Caltrain / HSR Blended System
Grade Crossing and Traffic Analysis

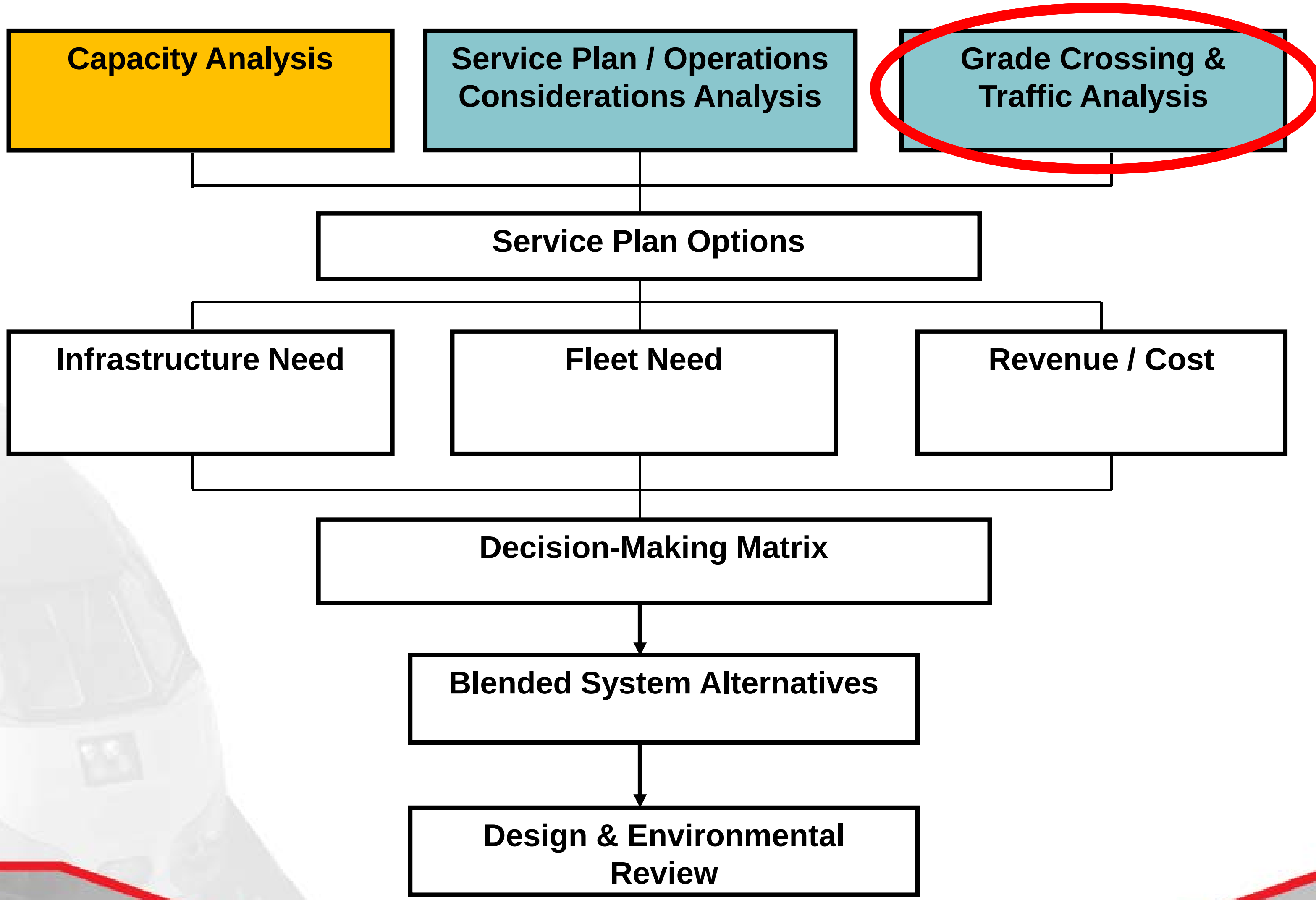
Local Policy Maker Group Meeting
May 2013

Presentation Topics

1. Context
2. Gate Down Time Analysis
3. Local Traffic Analysis
4. Next Steps

Context

Blended System Planning Process



Purpose

40 At-grade Crossings*

Considerations

- Train Operations
- Traffic Circulation
- Safety
- Regulatory/Agency practice & guidance

Tool Box

- Grade Separations
- Street Closures
- At-grade Crossing Upgrades
- IT Traffic Management
- Train Operations Management

* Note: Grade separations not required by law if operating speeds do not exceed 125mph

Goals

- Understand potential impact of blended system on gate down time
- Understand potential impact of changed gate down time on local traffic
- Inform future decisions about at-grade crossing improvements

Gate Downtime Analysis

Framework

- Analysis Tool: TrainOps (LTK, Engineering)
- Inputs
  - Electrified system with advanced signal system
  - Prototypical schedules
  - Long middle passing track option
- Analyzed scenarios at 40 at-grade crossings
  - Today: Caltrain diesel (5 trains/ph/pd)
  - Electrified future scenarios:
    - 6 Caltrain trains/ph/pd ("6/0")
    - 6 Caltrain trains/ph/pd + 2 HSR trains/ph/pd ("6/2")
    - 6 Caltrain trains/ph/pd + 4 HSR trains/ph/pd ("6/4")

Gate Down Time Variables

- Increased train service does not necessarily equal increased gate down time
- Interplay of key factors
  - More trains increase gate down time
  - Advanced signal system decreases gate down time
    - Double gate action removal
    - Gate efficiency/consistency
  - Overlapping 2+ train events at crossing decreases gate down time
- Net result at each crossing: varying gate down time (increase/decrease)

Example: Double Gate Action Removed

	Today	6/0	6/2	6/4
	(Approximate Minutes / AM Peak Hour)			
North Lane (Burlingame)	11.0	9.5	12.0	14.0

- Today gate down time: 11 out of 60 minutes
- From Today to 6/0
  - More train events
  - Double gate removal
  - Net decrease in gate down time
- From 6/0 to 6/2 and 6/4
  - More train events
  - Net increase in gate down time

Example: Gate Efficiency/Consistency

	Today	6/0	6/2	6/4
	(Approximate Minutes / AM Peak Hour)			
Glenwood Ave.(Menlo Park)	9.5	9.0	11.0	14.5

- Today gate down time: 9.5 out of 60 minutes (worst peak hour)
- From Today to 6/0
  - More train events
  - Gate down time efficiency/consistency
  - Net decrease in gate downtime
- From 6/0 to 6/2 and 6/4
  - More train events
  - Net increase in gate downtime

Example: Multiple Trains Crossing

	Today	6/0	6/2	6/4
	(Approximate Minutes / AM Peak Hour)			
Center St. (Millbrae)	11.5	8.5	10.5	14.0

- Today gate down time:11.5 out of 60 minutes (worst peak hour)
- From Today to 6/0
  - More train events
  - Multiple trains crossing at the same time
  - Net decrease in gate downtime
- From 6/0 to 6/2 and 6/4
  - More train events
  - Net increase in gate downtime

Important Notes

- Evaluation focuses on the worse peak hour for each crossing
- Increased train service does not necessarily equal proportional increase in gate down time
- Gate downtime impacts vary by crossing
- Model results have limited application
- Gate downtime results reflect order-of-magnitude

Local Traffic Analysis

Scope

- Scope revised from 80 total to 5 sample
- Usefulness of full analysis questionable
  - Prototypical train schedule
  - Unacceptable future traffic conditions
  - Traffic model limitations
- Examine a few to see what we might learn

Scope, cont.

- Sample intersection selection
  - From each of 3 counties in peninsula rail corridor
  - Pre-empted and non pre-empted intersections
  - Within and outside of assumed passing track location
- Simulated scenarios
  - 2035 traffic condition
  - Today's Caltrain service
  - Electrified 6/0, 6/2, 6/4 services

2035 Future Traffic

- Unacceptable future traffic conditions (without service change)
- < 80 seconds of delay/ vehicle is excessive

Intersection	Average Delay (sec per vehicle) / LOS			
	Existing		2035 No Service Change	
	AM Peak	PM Peak	AM Peak	PM Peak
16th Street/7th Street/Mississippi Street	41.7 / D	35.2 / D	>224.4 / F	>283.6 / F
25th Avenue/El Camino Real	18.8 / B	23.3 / C	>171.1 / F	74.7 / E
25th Avenue/Delaware Street	10.2 / B	10.3 / B	12.4 / B	13.1 / B
Broadway/El Camino Real	22.8 / C	26.1 / C	47.9 / D	61.5 / E
Churchill Avenue/Alma Street	49.9 / D	71.1 / E	>103.2 / F	>132.5 / F

Delay Variables

- Increased train service does not necessarily increase in delay
- Interplay of key factors
  - # of gate events
  - Average gate down time/event
- Net result at each crossing: varying delay (increase/decrease)

Example: Pre-empted Intersection

- Gates communicate with intersection signal
- Varying changes in gate down time/event for 6/0, 6/2, 6/4
- Driving factor: Increased gate events increase delay

Intersection	Average Delay (sec per vehicle)		Change in Average Delay 2035 Service Change		
	Existing	*2035 No Service Change*	*"6/0"*	*"6/2"*	*"6/4"*
AM Peak Hour Churchill Avenue/Alma Street	49.9	103.2	+4.2	+1.2	+8.4

Example: Pre-empted Intersection

- Gates communicate with intersection signal
- Located within passing track
- Average gate down time/event is similar 6/0, 6/2, 6/4
- Increased gate events increase delay (6/0, 6/2)
- Passing tracks allow more trains w/o increasing gate events (6/4)

Intersection	Average Delay (sec per vehicle)		Change in Average Delay 2035 Service Change		
	Existing	*2035 No Service Change*	*"6/0"*	*"6/2"*	*"6/4"*
AM Peak Hour 25th Avenue/Delaware Street	10.2	12.4	+0.1	+0.6	+0.0

Example: Pre-empted Intersection

- Gates communicate with intersection signal
- Decrease in average gate down time/event decrease delay (6/0, 6/2)
- Increase in gate events and average gate time/event increase delay (6/4)

Intersection	Average Delay (sec per vehicle)		Change in Average Delay 2035 Service Change		
	Existing	*2035 No Service Change*	*“6/0”*	*“6/2”*	*“6/4”*
PM Peak Hour 16th Street/7th Street/Mississippi Street	35.2	283.6	-27.2	-18.4	+2.9

Example: Non Pre-empted Intersection

- Gates do not communicate with intersection signal
- No change to delay (6/0, 6/2, 6/4)
- Model evaluates one intersection in isolation
- Model does not see impacts to neighboring intersections

Intersection	Average Delay (sec per vehicle)		Change in Average Delay 2035 Service Change		
	Existing	*2035 No Service Change*	*"6/0"*	*"6/2"*	*"6/4"*
AM Peak Hour Broadway/El Camino Real	22.8	47.9	+0.0	+0.0	+0.0

Important Notes

- Results from sample analysis inconclusive
- Additional analysis needed
  - Peninsula Corridor Electrification EIR (2013 – 2014)
  - Blended system planning and EIS/EIR (TBD)
- Lessons learned
  - Schedule
  - Future traffic condition
  - Traffic modeling tool

Next Steps (Finalize Report)

Finalize Report

- Release Draft Report: May 29th
- End of comment period: June 14th
- Final Report: end of June