 55A	●●9 55A	●●5 10P	●●7 31P	●●7 40P	●●10 10P	●●10 10P	●●10 10P
Santa Ana, CA	595	●●●		●●10 26A	●●10 26A	●●5 42P	●●8 02P	●●8 11P	●●10 41P	●●10 41P	●●10 41P
Irvine, CA	605	●●●		●●10 34A	●●10 34A	●●5 51P	●●8 10P	●●8 19P	●●10 49P	●●10 49P	●●10 49P
San Juan Capistrano, CA	617	●●●		●●10 43A	●●10 43A	6 00P	●●8 19P	●●8 28P	●●10 58P	●●10 58P	●●10 58P
San Clemente Pier, CA	625	○		10 54A	10 54A	6 13P	8 32P	8 39P	11 09P	11 09P	11 09P
Oceanside, CA (LEGOLAND)	646	●●●		11 09A	11 09A	6 27P	8 47P	8 54P	11 24P	11 24P	11 24P
Carlsbad (Village), CA	649	○		11 22A	11 22A						
Carlsbad (Poinsettia), CA	653	○				●●7 03P	●●9 20P	●●9 27P	●●11 57P	●●11 57P	●●11 57P
Encinitas, CA	658	○				7 08P	9 25P	9 32P	12 03A	12 03A	12 03A
Solana Beach, CA	662	●●●				7 14P	9 32P	9 39P	12 12A	12 12A	12 12A
Sorrento Valley, CA	669	○				7 23P	9 40P	9 48P	12 19A	12 19A	12 19A
San Diego (Old Town), CA	684	○●●		12 08P	12 08P	7 29P	9 47P	9 55P	12 26A	12 26A	12 26A
<b>SAN DIEGO, CA</b>	687	●●●	Ar			7 39P	9 57P	10 06P	12 36A	12 36A	12 36A
				D12 41P	D12 41P	D8 01P	D10 19P	D10 27P	D12 58A	D12 58A	D12 58A
				●●12 49P	●●12 49P	●●8 09P	●●10 30P	●●10 39P	●●1 06A	●●1 06A	●●1 06A

CAPITOL CORRIDOR SCHEDULES EFFECTIVE 8/22/16. PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16.

<sup>74</sup> Modified Summer Weekend Schedule for Overnight Coastal Service

<sup>74</sup> The Amtrak Thruway buses for trains 749/768 and 549/768 operate 70 minutes earlier from Oakland to Santa Barbara on Friday and Saturday nights between July 15 and September 3, as well as Sunday night September 4. For Train 768 (Pacific Surfliner) schedule on those nights, see page 2. Capitol Corridor train schedule does not change.

See page 4 for Connecting Transit Services.  
See page 5 for Airport Connections.  
See page 8 for Route Map.

Train Name ▶		Capitol Corridor	Capitol Corridor	Pacific Surfliner	Pacific Surfliner	Pacific Surfliner	Pacific Surfliner	Pacific Surfliner	Pacific Surfliner	Pacific Surfliner	Pacific Surfliner	Pacific Surfliner	
Train Number ▶		732	538	761/546	1761/742	763/548	763/14	763/748	769	777	785/522	785/720	
Normal Days of Operation ▶		SaSuHo	Mo-Fr	Mo-Fr	SaSuHo	Mo-Fr	Daily	SaSuHo	Daily	Daily	Mo-Fr	SaSuHo	
On Board Service ▶													
	Mile	Symbol											
<b>SAN DIEGO, CA</b> †	0	●●QR	Dp										
San Diego (Old Town), CA	3	○●QR											
Solana Beach, CA	26	●●QR											
Oceanside, CA (LEGOLAND)	41	●●QR											
San Clemente Pier, CA	63	○											
San Juan Capistrano, CA	70	●●											
Irvine, CA	83	●●											
Santa Ana, CA	92	●●											
Anaheim, CA (Disneyland <sup>®</sup> )	97	●●											
Fullerton, CA	102	●●QR											
<b>LOS ANGELES, CA</b> †	128	●●QR	Ar Dp										
Glendale, CA	134	○●											
Burbank-Bob Hope Airport, CA †	142	○●QR											
Van Nuys, CA-Amtrak Station	147	●●QR											
Chatsworth, CA	157	○●											
Simi Valley, CA	164	○●											
Moorpark, CA	175	○●											
Camarillo, CA	186	○●											
Oxnard, CA	195	●●QR											
Ventura, CA	205	○●QR											
Carpinteria, CA	221	○●QR											
<b>SANTA BARBARA, CA</b>	232	●●QR	Ar Dp										
Goleta, CA	241	○●QR											
Solvang, CA-Solvang Park	279	○●											
Buellton, CA-Opp. Burger King		○											
Lompoc, CA-Visitors Center	288	○●											
Lompoc-Surf Station, CA	300	○											
Guadalupe-Santa Maria, CA	326	○●QR											
Santa Maria, CA-IHOP	327	○●											
Grover Beach, CA	338	○●QR											
<b>SAN LUIS OBISPO, CA</b>	350	●●QR	Ar Dp										
San Luis Obispo, CA-Cal Poly	351	○											
Atascadero, CA-Transit Center	375	○											
Paso Robles, CA	385	○●											
King City, CA-McDonald's		○●											
Salinas, CA	483	●●											
<b>SAN JOSE, CA</b>	554	●●QR	Ar Dp										
Santa Clara, CA-University Station	561	○											
Santa Clara, CA-Great America	564	○●QR											
Fremont-Centerville, CA	573	○●QR											
Hayward, CA	585	○●QR											
San Francisco, CA-Transbay Term.		○●QR											
Oakland Coliseum, CA	593	○●QR											
<b>OAKLAND, CA</b>	598	●●QR	Ar Dp										
—Jack London Square													
Emeryville, CA	603	●●QR											
Berkeley, CA	604	○●QR											
Richmond, CA	610	○●QR											
Martinez, CA	630	●●QR											
Suisun-Fairfield, CA	647	○●QR											
Davis, CA	674	●●QR											
<b>SACRAMENTO, CA</b>	687	●●QR	Ar										

CAPITOL CORRIDOR SCHEDULES EFFECTIVE 8/22/16. PACIFIC SURFLINER SCHEDULES EFFECTIVE 6/6/16.

Service on California Coastal Routes

- M** Meal stop.
- Bus 4784 operates express service to Santa Barbara via San Luis Obispo.
- For detailed service information for the *Capitol Corridor* between Reno and San Jose, please refer to our corresponding timetable folder (W34).
- For detailed service information for the *Pacific Surfliner* between San Luis Obispo and San Diego, please refer to pages 2-5.

- For detailed service information for the *Coast Starlight* between Seattle and Los Angeles, please refer to our corresponding timetable folder (P11).
- Train departs Oakland two minutes after arrival and makes connection with southbound coastal bus at San Jose.

See pages 2-3 for Services, Symbols and Reference Marks.

SHADING KEY

Daytime train	Overnight train
Thruway and connecting services	

Smoking is prohibited on trains and only permitted in designated areas at stations.

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DODGE CITY - RATON - LAMY (SANTA FE)  
ALBUQUERQUE - FLAGSTAFF - LOS ANGELES  
*and intermediate stations*



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# SOUTHWEST CHIEF

3		◀ Train Number ▶		4		
Daily		◀ Normal Days of Operation ▶		Daily		
		◀ On Board Service ▶				
Read Down	Mile	▼		Symbol	▲	Read Up
3:00P	0	Dp	Chicago, IL—Union Station (CT) Madison—see back	● & QT	Ar	3:15P
R3 35P	28	↓	Naperville, IL	● & QT	↑	D2 42P
4 24P	83	↓	Mendota, IL	○ & QT	↑	1 19P
4 46P	104	↓	Princeton, IL	○ & QT	↑	12 58P
5 38P	162	↓	Galesburg, IL—S. Seminary St. [7]	● & QT	↑	12 08P
6 42P	220	↓	Fort Madison, IA (Keokuk)	● & QT	↑	11 09A
7 51P	298	↓	La Plata, MO (Kirksville)	○ & QT	↑	9 55A
10 11P	437	Ar	Kansas City, MO	● & QT	Dp	7 43A
10 45P	477	Dp	Lawrence, KS	○ & QT	Ar	7 24A
12 29A	503	↓	Topeka, KS	● & QT	↑	5 47A
2 45A	638	↓	Newton, KS (Wichita)	● & QT	↑	5 18A
3 20A	671	↓	Hutchinson, KS	○ & QT	↑	2 19A
5 25A	791	↓	Dodge City, KS	● & QT	↑	12 27A
6 21A	841	↓	Garden City, KS (CT)	● & QT	↑	11 17P
6 59A	941	↓	Lamar, CO (MT)	○ & QT	↑	8 40P
8 15A	993	Ar	La Junta, CO	● & QT	Dp	7 41P
8 30A	1074	Dp	Trinidad, CO	○ & QT	Ar	7 31P
9 50A	1098	↓	Raton, NM	○ & QT	↑	5 49P
10 56A	1209	↓	Las Vegas, NM Denver—see back	○ & QT	↑	4 50P
12 38P	1274	↓	Lamy, NM	● & QT	↑	3 03P
2 24P	1341	Ar	Santa Fe—see back	● & QT	Ar	1 17P
3 55P	1341	Dp	Albuquerque, NM	● & QT	Dp	12 10P
4 45P	1341	Ar	Gallup, NM (MT)	○ & QT	Ar	11 42A
7 08P	1514	↓	Winslow, AZ (MST)	○ & QT	↑	8 21A
7 50P	1641	↓	Flagstaff, AZ	● & QT	↑	5 39A
8 51P	1699	Ar	Grand Canyon, Phoenix—see back	● & QT	Dp	4 41A
8 57P	1699	Dp	Williams Jct., AZ (Grand Can. Ry.)	○ & QT	Ar	4 36A
9 33P	1730	↓	Kingman, AZ (MST)	○ & QT	↑	3 50A
11 46P	1873	↓	Laughlin, Las Vegas—see back	○ & QT	↑	1 33A
12 49A	1940	↓	Needles, CA (PT)	○ & QT	↑	12 23A
3 39A	2109	↓	Barstow, CA	○ & QT	↑	9 56P
4 18A	2146	↓	Victorville, CA	○ & QT	↑	9 10P
5 32A	2193	↓	San Bernardino, CA	○ & QT	↑	7 59P
5 53A	2203	↓	Riverside, CA	○ & QT	↑	7 33P
D6 34A	2239	↓	Fullerton, CA	● & QT	↑	R6 50P
8 15A	2265	Ar	Los Angeles, CA ✈ (PT) Las Vegas—see back, below	● & QT	Dp	6 15P

[7] Executive Transportation operates Thruway van service from Springfield, IL for connections from Train 22 to Trains 3 and 5 at Galesburg, IL and from Galesburg, IL for connections from Trains 4 and 6 to Train 21 at Springfield, IL. Passengers with disabilities must provide advance notification of needs. For additional information call (217) 523-5466.

## SOUTHWEST CHIEF ROUTE MAP and SYMBOLS



- A Time Symbol for A.M.
- P Time Symbol for P.M.
- D Stops only to discharge passengers; train may leave before time shown.
- R Stops only to receive passengers.
- CT Central time
- MT Mountain time
- MST Mountain Standard time
- PT Pacific time
- Bus stop
- ✈ Airport connection
- QT Quik-Trak self-serve ticketing kiosk
- Unstaffed station
- Attended station
- Staffed ticket office; may or may not be open for all train departures
- ♿ Station wheelchair accessible; no barriers between station and train
- ♿ Station wheelchair accessible; not all stations facilities accessible

### Service on the Southwest Chief®

- Coaches:** Reservations required.
- Sleeping cars:** Superliner sleeping accommodations.
- Amtrak Metropolitan Lounge available in Chicago and Los Angeles for Sleeping car passengers.
- Dining:** Full meal service.
- Sightseer Lounge:** Sandwiches, snacks and beverages.
- Checked baggage at select stations.
- Free shuttle service between Williams Grand Canyon Railway Amtrak station and Williams Junction Amtrak station. Reservations required.
- This location does not observe Daylight Saving Time. Schedule times at this station will be ONE HOUR LATER beginning with the Fall time change on November 2, 2014.

**Smoking is prohibited.**

**Trails and Rails Program:** In cooperation with the National Park Service, volunteer rangers from Bent's Old Fort National Historic Site provide narrative between La Junta and Albuquerque on Train 3 Friday and Sunday and on Train 4 Saturday and Monday, May 4 through September 1; volunteers from Texas A&M University provide narrative between Chicago and La Plata on Train 3 Tuesday and Thursday and Train 4 Wednesday and Friday, May 13 through September 15 and November 11 through January 1. Seasonal programs are subject to change. Visit [nps.gov/trailsandrails](http://nps.gov/trailsandrails) and [amtraktoparks.com](http://amtraktoparks.com).

### Thruway Bus Connections

#### Flagstaff • Phoenix (Arizona Shuttle)

NOTE—In addition to the same-day train connections at Flagstaff shown on the next page, this service offers overnight connections for travel between Phoenix and the Grand Canyon or points east of Flagstaff.

										Thruway Number													
8561	8563	8553	8557	8559	8565	8567	8581	8569		Mile	▼	Days of Operation	Symbol	▲	8560	8554	8562	8576	8556	8558	8564	8566	8568
Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily							Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily
5 00A	7 00A	8 00A	9 00A	11 00A	1 00P	3 00P	5 00P	7 00P	0	Dp		Flagstaff, AZ (MST) —Amtrak Station	●	Ar	10 20A	12 20P	2 20P	3 20P	4 20P	6 20P	8 20P	10 20P	12 20A
6 00A	8 00A	9 00A	10 00A	12 00N	2 00P	4 00P	6 00P	8 00P	50	Dp		Camp Verde, AZ Phoenix, AZ	○	Dp	9 00A	11 00A	1 00P	2 00P	3 00P	5 00P	7 00P	9 00P	11 00P
7 50A	9 50A	10 50A	11 50A	1 50P	3 50P	5 50P	7 50P	9 50P	143	Ar		—Metro Center Transportation Ctr.	○	Dp	7 30A	9 30A	11 30A	12 30P	1 30P	3 30P	5 45P	7 30P	9 30P
8 10A	10 10A	11 10A	12 10P	2 10P	4 10P	6 10P	8 10P	10 00P	145	Ar		—Sky Harbor (MST) Airport	○	Dp	7 00A	9 00A	11 00A	12 00N	1 00P	3 00P	5 00P	7 00P	9 00P

NOTE—Additional service: Bus 8579 departs Flagstaff 2:00 p.m., arriving Camp Verde 3:00 p.m., Phoenix Metro Center 4:50 p.m. and Sky Harbor Airport 5:10 p.m. Bus 8580 departs Sky Harbor Airport 6:00 p.m., Metro Center 6:30 p.m. and Camp Verde 8:00 p.m., arriving Flagstaff 9:20 p.m.

#### Los Angeles • Las Vegas (Greyhound Lines) NOTE—Greyhound schedules subject to change.

8534		8536		Thruway Number		8535	
Daily	Daily	Mile	▼	Days of Operation	Symbol	▲	Daily
10 45A	3 10P	0	Dp	Los Angeles, CA ✈—Union Station (PT)	● & QT	Ar	3 15P
4 55P	8 20P	271	Ar	Las Vegas, NV—Greyhound Station (PT)	○	Dp	9 05A

#### Shading Key

- Long-distance train
- Thruway and connecting services

## Thruway Bus Connections

### Madison • Rockford • Chicago

*(Van Galder—en route transfers may be necessary)*

8964	Mile		Thruway Number	Symbol		8965
			<b>Madison, WI</b> (CT)			
10 00A	0	Dp	–Univ. of Wisconsin/Chazen Museum	○	Ar	8 35P
10 15A	6		–Dutchmill Park & Ride	○		8 20P
11 00A	35		<b>Janesville, WI</b>	○		7 30P
11 25A	48		<b>South Beloit, IL</b>	○		7 10P
11 50A	65	Dp	<b>Rockford, IL</b>	○	Ar	6 50P
1 45P	140	Ar	<b>Chicago, IL</b> —Union Station (CT)	●	Dp	5 00P

### Denver • Colorado Springs • Pueblo • Raton

*(Greyhound Lines)*

3	Connecting Train Number					4
8603	Mile		Thruway Number	Symbol		8604
5 30A		Dp	<b>Denver, CO</b> —Amtrak Station (MT)	●♿	Ar	9 10P
7 10A		Ar	<b>Colorado Springs, CO</b>	○	Dp	7 40P
8 10A		Ar	<b>Pueblo, CO</b>	○	Dp	6 45P
10 20A		Ar	<b>Raton, NM</b> —Amtrak Station (MT)	○	Dp	5 05P

### Lamy • Santa Fe *(Lamy Shuttle)*

Lamy Shuttle Service van meets Trains 3 and 4 daily. From Lamy to Santa Fe, advance reservations required; call 1-800-USA-RAIL. From Santa Fe to Lamy, shuttle will pick up at your hotel; call (505) 982-8829 the day prior to departure to arrange pickup.

### Grand Canyon • Williams *(Grand Canyon Railway)*

7903	Grand Canyon Railway Train Number					7904
Daily	Mile		Days of Operation	Symbol		Daily
3 30P	0	Dp	<b>Grand Canyon, AZ</b> (MST) –Grand Canyon Railway Station	○♿	Ar	11 45A
5 45P	64	Ar	<b>Williams, AZ</b> (MST) –Grand Canyon Railway Station	○♿	Dp	9 30A

NOTE—The Grand Canyon Railway station at the Grand Canyon is located near the Canyon rim, across the road from the El Tovar Hotel. Please visit [www.thetrain.com/schedule](http://www.thetrain.com/schedule) for any updates to 2014 train schedule.

### Williams • Williams Junction <sup>53</sup>

*(Shuttle service provided by Grand Canyon Railway)*

3	Connecting Train Number					4
6903	Thruway Number					6904
Daily	Mile		Days of Operation	Symbol		Daily
<sup>69</sup> 9 10P	0	Dp	<b>Williams, AZ</b> (MST) –Grand Canyon Railway Station	○♿	Ar	<sup>69</sup> 4 10A
<sup>69</sup> 9 20P	3	Ar	<b>Williams Junction, AZ</b> (MST) –Amtrak Station	○♿	Dp	<sup>69</sup> 4 00A
6803	Thruway Number					6804
<sup>69</sup> 9 40P	0	Dp	<b>Williams Junction, AZ</b> (MST) –Amtrak Station	○♿	Ar	<sup>69</sup> 3 40A
<sup>69</sup> 9 50P	3	Ar	<b>Williams, AZ</b> (MST) –Grand Canyon Railway Station	○♿	Dp	<sup>69</sup> 3 30A

### Kingman • Laughlin • Las Vegas *(Commuter Services)*

8003	Mile		Thruway Number	Symbol		8004
<sup>69</sup> 11 50P	0	Dp	<b>Kingman, AZ</b> —Amtrak Station (MST)	○	Ar	<sup>69</sup> 1 00A
12 50A	33	Ar	<b>Laughlin, NV</b> —Tropicana Express (PT)	○	Dp	12 01A
3 10A	128	Ar	<b>Las Vegas, NV</b> (PT) –McCarran International Airport	○	Dp	9 30P

### Flagstaff • Phoenix *(Greyhound Lines)*

3	Connecting Train Number					4
8703	Thruway Number					8704
Daily	Mile		Days of Operation	Symbol		Daily
<sup>69</sup> 10 10P	0	Dp	<b>Flagstaff, AZ</b> —KP Transport. (MST)	○	Ar	<sup>69</sup> 2 20A
<sup>69</sup> 12 40A	145	Ar	<b>Phoenix, AZ</b> —Greyhound Sta. (MST)	○	Dp	<sup>69</sup> 11 40P

## Rail Runner Commuter Rail Service

### *Belen–Albuquerque–Santa Fe*

For information call (866) 795-7245 or visit [www.nmrailrunner.com](http://www.nmrailrunner.com).

See other side for Shading Key, Route Map and Symbols.

Effective JUNE 9, 2014

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# SUNSET LIMITED

1 <sup>(20)</sup>		◀ Train Number ▶		2 <sup>(20)</sup>	
As indicated in column		◀ Normal Days of Operation ▶		As indicated in column	
		◀ On Board Service ▶			
Read Down	Mile	Symbol	Symbol	Read Up	
09 00A MoWeSa	0	Dp	New Orleans, LA (CT)	09 40P TuFrSu	Ar
			Baton Rouge—see below		
10 30A MoWeSa	56	↓	Schriever, LA (Houma/Thibodaux)	07 03P TuFrSu	↑
11 56A MoWeSa	127	↓	New Iberia, LA	05 41P TuFrSu	↑
12 24P MoWeSa	145	↓	Lafayette, LA	05 15P TuFrSu	↑
01 55P MoWeSa	219	↓	Lake Charles, LA	03 29P TuFrSu	↑
03 48P MoWeSa	281	↓	Beaumont, TX (Port Arthur)	02 05P TuFrSu	↑
06 18P MoWeSa	363	Ar	Houston, TX	12 10P TuFrSu	Dp
06 55P MoWeSa		Dp	Galveston—see below	11 10A TuFrSu	Ar
12 05A TuThSu	573	Ar	San Antonio, TX	06 25A TuFrSu	Dp
02 45A TuThSu		Dp		04 50A TuFrSu	Ar
05 49A TuThSu	742	↓	Del Rio, TX	02 02A TuFrSu	↑
08 24A TuThSu	868	↓	Sanderson, TX	10 36P MoThSa	↑
10 38A TuThSu	959	↓	Alpine, TX (Big Bend Nat'l Park) (CT)	08 45P MoThSa	↑
01 22P TuThSu	1178	Ar	El Paso, TX (MT)	03 35P MoThSa	Dp
01 47P TuThSu		Dp	(Ciudad Juarez, Mexico)	03 10P MoThSa	Ar
03 18P TuThSu	1264	↓	Deming, NM	01 10P MoThSa	↑
04 13P TuThSu	1325	↓	Lordsburg, NM (MT)	12 15P MoThSa	↑
05 18P TuThSu	1443	↓	Benson, AZ (MST)	09 15A MoThSa	↑
06 45P TuThSu	1493	Ar	Tucson, AZ	08 15A MoThSa	Dp
07 35P TuThSu		Dp		07 28A MoThSa	Ar
08 52P TuThSu	1579	Ar	Maricopa, AZ (Phoenix)	05 40A MoThSa	Dp
09 02P TuThSu		Dp		05 30A MoThSa	Ar
11 49P TuThSu	1744	↓	Yuma, AZ (MST)	02 47A MoThSa	↑
02 02A WeFrMo	1890	↓	Palm Springs, CA (PT)	12 36A MoThSa	↑
D3 54A WeFrMo	1957	↓	Ontario, CA	10 54P SuWeFr	↑
D4 04A WeFrMo	1964	↓	Pomona, CA	10 41P SuWeFr	↑
05 35A WeFrMo	1995	Ar	Los Angeles, CA <sup>(PT)</sup>	10 00P SuWeFr	Dp

# SUNSET LIMITED ROUTE MAP and SYMBOLS



- A** Time Symbol for A.M.
- P** Time Symbol for P.M.
- D** Stops only to discharge passengers; train may leave before time shown.
- CT** Central time
- ET** Eastern time
- MT** Mountain time
- MST** Mountain Standard time
- PT** Pacific time
- Bus stop**
- Flag stop**
- Airport connection**
- QT** Quik-Trak self-serve ticketing kiosk
- Unstaffed station
- Staffed ticket office; may or may not be open for all train departures
- ♿** Station wheelchair accessible; no barriers between station and train
- ♿** Station wheelchair accessible; not all stations facilities accessible

## Service on the Sunset Limited®

- Coaches:** Reservations required.
- Sleeping cars:** Superliner sleeping accommodations.
  - Magnolia Room is available in New Orleans and Amtrak Metropolitan Lounge in Los Angeles for Sleeping car passengers.
  - Sleeping car passengers arriving at Los Angeles are welcome to occupy their accommodations until 6:30 a.m.
- Dining:** Full meal service.
- Sightseer Lounge:** Sandwiches, snacks and beverages.
- Checked baggage** at select stations.
- Train stops** only when passengers are present, either on the train or station platform, and ticketed to and/or from this station. Reservations are required. Boarding passengers must reserve as far in advance as possible.
- This location** does not observe Daylight Saving Time. Schedule times at this station will be ONE HOUR LATER beginning with the Fall time change on November 2, 2014.

### Smoking is prohibited.

**Trails and Rails Program:** In cooperation with the National Park Service, volunteer rangers from the New Orleans Jazz National Historical Park provide a narrative on Train 1, Monday and Saturday, and Train 2, Tuesday and Sunday, between New Orleans and Beaumont, May 22 through September 2. Seasonal programs are subject to change. Visit [nps.gov/trailsandrails](http://nps.gov/trailsandrails) and [amtraktoparks.com](http://amtraktoparks.com).

## Scenic Highlights

- Gulf Coast
- Mexican border
- Bayou Country
- Southwestern desert

**Modified Amtrak Service for the Sunset Limited**

<sup>(20)</sup> The *Sunset Limited* service between Orlando and New Orleans has been suspended. Future service has not been determined.

Shading Key	
Long-distance train	Thruway and connecting services

## Thruway Bus Connections

### Galveston • Houston (Lone Star Coach)

6022		Thruway Number				6021	
Daily	Mile	Days of Operation	Symbol	Daily	Daily	Daily	Daily
11 30A	0	Dp	Galveston, TX (CT)	○	Ar	2 45P	
01 05P	47	Ar	Houston, TX—Amtrak Station (CT)	●	Dp	1 15P	

### New Orleans • Baton Rouge (Greyhound Lines)

8059		Thruway Number				8058	
Daily	Mile	Days of Operation	Symbol	Daily	Daily	Daily	Daily
6 10P	0	Dp	New Orleans, LA (CT)	●	Ar	7 00A	
7 55P	80	Ar	Baton Rouge, LA (CT)	○	Dp	5 15A	

# Discover NEW HORIZONS.

For reservations and information visit [Amtrak.com](http://Amtrak.com) or call 1-800-USA-RAIL.

Download the Sunset Limited podcast at [www.AmtrakRailGuide.com](http://www.AmtrakRailGuide.com).

*En efecto a partir del  
9 DE JUNIO DE 2014*

**ENGLISH  
VERSION**  
*on other side*

# SUNSET LIMITED®

NEW ORLEANS

— y —

LOS ANGELES



NEW ORLEANS - HOUSTON

SAN ANTONIO - TUCSON

MARICOPA - LOS ANGELES

*y estaciones intermedias*



Formulario de NRPC P1-125M-6/9/14 Artículo #02-3608

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# SUNSET LIMITED

1 <sup>(20)</sup>	◀ Número de tren ▶				2 <sup>(20)</sup>	
Como se indica en la columna	◀ Días de operación ▶				Como se indica en la columna	
	◀ Servicio a bordo ▶					
Leer hacia abajo	Milla		Símbolo		Leer hacia arriba	
09 00A LMIS	0	Dp	New Orleans, LA (CT)	●●QT	Ar	09 40P MVD
10 30A LMIS	56	↓	Baton Rouge—ver la derecha	○	↑	07 03P MVD
11 56A LMIS	127	↓	Schriever, LA (Houma/Thibodaux)	○	↑	05 41P MVD
12 24P LMIS	145	↓	New Iberia, LA	○	↑	05 15P MVD
1 55P LMIS	219	↓	Lafayette, LA	○	↑	03 29P MVD
3 48P LMIS	281	↓	Lake Charles, LA	○	↑	02 05P MVD
06 18P LMIS	363	Ar	Beaumont, TX (Port Arthur)	○	Dp	12 10P MVD
06 55P LMIS	363	Dp	Houston, TX	●	Ar	11 10A MVD
12 05A MJD	573	Ar	Galveston—ver la derecha	●●QT	Dp	06 25A MVD
12 45A MJD	573	Dp	San Antonio, TX	○	Ar	04 50A MVD
5 49A MJD	742	↓	Del Rio, TX	○	↑	1 02A MVD
08 24A MJD	868	↓	Sanderson, TX	○	↑	10 36P LJS
10 38A MJD	959	↓	Alpine, TX (Big Bend Nat'l Park) (CT)	○	↑	08 45P LJS
11 22P MJD	1178	Ar	El Paso, TX (MT)	●●QT	Dp	03 35P LJS
11 47P MJD	1178	Dp	(Ciudad Juarez, Mexico)	○	Ar	03 10P LJS
03 18P MJD	1264	↓	Deming, NM	○	↑	01 10P LJS
04 13P MJD	1325	↓	Lordsburg, NM	○	↑	12 15P LJS
05 18P MJD	1443	↓	Benson, AZ (MST)	○	↑	09 15A LJS
06 45P MJD	1493	Ar	Tucson, AZ	●●QT	Dp	08 15A LJS
07 35P MJD	1493	Dp		○	Ar	07 28A LJS
08 52P MJD	1579	Ar	Maricopa, AZ (Phoenix)	●	Dp	05 40A LJS
09 02P MJD	1579	Dp		○	Ar	05 30A LJS
11 49P MJD	1744	↓	Yuma, AZ (MST)	○	↑	02 47A LJS
2 02A MIVL	1890	↓	Palm Springs, CA	○	↑	12 36A LJS
D3 54A MIVL	1957	↓	Ontario, CA	○	↑	10 54P DMIV
D4 04A MIVL	1964	↓	Pomona, CA	○	↑	10 41P DMIV
05 35A MIVL	1995	Ar	Los Angeles, CA	●●QT	Dp	10 00P DMIV

## Servicio en el Sunset Limited®

- Clase económica: se requiere reservación.**
- Cabinas dormitorio:** Dormitorios en Superliner.
  - El Salón Magnolia está disponible en Nueva Orleans y el Salón Metropolitano en Los Angeles para los pasajeros con servicio de coche-cama.
  - Los pasajeros con servicio de coche-cama que lleguen a Los Angeles pueden ocupar sus lugares hasta las 6:30 a.m.
- Comedor:** servicio de comida completo.
- Lounge Sightseer:** sándwiches, refrigerios y bebidas.
- Equipaje facturado en estaciones selectas.
- El tren se detiene en una estación sólo cuando hay pasajeros en el tren con boleto hasta dicha estación o en la plataforma de la misma con boleto para salir desde allí. Es necesario hacer reservaciones. Los pasajeros que se van a embarcar deben reservar con la mayor anticipación posible.
- Esta ubicación no respeta el horario de verano. Los horarios programados para esta estación se RETRASARÁN UNA HORA a partir del cambio de horario de otoño que comenzará a regir el 2 de noviembre de 2014.

### Está prohibido fumar.

**Programa Trails and Rails:** en cooperación con el Servicio de Parques Nacionales, los guardaparques voluntarios del Parque Histórico Nacional de Jazz de Nueva Orleans realizarán una narración en el tren 1, los lunes y los sábados, y en el tren 2, los martes y los domingos, entre Nueva Orleans y Beaumont, desde el 22 de mayo hasta el 2 de septiembre. Los programas de temporada están sujetos a modificación. Visite [nps.gov/trailsandrails](http://nps.gov/trailsandrails) y [amtraktoparks.com](http://amtraktoparks.com).

## Conexión de Thruway Bus

### Galveston • Houston (Lone Star Coach)

6022	Número de Thruway				6021	
Diariamente	Milla		Días de operación	Símbolo	Diariamente	
11 30A	0	Dp	Galveston, TX -123 Rosenberg	○	Ar	2 45P
01 05P	47	Ar	Houston, TX—Estación de Amtrak(CT)	●	Dp	1 15P

### New Orleans • Baton Rouge (Greyhound Lines)

8059	Número de Thruway				8058	
Diariamente	Milla		Días de operación	Símbolo	Diariamente	
6 10P	0	Dp	New Orleans, LA -Union Passenger Terminal	●	Ar	7 00A
7 55P	80	Ar	Baton Rouge, LA	○	Dp	5 15A

## Convenciones del sombreado

Tren de larga distancia	Thruway y servicios de conexión
-------------------------	---------------------------------

### Servicio Amtrak modificado para Sunset Limited

<sup>(20)</sup> El servicio de *Sunset Limited* entre Orlando y New Orleans ha sido suspendido. No se ha determinado cuándo iniciará el servicio futuro.

## Descubra NUEVOS HORIZONTES.



Descargue los podcast de **Sunset Limited** en [www.AmtrakRailGuide.com](http://www.AmtrakRailGuide.com) <<http://www.AmtrakRailGuide.com/>>.

## SUNSET LIMITED MAPA DE LA RUTA y SÍMBOLOS



- A** Símbolo de tiempo para A.M.
- N** Símbolo de tiempo para mediodía.
- P** Símbolo de tiempo para P.M.
- D** Sólo se detiene para bajar pasajeros; el tren puede partir antes de la hora que se muestra.
- CT** Hora del Centro
- ET** Hora del Este
- MT** Hora de la Montaña
- MST** Hora estándar de la Montaña
- PT** Símbolo de tiempo para P.M.
- ☽** Parada de autobús
- ✎** Parada a petición del pasajero
- ✈** Conexión al aeropuerto
- QT** Quiosco Quik-Trak, venta de boletos autoservicio
- Estación no provista de personal
- Oficina de boletos provista de personal; puede no estar abierta en todos los horarios de salida
- ♿ Estación con acceso para silla de ruedas; no hay obstáculos entre la estación y el tren.
- ♿ Estación con acceso para silla de ruedas; no todas las instalaciones de la estación son accesibles

**Appendix B:  
Metrolink and Amtrak Forecast – Daily and for 6-Hour AM/PM  
Peak for 2026, 2031, and 2040**

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Table B-1. 2026 Metrolink Projection by Line		
Breakdown by Metrolink Line		
Ventura County Line	Total Daily <sup>a</sup>	70
	6-hour peak <sup>b</sup>	24
	LAUS-CMF	0
Orange County Line	Total Daily <sup>a</sup>	74
	6-hour peak <sup>b</sup>	26
	LAUS-CMF	0
Antelope Valley Line	Total Daily <sup>a</sup>	81
	6-hour peak <sup>b</sup>	32
	LAUS-CM	10
San Bernardino Line	Total Daily <sup>a</sup>	62
	6-hour peak <sup>b</sup>	28
	LAUS-CMF	10
Riverside Line	Total Daily <sup>a</sup>	12
	6-hour peak <sup>b</sup>	9
	LAUS-CMF	10
91/Perris Valley Line	Total Daily <sup>a</sup>	71
	6-hour peak <sup>b</sup>	25
	LAUS-CMF	10
<b>Total Daily</b>		<b>410</b>
# of Rev Trains		370
# of dead head equipment moves*		40
<b>Total 6-hour Peak (AM and PM combined)</b>		<b>144</b>

Source: Source: SCRRRA 2018a

Notes:

<sup>a</sup> Includes deadhead moves between LAUS and CMF

<sup>b</sup> Inbound/Outbound 6:00-9:00 AM; 3:00-6:00 PM

Service frequencies assumed at 30-minutes based on direction from Metrolink

2026 15 Minute Peak:

AM: 6:00 – 6:15; 7:00 – 7:15; 7:30 – 7:45;

PM: 4:30 – 4:45; 5:00 – 5:15; 5:30 – 5:45;

Table B-2. 15-min peak breakdown – AM

Line	Time												TOTAL
	6:00	6:15	6:30	6:45	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	
VCL	2	0	2	0	2	0	2	0	2	0	2	0	12
OCL	1	1	1	1	1	1	1	1	1	1	1	2	13
AVL	2	1	2	0	2	1	2	0	2	1	2	1	16
SBL	2	0	2	1	2	0	2	1	2	0	2	1	15
Riv	1	—	—	—	1	—	1	—	—	1	—	—	4
91/Perris	1	0	1	1	1	1	1	1	1	1	1	2	12
<b>TOTAL</b>	<b>9</b>	<b>2</b>	<b>8</b>	<b>3</b>	<b>9</b>	<b>3</b>	<b>9</b>	<b>3</b>	<b>8</b>	<b>4</b>	<b>8</b>	<b>6</b>	<b>72</b>

Table B-3. 15-min peak breakdown – PM													
Line	Time												TOTAL
	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	
VCL	2	0	2	0	2	0	2	0	2	0	2	0	12
OCL	1	1	1	1	1	1	1	1	1	1	1	2	13
AVL	2	1	2	0	2	1	2	0	2	1	2	1	16
SBL	1	0	2	1	1	0	2	1	2	0	2	1	13
Riv	—	—	—	—	—	1	1	—	1	—	1	1	5
91/Perris	1	1	1	1	1	1	1	1	1	1	1	2	13
<b>TOTAL</b>	<b>7</b>	<b>3</b>	<b>8</b>	<b>3</b>	<b>7</b>	<b>5</b>	<b>9</b>	<b>3</b>	<b>9</b>	<b>4</b>	<b>8</b>	<b>6</b>	<b>72</b>

Source: SCRRRA 2018a

Table B-4. 2031/2040 Metrolink Projection by Line		
Breakdown by Metrolink Line		
Ventura – Orange County Line	Total Daily <sup>a</sup>	304
	VC-OC High Frequency Local <sup>c</sup>	288
	Ventura County Express	16
	6-hour peak <sup>b</sup>	112
	LAUS-CMF	0
Antelope Valley Line - Perris Valley Line	Total Daily <sup>a</sup>	276
	Antelope Valley/91-Perris Valley Regional <sup>c</sup>	132
	Santa Clarita High-Frequency Local	144
	6-hour peak <sup>b</sup>	92
	LAUS-CMF	0
San Bernardino Line	Total Daily <sup>a</sup>	86
	San Bernardino Regional	78
	San Bernardino Express	8
	6-hour peak <sup>b</sup>	34
	LAUS-CMF	0
Riverside Line	Total Daily <sup>a</sup>	24
	6-hour peak <sup>b</sup>	12
	LAUS-CMF	12
<b>Total Daily</b>		<b>690</b>
# of Rev Trains		678
# of dead head equipment moves *		12
<b>Total 6-hour Peak (AM and PM combined)</b>		<b>250</b>

Source: SCRRA 2018b

Notes:

<sup>a</sup> Includes deadhead moves between LAUS and CMF

<sup>b</sup> Inbound/Outbound 6:00-9:00 AM; 3:00-6:00 PM

<sup>c</sup> Run-through trains are counted as separate moves and hence doubled

Calculations based off 2028 Service Levels – 2018 TIRCP Application Assumptions

2031/2040 15 Minute Peak:

AM: 7:00 – 6:15; 7:30 – 7:45; 8:00 – 8:15; 8:30 – 8:45

PM: 4:00 – 4:15; 4:30 – 4:45; 5:00 – 5:15; 5:30 – 5:45

Table B-5. 15-min peak breakdown – AM

Line	Time												TOTAL
	6:00	6:15	6:30	6:45	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	
VCL/OCL	4	4	4	5	5	5	5	5	5	5	5	4	56
AVL/PVL	3	3	4	4	4	4	4	4	4	4	4	4	46
SBL	2	1	1	1	2	1	2	1	2	1	2	1	17
Riv	1	0	1	0	1	0	1	0	1	0	1	0	6
<b>TOTAL</b>	<b>10</b>	<b>8</b>	<b>10</b>	<b>10</b>	<b>12</b>	<b>10</b>	<b>12</b>	<b>10</b>	<b>12</b>	<b>10</b>	<b>12</b>	<b>9</b>	<b>125</b>

Table B-6. 15-min peak breakdown – PM

Line	Time												TOTAL
	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	
VCL/OCL	4	4	4	5	5	5	5	5	5	5	5	4	56
AVL/PVL	3	3	4	4	4	4	4	4	4	4	4	4	46
SBL	2	1	1	1	2	1	2	1	2	1	2	1	17
Riv	1	0	1	0	1	0	1	0	1	0	1	0	6
<b>TOTAL</b>	<b>10</b>	<b>8</b>	<b>10</b>	<b>10</b>	<b>12</b>	<b>10</b>	<b>12</b>	<b>10</b>	<b>12</b>	<b>10</b>	<b>12</b>	<b>9</b>	<b>125</b>

Source: SCRRRA 2018b

Table B-7. 2026 Amtrak Projection (Pacific Surfliner and Amtrak Long Distance)						
	6 hour peak			Daily Total		
	LOSSAN	Long Distance	TOTAL	LOSSAN	Long Distance	TOTAL
Revenue Trains	19	1	20	48	5	53
Non-Revenue Trains	0	1	1	10	5	15
<b>Total</b>	<b>19</b>	<b>2</b>	<b>21</b>	<b>58</b>	<b>10</b>	<b>68</b>

Source: SCRRRA 2018a

**Notes:**

**Assumptions:**

- 7 LAUS to north of LAUS Round Trips
- 15 LAUS to San Diego Round Trips
- 2 LAUS to Coachella/Indio Round Trips
- Equipment in LAUS: 4 Pacific Surfliner (LOSSAN), 1 Coachella
- No Future Growth on Amtrak Long Distance

Table B-8. 2031 Amtrak Projection (Pacific Surfliner and Amtrak Long Distance)						
	6 hour peak			Daily Total		
	LOSSAN	Long Distance	TOTAL	LOSSAN	Long Distance	TOTAL
Revenue Trains	19	1	20	56	5	61
Non-Revenue Trains	0	1	1	14	5	19
<b>Total</b>	<b>19</b>	<b>2</b>	<b>21</b>	<b>70</b>	<b>10</b>	<b>80</b>

Source: SCRRRA 2018b

**Notes:**

**Assumptions:**

- 18-hour Service Day
- 8 LAUS to north of LAUS Round Trips
- Hourly service between LAUS and San Diego
- 2 LAUS to Coachella/Indio Round Trips
- Equipment in LAUS: 6 Pacific Surfliner (LOSSAN), 1 Coachella
- No Future Growth on Amtrak Long Distance

Table B-9. 2040 Amtrak Projection (Pacific Surfliner and Amtrak Long Distance)						
	6 hour peak			Daily Total		
	LOSSAN	Long Distance	TOTAL	LOSSAN	Long Distance	TOTAL
Revenue Trains	37	1	38	112	5	117
Non-Revenue Trains	0	1	1	18	5	23
<b>Total</b>	<b>37</b>	<b>2</b>	<b>39</b>	<b>130</b>	<b>10</b>	<b>140</b>

Source: SCRRRA 2018b

**Notes:**

**Assumptions:**

- 18-hour Service Day
- Hourly service between LAUS and north of LAUS
- 30-minutes service between LAUS and San Diego
- 2 LAUS to Coachella/Indio Round Trips
- Equipment in LAUS: 8 Pacific Surfliner (LOSSAN), 1 Coachella
- No Future Growth on Amtrak Long Distance

## Appendix B: Construction and Operational Assumptions

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EQUIPMENT USE BY EQUIPMENT - Build Alternative

Biditem/ Category	Activity/ Resource	Description	Quantity	Unit	Pcs	Rnt %	EOE %	Inside Equipment	Outside Equipment	EOE	Other	Total
8APPV020		Asphalt Paver, CAT 1055D										
*** 8APPV020		Asphalt Paver, CAT 1055D	82.53					12,468		9,118		21,586
8APPV200B		Asphalt Paver, CAT 200B										
*** 8APPV200B		Asphalt Paver, CAT 200B	156.00					11,982				11,982
8BH		***Backhoe***										
*** 8BH		***Backhoe***	41.20						5,601			5,601
8BH336		Crawler Hoe 40T (Cat 336)										
*** 8BH336		Crawler Hoe 40T (Cat 336)	12.27					589		352		941
8BH416		Tractor Backhoe, CAT 416										
*** 8BH416		Tractor Backhoe, CAT 416	2,674.67					39,572		46,641		86,213
8BH430		Tractor Backhoe, CAT 430										
*** 8BH430		Tractor Backhoe, CAT 430	3,253.82					59,825		73,146		132,971
8BHAHAM1500		Attach, Hammer, 1500 flb										
*** 8BHAHAM1500		Attach, Hammer, 1500 flb	75.62					840		495		1,336
8CA2CL		Exc Clam Shall 1.5CY										
*** 8CA2CL		Exc Clam Shall 1.5CY	1,334.08					26,148				26,148
8CC150		Crane 4000 175T										
*** 8CC150		Crane 4000 175T	41.20					2,636		1,912		4,548
8CMP0185D		Air Compressor, 185 cfm, Ds										
*** 8CMP0185D		Air Compressor, 185 cfm, Ds	1,311.64					4,769		14,192		18,961
8CMP0375D		Air Compressor, 375 cfm, Ds										
*** 8CMP0375D		Air Compressor, 375 cfm, Ds	5,523.14					38,413		91,353		129,766
8COECP01		Cellular Concrete Pump/Mixer										
*** 8COECP01		Cellular Concrete Pump/Mixer	5,710.49					1,142,098		285,525		1,427,623
8COEPU100		Conc.Pump Trlr Mtd.100 cy/Hr										
*** 8COEPU100		Conc.Pump Trlr Mtd.100 cy/Hr	5.47					178		255		433
8COEWB090		Work Bridge, 90 ft										
*** 8COEWB090		Work Bridge, 90 ft	1,217.99					9,190		9,459		18,649
8COPFIN80		Paving Roller/Finisher, 80'										
*** 8COPFIN80		Paving Roller/Finisher, 80'	1,217.99					17,716		18,708		36,424
8CRNCR100		Crane, 100 Ton Crawler(222)										
*** 8CRNCR100		Crane, 100 Ton Crawler(222)	2,907.43					297,945		252,481		550,426
8CRNCR200		Crane 200 Ton Crawler(777)										
*** 8CRNCR200		Crane 200 Ton Crawler(777)	77,136.15					13,411,200		10,853,829		24,265,028
8CRNRT35		R.T. Crane, 35 Ton										
*** 8CRNRT35		R.T. Crane, 35 Ton	1,242.61					61,876		65,377		127,253
8CRNRT50		R.T. Crane, 50 Ton										
*** 8CRNRT50		R.T. Crane, 50 Ton	169.26					9,078		11,305		20,383
8CRNTK140		Crane,Hy Trk, 140 Ton (238A)										
*** 8CRNTK140		Crane,Hy Trk, 140 Ton (238A)	300.00					37,534		36,008		73,542
8DSCMHD075		Bauer BG 18, 75'/5'										
*** 8DSCMHD075		Bauer BG 18, 75'/5'	1,789.66					192,469		169,898		362,367
8DSCMHD100		Bauer BG 28, 100'/7'										
*** 8DSCMHD100		Bauer BG 28, 100'/7'	8,020.50					1,433,119		1,259,820		2,692,939
8DSCMHD200		Bauer BG 36, 200'/10'										
*** 8DSCMHD200		Bauer BG 36, 200'/10'	33,295.43					7,447,588		6,208,765		13,656,354
8DSCMHD300		Bauer BG 40, 300'/12'										
*** 8DSCMHD300		Bauer BG 40, 300'/12'	17,575.80					4,019,269		3,498,428		7,517,697
8DSGRAB		Hartfuss Ball Grab										
*** 8DSGRAB		Hartfuss Ball Grab	60,647.39					609,203		1,516,185		2,125,388
8DZ06		CAT D6 T, 185 hp										
*** 8DZ06		CAT D6 T, 185 hp	627.44					30,459		31,910		62,369
8EL100		8 Ton Crane										
*** 8EL100		8 Ton Crane	1,837.99					148,510		27,570		176,079
8EL110		10 Ton Crane										
*** 8EL110		10 Ton Crane	8.00					819		120		939

EQUIPMENT USE BY EQUIPMENT - Build Alternative

Biditem/ Category	Activity/ Resource	Description	Quantity	Unit	Rnt Pcs	EOE %	Inside Equipment	Outside Equipment	EOE	Other	Total
8EL200		40' Telescopic Boom Lift w/									
*** 8EL200		40' Telescopic Boom Lift w/	444.78				37,691		6,672		44,362
8EX307		CAT 307 Exc - 0.43 cy									
*** 8EX307		CAT 307 Exc - 0.43 cy	12.82				277		256		533
8EX321		CAT 321D Exc,1.18 cy,21 tn									
*** 8EX321		CAT 321D Exc,1.18 cy,21 tn	5,253.53				207,278		222,645		429,923
8EX324		CAT 324E L Exc,1.74 cy,24 tn									
*** 8EX324		CAT 324E L Exc,1.74 cy,24 tn	132.77				5,824		6,883		12,707
8EX330		CAT 330 Exc - 2.0 cy									
*** 8EX330		CAT 330 Exc - 2.0 cy	1.33				180				180
8EX336		CAT 336D L Exc,1.56 cy,36 tn									
*** 8EX336		CAT 336D L Exc,1.56 cy,36 tn	14,529.38				812,657		960,683		1,773,340
8EX345		CAT 345 Exc,2.36 cy,45 tn									
*** 8EX345		CAT 345 Exc,2.36 cy,45 tn	1,959.74				143,463		175,260		318,722
8EXACMP24		Attach, Compact, 24"									
*** 8EXACMP24		Attach, Compact, 24"	10.85				36		23		59
8EXAHAM2500		Attach, Hammer, 2500 flb									
*** 8EXAHAM2500		Attach, Hammer, 2500 flb	489.24				6,504		4,971		11,475
8EXAHAM7500		Attach, Hammer, 7500 flb									
*** 8EXAHAM7500		Attach, Hammer, 7500 flb	913.86				31,964		21,028		52,992
8FLTELE10		RT Fork Lift, CAT TL-1055									
*** 8FLTELE10		RT Fork Lift, CAT TL-1055	25,210.29				690,409		679,115		1,369,524
8GEN005		Generator, 5Kw									
*** 8GEN005		Generator, 5Kw	51,081.19				39,486		210,863		250,349
8GENLPL		Light Tower, 6000 Watt									
*** 8GENLPL		Light Tower, 6000 Watt									
8GR14		Grader, CAT 14									
*** 8GR14		Grader, CAT 14	3,867.88				230,491		217,994		448,485
8LD210		Loader, Deere 210, 1.0 cy									
*** 8LD210		Loader, Deere 210, 1.0 cy	1,344.00				109		22,310		22,419
8LD950		Loader, Whl, CAT 950, 4.0 cy									
*** 8LD950		Loader, Whl, CAT 950, 4.0 cy	1,293.42				29,866		38,466		68,333
8LD966		Loader, Whl, CAT 966, 5.5 cy									
*** 8LD966		Loader, Whl, CAT 966, 5.5 cy	125,237.37				4,696,402		6,230,559		10,926,961
8LD980		Loader, Whl, CAT 980, 7.5 cy									
*** 8LD980		Loader, Whl, CAT 980, 7.5 cy	913.86				51,197		55,745		106,943
8LDIT62		Loader, IT, CAT IT62 w/Forks									
*** 8LDIT62		Loader, IT, CAT IT62 w/Forks	33,538.36				1,143,356		1,217,946		2,361,302
8LDT963		loader, Trk, CAT 963, 3.0 cy									
*** 8LDT963		loader, Trk, CAT 963, 3.0 cy	7,232.82				445,968		421,782		867,750
8LRSTR		Skid Steer Loader Tracked									
*** 8LRSTR		Skid Steer Loader Tracked	487.91				5,988		2,644		8,633
8MIBROOM		Pavement Broom									
*** 8MIBROOM		Pavement Broom	12,480.00				761		208,042		208,803
8MISNDBL300		Sand Blaster - 300 lb, Air									
*** 8MISNDBL300		Sand Blaster - 300 lb, Air	1,302.04				1,746		755		2,501
8MISRT		Forktruck 10K Telehandler									
*** 8MISRT		Forktruck 10K Telehandler	2,377.16				42,682		25,602		68,284
8MITCMR		Mortar Mixer									
*** 8MITCMR		Mortar Mixer	2,377.16				23,772		11,886		35,657
8MITMK		Telescopic Man Lift, 40 Ft									
*** 8MITMK		Telescopic Man Lift, 40 Ft	13,434.25				177,399		147,253		324,652
8MITML		Telescopic Man Lift, 80 Ft									
*** 8MITML		Telescopic Man Lift, 80 Ft	1,124.70				33,613		23,399		57,012
8PEHV200		Vib Hammer,APD 200,200t/150t									
*** 8PEHV200		Vib Hammer,APD 200,200t/150t	2,104.50				107,138		221,221		328,359

EQUIPMENT USE BY EQUIPMENT - Build Alternative

Biditem/ Category	Activity/ Resource	Description	Quantity	Unit	Pcs	Rnt %	EOE %	Inside Equipment	Outside Equipment	EOE	Other	Total
8PUSUB03		Pump, 3" Sub Elect. 3.0Hp										
*** 8PUSUB03		Pump, 3" Sub Elect. 3.0Hp	12,938.47					22,060		20,184		42,244
8R02		TRUCK - PICKUP										
*** 8R02		TRUCK - PICKUP	4,148.13					22,392		43,887		66,279
8R06		TRUCK - MATERIAL HANDLER										
*** 8R06		TRUCK - MATERIAL HANDLER	1,416.48					58,792		92,680		151,473
8RCDDS67		Compact,DD Smooth, CAT CB54										
*** 8RCDDS67		Compact,DD Smooth, CAT CB54	156.00					5,705		4,207		9,912
8RCDDS84		Compact,DD Smooth, CAT CB64										
*** 8RCDDS84		Compact,DD Smooth, CAT CB64	165.03					8,454		5,413		13,867
8RCPAD66		Compact,SD Padfoot, CAT 433										
*** 8RCPAD66		Compact,SD Padfoot, CAT 433	3.74					63		83		147
8RCPAD84		Compact,SD Padfoot, CAT CP56										
*** 8RCPAD84		Compact,SD Padfoot, CAT CP56	971.42					27,001		33,490		60,490
8RCPNU90		Compact, Pnumatic, CAT PS360										
*** 8RCPNU90		Compact, Pnumatic, CAT PS360	238.53					10,902		5,614		16,516
8RCSDS66		Compact,SD Smooth, CAT CS423										
*** 8RCSDS66		Compact,SD Smooth, CAT CS423	4,481.74					75,679		98,733		174,411
8RCVIBE		Hand Tamp,Vibro Plate/Wacker										
*** 8RCVIBE		Hand Tamp,Vibro Plate/Wacker	9,461.68					32,898		33,305		66,203
8RCWALK		Walk Behind Roller										
*** 8RCWALK		Walk Behind Roller	5,094.56					22,926		23,888		46,814
8SCR615C		Scraper, CAT 615 EL,14 cy										
*** 8SCR615C		Scraper, CAT 615 EL,14 cy	50.00					27		4,796		4,822
8SLD226		CAT Skid Steer 226										
*** 8SLD226		CAT Skid Steer 226	60,650.59					720,893		836,250		1,557,143
8SLD246		CAT Skid Steer 246										
*** 8SLD246		CAT Skid Steer 246	12,958.31					168,160		204,392		372,551
8TK14		Dump Truck, 14 Cy										
*** 8TK14		Dump Truck, 14 Cy	82.40					1,391		1,496		2,886
8TK600		Rack Truck 11000 GVW										
*** 8TK600		Rack Truck 11000 GVW	12,480.00					86,149		81,744		167,893
8TKDMP10		Trk, End Dump, 10 cy										
*** 8TKDMP10		Trk, End Dump, 10 cy	35,096.45					583,092		1,542,489		2,125,581
8TKDMP15		Trk, End Dump, 15 cy										
*** 8TKDMP15		Trk, End Dump, 15 cy	130,928.66					3,169,128		6,885,538		10,054,667
8TKFB10		Trk, Flatbed/Dump 10 Ton										
*** 8TKFB10		Trk, Flatbed/Dump 10 Ton	86,337.30					529,766		1,357,222		1,886,988
8TKFB2		Flatbed/Dump 2 Ton										
*** 8TKFB2		Flatbed/Dump 2 Ton	156.00					2,785				2,785
8TKFB20		Trk, Flatbed/Dump 20 Ton										
*** 8TKFB20		Trk, Flatbed/Dump 20 Ton	25,145.44					257,163		590,163		847,326
8TKMCH		Mechanics Truck, 1Ton										
*** 8TKMCH		Mechanics Truck, 1Ton	3,120.00					42,544		34,320		76,864
8TKOIL		Oil Distributer Truck										
*** 8TKOIL		Oil Distributer Truck	213.53					2,912		2,349		5,261
8TKPU2		Pickup, 1/2 Ton, 2X4										
*** 8TKPU2		Pickup, 1/2 Ton, 2X4	327,237.00					1,085,772		2,424,826		3,510,599
8TKPU4		Pickup, 3/4 Ton, 4X4										
*** 8TKPU4		Pickup, 3/4 Ton, 4X4	343,772.09					1,484,408		2,677,985		4,162,393
8TKTRA		Trk, Tractor, 6 X 4, 45K										
*** 8TKTRA		Trk, Tractor, 6 X 4, 45K	6,280.00					97,196		233,333		330,529
8TKWAT04		Trk, Water,4000 G										
*** 8TKWAT04		Trk, Water,4000 G	51,441.90					879,193		1,555,346		2,434,540
8TLFLT40		Trailer, Float, 40 ft										
*** 8TLFLT40		Trailer, Float, 40 ft	6,280.00					32,399		34,854		67,253

**EQUIPMENT USE BY EQUIPMENT - Build Alternative**

<b>Biditem/ Category</b>	<b>Activity/ Resource</b>	<b>Description</b>	<b>Quantity</b>	<b>Unit</b>	<b>Pcs</b>	<b>Rnt %</b>	<b>EOE %</b>	<b>Inside Equipment</b>	<b>Outside Equipment</b>	<b>EOE</b>	<b>Other</b>	<b>Total</b>
8WM350		Welding Machine, 350 Amp										
*** 8WM350		Welding Machine, 350 Amp	5,106.97					8,590		21,679		30,269
8WM8PE		Weld Machine,8 Pack 200 Amp										
*** 8WM8PE		Weld Machine,8 Pack 200 Amp	7,118.69					4,855		40,349		45,204
<b>***REPORT TOTALS***</b>								47,475,042	5,601	54,507,470		101,988,113

\*\*\* indicates non-additive item

**EQUIPMENT USE BY EQUIPMENT - Proposed Project**

Biditem/ Category	Activity/ Resource	Description	Quantity	Unit	Pcs	Rnt %	EOE %	Inside Equipment	Outside Equipment	EOE	Other	Total
8APPV020		Asphalt Paver, CAT 1055D										
*** 8APPV020		Asphalt Paver, CAT 1055D	25.00					3,777		2,762		6,539
8APPV200B		Asphalt Paver, CAT 200B										
*** 8APPV200B		Asphalt Paver, CAT 200B	156.00					11,982				11,982
8BH		***Backhoe***										
*** 8BH		***Backhoe***	41.20						5,601			5,601
8BH416		Tractor Backhoe, CAT 416										
*** 8BH416		Tractor Backhoe, CAT 416	1,958.37					28,974		34,150		63,124
8BH430		Tractor Backhoe, CAT 430										
*** 8BH430		Tractor Backhoe, CAT 430	3,178.20					58,434		71,446		129,880
8CA2CL		Exc Clam Shall 1.5CY										
*** 8CA2CL		Exc Clam Shall 1.5CY	1,334.08					26,148				26,148
8CC150		Crane 4000 175T										
*** 8CC150		Crane 4000 175T	41.20					2,636		1,912		4,548
8CMP0185D		Air Compressor, 185 cfm, Ds										
*** 8CMP0185D		Air Compressor, 185 cfm, Ds	779.66					2,835		8,436		11,271
8CMP0375D		Air Compressor, 375 cfm, Ds										
*** 8CMP0375D		Air Compressor, 375 cfm, Ds	5,292.83					36,812		87,544		124,355
8COECP01		Cellular Concrete Pump/Mixer										
*** 8COECP01		Cellular Concrete Pump/Mixer	5,091.71					1,018,342		254,586		1,272,928
8COEWB090		Work Bridge, 90 ft										
*** 8COEWB090		Work Bridge, 90 ft	878.22					6,626		6,820		13,446
8COPFIN80		Paving Roller/Finisher, 80'										
*** 8COPFIN80		Paving Roller/Finisher, 80'	878.22					12,774		13,490		26,263
8CRNCR100		Crane, 100 Ton Crawler(222)										
*** 8CRNCR100		Crane, 100 Ton Crawler(222)	2,196.23					225,063		190,721		415,784
8CRNCR200		Crane 200 Ton Crawler(777)										
*** 8CRNCR200		Crane 200 Ton Crawler(777)	40,200.93					6,989,495		5,656,674		12,646,168
8CRNRT35		R.T. Crane, 35 Ton										
*** 8CRNRT35		R.T. Crane, 35 Ton	1,242.61					61,876		65,377		127,253
8CRNRT50		R.T. Crane, 50 Ton										
*** 8CRNRT50		R.T. Crane, 50 Ton	148.19					7,948		9,898		17,846
8CRNTK140		Crane,Hy Trk, 140 Ton (238A)										
*** 8CRNTK140		Crane,Hy Trk, 140 Ton (238A)	3,810.05					476,691		457,301		933,992
8DSCMHD075		Bauer BG 18, 75'/5'										
*** 8DSCMHD075		Bauer BG 18, 75'/5'	2,965.33					318,906		281,508		600,414
8DSCMHD100		Bauer BG 28, 100'/7'										
*** 8DSCMHD100		Bauer BG 28, 100'/7'	4,875.27					871,123		765,783		1,636,906
8DSCMHD200		Bauer BG 36, 200'/10'										
*** 8DSCMHD200		Bauer BG 36, 200'/10'	2,575.06					575,995		480,184		1,056,179
8DSCMHD300		Bauer BG 40, 300'/12'										
*** 8DSCMHD300		Bauer BG 40, 300'/12'	14,878.60					3,402,468		2,961,556		6,364,024
8DSGRAB		Hartfuss Ball Grab										
*** 8DSGRAB		Hartfuss Ball Grab	25,294.26					254,081		632,357		886,437
8DZ06		CAT D6 T, 185 hp										
*** 8DZ06		CAT D6 T, 185 hp	307.44					14,925		15,636		30,560
8EL100		8 Ton Crane										
*** 8EL100		8 Ton Crane	99.50					8,040		1,493		9,532
8EL110		10 Ton Crane										
*** 8EL110		10 Ton Crane	8.00					819		120		939
8EL200		40' Telescopic Boom Lift w/										
*** 8EL200		40' Telescopic Boom Lift w/	48.44					4,105		727		4,831
8EX307		CAT 307 Exc - 0.43 cy										
*** 8EX307		CAT 307 Exc - 0.43 cy	12.82					277		256		533
8EX321		CAT 321D Exc,1.18 cy,21 tn										
*** 8EX321		CAT 321D Exc,1.18 cy,21 tn	3,294.05					129,967		139,602		269,569

**EQUIPMENT USE BY EQUIPMENT - Proposed Project**

Biditem/ Category	Activity/ Resource	Description	Quantity	Unit	Pcs	Rnt %	EOE %	Inside Equipment	Outside Equipment	EOE	Other	Total
8EX324		CAT 324E L Exc,1.74 cy,24 tn										
*** 8EX324		CAT 324E L Exc,1.74 cy,24 tn	132.77					5,824		6,883		12,707
8EX330		CAT 330 Exc - 2.0 cy										
*** 8EX330		CAT 330 Exc - 2.0 cy	1.33					180				180
8EX336		CAT 336D L Exc,1.56 cy,36 tn										
*** 8EX336		CAT 336D L Exc,1.56 cy,36 tn	6,068.81					339,441		401,270		740,710
8EX345		CAT 345 Exc,2.36 cy,45 tn										
*** 8EX345		CAT 345 Exc,2.36 cy,45 tn	1,229.10					89,976		109,918		199,895
8EXACMP24		Attach, Compact, 24"										
*** 8EXACMP24		Attach, Compact, 24"	10.85					36		23		59
8EXAHAM2500		Attach, Hammer, 2500 flb										
*** 8EXAHAM2500		Attach, Hammer, 2500 flb	1.33					18		14		31
8EXAHAM7500		Attach, Hammer, 7500 flb										
*** 8EXAHAM7500		Attach, Hammer, 7500 flb	671.13					23,474		15,443		38,917
8FLTELE10		RT Fork Lift, CAT TL-1055										
*** 8FLTELE10		RT Fork Lift, CAT TL-1055	21,394.17					585,901		576,317		1,162,217
8GEN005		Generator, 5Kw										
*** 8GEN005		Generator, 5Kw	24,535.00					18,965		101,280		120,246
8GENLPL		Light Tower, 6000 Watt										
*** 8GENLPL		Light Tower, 6000 Watt										
8GR14		Grader, CAT 14										
*** 8GR14		Grader, CAT 14	2,741.02					163,340		154,484		317,824
8LD210		Loader, Deere 210, 1.0 cy										
*** 8LD210		Loader, Deere 210, 1.0 cy	1,344.00					109		22,310		22,419
8LD950		Loader, Whl, CAT 950, 4.0 cy										
*** 8LD950		Loader, Whl, CAT 950, 4.0 cy	1,244.77					28,743		37,019		65,762
8LD966		Loader, Whl, CAT 966, 5.5 cy										
*** 8LD966		Loader, Whl, CAT 966, 5.5 cy	97,888.04					3,670,802		4,869,930		8,540,732
8LD980		Loader, Whl, CAT 980, 7.5 cy										
*** 8LD980		Loader, Whl, CAT 980, 7.5 cy	671.13					37,599		40,939		78,538
8LDIT62		Loader, IT, CAT IT62 w/Forks										
*** 8LDIT62		Loader, IT, CAT IT62 w/Forks	27,284.59					930,159		990,840		1,920,999
8LDT963		loader, Trk, CAT 963, 3.0 cy										
*** 8LDT963		loader, Trk, CAT 963, 3.0 cy	1,259.78					77,677		73,464		151,141
8MIBROOM		Pavement Broom										
*** 8MIBROOM		Pavement Broom	12,480.00					761		208,042		208,803
8MISNDBL300		Sand Blaster - 300 lb, Air										
*** 8MISNDBL300		Sand Blaster - 300 lb, Air	770.06					1,033		447		1,479
8MITMK		Telescopic Man Lift, 40 Ft										
*** 8MITMK		Telescopic Man Lift, 40 Ft	9,109.04					120,285		99,844		220,129
8MITML		Telescopic Man Lift, 80 Ft										
*** 8MITML		Telescopic Man Lift, 80 Ft	4,695.76					140,337		97,695		238,033
8PEHV200		Vib Hammer,APD 200,200t/150t										
*** 8PEHV200		Vib Hammer,APD 200,200t/150t	3,810.05					193,966		400,505		594,471
8PUSUB03		Pump, 3" Sub Elect. 3.0Hp										
*** 8PUSUB03		Pump, 3" Sub Elect. 3.0Hp	6,008.51					10,245		9,373		19,618
8R02		TRUCK - PICKUP										
*** 8R02		TRUCK - PICKUP	3,602.74					19,448		38,117		57,565
8R06		TRUCK - MATERIAL HANDLER										
*** 8R06		TRUCK - MATERIAL HANDLER	1,416.48					58,792		92,680		151,473
8RCDDS67		Compact,DD Smooth, CAT CB54										
*** 8RCDDS67		Compact,DD Smooth, CAT CB54	156.00					5,705		4,207		9,912
8RCDDS84		Compact,DD Smooth, CAT CB64										
*** 8RCDDS84		Compact,DD Smooth, CAT CB64	50.00					2,561		1,640		4,201
8RCPAD66		Compact,SD Padfoot, CAT 433										
*** 8RCPAD66		Compact,SD Padfoot, CAT 433	3.74					63		83		147

**EQUIPMENT USE BY EQUIPMENT - Proposed Project**

Biditem/ Category	Activity/ Resource	Description	Quantity	Unit	Pcs	Rnt %	EOE %	Inside Equipment	Outside Equipment	EOE	Other	Total
8RCPAD84		Compact,SD Padfoot, CAT CP56										
*** 8RCPAD84		Compact,SD Padfoot, CAT CP56	971.42					27,001		33,490		60,490
8RCPNU90		Compact, Pnumatic, CAT PS360										
*** 8RCPNU90		Compact, Pnumatic, CAT PS360	181.00					8,273		4,260		12,532
8RCSDS66		Compact,SD Smooth, CAT CS423										
*** 8RCSDS66		Compact,SD Smooth, CAT CS423	3,206.39					54,143		70,637		124,780
8RCVIBE		Hand Tamp,Vibro Plate/Wacker										
*** 8RCVIBE		Hand Tamp,Vibro Plate/Wacker	7,817.39					27,181		27,517		54,698
8RCWALK		Walk Behind Roller										
*** 8RCWALK		Walk Behind Roller	3,498.93					15,745		16,407		32,152
8SCR615C		Scraper, CAT 615 EL,14 cy										
*** 8SCR615C		Scraper, CAT 615 EL,14 cy	50.00					27		4,796		4,822
8SLD226		CAT Skid Steer 226										
*** 8SLD226		CAT Skid Steer 226	25,297.46					300,686		348,801		649,487
8SLD246		CAT Skid Steer 246										
*** 8SLD246		CAT Skid Steer 246	6,028.35					78,230		95,085		173,315
8TK14		Dump Truck, 14 Cy										
*** 8TK14		Dump Truck, 14 Cy	82.40					1,391		1,496		2,886
8TK600		Rack Truck 11000 GVW										
*** 8TK600		Rack Truck 11000 GVW	12,480.00					86,149		81,744		167,893
8TKDMP10		Trk, End Dump, 10 cy										
*** 8TKDMP10		Trk, End Dump, 10 cy	12,417.92					206,311		545,768		752,079
8TKDMP15		Trk, End Dump, 15 cy										
*** 8TKDMP15		Trk, End Dump, 15 cy	117,949.40					2,854,965		6,202,959		9,057,924
8TKFB10		Trk, Flatbed/Dump 10 Ton										
*** 8TKFB10		Trk, Flatbed/Dump 10 Ton	50,338.98					308,880		791,329		1,100,209
8TKFB2		Flatbed/Dump 2 Ton										
*** 8TKFB2		Flatbed/Dump 2 Ton	156.00					2,785				2,785
8TKFB20		Trk, Flatbed/Dump 20 Ton										
*** 8TKFB20		Trk, Flatbed/Dump 20 Ton	21,109.43					215,886		495,438		711,325
8TKMCH		Mechanics Truck, 1Ton										
*** 8TKMCH		Mechanics Truck, 1Ton	3,120.00					42,544		34,320		76,864
8TKOIL		Oil Distributer Truck										
*** 8TKOIL		Oil Distributer Truck	156.00					2,127		1,716		3,843
8TKPU2		Pickup, 1/2 Ton, 2X4										
*** 8TKPU2		Pickup, 1/2 Ton, 2X4	320,041.01					1,061,896		2,371,504		3,433,400
8TKPU4		Pickup, 3/4 Ton, 4X4										
*** 8TKPU4		Pickup, 3/4 Ton, 4X4	251,424.11					1,085,649		1,958,594		3,044,244
8TKTRA		Trk, Tractor, 6 X 4, 45K										
*** 8TKTRA		Trk, Tractor, 6 X 4, 45K	6,280.00					97,196		233,333		330,529
8TKWAT04		Trk, Water,4000 G										
*** 8TKWAT04		Trk, Water,4000 G	37,473.62					640,462		1,133,015		1,773,477
8TLFLT40		Trailer, Float, 40 ft										
*** 8TLFLT40		Trailer, Float, 40 ft	6,280.00					32,399		34,854		67,253
8WM350		Welding Machine, 350 Amp										
*** 8WM350		Welding Machine, 350 Amp	2,739.55					4,608		11,629		16,237
8WM8PE		Weld Machine,8 Pack 200 Amp										
*** 8WM8PE		Weld Machine,8 Pack 200 Amp	3,263.66					2,226		18,498		20,724
***REPORT TOTALS***								28,233,313	5,601	35,010,293		63,249,206

\*\*\* indicates non-additive item

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## Appendix C: Construction Emission Calculations

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Unmitigated Emissions - Above Grade

Off-Road Equipment	HP Rating	Hours	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	Emissions (lbs)									
			ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Asphalt Paver	224	25	0.096219	0.306812	0.823589	0.001376	0.029997	0.029098	122.2913	0.008682	2.4	7.7	20.6	0.0	0.7	0.7	3057.3	0.2	3061.8
Asphalt Paver	35	156	0.082099	0.269557	0.216492	0.000309	0.018532	0.017976	23.92655	0.007408	12.8	42.1	33.8	0.0	2.9	2.8	3732.5	1.2	3756.8
Backhoe	50	41	0.051274	0.364663	0.333077	0.000775	0.018901	0.018334	66.79721	0.004626	2.1	15.0	13.7	0.0	0.8	0.8	2738.7	0.2	2742.7
Tractor Backhoe	62	1958	0.049709	0.283857	0.234245	0.000392	0.012081	0.011719	30.3471	0.004485	97.3	555.8	458.7	0.8	23.7	22.9	59419.6	8.8	59604.0
Tractor Backhoe	98	3178	0.043487	0.342622	0.29366	0.000607	0.018357	0.017807	51.72802	0.003924	138.2	1088.9	933.3	1.9	58.3	56.6	164391.7	12.5	164653.5
Excavator	120	1334	0.069294	0.501744	0.442525	0.000864	0.028931	0.028063	73.62307	0.006252	92.4	669.3	590.3	1.2	38.6	37.4	98213.2	8.3	98388.3
8T Crane	50	100	0.064589	0.252711	0.201938	0.0003	0.01513	0.014676	23.1867	0.005828	6.5	25.3	20.2	0.0	1.5	1.5	2318.7	0.6	2330.9
10T Crane	120	8	0.063871	0.34863	0.38575	0.000588	0.030642	0.029722	50.14797	0.005763	0.5	2.8	3.1	0.0	0.2	0.2	401.2	0.0	402.2
35T Crane	175	1242	0.075221	0.476621	0.502915	0.000904	0.028272	0.027424	80.3446	0.006787	93.4	592.0	624.6	1.1	35.1	34.1	99788.0	8.4	99965.0
50T Crane	250	148	0.07866	0.252136	0.616831	0.001262	0.021189	0.020553	112.1589	0.007097	11.6	37.3	91.3	0.2	3.1	3.0	16599.5	1.1	16621.6
100T Crane	500	2196	0.120161	0.408545	0.874849	0.001768	0.031732	0.03078	180.1013	0.010842	263.9	897.2	1921.2	3.9	69.7	67.6	395502.4	23.8	396002.4
140T Crane	550	3810	0.140979	0.478129	1.037114	0.002088	0.037402	0.03628	210.8371	0.01272	537.1	1821.7	3951.4	8.0	142.5	138.2	803289.4	48.5	804307.2
175T Crane	600	41	0.161797	0.547713	1.199378	0.002407	0.043072	0.04178	241.573	0.014599	6.6	22.5	49.2	0.1	1.8	1.7	9904.5	0.6	9917.1
200T Crane	750	40200	0.203433	0.686882	1.523907	0.003047	0.054413	0.052781	303.0447	0.018355	8178.0	27612.7	61261.1	122.5	2187.4	2121.8	12182395.8	737.9	12197891.4
Air Compressor	49	780	0.051782	0.214174	0.184788	0.000288	0.013056	0.012664	22.27126	0.004672	40.4	167.1	144.1	0.2	10.2	9.9	17371.6	3.6	17448.1
Air Compressor	120	5293	0.058164	0.313021	0.393537	0.000711	0.024634	0.023895	63.60731	0.005248	307.9	1656.8	2083.0	3.8	130.4	126.5	336673.5	27.8	337256.8
Concrete Mixer	20	5092	0.008662	0.041629	0.053759	0.000109	0.002193	0.002127	7.248148	0.000782	44.1	212.0	273.7	0.6	11.2	10.8	36907.6	4.0	36991.1
Roller	120	878	0.068263	0.388482	0.448478	0.00077	0.029074	0.028202	67.04405	0.006159	59.9	341.1	393.8	0.7	25.5	24.8	58864.7	5.4	58978.2
Drill Rig	249	2965	0.053756	0.342582	0.249932	0.002116	0.006828	0.006624	188.1019	0.00485	159.4	1015.8	741.0	6.3	20.2	19.6	557722.1	14.4	558024.1
Drill Rig	474	4875	0.088668	0.551156	0.403468	0.003056	0.011209	0.010873	311.3086	0.008	432.3	2686.9	1966.9	14.9	54.6	53.0	1517629.6	39.0	1518448.7
Drill Rig	580	2575	0.132064	0.820109	0.602858	0.00462	0.016706	0.016205	463.2009	0.011916	340.1	2111.8	1552.4	11.9	43.0	41.7	1192742.2	30.7	1193386.6
Drill Rig	580	14878	0.132064	0.820109	0.602858	0.00462	0.016706	0.016205	463.2009	0.011916	1964.9	12201.6	8969.3	68.7	248.5	241.1	6891502.4	177.3	6895225.4
D6 Tractor	215	307	0.133304	0.417938	1.043014	0.001869	0.03855	0.037393	166.1315	0.012028	40.9	128.3	320.2	0.6	11.8	11.5	51002.4	3.7	51079.9
Boom Lift	65	48	0.064589	0.252711	0.201938	0.0003	0.01513	0.014676	23.1867	0.005828	3.1	12.1	9.7	0.0	0.7	0.7	1113.0	0.3	1118.8
Excavator CAT307	54	13	0.046808	0.252087	0.200215	0.000323	0.011054	0.010722	25.01754	0.004223	0.6	3.3	2.6	0.0	0.1	0.1	325.2	0.1	326.4
Excavator CAT321	148	3294	0.069294	0.501744	0.442525	0.000864	0.028931	0.028063	73.62307	0.006252	228.3	1652.7	1457.7	2.8	95.3	92.4	242514.4	20.6	242946.9
Excavator CAT324	190	133	0.082387	0.664068	0.506902	0.001263	0.02643	0.025637	112.2216	0.007434	11.0	88.3	67.4	0.2	3.5	3.4	14925.5	1.0	14946.2
Excavator CAT330	235	2	0.09333	0.33234	0.598381	0.001785	0.020201	0.019595	158.6828	0.008421	0.2	0.7	1.2	0.0	0.0	0.0	317.4	0.0	317.7
Excavator CAT336	266	6069	0.09333	0.33234	0.598381	0.001785	0.020201	0.019595	158.6828	0.008421	566.4	2017.0	3631.6	10.8	122.6	118.9	963045.8	51.1	964119.1
Excavator CAT345	345	1230	0.113598	0.400618	0.693245	0.00204	0.024313	0.023584	196.2091	0.01025	139.7	492.8	852.7	2.5	29.9	29.0	241337.2	12.6	241601.9
Forklift CAT TL-1055	125	21395	0.026472	0.211761	0.174533	0.000366	0.010802	0.010478	31.22492	0.002389	566.4	4530.6	3734.1	7.8	231.1	224.2	668057.1	51.1	669130.2
Generator 5kW	15	24535	0.012261	0.064385	0.085235	0.000159	0.00429	0.004162	10.20766	0.001106	300.8	1579.7	2091.2	3.9	105.3	102.1	250444.9	27.1	251015.0
Grader CAT14	180	2741	0.105909	0.729413	0.700188	0.001394	0.038491	0.037336	123.9215	0.009556	290.3	1999.3	1919.2	3.8	105.5	102.3	339668.9	26.2	340219.0
Loader Deere 210	78	1344	0.074242	0.319812	0.259094	0.000403	0.017448	0.016925	31.14967	0.006699	99.8	429.8	348.2	0.5	23.5	22.7	41865.2	9.0	42054.2
Loader CAT950	130	1245	0.065966	0.401558	0.412143	0.000691	0.030685	0.029765	58.91351	0.005952	82.1	499.9	513.1	0.9	38.2	37.1	73347.3	7.4	73502.9
Loader CAT963	150	1260	0.065966	0.401558	0.412143	0.000691	0.030685	0.029765	58.91351	0.005952	83.1	506.0	519.3	0.9	38.7	37.5	74231.0	7.5	74388.5
Loader CAT966	170	97888	0.088786	0.622687	0.590182	0.001196	0.032334	0.031364	106.3152	0.008011	8691.1	60953.6	57771.7	117.1	3165.1	3070.1	10406982.2	784.2	10423450.1
Loader CAT IT62	207	27285	0.091694	0.473199	0.652182	0.001436	0.028343	0.027492	127.646	0.008273	2501.9	12911.2	17794.8	39.2	773.3	750.1	3482819.8	225.7	3487560.3
Loader CAT980	355	672	0.094601	0.323711	0.714183	0.001676	0.024351	0.023621	148.9767	0.008536	63.6	217.5	479.9	1.1	16.4	15.9	100112.3	5.7	100232.8
Pavement Broom	74	12480	0.082099	0.269557	0.216492	0.000309	0.018532	0.017976	23.92655	0.007408	1024.6	3364.1	2701.8	3.9	231.3	224.3	298603.4	92.4	300544.8
Manlift 40ft	50	9110	0.033638	0.150605	0.152478	0.000254	0.009254	0.008976	19.61275	0.003035	306.4	1372.0	1389.1	2.3	84.3	81.8	178672.2	27.7	179252.8
Manlift 80ft	74	4696	0.033162	0.191258	0.204503	0.00035	0.013102	0.012709	28.84229	0.002992	155.7	898.1	960.3	1.6	61.5	59.7	135443.4	14.1	135738.5
Compactor CAT CB54	130	156	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	12.6	59.4	76.0	0.1	6.2	6.1	8501.9	1.1	8525.7
Compactor CAT CB64	130	50	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	4.0	19.0	24.3	0.0	2.0	1.9	2725.0	0.4	2732.6
Compactor CAT 433	100	4	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	0.3	1.5	1.9	0.0	0.2	0.2	218.0	0.0	218.6
Compactor CAT CP56	145	972	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	78.3	370.2	473.2	0.6	38.9	37.7	52973.4	7.1	53121.7
Compactor CAT PS360	130	181	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	14.6	68.9	88.1	0.1	7.2	7.0	9864.4	1.3	9892.0
Compactor CAT CS423	80	3207	0.082099	0.269557	0.216492	0.000309	0.018532	0.017976	23.92655	0.007408	263.3	864.5	694.3	1.0	59.4	57.7	76732.5	23.8	77231.3
Scraper CAT 615	250	50	0.170437	0.532359	1.355816	0.002357	0.05014	0.048636	209.4703	0.015378	8.5	26.6	67.8	0.1	2.5	2.4	10473.5	0.8	10489.7
Skid Steer CAT 226	58	25298	0.026321	0.203471	0.17869	0.00033	0.006505	0.00631	25.51916	0.002375	665.9	5147.4	4520.5	8.3	164.6	159.6	645583.8	60.1	646845.5
Skid Steer CAT 246	80	6029	0.012398	0.133999	0.098489	0.000251	0.004746	0.004604	21.38091	0.001119	74.7	807.9	593.8	1.5	28.6	27.8	128905.5	6.7	129047.2
Rack Truck		12480	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	69.5	461.9	3489.9	12.6	284.6	115.4	1359892.1	40.7	1360746.7
Mechanics Truck		3120	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	3.8	234.1	23.1	0.7	32.7	13.1	70256.6	1.1	70278.9

Oil dist Truck	156	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	0.2	11.7	1.2	0.0	1.6	0.7	3512.8	0.1	3513.9
Pickup 1/2T	320041	0.002048	0.106169	0.010292	0.000211	0.010524	0.004261	20.93382	0.000522	655.5	33978.6	3293.9	67.4	3368.0	1363.6	6699681.4	166.9	6703187.1
Pickup 3/4T	251424	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	302.8	18868.0	1859.0	56.8	2633.4	1059.7	5661599.2	85.5	5663394.2
Tractor 6x4	6280	0.013788	0.05546	0.419738	0.001278	0.023416	0.009838	133.9301	0.00064	86.6	348.3	2636.0	8.0	147.1	61.8	841081.3	4.0	841165.8
Water truck	37474	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	45.1	2812.2	277.1	8.5	392.5	157.9	843844.5	12.7	844112.1
<b>total</b>										30,234	211,520	200,783	613	15,418	11,073	58,431,840	2,934	58,493,453

On-Road Equipment	Hours	(lb/hr)								Emissions (lbs)								
		ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Dump Truck	82	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	0.5	3.0	22.9	0.1	1.9	0.8	8935.2	0.3	8940.8
End Dump 10CY	12418	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	69.2	459.6	3472.6	12.5	283.2	114.9	1353136.2	40.5	1353986.6
End Dump 15CY	117949	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	657.0	4365.2	32983.4	118.9	2689.5	1091.1	12852397.1	384.6	12860473.8
Flatbed 10T	50340	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	280.4	1863.1	14077.2	50.7	1147.9	465.7	5485334.1	164.1	5488781.2
Flatbed 2T	156	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	0.9	5.8	43.6	0.2	3.6	1.4	16998.7	0.5	17009.3
Flatbed 20T	21110	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	117.6	781.3	5903.2	21.3	481.4	195.3	2300266.2	68.8	2301711.8
Employee Commutes	147062.1	0.000689	0.052913	0.003519	0.000178	0.010467	0.004209	17.80674	0.000209	101.4	7781.5	517.5	26.2	1539.3	618.9	2618697.6	30.8	2619343.5
<b>total</b>										1,227	15,259	57,020	230	6,147	2,488	24,635,765	690	24,650,247

Daily Acres	lb/acre PM	Daily Emissions (lbs)						Total Emissions (lbs)		
		PM10	PM2.5	CO2	CH4	CO2e	PM10	PM2.5		
Fugitive Dust	15	20							450000	94500

	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Total (lb)	31,460	226,780	257,803	842	471,564	108,061	83,067,605	3,624	83,143,700
Daily (lb)	21.0	151.2	171.9	0.6	314.4	72.0	55,378.4	2.4	55,429.1
Annual (T)	2.6	18.9	21.5	0.1	39.3	9.0	6,922.3	0.3	6,928.6

On-site Emissions									
	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Total (lb)	30294.9	212283.3	203633.6	624.1	465725.1	105697.8	59663628.7	2968.4	59725965.2
Daily (lb)	20.19657	141.5222	135.7557	0.416071	310.4834	70.46518	39775.75244	1.978939	39817.31015
Annual (T)	2.524572	17.69027	16.96947	0.052009	38.81042	8.808148	4971.969055	0.247367	4977.163768

Total Emissions (tons)	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Off-road	15.1	105.8	100.4	0.3	7.7	5.5	29,215.9	1.5	29,246.7
On-Road	0.6	7.6	28.5	0.1	3.1	1.2	12,317.9	0.3	12,325.1
Fugitive Dust					225.0	47.3			
Total	15.7	113.4	128.9	0.4	235.8	54.0	41,533.8	1.8	41,571.8
Annual	2.6	18.9	21.5	0.1	39.3	9.0	6,922.3	0.3	6,928.6

Mitigated Emissions - Above Grade

										RD reduction		Emissions (lbs)							
										0.95	0.9	0.9	1	0.7	0.7	0.8			
Off-Road Equipment	HP Rating	Hours	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM10	(lb/hr) PM2.5	(lb/hr) CO2	(lb/hr) CH4	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Asphalt Paver	224	25	0.040774	0.028648	0.084842	0.00153	0.003483	0.003378	120.8164	0.008682	1.0	0.6	1.9	0.0	0.1	0.1	2416.3	0.2	2420.9
Asphalt Paver	35	156	0.006189	0.004348	0.012878	0.000232	0.000529	0.000513	18.3382	0.007408	0.9	0.6	1.8	0.0	0.1	0.1	2288.6	1.2	2312.9
Backhoe	50	41	0.006826	0.004796	0.014203	0.000256	0.000583	0.000566	20.22595	0.004626	0.3	0.2	0.5	0.0	0.0	0.0	663.4	0.2	667.4
Tractor Backhoe	62	1958	0.008464	0.005947	0.017612	0.000318	0.000723	0.000701	25.08018	0.004485	15.7	10.5	31.0	0.6	1.0	1.0	39285.6	8.8	39470.0
Tractor Backhoe	98	3178	0.013379	0.0094	0.027839	0.000502	0.001143	0.001109	39.64287	0.003924	40.4	26.9	79.6	1.6	2.5	2.5	100788.0	12.5	101049.9
Excavator	120	1334	0.020434	0.012377	0.042519	0.000767	0.001745	0.001693	60.54737	0.006252	25.9	14.9	51.0	1.0	1.6	1.6	64616.2	8.3	64791.3
8T Crane	50	100	0.006312	0.004282	0.013134	0.000237	0.000539	0.000523	18.70357	0.005828	0.6	0.4	1.2	0.0	0.0	0.0	1496.3	0.6	1508.5
10T Crane	120	8	0.015149	0.010277	0.031522	0.000569	0.001294	0.001255	44.88857	0.005763	0.1	0.1	0.2	0.0	0.0	0.0	287.3	0.0	288.3
35T Crane	175	1242	0.022093	0.014987	0.04597	0.000829	0.001887	0.001831	65.46249	0.006787	26.1	16.8	51.4	1.0	1.6	1.6	65043.5	8.4	65220.6
50T Crane	250	148	0.031561	0.02141	0.065672	0.001184	0.002696	0.002615	93.51784	0.007097	4.4	2.9	8.7	0.2	0.3	0.3	11072.5	1.1	11094.6
100T Crane	500	2196	0.063123	0.042821	0.131343	0.002369	0.005392	0.00523	187.0357	0.010842	131.7	84.6	259.6	5.2	8.3	8.0	328584.3	23.8	329084.3
140T Crane	550	3810	0.069435	0.047103	0.144478	0.002606	0.005931	0.005753	205.7393	0.01272	251.3	161.5	495.4	9.9	15.8	15.3	627093.3	48.5	628111.0
175T Crane	600	41	0.075747	0.051385	0.157612	0.002843	0.00647	0.006276	224.4428	0.014599	3.0	1.9	5.8	0.1	0.2	0.2	7361.7	0.6	7374.3
200T Crane	750	40200	0.094684	0.064231	0.197015	0.003553	0.008088	0.007845	280.5535	0.018355	3616.0	2323.9	7128.0	142.8	227.6	220.8	9022601.6	737.9	9038097.3
Air Compressor	49	780	0.006905	0.004852	0.014368	0.000259	0.00059	0.000572	20.46083	0.004672	5.1	3.4	10.1	0.2	0.3	0.3	12767.6	3.6	12844.1
Air Compressor	120	5293	0.001691	0.001188	0.003519	6.35E-05	0.000144	0.00014	5.010817	0.005248	8.5	5.7	16.8	0.3	0.5	0.5	21217.8	27.8	21801.1
Concrete Mixer	20	5092	0.002818	0.00198	0.005865	0.000106	0.000241	0.000234	8.351361	0.000782	13.6	9.1	26.9	0.5	0.9	0.8	34020.1	4.0	34103.7
Roller	120	878	0.020258	0.014233	0.042152	0.00076	0.00173	0.001679	60.02541	0.006159	16.9	11.2	33.3	0.7	1.1	1.0	42161.8	5.4	42275.4
Drill Rig	249	2965	0.031435	0.01904	0.065409	0.00118	0.002685	0.002605	93.14377	0.00485	88.5	50.8	174.5	3.5	5.6	5.4	220937.0	14.4	221239.0
Drill Rig	474	4875	0.05984	0.036245	0.124514	0.002246	0.005112	0.004958	177.3098	0.008	277.1	159.0	546.3	10.9	17.4	16.9	691508.3	39.0	692327.4
Drill Rig	580	2575	0.073222	0.04435	0.152358	0.002748	0.006255	0.006067	216.9614	0.011916	179.1	102.8	353.1	7.1	11.3	10.9	446940.5	30.7	447584.8
Drill Rig	580	14878	0.073222	0.04435	0.152358	0.002748	0.006255	0.006067	216.9614	0.011916	1034.9	593.9	2040.1	40.9	65.1	63.2	2582361.4	177.3	2586084.4
D6 Tractor	215	307	0.037242	0.025264	0.077493	0.001398	0.003181	0.003086	110.3511	0.012028	10.9	7.0	21.4	0.4	0.7	0.7	27102.2	3.7	27179.8
Boom Lift	65	48	0.009065	0.006369	0.018862	0.00034	0.000774	0.000751	26.85919	0.005828	0.4	0.3	0.8	0.0	0.0	0.0	1031.4	0.3	1037.3
Excavator CAT307	54	13	0.009195	0.00557	0.019133	0.000345	0.000785	0.000762	27.24632	0.004223	0.1	0.1	0.2	0.0	0.0	0.0	283.4	0.1	284.5
Excavator CAT321	148	3294	0.025202	0.015265	0.05244	0.000946	0.002153	0.002088	74.67509	0.006252	78.9	45.3	155.5	3.1	5.0	4.8	196783.8	20.6	197216.3
Excavator CAT324	190	133	0.032354	0.019597	0.067321	0.001214	0.002764	0.002681	95.86666	0.007434	4.1	2.3	8.1	0.2	0.3	0.2	10200.2	1.0	10221.0
Excavator CAT330	235	2	0.040017	0.024238	0.083266	0.001502	0.003418	0.003316	158.6828	0.008421	0.1	0.0	0.1	0.0	0.0	0.0	253.9	0.0	254.2
Excavator CAT336	266	6069	0.045296	0.027435	0.09425	0.0017	0.003869	0.003753	134.2133	0.008421	261.2	149.9	514.8	10.3	16.4	15.9	651632.6	51.1	652705.8
Excavator CAT345	345	1230	0.058748	0.035583	0.122241	0.002205	0.005018	0.004868	174.0737	0.01025	68.6	39.4	135.3	2.7	4.3	4.2	171288.5	12.6	171553.3
Forklift CAT TL-1055	125	21395	0.017432	0.012248	0.036272	0.000654	0.001489	0.001444	51.6523	0.002389	354.3	235.8	698.4	14.0	22.3	21.6	884080.7	51.1	885153.9
Generator 5kW	15	24535	0.003259	0.004027	0.073706	0.000122	0.000557	0.00054	9.656261	0.001106	76.0	88.9	1627.5	3.0	9.6	9.3	189533.1	27.1	190103.1
Grader CAT14	180	2741	0.030387	0.018405	0.063228	0.00114	0.002596	0.002518	90.03811	0.009556	79.1	45.4	156.0	3.1	5.0	4.8	197435.6	26.2	197985.6
Loader Deere 210	78	1344	0.010649	0.007482	0.022157	0.0004	0.00091	0.000882	31.55249	0.006699	13.6	9.0	26.8	0.5	0.9	0.8	33925.2	9.0	34114.3
Loader CAT950	130	1245	0.017748	0.01247	0.036929	0.000666	0.001516	0.001471	52.58748	0.005952	21.0	14.0	41.4	0.8	1.3	1.3	52377.1	7.4	52532.7
Loader CAT963	150	1260	0.020478	0.014388	0.04261	0.000768	0.001749	0.001697	60.67786	0.005952	24.5	16.3	48.3	1.0	1.5	1.5	61163.3	7.5	61320.8
Loader CAT966	170	97888	0.023209	0.016306	0.048292	0.000871	0.001982	0.001923	68.76824	0.008011	2158.2	1436.6	4254.5	85.3	135.8	131.8	5385268.2	784.2	5401736.1
Loader CAT IT62	207	27285	0.02826	0.019855	0.058802	0.001061	0.002414	0.002342	83.73544	0.008273	732.5	487.6	1444.0	28.9	46.1	44.7	1827777.3	225.7	1832517.8
Loader CAT980	355	672	0.048465	0.034052	0.100844	0.001819	0.00414	0.004016	143.6043	0.008536	30.9	20.6	61.0	1.2	1.9	1.9	77201.7	5.7	77322.1
Pavement Broom	74	12480	0.01032	0.007251	0.021473	0.000387	0.000882	0.000855	30.57816	0.007408	122.4	81.4	241.2	4.8	7.7	7.5	305292.4	92.4	307233.8
Manlift 40ft	50	9110	0.006973	0.004899	0.014509	0.000262	0.000596	0.000578	20.66092	0.003035	60.3	40.2	119.0	2.4	3.8	3.7	150576.8	27.7	151157.4
Manlift 80ft	74	4696	0.01032	0.007251	0.021473	0.000387	0.000882	0.000855	30.57816	0.002992	46.0	30.6	90.8	1.8	2.9	2.8	114876.0	14.1	115171.1
Compactor CAT CB54	130	156	0.021946	0.015419	0.045665	0.000824	0.001875	0.001818	65.02752	0.007268	3.3	2.2	6.4	0.1	0.2	0.2	8115.4	1.1	8139.2
Compactor CAT CB64	130	50	0.021946	0.015419	0.045665	0.000824	0.001875	0.001818	65.02752	0.007268	1.0	0.7	2.1	0.0	0.1	0.1	2601.1	0.4	2608.7
Compactor CAT 433	100	4	0.016882	0.011861	0.035127	0.000634	0.001442	0.001399	50.02117	0.007268	0.1	0.0	0.1	0.0	0.0	0.0	160.1	0.0	160.7
Compactor CAT CP56	145	972	0.024478	0.017199	0.050934	0.000919	0.002091	0.002028	72.5307	0.007268	22.6	15.0	44.6	0.9	1.4	1.4	56399.9	7.1	56548.2
Compactor CAT PS360	130	181	0.021946	0.015419	0.045665	0.000824	0.001875	0.001818	65.02752	0.007268	3.8	2.5	7.4	0.1	0.2	0.2	9416.0	1.3	9443.6
Compactor CAT CS423	80	3207	0.013505	0.009489	0.028101	0.000507	0.001154	0.001119	40.01694	0.007408	41.1	27.4	81.1	1.6	2.6	2.5	102667.5	23.8	103166.3
Scraper CAT 615	250	50	0.042204	0.025563	0.087817	0.001584	0.003605	0.003497	125.0529	0.015378	2.0	1.2	4.0	0.1	0.1	0.1	5002.1	0.8	5018.3
Skid Steer CAT 226	58	25298	0.007918	0.005563	0.016476	0.000297	0.000676	0.000656	23.4621	0.002375	190.3	126.7	375.1	7.5	12.0	11.6	474835.5	60.1	476097.2
Skid Steer CAT 246	80	6029	0.010922	0.007674	0.022725	0.00041	0.000933	0.000905	32.36152	0.001119	62.6	41.6	123.3	2.5	3.9	3.8	156086.1	6.7	156227.7
Rack Truck		12480	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	66.0	415.7	3140.9	12.6	199.2	80.8	1087913.7	40.7	1088768.3
Mechanics Truck		3120	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	3.6	210.7	20.8	0.7	22.9	9.2	56205.3	1.1	56227.5
Oil dist Truck		156	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	0.2	10.5	1.0	0.0	1.1	0.5	2810.3	0.1	2811.4
Pickup 1/2T		320041	0.002048	0.106169	0.010292	0.000211	0.010524	0.004261	20.93382	0.000522	622.8	30580.7	2964.5	67.4	2357.6				

Pickup 3/4T	251424	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	287.6	16981.2	1673.1	56.8	1843.4	741.8	4529279.4	85.5	4531074.3
Tractor 6x4	6280	0.013788	0.05546	0.419738	0.001278	0.023416	0.009838	133.9301	0.00064	82.3	313.5	2372.4	8.0	102.9	43.2	672865.0	4.0	672949.5
Water truck	37474	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	42.9	2531.0	249.4	8.5	274.7	110.6	675075.6	12.7	675343.2
<b>total</b>										11,316	57,593	32,029	557	5,449	2,569	37,862,774	2,934	37,924,387
														0.6				

On-Road Equipment	Hours	(lb/hr)								Emissions (lbs)								
		ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Dump Truck	82	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	0.5	3.0	22.9	0.1	1.9	0.8	8935.2	0.3	8940.8
End Dump 10CY	12418	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	69.2	459.6	3472.6	12.5	283.2	114.9	1353136.2	40.5	1353986.6
End Dump 15CY	117949	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	657.0	4365.2	32983.4	118.9	2689.5	1091.1	12852397.1	384.6	12860473.8
Flatbed 10T	50340	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	280.4	1863.1	14077.2	50.7	1147.9	465.7	5485334.1	164.1	5488781.2
Flatbed 2T	156	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	0.9	5.8	43.6	0.2	3.6	1.4	16998.7	0.5	17009.3
Flatbed 20T	21110	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	117.6	781.3	5903.2	21.3	481.4	195.3	2300266.2	68.8	2301711.8
Employee Commutes	147062.1	0.000689	0.052913	0.003519	0.000178	0.010467	0.004209	17.80674	0.000209	101.4	7781.5	517.5	26.2	1539.3	618.9	2618697.6	30.8	2619343.5
<b>total</b>										1,227	15,259	57,020	230	6,147	2,488	24,635,765	690	24,650,247

Fugitive Dust	Daily Acres	lb/acre PM	Daily Emissions (lbs)					Total Emissions (lbs)	
			PM10	PM2.5	CO2	CH4	CO2e	PM10	PM2.5
	15	10	150.0	31.5				225000	47250

	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Total (lb)	12,543	72,852	89,049	787	236,596	52,307	62,498,539	3,624	62,574,634
Daily (lb)	8.4	48.6	59.4	0.5	157.7	34.9	41,665.7	2.4	41,716.4
Annual (T)	1.0	6.1	7.4	0.1	19.7	4.4	5,208.2	0.3	5,214.6

On-site Emissions									
	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Total (lb)	11377.7	58355.8	34879.6	568.9	230756.7	49943.0	39094562.7	2968.4	39156899.2
Daily (lb)	7.6	38.9	23.3	0.4	153.8	33.3	26063.0	2.0	26104.6
Annual (T)	0.9	4.9	2.9	0.0	19.2	4.2	3257.9	0.2	3263.1

Total Emissions (tons)									
	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Off-road	5.7	28.8	16.0	0.3	2.7	1.3	18,931.4	1.5	18,962.2
On-Road	0.6	7.6	28.5	0.1	3.1	1.2	12,317.9	0.3	12,325.1
Fugitive Dust					112.5	23.6			
Total	6.3	36.4	44.5	0.4	118.3	26.2	31,249.3	1.8	31,287.3
Annual	1.0	6.1	7.4	0.1	19.7	4.4	5,208.2	0.3	5,214.6

## SCAB Fleet Average Emission Factors (Diesel)

### Road Emission Rates

Air Basin	SC
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Equipment	MaxHP	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0143	0.0468	0.0865	0.0001	0.0039	11.0	0.0013
	50	0.0336	0.1506	0.1525	0.0003	0.0093	19.6	0.0030
	120	0.0327	0.2319	0.2565	0.0004	0.0170	38.1	0.0029
	500	0.0840	0.3899	0.8852	0.0021	0.0270	213	0.0076
	750	0.1545	0.7049	1.6423	0.0039	0.0494	385	0.0139
Aerial Lifts Composite		0.0322	0.1740	0.2152	0.0004	0.0119	34.7	0.0029
Air Compressors	15	0.0098	0.0456	0.0608	0.0001	0.0033	7.2	0.0009
	25	0.0207	0.0645	0.1187	0.0002	0.0060	14.4	0.0019
	50	0.0518	0.2142	0.1848	0.0003	0.0131	22.3	0.0047
	120	0.0504	0.3097	0.3370	0.0006	0.0255	47.0	0.0045
	175	0.0685	0.4994	0.5069	0.0010	0.0268	88.5	0.0062
	250	0.0747	0.2653	0.6529	0.0015	0.0206	131	0.0067
	500	0.1262	0.4504	1.0161	0.0023	0.0345	232	0.0114
	750	0.1960	0.6961	1.6134	0.0036	0.0540	358	0.0177
1000	0.2958	1.0416	3.7257	0.0049	0.0965	486	0.0267	
Air Compressors Composite		0.0582	0.3130	0.3935	0.0007	0.0246	63.6	0.0052
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0204	0.2211	0.1897	0.0004	0.0034	31.0	0.0018
	120	0.0308	0.4665	0.2710	0.0009	0.0072	77.1	0.0028
	175	0.0475	0.7542	0.2910	0.0016	0.0092	141	0.0043
	250	0.0538	0.3426	0.2499	0.0021	0.0068	188	0.0049
	500	0.0887	0.5512	0.4035	0.0031	0.0112	311	0.0080
	750	0.1755	1.0891	0.8022	0.0062	0.0222	615	0.0158
1000	0.2789	1.6441	4.2095	0.0093	0.0723	928	0.0252	
Bore/Drill Rigs Composite		0.0539	0.5011	0.4175	0.0017	0.0099	165	0.0049
Cement and Mortar	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0232	0.0754	0.1391	0.0002	0.0064	17.6	0.0021
Cement and Mortar Mixers Composite		0.0087	0.0416	0.0538	0.0001	0.0022	7.2	0.0008
Concrete/Industrial	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0549	0.2534	0.2388	0.0004	0.0148	30.2	0.0050
	120	0.0650	0.4661	0.4898	0.0009	0.0335	74.1	0.0059
	175	0.1012	0.8661	0.8304	0.0018	0.0410	160	0.0091
Concrete/Industrial Saws Composite		0.0605	0.3850	0.3959	0.0007	0.0261	58.5	0.0055
Cranes	50	0.0646	0.2527	0.2019	0.0003	0.0151	23.2	0.0058
	120	0.0639	0.3486	0.3857	0.0006	0.0306	50.1	0.0058
	175	0.0752	0.4766	0.5029	0.0009	0.0283	80.3	0.0068
	250	0.0787	0.2521	0.6168	0.0013	0.0212	112	0.0071
	500	0.1202	0.4085	0.8748	0.0018	0.0317	180	0.0108
	750	0.2034	0.6869	1.5239	0.0030	0.0544	303	0.0184
9999	0.7422	2.3933	7.8338	0.0098	0.2146	971	0.0670	
Cranes Composite		0.1012	0.4060	0.7908	0.0014	0.0318	129	0.0091
Crawler Tractors	50	0.0813	0.2884	0.2240	0.0003	0.0181	24.9	0.0073
	120	0.0945	0.4679	0.5589	0.0008	0.0448	65.8	0.0085
	175	0.1270	0.7327	0.8534	0.0014	0.0479	121	0.0115
	250	0.1333	0.4179	1.0430	0.0019	0.0385	166	0.0120
	500	0.1959	0.7202	1.4625	0.0025	0.0554	259	0.0177
	750	0.3529	1.2889	2.6916	0.0047	0.1006	465	0.0318
	1000	0.5380	2.0171	5.7362	0.0066	0.1663	658	0.0485
Crawler Tractors Composite		0.1185	0.5387	0.7960	0.0013	0.0457	114	0.0107
Crushing/Proc. Equ	50	0.0949	0.4230	0.3607	0.0006	0.0241	44.0	0.0086
	120	0.0849	0.5506	0.5679	0.0010	0.0416	83.1	0.0077
	175	0.1258	0.9520	0.8975	0.0019	0.0475	167	0.0113
	250	0.1386	0.4932	1.1284	0.0028	0.0359	245	0.0125
	500	0.2037	0.7231	1.5205	0.0037	0.0524	374	0.0184
	750	0.3193	1.1368	2.4441	0.0059	0.0824	589	0.0288
	9999	0.8312	2.7569	9.5902	0.0131	0.2467	1,308	0.0750

Crushing/Proc. Equipment Comp		0.1109	0.6328	0.7330	0.0015	0.0412	132	0.0100
Dumpers/Tenders	25	0.0092	0.0314	0.0584	0.0001	0.0023	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0584	0.0001	0.0023	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0468	0.2521	0.2002	0.0003	0.0111	25.0	0.0042
	120	0.0693	0.5017	0.4425	0.0009	0.0289	73.6	0.0063
	175	0.0824	0.6641	0.5069	0.0013	0.0264	112	0.0074
	250	0.0933	0.3323	0.5984	0.0018	0.0202	159	0.0084
	500	0.1339	0.4689	0.7881	0.0023	0.0284	234	0.0121
Excavators Composite		0.0848	0.5160	0.5181	0.0013	0.0249	120	0.0077
Forklifts	50	0.0229	0.1440	0.1180	0.0002	0.0058	14.7	0.0021
	120	0.0265	0.2118	0.1745	0.0004	0.0108	31.2	0.0024
	175	0.0394	0.3322	0.2328	0.0006	0.0125	56.1	0.0036
	250	0.0440	0.1559	0.2594	0.0009	0.0089	77.1	0.0040
	500	0.0623	0.2131	0.3432	0.0011	0.0125	111	0.0056
Forklifts Composite		0.0372	0.2173	0.2186	0.0006	0.0101	54.4	0.0034
Generator Sets	15	0.0123	0.0644	0.0852	0.0002	0.0043	10.2	0.0011
	25	0.0231	0.0788	0.1449	0.0002	0.0070	17.6	0.0021
	50	0.0491	0.2265	0.2357	0.0004	0.0138	30.6	0.0044
	120	0.0642	0.4694	0.5181	0.0009	0.0333	77.9	0.0058
	175	0.0808	0.7324	0.7528	0.0016	0.0337	142	0.0073
	250	0.0857	0.3931	0.9756	0.0024	0.0274	213	0.0077
	500	0.1264	0.6113	1.3836	0.0033	0.0415	337	0.0114
	750	0.2080	0.9868	2.2918	0.0055	0.0679	544	0.0188
	9999	0.5230	2.0948	7.5356	0.0105	0.1778	1,049	0.0472
Generator Sets Composite		0.0477	0.2786	0.3759	0.0007	0.0192	61.0	0.0043
Graders	50	0.0676	0.2868	0.2305	0.0004	0.0157	27.5	0.0061
	120	0.0860	0.5138	0.5323	0.0009	0.0398	75.0	0.0078
	175	0.1059	0.7294	0.7002	0.0014	0.0385	124	0.0096
	250	0.1115	0.3778	0.8409	0.0019	0.0287	172	0.0101
	500	0.1420	0.5194	0.9989	0.0023	0.0359	229	0.0128
	750	0.3024	1.0988	2.1820	0.0049	0.0774	486	0.0273
Graders Composite		0.1049	0.5812	0.7217	0.0015	0.0355	133	0.0095
Off-Highway Tracto	120	0.1622	0.6879	0.9427	0.0011	0.0779	93.7	0.0146
	175	0.1614	0.8085	1.1191	0.0015	0.0632	130	0.0146
	250	0.1275	0.3861	1.0244	0.0015	0.0411	130	0.0115
	750	0.5173	2.0914	4.1264	0.0057	0.1633	568	0.0467
	1000	0.7842	3.2770	8.0820	0.0082	0.2526	814	0.0708
Off-Highway Tractors Composite		0.1631	0.6762	1.2293	0.0017	0.0579	151	0.0147
Off-Highway Trucks	175	0.0983	0.7542	0.5947	0.0014	0.0314	125	0.0089
	250	0.1042	0.3572	0.6660	0.0019	0.0225	167	0.0094
	500	0.1656	0.5578	0.9706	0.0027	0.0351	272	0.0149
	750	0.2693	0.9044	1.6152	0.0044	0.0577	442	0.0243
	1000	0.4058	1.3339	4.3394	0.0063	0.1110	625	0.0366
Off-Highway Trucks Composite		0.1613	0.5634	1.0525	0.0027	0.0360	260	0.0146
Other Construction	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0412	0.2342	0.2102	0.0004	0.0108	28.0	0.0037
	120	0.0604	0.5116	0.4573	0.0009	0.0279	80.9	0.0054
	175	0.0608	0.5859	0.4478	0.0012	0.0218	107	0.0055
	500	0.1122	0.4743	0.8004	0.0025	0.0275	254	0.0101
Other Construction Equipment Co		0.0633	0.3542	0.4478	0.0013	0.0181	123	0.0057
Other General Indu	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0548	0.2314	0.1869	0.0003	0.0134	21.7	0.0049
	120	0.0732	0.4277	0.4544	0.0007	0.0350	62.0	0.0066
	175	0.0835	0.5664	0.5608	0.0011	0.0307	95.9	0.0075
	250	0.0884	0.2862	0.6866	0.0015	0.0221	136	0.0080
	500	0.1664	0.5336	1.1846	0.0026	0.0412	265	0.0150
	750	0.2755	0.8795	2.0057	0.0044	0.0689	437	0.0249
	1000	0.3866	1.2370	4.3716	0.0056	0.1169	560	0.0349
Other General Industrial Equipme		0.1113	0.4591	0.8242	0.0016	0.0336	152	0.0100
Other Material Han	50	0.0758	0.3192	0.2598	0.0004	0.0186	30.3	0.0068
	120	0.0709	0.4162	0.4437	0.0007	0.0341	60.7	0.0064
	175	0.1050	0.7171	0.7125	0.0014	0.0389	122	0.0095
	250	0.0934	0.3046	0.7336	0.0016	0.0237	145	0.0084

	500	0.1186	0.3838	0.8543	0.0019	0.0297	192	0.0107
	9999	0.5386	1.6331	5.7822	0.0073	0.1543	741	0.0486
Other Material Handling Equipment		0.1050	0.4495	0.8053	0.0015	0.0324	141	0.0095
Pavers	25	0.0226	0.0769	0.1434	0.0002	0.0057	18.7	0.0020
	50	0.0968	0.3188	0.2539	0.0004	0.0217	28.0	0.0087
	120	0.1030	0.4862	0.6205	0.0008	0.0506	69.2	0.0093
	175	0.1365	0.7632	0.9644	0.0014	0.0539	128	0.0123
	250	0.1574	0.5000	1.3162	0.0022	0.0490	194	0.0142
	500	0.1765	0.6885	1.4189	0.0023	0.0539	233	0.0159
Pavers Composite		0.1121	0.5017	0.6241	0.0009	0.0419	77.9	0.0101
Paving Equipment	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0821	0.2696	0.2165	0.0003	0.0185	23.9	0.0074
	120	0.0805	0.3809	0.4869	0.0006	0.0400	54.5	0.0073
	175	0.1062	0.5971	0.7567	0.0011	0.0424	101	0.0096
	250	0.0962	0.3068	0.8236	0.0014	0.0300	122	0.0087
Paving Equipment Composite		0.0857	0.4136	0.5558	0.0008	0.0374	68.9	0.0077
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washers	15	0.0059	0.0308	0.0408	0.0001	0.0021	4.9	0.0005
	25	0.0094	0.0319	0.0587	0.0001	0.0028	7.1	0.0008
	50	0.0170	0.0895	0.1059	0.0002	0.0054	14.3	0.0015
	120	0.0167	0.1383	0.1528	0.0003	0.0087	24.1	0.0015
Pressure Washers Composite		0.0101	0.0562	0.0703	0.0001	0.0036	9.4	0.0009
Pumps	15	0.0101	0.0468	0.0625	0.0001	0.0034	7.4	0.0009
	25	0.0279	0.0871	0.1601	0.0002	0.0080	19.5	0.0025
	50	0.0599	0.2670	0.2677	0.0004	0.0164	34.3	0.0054
	120	0.0676	0.4767	0.5260	0.0009	0.0350	77.9	0.0061
	175	0.0845	0.7338	0.7548	0.0016	0.0350	140	0.0076
	250	0.0866	0.3786	0.9399	0.0023	0.0271	201	0.0078
	500	0.1387	0.6343	1.4367	0.0034	0.0442	345	0.0125
	750	0.2330	1.0487	2.4376	0.0057	0.0741	571	0.0210
	9999	0.7050	2.7434	9.8509	0.0136	0.2358	1,355	0.0636
Pumps Composite		0.0458	0.2722	0.3306	0.0006	0.0189	49.6	0.0041
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0662	0.2547	0.2171	0.0003	0.0158	26.0	0.0060
	120	0.0680	0.3919	0.4411	0.0007	0.0341	59.0	0.0061
	175	0.0897	0.6130	0.6569	0.0012	0.0356	108	0.0081
	250	0.0934	0.3306	0.8164	0.0017	0.0274	153	0.0084
	500	0.1262	0.4902	1.0345	0.0022	0.0365	219	0.0114
Rollers Composite		0.0683	0.3885	0.4485	0.0008	0.0291	67.0	0.0062
Rough Terrain Forklifts	50	0.0655	0.3294	0.2744	0.0004	0.0166	33.9	0.0059
	120	0.0596	0.4179	0.3967	0.0007	0.0273	62.4	0.0054
	175	0.0911	0.7231	0.6072	0.0014	0.0322	125	0.0082
	250	0.0988	0.3504	0.7075	0.0019	0.0237	171	0.0089
	500	0.1441	0.5029	0.9468	0.0025	0.0341	257	0.0130
Rough Terrain Forklifts Composite		0.0638	0.4499	0.4219	0.0008	0.0277	70.3	0.0058
Rubber Tired Dozers	175	0.1676	0.8191	1.1443	0.0015	0.0646	129	0.0151
	250	0.1890	0.5640	1.4879	0.0021	0.0605	183	0.0171
	500	0.2531	1.0338	1.9476	0.0026	0.0787	265	0.0228
	750	0.3821	1.5520	2.9917	0.0040	0.1195	399	0.0345
	1000	0.5986	2.5082	6.0072	0.0060	0.1906	592	0.0540
Rubber Tired Dozers Composite		0.2343	0.8819	1.8194	0.0025	0.0737	239	0.0211
Rubber Tired Loaders	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0742	0.3198	0.2591	0.0004	0.0174	31.1	0.0067
	120	0.0660	0.4016	0.4121	0.0007	0.0307	58.9	0.0060
	175	0.0888	0.6227	0.5902	0.0012	0.0323	106	0.0080
	250	0.0946	0.3237	0.7142	0.0017	0.0244	149	0.0085
	500	0.1440	0.5256	1.0103	0.0023	0.0363	237	0.0130
	750	0.2966	1.0762	2.1374	0.0049	0.0758	486	0.0268
	1000	0.3912	1.4170	4.4558	0.0060	0.1188	594	0.0353
Rubber Tired Loaders Composite		0.0861	0.4470	0.5831	0.0012	0.0300	109	0.0078
Scrapers	120	0.1382	0.6686	0.8165	0.0011	0.0661	93.9	0.0125
	175	0.1579	0.8954	1.0712	0.0017	0.0603	148	0.0142
	250	0.1704	0.5324	1.3558	0.0024	0.0501	209	0.0154
	500	0.2458	0.9165	1.8678	0.0032	0.0707	321	0.0222
	750	0.4267	1.5807	3.3123	0.0056	0.1238	555	0.0385

Scrapers Composite		0.2135	0.8418	1.6042	0.0027	0.0653	262	0.0193
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0649	0.2966	0.2820	0.0005	0.0172	36.2	0.0059
	120	0.0695	0.4999	0.5256	0.0009	0.0356	80.2	0.0063
	175	0.0955	0.8276	0.7968	0.0017	0.0385	155	0.0086
	250	0.1151	0.4857	1.1305	0.0029	0.0337	255	0.0104
Signal Boards Composite		0.0143	0.0916	0.1029	0.0002	0.0050	16.7	0.0013
Skid Steer Loaders	25	0.0176	0.0582	0.1081	0.0002	0.0048	13.8	0.0016
	50	0.0263	0.2035	0.1787	0.0003	0.0065	25.5	0.0024
	120	0.0248	0.2680	0.1970	0.0005	0.0095	42.8	0.0022
Skid Steer Loaders Composite		0.0253	0.2146	0.1799	0.0004	0.0074	30.3	0.0023
Surfacing Equipme	50	0.0317	0.1242	0.1139	0.0002	0.0077	14.1	0.0029
	120	0.0668	0.4072	0.4651	0.0007	0.0334	63.8	0.0060
	175	0.0637	0.4677	0.5082	0.0010	0.0257	85.8	0.0058
	250	0.0733	0.2858	0.7013	0.0015	0.0230	135	0.0066
	500	0.1120	0.5047	1.0316	0.0022	0.0350	221	0.0101
	750	0.1782	0.7911	1.6685	0.0035	0.0558	347	0.0161
Surfacing Equipment Composite		0.0923	0.4187	0.8043	0.0017	0.0291	166	0.0083
Sweepers/Scrubber	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0522	0.2974	0.2539	0.0004	0.0137	31.6	0.0047
	120	0.0647	0.4983	0.4442	0.0009	0.0291	75.0	0.0058
	175	0.0966	0.8030	0.6280	0.0016	0.0337	139	0.0087
	250	0.0894	0.3218	0.6073	0.0018	0.0204	162	0.0081
Sweepers/Scrubbers Composite		0.0681	0.4946	0.4308	0.0009	0.0251	78.5	0.0061
Tractors/Loaders/B	25	0.0191	0.0653	0.1211	0.0002	0.0046	15.9	0.0017
	50	0.0497	0.2839	0.2342	0.0004	0.0121	30.3	0.0045
	120	0.0435	0.3426	0.2937	0.0006	0.0184	51.7	0.0039
	175	0.0669	0.5845	0.4264	0.0011	0.0218	101	0.0060
	250	0.0914	0.3483	0.5964	0.0019	0.0200	172	0.0082
	500	0.1788	0.6771	1.0736	0.0039	0.0385	345	0.0161
	750	0.2691	1.0154	1.6525	0.0058	0.0585	517	0.0243
Tractors/Loaders/Backhoes Comp		0.0513	0.3647	0.3331	0.0008	0.0189	66.8	0.0046
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.1142	0.3647	0.2965	0.0004	0.0255	32.9	0.0103
	120	0.0959	0.4498	0.5899	0.0008	0.0477	64.9	0.0087
	175	0.1505	0.8436	1.1021	0.0016	0.0607	144	0.0136
	250	0.1783	0.5823	1.5446	0.0025	0.0582	223	0.0161
	500	0.2312	0.9564	1.9434	0.0031	0.0740	311	0.0209
	750	0.4382	1.7994	3.7533	0.0059	0.1413	587	0.0395
Trenchers Composite		0.1061	0.4368	0.5117	0.0007	0.0393	58.7	0.0096
Welders	15	0.0084	0.0392	0.0522	0.0001	0.0028	6.2	0.0008
	25	0.0161	0.0504	0.0927	0.0001	0.0047	11.3	0.0015
	50	0.0563	0.2339	0.2108	0.0003	0.0144	26.0	0.0051
	120	0.0398	0.2540	0.2787	0.0005	0.0205	39.5	0.0036
	175	0.0703	0.5400	0.5536	0.0011	0.0283	98.2	0.0063
	250	0.0617	0.2348	0.5828	0.0013	0.0179	119	0.0056
	500	0.0825	0.3196	0.7244	0.0016	0.0239	168	0.0074
Welders Composite		0.0388	0.1876	0.1941	0.0003	0.0133	25.6	0.0035

**Tier 4 Final Emission Rates**

Adjusted EF = Steady State EF x TAF x DF

Where:

EF = Emission Factor  
 TAF = Transient Adjustment Factor  
 DF = Deterioration Factor

Note: TAF = 1.0 for Tier 4 equipment

**Deterioration "A"**

ROG	0.027
CO	0.151
NOx	0.008
PM10	0.473

**DF**

ROG	1.0135
CO	1.0755
NOx	1.004
PM10	1.2365

Equipment	HP Rating	Load Factor	Steady State Emission Factors (g/bhphr)							CH4	Adjusted Emission Factors (g/bhphr)						CH4	Adjusted Emission Factors (lb/hr)						CH4
			ROG	CO	NOX	SOX	PM	CO2	ROG		CO	NOX	SOX	PM	CO2	ROG		CO	NOX	SOX	PM	CO2		
Drill Rig	250	0.43	0.1314	0.075	0.276	0.004998	0.0092	394.6		0.133174	0.080663	0.277104	0.004998	0.011376	394.6		0.031561	0.019116	0.065672	0.001184	0.002696	93.51784		
Wheel Loader	150	0.465	0.1314	0.087	0.276	0.004998	0.0092	394.6		0.133174	0.093569	0.277104	0.004998	0.011376	394.6		0.020478	0.014388	0.04261	0.000768	0.001749	60.67786		
Excavator	200	0.58	0.1314	0.075	0.276	0.004998	0.0092	394.6		0.133174	0.080663	0.277104	0.004998	0.011376	394.6		0.034057	0.020628	0.070864	0.001278	0.002909	100.9123		
Pump Truck	175	0.74	0.1314	0.075	0.276	0.004998	0.0092	394.6		0.133174	0.080663	0.277104	0.004998	0.011376	394.6		0.03802	0.023029	0.079111	0.001427	0.003248	112.6564		
Crane	375	0.43	0.1314	0.084	0.276	0.004998	0.0092	394.6		0.133174	0.090342	0.277104	0.004998	0.011376	394.6		0.047342	0.032116	0.098508	0.001777	0.004044	140.2768		
Forklift	150	0.475	0.1314	0.087	0.276	0.004998	0.0092	394.6		0.133174	0.093569	0.277104	0.004998	0.011376	394.6		0.020919	0.014697	0.043527	0.000785	0.001787	61.98276		
Pile Driving Machine	180	0.43	0.1314	0.075	0.276	0.004998	0.0092	394.6		0.133174	0.080663	0.277104	0.004998	0.011376	394.6		0.022724	0.013764	0.047284	0.000853	0.001941	67.33285		
Dozer	400	0.59	0.1314	0.084	0.276	0.004998	0.0092	394.6		0.133174	0.090342	0.277104	0.004998	0.011376	394.6		0.069288	0.047003	0.144172	0.0026	0.005919	205.3043		
Backhoe	150	0.465	0.1314	0.087	0.276	0.004998	0.0092	394.6		0.133174	0.093569	0.277104	0.004998	0.011376	394.6		0.020478	0.014388	0.04261	0.000768	0.001749	60.67786		
Grader	175	0.575	0.1314	0.075	0.276	0.004998	0.0092	394.6		0.133174	0.080663	0.277104	0.004998	0.011376	394.6		0.029543	0.017894	0.061472	0.001109	0.002524	87.53705		
Paver	34	0.62	0.1314	0.087	0.276	0.004998	0.0092	394.6		0.133174	0.093569	0.277104	0.004998	0.011376	394.6		0.006189	0.004348	0.012878	0.000232	0.000529	18.3382		
Roller	125	0.575	0.1314	0.087	0.276	0.004998	0.0092	394.6		0.133174	0.093569	0.277104	0.004998	0.011376	394.6		0.021102	0.014826	0.043908	0.000792	0.001803	62.52647		
Ballast Compressor	175	0.62	0.1314	0.075	0.276	0.004998	0.0092	394.6		0.133174	0.080663	0.277104	0.004998	0.011376	394.6		0.031855	0.019294	0.066283	0.001195	0.002721	94.38778		
Ballast Regulator	175	0.62	0.1314	0.075	0.276	0.004998	0.0092	394.6		0.133174	0.080663	0.277104	0.004998	0.011376	394.6		0.031855	0.019294	0.066283	0.001195	0.002721	94.38778		
Generator	49	0.74	0.1314	0.153	3	0.004998	0.0184	394.6		0.133174	0.164552	3.012	0.004998	0.022752	394.6		0.010646	0.013154	0.240774	0.0004	0.001819	31.54379		
Air Compressor	150	0.48	0.1314	0.087	0.276	0.004998	0.0092	394.6		0.133174	0.093569	0.277104	0.004998	0.011376	394.6		0.021139	0.014852	0.043985	0.000793	0.001806	62.63521		

EMFAC2017 2022 Emission Rates (g/mile)

Heavy Trucks																			
	CH4	CO	CO2	HC	NOx	PM	PM10	PM2_5	ROG	SOx	TOG								
35 MPH	0.04226	0.479642	1412.196	0.096002	3.624155	0.018407	0.018296	0.017505	0.07219	0.013061	0.121438								
Brake Wear						0.189	0.18522	0.07938											
Tire Wear						0.092	0.092	0.023											
<b>Total</b>	<b>0.04226</b>	<b>0.479642</b>	<b>1412.196</b>	<b>0.096002</b>	<b>3.624155</b>	<b>0.299407</b>	<b>0.295516</b>	<b>0.119885</b>	<b>0.07219</b>	<b>0.013061</b>	<b>0.121438</b>								
<b>lb/hr</b>	<b>0.003261</b>	<b>0.037009</b>	<b>108.9657</b>	<b>0.007408</b>	<b>0.279642</b>	<b>0.023102</b>	<b>0.022802</b>	<b>0.00925</b>	<b>0.00557</b>	<b>0.001008</b>	<b>0.00937</b>	<b>ROG</b>	<b>CO</b>	<b>NOX</b>	<b>SOX</b>	<b>PM10</b>	<b>PM2.5</b>	<b>CO2</b>	<b>CH4</b>
												0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261

LDA																			
	CH4	CO	CO2	HC	NOx	PM	PM10	PM2_5	ROG	SOx	TOG								
35 MPH	0.00271	0.685749	230.7754	0.011957	0.045605	0.001561	0.001403	0.001293	0.008933	0.002313	0.012984								
Brake Wear						0.1125	0.11025	0.04725											
Tire Wear						0.024	0.024	0.006											
<b>Total</b>	<b>0.00271</b>	<b>0.685749</b>	<b>230.7754</b>	<b>0.011957</b>	<b>0.045605</b>	<b>0.138061</b>	<b>0.135653</b>	<b>0.054543</b>	<b>0.008933</b>	<b>0.002313</b>	<b>0.012984</b>								
<b>lb/hr</b>	<b>0.000209</b>	<b>0.052913</b>	<b>17.80674</b>	<b>0.000923</b>	<b>0.003519</b>	<b>0.010653</b>	<b>0.010467</b>	<b>0.004209</b>	<b>0.000689</b>	<b>0.000178</b>	<b>0.001002</b>	<b>ROG</b>	<b>CO</b>	<b>NOX</b>	<b>SOX</b>	<b>PM10</b>	<b>PM2.5</b>	<b>CO2</b>	<b>CH4</b>
												0.000689	0.052913	0.003519	0.000178	0.010467	0.004209	17.80674	0.000209

LDT (gas)																			
	CH4	CO	CO2	HC	NOx	PM	PM10	PM2_5	ROG	SOx	TOG								
35 MPH	0.00676	1.375955	271.3023	0.035713	0.133387	0.002385	0.002137	0.001967	0.026546	0.00273	0.038684								
Brake Wear						0.1125	0.11025	0.04725											
Tire Wear						0.024	0.024	0.006											
<b>Total</b>	<b>0.00676</b>	<b>1.375955</b>	<b>271.3023</b>	<b>0.035713</b>	<b>0.133387</b>	<b>0.138885</b>	<b>0.136387</b>	<b>0.055217</b>	<b>0.026546</b>	<b>0.00273</b>	<b>0.038684</b>								
<b>lb/hr</b>	<b>0.000522</b>	<b>0.106169</b>	<b>20.93382</b>	<b>0.002756</b>	<b>0.010292</b>	<b>0.010716</b>	<b>0.010524</b>	<b>0.004261</b>	<b>0.002048</b>	<b>0.000211</b>	<b>0.002985</b>	<b>ROG</b>	<b>CO</b>	<b>NOX</b>	<b>SOX</b>	<b>PM10</b>	<b>PM2.5</b>	<b>CO2</b>	<b>CH4</b>
												0.002048	0.106169	0.010292	0.000211	0.010524	0.004261	20.93382	0.000522

LDT (diesel)																			
	CH4	CO	CO2	HC	NOx	PM	PM10	PM2_5	ROG	SOx	TOG								
35 MPH	0.004406	0.972576	291.835	0.020959	0.095824	0.001662	0.00149	0.001372	0.015606	0.002927	0.022723								
Brake Wear						0.1125	0.11025	0.04725											
Tire Wear						0.024	0.024	0.006											
<b>Total</b>	<b>0.004406</b>	<b>0.972576</b>	<b>291.835</b>	<b>0.020959</b>	<b>0.095824</b>	<b>0.138162</b>	<b>0.13574</b>	<b>0.054622</b>	<b>0.015606</b>	<b>0.002927</b>	<b>0.022723</b>								
<b>lb/hr</b>	<b>0.00034</b>	<b>0.075044</b>	<b>22.51813</b>	<b>0.001617</b>	<b>0.007394</b>	<b>0.010661</b>	<b>0.010474</b>	<b>0.004215</b>	<b>0.001204</b>	<b>0.000226</b>	<b>0.001753</b>	<b>ROG</b>	<b>CO</b>	<b>NOX</b>	<b>SOX</b>	<b>PM10</b>	<b>PM2.5</b>	<b>CO2</b>	<b>CH4</b>
												0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034

**Unmitigated At-Grade**

Off-Road Equipment	HP Rating	Hours	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	Emissions (lbs)									
			ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Asphalt Paver	224	83	0.096219	0.306812	0.823589	0.001376	0.029997	0.029098	122.2913	0.008682	8.0	25.5	68.4	0.1	2.5	2.4	10150.2	0.7	10165.3
Asphalt Paver	35	156	0.082099	0.269557	0.216492	0.000309	0.018532	0.017976	23.92655	0.007408	12.8	42.1	33.8	0.0	2.9	2.8	3732.5	1.2	3756.8
Backhoe	50	41	0.051274	0.364663	0.333077	0.000775	0.018901	0.018334	66.79721	0.004626	2.1	15.0	13.7	0.0	0.8	0.8	2738.7	0.2	2742.7
Crawler Backhoe	266	12	0.09137	0.348282	0.596387	0.001932	0.020044	0.019442	171.737	0.008244	1.1	4.2	7.2	0.0	0.2	0.2	2060.8	0.1	2062.9
Tractor Backhoe	62	2675	0.049709	0.283857	0.234245	0.000392	0.012081	0.011719	30.3471	0.004485	133.0	759.3	626.6	1.0	32.3	31.3	81178.5	12.0	81430.4
Tractor Backhoe	98	3253	0.043487	0.342622	0.29366	0.000607	0.018357	0.017807	51.72802	0.003924	141.5	1114.6	955.3	2.0	59.7	57.9	168271.3	12.8	168539.3
Excavator	120	1334	0.069294	0.501744	0.442525	0.000864	0.028931	0.028063	73.62307	0.006252	92.4	669.3	590.3	1.2	38.6	37.4	98213.2	8.3	98388.3
8T Crane	50	1838	0.064589	0.252711	0.201938	0.0003	0.01513	0.014676	23.1867	0.005828	118.7	464.5	371.2	0.6	27.8	27.0	42617.1	10.7	42842.1
10T Crane	120	8	0.063871	0.34863	0.38575	0.000588	0.030642	0.029722	50.14797	0.005763	0.5	2.8	3.1	0.0	0.2	0.2	401.2	0.0	402.2
35T Crane	175	1242	0.075221	0.476621	0.502915	0.000904	0.028272	0.027424	80.3446	0.006787	93.4	592.0	624.6	1.1	35.1	34.1	99788.0	8.4	99965.0
50T Crane	250	170	0.07866	0.252136	0.616831	0.001262	0.021189	0.020553	112.1589	0.007097	13.4	42.9	104.9	0.2	3.6	3.5	19067.0	1.2	19092.4
100T Crane	500	2908	0.120161	0.408545	0.874849	0.001768	0.031732	0.03078	180.1013	0.010842	349.4	1188.0	2544.1	5.1	92.3	89.5	523734.5	31.5	524396.6
140T Crane	550	300	0.140979	0.478129	1.037114	0.002088	0.037402	0.03628	210.8371	0.01272	42.3	143.4	311.1	0.6	11.2	10.9	63251.1	3.8	63331.3
175T Crane	600	41	0.161797	0.547713	1.199378	0.002407	0.043072	0.04178	241.573	0.014599	6.6	22.5	49.2	0.1	1.8	1.7	9904.5	0.6	9917.1
200T Crane	750	77136	0.203433	0.686882	1.523907	0.003047	0.054413	0.052781	303.0447	0.018355	15692.0	52983.4	117548.1	235.0	4197.2	4071.3	23375653.8	1415.9	23405386.9
Air Compressor	49	1312	0.051782	0.214174	0.184788	0.000288	0.013056	0.012664	22.27126	0.004672	67.9	281.0	242.4	0.4	17.1	16.6	29219.9	6.1	29348.6
Air Compressor	120	5523	0.058164	0.313021	0.393537	0.000711	0.024634	0.023895	63.60731	0.005248	321.2	1728.8	2173.5	3.9	136.1	132.0	351303.2	29.0	351911.9
Concrete Mixer	20	5710	0.008662	0.041629	0.053759	0.000109	0.002193	0.002127	7.248148	0.000782	49.5	237.7	307.0	0.6	12.5	12.1	41386.9	4.5	41480.6
Concrete Pump	30	6	0.045793	0.272172	0.330641	0.00059	0.018942	0.018374	49.60666	0.004132	0.3	1.6	2.0	0.0	0.1	0.1	297.6	0.0	298.2
Roller	120	1218	0.068263	0.388482	0.448478	0.00077	0.029074	0.028202	67.04405	0.006159	83.1	473.2	546.2	0.9	35.4	34.4	81659.7	7.5	81817.2
Drill Rig	249	1790	0.053756	0.342582	0.249932	0.002116	0.006828	0.006624	188.1019	0.00485	96.2	613.2	447.4	3.8	12.2	11.9	336702.4	8.7	336884.7
Drill Rig	474	8020	0.088668	0.551156	0.403468	0.003056	0.011209	0.010873	311.3086	0.008	711.1	4420.3	3235.8	24.5	89.9	87.2	2496695.3	64.2	2498042.7
Drill Rig	580	33295	0.132064	0.820109	0.602858	0.00462	0.016706	0.016205	463.2009	0.011916	4397.1	27305.5	20072.2	153.8	556.2	539.5	15422272.6	396.7	15430604.2
Drill Rig	580	17575	0.132064	0.820109	0.602858	0.00462	0.016706	0.016205	463.2009	0.011916	2321.0	14413.4	10595.2	81.2	293.6	284.8	8140755.1	209.4	8145153.0
D6 Tractor	215	627	0.133304	0.417938	1.043014	0.001869	0.03855	0.037393	166.1315	0.012028	83.6	262.0	654.0	1.2	24.2	23.4	104164.5	7.5	104322.8
Boom Lift	65	445	0.064589	0.252711	0.201938	0.0003	0.01513	0.014676	23.1867	0.005828	28.7	112.5	89.9	0.1	6.7	6.5	10318.1	2.6	10372.5
Excavator CAT307	54	13	0.046808	0.252087	0.200215	0.000323	0.011054	0.010722	25.01754	0.004223	0.6	3.3	2.6	0.0	0.1	0.1	325.2	0.1	326.4
Excavator CAT321	148	5253	0.069294	0.501744	0.442525	0.000864	0.028931	0.028063	73.62307	0.006252	364.0	2635.7	2324.6	4.5	152.0	147.4	386742.0	32.8	387431.7
Excavator CAT324	190	133	0.082387	0.664068	0.506902	0.001263	0.02643	0.025637	112.2216	0.007434	11.0	88.3	67.4	0.2	3.5	3.4	14925.5	1.0	14946.2
Excavator CAT330	235	2	0.09333	0.33234	0.598381	0.001785	0.020201	0.019595	158.6828	0.008421	0.2	0.7	1.2	0.0	0.0	0.0	317.4	0.0	317.7
Excavator CAT336	266	14530	0.09333	0.33234	0.598381	0.001785	0.020201	0.019595	158.6828	0.008421	1356.1	4828.9	8694.5	25.9	293.5	284.7	2305660.9	122.4	2308230.4
Excavator CAT345	345	1960	0.113598	0.400618	0.693245	0.00204	0.024313	0.023584	196.2091	0.01025	222.7	785.2	1358.8	4.0	47.7	46.2	384569.8	20.1	384991.7
Forklift CAT TL-1055	125	25210	0.026472	0.211761	0.174533	0.000366	0.010802	0.010478	31.22492	0.002389	667.4	5338.5	4400.0	9.2	272.3	264.1	787180.2	60.2	788444.7
Generator 5kW	15	51082	0.012261	0.064385	0.085235	0.000159	0.00429	0.004162	10.20766	0.001106	626.3	3288.9	4354.0	8.1	219.2	212.6	521427.7	56.5	522614.5
Grader CAT14	180	3868	0.105909	0.729413	0.700188	0.001394	0.038491	0.037336	123.9215	0.009556	409.7	2821.4	2708.3	5.4	148.9	144.4	479328.5	37.0	480104.7
Loader Deere 210	78	1344	0.074242	0.319812	0.259094	0.000403	0.017448	0.016925	31.14967	0.006699	99.8	429.8	348.2	0.5	23.5	22.7	41865.2	9.0	42054.2
Loader CAT950	130	1293	0.065966	0.401558	0.412143	0.000691	0.030685	0.029765	58.91351	0.005952	85.3	519.2	532.9	0.9	39.7	38.5	76175.2	7.7	76336.8
Loader CAT963	150	7233	0.065966	0.401558	0.412143	0.000691	0.030685	0.029765	58.91351	0.005952	477.1	2904.5	2981.0	5.0	221.9	215.3	426121.4	43.1	427025.5
Loader CAT966	170	125237	0.088786	0.622687	0.590182	0.001196	0.032334	0.031364	106.3152	0.008011	11119.3	77983.5	73912.6	149.8	4049.4	3927.9	13314596.6	1003.3	13335665.5
Loader CAT IT62	207	33538	0.091694	0.473199	0.652182	0.001436	0.028343	0.027492	127.646	0.008273	3075.2	15870.1	21872.9	48.2	950.6	922.0	4280989.9	277.5	4286816.8
Loader CAT980	355	914	0.094601	0.323711	0.714183	0.001676	0.024351	0.023621	148.9767	0.008536	86.5	295.9	652.8	1.5	22.3	21.6	136164.7	7.8	136328.5
Skid Steer Loader	50	488	0.025253	0.214562	0.179886	0.000375	0.00735	0.00713	30.27763	0.002279	12.3	104.7	87.8	0.2	3.6	3.5	14775.5	1.1	14798.8
Pavement Broom	74	12480	0.082099	0.269557	0.216492	0.000309	0.018532	0.017976	23.92655	0.007408	1024.6	3364.1	2701.8	3.9	231.3	224.3	298603.4	92.4	300544.8
Forktruck	74	2377	0.082099	0.269557	0.216492	0.000309	0.018532	0.017976	23.92655	0.007408	195.1	640.7	514.6	0.7	44.1	42.7	56873.4	17.6	57243.2
Manlift 40ft	50	13434	0.033638	0.150605	0.152478	0.000254	0.009254	0.008976	19.61275	0.003035	451.9	2023.2	2048.4	3.4	124.3	120.6	263477.7	40.8	264334.0
Manlift 80ft	74	1125	0.033162	0.191258	0.204503	0.00035	0.013102	0.012709	28.84229	0.002992	37.3	215.2	230.1	0.4	14.7	14.3	32447.6	3.4	32518.3
Compactor CAT CB54	130	156	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	12.6	59.4	76.0	0.1	6.2	6.1	8501.9	1.1	8525.7
Compactor CAT CB64	130	165	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	13.3	62.8	80.3	0.1	6.6	6.4	8992.4	1.2	9017.6
Compactor CAT 433	100	4	0.080548	0.380873	0.486882	0.000639	0.040033	0.038832	54.49936	0.007268	0.3	1.5	1.9	0.0	0.2	0.2	218.0	0.0	218.6



Mitigated At-Grade

										RD reduction	0.95	0.9	0.9	1	0.7	0.7	0.8		
Off-Road Equipment	HP Rating	Hours	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM10	(lb/hr) PM2.5	(lb/hr) CO2	(lb/hr) CH4	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Asphalt Paver	224	83	0.040774	0.028648	0.084842	0.00153	0.003483	0.003378	120.8164	0.008682	3.2	2.1	6.3	0.1	0.2	0.2	8,022.2	0.7	8037.3
Asphalt Paver	35	156	0.006189	0.004348	0.012878	0.000232	0.000529	0.000513	18.3382	0.007408	0.9	0.6	1.8	0.0	0.1	0.1	2,288.6	1.2	2312.9
Backhoe	50	41	0.006826	0.004796	0.014203	0.000256	0.000583	0.000566	20.22595	0.004626	0.3	0.2	0.5	0.0	0.0	0.0	663.4	0.2	667.4
Crawler Backhoe	266	12	0.036315	0.025515	0.075562	0.001363	0.003102	0.003009	107.6021	0.008244	0.4	0.3	0.8	0.0	0.0	0.0	1,033.0	0.1	1035.1
Tractor Backhoe	62	2675	0.008464	0.005947	0.017612	0.000318	0.000723	0.000701	25.08018	0.004485	21.5	14.3	42.4	0.8	1.4	1.3	53,671.6	12.0	53923.5
Tractor Backhoe	98	3253	0.013379	0.0094	0.027839	0.000502	0.001143	0.001109	39.64287	0.003924	41.3	27.5	81.5	1.6	2.6	2.5	103,166.6	12.8	103434.6
Excavator	120	1334	0.020434	0.012377	0.042519	0.000767	0.001745	0.001693	60.54737	0.006252	25.9	14.9	51.0	1.0	1.6	1.6	64,616.2	8.3	64791.3
8T Crane	50	1838	0.006312	0.004282	0.013134	0.000237	0.000539	0.000523	18.70357	0.005828	11.0	7.1	21.7	0.4	0.7	0.7	27,501.7	10.7	27726.7
10T Crane	120	8	0.015149	0.010277	0.031522	0.000569	0.001294	0.001255	44.88857	0.005763	0.1	0.1	0.2	0.0	0.0	0.0	287.3	0.0	288.3
35T Crane	175	1242	0.022093	0.014987	0.04597	0.000829	0.001887	0.001831	65.46249	0.006787	26.1	16.8	51.4	1.0	1.6	1.6	65,043.5	8.4	65220.6
50T Crane	250	170	0.031561	0.02141	0.065672	0.001184	0.002696	0.002615	93.51784	0.007097	5.1	3.3	10.0	0.2	0.3	0.3	12,718.4	1.2	12743.8
100T Crane	500	2908	0.063123	0.042821	0.131343	0.002369	0.005392	0.00523	187.0357	0.010842	174.4	112.1	343.8	6.9	11.0	10.6	435,119.8	31.5	435781.9
140T Crane	550	300	0.069435	0.047103	0.144478	0.002606	0.005931	0.005753	205.7393	0.01272	19.8	12.7	39.0	0.8	1.2	1.2	49,377.4	3.8	49457.6
175T Crane	600	41	0.075747	0.051385	0.157612	0.002843	0.00647	0.006276	224.4428	0.014599	3.0	1.9	5.8	0.1	0.2	0.2	7,361.7	0.6	7374.3
200T Crane	750	77136	0.094684	0.064231	0.197015	0.003553	0.008088	0.007845	280.5535	0.018355	6,938.4	4,459.1	13,677.3	274.1	436.7	423.6	17,312,621.9	1415.9	17342355.0
Air Compressor	49	1312	0.006905	0.004852	0.014368	0.000259	0.00059	0.000572	20.46083	0.004672	8.6	5.7	17.0	0.3	0.5	0.5	21,475.7	6.1	21604.4
Air Compressor	120	5523	0.001691	0.001188	0.003519	6.35E-05	0.000144	0.00014	5.010817	0.005248	8.9	5.9	17.5	0.4	0.6	0.5	22,139.8	29.0	22748.5
Concrete Mixer	20	5710	0.002818	0.00198	0.005865	0.000106	0.000241	0.000234	8.351361	0.000782	15.3	10.2	30.1	0.6	1.0	0.9	38,149.0	4.5	38242.7
Concrete Pump	30	6	0.004228	0.00297	0.008797	0.000159	0.000361	0.00035	12.52704	0.004132	0.0	0.0	0.0	0.0	0.0	0.0	60.1	0.0	60.7
Roller	120	1218	0.020258	0.014233	0.042152	0.00076	0.00173	0.001679	60.02541	0.006159	23.4	15.6	46.2	0.9	1.5	1.4	58,488.8	7.5	58646.3
Drill Rig	249	1790	0.031435	0.01904	0.065409	0.00118	0.002685	0.002605	93.14377	0.00485	53.5	30.7	105.4	2.1	3.4	3.3	133,381.9	8.7	133564.2
Drill Rig	474	8020	0.05984	0.036245	0.124514	0.002246	0.005112	0.004958	177.3098	0.008	455.9	261.6	898.7	18.0	28.7	27.8	1,137,619.9	64.2	1138967.3
Drill Rig	580	33295	0.073222	0.04435	0.152358	0.002748	0.006255	0.006067	216.9614	0.011916	2,316.0	1,329.0	4,565.5	91.5	145.8	141.4	5,778,983.8	396.7	5787315.4
Drill Rig	580	17575	0.073222	0.04435	0.152358	0.002748	0.006255	0.006067	216.9614	0.011916	1,222.5	701.5	2,409.9	48.3	76.9	74.6	3,050,477.3	209.4	3054875.2
D6 Tractor	215	627	0.037242	0.025264	0.077493	0.001398	0.003181	0.003086	110.3511	0.012028	22.2	14.3	43.7	0.9	1.4	1.4	55,352.1	7.5	55510.5
Boom Lift	65	445	0.009065	0.006369	0.018862	0.00034	0.000774	0.000751	26.85919	0.005828	3.8	2.6	7.6	0.2	0.2	0.2	9,561.9	2.6	9616.3
Excavator CAT307	54	13	0.009195	0.00557	0.019133	0.000345	0.000785	0.000762	27.24632	0.004223	0.1	0.1	0.2	0.0	0.0	0.0	283.4	0.1	284.5
Excavator CAT321	148	5253	0.025202	0.015265	0.05244	0.000946	0.002153	0.002088	74.67509	0.006252	125.8	72.2	247.9	5.0	7.9	7.7	313,814.6	32.8	314504.3
Excavator CAT324	190	133	0.032354	0.019597	0.067321	0.001214	0.002764	0.002681	95.86666	0.007434	4.1	2.3	8.1	0.2	0.3	0.2	10,200.2	1.0	10221.0
Excavator CAT330	235	2	0.040017	0.024238	0.083266	0.001502	0.003418	0.003316	158.6828	0.008421	0.1	0.0	0.1	0.0	0.0	0.0	253.9	0.0	254.2
Excavator CAT336	266	14530	0.045296	0.027435	0.09425	0.0017	0.003869	0.003753	134.2133	0.008421	625.2	358.8	1,232.5	24.7	39.4	38.2	1,560,095.8	122.4	1562665.2
Excavator CAT345	345	1960	0.058748	0.035583	0.122241	0.002205	0.005018	0.004868	174.0737	0.01025	109.4	62.8	215.6	4.3	6.9	6.7	272,947.5	20.1	273369.4
Forklift CAT TL-1055	125	25210	0.017432	0.012248	0.036272	0.000654	0.001489	0.001444	51.6523	0.002389	417.5	277.9	823.0	16.5	26.3	25.5	1,041,723.5	60.2	1042988.0
Generator 5kW	15	51082	0.003259	0.004027	0.073706	0.000122	0.000557	0.00054	9.656261	0.001106	158.1	185.1	3,388.6	6.2	19.9	19.3	394,608.9	56.5	395795.7
Grader CAT14	180	3868	0.030387	0.018405	0.063228	0.00114	0.002596	0.002518	90.03811	0.009556	111.7	64.1	220.1	4.4	7.0	6.8	278,613.9	37.0	279390.1
Loader Deere 210	78	1344	0.010649	0.007482	0.022157	0.0004	0.00091	0.000882	31.55249	0.006699	13.6	9.0	26.8	0.5	0.9	0.8	33,925.2	9.0	34114.3
Loader CAT950	130	1293	0.017748	0.01247	0.036929	0.000666	0.001516	0.001471	52.58748	0.005952	21.8	14.5	43.0	0.9	1.4	1.3	54,396.5	7.7	54558.1
Loader CAT963	150	7233	0.020478	0.014388	0.04261	0.000768	0.001749	0.001697	60.67786	0.005952	140.7	93.7	277.4	5.6	8.9	8.6	351,106.4	43.1	352010.4
Loader CAT966	170	125237	0.023209	0.016306	0.048292	0.000871	0.001982	0.001923	68.76824	0.008011	2,761.2	1,837.9	5,443.1	109.1	173.8	168.6	6,889,862.3	1003.3	6910931.2
Loader CAT IT62	207	33538	0.02826	0.019855	0.058802	0.001061	0.002414	0.002342	83.73544	0.008273	900.4	599.3	1,774.9	35.6	56.7	55.0	2,246,655.4	277.5	2252482.4
Loader CAT980	355	914	0.048465	0.034052	0.100844	0.001819	0.00414	0.004016	143.6043	0.008536	42.1	28.0	83.0	1.7	2.6	2.6	105,003.4	7.8	105167.3
Skid Steer Loader	50	488	0.006826	0.004796	0.014203	0.000256	0.000583	0.000566	20.22595	0.002279	3.2	2.1	6.2	0.1	0.2	0.2	7,896.2	1.1	7919.6
Pavement Broom	74	12480	0.01032	0.007251	0.021473	0.000387	0.000882	0.000855	30.57816	0.007408	122.4	81.4	241.2	4.8	7.7	7.5	305,292.4	92.4	307233.8
Forktruck	74	2377	0.01032	0.007251	0.021473	0.000387	0.000882	0.000855	30.57816	0.007408	23.3	15.5	45.9	0.9	1.5	1.4	58,147.4	17.6	58517.2
Manlift 40ft	50	13434	0.006973	0.004899	0.014509	0.000262	0.000596	0.000578	20.66092	0.003035	89.0	59.2	175.4	3.5	5.6	5.4	222,047.0	40.8	222903.3
Manlift 80ft	74	1125	0.01032	0.007251	0.021473	0.000387	0.000882	0.000855	30.57816	0.002992	11.0	7.3	21.7	0.4	0.7	0.7	27,520.3	3.4	27591.0
Compactor CAT CB54	130	156	0.021946	0.015419	0.045665	0.000824	0.001875	0.001818	65.02752	0.007268	3.3	2.2	6.4	0.1	0.2	0.2	8,115.4	1.1	8139.2
Compactor CAT CB64	130	165	0.021946	0.015419	0.045665	0.000824	0.001875	0.001818	65.02752	0.007268	3.4	2.3	6.8	0.1	0.2	0.2	8,583.6	1.2	8608.8
Compactor CAT 433	100	4	0.016882	0.011861	0.035127	0.000634	0.001442	0.001399	50.02117	0.007268	0.1	0.0	0.1	0.0	0.0	0.0	160.1	0.0	160.7

Compactor CAT CP56	145	972	0.024478	0.017199	0.050934	0.000919	0.002091	0.002028	72.5307	0.007268	22.6	15.0	44.6	0.9	1.4	1.4	56,399.9	7.1	56548.2
Compactor CAT PS360	130	239	0.021946	0.015419	0.045665	0.000824	0.001875	0.001818	65.02752	0.007268	5.0	3.3	9.8	0.2	0.3	0.3	12,433.3	1.7	12469.7
Compactor CAT CS423	80	4482	0.013505	0.009489	0.028101	0.000507	0.001154	0.001119	40.01694	0.007408	57.5	38.3	113.4	2.3	3.6	3.5	143,484.7	33.2	144182.0
Scraper CAT 615	250	50	0.042204	0.025563	0.087817	0.001584	0.003605	0.003497	125.0529	0.015378	2.0	1.2	4.0	0.1	0.1	0.1	5,002.1	0.8	5018.3
Skid Steer CAT 226	58	60651	0.007918	0.005563	0.016476	0.000297	0.000676	0.000656	23.4621	0.002375	456.2	303.7	899.4	18.0	28.7	27.9	1,138,400.1	144.0	1141425.0
Skid Steer CAT 246	80	12958	0.010922	0.007674	0.022725	0.00041	0.000933	0.000905	32.36152	0.001119	134.4	89.5	265.0	5.3	8.5	8.2	335,472.5	14.5	335776.9
Rack Truck	12480	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	66.0	415.7	3,140.9	12.6	199.2	80.8	1,087,913.7	40.7	1088768.3	
Mechanics Truck	3120	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	3.6	210.7	20.8	0.7	22.9	9.2	56,205.3	1.1	56227.5	
Oil dist Truck	213	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	0.2	14.4	1.4	0.0	1.6	0.6	3,837.1	0.1	3838.6	
Pickup 1/2T	327237	0.002048	0.106169	0.010292	0.000211	0.010524	0.004261	20.93382	0.000522	636.8	31,268.3	3,031.2	68.9	2,410.6	975.9	5,480,256.9	170.7	5483841.5	
Pickup 3/4T	343772	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	393.3	23,218.4	2,287.6	77.6	2,520.4	1,014.2	6,192,883.0	116.9	6195337.3	
Tractor 6x4	6280	0.013788	0.05546	0.419738	0.001278	0.023416	0.009838	133.9301	0.00064	82.3	313.5	2,372.4	8.0	102.9	43.2	672,865.0	4.0	672949.5	
Water truck	51442	0.001204	0.075044	0.007394	0.000226	0.010474	0.004215	22.51813	0.00034	58.8	3,474.4	342.3	11.6	377.2	151.8	926,702.3	17.5	927069.5	
<b>total</b>											19,008	70,192	49,296	881	6,763	3,370	58,752,293	4,632	58,849,564

On-Road Equipment	Hours	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	Emissions (lbs)								
		ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Dump Truck	82	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	0.5	3.0	22.9	0.1	1.9	0.8	8935.2	0.3	8940.8
End Dump 10CY	33096	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	184.4	1224.9	9255.0	33.4	754.7	306.2	3606329.3	107.9	3608595.6
End Dump 15CY	130929	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	729.3	4845.6	36613.2	132.0	2985.5	1211.1	14266772.0	426.9	14275737.6
Flatbed 10T	86337	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	480.9	3195.3	24143.4	87.0	1968.7	798.6	9407772.9	281.5	9413685.0
Flatbed 2T	156	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	0.9	5.8	43.6	0.2	3.6	1.4	16998.7	0.5	17009.3
Flatbed 20T	25145	0.00557	0.037009	0.279642	0.001008	0.022802	0.00925	108.9657	0.003261	140.1	930.6	7031.6	25.3	573.4	232.6	2739942.9	82.0	2741664.7
Employee Commutes	196025	0.000689	0.052913	0.003519	0.000178	0.010467	0.004209	17.80674	0.000209	135.1	10372.2	689.8	35.0	2051.8	825.0	3490562.5	41.0	3491423.4
<b>total</b>										1,671	20,577	77,800	313	8,339	3,376	33,537,313	940	33,557,056

Fugitive Dust	Daily Acres	lb/acre PM	Daily Emissions (lbs)									
			PM10	PM2.5	CO2	CH4	CO2e					
	15	10	150.0	31.5								
			ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e	
			Total (lb)	20,679	90,769	127,096	1,194	240,102	53,996	92,289,606	5,572	92,406,620
			Daily (lb)	13.8	60.5	84.7	0.8	160.1	36.0	61,526.4	3.7	61,604.4
			Annual (T)	1.7	7.6	10.6	0.1	20.0	4.5	7,690.8	0.5	7,700.6

On-site Emissions	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
	Total (lb)	19091.2	71220.9	53186.1	897.0	232179.9	50789.0	60429158.6	4678.9
Daily (lb)	12.72749	47.48059	35.45738	0.598016	154.7866	33.85932	40286.10574	3.119296	40351.6
Annual (T)	1.590936	5.935074	4.432172	0.074752	19.34833	4.232415	5035.763218	0.389912	5044.0

Total Emissions (tons)	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	CO2e
Off-road	9.5	35.1	24.6	0.4	3.4	1.7	29,376.1	2.3	29,424.8
On-Road	0.8	10.3	38.9	0.2	4.2	1.7	16,768.7	0.5	16,778.5
Fugitive Dust					112.5	23.6			
Total	10.3	45.4	63.5	0.6	120.1	27.0	46,144.8	2.8	46,203.3
Annual	1.7	7.6	10.6	0.1	20.0	4.5	7,690.8	0.5	7,700.6

## SCAB Fleet Average Emission Factors (Diesel)

### Road Emission Rates

Air Basin	SC
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Equipment	MaxHP	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0143	0.0468	0.0865	0.0001	0.0039	11.0	0.0013
	50	0.0336	0.1506	0.1525	0.0003	0.0093	19.6	0.0030
	120	0.0327	0.2319	0.2565	0.0004	0.0170	38.1	0.0029
	500	0.0840	0.3899	0.8852	0.0021	0.0270	213	0.0076
	750	0.1545	0.7049	1.6423	0.0039	0.0494	385	0.0139
Aerial Lifts Composite		0.0322	0.1740	0.2152	0.0004	0.0119	34.7	0.0029
Air Compressors	15	0.0098	0.0456	0.0608	0.0001	0.0033	7.2	0.0009
	25	0.0207	0.0645	0.1187	0.0002	0.0060	14.4	0.0019
	50	0.0518	0.2142	0.1848	0.0003	0.0131	22.3	0.0047
	120	0.0504	0.3097	0.3370	0.0006	0.0255	47.0	0.0045
	175	0.0685	0.4994	0.5069	0.0010	0.0268	88.5	0.0062
	250	0.0747	0.2653	0.6529	0.0015	0.0206	131	0.0067
	500	0.1262	0.4504	1.0161	0.0023	0.0345	232	0.0114
	750	0.1960	0.6961	1.6134	0.0036	0.0540	358	0.0177
1000	0.2958	1.0416	3.7257	0.0049	0.0965	486	0.0267	
Air Compressors Composite		0.0582	0.3130	0.3935	0.0007	0.0246	63.6	0.0052
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0204	0.2211	0.1897	0.0004	0.0034	31.0	0.0018
	120	0.0308	0.4665	0.2710	0.0009	0.0072	77.1	0.0028
	175	0.0475	0.7542	0.2910	0.0016	0.0092	141	0.0043
	250	0.0538	0.3426	0.2499	0.0021	0.0068	188	0.0049
	500	0.0887	0.5512	0.4035	0.0031	0.0112	311	0.0080
	750	0.1755	1.0891	0.8022	0.0062	0.0222	615	0.0158
1000	0.2789	1.6441	4.2095	0.0093	0.0723	928	0.0252	
Bore/Drill Rigs Composite		0.0539	0.5011	0.4175	0.0017	0.0099	165	0.0049
Cement and Mortar	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0232	0.0754	0.1391	0.0002	0.0064	17.6	0.0021
Cement and Mortar Mixers Composite		0.0087	0.0416	0.0538	0.0001	0.0022	7.2	0.0008
Concrete/Industrial	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0549	0.2534	0.2388	0.0004	0.0148	30.2	0.0050
	120	0.0650	0.4661	0.4898	0.0009	0.0335	74.1	0.0059
	175	0.1012	0.8661	0.8304	0.0018	0.0410	160	0.0091
Concrete/Industrial Saws Composite		0.0605	0.3850	0.3959	0.0007	0.0261	58.5	0.0055
Cranes	50	0.0646	0.2527	0.2019	0.0003	0.0151	23.2	0.0058
	120	0.0639	0.3486	0.3857	0.0006	0.0306	50.1	0.0058
	175	0.0752	0.4766	0.5029	0.0009	0.0283	80.3	0.0068
	250	0.0787	0.2521	0.6168	0.0013	0.0212	112	0.0071
	500	0.1202	0.4085	0.8748	0.0018	0.0317	180	0.0108
	750	0.2034	0.6869	1.5239	0.0030	0.0544	303	0.0184
9999	0.7422	2.3933	7.8338	0.0098	0.2146	971	0.0670	
Cranes Composite		0.1012	0.4060	0.7908	0.0014	0.0318	129	0.0091
Crawler Tractors	50	0.0813	0.2884	0.2240	0.0003	0.0181	24.9	0.0073
	120	0.0945	0.4679	0.5589	0.0008	0.0448	65.8	0.0085
	175	0.1270	0.7327	0.8534	0.0014	0.0479	121	0.0115
	250	0.1333	0.4179	1.0430	0.0019	0.0385	166	0.0120
	500	0.1959	0.7202	1.4625	0.0025	0.0554	259	0.0177
	750	0.3529	1.2889	2.6916	0.0047	0.1006	465	0.0318
	1000	0.5380	2.0171	5.7362	0.0066	0.1663	658	0.0485
Crawler Tractors Composite		0.1185	0.5387	0.7960	0.0013	0.0457	114	0.0107
Crushing/Proc. Equ	50	0.0949	0.4230	0.3607	0.0006	0.0241	44.0	0.0086
	120	0.0849	0.5506	0.5679	0.0010	0.0416	83.1	0.0077
	175	0.1258	0.9520	0.8975	0.0019	0.0475	167	0.0113
	250	0.1386	0.4932	1.1284	0.0028	0.0359	245	0.0125
	500	0.2037	0.7231	1.5205	0.0037	0.0524	374	0.0184
	750	0.3193	1.1368	2.4441	0.0059	0.0824	589	0.0288
	9999	0.8312	2.7569	9.5902	0.0131	0.2467	1,308	0.0750

Crushing/Proc. Equipment Comp		0.1109	0.6328	0.7330	0.0015	0.0412	132	0.0100
Dumpers/Tenders	25	0.0092	0.0314	0.0584	0.0001	0.0023	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0584	0.0001	0.0023	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0468	0.2521	0.2002	0.0003	0.0111	25.0	0.0042
	120	0.0693	0.5017	0.4425	0.0009	0.0289	73.6	0.0063
	175	0.0824	0.6641	0.5069	0.0013	0.0264	112	0.0074
	250	0.0933	0.3323	0.5984	0.0018	0.0202	159	0.0084
	500	0.1339	0.4689	0.7881	0.0023	0.0284	234	0.0121
Excavators Composite		0.0848	0.5160	0.5181	0.0013	0.0249	120	0.0077
Forklifts	50	0.0229	0.1440	0.1180	0.0002	0.0058	14.7	0.0021
	120	0.0265	0.2118	0.1745	0.0004	0.0108	31.2	0.0024
	175	0.0394	0.3322	0.2328	0.0006	0.0125	56.1	0.0036
	250	0.0440	0.1559	0.2594	0.0009	0.0089	77.1	0.0040
	500	0.0623	0.2131	0.3432	0.0011	0.0125	111	0.0056
Forklifts Composite		0.0372	0.2173	0.2186	0.0006	0.0101	54.4	0.0034
Generator Sets	15	0.0123	0.0644	0.0852	0.0002	0.0043	10.2	0.0011
	25	0.0231	0.0788	0.1449	0.0002	0.0070	17.6	0.0021
	50	0.0491	0.2265	0.2357	0.0004	0.0138	30.6	0.0044
	120	0.0642	0.4694	0.5181	0.0009	0.0333	77.9	0.0058
	175	0.0808	0.7324	0.7528	0.0016	0.0337	142	0.0073
	250	0.0857	0.3931	0.9756	0.0024	0.0274	213	0.0077
	500	0.1264	0.6113	1.3836	0.0033	0.0415	337	0.0114
	750	0.2080	0.9868	2.2918	0.0055	0.0679	544	0.0188
	9999	0.5230	2.0948	7.5356	0.0105	0.1778	1,049	0.0472
Generator Sets Composite		0.0477	0.2786	0.3759	0.0007	0.0192	61.0	0.0043
Graders	50	0.0676	0.2868	0.2305	0.0004	0.0157	27.5	0.0061
	120	0.0860	0.5138	0.5323	0.0009	0.0398	75.0	0.0078
	175	0.1059	0.7294	0.7002	0.0014	0.0385	124	0.0096
	250	0.1115	0.3778	0.8409	0.0019	0.0287	172	0.0101
	500	0.1420	0.5194	0.9989	0.0023	0.0359	229	0.0128
	750	0.3024	1.0988	2.1820	0.0049	0.0774	486	0.0273
Graders Composite		0.1049	0.5812	0.7217	0.0015	0.0355	133	0.0095
Off-Highway Tracto	120	0.1622	0.6879	0.9427	0.0011	0.0779	93.7	0.0146
	175	0.1614	0.8085	1.1191	0.0015	0.0632	130	0.0146
	250	0.1275	0.3861	1.0244	0.0015	0.0411	130	0.0115
	750	0.5173	2.0914	4.1264	0.0057	0.1633	568	0.0467
	1000	0.7842	3.2770	8.0820	0.0082	0.2526	814	0.0708
Off-Highway Tractors Composite		0.1631	0.6762	1.2293	0.0017	0.0579	151	0.0147
Off-Highway Trucks	175	0.0983	0.7542	0.5947	0.0014	0.0314	125	0.0089
	250	0.1042	0.3572	0.6660	0.0019	0.0225	167	0.0094
	500	0.1656	0.5578	0.9706	0.0027	0.0351	272	0.0149
	750	0.2693	0.9044	1.6152	0.0044	0.0577	442	0.0243
	1000	0.4058	1.3339	4.3394	0.0063	0.1110	625	0.0366
Off-Highway Trucks Composite		0.1613	0.5634	1.0525	0.0027	0.0360	260	0.0146
Other Construction	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0412	0.2342	0.2102	0.0004	0.0108	28.0	0.0037
	120	0.0604	0.5116	0.4573	0.0009	0.0279	80.9	0.0054
	175	0.0608	0.5859	0.4478	0.0012	0.0218	107	0.0055
	500	0.1122	0.4743	0.8004	0.0025	0.0275	254	0.0101
Other Construction Equipment Co		0.0633	0.3542	0.4478	0.0013	0.0181	123	0.0057
Other General Indu	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0548	0.2314	0.1869	0.0003	0.0134	21.7	0.0049
	120	0.0732	0.4277	0.4544	0.0007	0.0350	62.0	0.0066
	175	0.0835	0.5664	0.5608	0.0011	0.0307	95.9	0.0075
	250	0.0884	0.2862	0.6866	0.0015	0.0221	136	0.0080
	500	0.1664	0.5336	1.1846	0.0026	0.0412	265	0.0150
	750	0.2755	0.8795	2.0057	0.0044	0.0689	437	0.0249
	1000	0.3866	1.2370	4.3716	0.0056	0.1169	560	0.0349
Other General Industrial Equipme		0.1113	0.4591	0.8242	0.0016	0.0336	152	0.0100
Other Material Han	50	0.0758	0.3192	0.2598	0.0004	0.0186	30.3	0.0068
	120	0.0709	0.4162	0.4437	0.0007	0.0341	60.7	0.0064
	175	0.1050	0.7171	0.7125	0.0014	0.0389	122	0.0095
	250	0.0934	0.3046	0.7336	0.0016	0.0237	145	0.0084

	500	0.1186	0.3838	0.8543	0.0019	0.0297	192	0.0107
	9999	0.5386	1.6331	5.7822	0.0073	0.1543	741	0.0486
Other Material Handling Equipment		0.1050	0.4495	0.8053	0.0015	0.0324	141	0.0095
Pavers	25	0.0226	0.0769	0.1434	0.0002	0.0057	18.7	0.0020
	50	0.0968	0.3188	0.2539	0.0004	0.0217	28.0	0.0087
	120	0.1030	0.4862	0.6205	0.0008	0.0506	69.2	0.0093
	175	0.1365	0.7632	0.9644	0.0014	0.0539	128	0.0123
	250	0.1574	0.5000	1.3162	0.0022	0.0490	194	0.0142
	500	0.1765	0.6885	1.4189	0.0023	0.0539	233	0.0159
Pavers Composite		0.1121	0.5017	0.6241	0.0009	0.0419	77.9	0.0101
Paving Equipment	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0821	0.2696	0.2165	0.0003	0.0185	23.9	0.0074
	120	0.0805	0.3809	0.4869	0.0006	0.0400	54.5	0.0073
	175	0.1062	0.5971	0.7567	0.0011	0.0424	101	0.0096
	250	0.0962	0.3068	0.8236	0.0014	0.0300	122	0.0087
Paving Equipment Composite		0.0857	0.4136	0.5558	0.0008	0.0374	68.9	0.0077
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washers	15	0.0059	0.0308	0.0408	0.0001	0.0021	4.9	0.0005
	25	0.0094	0.0319	0.0587	0.0001	0.0028	7.1	0.0008
	50	0.0170	0.0895	0.1059	0.0002	0.0054	14.3	0.0015
	120	0.0167	0.1383	0.1528	0.0003	0.0087	24.1	0.0015
Pressure Washers Composite		0.0101	0.0562	0.0703	0.0001	0.0036	9.4	0.0009
Pumps	15	0.0101	0.0468	0.0625	0.0001	0.0034	7.4	0.0009
	25	0.0279	0.0871	0.1601	0.0002	0.0080	19.5	0.0025
	50	0.0599	0.2670	0.2677	0.0004	0.0164	34.3	0.0054
	120	0.0676	0.4767	0.5260	0.0009	0.0350	77.9	0.0061
	175	0.0845	0.7338	0.7548	0.0016	0.0350	140	0.0076
	250	0.0866	0.3786	0.9399	0.0023	0.0271	201	0.0078
	500	0.1387	0.6343	1.4367	0.0034	0.0442	345	0.0125
	750	0.2330	1.0487	2.4376	0.0057	0.0741	571	0.0210
	9999	0.7050	2.7434	9.8509	0.0136	0.2358	1,355	0.0636
Pumps Composite		0.0458	0.2722	0.3306	0.0006	0.0189	49.6	0.0041
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0662	0.2547	0.2171	0.0003	0.0158	26.0	0.0060
	120	0.0680	0.3919	0.4411	0.0007	0.0341	59.0	0.0061
	175	0.0897	0.6130	0.6569	0.0012	0.0356	108	0.0081
	250	0.0934	0.3306	0.8164	0.0017	0.0274	153	0.0084
	500	0.1262	0.4902	1.0345	0.0022	0.0365	219	0.0114
Rollers Composite		0.0683	0.3885	0.4485	0.0008	0.0291	67.0	0.0062
Rough Terrain Forklifts	50	0.0655	0.3294	0.2744	0.0004	0.0166	33.9	0.0059
	120	0.0596	0.4179	0.3967	0.0007	0.0273	62.4	0.0054
	175	0.0911	0.7231	0.6072	0.0014	0.0322	125	0.0082
	250	0.0988	0.3504	0.7075	0.0019	0.0237	171	0.0089
	500	0.1441	0.5029	0.9468	0.0025	0.0341	257	0.0130
Rough Terrain Forklifts Composite		0.0638	0.4499	0.4219	0.0008	0.0277	70.3	0.0058
Rubber Tired Dozers	175	0.1676	0.8191	1.1443	0.0015	0.0646	129	0.0151
	250	0.1890	0.5640	1.4879	0.0021	0.0605	183	0.0171
	500	0.2531	1.0338	1.9476	0.0026	0.0787	265	0.0228
	750	0.3821	1.5520	2.9917	0.0040	0.1195	399	0.0345
	1000	0.5986	2.5082	6.0072	0.0060	0.1906	592	0.0540
Rubber Tired Dozers Composite		0.2343	0.8819	1.8194	0.0025	0.0737	239	0.0211
Rubber Tired Loaders	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0742	0.3198	0.2591	0.0004	0.0174	31.1	0.0067
	120	0.0660	0.4016	0.4121	0.0007	0.0307	58.9	0.0060
	175	0.0888	0.6227	0.5902	0.0012	0.0323	106	0.0080
	250	0.0946	0.3237	0.7142	0.0017	0.0244	149	0.0085
	500	0.1440	0.5256	1.0103	0.0023	0.0363	237	0.0130
	750	0.2966	1.0762	2.1374	0.0049	0.0758	486	0.0268
	1000	0.3912	1.4170	4.4558	0.0060	0.1188	594	0.0353
Rubber Tired Loaders Composite		0.0861	0.4470	0.5831	0.0012	0.0300	109	0.0078
Scrapers	120	0.1382	0.6686	0.8165	0.0011	0.0661	93.9	0.0125
	175	0.1579	0.8954	1.0712	0.0017	0.0603	148	0.0142
	250	0.1704	0.5324	1.3558	0.0024	0.0501	209	0.0154
	500	0.2458	0.9165	1.8678	0.0032	0.0707	321	0.0222
	750	0.4267	1.5807	3.3123	0.0056	0.1238	555	0.0385

Scrapers Composite		0.2135	0.8418	1.6042	0.0027	0.0653	262	0.0193
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0649	0.2966	0.2820	0.0005	0.0172	36.2	0.0059
	120	0.0695	0.4999	0.5256	0.0009	0.0356	80.2	0.0063
	175	0.0955	0.8276	0.7968	0.0017	0.0385	155	0.0086
	250	0.1151	0.4857	1.1305	0.0029	0.0337	255	0.0104
Signal Boards Composite		0.0143	0.0916	0.1029	0.0002	0.0050	16.7	0.0013
Skid Steer Loaders	25	0.0176	0.0582	0.1081	0.0002	0.0048	13.8	0.0016
	50	0.0263	0.2035	0.1787	0.0003	0.0065	25.5	0.0024
	120	0.0248	0.2680	0.1970	0.0005	0.0095	42.8	0.0022
Skid Steer Loaders Composite		0.0253	0.2146	0.1799	0.0004	0.0074	30.3	0.0023
Surfacing Equipme	50	0.0317	0.1242	0.1139	0.0002	0.0077	14.1	0.0029
	120	0.0668	0.4072	0.4651	0.0007	0.0334	63.8	0.0060
	175	0.0637	0.4677	0.5082	0.0010	0.0257	85.8	0.0058
	250	0.0733	0.2858	0.7013	0.0015	0.0230	135	0.0066
	500	0.1120	0.5047	1.0316	0.0022	0.0350	221	0.0101
	750	0.1782	0.7911	1.6685	0.0035	0.0558	347	0.0161
Surfacing Equipment Composite		0.0923	0.4187	0.8043	0.0017	0.0291	166	0.0083
Sweepers/Scrubber	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0522	0.2974	0.2539	0.0004	0.0137	31.6	0.0047
	120	0.0647	0.4983	0.4442	0.0009	0.0291	75.0	0.0058
	175	0.0966	0.8030	0.6280	0.0016	0.0337	139	0.0087
	250	0.0894	0.3218	0.6073	0.0018	0.0204	162	0.0081
Sweepers/Scrubbers Composite		0.0681	0.4946	0.4308	0.0009	0.0251	78.5	0.0061
Tractors/Loaders/B	25	0.0191	0.0653	0.1211	0.0002	0.0046	15.9	0.0017
	50	0.0497	0.2839	0.2342	0.0004	0.0121	30.3	0.0045
	120	0.0435	0.3426	0.2937	0.0006	0.0184	51.7	0.0039
	175	0.0669	0.5845	0.4264	0.0011	0.0218	101	0.0060
	250	0.0914	0.3483	0.5964	0.0019	0.0200	172	0.0082
	500	0.1788	0.6771	1.0736	0.0039	0.0385	345	0.0161
	750	0.2691	1.0154	1.6525	0.0058	0.0585	517	0.0243
Tractors/Loaders/Backhoes Comp		0.0513	0.3647	0.3331	0.0008	0.0189	66.8	0.0046
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.1142	0.3647	0.2965	0.0004	0.0255	32.9	0.0103
	120	0.0959	0.4498	0.5899	0.0008	0.0477	64.9	0.0087
	175	0.1505	0.8436	1.1021	0.0016	0.0607	144	0.0136
	250	0.1783	0.5823	1.5446	0.0025	0.0582	223	0.0161
	500	0.2312	0.9564	1.9434	0.0031	0.0740	311	0.0209
	750	0.4382	1.7994	3.7533	0.0059	0.1413	587	0.0395
Trenchers Composite		0.1061	0.4368	0.5117	0.0007	0.0393	58.7	0.0096
Welders	15	0.0084	0.0392	0.0522	0.0001	0.0028	6.2	0.0008
	25	0.0161	0.0504	0.0927	0.0001	0.0047	11.3	0.0015
	50	0.0563	0.2339	0.2108	0.0003	0.0144	26.0	0.0051
	120	0.0398	0.2540	0.2787	0.0005	0.0205	39.5	0.0036
	175	0.0703	0.5400	0.5536	0.0011	0.0283	98.2	0.0063
	250	0.0617	0.2348	0.5828	0.0013	0.0179	119	0.0056
	500	0.0825	0.3196	0.7244	0.0016	0.0239	168	0.0074
Welders Composite		0.0388	0.1876	0.1941	0.0003	0.0133	25.6	0.0035

**Tier 4 Final Emission Rates**

Adjusted EF = Steady State EF x TAF x DF

Where:

EF = Emission Factor  
 TAF = Transient Adjustment Factor  
 DF = Deterioration Factor

Note: TAF = 1.0 for Tier 4 equipment

**Deterioration "A"**

ROG 0.027  
 CO 0.151  
 NOx 0.008  
 PM10 0.473

**DF**

ROG 1.0135  
 CO 1.0755  
 NOx 1.004  
 PM10 1.2365

Equipment	HP Rating	Load Factor	Steady State Emission Factors (g/bhphr)						Adjusted Emission Factors (g/bhphr)						Adjusted Emission Factors (lb/hr)					
			ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2
Drill Rig	250	0.43	0.1314	0.075	0.276	0.004998	0.0092	394.6	0.133174	0.080663	0.277104	0.004998	0.011376	394.6	0.031561	0.019116	0.065672	0.001184	0.002696	93.51784
Wheel Loader	150	0.465	0.1314	0.087	0.276	0.004998	0.0092	394.6	0.133174	0.093569	0.277104	0.004998	0.011376	394.6	0.020478	0.014388	0.04261	0.000768	0.001749	60.67786
Excavator	200	0.58	0.1314	0.075	0.276	0.004998	0.0092	394.6	0.133174	0.080663	0.277104	0.004998	0.011376	394.6	0.034057	0.020628	0.070864	0.001278	0.002909	100.9123
Pump Truck	175	0.74	0.1314	0.075	0.276	0.004998	0.0092	394.6	0.133174	0.080663	0.277104	0.004998	0.011376	394.6	0.03802	0.023029	0.079111	0.001427	0.003248	112.6564
Crane	375	0.43	0.1314	0.084	0.276	0.004998	0.0092	394.6	0.133174	0.090342	0.277104	0.004998	0.011376	394.6	0.047342	0.032116	0.098508	0.001777	0.004044	140.2768
Forklift	150	0.475	0.1314	0.087	0.276	0.004998	0.0092	394.6	0.133174	0.093569	0.277104	0.004998	0.011376	394.6	0.020919	0.014697	0.043527	0.000785	0.001787	61.98276
Pile Driving Machine	180	0.43	0.1314	0.075	0.276	0.004998	0.0092	394.6	0.133174	0.080663	0.277104	0.004998	0.011376	394.6	0.022724	0.013764	0.047284	0.000853	0.001941	67.33285
Dozer	400	0.59	0.1314	0.084	0.276	0.004998	0.0092	394.6	0.133174	0.090342	0.277104	0.004998	0.011376	394.6	0.069288	0.047003	0.144172	0.0026	0.005919	205.3043
Backhoe	150	0.465	0.1314	0.087	0.276	0.004998	0.0092	394.6	0.133174	0.093569	0.277104	0.004998	0.011376	394.6	0.020478	0.014388	0.04261	0.000768	0.001749	60.67786
Grader	175	0.575	0.1314	0.075	0.276	0.004998	0.0092	394.6	0.133174	0.080663	0.277104	0.004998	0.011376	394.6	0.029543	0.017894	0.061472	0.001109	0.002524	87.53705
Paver	34	0.62	0.1314	0.087	0.276	0.004998	0.0092	394.6	0.133174	0.093569	0.277104	0.004998	0.011376	394.6	0.006189	0.004348	0.012878	0.000232	0.000529	18.3382
Roller	125	0.575	0.1314	0.087	0.276	0.004998	0.0092	394.6	0.133174	0.093569	0.277104	0.004998	0.011376	394.6	0.021102	0.014826	0.043908	0.000792	0.001803	62.52647
Ballast Compressor	175	0.62	0.1314	0.075	0.276	0.004998	0.0092	394.6	0.133174	0.080663	0.277104	0.004998	0.011376	394.6	0.031855	0.019294	0.066283	0.001195	0.002721	94.38778
Ballast Regulator	175	0.62	0.1314	0.075	0.276	0.004998	0.0092	394.6	0.133174	0.080663	0.277104	0.004998	0.011376	394.6	0.031855	0.019294	0.066283	0.001195	0.002721	94.38778
Generator	49	0.74	0.1314	0.153	3	0.004998	0.0184	394.6	0.133174	0.164552	3.012	0.004998	0.022752	394.6	0.010646	0.013154	0.240774	0.0004	0.001819	31.54379
Air Compressor	150	0.48	0.1314	0.087	0.276	0.004998	0.0092	394.6	0.133174	0.093569	0.277104	0.004998	0.011376	394.6	0.021139	0.014852	0.043985	0.000793	0.001806	62.63521

**EMFAC2017 2022 Emission Rates (g/mile)**

**Heavy Trucks**

	CH4	CO	CO2	HC	NOx	PM	PM10	PM2_5	ROG	SOx	TOG
35 MPH	0.04226	0.479642	1412.196	0.096002	3.624155	0.018407	0.018296	0.017505	0.07219	0.013061	0.121438
Brake Wear						0.189	0.18522	0.07938			
Tire Wear						0.092	0.092	0.023			
<b>Total</b>	<b>0.04226</b>	<b>0.479642</b>	<b>1412.196</b>	<b>0.096002</b>	<b>3.624155</b>	<b>0.299407</b>	<b>0.295516</b>	<b>0.119885</b>	<b>0.07219</b>	<b>0.013061</b>	<b>0.121438</b>
<b>lb/hr</b>	<b>0.003261</b>	<b>0.037009</b>	<b>108.9657</b>	<b>0.007408</b>	<b>0.279642</b>	<b>0.023102</b>	<b>0.022802</b>	<b>0.00925</b>	<b>0.00557</b>	<b>0.001008</b>	<b>0.00937</b>

**LDA**

	CH4	CO	CO2	HC	NOx	PM	PM10	PM2_5	ROG	SOx	TOG
35 MPH	0.00271	0.685749	230.7754	0.011957	0.045605	0.001561	0.001403	0.001293	0.008933	0.002313	0.012984
Brake Wear						0.1125	0.11025	0.04725			
Tire Wear						0.024	0.024	0.006			
<b>Total</b>	<b>0.00271</b>	<b>0.685749</b>	<b>230.7754</b>	<b>0.011957</b>	<b>0.045605</b>	<b>0.138061</b>	<b>0.135653</b>	<b>0.054543</b>	<b>0.008933</b>	<b>0.002313</b>	<b>0.012984</b>
<b>lb/hr</b>	<b>0.000209</b>	<b>0.052913</b>	<b>17.80674</b>	<b>0.000923</b>	<b>0.003519</b>	<b>0.010653</b>	<b>0.010467</b>	<b>0.004209</b>	<b>0.000689</b>	<b>0.000178</b>	<b>0.001002</b>

**LDT (gas)**

	CH4	CO	CO2	HC	NOx	PM	PM10	PM2_5	ROG	SOx	TOG
35 MPH	0.00676	1.375955	271.3023	0.035713	0.133387	0.002385	0.002137	0.001967	0.026546	0.00273	0.038684
Brake Wear						0.1125	0.11025	0.04725			
Tire Wear						0.024	0.024	0.006			
<b>Total</b>	<b>0.00676</b>	<b>1.375955</b>	<b>271.3023</b>	<b>0.035713</b>	<b>0.133387</b>	<b>0.138885</b>	<b>0.136387</b>	<b>0.055217</b>	<b>0.026546</b>	<b>0.00273</b>	<b>0.038684</b>
<b>lb/hr</b>	<b>0.000522</b>	<b>0.106169</b>	<b>20.93382</b>	<b>0.002756</b>	<b>0.010292</b>	<b>0.010716</b>	<b>0.010524</b>	<b>0.004261</b>	<b>0.002048</b>	<b>0.000211</b>	<b>0.002985</b>

**LDT (diesel)**

	CH4	CO	CO2	HC	NOx	PM	PM10	PM2_5	ROG	SOx	TOG
35 MPH	0.004406	0.972576	291.835	0.020959	0.095824	0.001662	0.00149	0.001372	0.015606	0.002927	0.022723
Brake Wear						0.1125	0.11025	0.04725			
Tire Wear						0.024	0.024	0.006			
<b>Total</b>	<b>0.004406</b>	<b>0.972576</b>	<b>291.835</b>	<b>0.020959</b>	<b>0.095824</b>	<b>0.138162</b>	<b>0.13574</b>	<b>0.054622</b>	<b>0.015606</b>	<b>0.002927</b>	<b>0.022723</b>
<b>lb/hr</b>	<b>0.00034</b>	<b>0.075044</b>	<b>22.51813</b>	<b>0.001617</b>	<b>0.007394</b>	<b>0.010661</b>	<b>0.010474</b>	<b>0.004215</b>	<b>0.001204</b>	<b>0.000226</b>	<b>0.001753</b>