

## **PROPOSED CONSTRUCTION ACTIVITIES**

The project, funded by the GLO grant, aims to rehabilitate an old detention area in disrepair (Lakeland Lake) and establish new detention areas alongside existing streams within the project area (**Appendix C**). The proposed excavation activities will be performed outside of the OHWM of the delineated streams.

## **PURPOSE AND NEED FOR THE WORK**

The overall purpose of the project is to reduce flooding risk within the City of Patton Village, as well as generally reduce flooding in the watershed, by restoring an old detention area (Lakeland Lake) and adding several more detention areas along Peach Creek Tributary No. 1.

## **IMPACTS**

The proposed drainage improvements will impact a total of 18.56 acres of jurisdictional wetlands. This includes 18.25 acres of Lakeland Lake, an old detention area whose berm blew out in two locations and is now a mosaic wetland feature. This area will be restored to its previous detention function, which will involve clearing and re-grading activities. Three other small wetland areas, totaling 0.31 acres, will also be impacted by the proposed project. These will be excavated as part of the addition of several more detention areas along the project corridor.

## **AVOIDANCE AND MINIMIZATION**

The Applicant has minimized impacts to potentially jurisdictional areas to the most practical extent possible while maintaining the purpose and need for the project. The Applicant has shifted the design to avoid 15,718 linear feet of Waters of the US, primarily a tributary of Peach Creek, located on the project site. All work around streams will be done above their OHWM.

## **ALTERNATIVES ANALYSIS**

### **No Action Alternative**

Under this scenario, the Applicant would not install the impoundment stormwater management features. A no action alternative was analyzed and eliminated for the following reason(s): 1) the desired goal of improving the safety of the citizens of Patton Village; 2) not constructing the proposed detention ponds and associated features would prohibit proper storm water drainage; and

3) the demand by public stakeholders for better access between disjointed portions of the park would not be satisfied; and 4) the grant funding would be forfeited.

Additionally, the grant funding may be at risk if the agreed upon project schedule is not adhered to. To meet the stipulated completion date of November 2024, construction activities need to begin no later than August 2023.

**Relocation (Off-Site) Alternative**

No off-site alternative exists as all approved funds must be utilized on improvements within the city. Additionally, for hydrologic reasons the detention ponds must be located near or along Peach Creek Tributary No. 1, the primary draining feature for the City of Patton Village.

**On-Site Alternative**

Onsite alternatives were analyzed in three phases, and were judged on their cost effectiveness, environmental impact, and stormwater detention capability. Phase 1 extends from the downstream end of Lakeland Lake to Main Street. Phase 2 is from Main Street to Crossroads. Phase 3 is from Crossroads to Tram Road. Phase 1 contains the majority of the proposed work, which if completed would reduce the modeled flood hazard to the adjacent residential area to a 100-year event. Phase 2, by itself, would reduce that flooding hazard to a 10-year event, and Phase 3 a 2-year event. Each phase would be dependent on the downstream ones, that is to say Phases 2 and/or 3 would not be viable without Phase 1.

From this, three Alternatives were evaluated:

	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
	Phase 1	Phase 1 + 2	Phase 1 + 2 + 3
CY of capacity	606,000	709,000	718,000
Cost (\$ million)	\$14	\$16.10	\$17.20
Wetland impacts	18.25 acs.	18.56 acs.	~24+ acs.

**Preferred Alternative**

The preferred alternative of Alternative 2 (combination of Phases 1 and 2) was determined to be the most practical and efficient means of mitigating flood risk, while limiting work within wetland areas (other than in the defunct Lakeland Lake area). Phase 1 by itself would be somewhat beneficial, but the addition of Phase 2 would only marginally increase cost and impacts to wetlands while providing a fairly substantial benefit to the overall flood control aspect of the system. Adding Phase 3 would be comparatively costly, providing only incremental flooding relief and having quite substantial impacts to wetlands. Phase 3 would also have unavoidable impacts to some streams.

**MITIGATION**

The 18.56 acres of delineated wetlands proposed to be impacted were evaluated by BOA using the Interim Hydrogeomorphic (iHGM) Wetland Functional Assessment for Herbaceous/Scrub-Shrub and Forested wetlands. It was determined that the total impacts in functional capacity units (FCUs) for forested wetlands are: 0.08 physical, 0.09 biological, and 0.07 chemical. For herbaceous/scrub-shrub, the impact FCU's are: 9.31 physical, 13.85 biological, and 8.35 chemical. The appropriate amount of mitigation credits will be purchased from Tarkington Bayou Mitigation Bank (or a similarly approved bank), pending USACE approval of the HGM values and permit package.

## **APPENDIX F**

### **MITIGATION PLAN AND ASSESSMENT MODELS**

## Patton Village IP Impacts Assessment Summary

<b>WAA</b>		<b>acres</b>	<b>Physical</b>	<b>Biological</b>	<b>Chemical</b>
WAA 4	PEM	0.02	0.01	0.01	0.01
WAA 7	PEM	0.08	0.06	0.07	0.06
WAA 10	PSS	3.56	2.05	2.67	1.74
WAA 9	PSS	14.7	7.11	11.03	6.47
WAA 8	PEM	0.08	0.07	0.07	0.07
		Total	9.31	13.85	8.35
WAA 5	PFO	0.13	0.08	0.09	0.07

**Interim Riverine/Herbaceous Shrub Hydrogeomorphic Analysis Worksheet**  
 (Project #12345 Patton Village)

**WAA 4 - Pre-Project Year "0"**  
**Natural Conditions - Existing Site**

**Acreage = 0.02**

Variable	Sub-Index	Notes
V <sub>dur</sub>	0.75	In an average year 80% of the WAA either floods and/or ponds for at least 7 consecutive days
V <sub>freq</sub>	0.50	Floods or ponds 2 out of 5 years (100 yr floodplain)
V <sub>topo</sub>	0.40	Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features
V <sub>wood</sub>	0.75	67-90% of the WAA is covered with woody vegetation
V <sub>mid</sub>	0.50	Midstory coverage of the WAA is between 25-50%
V <sub>herb</sub>	0.30	Herbaceous cover in the WAA averages between 1-25%
V <sub>connect</sub>	1.00	Wetland plus four habitat types and/or surrounded by forested
V <sub>detritus</sub>	0.30	Less than 10% of the area possesses an O or A horizon
V <sub>redox</sub>	0.10	Redox features less than 20%
V <sub>sorpt</sub>	0.50	The WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays

**Functional Capacity Index (FCI)**

<b>Physical</b>	0.495
<b>Biological</b>	0.600
<b>Chemical</b>	0.540

**Functional Capacity Units (FCU)**

<b>Physical</b>	0.010
<b>Biological</b>	0.012
<b>Chemical</b>	0.011

**Interim Riverine/Herbaceous Shrub Hydrogeomorphic Analysis Worksheet**  
 (Project #12345 Patton Village)

**WAA 7 - Pre-Project Year "0"**  
**Natural Conditions - Existing Site**

**Acreage = 0.08**

Variable	Sub-Index	Notes
V <sub>dur</sub>	1.00	In an average year 80% of the WAA either floods and/or ponds for at least 14 consecutive days
V <sub>freq</sub>	0.75	Floods or ponds 3 or 4 out of 5 years (elevation data reveals in floodway and mapped w/n 100 yr floodplain)
V <sub>topo</sub>	0.70	15-30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features
V <sub>wood</sub>	0.50	34-66% of the WAA is covered with woody vegetation
V <sub>mid</sub>	0.50	Midstory coverage of the WAA is between 25-50%
V <sub>herb</sub>	1.00	Herbaceous cover in the WAA averages greater than 75%
V <sub>connect</sub>	1.00	Wetland plus four habitat types and/or surrounded by forested
V <sub>detritus</sub>	1.00	Greater than 85% of the area possesses an O or A horizon
V <sub>redox</sub>	1.00	Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive redoximorphic processes (many mottles)
V <sub>sorpt</sub>	0.50	The WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays

**Functional Capacity Index (FCI)**

<b>Physical</b>	0.792
<b>Biological</b>	0.833
<b>Chemical</b>	0.763

**Functional Capacity Units (FCU)**

<b>Physical</b>	0.063
<b>Biological</b>	0.067
<b>Chemical</b>	0.061

**Interim Riverine/Herbaceous Shrub Hydrogeomorphic Analysis Worksheet**  
 (Project #12345 Patton Village)

**WAA 8 - Pre-Project Year "0"**  
**Natural Conditions - Existing Site**

**Acreage = 0.08**

Variable	Sub-Index	Notes
V <sub>dur</sub>	1.00	In an average year 80% of the WAA either floods and/or ponds for at least 14 consecutive days
V <sub>freq</sub>	1.00	Floods or ponds annually 5 out of 5 years (floodway)
V <sub>topo</sub>	0.70	15-30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features
V <sub>wood</sub>	0.75	67-90% of the WAA is covered with woody vegetation
V <sub>mid</sub>	0.75	Midstory coverage of the WAA is between 50-75%
V <sub>herb</sub>	1.00	Herbaceous cover in the WAA averages greater than 75%
V <sub>connect</sub>	1.00	Wetland plus four habitat types and/or surrounded by forested
V <sub>detritus</sub>	1.00	Greater than 85% of the area possesses an O or A horizon
V <sub>redox</sub>	1.00	Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive redoximorphic processes (many mottles)
V <sub>sorpt</sub>	0.50	The WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays

**Functional Capacity Index (FCI)**

<b>Physical</b>	0.887
<b>Biological</b>	0.917
<b>Chemical</b>	0.880

**Functional Capacity Units (FCU)**

<b>Physical</b>	0.071
<b>Biological</b>	0.073
<b>Chemical</b>	0.070

**Interim Riverine/Herbaceous Shrub Hydrogeomorphic Analysis Worksheet**  
 (Project #12345 Patton Village)

**WAA 9 - Pre-Project Year "0"**  
**Natural Conditions - Existing Site**

**Acreage = 14.70**

<b>Variable</b>	<b>Sub-Index</b>	<b>Notes</b>
V <sub>dur</sub>	0.25	In an average year 25-50% of the WAA either floods and/or ponds for at least 7 consecutive days
V <sub>freq</sub>	0.50	Floods or ponds 2 out of 5 years (100 yr floodplain)
V <sub>topo</sub>	0.70	15-30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features
V <sub>wood</sub>	0.50	34-66% of the WAA is covered with woody vegetation
V <sub>mid</sub>	0.50	Midstory coverage of the WAA is between 25-50%
V <sub>herb</sub>	0.75	Herbaceous cover in the WAA averages between 50-75%
V <sub>connect</sub>	1.00	Wetland plus four habitat types and/or surrounded by forested
V <sub>detritus</sub>	0.30	Less than 10% of the area possesses an O or A horizon
V <sub>redox</sub>	0.10	Redox features less than 20%
V <sub>sorpt</sub>	0.50	The WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays

**Functional Capacity Index (FCI)**

<b>Physical</b>	0.484
<b>Biological</b>	0.750
<b>Chemical</b>	0.440

**Functional Capacity Units (FCU)**

<b>Physical</b>	7.114
<b>Biological</b>	11.025
<b>Chemical</b>	6.468



**Interim Riverine/Herbaceous Shrub Hydrogeomorphic Analysis Worksheet**  
 (Project #12345 Patton Village)

**WAA 10 - Pre-Project Year "0"**  
**Natural Conditions - Existing Site**

**Acreage = 3.56**

Variable	Sub-Index	Notes
$V_{dur}$	0.50	In an average year 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days
$V_{freq}$	0.50	Floods or ponds 2 out of 5 years (100 yr floodplain)
$V_{topo}$	0.70	15-30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features
$V_{wood}$	0.50	34-66% of the WAA is covered with woody vegetation
$V_{mid}$	0.50	Midstory coverage of the WAA is between 25-50%
$V_{herb}$	0.75	Herbaceous cover in the WAA averages between 50-75%
$V_{connect}$	1.00	Wetland plus four habitat types and/or surrounded by forested
$V_{detritus}$	0.30	Less than 10% of the area possesses an O or A horizon
$V_{redox}$	0.10	Redox features less than 20%
$V_{sorpt}$	0.50	The WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays

**Functional Capacity Index (FCI)**

<b>Physical</b>	0.576
<b>Biological</b>	0.750
<b>Chemical</b>	0.490

**Functional Capacity Units (FCU)**

<b>Physical</b>	2.049
<b>Biological</b>	2.670
<b>Chemical</b>	1.744

**Interim Riverine Forested Shrub Hydrogeomorphic Analysis Worksheet**  
 (Project #12345 Patton Village)

**WAA 5 - Pre-Project Year "0"**  
**Natural Conditions - Existing Site**

**Acreeage = 0.13**

Variable	Sub-Index	Notes
V <sub>dur</sub>	0.75	In an average year at 80% of the WAA either floods and/or ponds for at least 7 consecutive days
V <sub>freq</sub>	0.50	Floods or ponds 2 out of 5 years (100- year floodplain)
V <sub>topo</sub>	0.40	Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features
V <sub>cwd</sub>	0.50	From 3 -7 pieces of cwd greater than 3" diameter along 100' transect
V <sub>wood</sub>	0.75	67 to 90 % of the WAA is covered with woody vegetation
V <sub>tree</sub>	1.00	At least 60% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 5% of the stand.
V <sub>rich</sub>	0.60	Three tree species present
V <sub>basal</sub>	0.40	The average basal area of the WAA is less than 60 square ft /acre
V <sub>density</sub>	0.60	The WAA averages a tree density of 250-500 trees/acre OR 50-100 trees/acre
V <sub>mid</sub>	0.50	Midstory coverage of the WAA is between 11-30%
V <sub>herb</sub>	0.30	Herbaceous cover in the WAA is less than 5% or greater than 50%
V <sub>detritus</sub>	0.30	Less than 10% of the area possesses an O or A horizon
V <sub>redox</sub>	0.10	Redox features less than 20%
V <sub>sorpt</sub>	0.50	WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays
V <sub>connect</sub>	1.00	Wetland plus four habitats and/or surrounded by forested

**Functional Capacity Index (FCI)**

<b>Physical</b>	0.580
<b>Biological</b>	0.667
<b>Chemical</b>	0.570

**Functional Capacity Units (FCU)**

<b>Physical</b>	0.075
<b>Biota</b>	0.087
<b>Chemical</b>	0.074

Tarkington Bayou MB											
HUC	Feature Type	TOTAL IMPACTS			Service Area Multiplier	FCUs REQUIRED FROM GCPMB			Total Number of Wetland FCUs	Price per FCU*	Cost of Wetland FCUs
		TSSW	MPAC	RSEC		TSSW	MPAC	RSEC			
East Fork San Jacinto	PFO	0.08	0.09	0.07	1.0	0.08	0.09	0.07			
East Fork San Jacinto	PEM/PSS	9.31	13.85	8.35	1.0	9.31	13.85	8.35			
						<i>9.39</i>	<i>13.94</i>	<i>8.42</i>			
		<b>Total FCUs** Required from TBMB</b>				<b>14.0</b>	<b>14.0</b>	<b>14.0</b>	<b>42.00</b>		
		<b>Mitigation cost</b>								<b>\$65,000</b>	<b>\$2,730,000</b>

\*Price valid through 9-21-2022

\*\*FCU Credits Subject to Availability - PEM/PSS credits availability subject to USACE release anticipated end of 2022

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