STEEL BRIDGE Retrofit and Maintenance

Portland Mall Light Rail Project

July 7, 2009

State of Good Repair

TriMet System



- 44 Miles Light Rail
 - Add'l 8.3 in Sept. '09
- 122 LRVs
- 654 Buses
- O&M Facilities
 - 3 Bus Sites
 - 2 LRV Sites
- 325,000 Weekly Ridership
 - 216,000 Bus
 - 108,000 MAX
 - 1,180 WES

TriMet System & Steel Bridge



- Center of System
- 3 Light Rail Lines
 - 4th Green Line
 Opens Sept. 2009
- Headways over Bridge
 - 4-5 min off-peak
 - 2 min peak
- LRVs on system 21 hours/day

Steel Bridge



Union Pacific Structure
Built in 1912
Interstate Hwy (ODOT)
Unique independent
telescoping lift bridge

- UPRR on lower deck
- LRT and Roadway on upper deck

Steel Bridge Retrofits



- Light Rail System Added (1988)
- Continued LRT Expansions
 - 1998 Westside
 - 2001 Airport MAX
 - 2004 Interstate MAX
 - 2009 I-205/Portland Mall
 - Pedestrian Walkway (2000)

Portland Mall Light Rail



- Adds Light Rail to Portland Transit Mall
- 10 stations
- Reconstruction and Renovation of downtown couplet
- Connects:
 - PSU
 - Union Station
 - Art, Business, Government and Retail Centers

Portland Mall Light Rail



- New alignment on Glisan Ramp
 - additional turnout
- Turnout construction
 - 21-day main line operation shutdown over Steel Bridge
- 21-day Shutdown
 - Operations to maintain weekday headways
- \$ 4 M (Steel Bridge Only)

Maintenance Issues



- TriMet Capital Budgets Carried Line Items to Address:
 - Rail expansion joints (10 pair)

Maintenance Issues



- TriMet Capital Budgets
 Carried Line Items to
 Address:
 - Rail expansion joints (6 pair)
 - Overhead Catenary System structure at Lift Span

Maintenance Issues



- TriMet Capital Budgets
 Carried Line Items to
 Address:
 - Rail expansion joints (10 pair)
 - Overhead CatenarySystem structure at LiftSpan
 - Paving Repair
- \$ 900K Budget

Approach Ramp

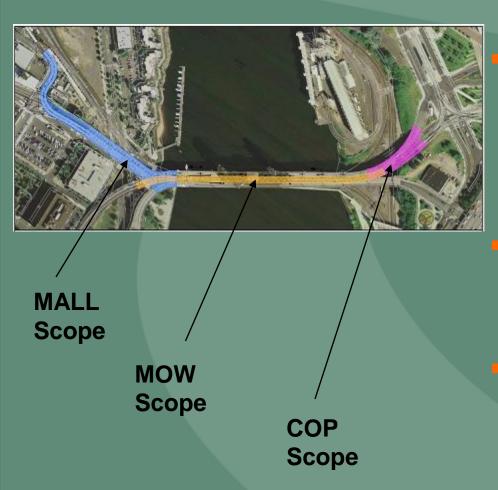


- City of Portland East Approach (1950/1983)
 - Seismic Retrofit
 - Load Rating modifications

Approach Ramp



- City of Portland East Approach (1950/1983)
 - Seismic Retrofit
 - Load Rating modifications
 - Deck Maintenance
 - Sub-Structure Improvements
- \$ 2.2M Budget



- TM MOW and COP request:
 - Combine MOW and COP repairs in Mall Project Contract
- TM Operations Requirement:
 - Same 21-day shutdown
- Mall Project Response:
 - Get 'er done.

- 12 month planning effort
- Mall CMGC Contractor
 - Stacy Witbeck, Kiewit Pacific, a Joint Venture
- TriMet
 - Operations
 - Maintenance of Way
 - Capital Project
 - Design Team (URS, KPFF)
- City of Portland
 - Structural Engineering

STEEL BRIDGE PROJECT SCHEDULE	87-	er ments	4/15/2008	1000		- 1		0.00		0.00	S 13	de	1
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STEEL BRIDGE PROJECT SCHEDULE	S		4/15/2008																	-		
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STEEL BRIDGE PROJECT SCHEDULE			4/15/2008	-	***	-	+		100	-	-	-	_	-			_	_	_	_	22		-
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oughen and dowel existing columns	Under	Sub/SWKP																					
rm/reber/pour shear wall - bottom half	Under	Sub/SWKP				-										97					_		
rm/rebar/pour shear wall - top half	Under	Sub/SWKP										117				- 62							
rm/rebar/pour strengthened girder	Under	Sub/SWKP			15	_										100					_		
ackfill behind shear wall	Under	Sub/SWKP.										- 1			-11		- 1						
gest for other bents	Under	Sub/SWKP																					
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Efristall shear anchors	East/S Lane	Sub/SWKP				-				_												in Closu	
schinjection	East/S, Lane	Pioneer				-				_												in Closu	
stall top tensile strut FRP	East/S. Lane	Sub					-			-	-											en Closu	
stall rebar in pour back	East/S. Lane	R2M2			_					-	-	-	-									ein Closu	
our back infili	East/S. Lane	SWKP		-	-	-	-			-	-	-	-									in Closu	
emab .	East/S. Lane	SWKP		-	-	-	-		-	-	-	-	-				-		Rec	urres	s Tra	iin Closu	ire)
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STEEL BRIDGE PROJECT SCHEDULE			4/15/2000						1 1								
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Item of Work	on Bridge		Start Date	2 (20)								11					
						Portland Rose Festival	Vehic	ular Tr	raffic Shut	and	ricular Train t Dow		П				
TRACK TIE-IN SHUTDOWN												F					
VEST APPROACH TRACK TIE-IN	_		8/2/08					++			-		-	- 1		_	_
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avery top of rail	Wye	DEA										-				& Bus	
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et rail furnout	Wve	SWKP														& Bus	
stell track expension joints	Wve	SWKP		\neg												& Bus	
et boxes, conduit, dramage	Wve	SWKP/Afford		0.00												& Bus	
stall expension joints west	Wye	SWKP						$\overline{}$								& Bus	
ore drift penetrations	Wye	Perinal/SWKP											100	tequire	s Auto	& Bus	Closure
un conduit under bridge	Wye	Affordable											10	ndeper	dent o	of Closur	res)
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our 2 - form and pour non-structural concrete infill and ourb	Wye	SWKP											10	tequire	s Auto	& Bus	Closure
TQ.	Wye	SWKP											1 (6	tequire	s Auto	& Bus	Closure
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sphall mild	Wye	Kodisk		_									(F	lequire	s Auto	& Bus	Closure
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NOW RAIL EXPANSION JOINT REPLACEMENT			8/2/08	-				_					+				-
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if and remove rail on either side of EJ	East/Center	BWKP						1								n Closur	
dal new rail	EastCenter	SWKP		$\overline{}$				$\overline{}$				-				n Closur	
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STEEL BRIDGE PROJECT SCHEDULE			4/15/2008				100													
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GNALS / COMMUNICATION - SWKP WORK				-	-	-		-	\rightarrow	-		-	-		+	-	1	-	_	_
mplete OCS foundations in North Terminus and Glean namp	Glaso Ramp/NES	DWKP	complete by 5/1	-	-	-	_	⊢	\rightarrow	-	_	\rightarrow	\rightarrow	-	+	-	+-	_	-	_
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tall U Conduits across Everet (directional boring)	Everett Ramp	SWKP		-	-	-		-	\rightarrow	-		-	-	-				t of Ck		
demo for (js. @ 1st and Everett call ijs. @ 1st & Everett	Everett Ramp	SWKP	-	-	-	-		-	+ +	-				_				ain Clo		_
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nplete conduit		SWKP		-	_	-	-	⊢	\rightarrow	-			_	-						_
of Foundation for A1 case/Demo	Everett Ramp	SWKP		-	_	-		-	\rightarrow	-			-	-				ain Clo		-
e - relocate Signal 10	Everett Ramp	Tipe		-	_	-		-	+	-			-	-				sures)	/sures	4
e - recoate Signal 10 e drill bridge deck for new conduits	All Everett Hamp	Penhali		-	4													ain Clo	errore'	_
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tal M14 Signal	Wye	Mess			_	-		_	11									ain Clo		-
move Existing Case/Cobies	Wye	Mass			_	- 10	100	-	1									ain Clo		
move Signal 10	Wye	Mass				-		т										ain Clo		7
A3 Case	Wye	Mass			_	-		_	_					_				ain Clo		_
A2 Switch Heater Case	Wye	Mass				- 10		_	-									ain Clo		_
move Existing Cordova Hose and Cable	Spen	Mess	9 5	- 1	- 1	100	100	_					- 0					ain Clo		7
el Bridge Overhead Signal Cable	Spen	Mass		\neg	_	-		_	$\overline{}$									ain Clo		
A!	Wye	Mana		_	_		100	т	-	_								ain Clo		_
fall A1 Cables & Rose TWC Cables	East	Tipe		\neg		-		-	$\overline{}$	_								ain Clo		
tol: Switch Heaters (2 each)	Wye	Marss				-		_	1 1									ain Clo		_
nal: Z-Bond Cable/TO Bonding	W/ye.	Mass			_			г										ain Clo		$\overline{}$
se Quarter TWCs	East	Tics			_			_	\Box									ain Clo		
68	Span	Miss			_	100		_										ain Clo		_
el Bridge Feeder Cables	Spen	Mess			_	100	162 183											ain Clo		
el Bridge TPSS Mods	Everett	Mass				- 6												ain Clo		
tal M17 and 18	Glass Ramp/NES	Mass		\neg	_			г	$\overline{}$						10	Requi	res Tr	ain Clo	sure)	$\overline{}$
connect Switch	Spen	Mess		\neg	_	- 10		т	$\overline{}$									ain Clo		5
all switch heaters and connect to case A2	We	Mess		\neg	_	-		_	$\overline{}$									ain Clo		_
gram TWC interrogator at 1st & Everett for required relay outputs to LRT signal system	Wye	Trimet?		\neg				_			100				10	Requi	res Tr	ain Clo	sure)	_
tall temporary signal circuits in A1 relay ficuse to control signal 10 in Wartin amangement	Everett	Mana				- 6		г			2							ain Clo		=
end track drouts thru new special track work down to 1st & Everett	Everett	Missa						г		_					10	Requi	res Tr	ain Clo	sure)	-
all ATS magnets at 1st & Everett and connect to case A3	Everet	Mess				- 10									10	Requi	res Tr	ain Clo	sure)	
	1 444	1000				-											1	1	1	
	20	1	2 1										- 1						- 1	
CS WORK GLISAN RAMP / NORTH TERMINUS	91							_							1		1			_
Imporary Configuration for Widening Work	Widening	Mass	Sefore 6/1								(3)				0	Prior !	o Wid	tening)	- 1	_
tell Poles (bridge through North Terminus) and Cross Spans	Gitten Ramp/NES	Mess	After 5/1																	_
full wire runs M11 and M12	Gésan Ramp/NES	Mass	5/1-8/2												0	Regui	res Tr	ain Clo	sure)	
full insulators	Gisen Remp/NES	Mess	5/1-8/2														110			

21-Day Shutdown



- Maximized advance work
- 24-7 Construction Activity
 - August 3-24, 2008
- One Contractor, Many crews

21-day Shutdown





21-day Shutdown



