

# TRANSIT CORRIDOR ALTERNATIVES ANALYSIS

## INITIAL LIST OF ALTERNATIVES

In support of the Transit Corridor Alternatives Analysis: Santa Cruz to Watsonville, the universe of alternatives for the Rail Right of Way (ROW) will be identified for evaluation. This universe will be categorized into core and connector services.

- Core services will utilize the Rail ROW for the majority of its available length and to its fullest extent possible.
- Connector services are those that minimally run along the corridor or offer links/transfers to the core services.

## CORE SERVICES

Core services, characterized as high capacity transit options for the Rail Right of Way (ROW), will leverage the characteristics of the dedicated corridor and be a key component of an integrated transportation network in the County. Characteristics of core services include:

- Service Model
  - Local Service
  - Commuter/Express
  - Intercity
- Fuel/Propulsion
  - Diesel
  - Electric – Battery, Fuel cell/hydrogen, Overhead Catenary
  - Compressed Natural Gas (CNG)
  - Hybrid
- Form Factor and Capacity, with the following ranges of passengers:
  - Up to 4 passengers seated
  - 10 to 20 passengers seated
  - 20 to 40 passengers seated
  - 40 to 50 passengers seated
  - 90 to 100 passengers seated/standing
- Guideway
  - Open/Mixed Traffic
  - Exclusive
  - Guided Exclusive
- Driver
  - Human-driven
  - Automated/Connected

Core service alternatives include:

**Local Bus & ROW Bus** – Large vehicles designed to carry passengers, usually along a fixed route according to a schedule. Local bus routes make frequent stops, linking neighborhoods with urban centers and providing connections within and between communities.



**Commuter Express Bus** – Fixed route bus, usually operating for longer distance trips with limited stops during peak commuting periods, operating on local streets and arterials as well as dedicated rights of way.



**Arterial & BRT** – A high-quality bus-based transit system that delivers fast and efficient service that may include some combination of dedicated lanes, traffic signal priority, off-board fare collection, elevated platforms, and enhanced stations. BRT often uses dedicated busways, guideways, or other exclusive ROWs to operate faster and more efficiently than traditional BRT systems.



**Autonomous Road Train** – An emerging vehicle technology that combines the capacity and form-factor of a traditional streetcar with rubber-tire operation. Manufacturers are planning for the incorporation of advanced autonomous and connected technology, essentially providing a rail-type service, without the cost associated with rail infrastructure.

**Dual Rail and Bus Vehicles** – An emerging technology that provides the versatility of a bus and the speed of light rail with vehicles that operate on both roadways and fixed guideways.



**Micro-shuttles** – Smaller passenger autonomous vehicles (12-15 persons operating at low speed and fixed routes. Manufacturers have been developing fully autonomous versions, with several deployed in the United States and California.



**Shuttle (Light Duty, Van, Electric Vehicle)** – A small public or private bus that travels back and forth over a particular route, especially a short-route or one that provides connections between transportation systems, employment centers, and other locations.



**Intercity Rail** – Train systems that travel between many cities, regions of a county, sometimes cross several counties or states, and are compatible with freight rail.

**Commuter Rail** – Passenger train operations (includes, Diesel Multiple Unit -DMU) between a central city, its suburbs and/or another central city. It is characterized by multi-trip tickets, specific station-to-station fares, with usually only one or two stations in the central business district, and are compatible



with freight rail.



**Light Rail/Electric Multiple Unit** – Light Rail/EMUs are popular on commuter and suburban rail networks around the world due to their fast acceleration and pollution-free operation. Being quieter than diesel multiple units locomotive hauled trains, EMUs require no separate locomotive, as electric traction motors are incorporated within one or a number of the carriages, and are compatible with freight rail.



**Light Rail/Diesel Multiple Unit** – A rail transit line that can operate in a variety of settings including dedicated ROW, subway, or mixed on-street traffic. Light rail transit (LRT) usually relies on overhead wires for power and is designed for heavily traveled corridors where the stop needs do not support heavy rail transit, and are typically not compatible with freight rail.

#### **Monorail / Automated People**

**Mover (APM)** – An electric railway that is suspended from or straddles a guided roadway formed by a single beam or rail, and are not compatible with freight rail.



**Tram / Trolley / Streetcar** – Typically an electric railway with a “light volume” traffic capacity compared to heavier rail. The system may use shared or exclusive ROW, high or low platform loading, and multi-car trains or single cars, and are not compatible with freight rail.





**Personal Rapid Transit (PRT)** - Personal Rapid Transit (PRT) are systems of small vehicles that operate on a demand-responsive basis, and work to move travelers directly from origin to destination along a fixed route. Several systems have been built, with the most notable in Morgantown, WV.



**Inverted (or Elevated) PRT** – Similar in concept to traditional PRTs, but using an inverted rail and smaller cars. This system is generally sold as a solution in urban areas, with space at a premium in which the system can be built over the top of an existing right of way.



**Gondola** - Also known as aerial tramways, these systems are a type of cable car pioneered for ski resorts, but have been deployed in urbanized areas to avoid the issues related to surface infrastructure. Passenger capacity can range from four passengers up to 100 per car, and the systems will typically have only two cars and two stops.

**String Rail** - A future concept using rigid overhead rails to transport passenger pods of various sizes. Unlike PRT, these systems would operate similar to traditional transit, and board at every stop. No functioning system has yet to be fully deployed for commercial or public use at this time.



**Hyperloop** - Started as a concept released by Elon Musk, a Hyperloop is a future transport system that uses evacuated tubes to move multi-passenger vehicles at speeds up to 700 mph. Several companies are currently developing prototypes, and planning has been started to deploy the systems in routes in several key markets within the U.S.



## CONNECTOR SERVICES

Connector services support travel along portions of the Rail ROW and will augment the core services presented above. The extent to which many of these types of connector services will be implemented (e.g., human powered – walk, bicycle, scooter; micromobility – Segway, electric bicycle, electric scooter; and mini-/low capacity urban transport – automobiles, motorcycles, autonomous micro-shuttle, van), will be at the discretion of the commuter, though they are typically operated as first-mile/last-mile connections. Below examples consider connector services that could be implemented as part of an integrated transit system for Santa Cruz County, each previously shown under bus services.

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