Lessons learned implementing speed enforcement to meet 49 CFR 236.1019(b)(1) using PTC (I-ETMS) at Los Angeles Union Station

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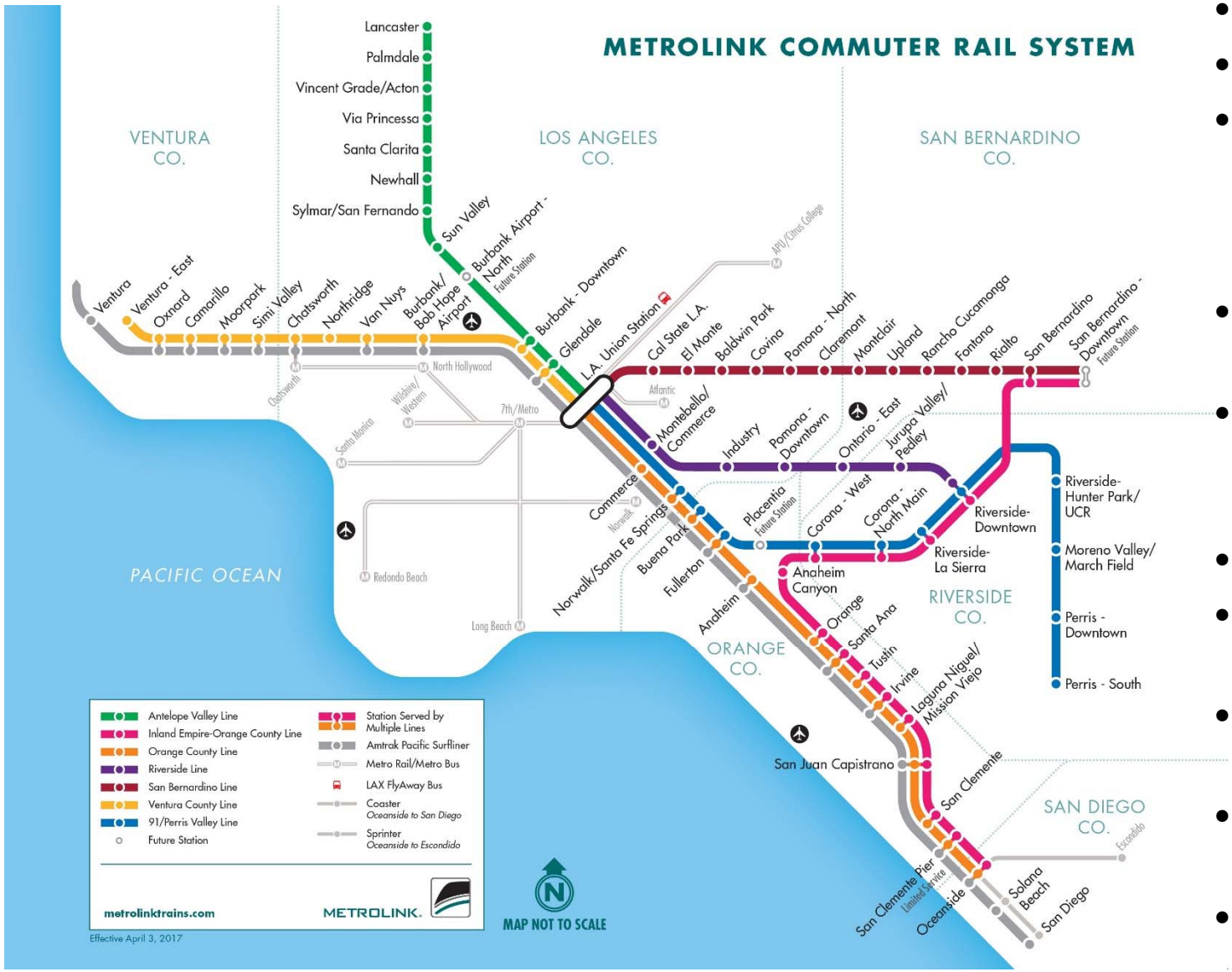
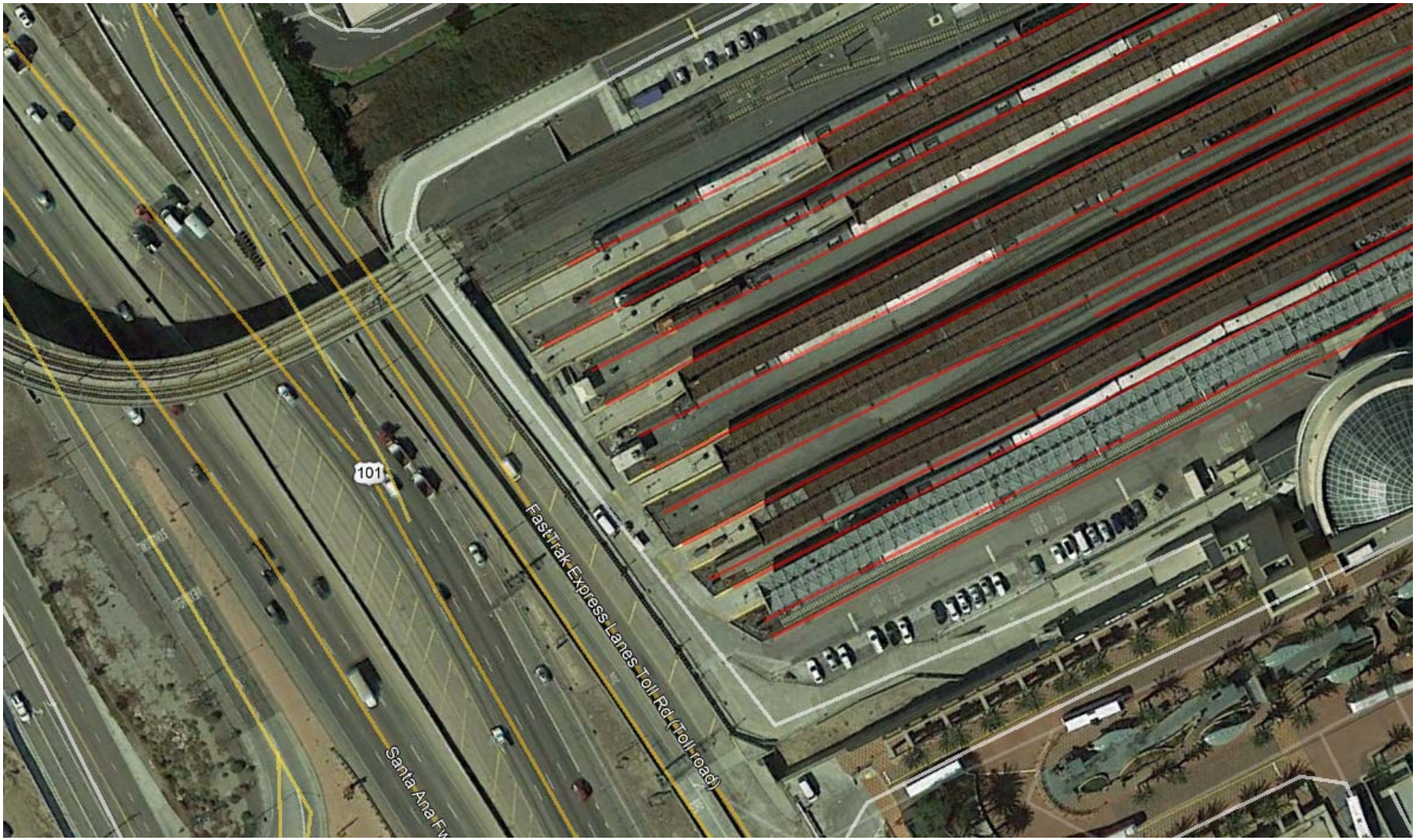
Key Presentation Take-Aways

- Speed Enforcement within the Los Angeles Union Station (LAUS) is required as part of the Main Line Track Exclusion Addendum (MTEA)
- End of track territory can be PTC protected

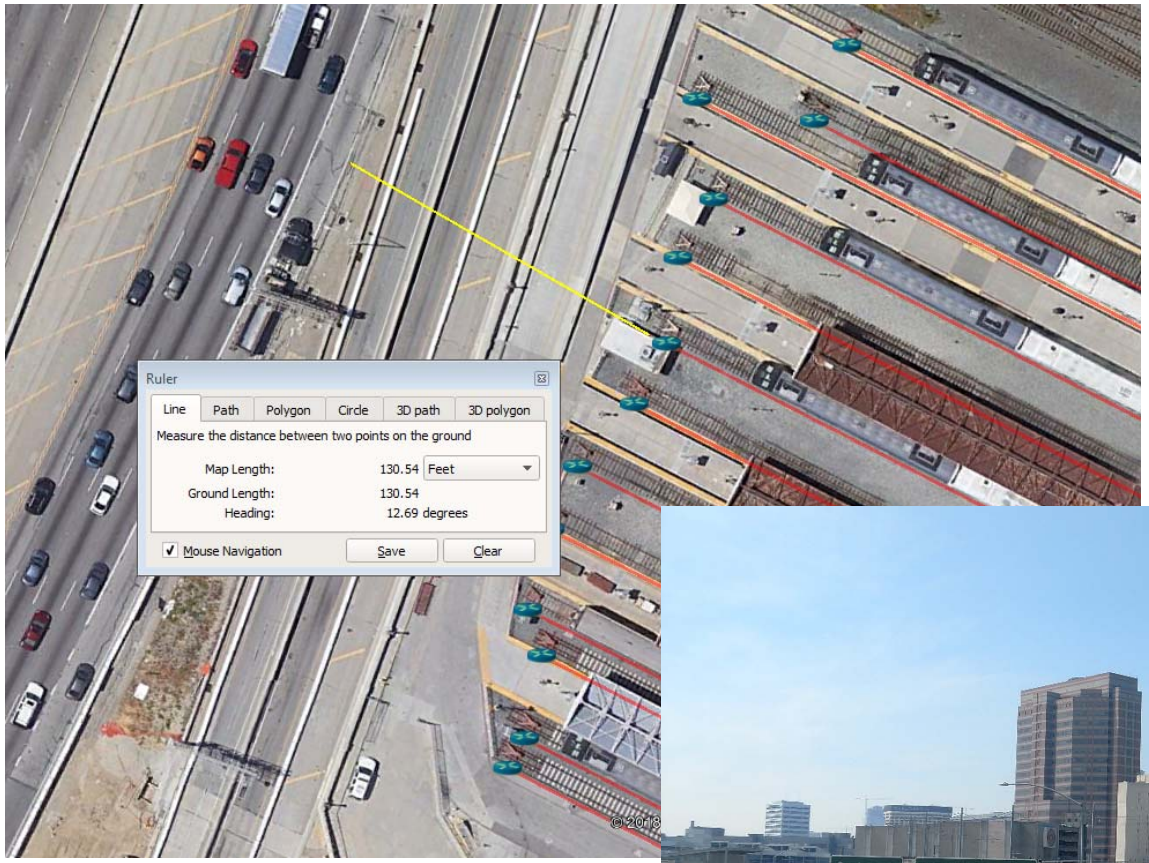


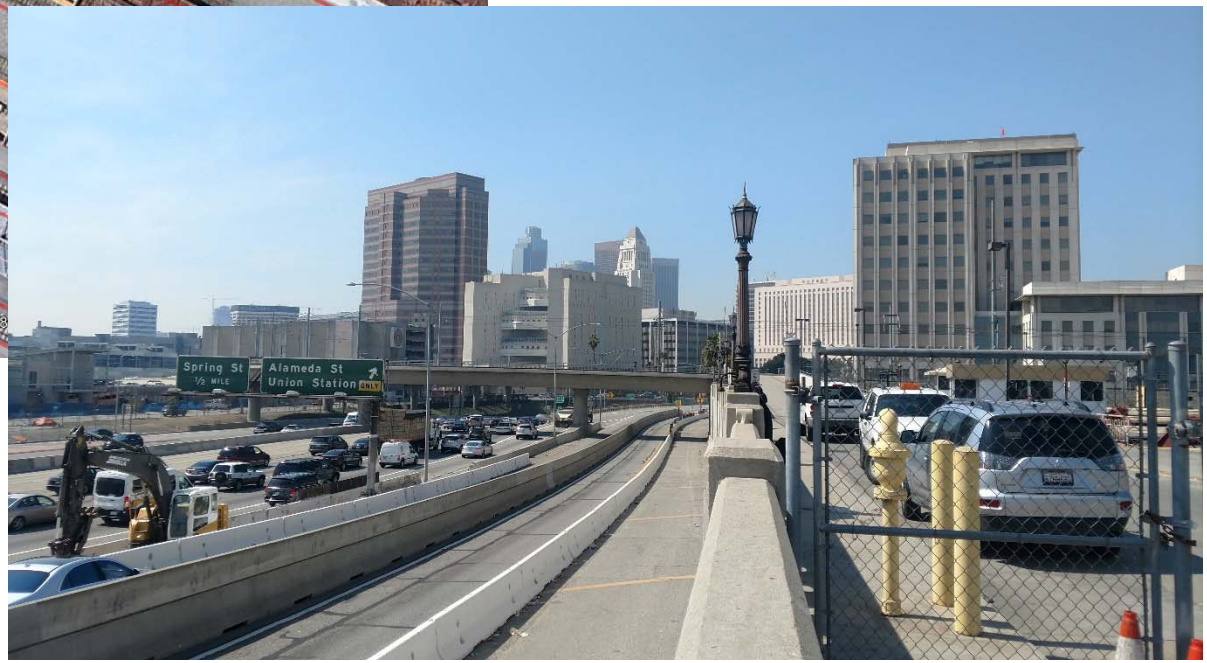
- **System:** 538 miles
- **PTC Subdivisions:** 9
- **PTC Status:** Interoperable Revenue Service Operations
- **Weekday revenue trains:** 171
- **Locomotives:** 55 (Replacing 40 with new Tier 4 F125)
- **Cab cars:** 57
- **Max speed:** 90 mph
- **Host to:** BNSF, UPRR, Amtrak
- **Daily Hosted Trains:** 325
- **Tenant on:** NCTD, BNSF, UPRR

Metrolink Network

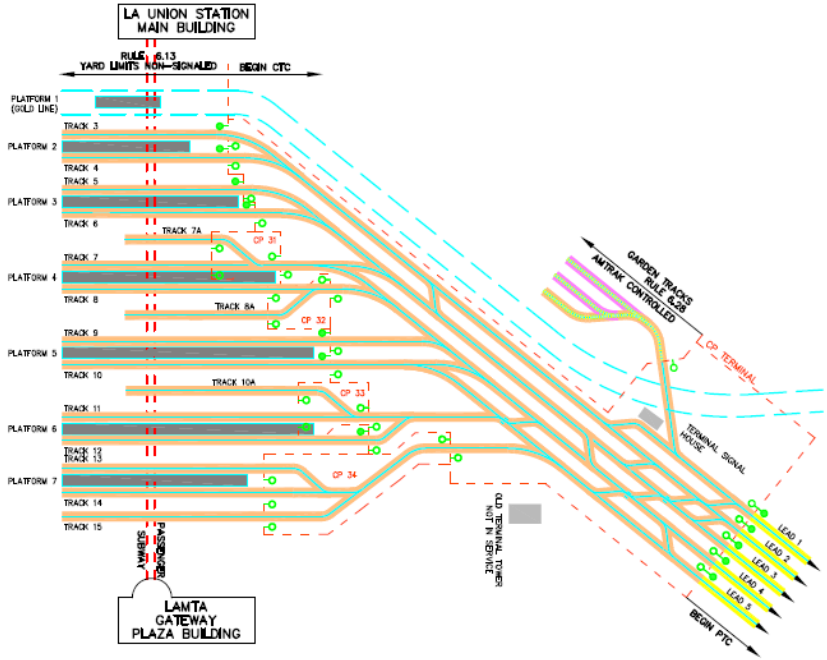


Los Angeles Union Station





Proximity to the 101 Freeway



(PREVIOUS TRACK CONFIGURATION)

LEGEND:

- DENOTES TRACK WITHIN LIMITS OF CONTROL POINTS
- DENOTES CONTROL SIGNAL OF CONTROL POINTS
- DENOTES SIGNAL WITH NO. PLATE
- DENOTES DOUBLE SLIP SWITCH
- DENOTES AMTRAK OWNED TRACK

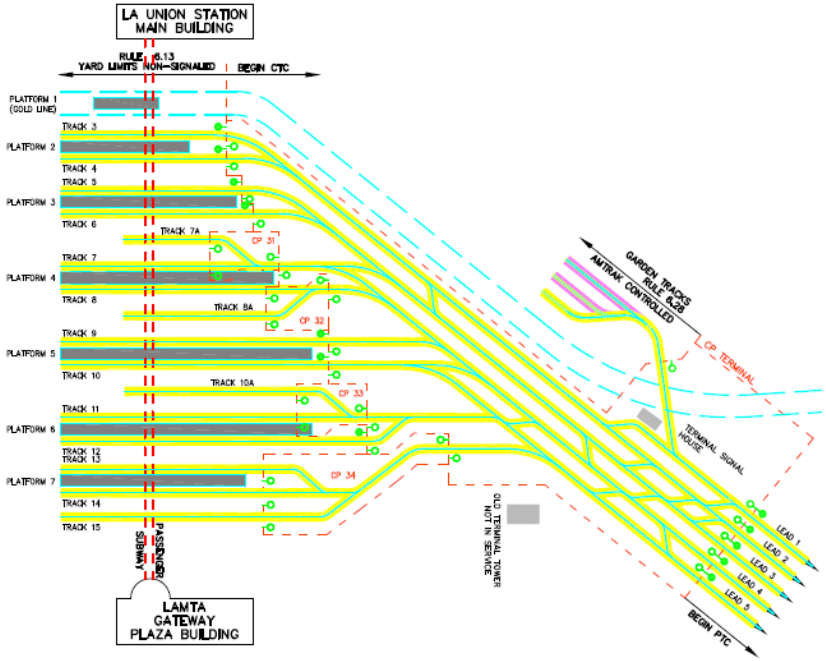
MAX SPEED P/E

- UNMAPPED TRACK
- PTC ENTRY TRACK
- PTC MAPPED TRACK

RIVER SUBDIVISION

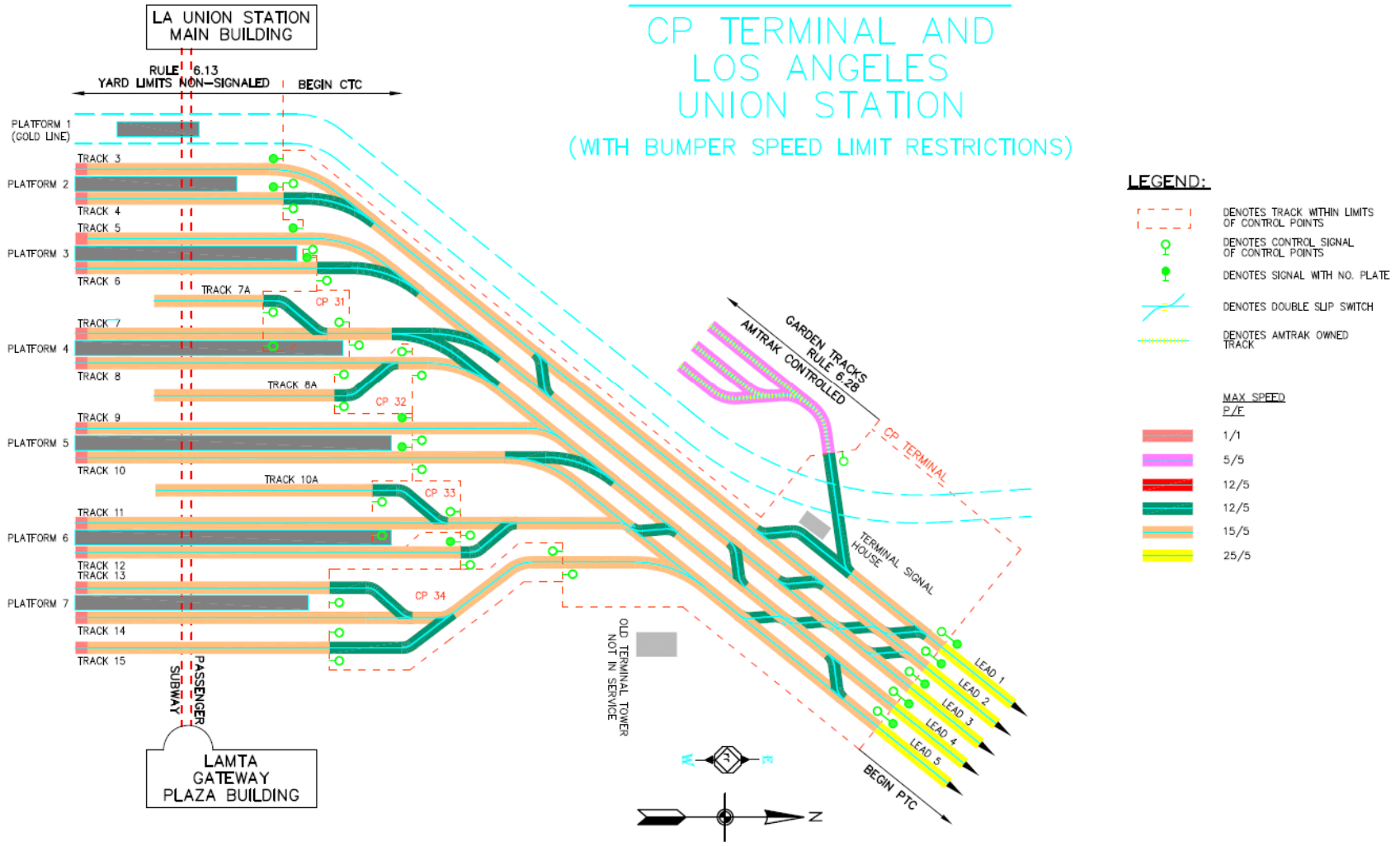
CP TERMINAL AND LOS ANGELES UNION STATION

(PTC MAPPED AREAS)



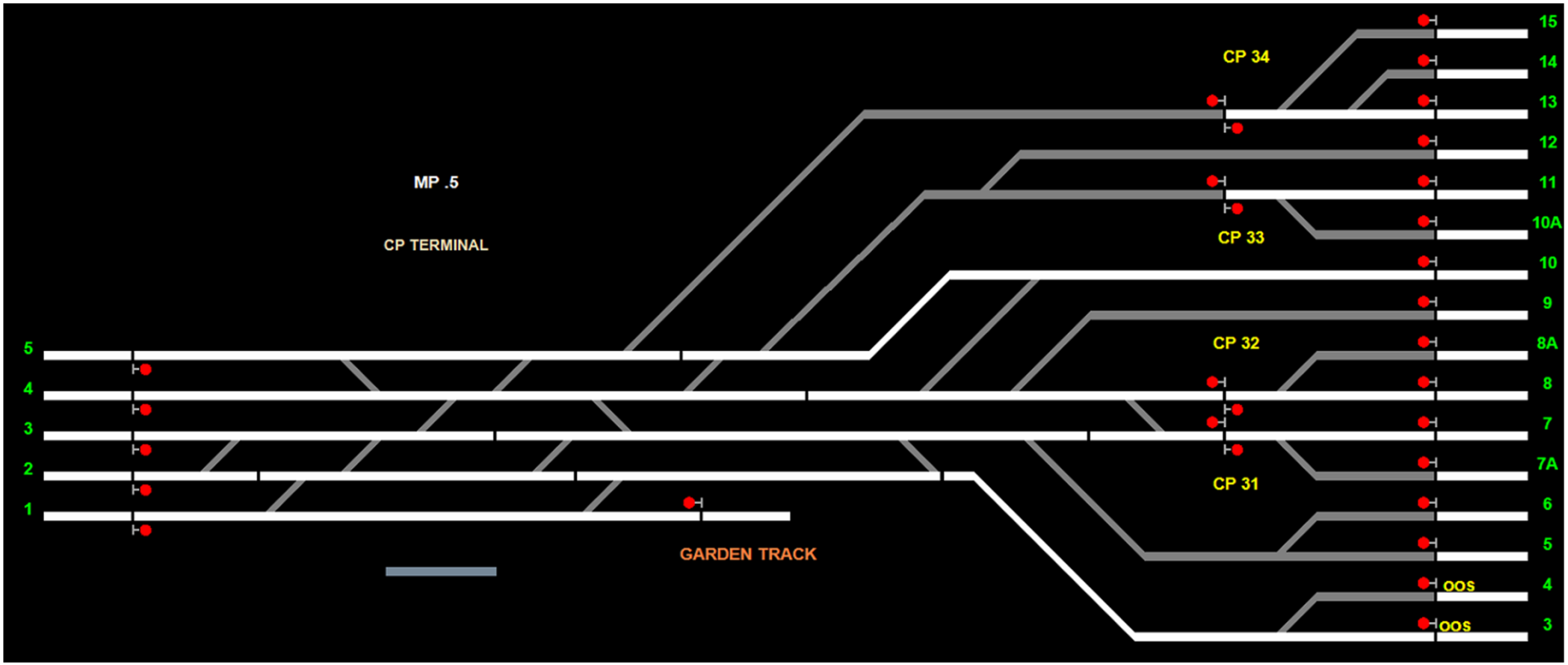
(CURRENT TRACK CONFIGURATION)

LAUS PTC Configuration



End of Track Protection

On-Board Testing



On-Board Testing

- Total of 294 routes (147 inbound and 147 outbound).
- Testing consisted in ensuring that on all routes, train can go active upon departure and remain PTC active with all needed warnings in place and be able to reach end of track without losing PTC protection
- All routes were testing in the lab and 30 sample routes tested in the field

On-Board Testing

- Original intent was to have a 0 MPH target on all bumper posts
- Lab testing results showed that train could not get closer than 30 feet to bumper before On-Board applied predictive penalty brake application
- SCRRA has ADA ramps that are closer than 30 feet from bumper, therefore this presented an operational concern of going into full service brake application as train would spot up to ADA ramp
- As a work around, 1 MPH target was placed on bumper posts on platform tracks which would require train speed to be reduced to <5 MPH approaching bumper

On-Board Testing

- Lab and field testing resulted on high TMC CPU usage due to multiple routes updates (one per second) caused system resets, thus disabling PTC; this was seen on both inbound and outbound routes
- CPU usage was determined to be too high due to a 2 foot block determined to be parallel to the route.
- Software developer worked with SCRRA on getting lab and field results to address high CPU usage failures

Success

Form C

- EFFECTIVE JULY 22, 2017 AT 00:01AM SPEED ENFORCEMENT WILL BE IMPLEMENTED IN BOTH DIRECTIONS BETWEEN EAST LIMITS OF CP TERMINAL AND MP 0.0 (END OF TRACK).
- INBOUND TRAINS WILL RECEIVE A ONE MPH SPEED TARGET JUST SHORT OF THE BUMPER ON ALL TRACKS OTHER THAN TRACK 15 WHICH WILL HAVE A 0 MPH TARGET. TRAIN CREWS SHOULD HANDLE TRAIN ACCORDINGLY TO AVOID PENALTY APPLICATION.

Lessons Learned

- Speed enforcement within the MTEA works as required by the regulations.
- I-ETMS end of track protection is configured to warn at 3 MPH above the allowed speed and to enforce at 5 MPH above the allowed speed. Meaning with the 1 MPH speed restriction, a train could conceivably hit the bumper post at 6 MPH.
- SCRRA has discussed the end of track speed restriction need with Wabtec. Management is being targeted to allow us to set a 0 MPH target with a lesser chance of enforcement.