Los Angeles to Las Vegas

Proposed Electrified Brightline West

This is not an official website document, but an illustration of the HSR corridor between Los Angeles and Las Vegas

The Proposed Cajon HSR Pass Tunnel

- This is a tunnel proposal from San Bernardino to Oro Grande CA to lower the track grade percentage and the overall distance.

- The twin-bore tunnels will reduce train run-aways and stalled trains. Conserve much energy and reduce regional emissions. Tracks in tunnels have minimal temperature changes, thus reducing thermal coefficient track-buckling. The HSR corridor will be electrified. The HSR tunnel route is ± 21 miles shorter versa the existing BNSF RR route.

- The elevation climb for the railroad is reduced by 1119’ (341m.) Existing rail grades are 2%>, and I-15 has up to 5% grades. In addition, the I-15 Cajon Pass corridor is too narrow to accommodate pre-planned HSR trains in the median. Adding rail tracks along this Cajon Pass I-15 section will be enormously costly, so allocate this money to build the tunnels. Also, we cannot use the freight rail tracks for HSR trains; they are needed to move fast amounts of freight.

- This corridor tunnel can also connect proposed HSR “Brightline West” trains to Las Vegas, thus continuing from Barstow, CA to Las Vegas NV using mostly the I-15 corridor. Some curve alterations will be required. The I-15, Barstow, CA corridor plan to Las Vegas, NV is in development.

- BNSF can use this proposed electrified corridor to the Long Beach Marine Terminal for express freight movements, thus reducing diesel exhaust in the vicinity. The tunnel bore size may be increased to accommodate multi-modal double-stack container trains. Herrenknecht AG manufacturer’s TBM machines to bore such tunnels. Heavy trains will use the existing route.

HSR Cajon Pass

Des By R N

Legend

CHSR Station in Tunnel

CHSR Station on Flyovers

CHSR Station on Ground

On ground

Cuts

Fills

Flyovers

Tunnels

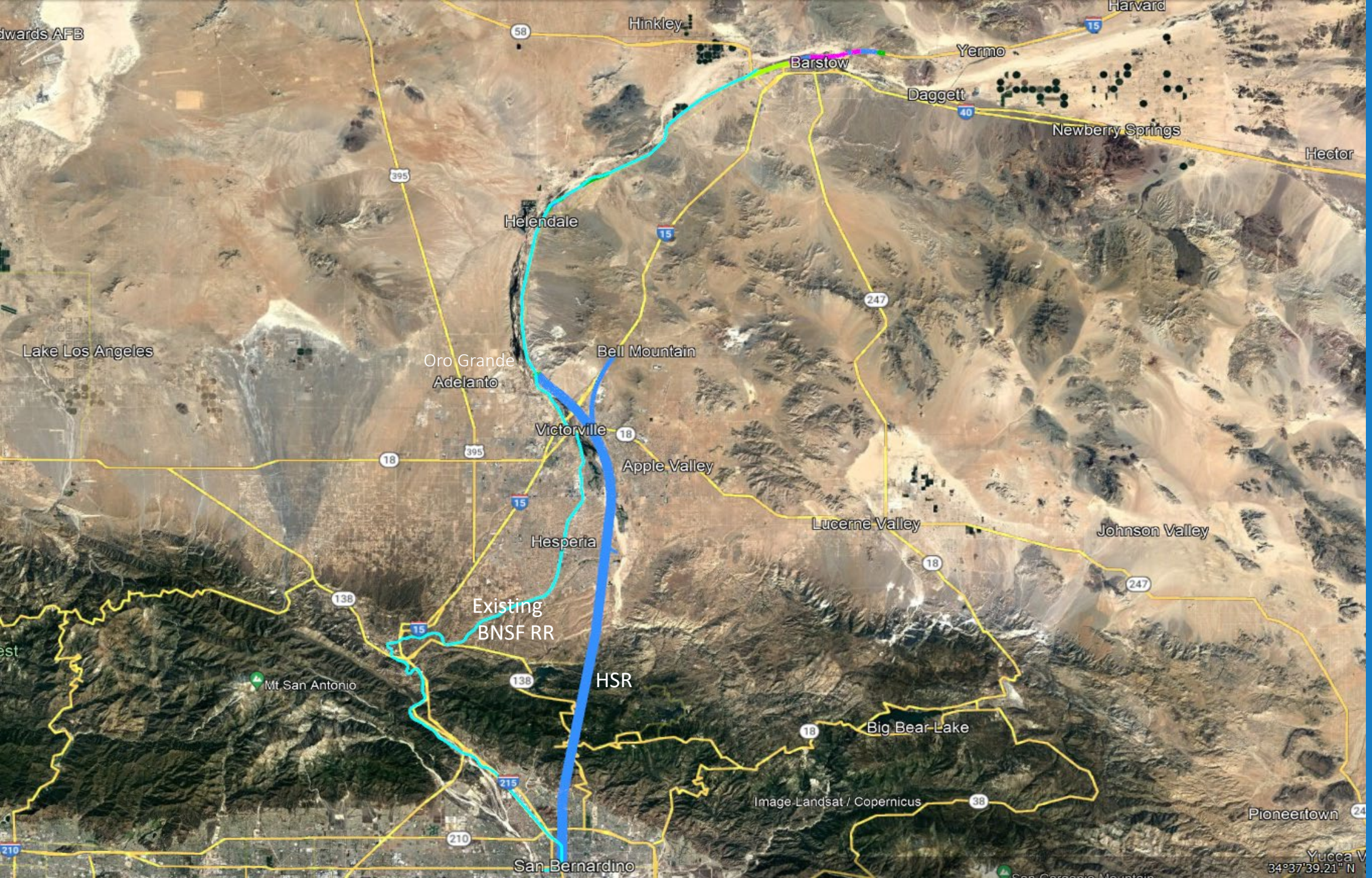
Existing Freight Railroads, other than BNSF and UP RR

Existing Freight Railroads

C-ICE: Cascadia Inter-City Express

CCE: Cascadia Commuter Express

HSR Legend 08
Des by RN/BCP



Overview of the Proposed Cajon Pass HSR Tunnel between San Bernardino and Oro Grande and the On-Ground Continuing to Barstow, CA

Showing the HSR tunnel and existing BNSF rail corridor.

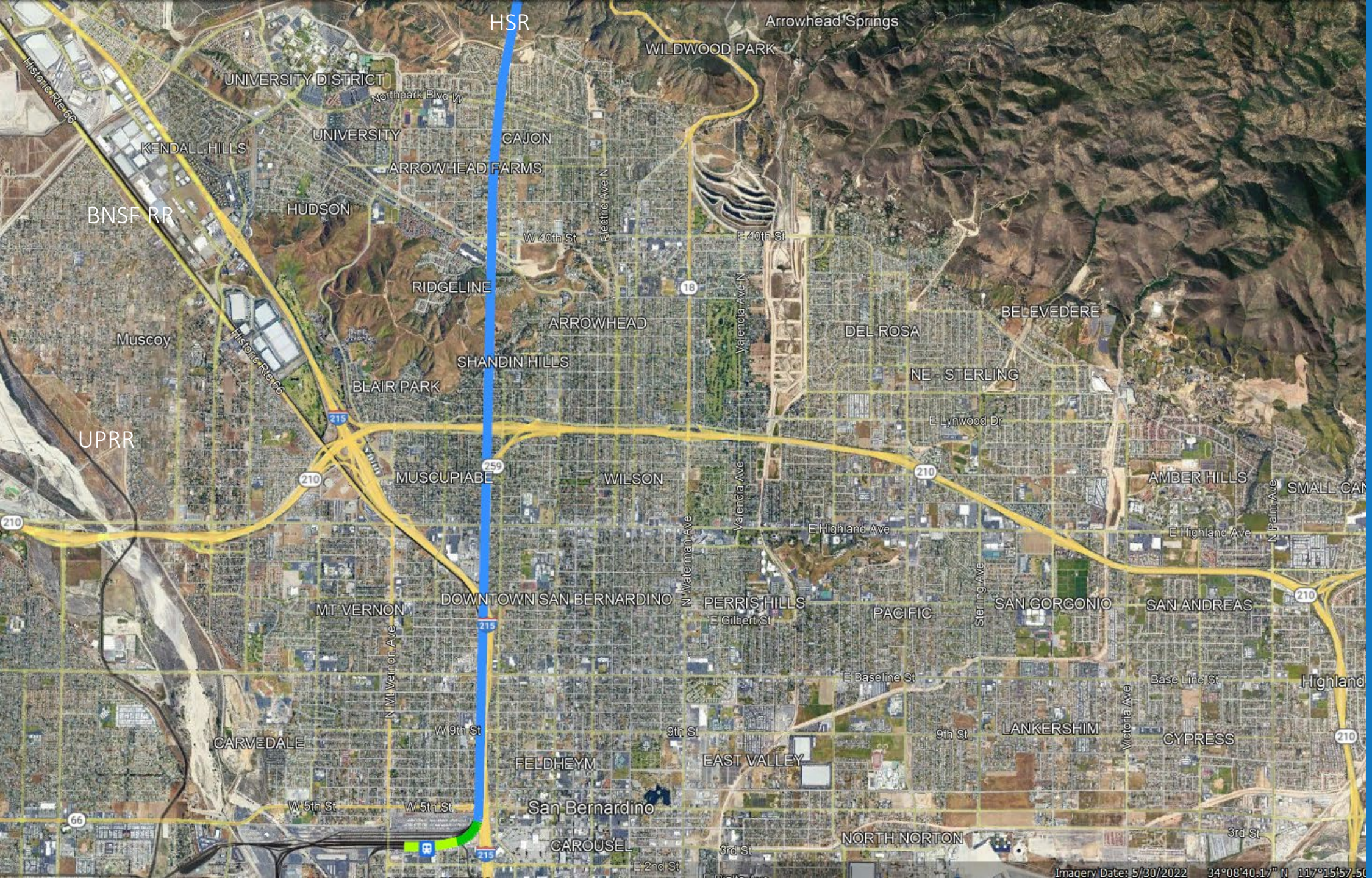
The existing BNSF RR corridor has many tight curves and steep grades.

HSR at San Bernardino

The HSR will go into a trench before entering the Cajon Pass Tunnel. The trench is along the south side of the existing BNSF RR tracks and in a single track for one mile or to W 9th St.

The westside on/off ramps may need a short closing time during the tunneling construction.

E = natural elevations.
El = built elevations.



HSR Tunnel between San Bernardino and Sycamore Percolation Ponds

The tunnel is in twin bores from W 9th St and East.

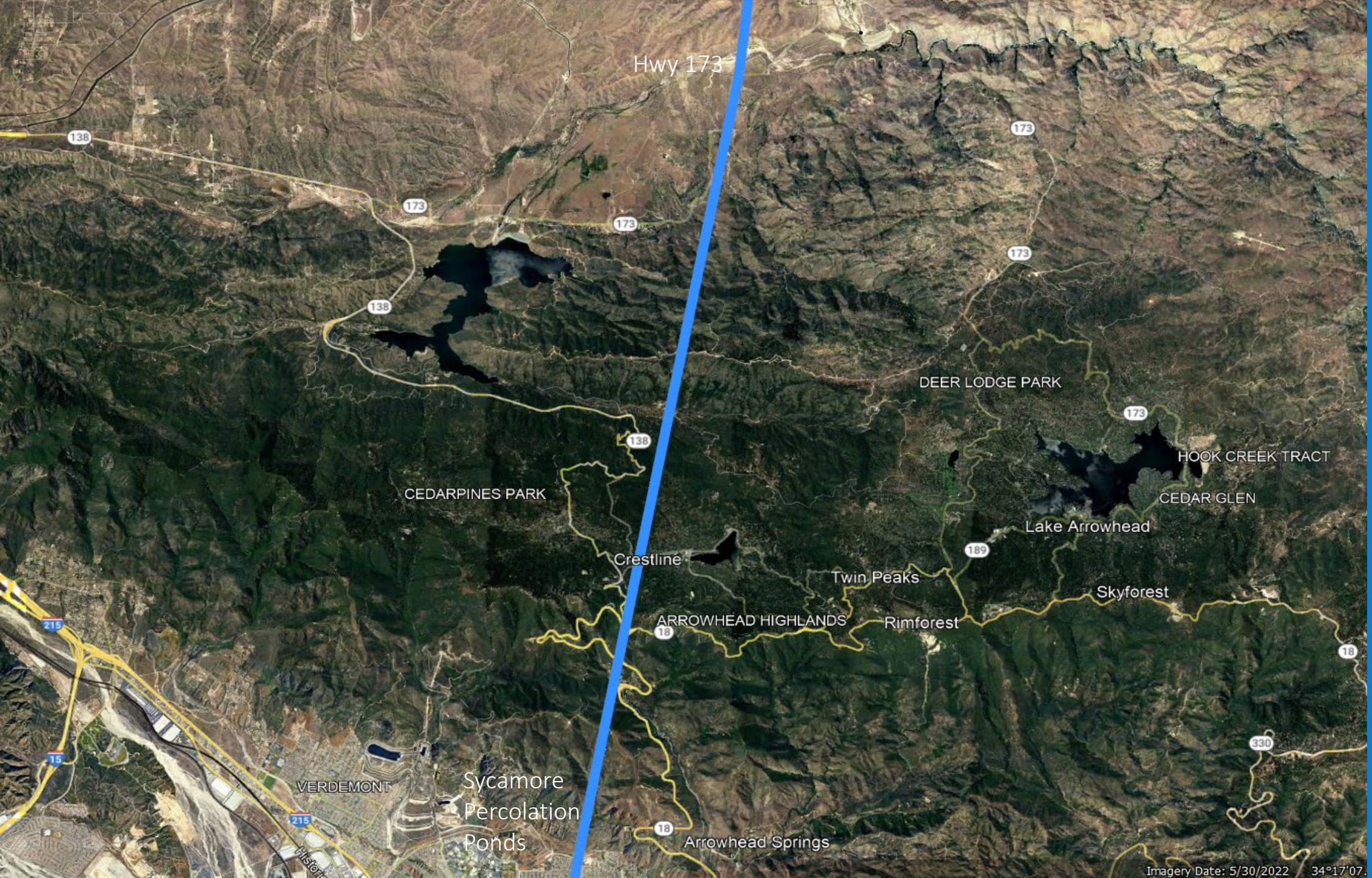
The tunnels are below the I-15 and Hwy 259 till West 27th St and a section between W 40th St/W48th St. to reduce right-of-way (RoW) acquisition costs.

BNSF RR and UPRR use the Cajon Pass corridor.

HSR at Sycamore Percolation Basin

There is an adit at this place. The base of the adit is at El 1128’. The shaft depth is 412’, or 125m.

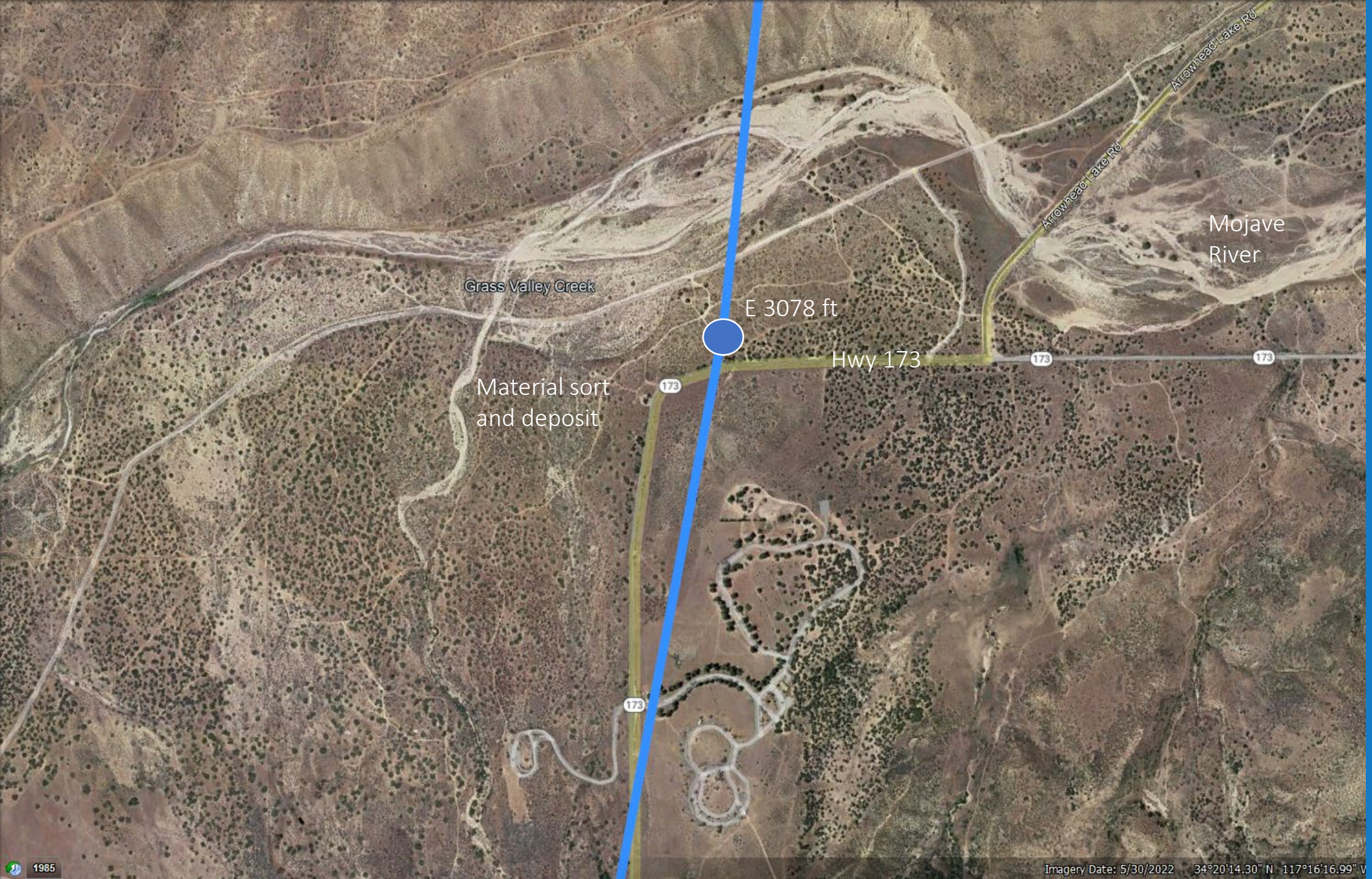
Begin the tunnel boring from here toward San Bernardino and Hwy 173.



HSR between Sycamore Percolation Ponds and Hwy 173

The HSR is in twin tunnels.

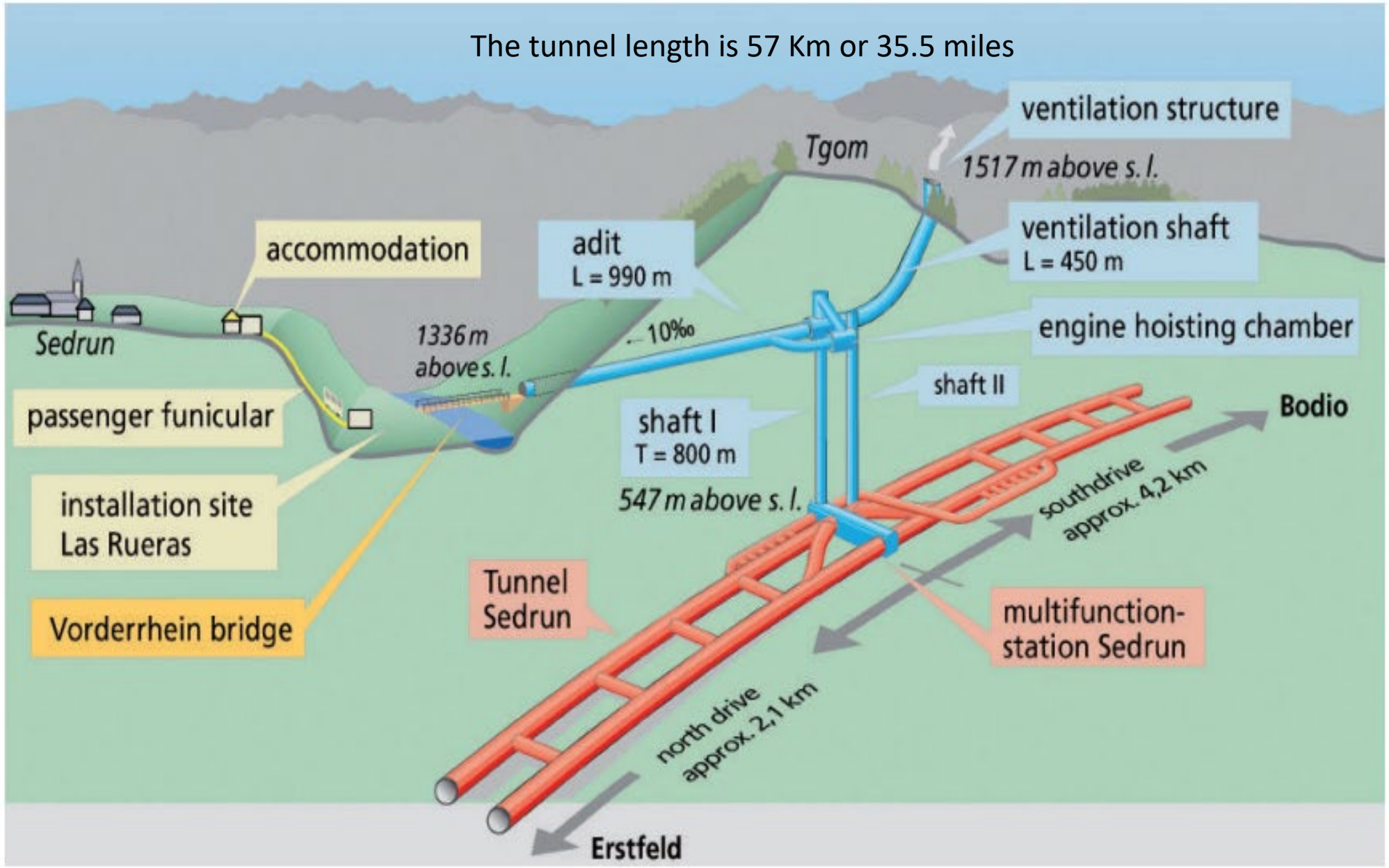
The next addit is at Hwy 173.



HSR at Hwy 173

There is an adit at this place. The base of the adit is at El 1354’. The shaft depth is 1724’ or 575m. See the next frame.

Excavation material sort and deposit area. Sort material for ballast, concrete aggregate, and other use. Landfill only none usable material.



The adit shaft in Sedrun Switzerland is 800m deep, or 2600’

Hoisting equipment was provided by

https://library.e.abb.com/public/05c1e12696513423c1257384004b5d78/3AST002863_Sedrun.pdf

HSR between Hwy 173 and Jess Ranch

There is a possible adit here. The TBMs will bore from Hwy 173 toward Jess Ranch, Jess Ranch toward Oro Grande, and Oro Grande toward Jess Ranch.

Possible Hesperia Adit

The HSR base elevation is 2025 ft, the sloped adit is 0.8 miles long; the access grade is 3.5%.

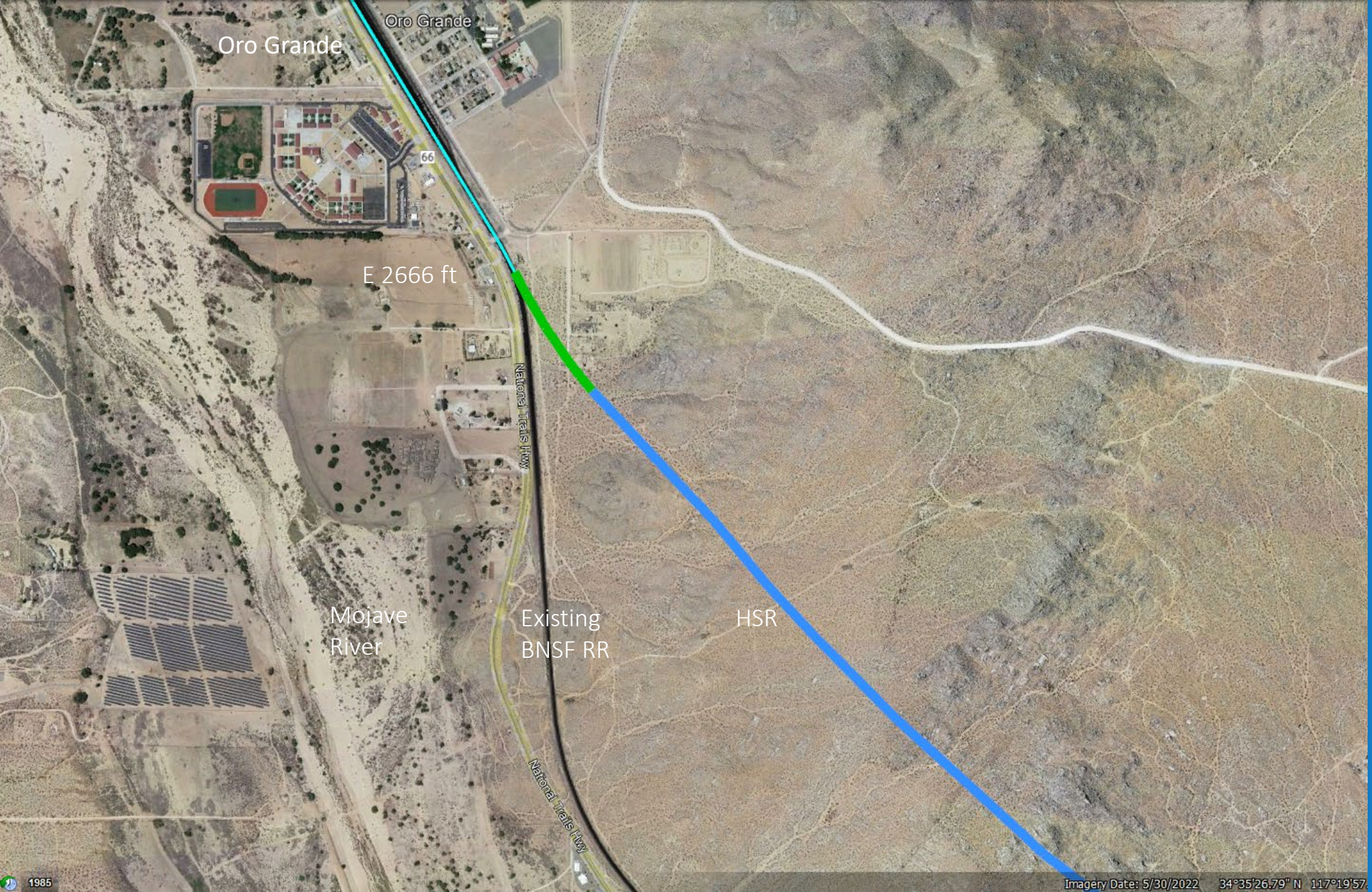
Load material via conveyor to the Mitsubishi RR and ship to deposit areas. Process usable material for marketing.

Omiya CA, Specialty Minerals, Mitsubishi Cement Plant may be able to use suitable materials.

HSR between Jess Ranch and Oro Grande and to Las Vegas

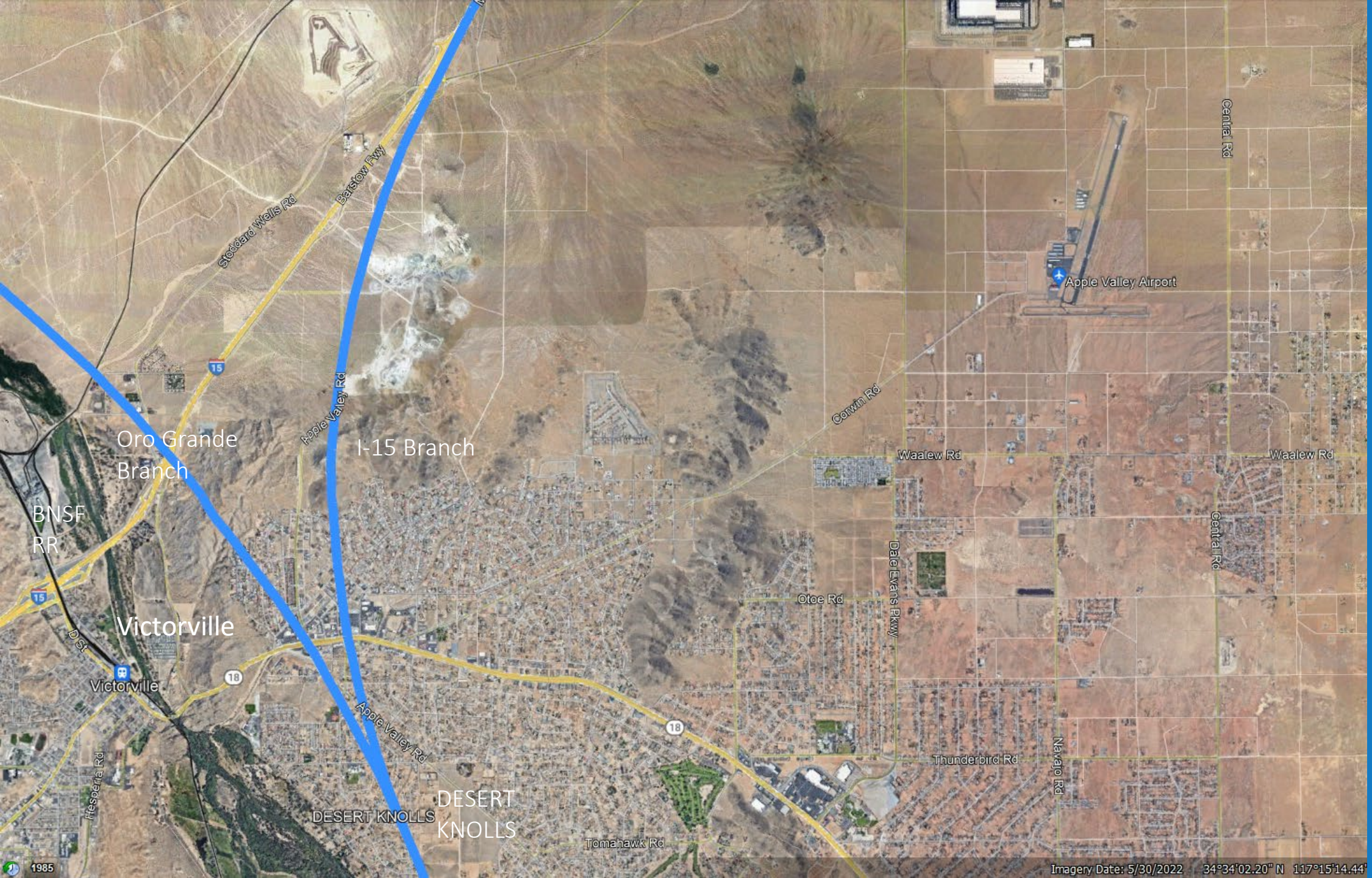
The TBMs will start boring from Oro Grande and I-15 toward Jess Ranch. The I-15 TBM will merge at Desert Knolls.

Option; HSR will re-connect with the existing BNSF corridor. BNSF can use the HSR tracks for express container shipment to Long Beach, CA.



HSR at Oro Grande

Here the Cajon Pass Tunnel will merge with the BNSF tracks. The proposal for the BNSF is to electrify the Corridor from Barstow to the Long Beach harbor. This electrified corridor is for express freight shipping. The HSR to Las Vegas will use the same corridor from San Bernardino via Desert Knolls to Las Vegas.



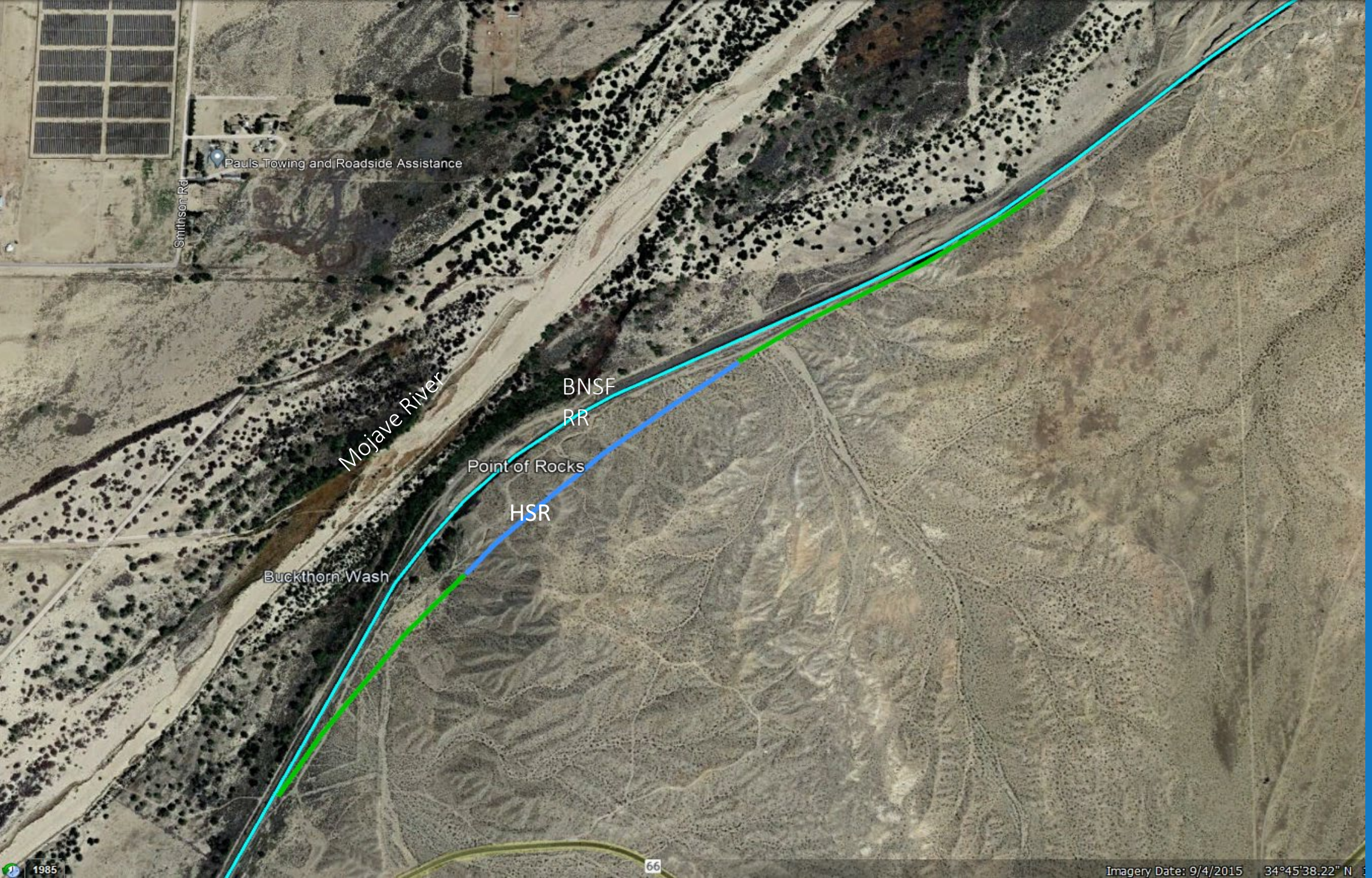
HSR Branch Tunnels between Desert Knolls, Oro Grande, and I-15 median intersection.

The Oro Grande to Desert Knoll is a single-track tunnel. The I-15 to Desert Knolls is a single-track tunnel.

From San Bernardino to Desert Knolls, the tunnels are in twin bores. At Desert Knolls, the tracks have cross-overs.

Proposed HSR Corridors between Oro Grande and Bell Mountain

There are two corridor options in this region.
Oro Grande to Barstow would follow the BNSF RR corridor and the other would follow the I-15.
The I-15 has median clearance problems in the Barstow area.



HSR at Point of Rocks

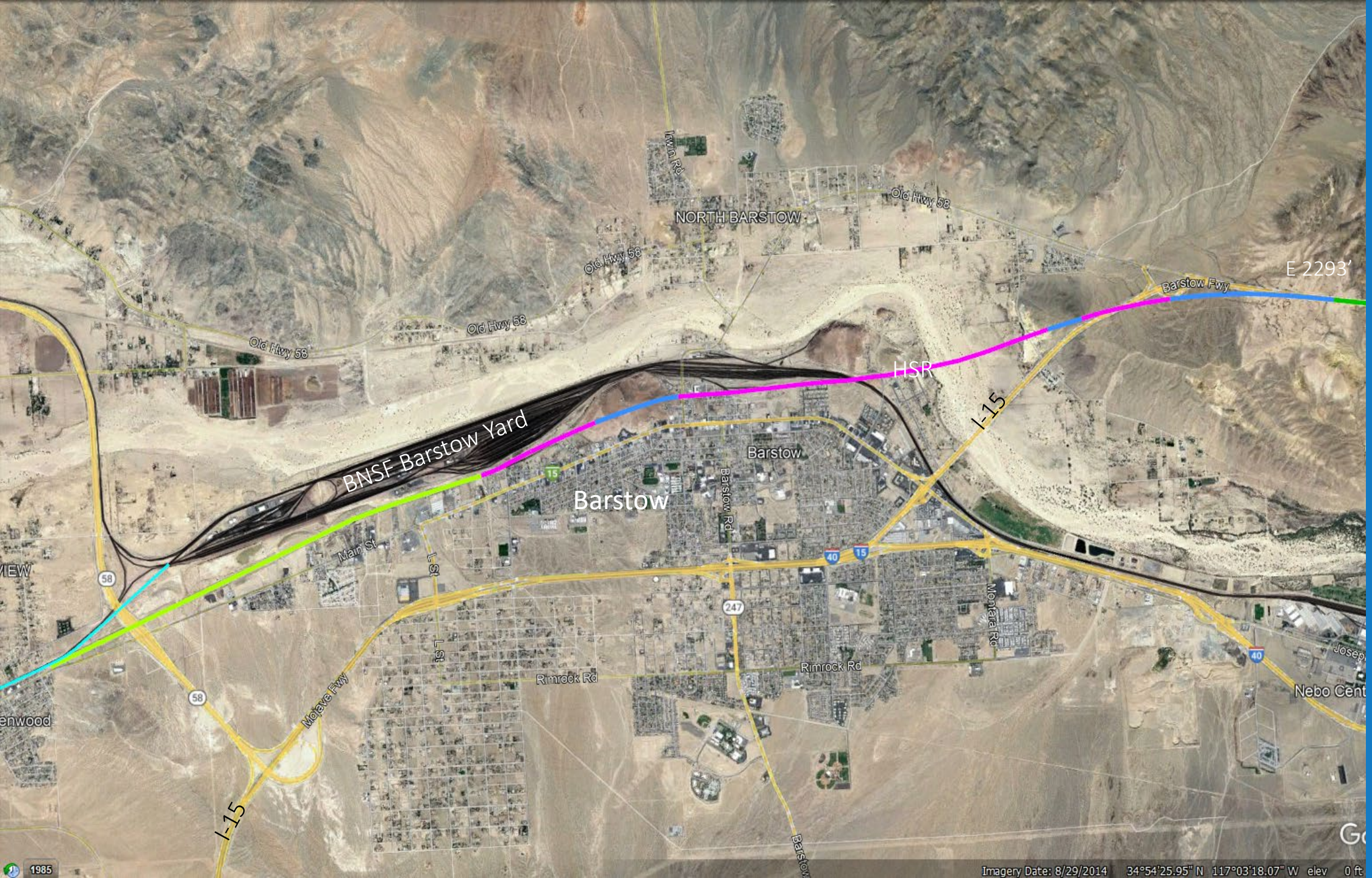
Here we have a cut, short tunnel, and cut to allow HSR train speeds of 140 mph.

The HSR will depart the BNSF and then rejoin the BNSF corridor again.

HSR at Indian Trail and Lords Rd

Here again, we have a cut to keep the HSR train speed to 140 mph.

Eastward from here, the train speeds will go down to 100 Mph and lower to enter the Barstow HSR Station at ±13 miles farther east.



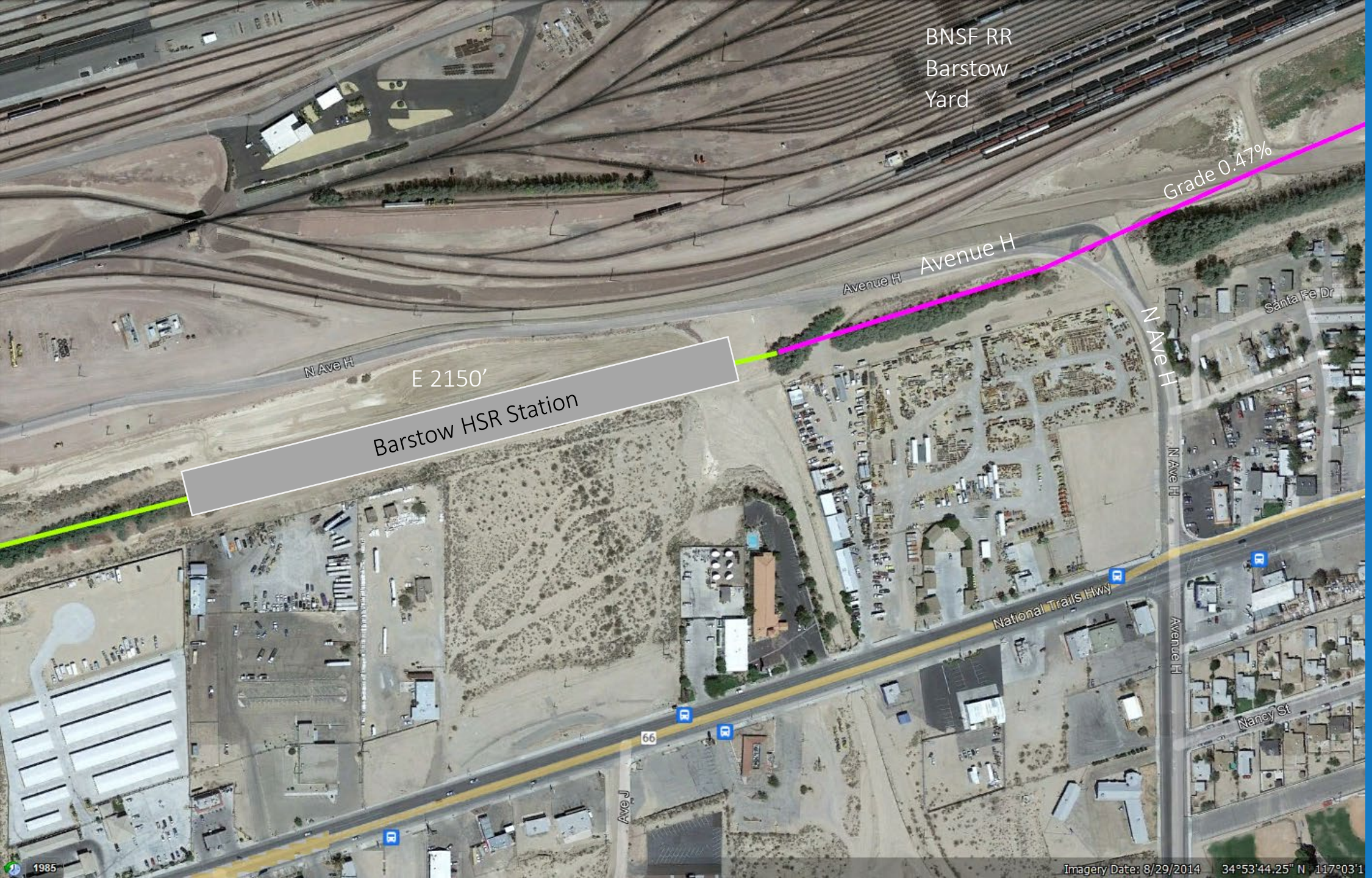
HSR at Barstow

General overview of Barstow area.

The I-15 median is often too narrow to accommodate the HSR double tracks.

The I-15 between Desert Knolls and Barstow also has several tight curves, which will not allow HSR speeds.

The BNSF corridor is the better choice.



HSR at Barstow Station

The BNSF corridor will allow an HSR station in Barstow. The room for parking is ample.

Avenue H/N Ave H will get an overpass.

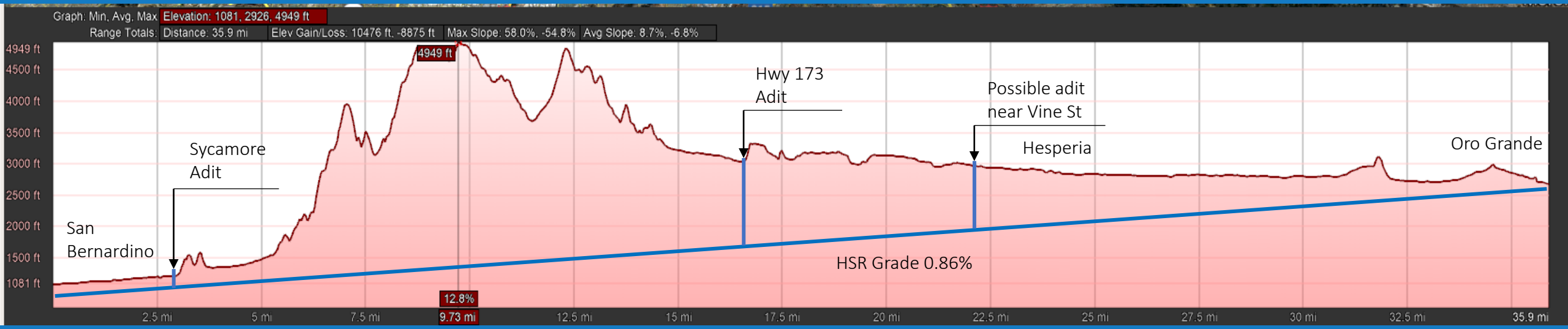
HSR to Las Vegas at Quarry Rd

From then on, the HSR is mostly in the median of I-15.

There are problems in Barstow, “insufficient room” and, later, tight curves that HSR trains can’t negotiate.

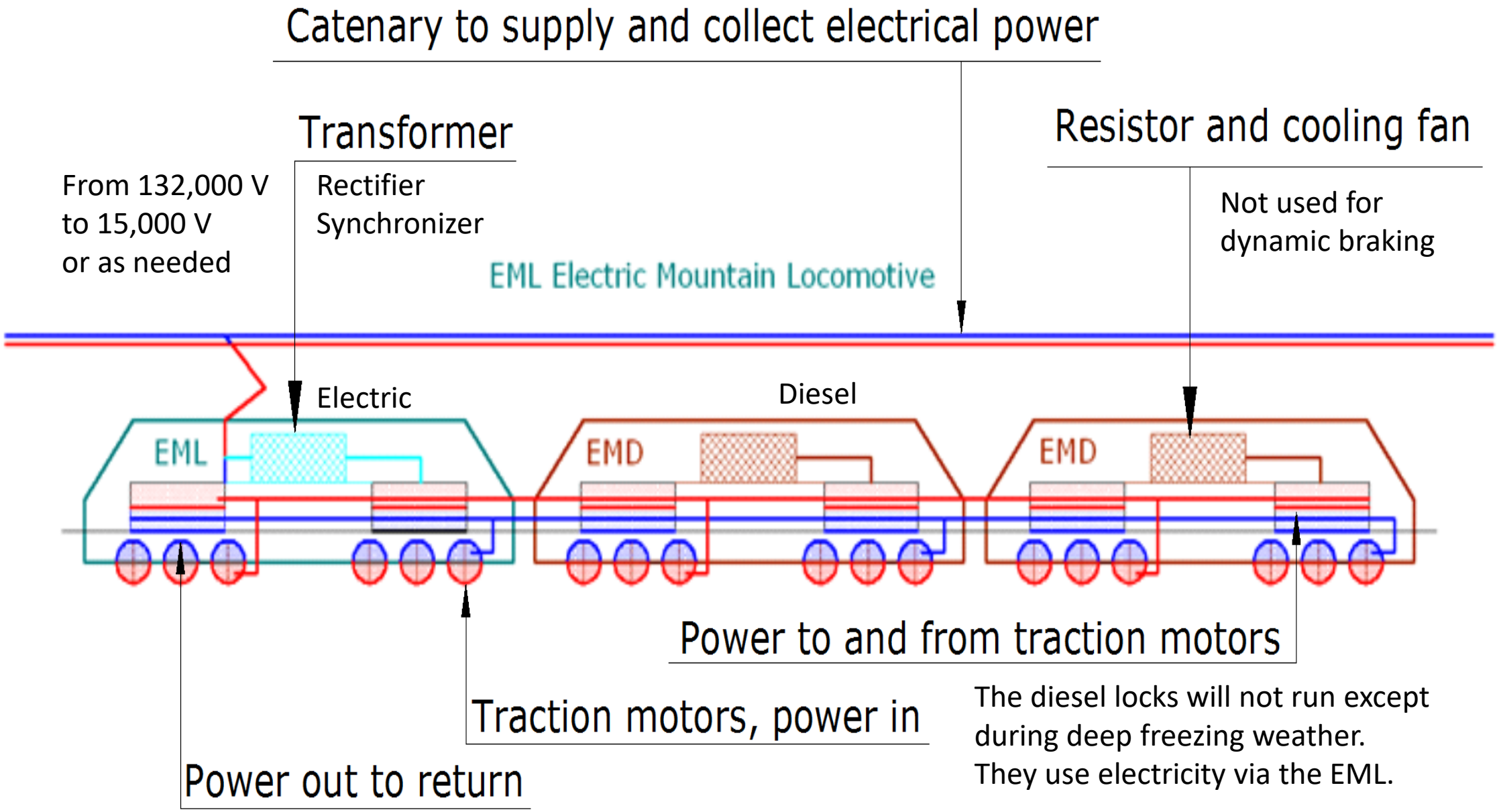
The I-15 HSR corridor plan from Barstow to Las Vegas is not drawn yet.

Cajon Pass Profile



3.85 Miles | 11 Miles | 5.92 Miles | 13.2 Miles

TBM boring directions. This approach would use 6 TBMs, thus speeding up the tunnel boring.
Depending on the geology, the 3.8-mile-long Sycamore/San Bernardino tunnel may be excavated by the conventional method.
Use the same TBMs to bore the next twin tunnels.
Miles are estimated. There are 33.97 (54.65 Km) tunnel miles per corridor tunnel and 1.93 miles in a cut.

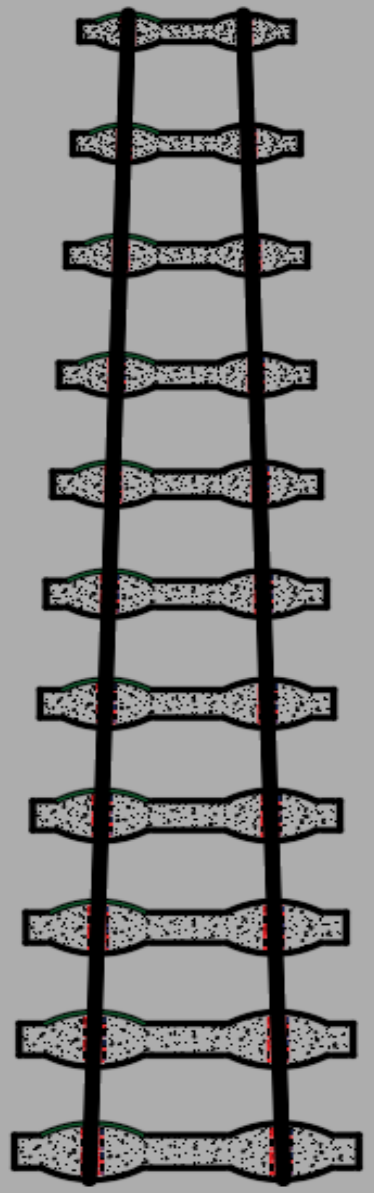


Approach for Electrification over the Cajon Pass Route

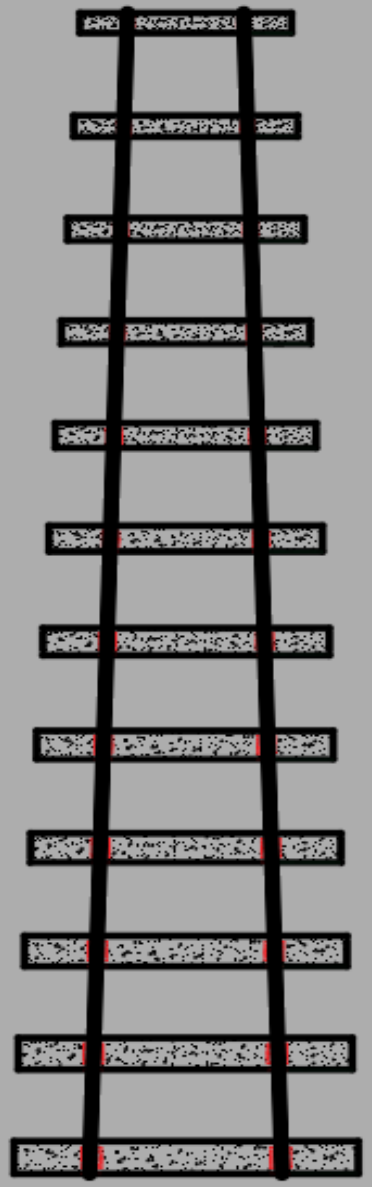
Keep intermodal trains configuration with the diesel locomotives as they are. Add the Electric Mountain Locomotive (EML) to the front. The EML will use electric power to propel the trains. Diesel locomotives are an auxiliary power source. During the braking, the diesel will forward the power to the EML. Once off the grid, the diesel Locks will bring the train to the destination point.

Tracks into the Future

Breasted Tie System



Standard Tie System



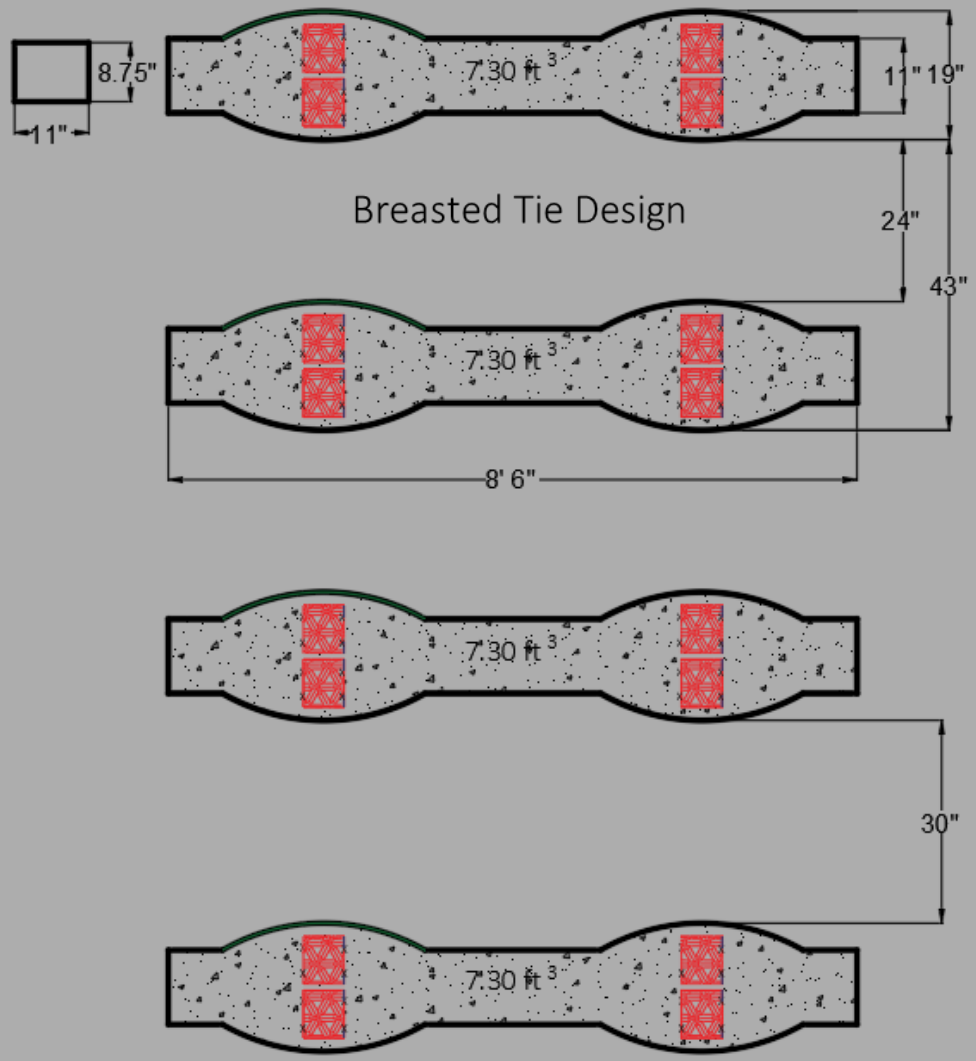
Tracks into the Future with Breasted Concrete Ties

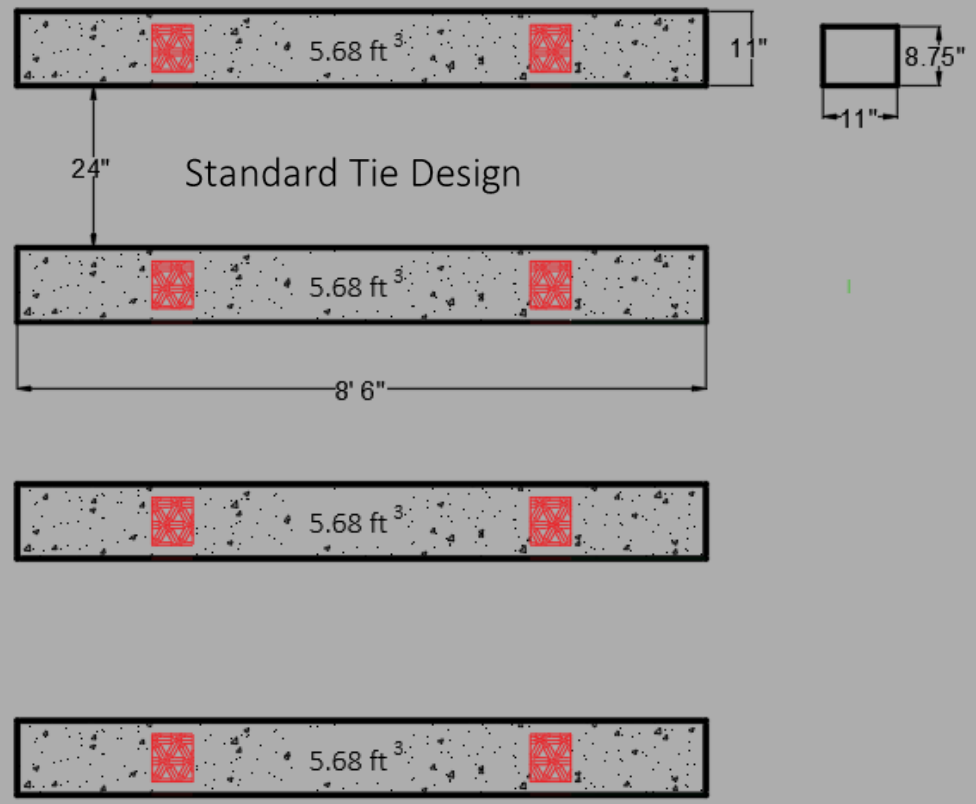
- Our North American Railroads need this new and advanced concrete tie design.
- So many derailments are costing millions of dollars because of ever-increasing tons of freight rail cars.
- This increased weight causes much stress to the rail ties. The current beam-configured ties are still the same as decades or a century ago.
- To address this problem, I developed the breasted tie configuration. This tie design will increase the load distribution to the ballast area directly under the rail, reducing the center tie bending at the wood ties and relief bending stresses for concrete ties.
- The current concrete tie has one “tie plate on each side”; the breasted tie has two tie plates on each side and rail clip fasteners. This arrangement will reduce the “tie-rocking” thus further increasing track stability.
- The breasted design will also reduce traversal shifting of the tracks; the bulges create an added tie sliding hindrance.
- Reducing track bending will help to reduce derailments. Horizontal stability will help to reduce energy consumption by lessening vertical track bending; every millimeter does make a difference.
- Estimated standard concrete ties per mile at 24” spacing = 1810, or 380 y3. Breasted tie at 24” spacing = 1473 and will require more concrete (398 y3.) Spacing at 30” = 1293 ties or 349 y3 cubic yards of concrete per track mile.

The question will be, can a 30” spacing be allowed? I think this will work with this design. The enlarged tie footprint will allow this and reduce the overall concrete demand per mile. Tie-tamping equipment can be developed to install this tie type.

The new Breasted Concrete Tie versa the Current Standard Tie Design

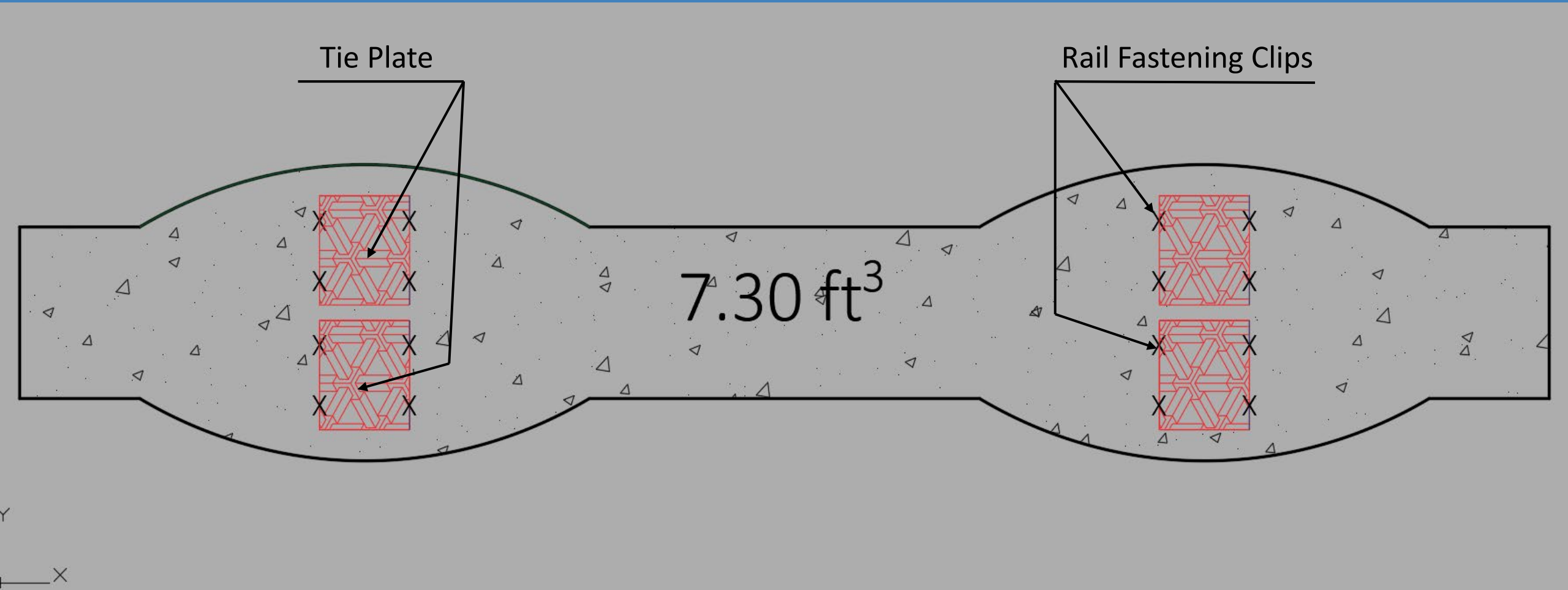
This tie design increases the footprint on the ballast, increasing the load-bearing distribution of heavier trains in nowadays use.



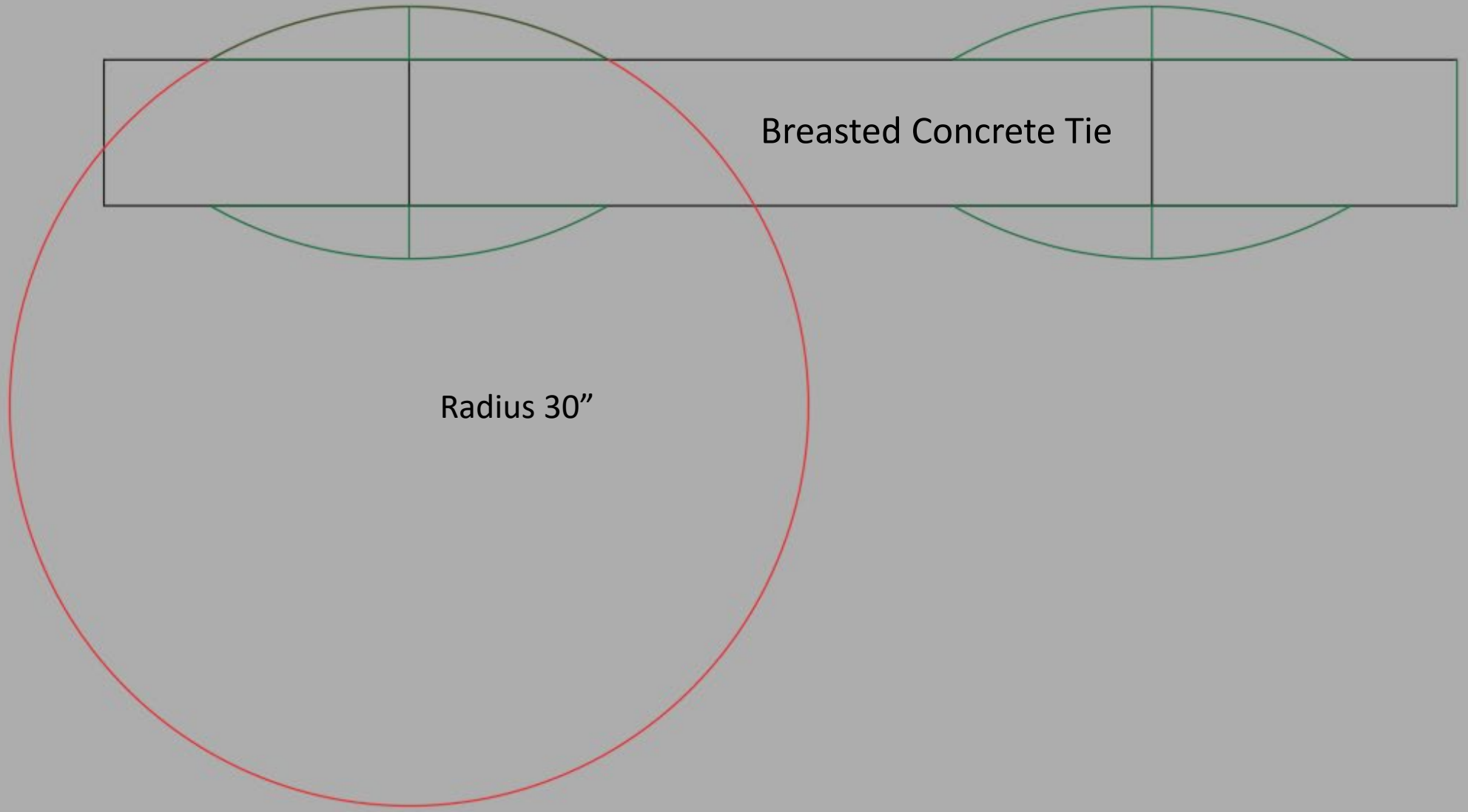


Enlarged View of the Breasted Tie

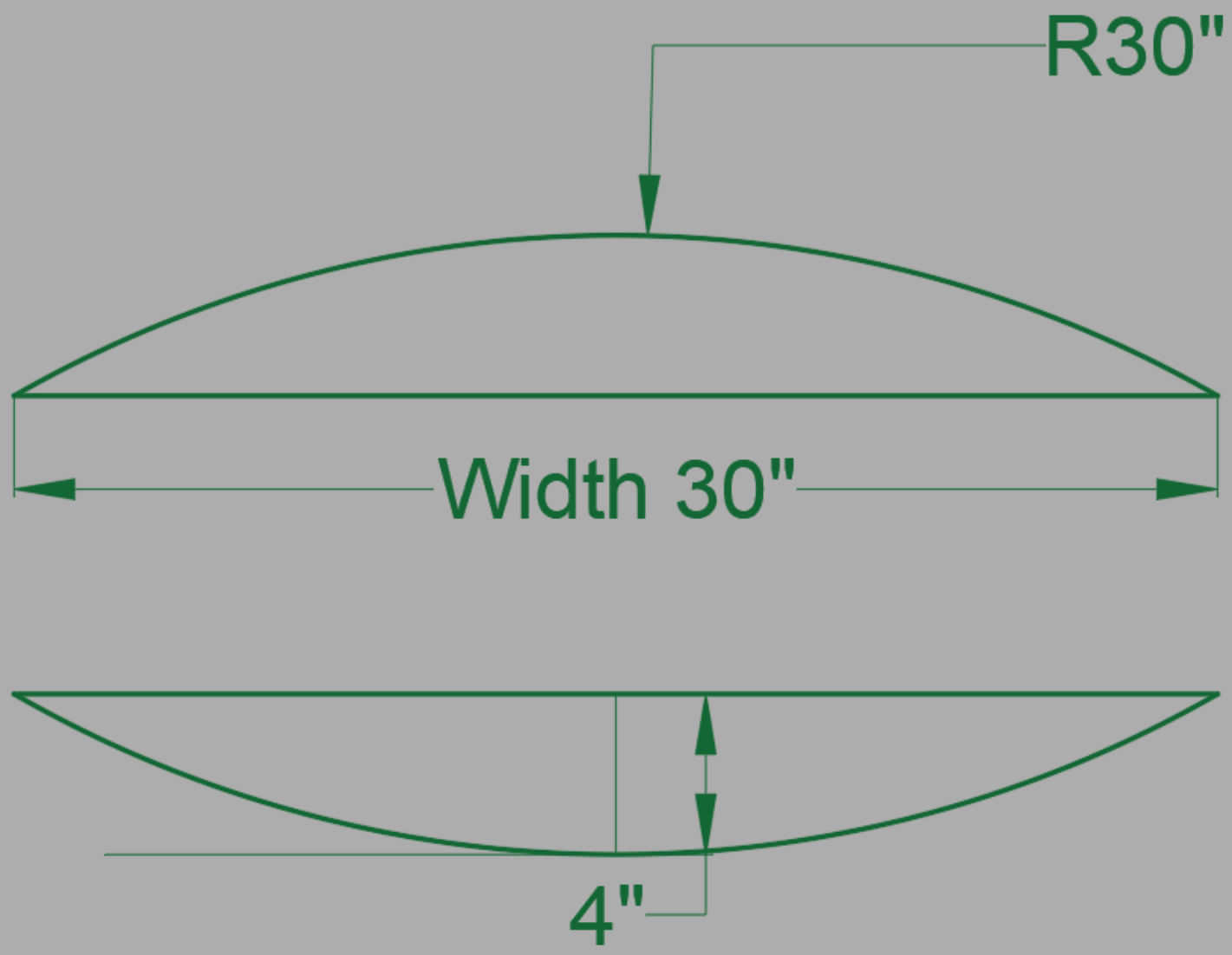
This tie has two tie plates on each side.
The concrete volume is estimated; the tie may have an indented section in the center to reduce concrete.



The Overall Overview of the Design



The Breasting Section



Notes