WLSWCA FAIRWOOD 11 PIPE PHASE 2 ALTERNATIVE COMPARISON MATRIX
Project # 1117559

ALTERNATIVES COMPARISON MATRIX		KING COUNTY, WATER AND LAND RESOURCES DIVISION	
Project Name	**WLSWCA FAIRWOOD 11 PIPE PHASE 2**	**Prepared By**	**J. Polka, EIT**
Project Number	**1117559**	**Date**	**10/4/2019**
Scope	Remove fish barrier at Fairwood Park Division 11. The existing conveyance system includes one 36-inch pipe, three 48-inch pipes, 2 manholes, and 1 Type 2 catch basin. An approximately 6-foot drop (fish barrier) exists at one of the manholes (most downstream of the ones listed).		
Objective	Remove fish barrier.		
Consequence of Failure	Continued existence of fish barrier. The site also has a history of sinkhole formations along the conveyance system.		
WDFW Hydraulic Project Approval – Permit Terms	**Permit #2016-4-390+1 / Issued 06-13-2016 / End Date 06-12-2021 / Project Description:** Provision 1.b. “As discussed at the June 5, 2014 meeting, the site at the upstream end of the pipe system, where there is an approximately six foot drop in elevation, shall be reconstructed with a fish passable design prior to June 12, 2021.”		

	ALTERNATIVE 1 **Remove up to 180 feet of Existing System and Replace with Constructed Stream Channel** **PREFERRED ALTERNATIVE**	**ALTERNATIVE 2** **Conveyance Repair Only**	**ALTERNATIVE 3** **Conveyance Repair with Fish Passage**		
			Option 1 **Stream Simulation Method**	**Option 2** **Zero Slope Method**	**Option 3** **Hydraulic Method**
		Unsuitable because replacing system with round pipe does not provide fish passage.	Preferred method by DFW/Tribes/Corps	This alternative is unsuitable for this site because the slope is greater than 4% and the box height would need to be 19’, which is above the existing ground surface.	Acceptable method under exceptional circumstances
Description	Replace existing system with: • roughened channel (190 – 340 LF) • new trash rack where stream meets ex. downstream 48-in pipe		Replace existing system with • engineered stream channel (~190 LF) • box culvert (~125 LF) w/ stream sed.; width ≥ 14-ft • access road for maintenance		Replace existing system with: • pool and chute fishway (45 LF) width ~12-ft • Roughened channel (158 LF) • other appurtenances • access road for maintenance
Operation & Maintenance *Life Cycle Costs of 25 years as basis*	• 5 years of monitoring per HPA • Confined space entry not required • 2 insp/year ($1k/yr) • 1 large event ($20k/event) • Total est cost: $45k	N/A	• CSE likely needed • 2 insp/year ($1k/yr) • 1 large mx event evert 5 yrs ($20k/event) • Total est cost: $125k	N/A	• CSE likely needed • 2 insp/year ($1k/yr) • 1 large mx event evert 5 yrs ($20k/event) • Total Estimated Cost: $125k
Acquisitions/Easements Required *Includes costs for demo & relocation*	• 1 parcel acquisition: $385k • Demolition: est $70k • Add’l drainage easement required ○ cost TBD	N/A	• Potentially need add’l drainage easement in park	N/A	None required
Construction Cost Includes CMI	$480K	N/A	$2M+	N/A	$2M+
Total Project Cost *Includes Acquisitions Construction, PM&D, Permits, Acquisitions; excludes O&M*	$1.6M (includes $600k spent to date)	N/A	$3.3M (includes $600k spent to date)	N/A	$3.3M (includes $600k spent to date)

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Project Pros *(includes long term environmental benefits, if applicable)*	• Improves/increases stream habitat • Construction is relatively easy (no need to excavate to bearing material) • O & M is easier since no new structures	N/A	• Improves/increases stream habitat	N/A	• Possible to stay within existing drainage easement
Project Cons *(includes long term negative environmental impacts, if applicable)*	Requires HOA acceptance due change in the park landscape (slopes) outside of existing drainage easement	N/A	• Unsuitable for this site based on WDFW guidelines ○ culvert bed slope > 1.25 x upstream channel slope • May require HOA acceptance due to permanent features in the park outside of existing drainage easement • Maintenance and monitoring may require confined space entry • Relatively complex construction (deep excavation work requiring shoring)	N/A	• 2.5 to 1 side slopes and fencing likely required for open channel portion • May require HOA acceptance due to permanent features in the park outside of existing drainage easement • Maintenance and monitoring may require confined space entry • Relatively complex construction (deep excavation work requiring shoring)
Risks	Not fully meeting HOA expectations. Employing periodic communications with HOA board.	N/A	Downstream deposition of eng. stream sediment	N/A	Significant permitting challenges
Permits Required *Include possible issues*	Local: C&G State: HPA Federal: ACOE Section 401/404	N/A	Local: C&G State: HPA Federal: ACOE Section 401/404	N/A	Local: C&G State: HPA Federal: ACOE Section 401/404
Geotechnical Issues	Not expecting the site's poor soils will impact design and construction of new stream channel	N/A	Poor site soils likely require over-excavation to depths of 18 to 23 ft BGS and backfilling with foundation material	N/A	Poor site soils likely require over-excavation to depths of 18 to 23 ft BGS and backfilling with foundation material
Construct-ability	• Fish window limitations would apply • Relatively simple construction	N/A	• Fish window limitations would apply • Shoring likely required for excavation	N/A	• Fish window limitations would apply • Shoring likely required for excavation