Communications Based Train Control Update

October 12, 2023 | BART Board of Directors Meeting

Overview

Legacy Train Control 01

Benefits of CBTC 02

Wayside Progress 03

Software/Hardware Progress 04

Vehicles Progress 05

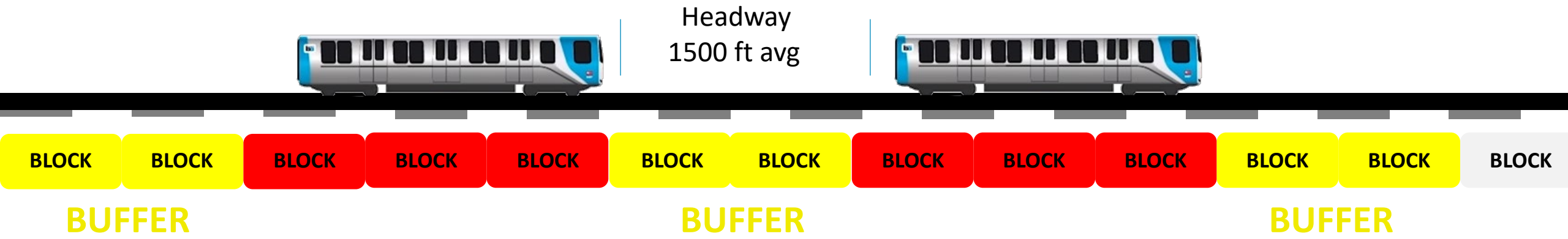
Current Status 06

Legacy Train Control

Fixed-block signaling system

Animation Slide

Limitations of Current Fixed-Block Train Control



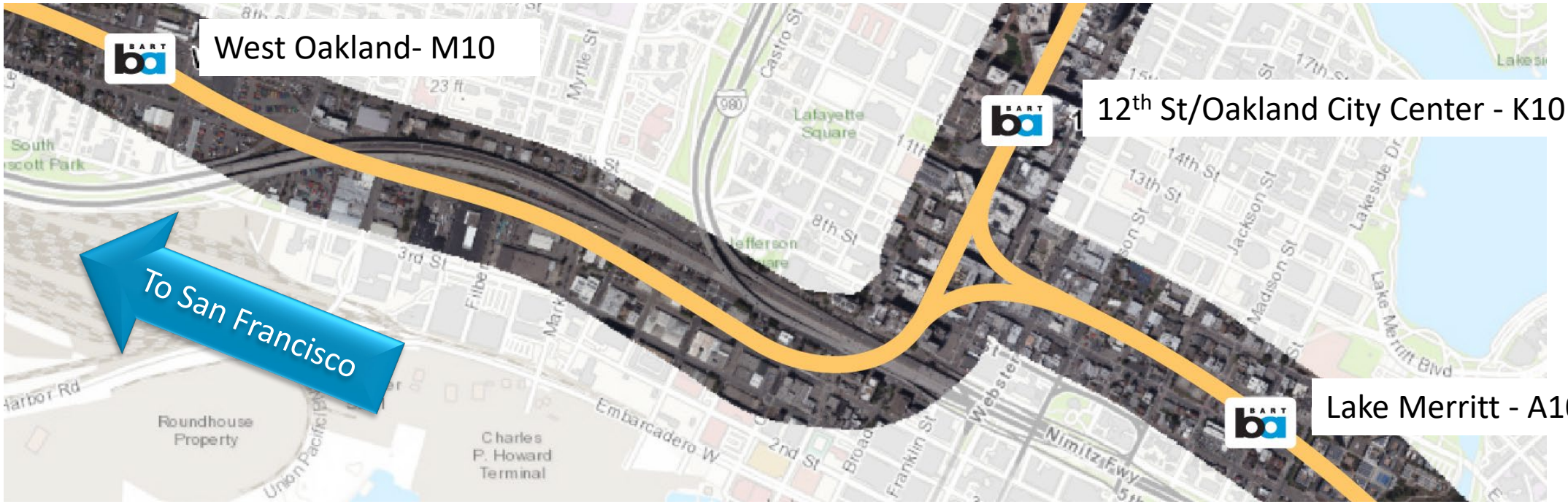
Speed and Throughput

- Fixed Speeds Within Track Circuit 27, 36, 50, 70, 80 mph
- Headway Limited Between Trains Avg 1500ft
- Delays from Incidents Unrecoverable

Physical

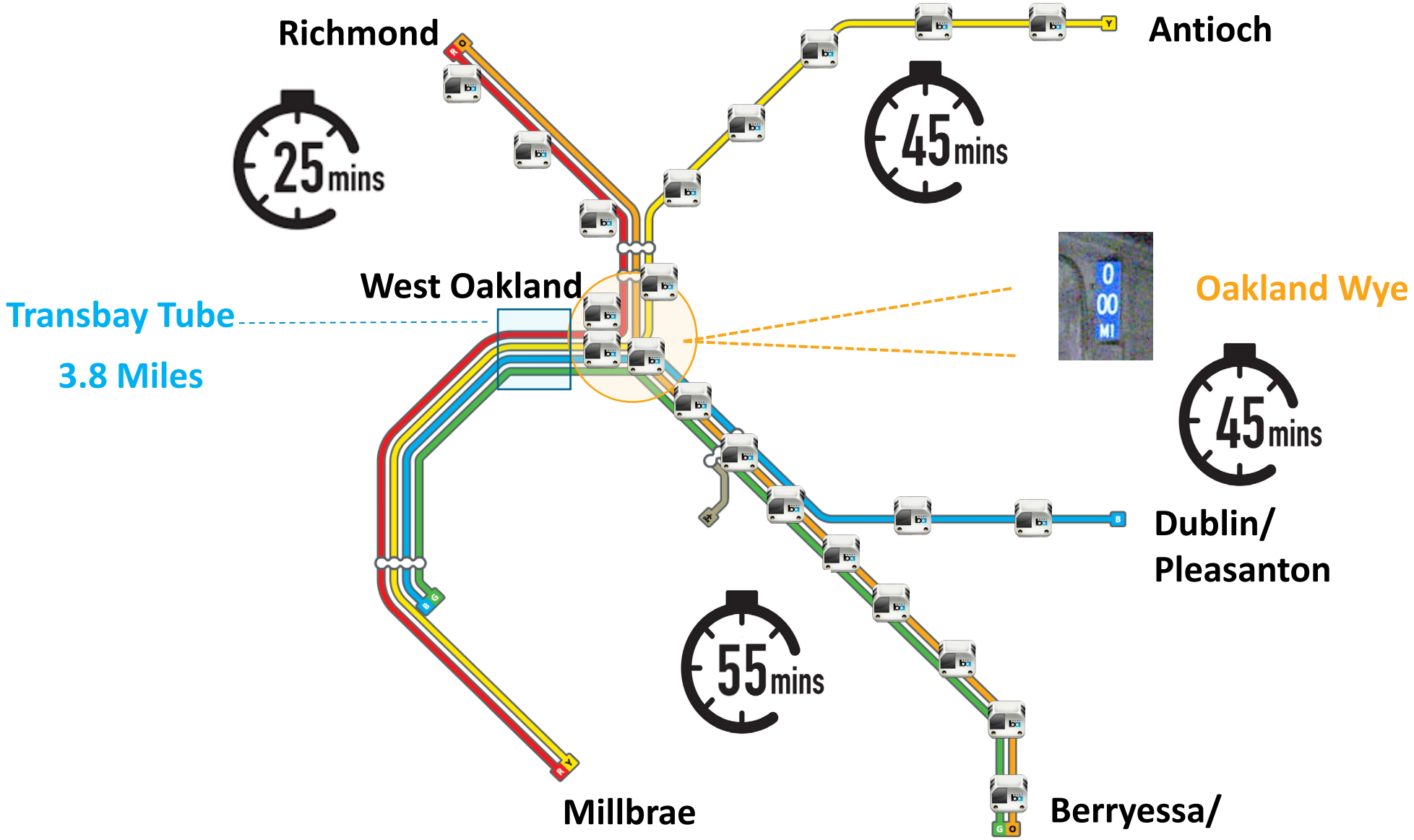
- Equipment Located Within Trackway
- Equipment Wayside Limited Access
- Environmental Impacts

The Why of the Wye



Oakland Wye “A triangle of railroad track used for turning trains. All mileposts are measured from the wye”

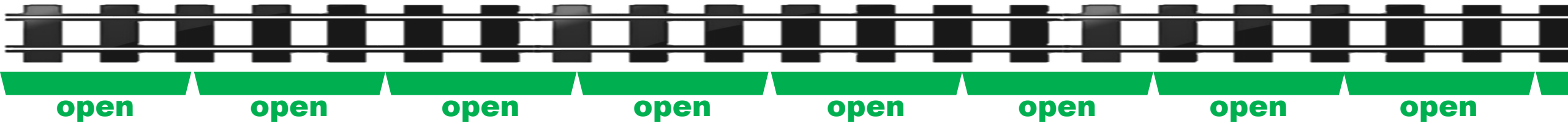
30 Trains Per Hour through the Wye only with CBTC



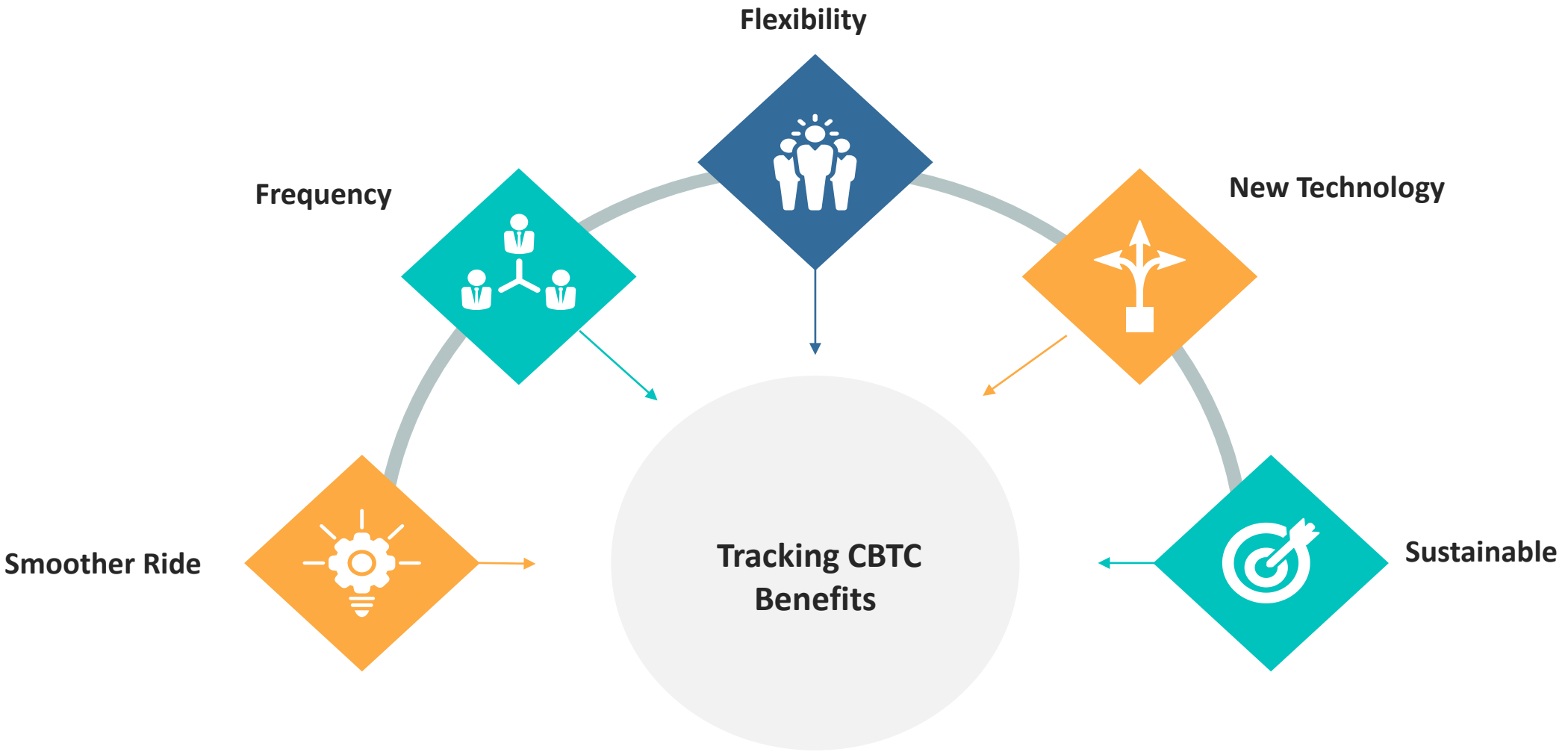
CBTC Train Control

Moving - block signaling system

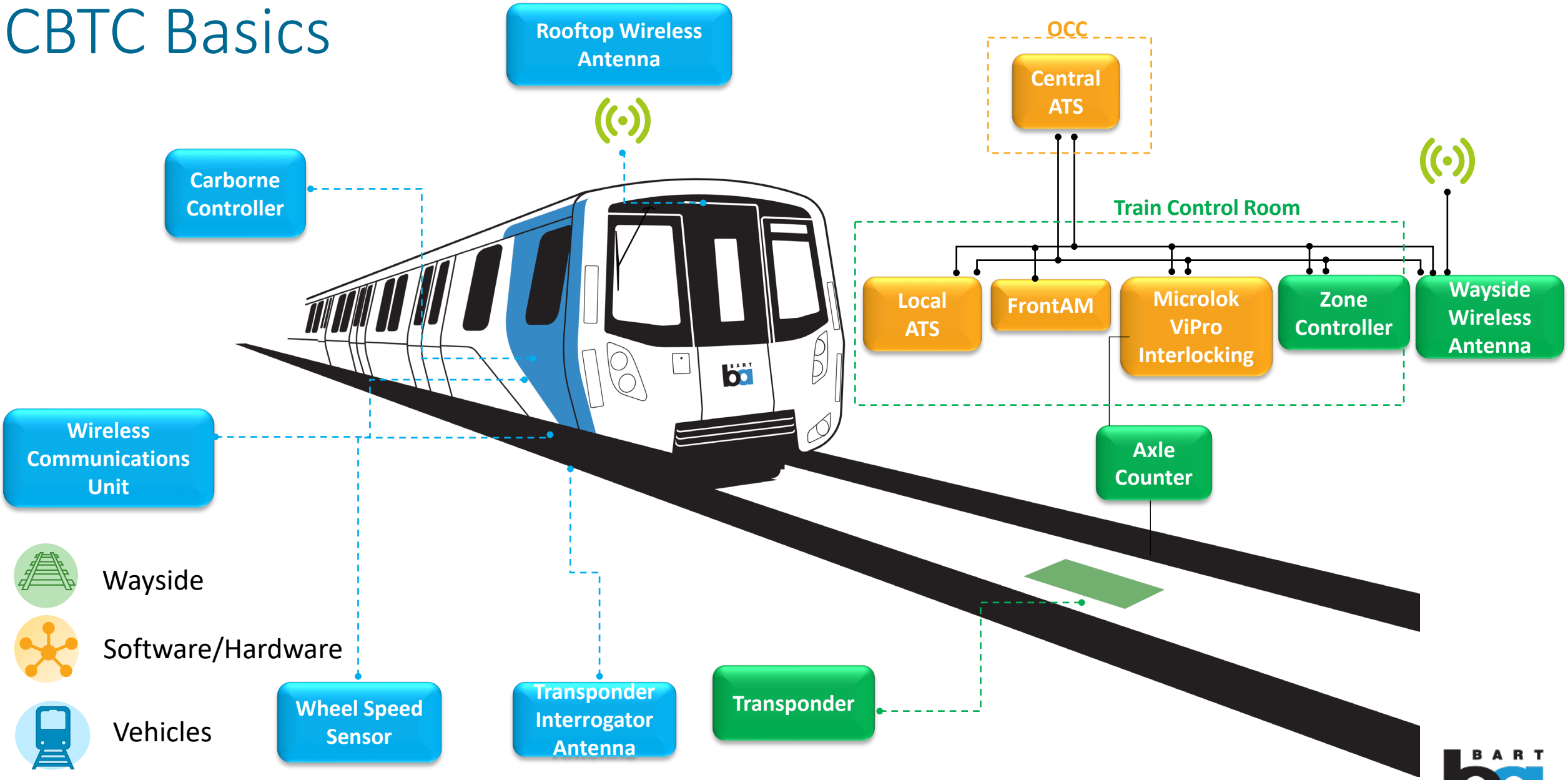
Animation Slide



The Future is CBTC



CBTC Basics


Rooftop Wireless Antenna
OCC
Central ATS
Carborne Controller
Train Control Room
Local ATS
FrontAM
Microlok ViPro Interlocking
Zone Controller
Wayside Wireless Antenna
Wireless Communications Unit
Axle Counter
Wayside
Software/Hardware
Vehicles
Wheel Speed Sensor
Transponder Interrogator Antenna
Transponder

CBTC Implementation at BART - Scope

Test Concepts and overlay Test Tracks with new CBTC equipment.

Implement a new Automatic Train Supervision (ATS) System.

Install new onboard CBTC equipment on the Fleet of the Future vehicles.

Deploy Hitachi Rail's new CBTC System across the BART Network.

Meet capacity of 28 trains per hour through the Transbay Tube with Phase 4 Implementation.

Final capacity of 30 trains per hour through the Transbay Tube with CBTC across system after phase 8.

Wayside, Software/Hardware, & Vehicles

Wayside

4500 Transponders
1100 Radio Antennas
Train Control Houses
Fiber Optic Cables
Switch Power Cables
Signal Cables
Enabling Works

Next Milestones

K line Enabling Works Contract NTP Q124
Hayward Test Track Train Control House Q224

Software/Hardware

CBTC Core Software - Phoenix
Automatic Train Supervision (ATS)
Data Communications System (DCS)
"Yams" Intelligent Asset Management System (IAMS)
SCADA

Next Milestones

ATS Software Release #6 Q124
CBTC Core Phoenix #2 Q324

Vehicles

Radio Antenna
Carborne Controller
Speed Sensor
Transponder Interrogator Antenna
Pilot Vehicle
Captive Fleet

Next Milestones

Test Antenna on Pilot Car Q423
Finalize Design for all Components Q423

Wayside Progress

Hayward Test Track (HTT)

- 320 Feet of Duct bank
- 90 Feet of Armorcast cable raceways
- Survey/assessment and power load analysis

A-Line, C-Line, K-Line, R-Line

- 27 Train Control rooms Asbestos Assessment

M-Line

- 8 Train Control Rooms Asbestos Mitigation
- 5 Cabinets installed

Software/Hardware Progress

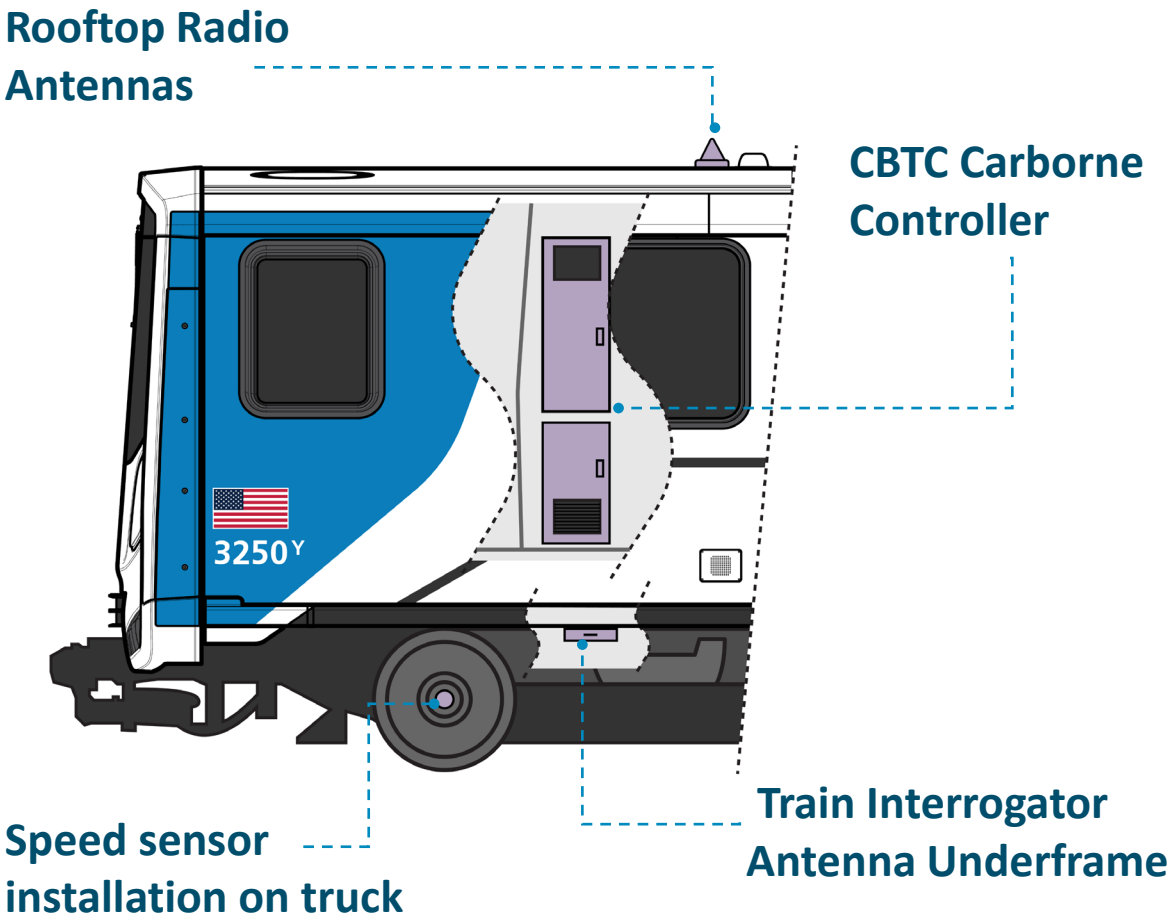
Automatic Train Supervision (ATS)
- Software Release #5 test running at BHQ
- ATS Hardware Factory Acceptance Test

Data Communications System (DCS)
- Hardware under construction

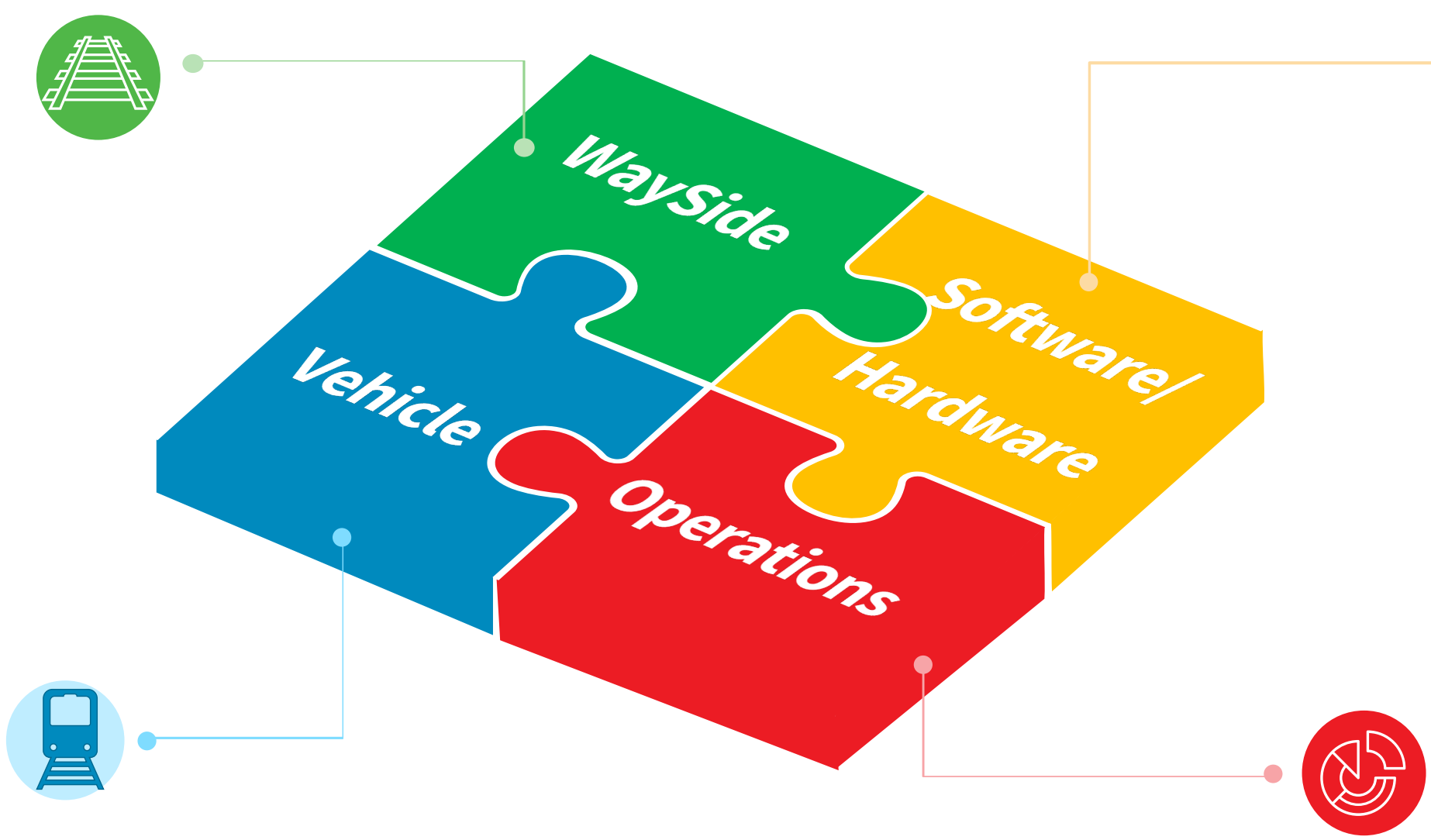
Intelligent Asset Management System (IAMS)
- Software Release V2 running at BHQ

Vehicle Progress

- More than 2000 Design Reviews
- Sleep mode on train cars
- Technology Development to use existing under car-to-car cables for CBTC on E cars
- Critical Component Designs complete

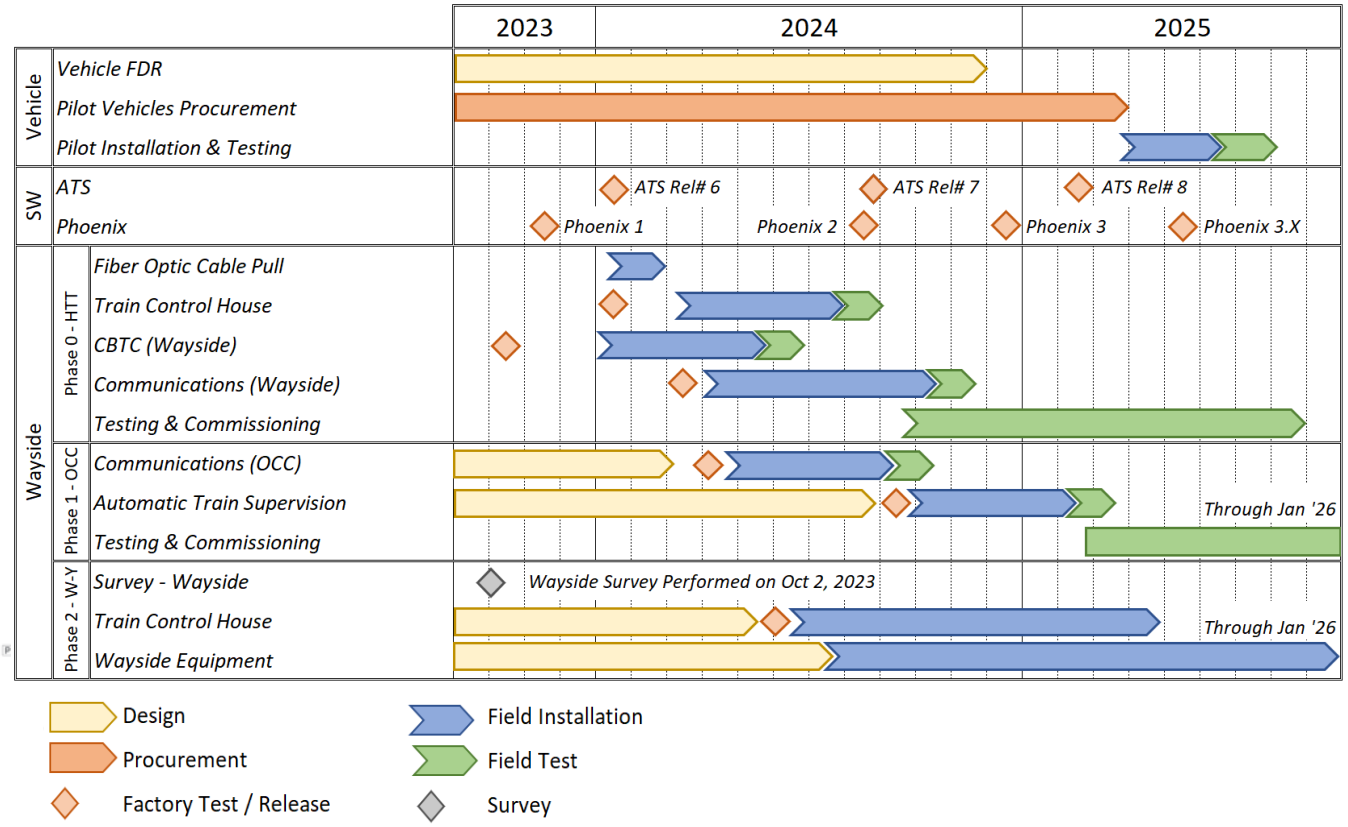


CBTC SYSTEM



Installing CBTC throughout the System

2 - Year Look Ahead



Thank You