

APPENDIX D.4: BRISBANE LMF (WEST) REPORT AND EXHIBITS – ALTERNATIVE B

Part 1 of 2

**CALIFORNIA HIGH SPEED TRAIN PROJECT
CONSTRUCTABILITY ANALYSIS**

**APPENDIX D.4 BRISBANE LMF (WEST) ALTERNATIVE B REPORT AND
EXHIBITS**

March 2019

APPENDIX D.4 BRISBANE LMF (WEST) ALTERNATIVE B REPORT AND EXHIBITS

Index

1	CONSTRUCTABILITY PHASES APPROACH THE BAYSHORE STATION. ...	1
2	FUTURE SITUATION	1
3	PHASES	2
3.1	Phase 1	2
3.2	Phase 2	3
3.3	Phase 3	3
3.4	Phase 4	4
3.5	Phase 5	4
3.6	Phase 6	5
3.7	Phase 7	5
3.8	Phase 8	6
3.9	Phase 9	6
3.10	Phase 10.....	7
3.11	Final Phase	8

EXHIBITS

- Plan
- Scheme
- Plan and profile scheme

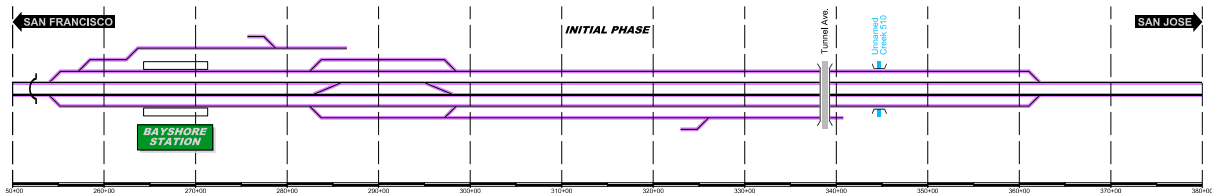
1 CONSTRUCTABILITY PHASES APPROACH THE BAYSHORE STATION.

This document describes the working phases of Bayshore station approach tracks adaptation. The main object of this work is the construction of a maintenance facility for future high-speed trains in the west side of the existing Caltrain tracks.

Affected area starts near the tunnel portal placed in Caltrain Bayshore station and ends on the straight alignment after Tunnel Avenue overpass.

The layout of the main track in this area is composed of the straight section running from the tunnel, a left-hand curve, a straight stretch parallel to future maintenance facilities, another left-hand curve and a last straight alignment.

LMF access turnouts are placed in the first and last straight sections, Bayshore station is at the beginning of the central straight line, and consists of two lateral platforms linked in with a footbridge. In addition, East side siding track is connected with an industrial area near the northern end.



As a general comment in the following phases, a series of speed limits are necessary. Experience shows that in the work area the speed limit is 20 mph, a permanent monitoring of the tracks condition must be made and the track ballast must be tamped under the railway track when necessary.

This speed limit restriction will be gradually lifted with the progression of the leveling works, the adjustments of the ballast bed, the release of tensions and the dynamic stabilization.

2 FUTURE SITUATION

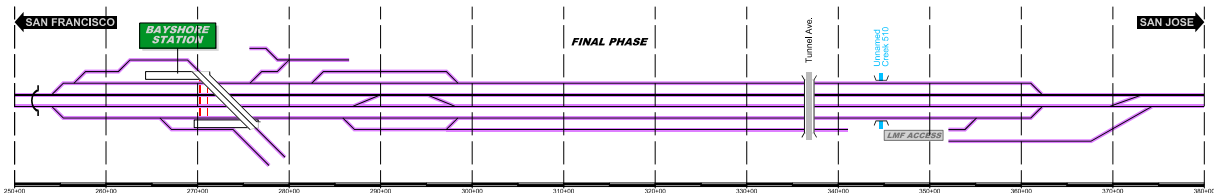
Future situation presents a similar layout to the current one, there are just a curve radii value decrease. These curves are slightly modified and new turnouts are placed to ease access, exit and maneuverability of trains in the workshops.



Figure 1. Localization of Brisbane LMF alternative B

In this alternative workshops are located in the west side of the tracks, so railway access from San Francisco is made directly from siding track. In addition, a flyover is necessary to allow departure of vehicles from workshops to San Francisco Station.

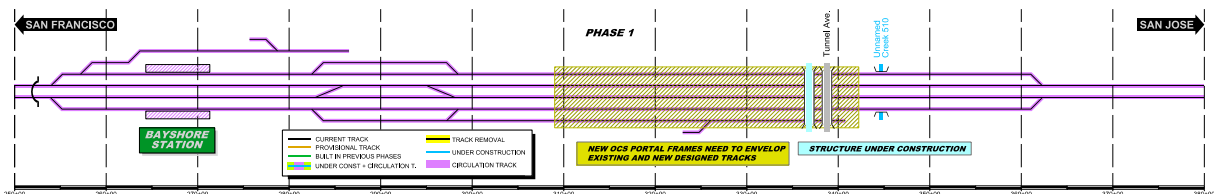
Southern access does not have a flyover so the entrance to workshops is run through turnouts located on main tracks.



3 PHASES

3.1 Phase 1

1. Electrification facilities are considered in current situation, so it is necessary to design compatible stages with current and future tracks to guarantee rail traffic during the works. In the next picture, the shaded area represents the affected area.
2. During this stage, the new Tunnel Ave overpass structure is built.



There are no railway traffic restrictions.

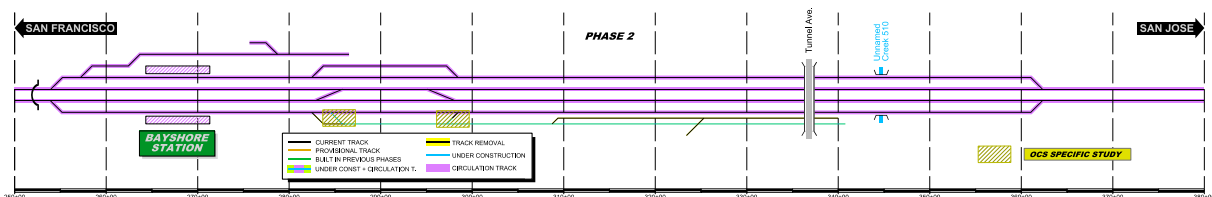
The capacity of the railway line is not affected. The railway traffic runs freely in both directions.

The OCS adaptation works will be carried out during:

- Day-time period: Works taking place outside the safety area.
- Night-time period: Works taking place inside the safety area or areas where a power outage is needed.

3.2 Phase 2

1. Western siding track removal near central curve area. Once removed, construction of the new lateral track and specific adjustments of catenary in turnout's area.



Traffic runs through all tracks except the removed one.

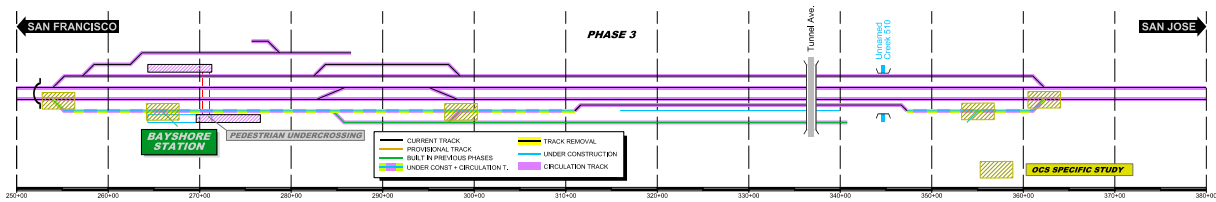
The capacity of the railway line is not affected, although there will be some speed limits due to the assembly and disassembly of turnouts. Traffic runs freely in both directions.

The assembly of a new turnout in a track put into service, will be carried out in a night-time period and with traffic cut. The speed limit will not be lifted until the turnout is completely installed.

3.3 Phase 3

In this phase, works are concentrated in the right siding track, they include:

1. Turnouts construction in main track to access to or exit from siding track.
2. Right siding track construction by renewal track and laterally displacing on end sections and new track in the central section.
3. Insertion of northern and southern turnouts to access workshops.
4. The new right lateral subgrade is built.
5. The pedestrian undercrossing is built under the right lateral track during its construction.
6. Extension of the platform in the direction towards San Jose and put into service of it.

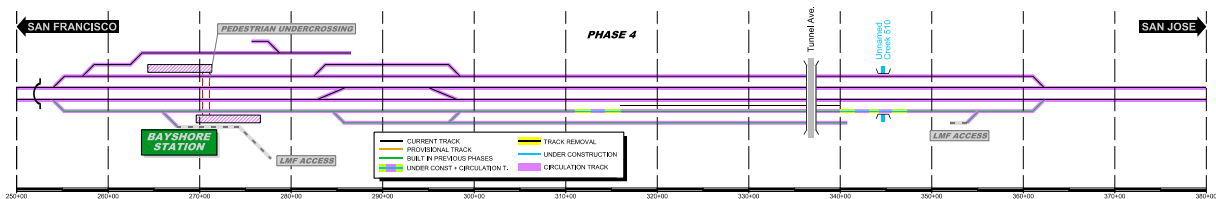


Traffic is in this phase carried out by all tracks without restrictions except on the right siding track where traffic must be compatible with the lateral displacement works.

Works of renewal and lateral displacement of the railway track and assembly of new turnouts will be carried out on a nighttime period. Execution of the new track will also be carried out at night because it is located between two tracks in use.

3.4 Phase 4

1. This stage complements the previous one, in this phase, right side sections are connected with each other.



Traffic is in this phase carried out by all tracks without restrictions except on the western side where traffic must be compatible with the lateral displacement.

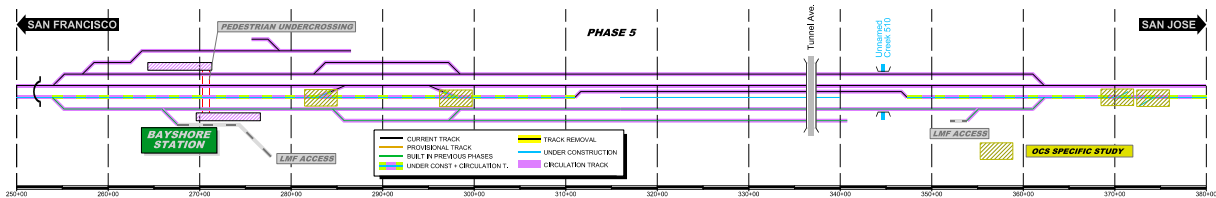
Works included in this phase will be carried out on a nighttime period. This stage, is a connection between works already executed in previous phases. For this reason, the work executed during the night must be compatible with the traffic of the next day. Speed limits will be imposed until the work is completed. In this phase it is necessary to duplicate the required equipment to enable both connections. This phase, can be defined as critical because an interruption in railway traffic at this point, would leave the Bayshore station in the San Jose direction without service.

3.5 Phase 5

This phase is similar to Phase 3 but in this case, works focus on the right side of main track.

1. Construction of the right main track by means of lateral displacement in end sections and by laying a new track in the central section.
2. Insertion of half crossings on the central straight alignment and on the southern end of workshops.

3. Another segment of the pedestrian undercrossing is built under the right main track during its construction.

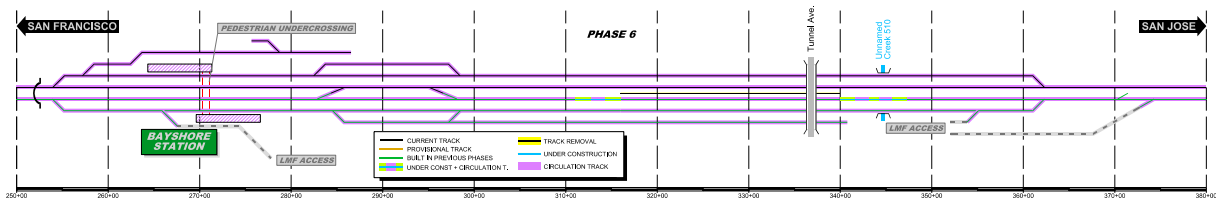


Traffic is in this phase carried out by all tracks without restrictions except on the right side where the circulation has to be compatible with the lateral displacement.

Works of renewal and lateral displacement of the railway track and assembly of new turnouts will be carried out on a nighttime period. Execution of the new track will also be carried out at night because it is located between two tracks in use.

3.6 Phase 6

1. This stage complements the previous one. In this phase, the new right side main track is connected with the previously laterally displaced stretch.



Traffic is in this phase carried out by all tracks without restrictions except on the right side main track where traffic must be compatible with the lateral displacement.

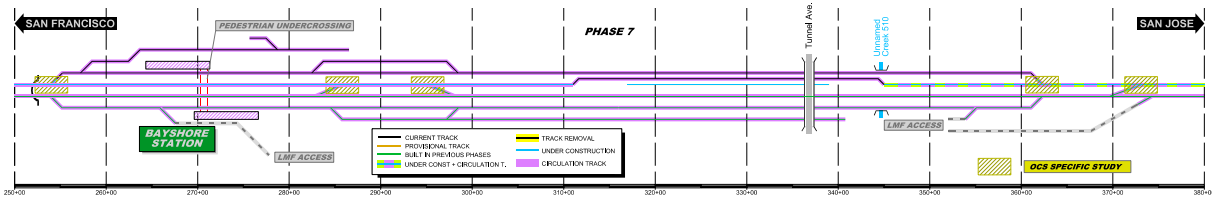
Works included in this phase will be carried out on a nighttime period. This stage, is a connection between works already executed in previous phases. For this reason, the work executed during the night must be compatible with the traffic of the next day. Speed limits will be imposed until the work is completed. This phase, is similar to 4, but of less importance because the Bayshore station always maintains the traffic in service and traffic over the main track can be diverted by the siding track.

3.7 Phase 7

This stage is similar to Phase 5 but in this case, works focus on the left side of main track.

1. Construction of the left main track by means of lateral displacement in end sections and by laying a new track in the central section

2. Insertion of the other half crossings on the central straight alignment and on the southern end of workshops
3. Another segment of the pedestrian undercrossing is built under the right main track during its construction.

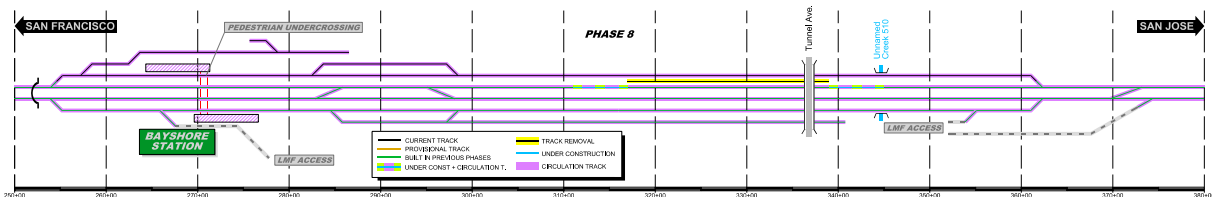


Traffic is in this phase carried out by all tracks without restrictions except on the left side where the circulation has to be compatible with the lateral displacement

Works of renewal and lateral displacement of the railway track and assembly of new turnouts will be carried out on a nighttime period. Execution of the new track will also be carried out at night because it is located between two tracks in use.

3.8 Phase 8

1. This stage complements the previous one. In this phase, the new left side main track is connected with the previously laterally displaced stretch.



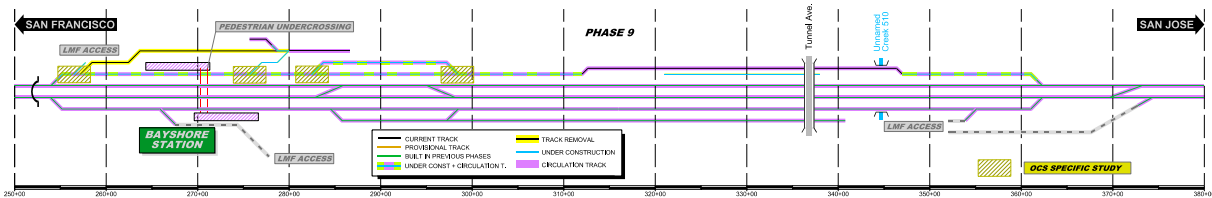
Traffic is in this phase carried out by all tracks without restrictions except on the left side main track where traffic must be compatible with the lateral displacement.

Works included in this phase will be carried out on a nighttime period. This stage, is a connection between works already executed in previous phases. For this reason, the work executed during the night must be compatible with the traffic of the next day. Speed limits will be imposed until the work is completed. This phase, like stage 6, is similar to 4, but of less importance because the Bayshore station always maintains the traffic in service and traffic over the main track can be diverted by the siding track.

3.9 Phase 9

1. Construction of the left lateral track by means of lateral displacement in end sections and by laying a new track in the central section.

2. Construction of the most left siding track by lateral displacement.
3. Insertion of North workshop exit turnout
4. Connection of industrial zone to main track layout.
5. A segment of the pedestrian undercrossing is built under the left siding track.



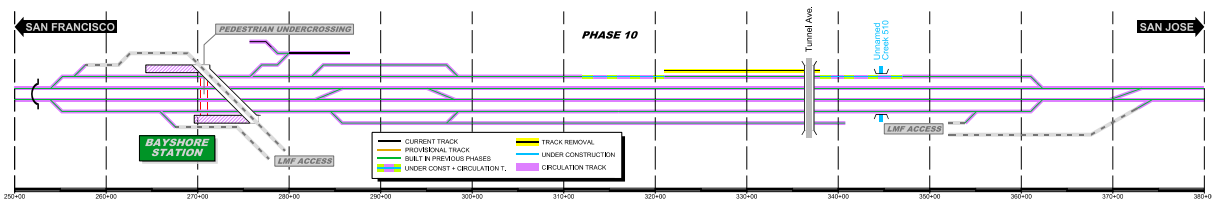
Circulation in this phase is carried out by all tracks without restrictions except on the left siding track where the circulation has to be compatible with the lateral displacement.

Works of renewal and lateral displacement of the railway track and assembly of new turnouts will be carried out on a nighttime period. Execution of the new track will also be carried out at night because it is located between two tracks in use.

In this phase, the connection with the industrial area is built, so it will be necessary to coordinate the works in a manner that the existing connection will not be dismantled until the new one is made.

3.10 Phase 10

1. This stage complements the previous one. In this phase, the new left siding track is connected with the previously laterally displaced stretch.
2. Traffic is in this phase carried out by all tracks without restrictions except on the left siding track where traffic must be compatible with the lateral displacement
3. Workshops access crossover construction in the northern end.



Works included in this phase will be carried out on a nighttime period. This stage, is a connection between works already executed in previous phases. For this reason, the work executed during the night must be compatible with the traffic of the next day. Speed limits will be imposed until the work is completed. In this phase it is necessary to duplicate the required equipment to enable both connections. This phase, like 4, can be defined as

critical because an interruption in railway traffic at this point, would leave the Bayshore station in the San Francisco direction without service.

The foreseen track disassembly can be done during a daytime period.

It is remarkable the execution of a railway flyover for the exit-track from the workshops to San Francisco, over the main-tracks and the siding-track. It is foreseen this structure to be built with a typology known as Pergola, which can be built without affecting the existing traffic, although some of the stages of the structure building must be carried out in night-time period, with power outage and without traffic.

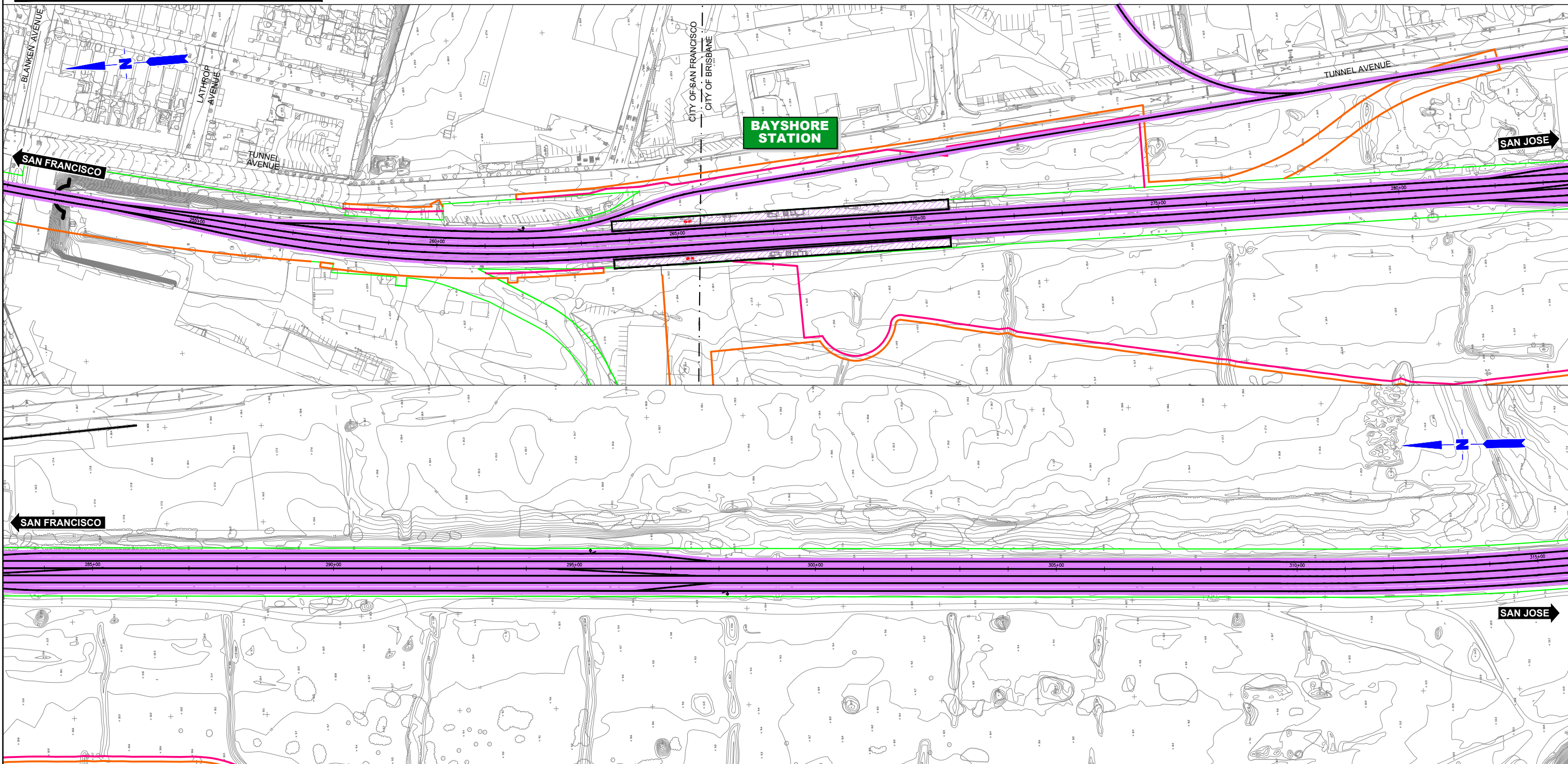
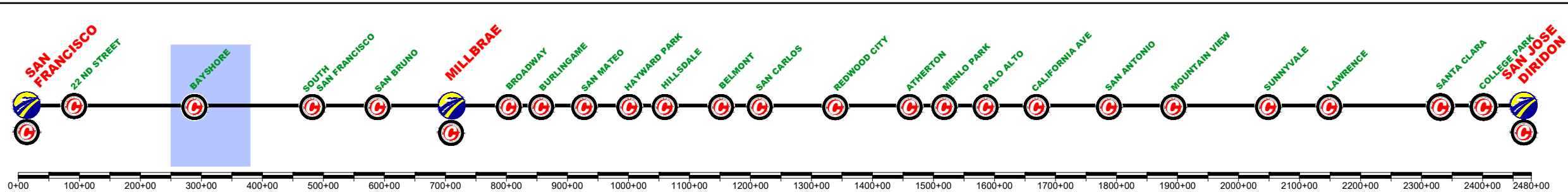
3.11 Final Phase

In this final stage, construction works are finished and railway traffic is fully operational.

EXHIBITS

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	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
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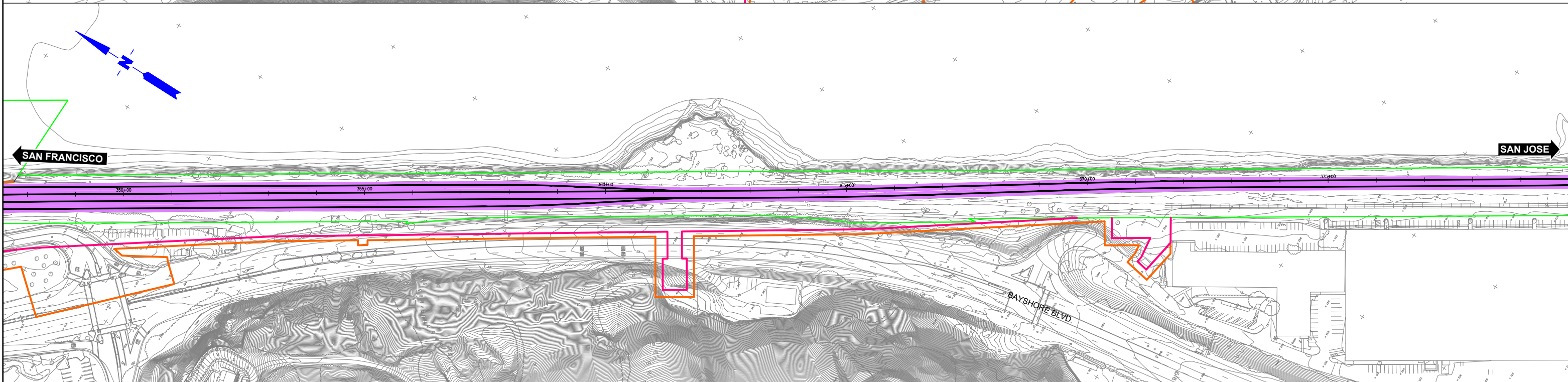
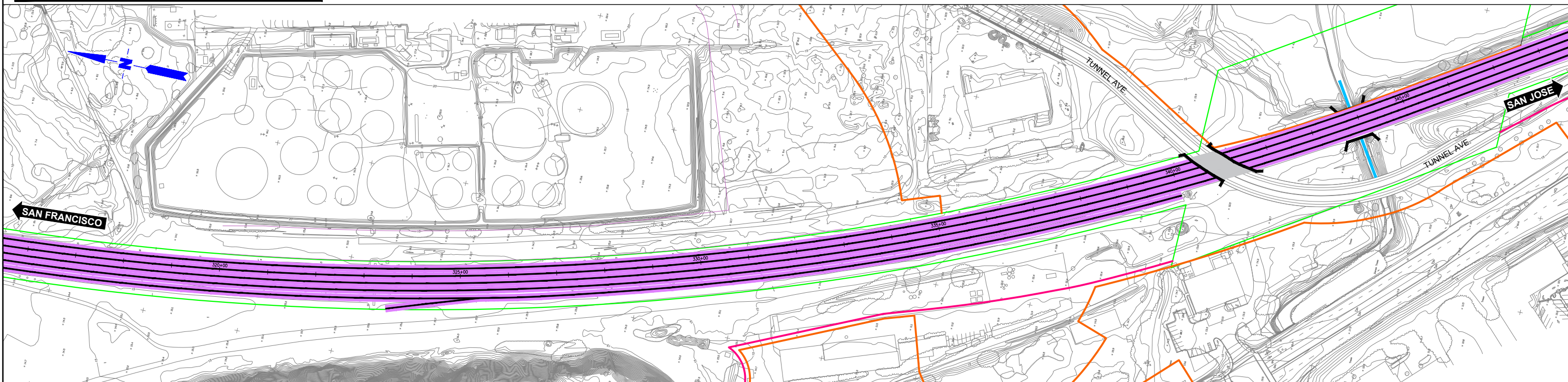
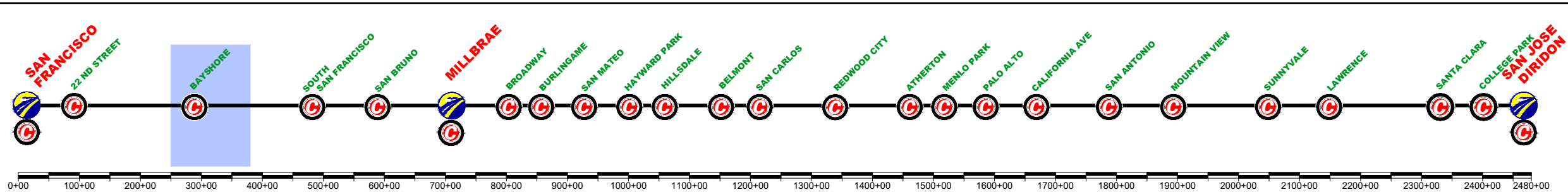
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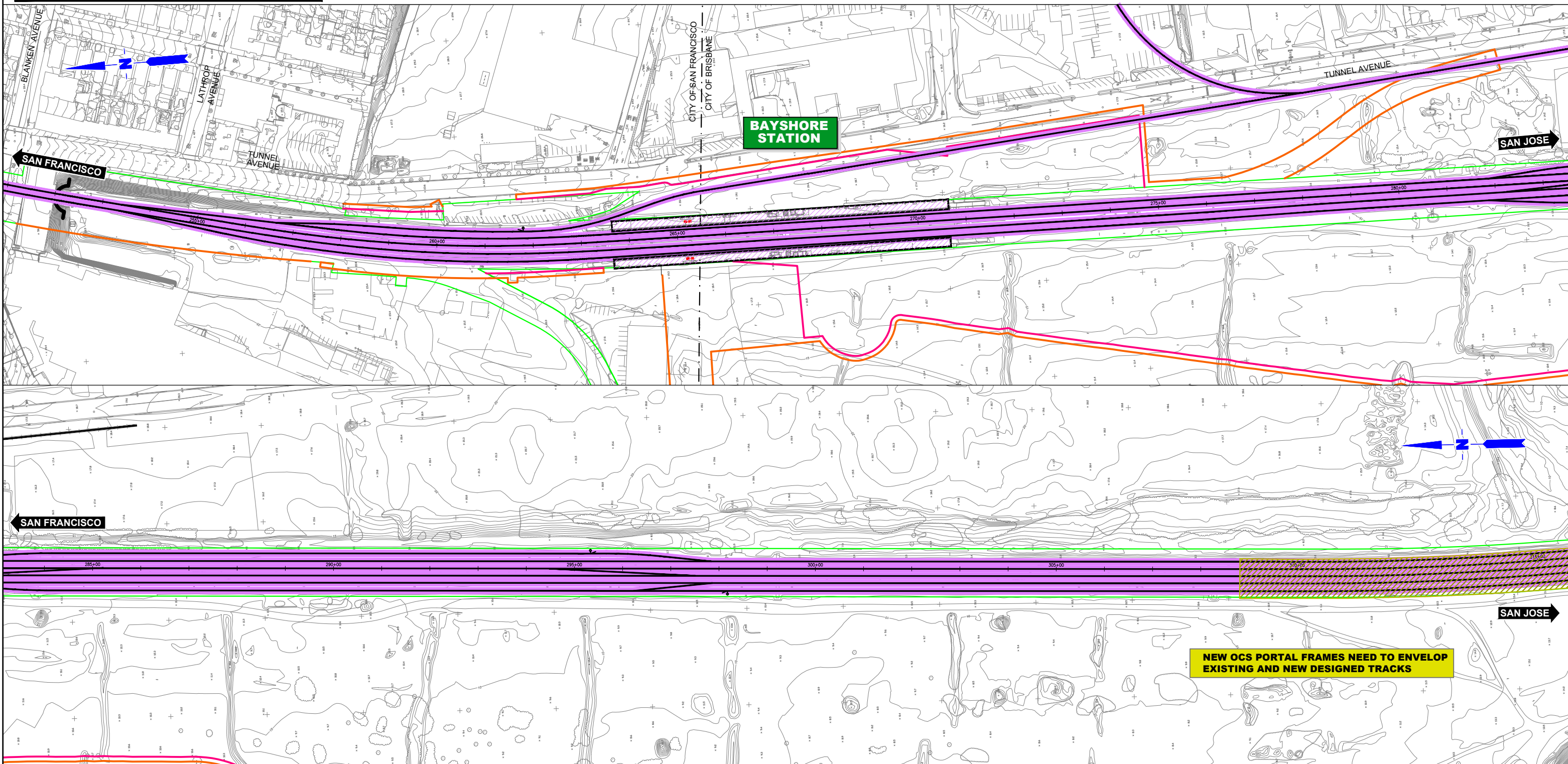
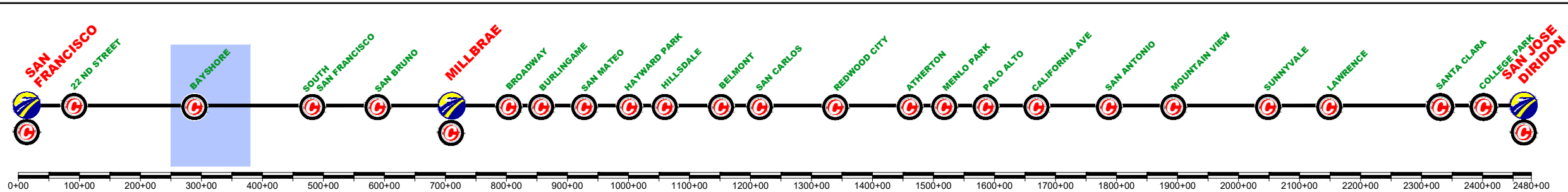
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	UNDER CONST + CIRCULATION T.		

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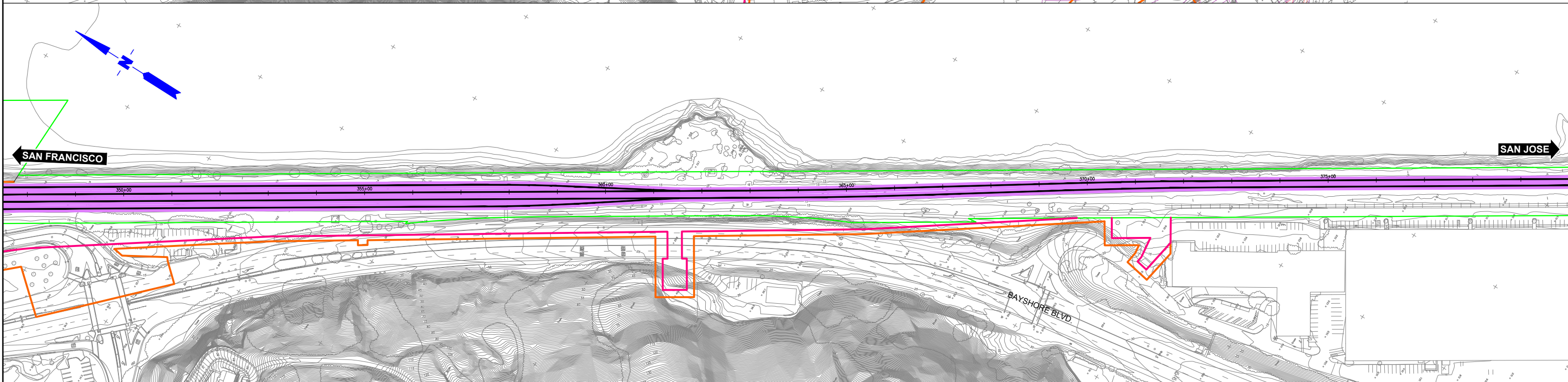
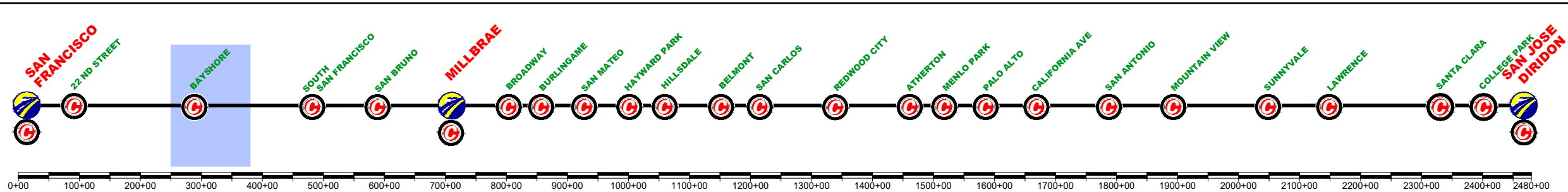
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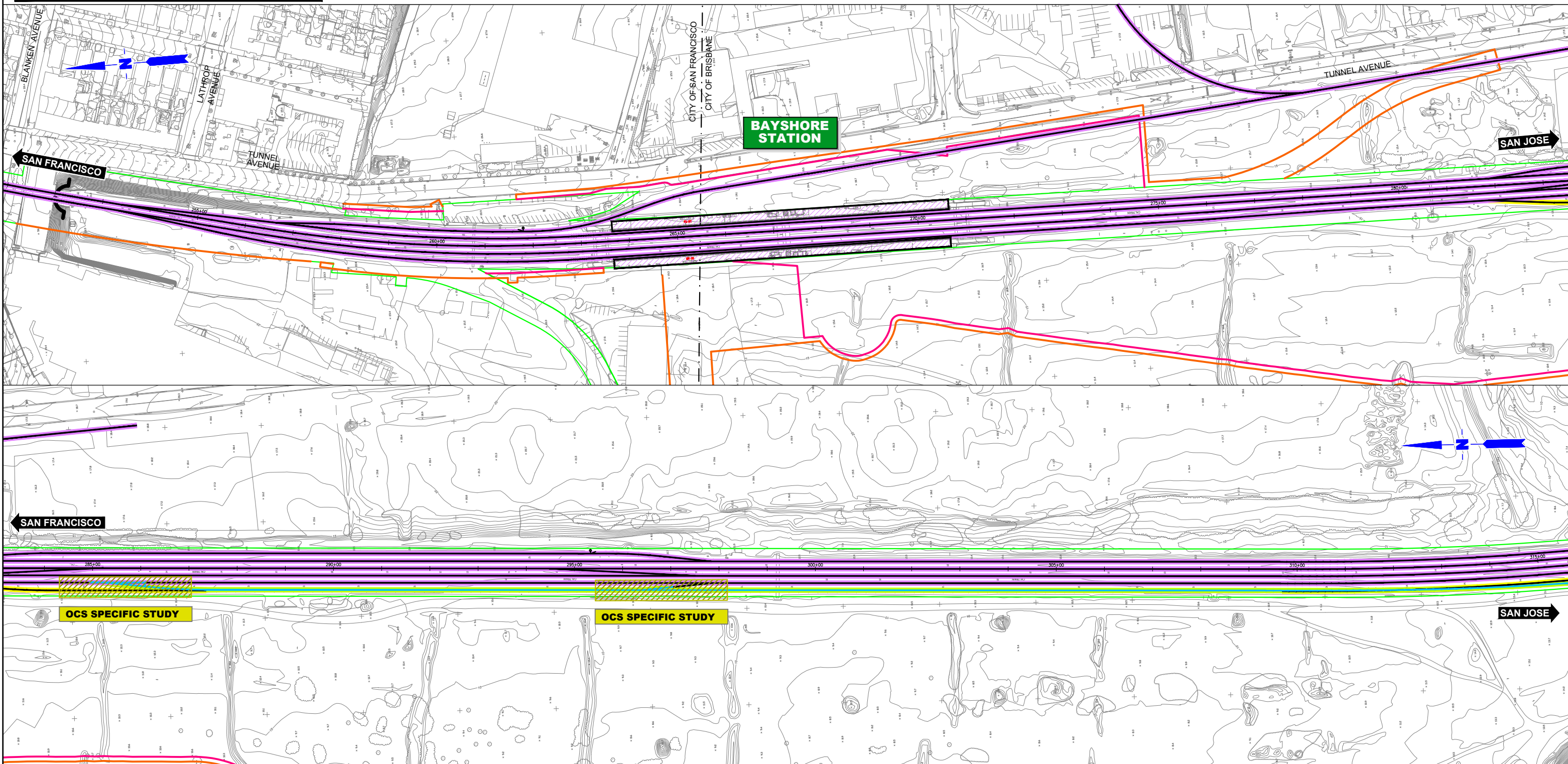
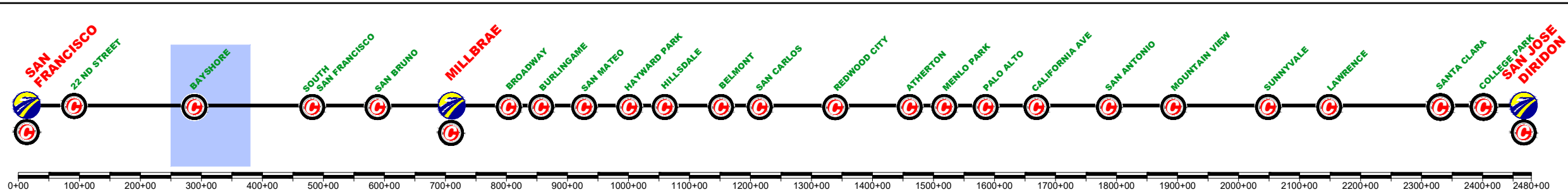
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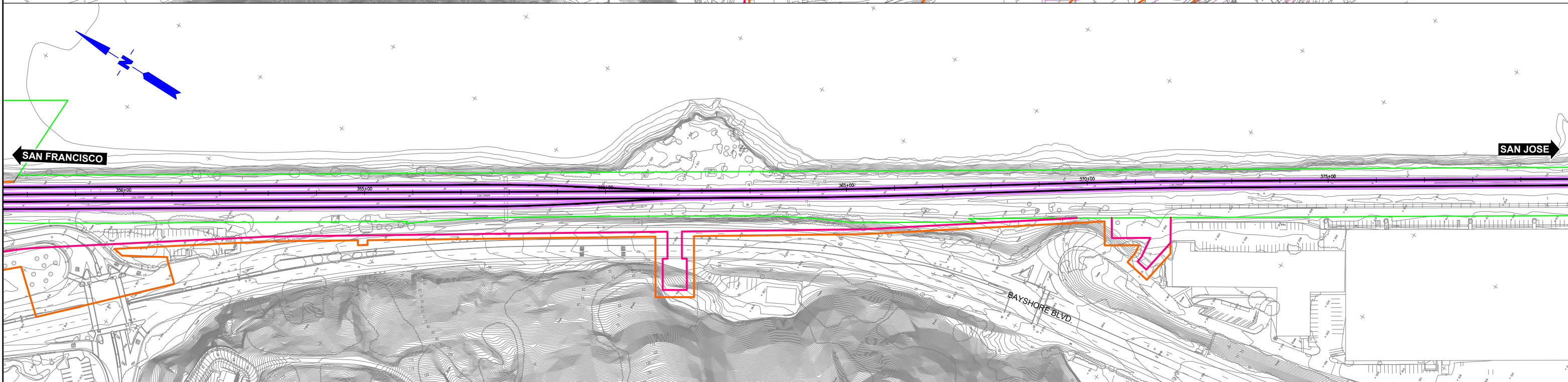
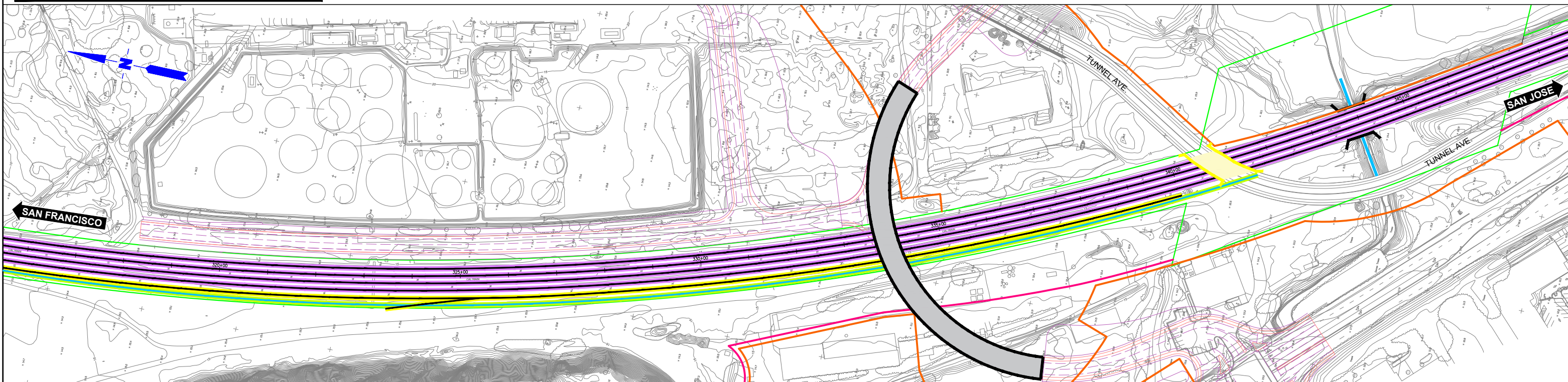
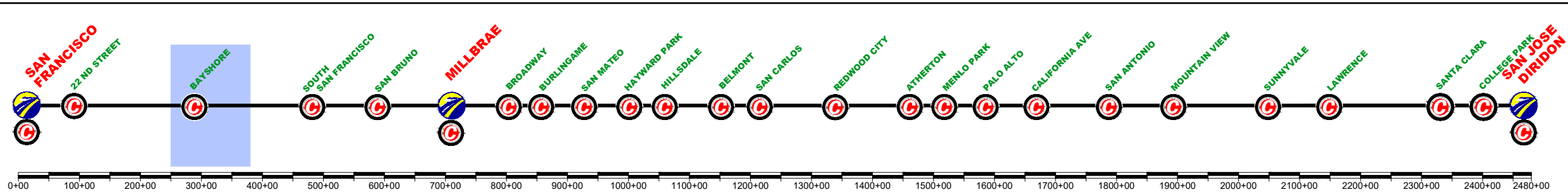
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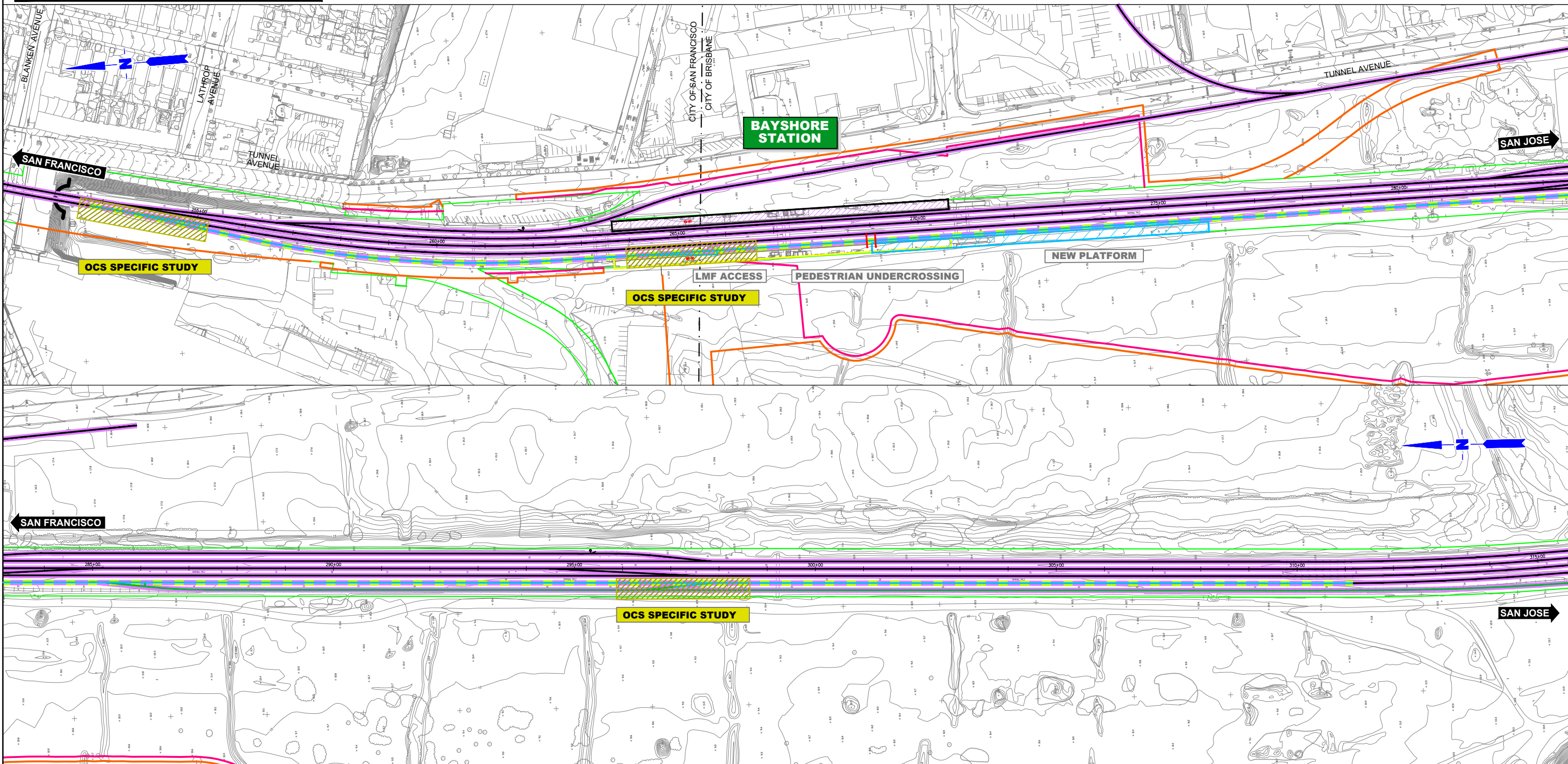
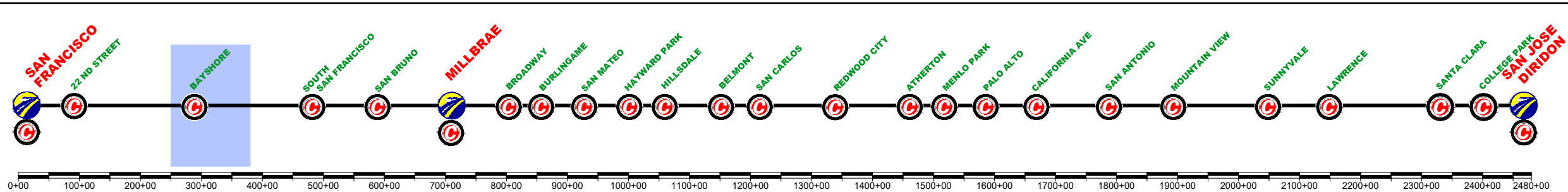
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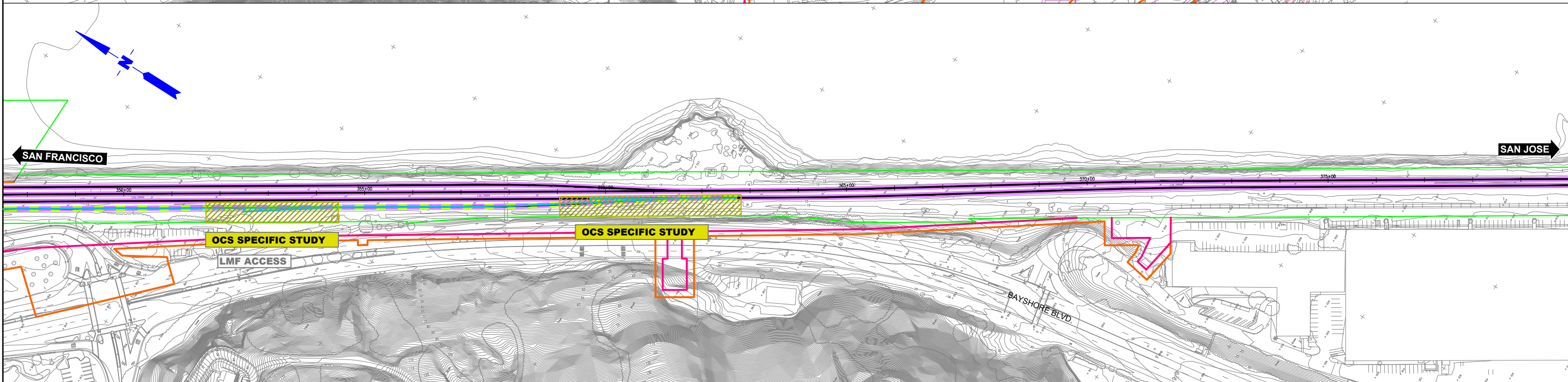
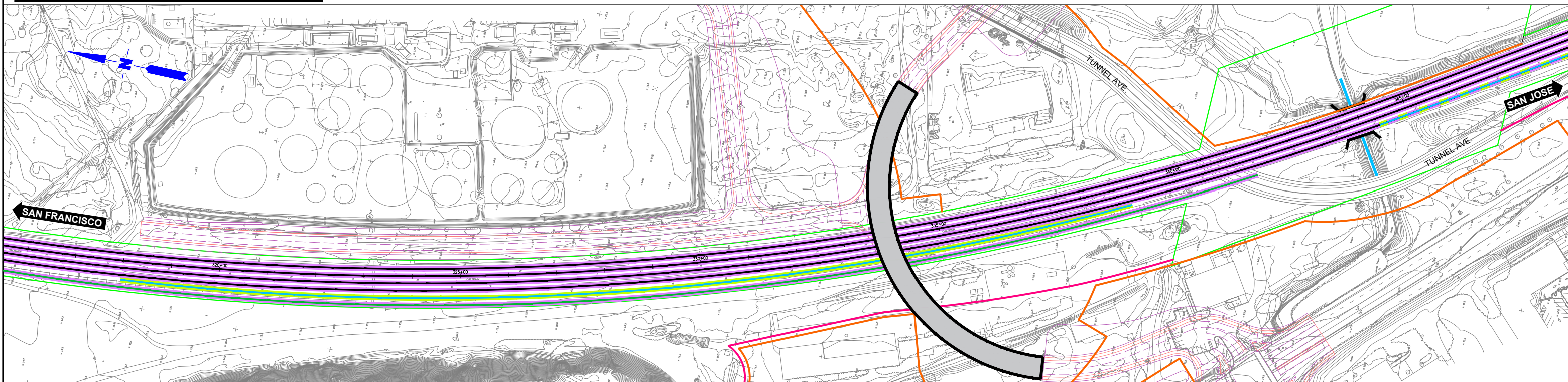
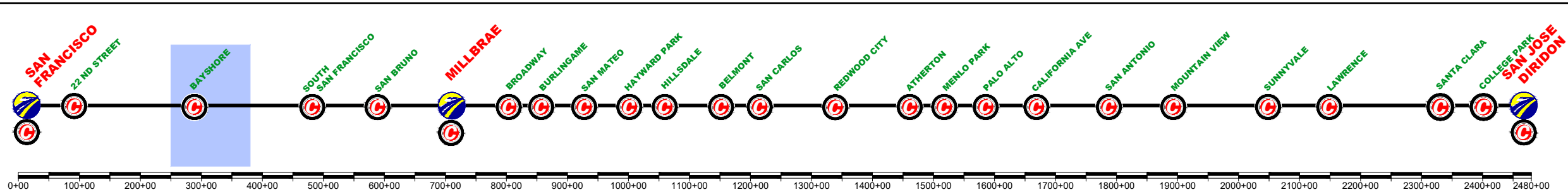
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	CREEK UNDERPASS		CURRENT ROW
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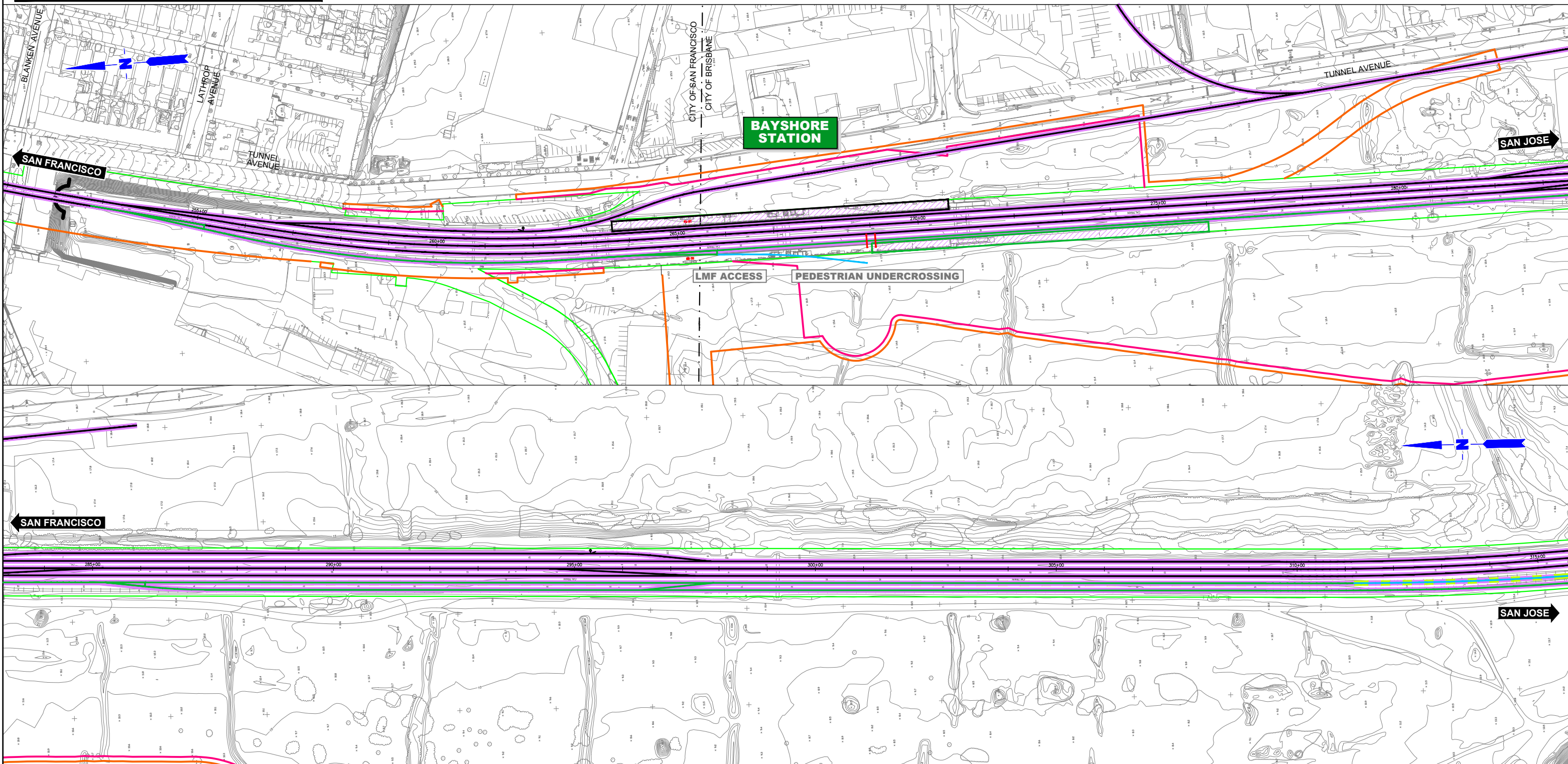
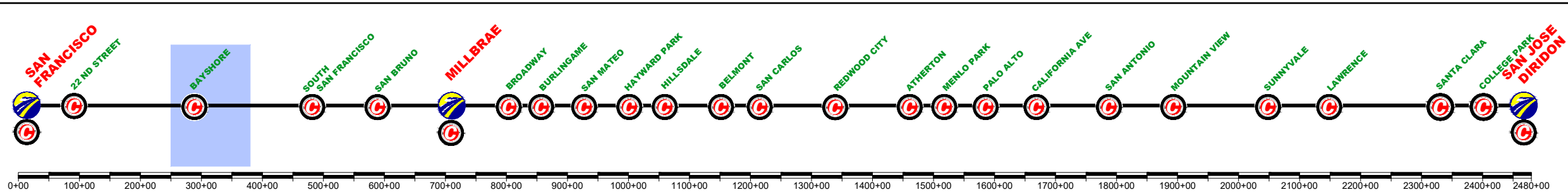
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SAN FRANCISCO TO SAN JOSE
BRISBANE LMF (WEST) ALTERNATIVE B
CONSTRUCTION PHASES
PLAN
PHASE 3

CONTRACT NO.	
DRAWING NO.	CV-11BRB-PH3-02
SCALE	NOT TO SCALE
SHEET NO.	2 OF 2

	CURRENT TRACK		TRACK REMOVAL
	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
			ROW



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REV	DATE	BY	SUB	APP	DESCRIPTION

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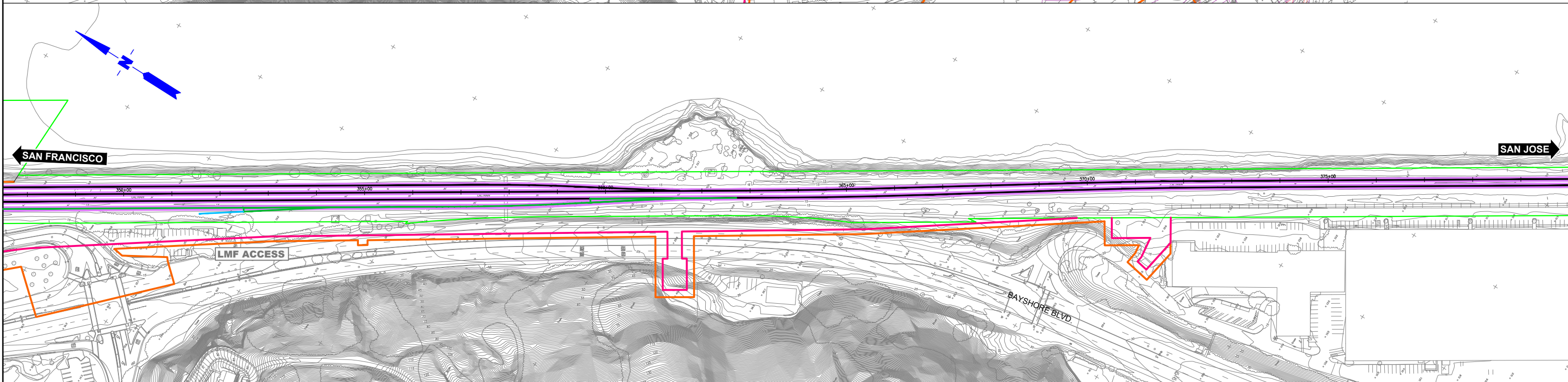
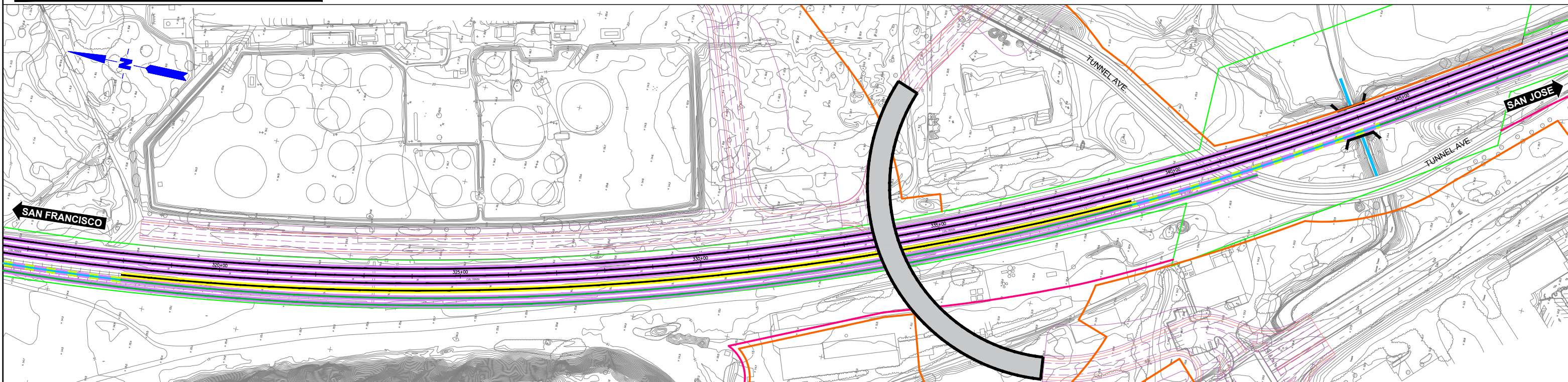
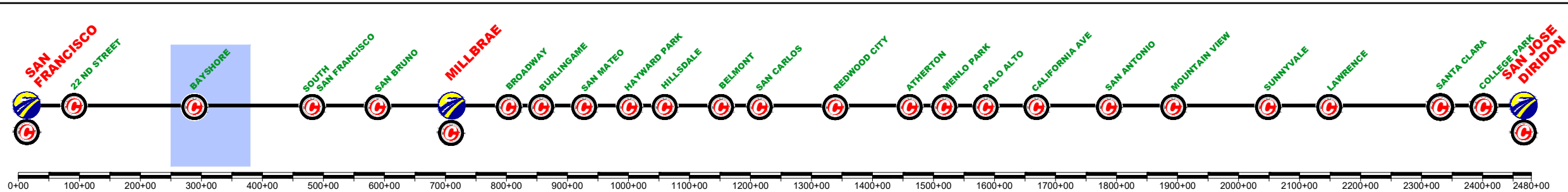
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SAN FRANCISCO TO SAN JOSE
BRISBANE LMF (WEST) ALTERNATIVE B
CONSTRUCTION PHASES
PLAN
PHASE 4

CONTRACT NO.	
DRAWING NO.	CV-11BRB-PH4-01
SCALE	NOT TO SCALE
SHEET NO.	1 OF 2

	CURRENT TRACK		TRACK REMOVAL
	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
			ROW



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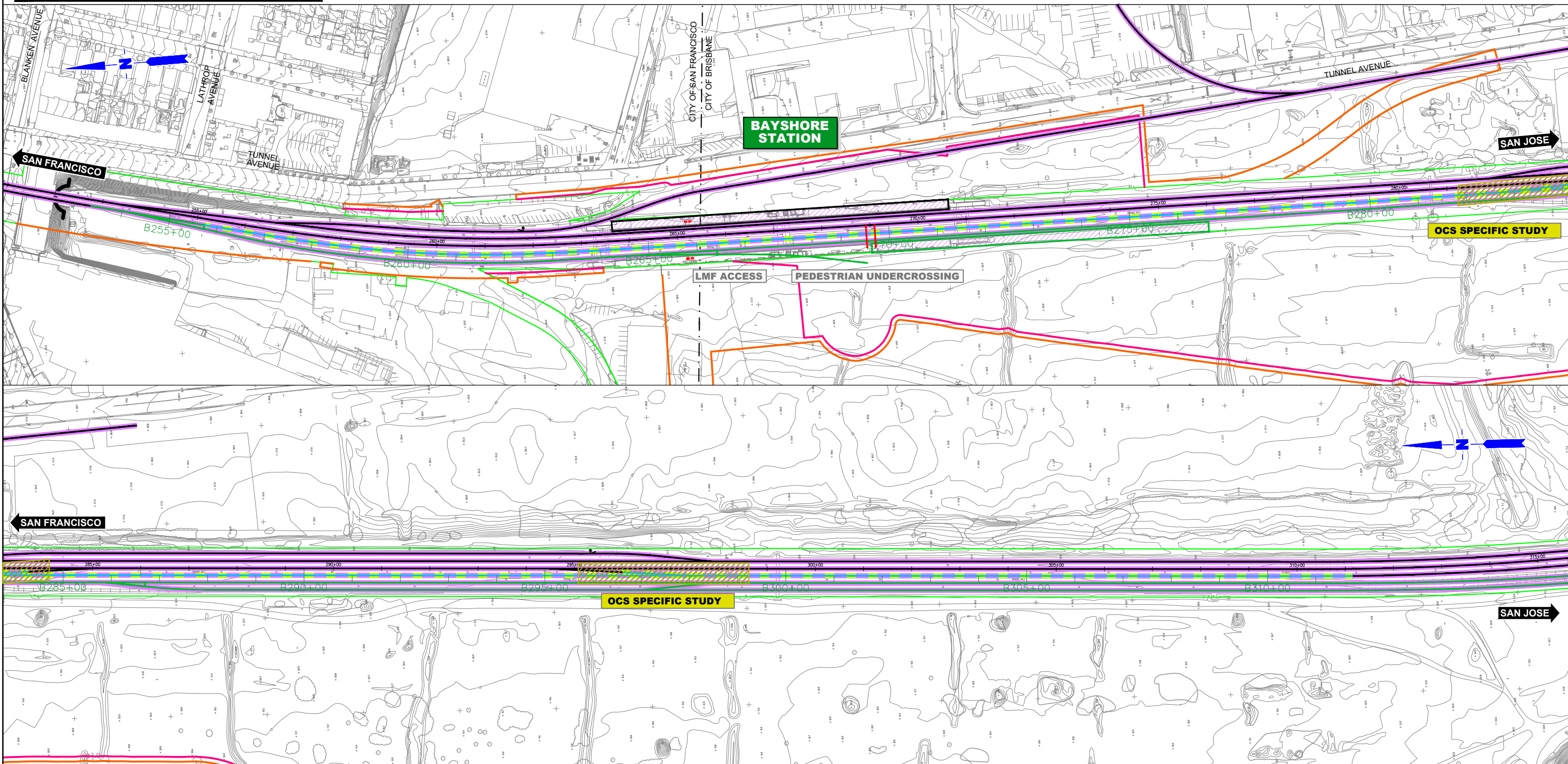
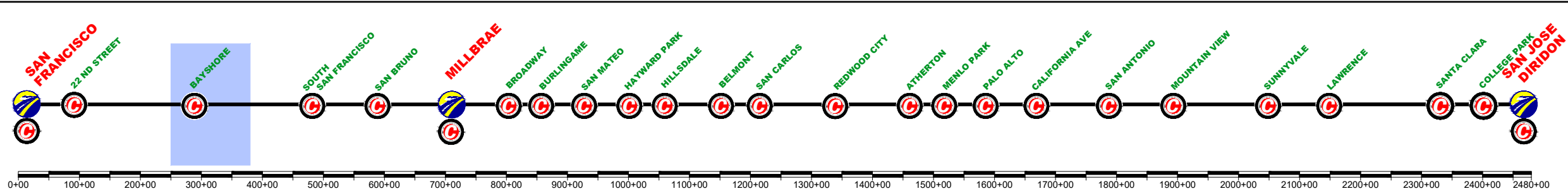
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SAN FRANCISCO TO SAN JOSE
BRISBANE LMF (WEST) ALTERNATIVE B
CONSTRUCTION PHASES
PLAN
PHASE 4

CONTRACT NO.
DRAWING NO.
CV-11BRB-PH4-02
SCALE
NOT TO SCALE
SHEET NO.
2 OF 2

	CURRENT TRACK		TRACK REMOVAL
	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
			ROW



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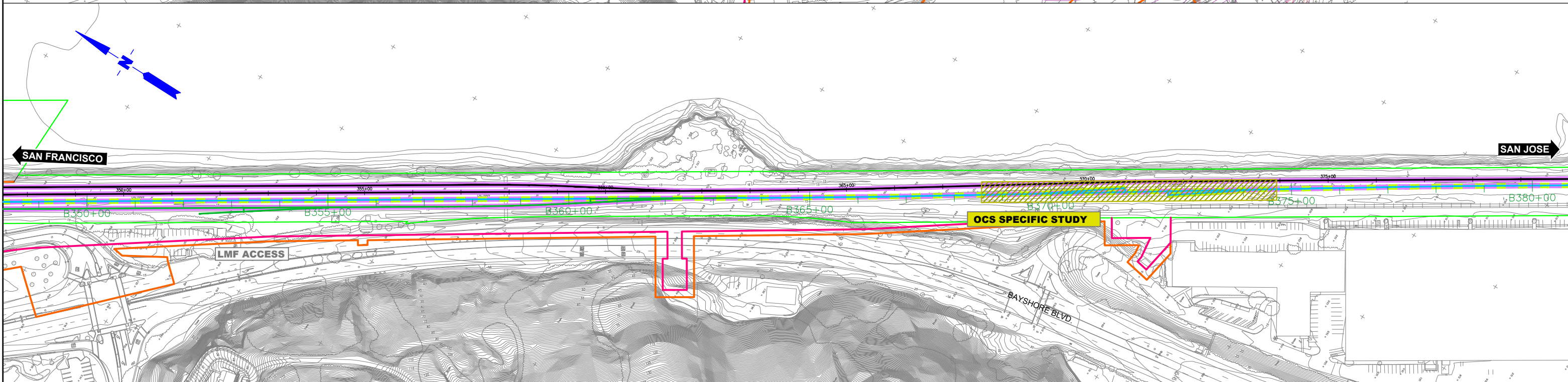
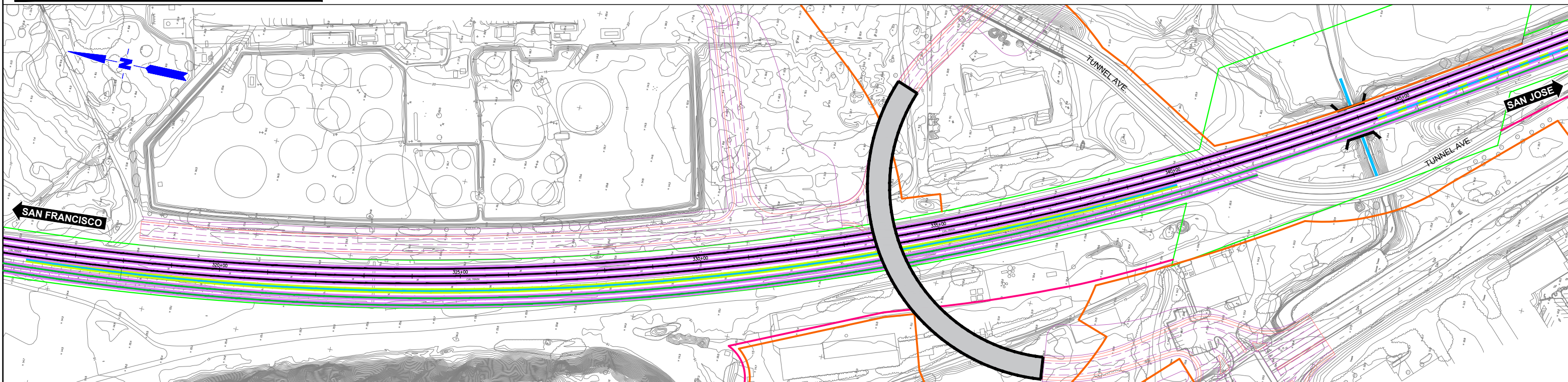
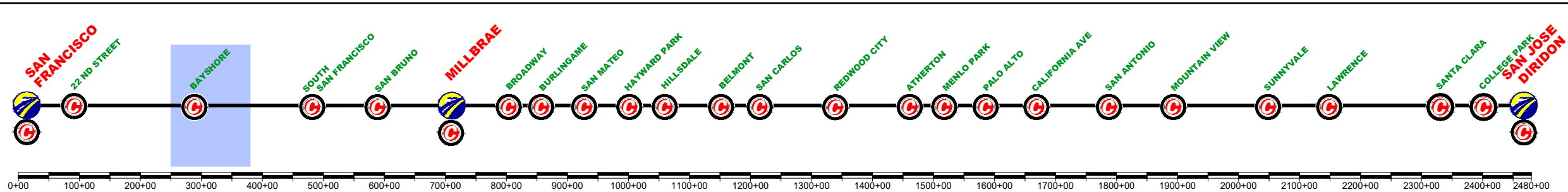
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SAN FRANCISCO TO SAN JOSE
BRISBANE LMF (WEST) ALTERNATIVE B
CONSTRUCTION PHASES
PLAN
PHASE 5

CONTRACT NO.	
DRAWING NO.	CV-11BRB-PH5-01
SCALE	NOT TO SCALE
SHEET NO.	1 OF 2

CURRENT TRACK	TRACK REMOVAL
PROVISIONAL TRACK	UNDER CONSTRUCTION
BUILT IN PREVIOUS PHASES	CIRCULATION TRACK
UNDER CONST + CIRCULATION T.	
OVERHEAD BRIDGE	TUNNEL
MAJOR UNDERPASS	GRADE CROSSING
CREEK UNDERPASS	CURRENT ROW
	TCE
	ROW



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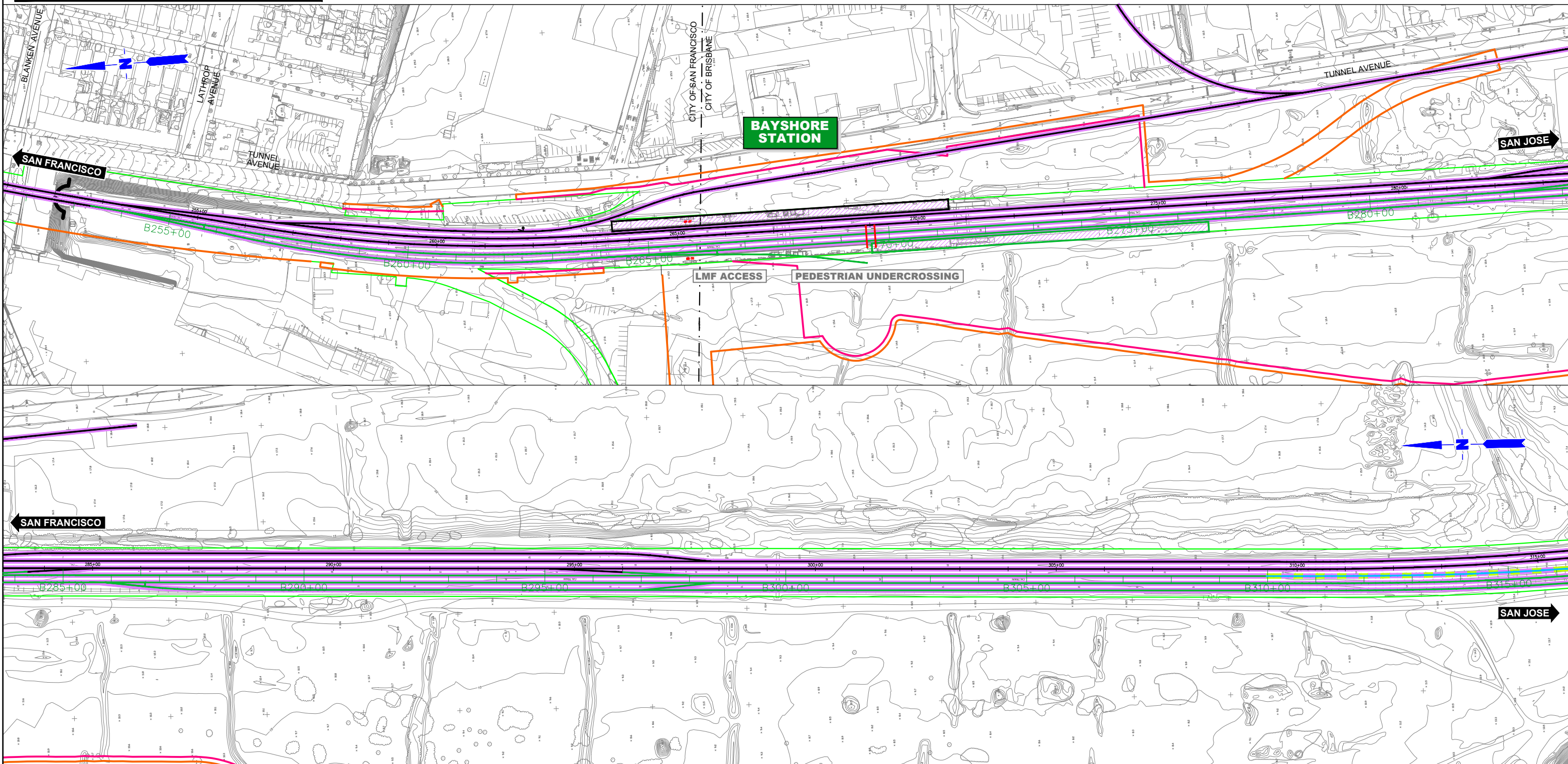
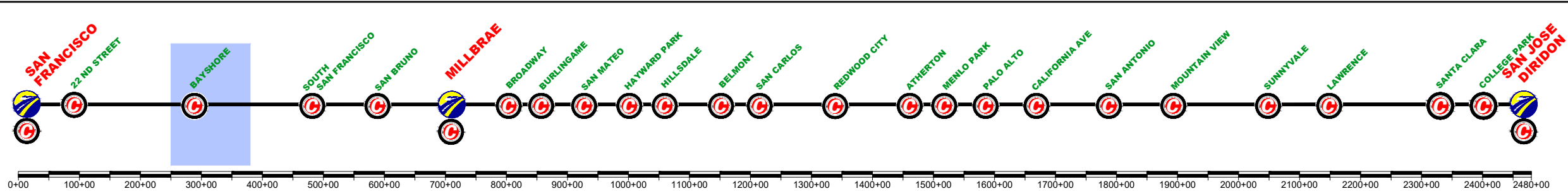
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BRISBANE LMF (WEST) ALTERNATIVE B
CONSTRUCTION PHASES
PLAN
PHASE 5

CONTRACT NO.	
DRAWING NO.	CV-11BRB-PH5-02
SCALE	NOT TO SCALE
SHEET NO.	2 OF 2

	CURRENT TRACK		TRACK REMOVAL
	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
			ROW



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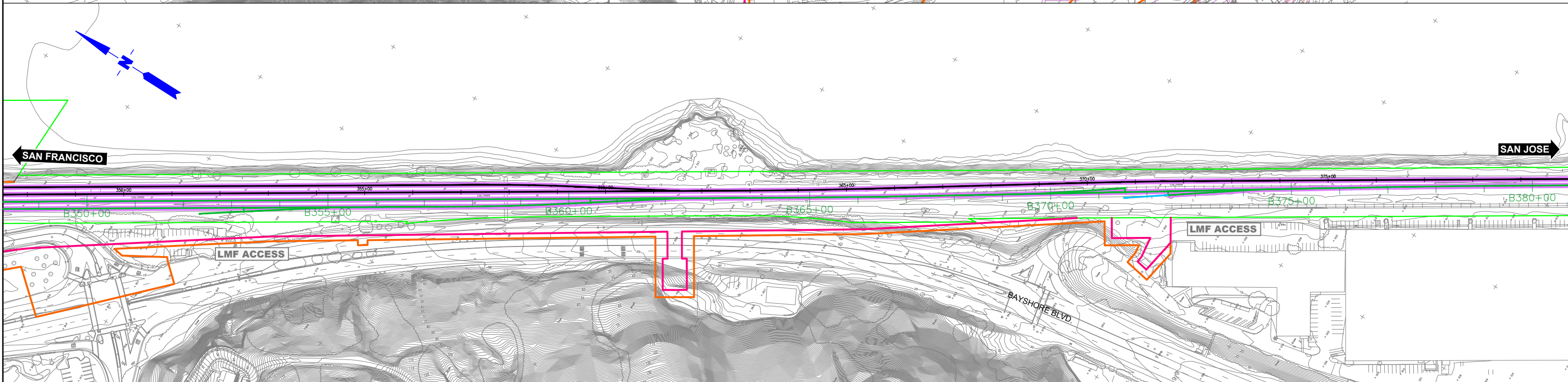
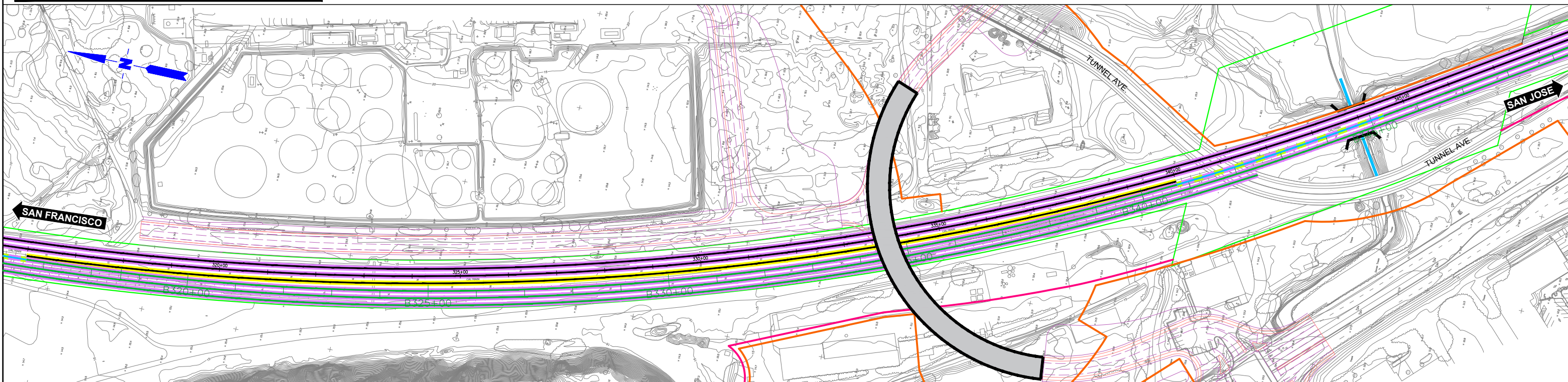
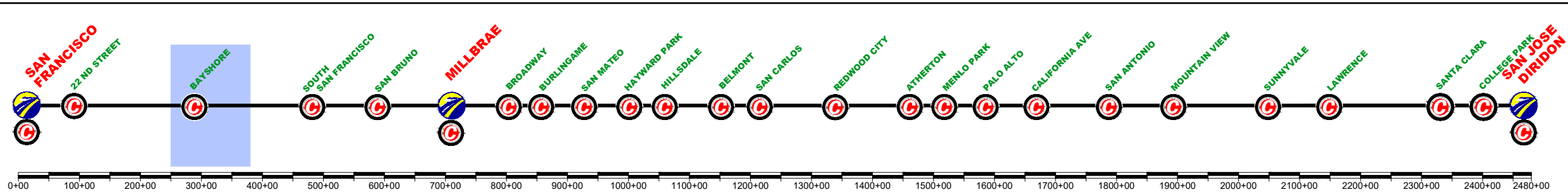
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BRISBANE LMF (WEST) ALTERNATIVE B
CONSTRUCTION PHASES
PLAN
PHASE 6

CONTRACT NO.	
DRAWING NO.	CV-11BRB-PH6-01
SCALE	NOT TO SCALE
SHEET NO.	1 OF 2

	CURRENT TRACK		TRACK REMOVAL
	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
			ROW



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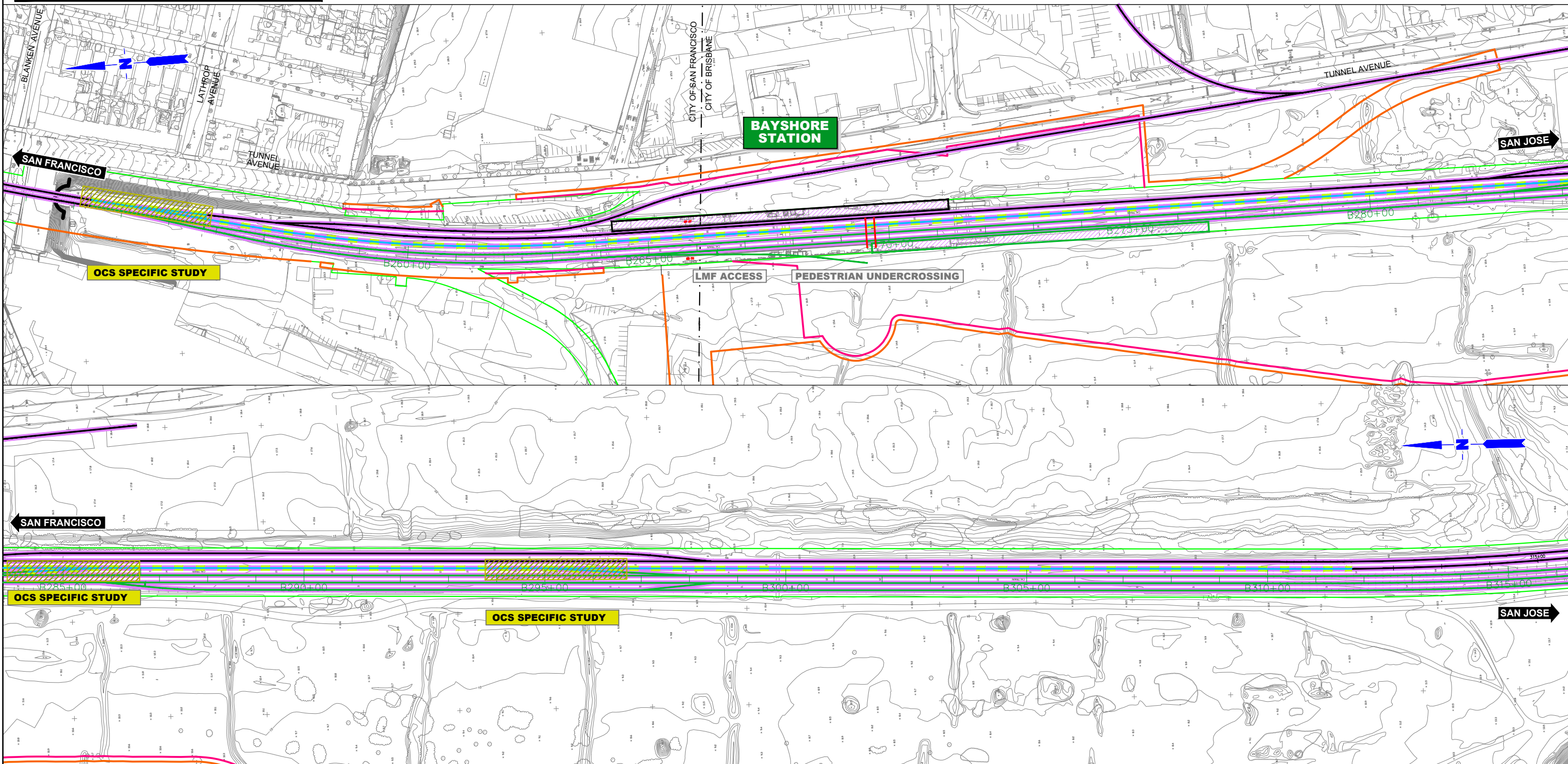
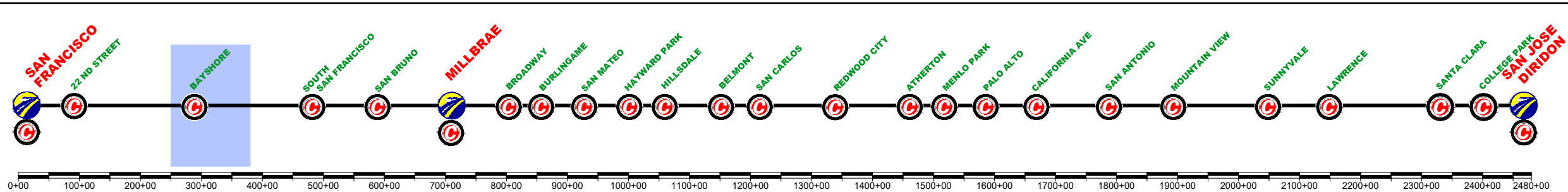
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PHASE 6

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SCALE
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SHEET NO.
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	CURRENT TRACK		TRACK REMOVAL
	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
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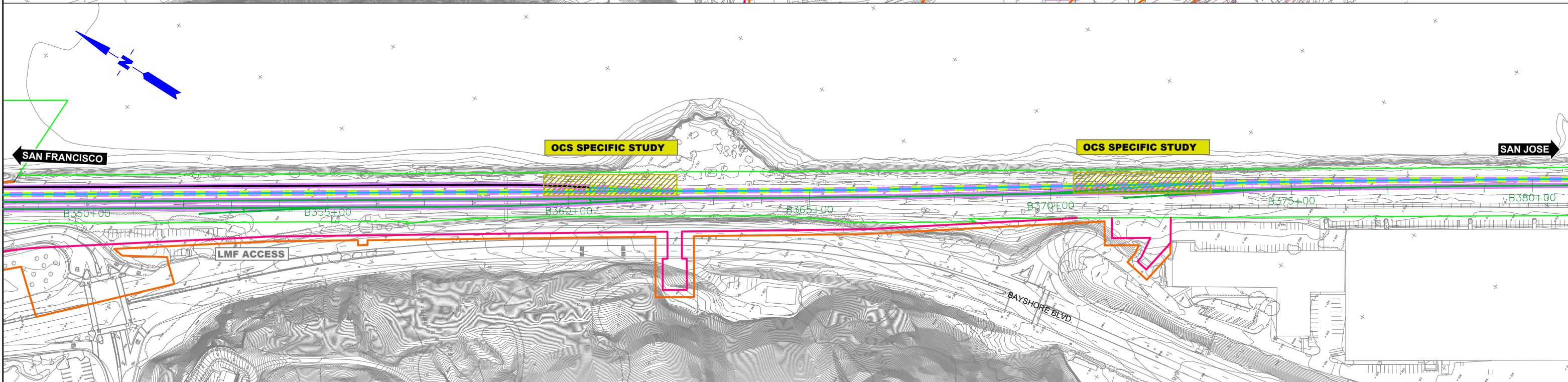
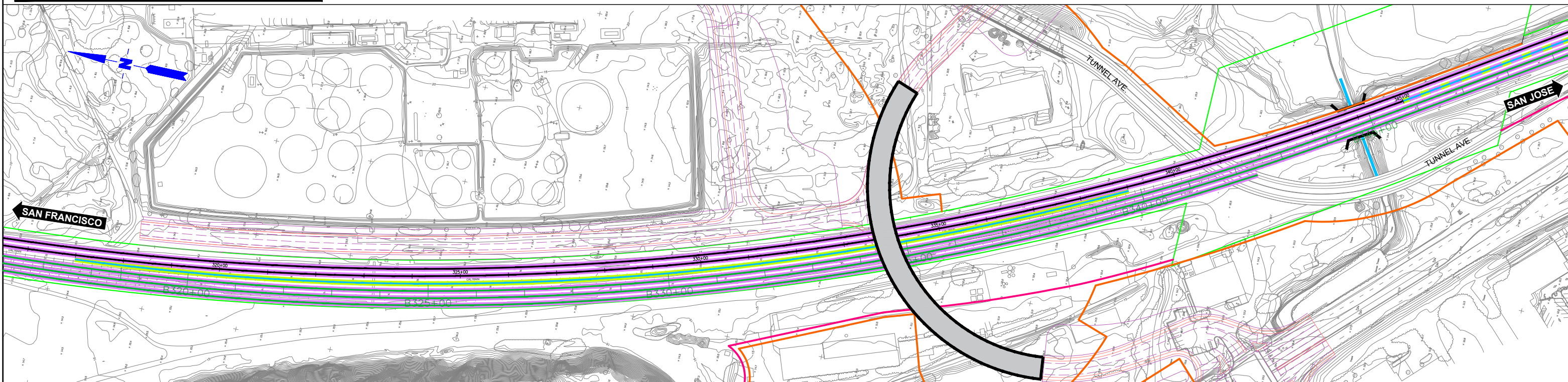
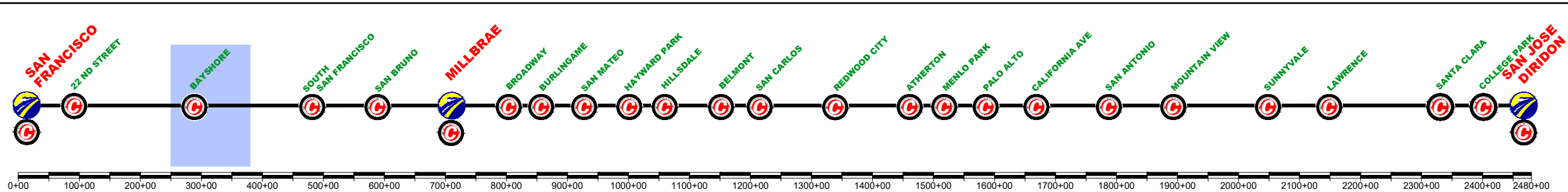
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SAN FRANCISCO TO SAN JOSE
BRISBANE LMF (WEST) ALTERNATIVE B
CONSTRUCTION PHASES
PLAN
PHASE 7

CONTRACT NO.	
DRAWING NO.	CV-11BRB-PH7-01
SCALE	NOT TO SCALE
SHEET NO.	1 OF 2

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	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
			ROW



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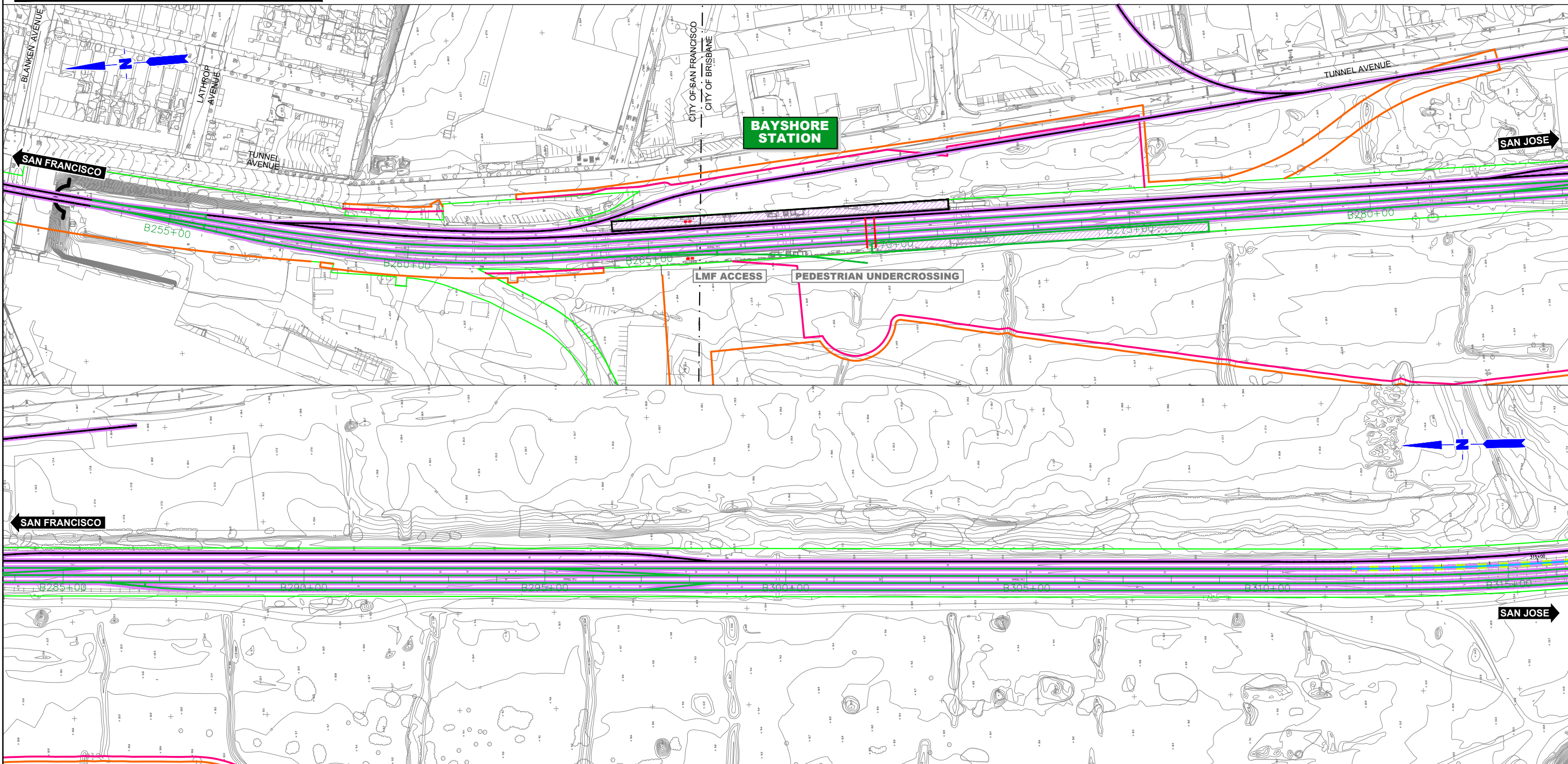
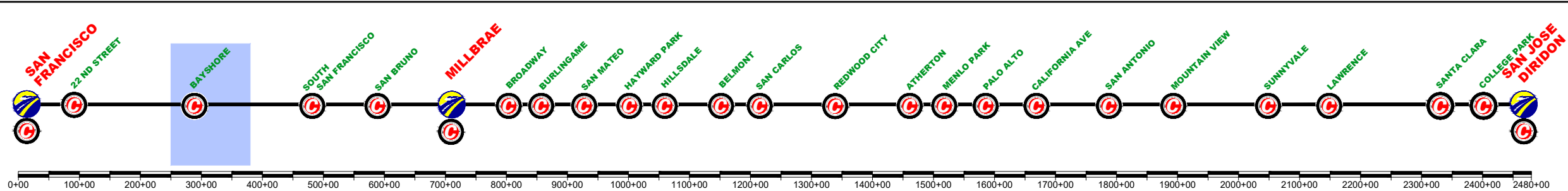
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SAN FRANCISCO TO SAN JOSE
BRISBANE LMF (WEST) ALTERNATIVE B
CONSTRUCTION PHASES
PLAN
PHASE 7

CONTRACT NO.
DRAWING NO.
CV-11BRB-PH7-02
SCALE
NOT TO SCALE
SHEET NO.
2 OF 2

	CURRENT TRACK		TRACK REMOVAL
	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
			ROW



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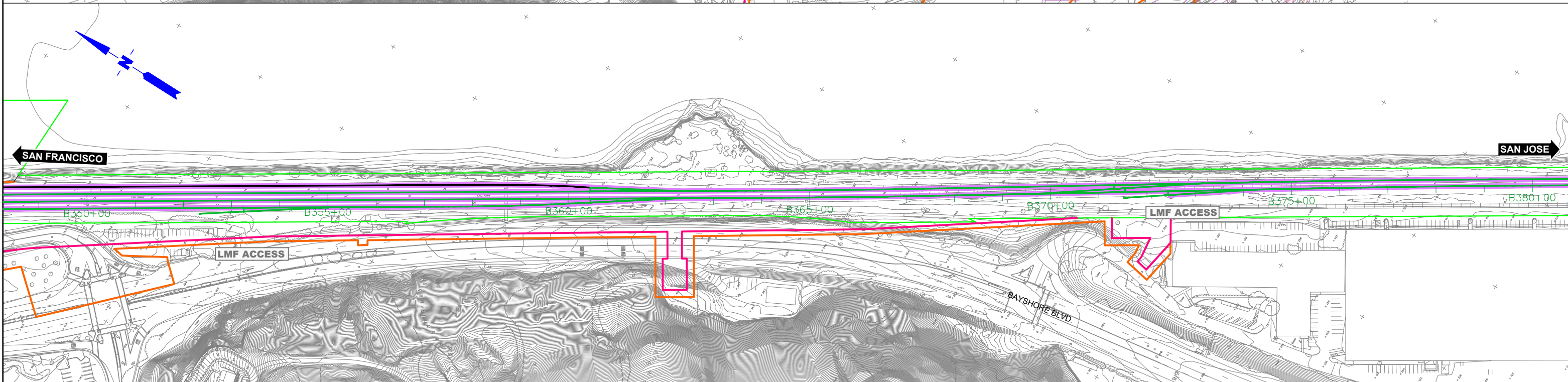
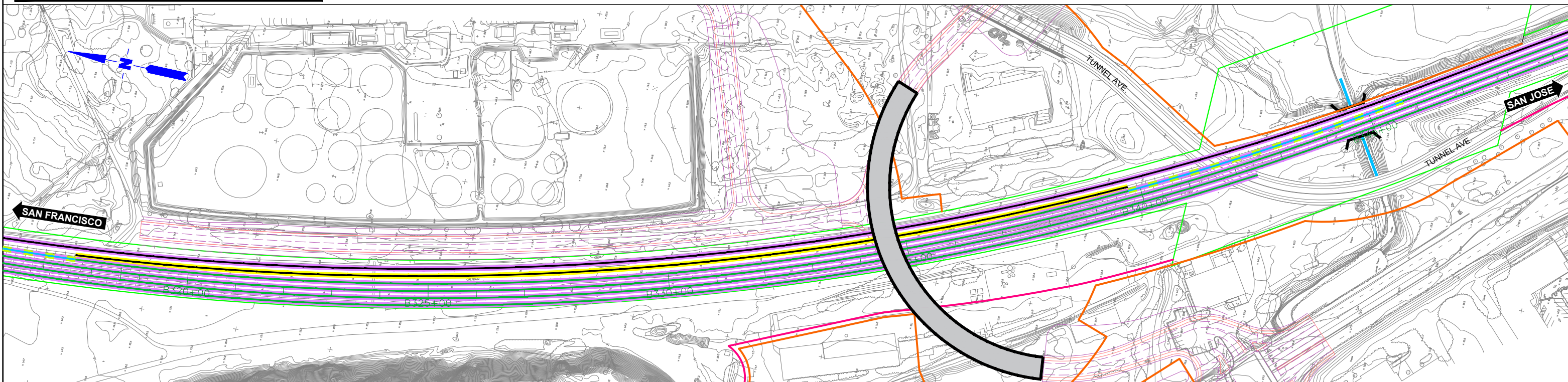
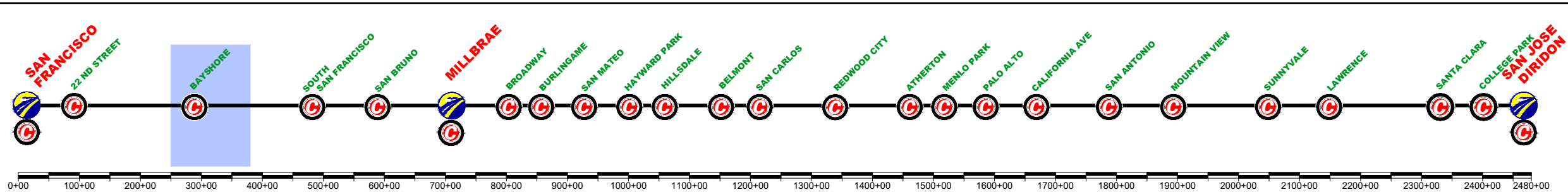
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BRISBANE LMF (WEST) ALTERNATIVE B
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PLAN
PHASE 8

CONTRACT NO.	
DRAWING NO.	CV-11BRB-PH8-01
SCALE	NOT TO SCALE
SHEET NO.	1 OF 2

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	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
			ROW



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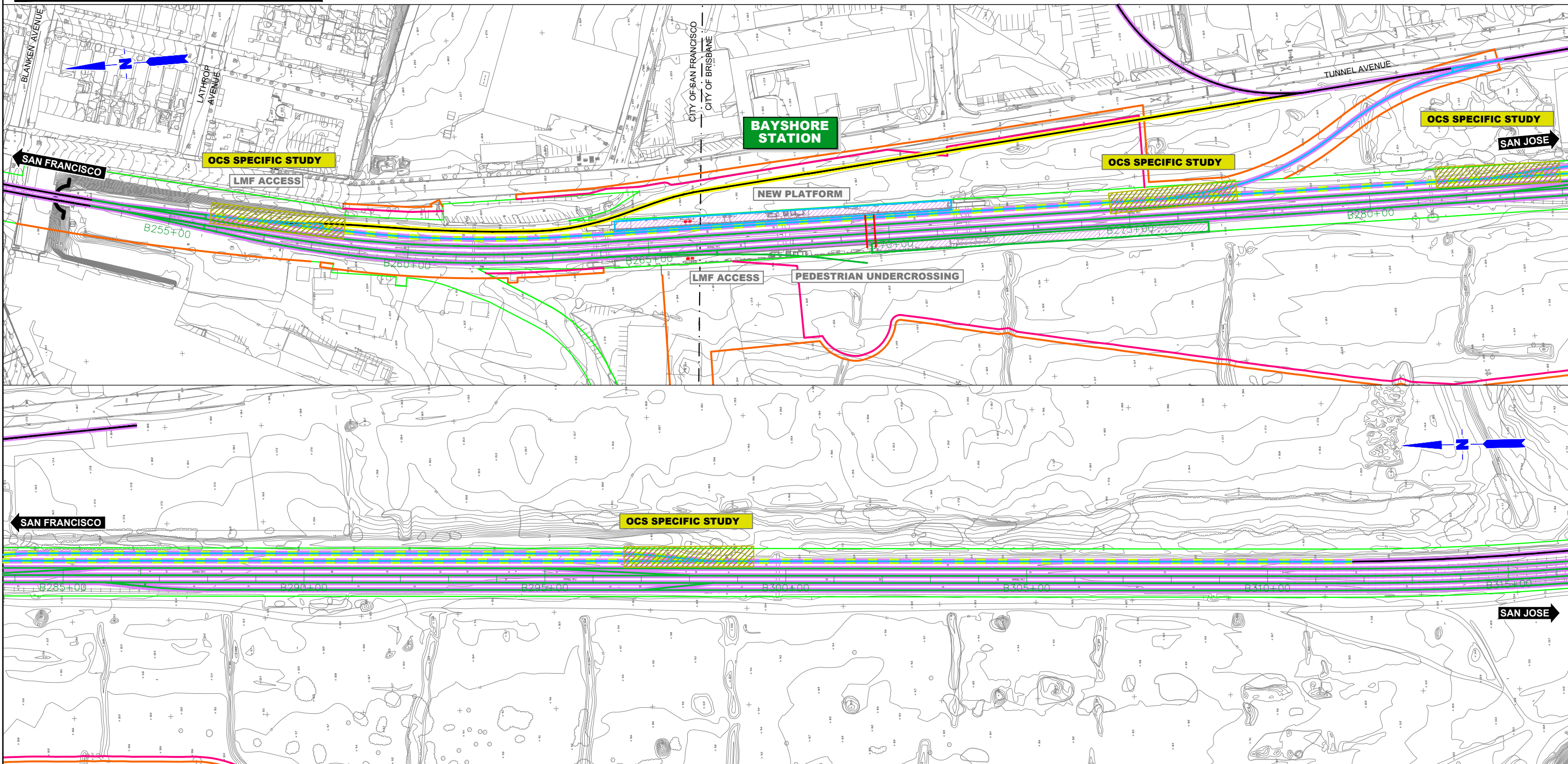
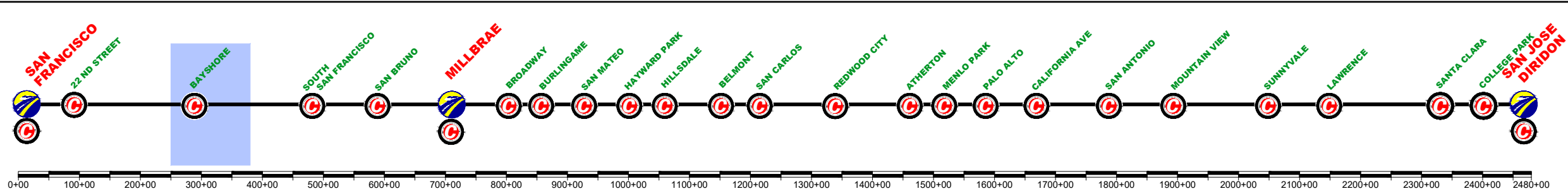
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PLAN
PHASE 8

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SCALE
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SHEET NO.
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	CURRENT TRACK		TRACK REMOVAL
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	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
			ROW



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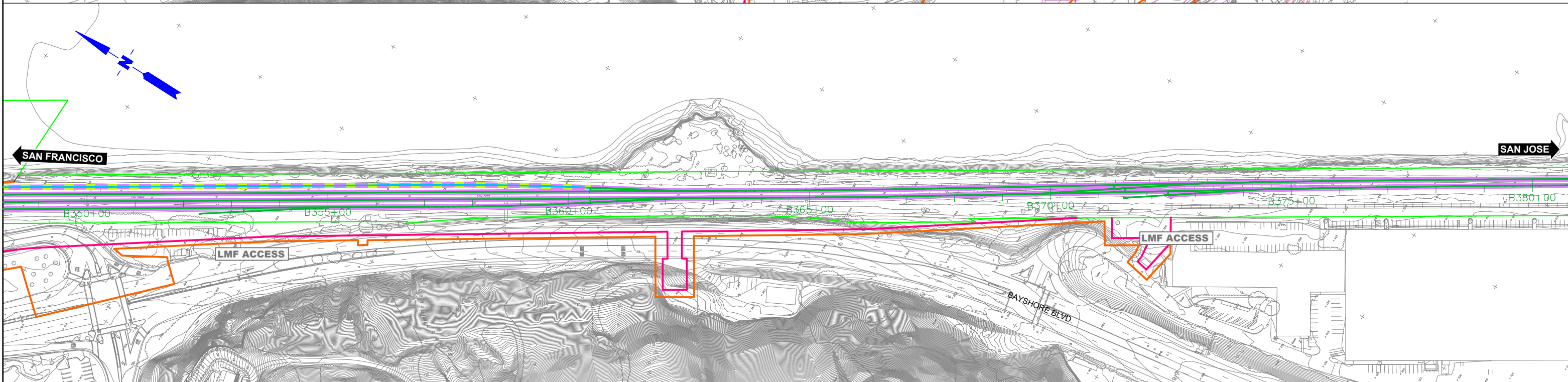
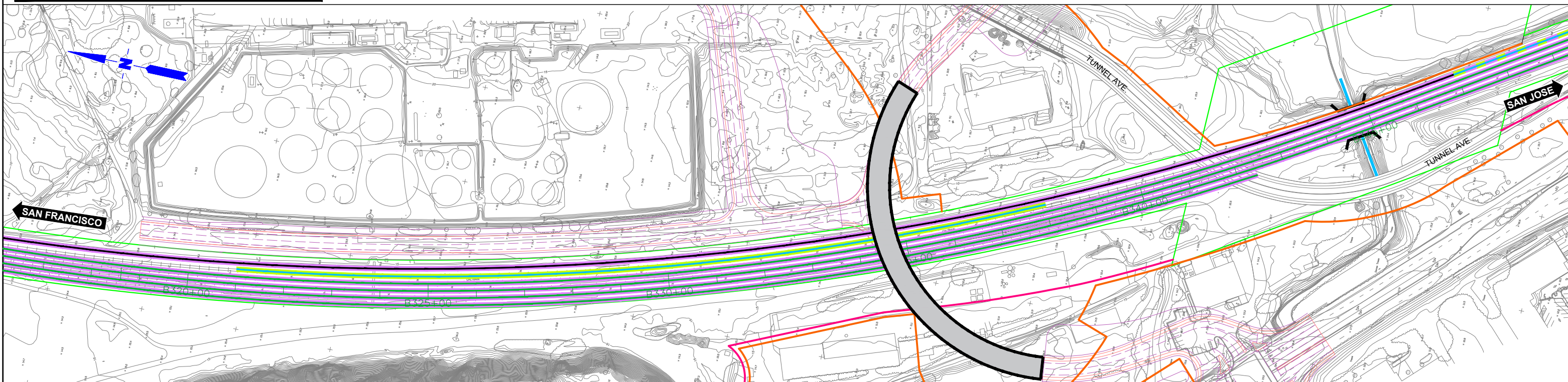
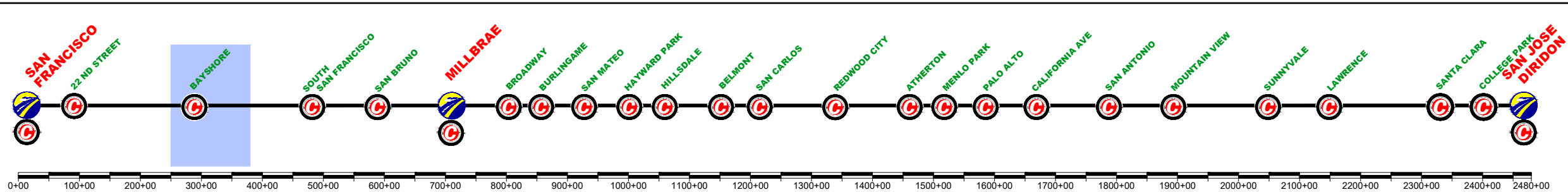
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CONSTRUCTION PHASES
PLAN
PHASE 9

CONTRACT NO.	
DRAWING NO.	CV-11BRB-PH9-01
SCALE	NOT TO SCALE
SHEET NO.	1 OF 2

	CURRENT TRACK		TRACK REMOVAL
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	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
			TCE
			ROW



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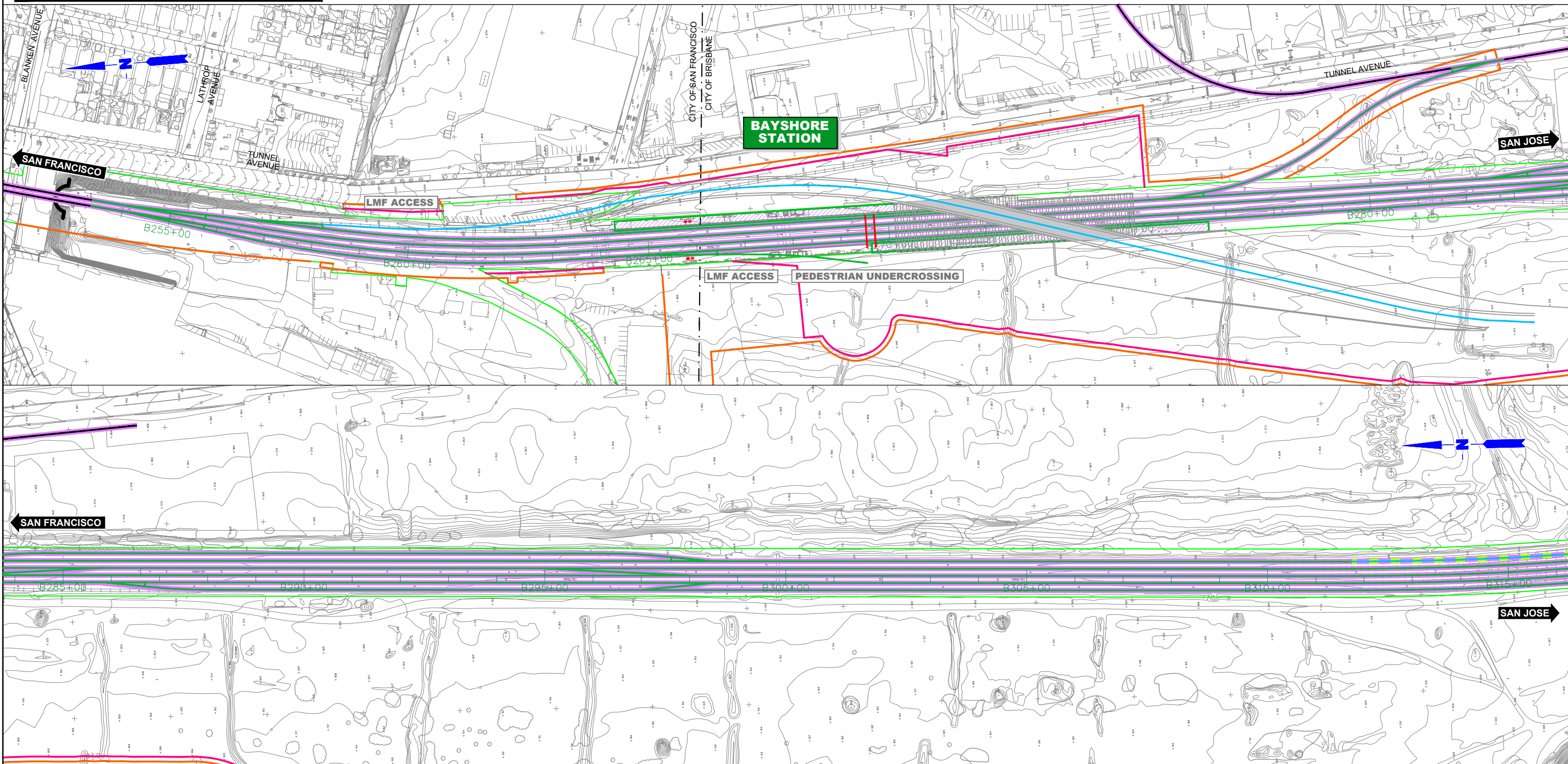
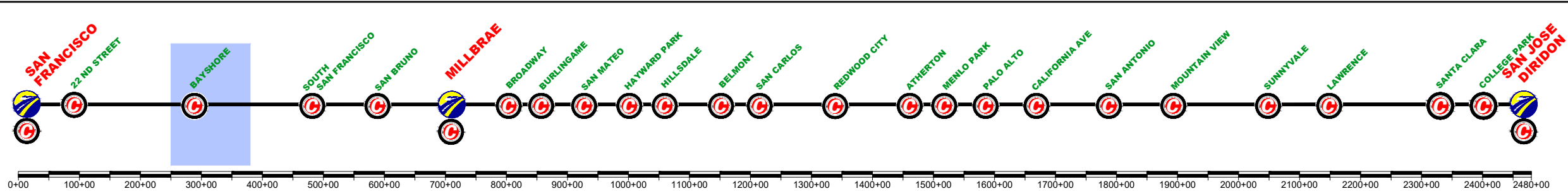
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PLAN
PHASE 9

CONTRACT NO.
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CV-11BRB-PH9-02
SCALE
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SHEET NO.
2 OF 2

	CURRENT TRACK		TRACK REMOVAL
	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
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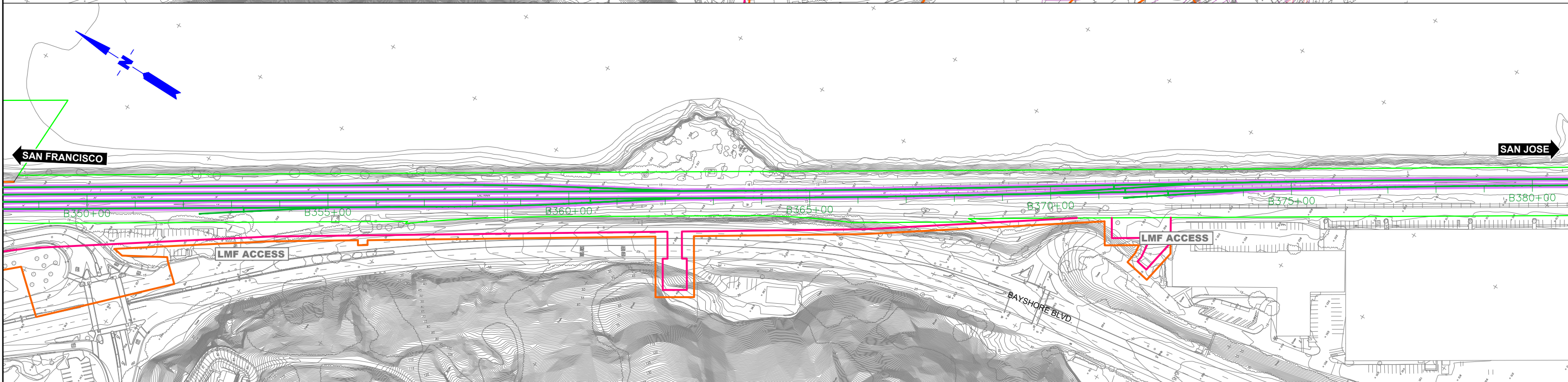
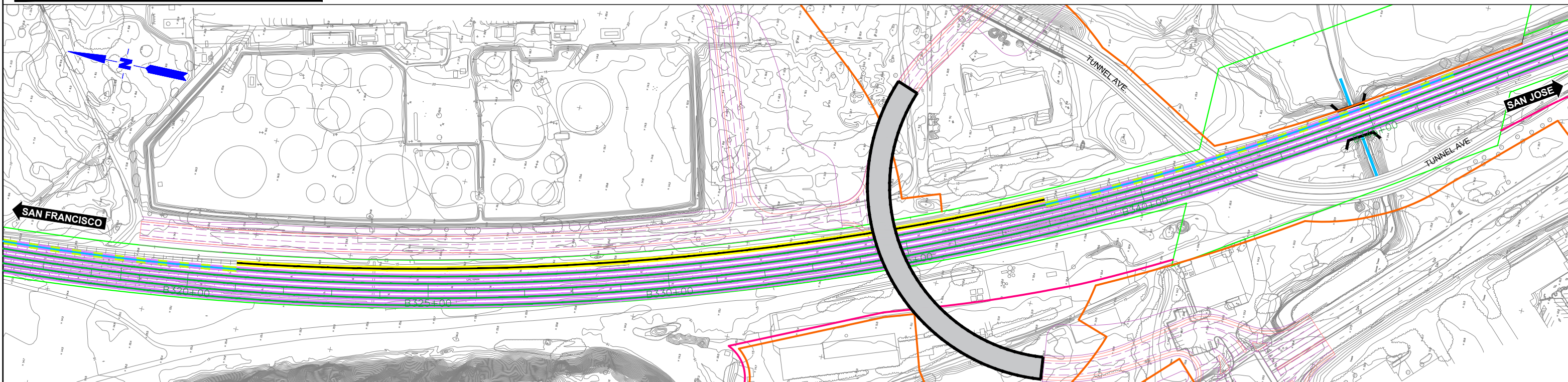
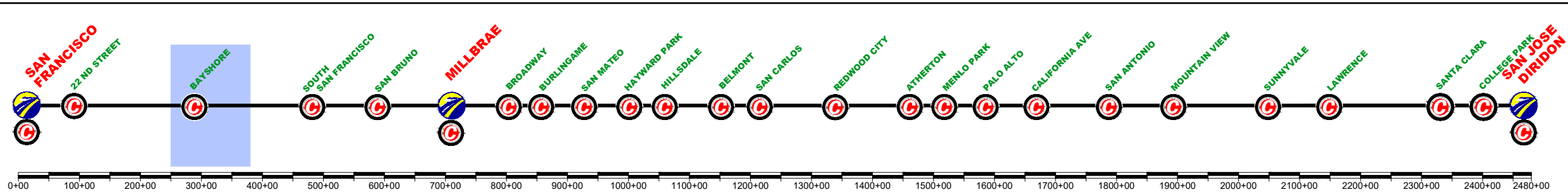
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CONSTRUCTION PHASES
PLAN
PHASE 10

CONTRACT NO.	
DRAWING NO.	CV-11BRB-PH10-01
SCALE	NOT TO SCALE
SHEET NO.	1 OF 2

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	PROVISIONAL TRACK		UNDER CONSTRUCTION
	BUILT IN PREVIOUS PHASES		CIRCULATION TRACK
	UNDER CONST + CIRCULATION T.		

	OVERHEAD BRIDGE		TUNNEL
	MAJOR UNDERPASS		GRADE CROSSING
	CREEK UNDERPASS		CURRENT ROW
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CALIFORNIA HIGH-SPEED TRAIN PROJECT
SAN FRANCISCO TO SAN JOSE
BRISBANE LMF (WEST) ALTERNATIVE B
CONSTRUCTION PHASES
PLAN
PHASE 10

CONTRACT NO.
DRAWING NO.
CV-11BRB-PH10-02
SCALE
NOT TO SCALE
SHEET NO.
2 OF 2