



PROJECT SOILS OVERVIEW

July 15, 2020

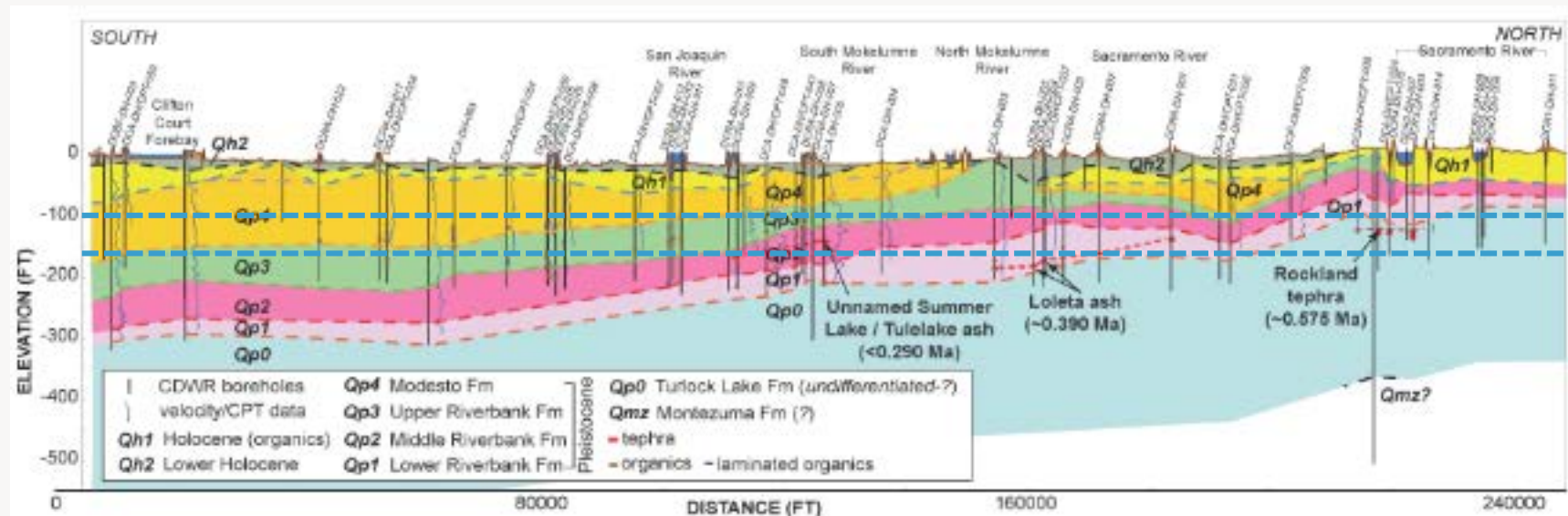
EARTHWORK OVERVIEW

- Project features need approx. ~15 to 18 MCYs of soil fill
 - ~4 to 11 MCYs of RTM will be generated during tunnel boring operations
 - Remaining fill from ~1.5 MCYs of planned imports and on-site borrow
- Effects of hauling and logistical constrictions highlight need to optimize material uses



REUSABLE TUNNEL MATERIAL (RTM) OVERVIEW

- Tunnel depths expected from approx. 100 - 160 ft below ground
- Peats not anticipated
- Older soils consisting of sands, silts, and clays w/ occasional buried stream channels
- Soils of the Modesto, Riverbank, and Turlock Formation deposits from Pleistocene Epoch
 - 11,700 – 2.6M years before present



Profile Source: Maier, et al., 2013. *Significance of Widespread Quaternary Volcanic Ash (tephra) in the Sacramento-San Joaquin Delta, California*. USGS Poster Presentation to American Geophysical Union.

PROJECT USE OF RTM

- Tremendous need for soil fill and will produce excess quantities of RTM
- Project circumstances drive creative thinking about using available resources
- Available RTM samples meet State and Federal embankment geotechnical requirements
- Biggest issue: moisture content; comes out wet, but have included processes for drying the material before use



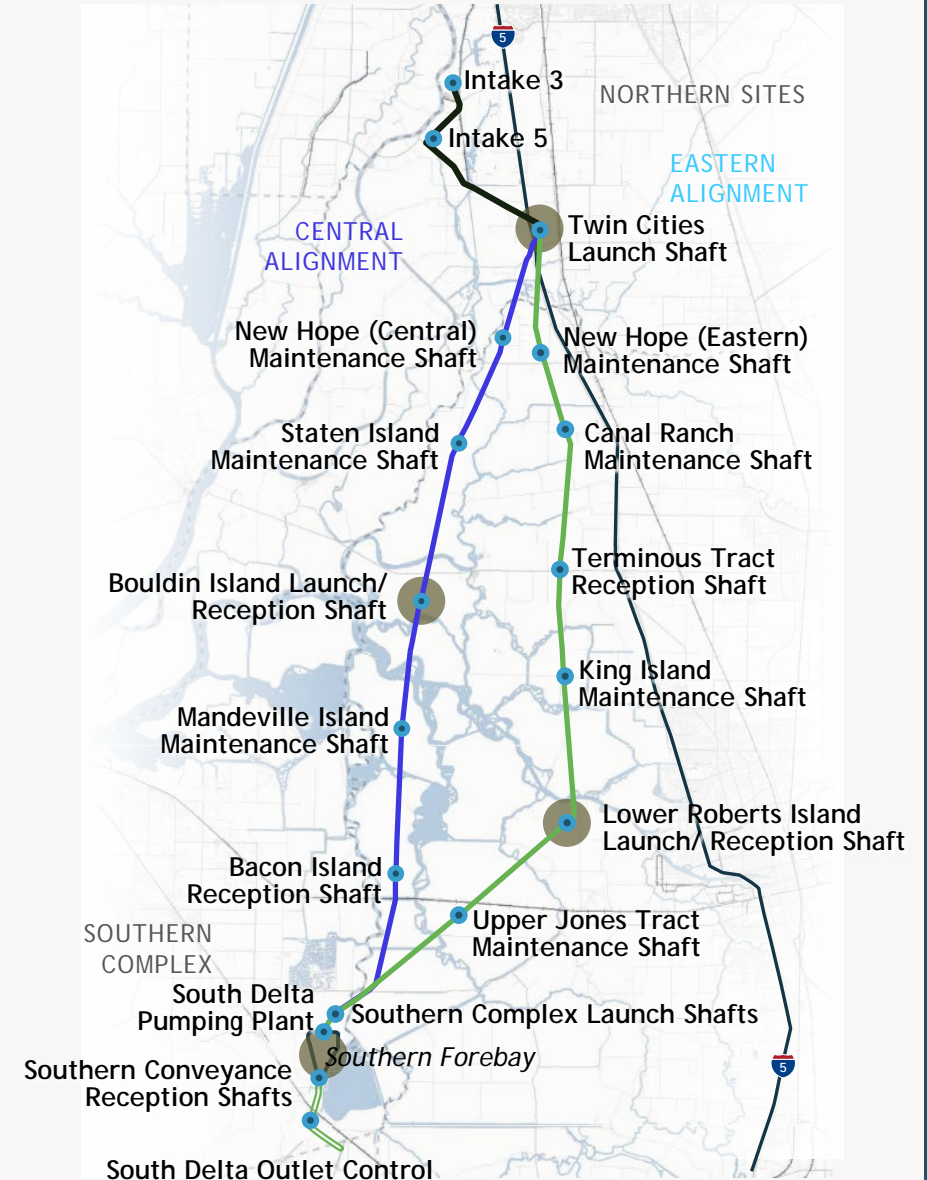
RTM GENERATION SITES

Eastern Alignment

- Twin Cities
- Lower Roberts
- Southern Complex

Central Alignment

- Twin Cities
- Bouldin Island
- Southern Complex



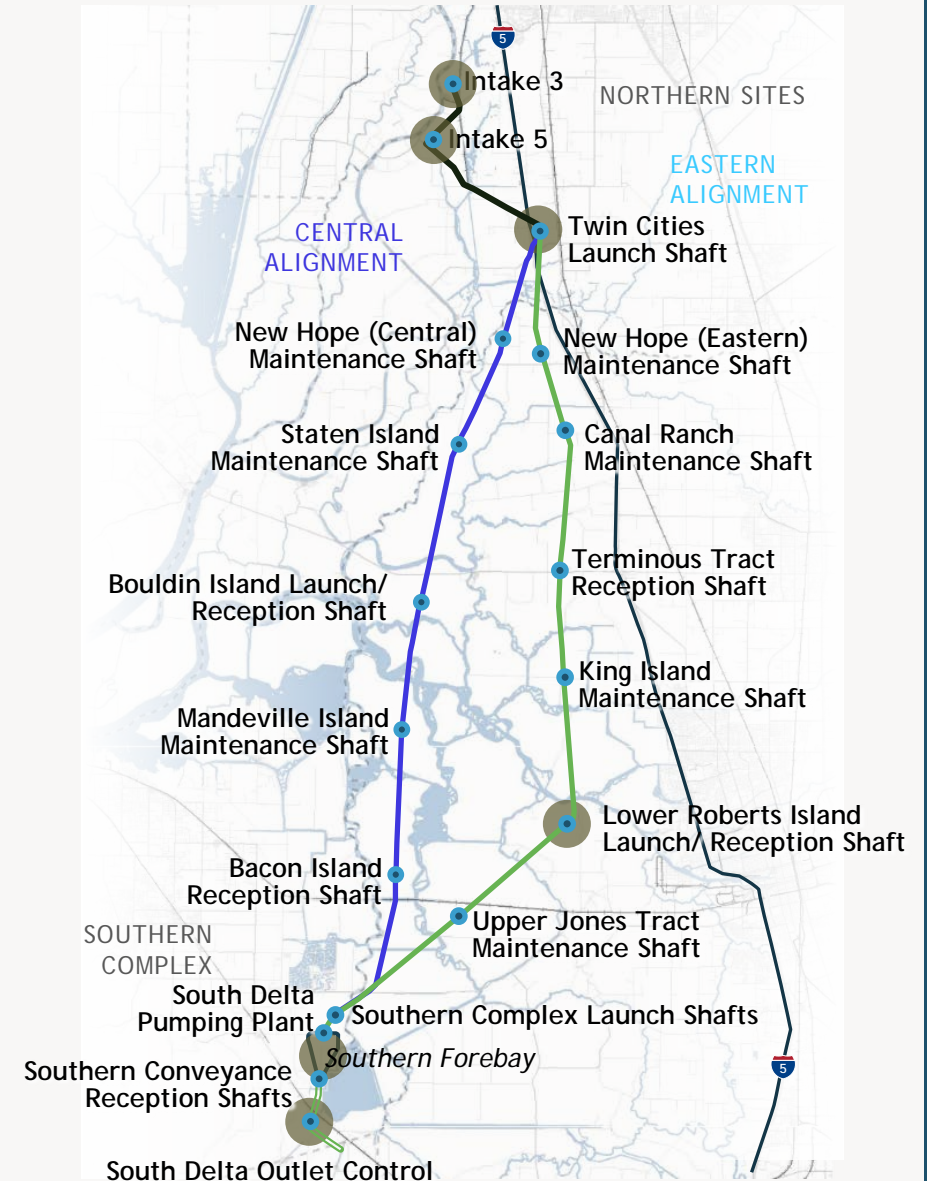
ON-SITE BORROW LOCATIONS

Eastern Alignment

- Intakes 2 and 3
- Twin Cities Complex
- Lower Roberts Island
- Southern Complex

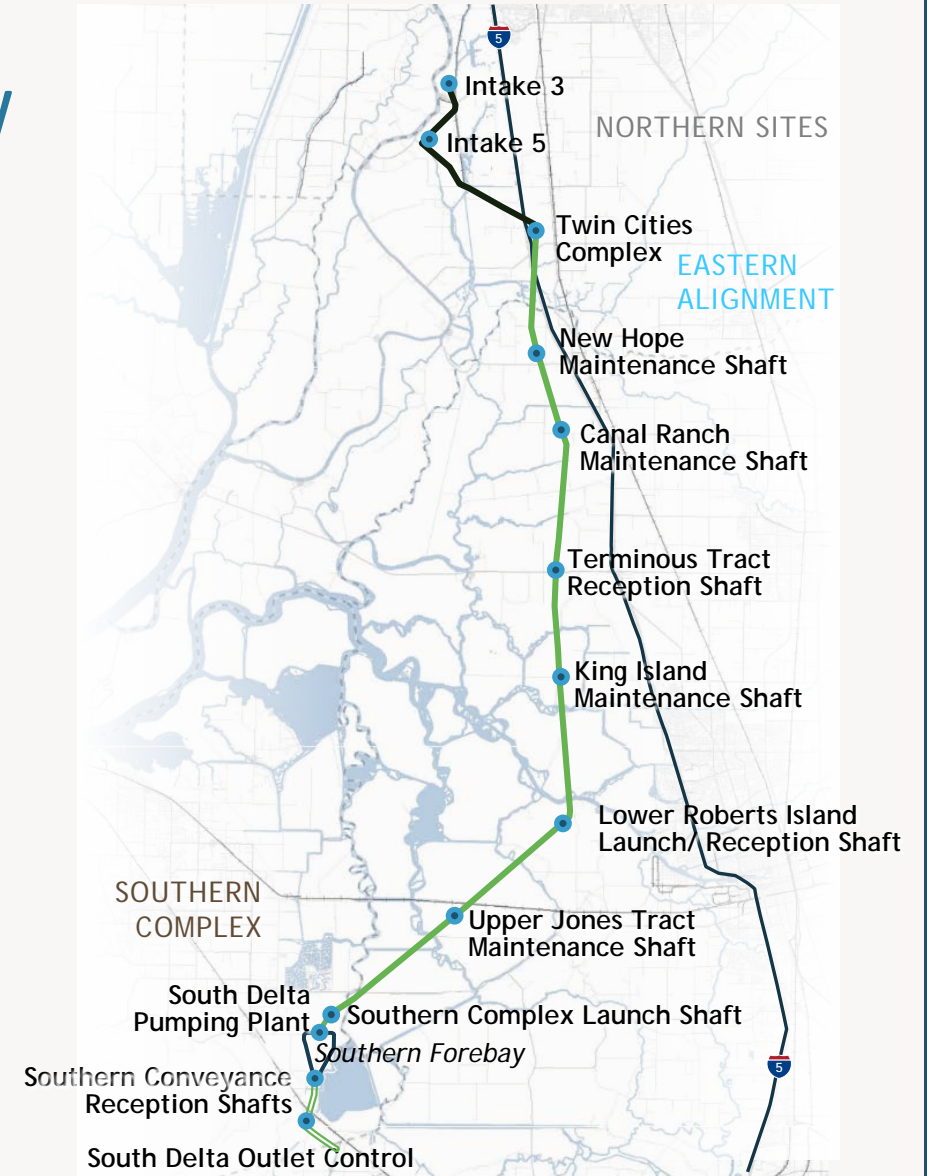
Central Alignment

- Intakes 2 and 3
- Twin Cities Complex
- Southern Complex



EASTERN ALIGNMENT OVERVIEW

SITE	FILL MATERIAL (CY)		Comments
	NEEDED	IMPORTED	
Intake 3	1,863,000	55,000	Specialty import for levees
Intake 5	1,684,000	55,000	Specialty import for levees
Twin Cities Complex (TCC)	975,000	0	Includes export to shafts
New Hope Tract Maintenance Shaft	32,000	32,000	Soil fill from TCC
Canal Ranch Tract Maintenance Shaft	29,000	29,000	Soil fill from TCC
Terminus Tract Reception Shaft	63,000	63,000	Soil fill from TCC
King Island Maintenance Shaft	78,000	78,000	Soil fill from TCC
Lower Roberts Tract Launch/Reception Shaft	513,000	0	Includes export to shafts & levee repairs
Upper Jones Tract Maintenance Shaft	65,000	65,000	From Lower Roberts
Southern Complex Launch Shaft	155,000	0	From Southern Forebay
Southern Forebay	8,518,000	1,373,000	Specialty import for embankment; soil fill from TCC
South Delta Conveyance	616,000	0	



CENTRAL ALIGNMENT OVERVIEW

SITE	FILL MATERIAL (CY)		Comments
	NEEDED	IMPORTED	
<i>Intake 3</i>	1,863,000	55,000	<i>Specialty import for levees</i>
<i>Intake 5</i>	1,684,000	55,000	<i>Specialty import for levees</i>
Twin Cities Complex (TCC)	1,385,000	0	Includes export to shafts
New Hope Tract Maintenance Shaft	45,000	45,000	Soil fill from TCC
Staten Island Maintenance Shaft	74,000	74,000	Soil fill from TCC
Bouldin Island Launch/Reception Shaft	519,000	519,000	Soil fill from TCC; includes levee repairs
Mandeville Island Maintenance Shaft	94,000	94,000	Soil fill from TCC
Bacon Island Reception Shaft	124,000	0	Soil fill from TCC
Southern Complex Launch Shaft	155,000	65,000	From Southern Forebay
Southern Forebay	8,518,000	1,890,000	Specialty import for embankment; soil fill from TCC
<i>South Delta Conveyance</i>	616,000	0	

