SEPTA's Optimizing Track Outage Planning on a Busy Multi-Modal System

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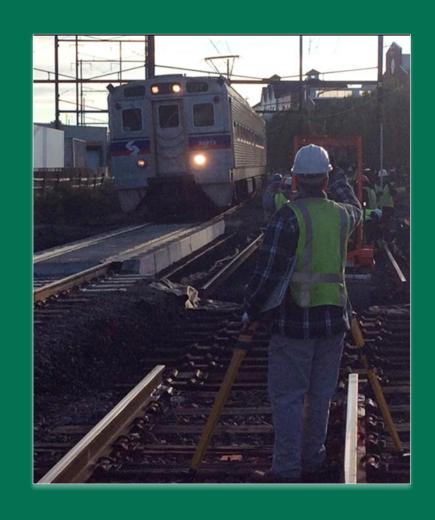
SEPTA
Philadelphia, Pennsylvania





Key Presentation Take-Aways

- Safety First, including Quick Reference Diagrams
- Planning & Communication is Essential for Success
- Balancing Customers vs. Track Time
- Handle Service Substitution Well





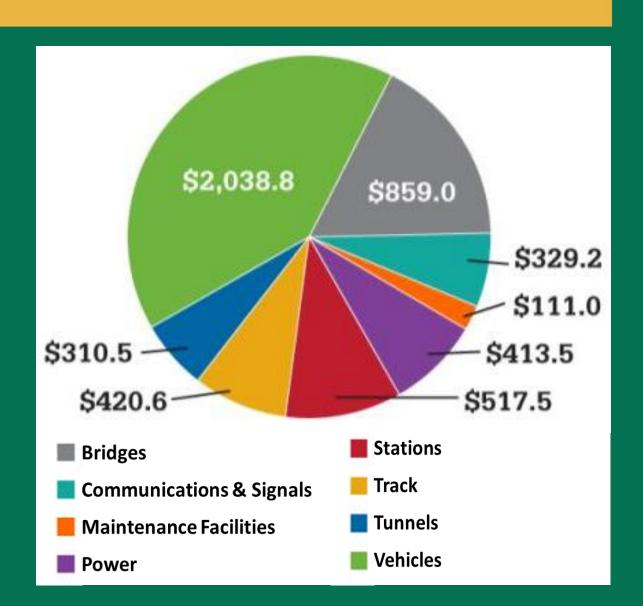
Southeastern Pennsylvania Transportation Authority SEPTA Rail Network

- ▶ 6th largest public transportation agency in the country
- 1.2M passenger trips per day
- > Coverage Area: 2,200 Miles
- **>** Vehicles: 4,000
- > Employees: 9,300
- Modes Operated:
 - Heavy Rail
 - Commuter (Regional) Rail
 - Light Rail (Trolley)
 - Bus and Trackless Trolley
 - Paratransit (CCT)



SEPTA is an Older System

- Legacy Agency in Dense Operating Environment
- > 2nd Most Dense Downtown in U.S.
- > \$5 Billion SOGR Backlog



Core Objectives

PROMOTE SAFETY



PRESERVE OTP



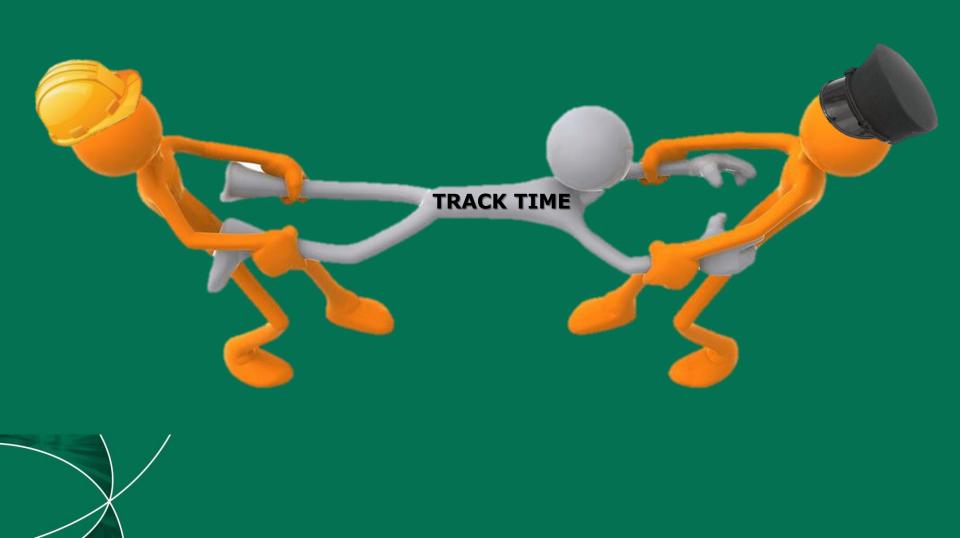
MAXIMIZE PROUDCTIVITY OF WORK CREWS



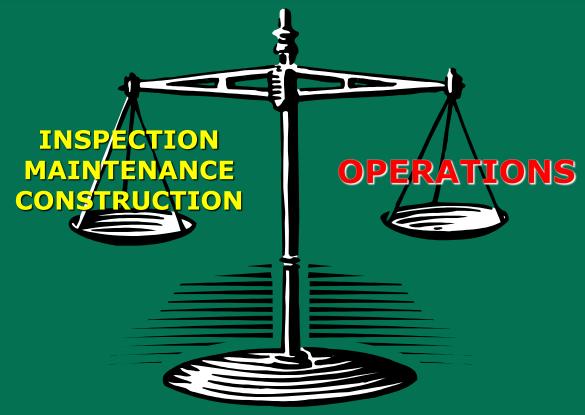
MINIMIZE CUSTOMER INCONVENIENCE



Tug of War for Track Time



Focus and Goal

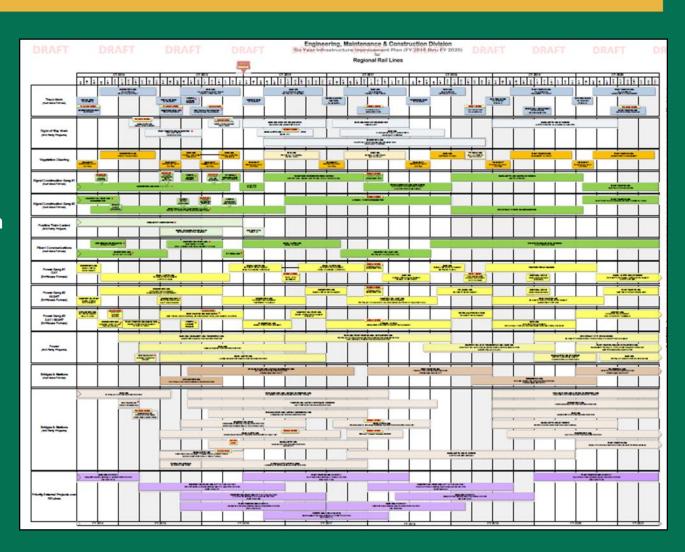


BALANCE SEEMINGLY COMPETING OBJECTIVES OF MAINTENANCE/CONSTRUCTION AND OPERATIONS

Starts with Long Range Planning

5-YEAR PLAN

- Key Construction & Large-ScaleMaintenance
- > Carefully Balanced
- Minimize Outages on a Given Line OverTime
- Labor Support Limitations
- Small Changes Can Cause Big Ripples





Bi-Weekly Communication Meetings

Example of 90-Day Look Ahead

- Chaired By TrackUsage Coordinator
- Mode-Specific
- Detailed ProjectNeeds and ProjectedOperational Impacts
- All Impacted Groups Attend
- Goal to Reach
 Consensus and
 Balance Customer
 Impact with Project
 Scope

	MINABORTHBILEADI VALVOORT																									
												MID-MARCH THRU EARLY-MAY 2017														
																	STAFF SUMMARY									
_			_	OPS/TRANSP	_		TRK		RULE		SERVICE	RAIL OPS	RUN ADJUST OR CREWPICK		STAFF	EM&C BACKGROUNE	SERVICE IMPACT INFO	ADA SERVICE	BUSING PACKAGE	STAFF	STAFF	GOVT / COMM	SIGNAGE TO		ON 80480 / 880C	
	ITEM	PROJECT	LINE	CHARGE No.	STATUS		OOS	BLOCK	135	HOURS	SERVICE	RAIL OPS MPACT	DISTRIBUTED	DISTRIBUTED	REQ	INFO SENT	CIRCULATED	PLAN	DISTRIBUTED	CIRCULATED	APPROVED	NOTIFICATION	SIGNAGE TO TRANSP	WEB POST	ON BOARD / RROC ANNOUNCEMENTS	
	\neg	SECANE STATION				WEEKDAYS				9:10 AM																
	18	RECONSTRUCTION	WCH		ON-GOING	RULE 135 ON #1 TRK 9:10AM-3:30PM	SEE WIRE TRAIN		Y	TO	NONE	WORK ZONE AT STATION	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
õ		(WEEKDAYS)				PIGGYBACK ON TRACK #2 OUTAGE	110004			3:30 PM																
8		DAY CATENARY				CONTINUING ON CURRENT TRACK		CANE		9:15AM	WEEKDAY / MIDDAY SINGLE	OPPOSITE SIDE BOARDING FOR INB TRAVEL BETWEEN 49TH STREET													ANNOUNCEMENTS	
E	28	CONSTRUCTION	WCH		ON-GOING	(WITH EXCEPTION OF CERTAIN KEY HEAVY TRAVEL EVENTS)	#2	TO	N	TO	TRACKING	AND SECANE STATIONS	ON-GOING	ON-GOING	NO	N/A	N/A	N/A	N/A	N/A	N/A	ON-GOING	ON-GOING	ON-GOING	WHILE DETOURING	
5	\rightarrow	(WEEKDAYS)	\vdash			, ,		ARSENAL		2:30PM			_													
8		COBBS CREEK BRIDGE STRUCTURE REPAIRS			SCHEDUL FO	SATURDAY-SUNDAY	BOTH	ARSENAL	N	FULL	WEEKEND BUSING	NO STARTS/QUITS AT MEDIA ON SAT OR SUN; SB ELW TRAINS SPIN AT UC (VIA #2 TRK WITH BARRICADE SOUTH OF ARSENAL) FOR BUS	IN	IN		COMPLETED	COMPLETED	COMPLETED	COMOL ETCO	COMPLETED	COMPLETED	ACTION ITEM	ACTION	ACTION	EARLY ANNOUNCEMENTS	
	35	(WEEKEND)	WCH		SCHEDULED	MARCH 25-26, 2017	BOIH	TO ELWYN	N	SERVICE	WEEKEND BUSING	CONNECTION, BUSING BTWUC AND ELWIN	PROGRESS	PROGRESS	YES	COMPLETED	COMPLETED	COMPLETED	COMPLETED	COMPLETED	COMPLETEL	ACTION TIEM	ITEM	ITEM	START BY MARCH 10	
	=	MONTHLY GLASS CLEANING	=																							
		AT JEFFERSON STATION		OPERATING	SCHEDULED	MONDAY NIGHT + TUESDAY NIGHT APRIL 17-18, 2017	SEE	VINE TO	N	9:30 PM TO	NIGHT TRACK OUTAGE IN CCCT	MINOR LATE-NIGHT PLATFORM BOARDING ADJUSTMENT AT SUBURBAN	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	AVPA AT SUBURBAN AND JEFFERSON	
	100	MEEKMOHT)	mi	OF EIGHING	SCHLOSELL	A 102 11-10, 2011	CALENDAR	BROAD	- N	4:15 AM	HIGH THOUSE OF TABLE IN COUR	AND JEFFERSON STATIONS.	11/0	187.6	INO	11/0	11/0	10.10	IN/A	11/0	11176	147.4	11/0	11/0	DURING OUTAGE	
8	\vdash	NIGHT PREP WORK	APT	-		(SUN NIGHTS THRU THURS NIGHTS)		WALNUT XO	-	10:35 PM					-											
EG EG	2CC	WALNUT INT+TUNNEL	мнк		ON-GOING		#5	TO	Υ	TO	NIGHT SINGLE TRACKING	INB (NB) TRAINS NORMALLY ON #5 TRK AT 30TH STREET WILL BOARD ON #6 TRK DURING OUTAGE	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TBD	AVPA AT 30TH STREET DURING OUTAGE	
Z,		(WEEKMOHT)	WCH			THRU APRIL 7, 2017		SCHUYLKILL		4:15 AM		UN 40 THE DURING OUT AGE													DUMING OUTAGE	
S S	П	MIGHT TIE & SURFACE	П			(MON NIGHTS THRU THURS NIGHTS)		VNE	Y	9:30 PM															AVPA AT TEMPLE U	
IB	scc	VINETO WAYNE	ML		ON-GOING	THRU APRIL 21, 2017	#2	TO	L.	TO	NIGHT TRACK OUTAGE	ALL NB TRAINS ON #1 TRACK VINE TO JU	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TBD	DURING OUTAGE	
8	Ц	(WEEKMOHT)	ш	\Box			\vdash	16TH ST JCT	(1+3)	4:15 AM					-									\vdash		
		MIGHT TIE & SURFACE WAYNE NORTH	I		SCHEDUL FO	(MON NIGHTS THRU THURS NIGHTS)		WAYNE	l ,	9:30 PM	NIGHT TRACK OUTLINE	NR TRAINS DETOUR ON 1 FROM WAYNE 18TH ST TO NX										N/A	N/A	TRO	N/A	
	₩CC	WAYNE NORTH WEFKMOHT)	ML		SCHEDULED	STARTS APRIL 24, 2017	#2	TO NX	Y	TO 4:15 AM	NIGHT TRACK OUTAGE	NO FROMIS DELICUR ON 1 FROM WAYNE 18 IH ST TO NO.	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	IBD	N/A	
	\dashv	Çilderin giriy	H	=			=	NX.	=	4:15 AM																
	l	YARDLEY STATION	L.C.			WEEKDAY OFF TOLOY	NONE		N		NONE	FIRST PHASE OF HIGH-LEVEL PLATFORM IN SERVICE (NO FULL ADA	N/A	N/A	NO				N/A	N/A		IN DOCCOUR		N/A	W/A	
	100	CONSTRUCTION (WEEKDAYS)	NSH	-	ON-GOING	WEEKDAY OFF-TRACK	NONE		N		NUNE:	ACCESS YET)	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	IN PROUNESS	N/A	N/A	N/A	
	\vdash	FORTUNA STATION	Н						-	8:50AM			_		-							_				
	2N	WRAP IIP	DOV		NEW	WEEKDAY (MIDDAY) WORKING LIMITS	NONE	MP 15-20	l v	TO	NONE	HIGH LEVEL PLATFORM OPEN; TARGETING FULL ADA ACCESS	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	ACTION ITEM	ACTION	ACTION	N/A	
	"	(WEEKDAYS)	[~'				·······	ATT LOCAL	'	2:30PM	HUNL.	EFFECTIVE APRIL 15, 2017											ITEM	ITEM		
	\vdash	LANSDALE GARAGE	Н					S. LIMITS LAND		9:30AM																
	3N	CONSTRUCTION	DOY		NEW	WEEKDAY (MIDDAY) WORKING LIMITS	NONE	TO	Y	TO	NONE	MIDDAY WORKING LIMITS (OFFSET FROM DALE INT LIMITS)	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
ž	Шİ	(WEEKDAYS+SAT)	L					S. SIDE MAIN ST	ட	3:10PM		1														
EGE	П	CURVE WORN RAIL	П			SATURDAY AND SUNDAY		WND		FULL		OB TRAINS ON INB TRACK FOR FULL SERVICE DAY, ALL STATIONS											ACTION	ACTION	ANNOUNCEMENTS	
£	4N (SERMANTOWN CURVE AZ TRK	CHE		UPDATED	APRIL 1-2, 2017	#2	TO	Υ	SERVICE	WEEKEND SINGLE TRACKING	DISTRAINS ON INSTRACK FOR FULL SERVICE DAY, ALL STATIONS EXCEPT CHE AND WAYNE JCT	TBD	TBD	NO	N/A	N/A	N/A	N/A	N/A	N/A	ACTION ITEM	ITEM	ITEM	WHILE DETOURING	
DR.	Щ	(WEEKEND)	ш					SPRING		DAY																
ž		CURVE WORN RAIL DERMANTOWN CURVE #1 TRK	L		UPDATED	SATURDAY AND SUNDAY	ا ا	SPRING		FULL		INB TRAINS ON OB TRACK FOR FULL SERVICE DAY, ALL STATIONS	l	l								ACTION ITEM	ACTION	ACTION	ANNOUNCEMENTS	
	SN 6	(WEEKEND)	CHE		UPLIATED	APRIL 8-9, 2017	#1	TO WIND	Y	SERVICE	WEEKEND SINGLE TRACKING	EXCEPT CHE AND WAYNE JCT	TBD	TBD	NO	N/A	N/A	N/A	N/A	N/A	N/A	ACTION FIEM	ITEM	ITEM	WHILE DETOURING	
	\vdash	HATBORD STATION	Н			SATURDAY AND SUNDAY	\vdash	WAD	\vdash	5:30 AM		1			-											
	6N	PLATFORM EXTENSION	WAR		ON-GOING		NONE	STATIONLIMITS	Y	TO TO	NONE	WEEKEND WORKING LIMITS BETWEEN MONTGOMERY AVE AND	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	"	(WEEKENDS)	"			THRU APRIL 1-2, 2017			1	5:45 PM		BYBERRY ROAD														
	\vdash	ELM + BRIDGE	П			SATURDAY AND SUNDAY		KALB		FULL															EARLY	
	7N	WARP UP AND CUTOVER	NOR		NEW	APRIL 1-2 AND MAY 6-7, 2017	ALL	TO	N	SERVICE	WEEKEND BUSING	ALL SEPTA TRAINS SPIN AT NTC VIA FORD (NO KALB)	ACTION ITEM	ACTI ON ITEM	YES	ACTION ITEM					l	ACTION ITEM	ACTION ITEM	ACTION ITEM	ANNOUNCEMENTS	
	Ш	(WEEKENDS)	Ш				oxdot	ELM STREET	ш	DAY		1													START BY APR 14	
	ΠĪ	CYNWYD ACCESS	an.			CUTOVER DATES	#4 HAD	PAXON-JEFF	ΠĪ	Ī												MORE INFO TO	MODE INCO	MODE INCO		
	1A	PROJECT	PAO		TENTATIVE	JUNE 1-11, 2017	#4 HAR AND IVR	AND	N	TBD	TBD	TBD	HOLD	HOLD	YES				HOLD	HOLD	l	MORE INFO TO FOLLOW	MORE INFO TO FOLLOW	TO FOLLOW	l l	
>	Ш		Ë					PAXON-WOODBINE	ш			1														
S S		LEVITTOWN STATION RECONSTRUCTION		-	ON-GOING			MORRIS TO				1	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	EARLY ANNOUNCEMENTS	
88		ALCOND I RUCTION	INE	\vdash	- SHOULING			HOLMES	N				N/A	N/A	NO	N/A	W/A	N/A	N/A	N/A	NIN	N/A	N/A	N/A	PRIOR TO OUTAGE	
E	\vdash	VILLANOVA STATION	Н			1		PAOLI																	EARLY	
S.	за	NEW PED TUNNEL	PAO		ON-GOING	IN PROGRESS UNDER NORMAL TRAFFIC		10	N				N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	TBD	TBD	ACTION ITEM	ANNOUNCEMENTS +	
N.								BRYN MAWR																	DURING OUTAGES	
1	П	PAOLI INTERLOCKING				(10-DAY OUTAGE)		WEST END																		
	4A	MODIFICATIONS	PAO		UPDATED	THURS NIGHT, MARCH 23 THRU SUNDAY APRIL 2 2017	2+3	OF DAGGERST	N	CONTIN	NONE	WEEKDAY PAOLI TURNS TO FRAZER YARD	N/A	N/A	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	ш	(CONTINUOUS)	\vdash	-		SUNDAY, APRIL 2, 2017	-	PAQLI INT	\vdash	_			_										_			
PR	DIECT	RELATED TEMPORAR																								
		PROJECT	LINE	SPEED	STATUS	LOCATION	TRK	DISTANCE (MI)	MAS	(MPH)	EST DURATION	ADDITIONAL INFO														
	1	SECANE STATION	WCH	30/10	CN-GONG	BISHOP AVE TO PROVIDENCE RD	BOTH	0.2	6	0/25	UFN															
	2	TIE & SURFACE	ML	30/10	SCHED	16TH ST JCT TO WAYNE JCT STA	#2				2 WEEKS	TSR MOVING WITH THE PRODUCTION GANG												unne	TED: 04 MADOU 0047	
	3	CATENARY	NOR	30/10	NEW		#2				UFN	STARTS 2:00AM MON MAR 27TH												UPDA	TED: 21 MARCH 2017	
													1													
_	_		_				_		_	_		·				_			_	_	_		_	_		



Outage Preparation

- > Major Project-Driven Operational Impacts
- > Starts with 90-Day Look-Ahead and Special Events Calendar
- > Outages Should be Uncomplicated for the Customer
- > Community Notifications and "Sell" the Work to Customers
- Utilize Test Trains/Trolleys (and Buses) when Needed to Develop Schedule Adjustments and Alternate Service Plans
- > Plan for Overall Safety
 - Customers
 - Employees
 - General Public



Temporary Infrastructure Changes

TEMPORARY BARRICADE & TIE BUMPER (OUT OF VIEW IN FRONT OF TRAIN)
AND TEMPORARY TRACTION POWER SECTIONALIZATION





- Temporary Infrastructure Changes Utilized to Reduce Outage Impacts on Train Operations
- Reduces Length of Busing and Amount of Stations Affected by Outage.
- > Find Innovative Solutions to Construction Challenges

Weekly Project Coordination Meetings

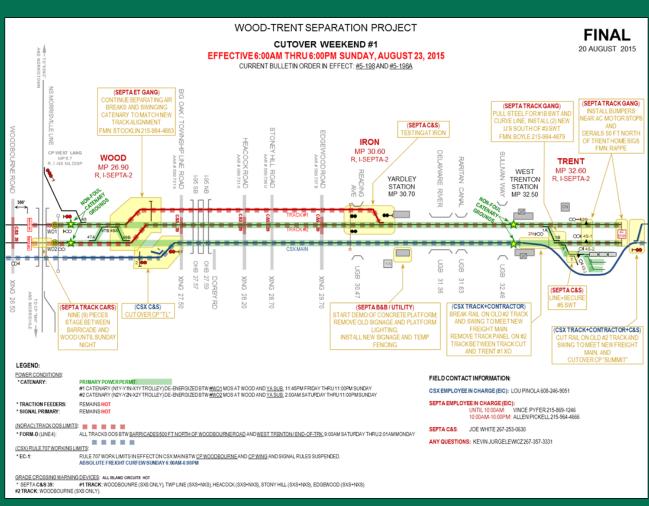
- > All Capital and MoW Groups
- Add Work Generated from Field Inspections into the Outage Plan
- Address Special Safety Needs of the Work Force
- Immediate Work Details Finalized
 - Table Top Exercise
 - Hour-by-Hour Schedules
 - Final Go/No-Go Times
 - Establish Primary and Secondary Objectives
 - Project Specific Outage Summary Diagrams





Quick Reference Outage Summary Sheet

- Job Briefings are Foundation for Safety
- No Changes to Game Plan Without Reconvening During Outage
- Maximize Outages on Particular Line
 - Include Other Agencies, Such as Bridge Insp (DOT)
 - Short-Term Maintenance Initiatives



Outage Oversight

- > Job Briefings Foundation for Safety
 - No Changes to Game Plan Without Reconvening During Outage
- > Transportation Supervision
- Supplemental Schedules/Public Timetables for Major Outages
- Employee "Ambassadors" for Customer Support in Field
- Additional Support:
 - Position Signal Maintainers at Important Interlockings
- EM&C Internal Safety Presence
- Thank Riding Customers



Bus Substitution for Project Work



After Action Review

- > Overall Safety
- > Any Reported Injuries
- > OTP
- Customer Feedback
- > Actual Production
- > Review CTC Playbacks
- Make Adjustments as Needed



Still-Frame Example for CTC Playback

Wrap-Up

- > Safety is the Foundation
- > Planning and Communication
- > Track Usage Coordinator is Independent
- > Innovative Approaches to Construction
- > Learn from Mistakes and Build Upon Successes
- > Team Work