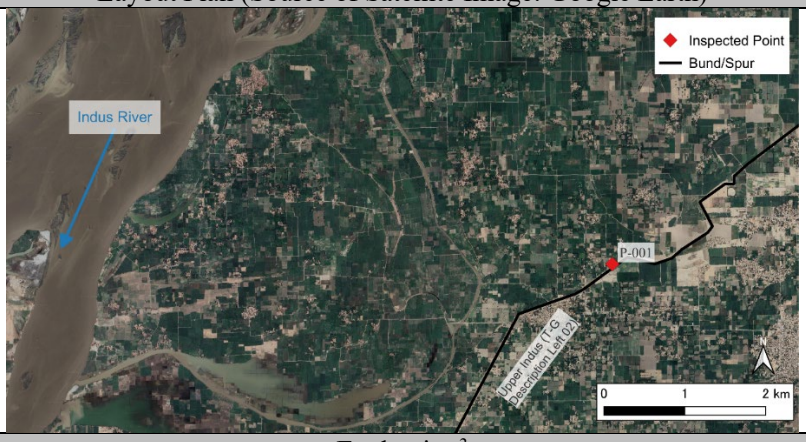
Minchin Flood Bund RD 90+000

Creation Date: 3/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Bahawalpur Zone | Punjnad Headworks Division | Punjnad Canal Circle |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-001 | Indus River | Indus River | Left |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Minchin Flood Bund | | RD 90+000 to 100+000 | 29°08'78.33"N, 70°76'66.67"E |

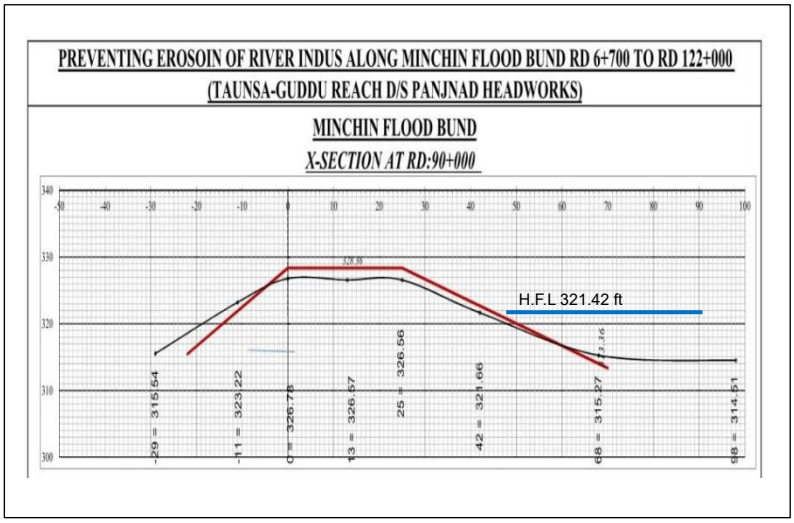
| | |
|---|---|
| Name of Vulnerable Point | Minch in Flood Bund RD 90+000 to 100+000 |
| Reason for the Vulnerability | • In 2010 flood, seepage water crossed this bund at this reach and approx. 10 feet. deep pit was formed on the country side of the bund.<br>• During 2015 flood, the River Indus impacted the same reach once again |
| Flow Condition[1] | • There is no flow at this location due to shift in the river's direction away from the bund.<br>• River is approx. 4 km away from the said reach. |
| Site Condition in the Country Side[2] | • Cultivated land is located on the countryside side of the bund, supporting agricultural activities in the area.. |

Layout Plan (Source of Satellite Image: Google Earth)




| Evaluation[3] | |
|---|---|
| Category | Quality Score |
| **Emergent Type C** | **4/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 326.57 feet. | Not Applicable — |
| | H.F. L | 321.42 feet | |
| | Free Board Height | 5.15 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:3 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 1000 feet | |
| | Slope Protection Material | Earthen (Silty clay) | |
| | Covering Material/ Pavement on the Top | Earthen (Silty clay) | |
| | Embankment Material | Earthen (Silty clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Nil | |
| Typical Cross Section |   | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | Nil | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Preventing erosion of River Indus along Minchin Flood Bund Rd 6+700 to Rd 122+000 (Taunsa-Guddu Reach D/S Panjnad Headworks) | Rs. 669.77 Million | ADB |

<table>
<tr><th colspan="3">Site Photo</th></tr>
<tr><td rowspan="8">Vulnerable Section</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">Close View of Deformation<br>  <br>Road crossing by cutting the bund</td></tr>
<tr><td colspan="2">Close View of Damages<br>Not Applicable</td></tr>
</table>

<table>
<tr><td></td><td>Photo with 360$^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td>General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  <br>Facing Upstream Side<br>  </td></tr>
<tr><td>General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  <br>Facing Upstream Side<br>  </td></tr>
<tr><td>General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  <br>Facing Upstream Side<br>  </td></tr>
<tr><td>Photo with 360$^0$ angles<br>  </td></tr>
</table>

| | |
|---|---|
| Downstream End of the Bund | General View<br>(Not Available) |
| | Photo with $360^0$ angles<br>(Not Available) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, and deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 03/3/2024 | Visual Inspection | • Top level is bumpy and uneven.<br>• Natural surface level is approximately 28 feet below the top level.<br>• Cultivated areas are present on the countryside side of the bund.<br>• Seepage was observed in the past flood.<br>  <br>Cropped area towards country side | L |

*[4] Current Status, Effect of the Existing Structural Countermeasure Such As Spurs/studs, Sheet Piles for Seepage Control etc and Development of Erosion, Deformation, Deterioration of the Existing Bund*

*[5] a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | YES | Seepage was observed. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 5.1 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Pass | Floodplain length is about 15900 feet. |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Emergent Type C** | |
| | For Evaluation Score | Bund Damage | | 3 | Seepage was observed. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 5.1 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 0 | Floodplain length is about 15900 feet. |
| | **Quality Score** | | | **4/9** | |

Note) HGL: hydraulic gradient line

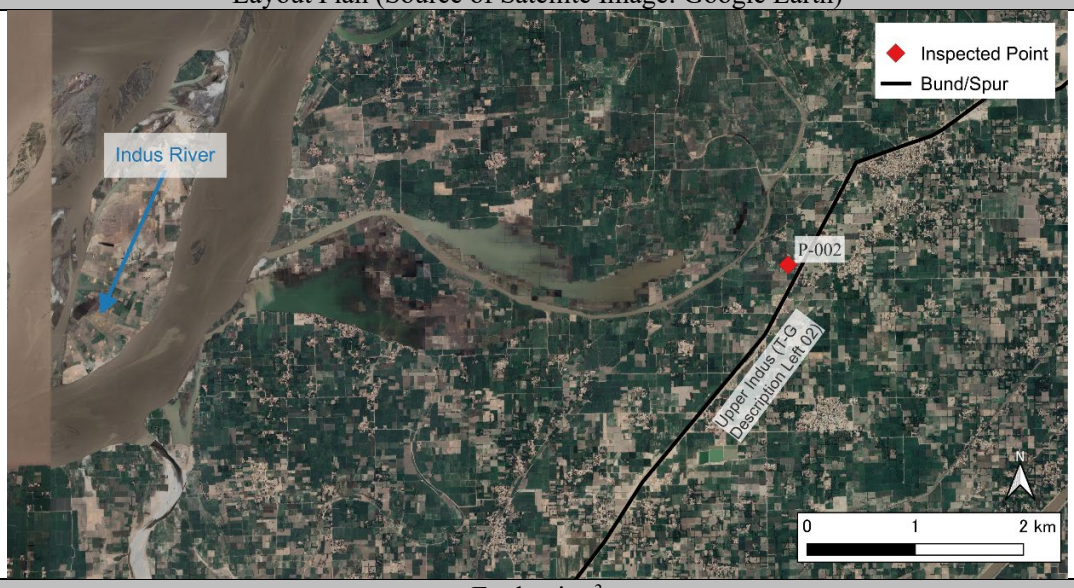
Minchin Flood Bund RD 105+000

Creation Date: 30/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Bahawalpur Zone | Punjnad Headworks Division | Punjnad Canal Circle |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-002 | Indus River | Indus River | Left |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Minchin Flood Bund | | RD 105+000 - 122 +000 | 29°07'38.33"N, 70°74'83.33"E |

| | |
|---|---|
| Name of Vulnerable Point | REACH RD: 105+000 - 122 +000 |
| Reason for the Vulnerability | • During flood 2010, the backwater of river Indus impacted the Minchin Bund RD: 122+000 to 60+000, causing seepages at different locations, which were managed and protected by providing earthen backfill (pushta). |
| Flow Condition[1] | • There is no flow at this location because the river has changed its direction away from the bund.<br>• River is approximately 4 km away from the said reach. |
| Site Condition in the Country Side[2] | • Cultivated areas and human settlements are located on the countryside side of the bund. |

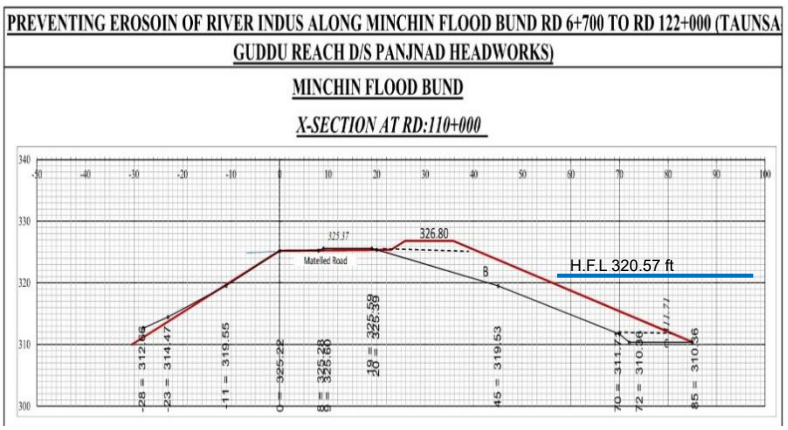
Layout Plan (Source of Satellite Image: Google Earth)




Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type C** | **2/9** |

[1] *Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
[2] *Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
[3] *Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 326.8 feet. | Not Applicable |
| | H.F. L | 320.57 feet | |
| | Free Board Height | 6.23 feet | |
| | Top Width | 40 ft. with back dowel bund | |
| | River Side Slope | 1:3 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 1000 feet. | |
| | Slope Protection Material | Earthen (Silty clay) | |
| | Covering Material/ Pavement on the Top | Earthen (Silty clay) | |
| | Embankment Material | Earthen (Silty clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | No | |
| Typical Cross Section |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | Nil | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Preventing erosion of River Indus along Minchin Flood Bund Rd 6+700 to Rd 122+000 (Taunsa-Guddu Reach D/S Panjnad Headworks) | Rs. 669.77 Million | ADB |
| | | | |
| | | | |

<table>
<tr><th colspan="3">Site Photo</th></tr>
<tr><td rowspan="11">Vulnerable Section</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">Close View of Deformation<br>Not Applicable</td></tr>
<tr><td colspan="2">Close View of Damages<br>Not Applicable</td></tr>
<tr><td colspan="2">Photo with $360^0$ angles</td></tr>
<tr><td rowspan="3">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

<table>
<tr><td rowspan="5"></td><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">360 Degrees Photo</td></tr>
<tr><td rowspan="2">Downstream End of the Bund</td><td colspan="2">General View<br>(Not Available)</td></tr>
<tr><td colspan="2">Photo with $360^0$ angles<br>(Not Available)</td></tr>
<tr><td rowspan="2">Upstream End of the Bund</td><td colspan="2">General View (In the case that the VP is located near the end)<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Photo with $360^0$ angles<br>(Not Applicable)</td></tr>
</table>

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, and deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 03/3/2024 | Visual Inspection | • A metaled road runs along the top of the bund.<br>• Natural surface level is approximately 15 feet below the top of the bund.<br>• Cultivated areas are present on both side of the bund.<br>  <br><br>Metaled road on top of the bund<br>  <br><br>Cropped area on either side of the bund | A |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such As Spurs/studs, Sheet Piles for Seepage Control etc and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 6.2 feet. |
| | | | Bund Width | Fail | The HGL isn't exposed above the ground, but the soil cover thickness over HGL is less than the guideline value ( 2 feet > Soil Depth ≧0 feet ). |
| | | | Flood Plain Length | Pass | Floodplain length is about 13,000 feet. |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 6.2 feet. |
| | | | Bund Width | 1 | The HGL isn't exposed above the ground, but the soil cover thickness over HGL is less than the guideline value ( 2 feet > Soil Depth ≧0 feet ). |
| | | | Flood Plain Length | 0 | Floodplain length is about 13000 feet. |
| | **Quality Score** | | | **2/9** | |

Note) HGL: hydraulic gradient line

Minchin Flood Bund RD 207+000 (Ahmad Kuddan)

Creation Date: 02/3/2024

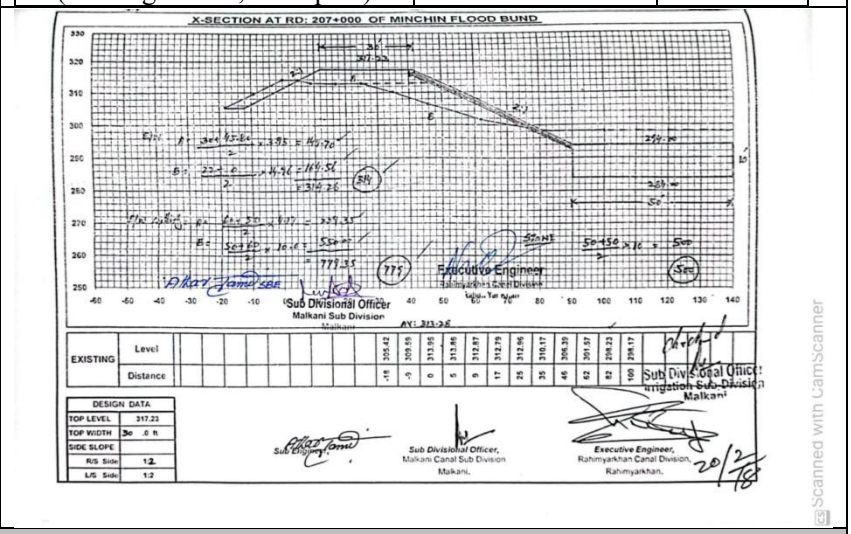
| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Bahawalpur Zone | Rahim Yar Khan Canal Division | Rahim Yar Khan Canal Circle |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-003a | Indus River | Indus River | Left |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Minchin Flood Bund | | RD 206+000-224+000 | 28°91'2."N, 70°53'5."E |
| Name of Vulnerable Point | Reach RD 206+000-224+000 (Reach Ahmad Kundan) _1 | | |
| Reason for the Vulnerability | • The river's flow is directed toward this reach. Four studs were previously constructed in 2022, which were directly exposed to the river's erosive action.<br>• Significant erosion has been observed along the flood bund at this RD.<br>• There is proposal of providing stone pitching from RD 207+000 to RD 212+000 towards Riverside to prevent further erosion of the river. | | |
| Flow Condition[1] | • Sever turbulent flow has been observed along the flood bund. | | |
| Site Condition in the Country Side[2] | • 5/R Chahchran Disty. is observed towards the country side of the above said reach.<br>• Cultivatwed area observed beyond the Disty. Which 22 feet. beneath the top level of the said reach. | | |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Emergent Type C** | **5/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 317.23 feet | Not Applicable |
| | H.F. L | 307.48 feet | |
| | Free Board Height | 9.75 feet | |
| | Top Width | 30 feet | |
| | River Side Slope | 1:3 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 1000 feet | |
| | Slope Protection Material | Earthen (clay) | |
| | Covering Material/ Pavement on the Top | Earthen (clay) | |
| | Embankment Material | Earthen (clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | No | |
| Typical Cross Section |   | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| 2021 | River side slop damaged | Slope damaged due to erosion of the river |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| 2022 | 4 No. studs constructed | Not provided by field staff | Maintenance and repair work by the PID |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

<table>
<tr><th colspan="3">Site Photo</th></tr>
<tr><td rowspan="8">Vulnerable<br>Section</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
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<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">Close View of Deformation<br>  </td></tr>
</table>

<table>
<tr><td></td><td colspan="2">Close View of Damages<br>  </td></tr>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="4">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

<table>
<tr><td rowspan="3"></td><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="2">Downstream End of the Bund</td><td colspan="2">General View<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Photo with $360^0$ angles<br>(Not Applicable)</td></tr>
<tr><td rowspan="2">Upstream End of the Bund</td><td colspan="2">General View (In the case that the VP is located near the end)<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Photo with $360^0$ angles<br>(Not Applicable)</td></tr>
</table>

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, and deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 02/3/2024 | Visual Inspection | • Extreme erosion has been observed along the flood bund at this RD.<br>• Top level is bumpy and uneven.<br>• 5/R Chahchran Disty. is observed towards the country side of the said RD.<br>• Cultivated area has been observed beyond the Disty. Which 22 feet. beneath the top level of the said reach.<br>  <br>Extreme erosive action<br>  <br>5/R Chahchran Disty. is observed towards the country side<br>  <br>Cropped area observed beyond the Disty. | c |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such As Spurs/studs, Sheet Piles for Seepage Control etc and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | YES | The bund body is currently damaged. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 9.8 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Fail | The river touch the bund |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Emergent Type C** | |
| | For Evaluation Score | Bund Damage | | 3 | The bund body is currently damaged. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 9.8 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 2 | The river touches the bund |
| | **Quality Score** | | | **5/9** | |

Note) HGL: hydraulic gradient line

Minchin Flood Bund RD 214+000 (Ahmad Kuddan)

Creation Date: 02/3/2024

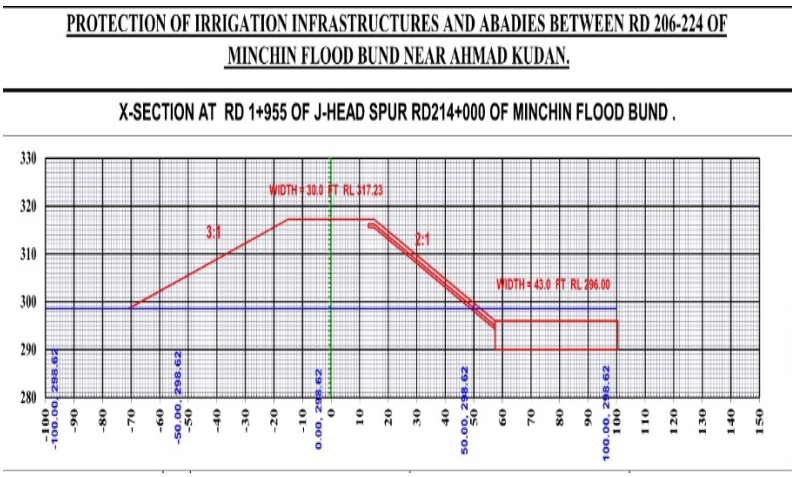
| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Bahawalpur Zone | Rahim Yar Khan Canal Division | Rahim Yar Khan Canal Circle |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-003b | Indus River | Indus River | Left |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Minchin Flood Bund | | RD 206+000-224+000 | 28°89'83.33"N, 70°52'."E |
| Name of Vulnerable Point | Reach RD 206+000-224+000 (Reach Ahmad Kundan) _2 | | |
| Reason for the Vulnerability | • The said reach was previously vulnerable as the river's flow was directed towards the bund.<br>• However, after construction of J head spur, now river has shifted approximately 2 km away from the bund. | | |
| Flow Condition[1] | • Small creek / standing water, and populated areas observed on the riverside of the newly constructed J head spur and the bund. | | |
| Site Condition in the Country Side[2] | • River bed is present on the both sides of the J head spur. On the country side areas of the bund, there is cultivated lands and dense population | | |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type C** | **2/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 317.23 feet | Not Applicable |
| | H.F. L | 306.50 feet | |
| | Free Board Height | 10.73 feet | |
| | Top Width | 30 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 3087 feet | |
| | Slope Protection Material | Stone pitched on river side and 150 feet. stone pitched on the downstream side | |
| | Covering Material/ Pavement on the Top | Shingle and reserve stock of stones | |
| | Embankment Material | Earthen (clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | No | |
| Typical Cross Section |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| 2024 | A J-head spur was proposed and is under construction for the Minchin flood bund and allied irrigation infrastructure, with a reserve stock of stones on top of the spur remaining at the time of the inspection. | 1210 M | Annual Development Program (ADP) |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

<table>
<tr><th colspan="3">Site Photo</th></tr>
<tr><td rowspan="8">Vulnerable<br>Section</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">Close View of Deformation<br>(Not Available)</td></tr>
<tr><td colspan="2">Close View of Damages<br>(Not Available)</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
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<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2"></td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, and deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 02/3/2024 | Visual Inspection | • Small creeks / standing waters have been observed along the said reach.<br>• At this RD, 5/R distributary (Small canal) is flowing along the country side.<br>  <br>Small creek / standing water observed along the said reach<br>  <br>5/R distributary (Small canal) is flowing along the country side | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such As Spurs/studs, Sheet Piles for Seepage Control etc and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 10.7 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Fail | The river touch the bund |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 10.7 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 2 | The river touch the bund |
| | **Quality Score** | | | **2/9** | |

Note) HGL: hydraulic gradient line

Minchin Flood Bund RD 220+000 (Ahmad Kuddan)

Creation Date: 02/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Bahawalpur Zone | Rahim Yar Khan Canal Division | Rahim Yar Khan Canal Circle |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-003c | Indus River | Indus River | Left |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Minchin Flood Bund | | RD 206+000-224+000 | 28°88'91.67"N, 70°51'."E |

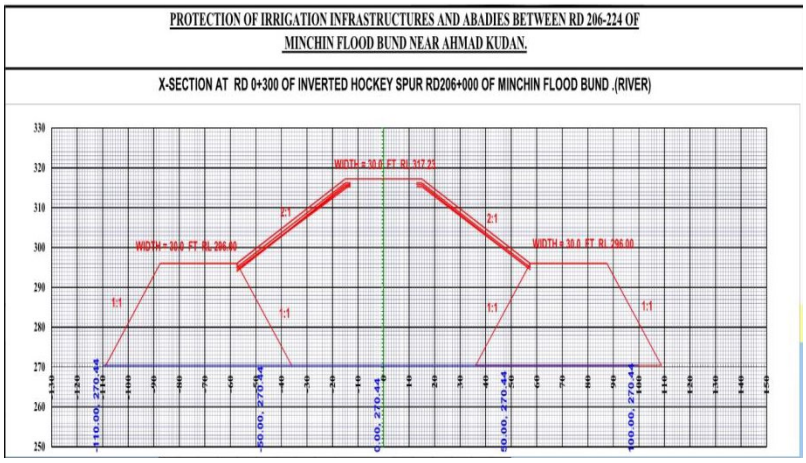
| | |
|---|---|
| Name of Vulnerable Point | Reach RD 206+000-224+000 (Reach Ahmad Kundan)_3 |
| Reason for the Vulnerability | • River Indus was directly impacting the said reach, and that was the reason to consider it as vulnerable. As a result, the construction of the J-head spur was proposed and completed to address this issue. |
| Flow Condition[1] | • Small creek has been observed on the riverside of the newly constructed J head spur. |
| Site Condition in the Country Side[2] | • River bed on the both sides of the J head spur. Cultivated area and dense population are observed on both side of the bund. |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type C** | **3/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 317.23 feet. | Not Applicable |
| | H.F. L | 305.66 feet | |
| | Free Board Height | 11.57 feet | |
| | Top Width | 30 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 2717 feet | |
| | Slope Protection Material | Stone pitched on river side and 150 feet. stone pitched on the downstream side | |
| | Covering Material/ Pavement on the Top | Shingle and reserve stock of stones | |
| | Embankment Material | Earthen (clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Nil | |
| Typical Cross Section |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| 2024 | To protect Basti Hayyat Muhmmad, and Basti Arshad Khan, a J-head spur was proposed and is under construction, with a stone stacking remaining at the time of inspection | 1210 M | Annual Development Program (ADP) |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>(Not Applicable) | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2"></td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, and deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 02/3/2024 | Visual Inspection | • Small creek are flowing along the said reach.<br>• Reserve stock of stones was found at the top of spur.<br>  <br>Small creek flowing along the said reach<br>  <br>Reserve stock of stones was present at the top of spur | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such As Spurs/studs, Sheet Piles for Seepage Control etc and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 11.6 feet. |
| | | | Bund Width | Fail | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | Fail | The river touch the bund |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 11.6 feet. |
| | | | Bund Width | 1 | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | 2 | The river touch the bund |
| | **Quality Score** | | | **3/9** | |

Note) HGL: hydraulic gradient line

J-Head Spur Number 1 at RD 230+000

Creation Date: 2/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Bahawalpur Zone | Rahim Yar Khan Canal Division | Rahim Yar Khan Canal Circle |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-004 | Indus River | Indus River | Left |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Minchin Flood Bund | | RD 230+000 | 28°88'43.33"N, 70°47'83.33"E |

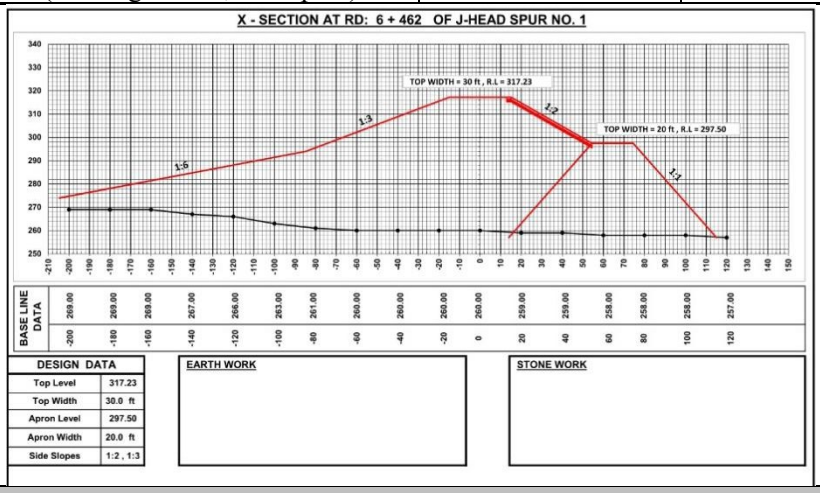
| | |
|---|---|
| Name of Vulnerable Point | J-Head Spur No. 1 at RD 230+000 |
| Reason for the Vulnerability | • River Indus is directly impacting the J-head spur.<br>• Restoration work was in progress at the time of inspection.<br>• River Indus is striking the nose point and stone pitching of the spur. |
| Flow Condition[1] | • Extreme turbulent flow observed on the riverside of the spur.<br>• The water was flowing just below the top level of apron. |
| Site Condition in the Country Side[2] | • Deep pit is present on the country side. The depth was measured at approximately 45 feet at the time of observation.<br>• Cultivated area and human settlement were also observed. |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Emergent Type C** | **4/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 317.23 feet | Not Applicable |
| | H.F. L | 304.26 feet | |
| | Free Board Height | 12.97 feet | |
| | Top Width | 30 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 7912 feet | |
| | Slope Protection Material | Stone pitched | |
| | Covering Material/ Pavement on the Top | Earthen (Silty clay) | |
| | Embankment Material | Earthen (Silty clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Nil | |
| Typical Cross Section |   | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| 2022 | Apron and shank damage | 970 feet of apron and shank portion damaged in 2022 flood. |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| 2024 | Restoration of apron and shank portion of J Head spur | 472.352 M | Maintenance and repair works by the PID |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation | |
| |  | |

<table>
<tr><td rowspan="2"></td><td>Close View of Damages<br>  </td></tr>
<tr><td>Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="5">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br> 
</td></tr>
</table>

<table>
<tr><td rowspan="3"></td><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="2">Downstream End of the Bund</td><td colspan="2">General View<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Photo with $360^0$ angles<br>(Not Applicable)</td></tr>
<tr><td rowspan="2">Upstream End of the Bund</td><td colspan="2">General View (In the case that the VP is located near the end)<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Photo with $360^0$ angles<br>(Not Applicable)</td></tr>
</table>

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, and deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 02/3/2024 | Visual Inspection | • Deep pit was formed during 2022 flood, with a depth of 45 feet, caused by the river's erosive action.<br>• After restoration, J-head portion again damaged at nose which disturbed the pitching too.<br>  <br>Deep pit formed in 2022 flood with 45 feet sounding<br>  <br>Damaged nose portion | c |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such As Spurs/studs, Sheet Piles for Seepage Control etc and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | YES | The bund body is currently damaged. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 13 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Fail | Floodplain length is about 200 feet. |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Emergent Type C** | |
| | For Evaluation Score | Bund Damage | | 3 | The bund body is currently damaged. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 13 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 1 | Floodplain length is about 200 feet. |
| | **Quality Score** | | | **4/9** | |

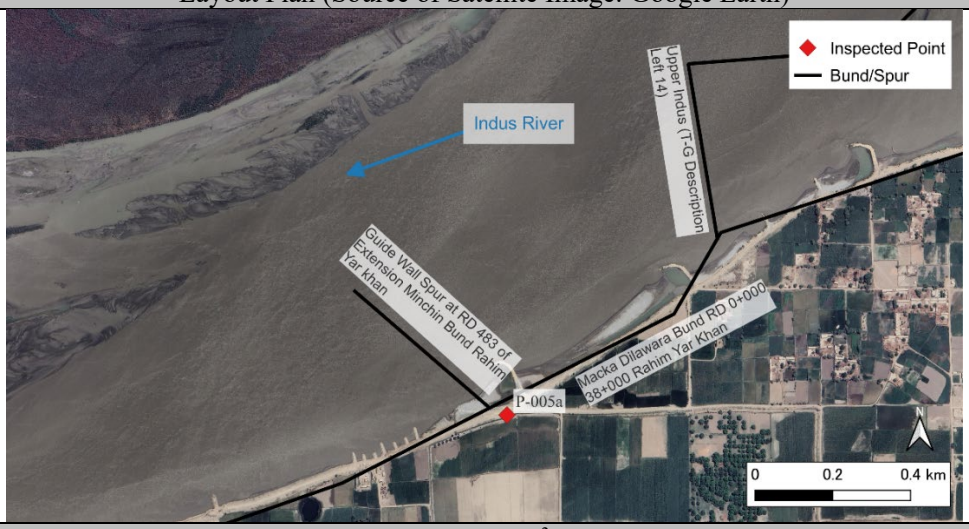
Note) HGL: hydraulic gradient line

Extension Minchin Flood Bund RD 465+500

Creation Date: 03/1/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Bahawalpur Zone | Dalas Canal Division | Rahim Yar Khan Canal Circle |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-005a | Indus River | Indus River | Left |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Extension Minch in Flood Bund | | RD: 458+000-465+000 & RD: 450-453 | 28°53'28.33"N, 69°96'33.33"E |
| Name of Vulnerable Point | RD: 458+000-465+000 & RD: 450-453 of Extension Minchin Flood Bund 1 | | |
| Reason for the Vulnerability | • There are 5 hockey studs and solid stone studs at RD 463 +800, RD 463+000, RD 462+500, RD 462+000 and RD 460 +500 respectively.<br>• These structures caused the river to drift approximately 200 feet away from the bund; however, it shifted downstream at RD 466+000, causing damage to the bund. | | |
| Flow Condition[1] | • Extreme turbulent flow approximately 200 feet away from the bund along the allied above said structures. | | |
| Site Condition in the Country Side[2] | Cultivated area was found towards country side. | | |

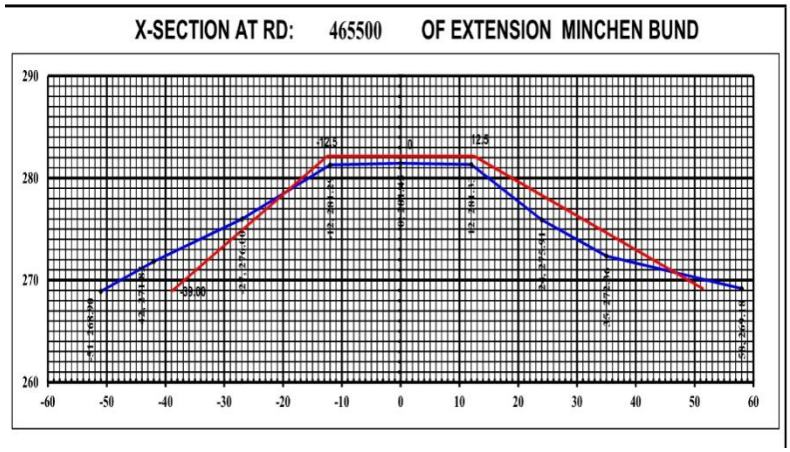
Layout Plan (Source of Satellite Image: Google Earth)




Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type R** | **3/9** |

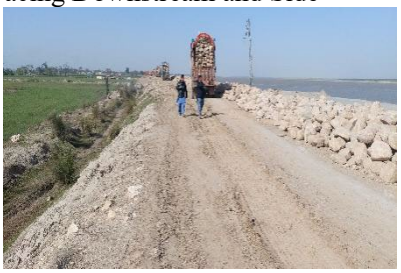
*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

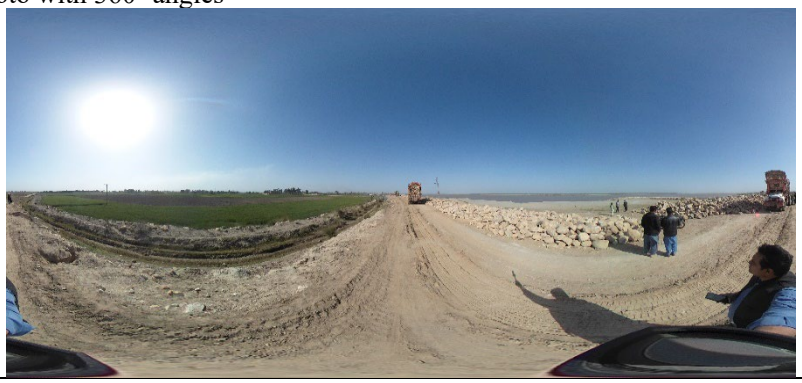
| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 281.14 feet | Not Applicable |
| | H.F. L | 274.83 feet | |
| | Free Board Height | 6.31 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | 1:3 | |
| | Longitudinal Length | 1000 feet | |
| | Slope Protection Material | Earthen (clay) | |
| | Covering Material/ Pavement on the Top | Earthen (clay) | |
| | Embankment Material | Earthen (clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Nil | |
| Typical Cross Section |   | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | Nil | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side  | Facing Upstream Side  |
| | General View of Top | |
| | Facing Downstream and Side  | Facing Upstream Side   |
| | General View of Landside | |
| | Facing Downstream and Side  | Facing Upstream Side  |
| | Close View of Deformation  | |

<table>
<tr><td></td><td colspan="2">Close View of Damages<br>  <br>Erosive action 200 feet away from bund inside the river bed</td></tr>
<tr><td></td><td colspan="2">Photo with 360$^0$ angles<br>  </td></tr>
<tr><td rowspan="8">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>(photography was restricted due to security reasons)</td><td>Facing Upstream Side<br>(photography was restricted due to security reasons)</td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>(photography was restricted due to security reasons)</td><td>Facing Upstream Side<br>(photography was restricted due to security reasons)</td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>(photography was restricted due to security reasons)</td><td>Facing Upstream Side<br>(photography was restricted due to security reasons)</td></tr>
<tr><td colspan="2">Photo with 360$^0$ angles<br>(photography was restricted due to security reasons)</td></tr>
<tr><td rowspan="2">Downstream End of the Bund</td><td colspan="2">General View<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Photo with 360$^0$ angles<br>(Not Available)</td></tr>
<tr><td rowspan="2">Upstream End of the Bund</td><td colspan="2">General View (In the case that the VP is located near the end)<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Photo with 360$^0$ angles<br>(Not Applicable)</td></tr>
</table>

<table>
<tr><th colspan="4">Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, and deterioration)</th></tr>
<tr><th>DD/MM/YYYY</th><th>Inspection Type</th><th>Description and Photo</th><th>Damage[5]</th></tr>
<tr><td>03/1/2024</td><td>Visual Inspection</td><td>
<ul>
<li>Continuous Erosion was observed along the allied river training structures.</li>
<li>Top level is bumpy and uneven.</li>
<li>Natural surface level is 15 feet below the top level.</li>
<li>Cultivated area was found towards country side.</li>
<li>Stone dumped at this reach for the restoration works at RD 466+000.</li>
</ul>
 <br>
Continuous Erosion observed along the allied river training structures<br>
 <br>
Cropped area towards country side<br>

<br>
Stone dumped at this reach for the restoration works
</td><td>a</td></tr>
</table>

[4] *Current Status, Effect of the Existing Structural Countermeasure Such As Spurs/studs, Sheet Piles for Seepage Control etc and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 6.3 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Fail | The river touch the bund |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | YES | It's been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type R** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 6.3 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 2 | The river touch the bund |
| | **Quality Score** | | | **3/9** | |

Note) HGL: hydraulic gradient line

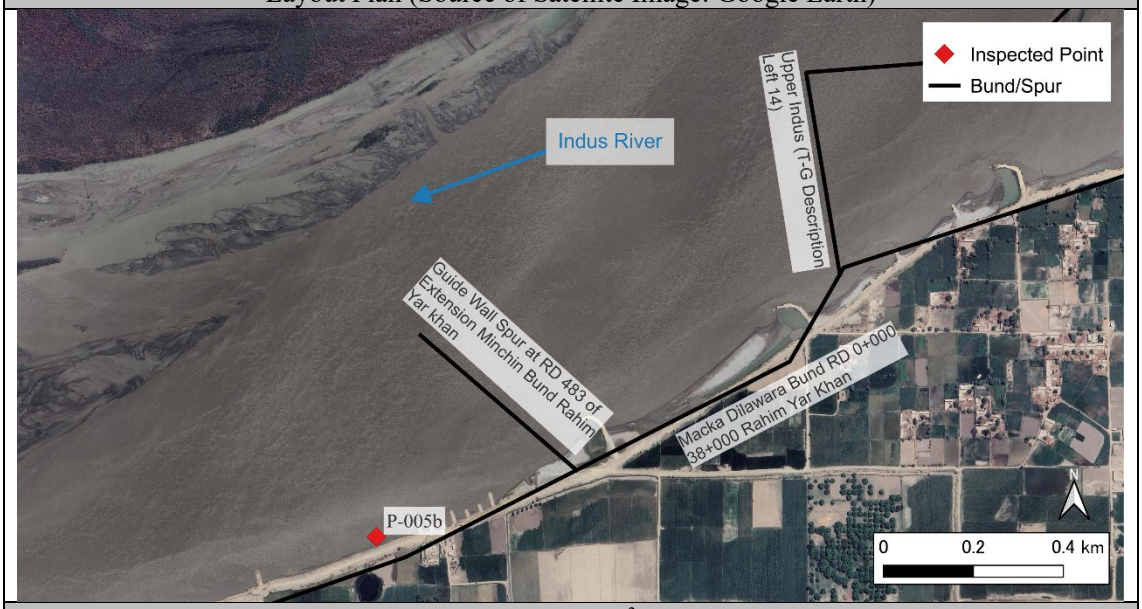
Extension Minchin Flood Bund RD 466+000

Creation Date: 03/1/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Bahawalpur Zone | Dalas Canal Division | Rahim Yar Khan Canal Circle |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-005b | Indus River | Indus River | Left |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Extension Minch in Flood Bund | | RD: 458+000-465+000 & RD: 450-453 | 28°53'16.67"N, 69°95'83.33"E |

| | |
|---|---|
| Name of Vulnerable Point | RD: 458+000-465+000 & RD: 450-453 of Extension Minchin Flood Bund_2 |
| Reason for the Vulnerability | • River drifted rapidly towards this reach, prompting an emergency was declared on December 23, 2023, with work started on December 29, 2023.<br>• There is severe erosive action in this reach. |
| Flow Condition[1] | • Extreme turbulent flow along the bund in the immediate vicinity in this reach. |
| Site Condition in the Country Side[2] | Cultivated area was found towards country side. |

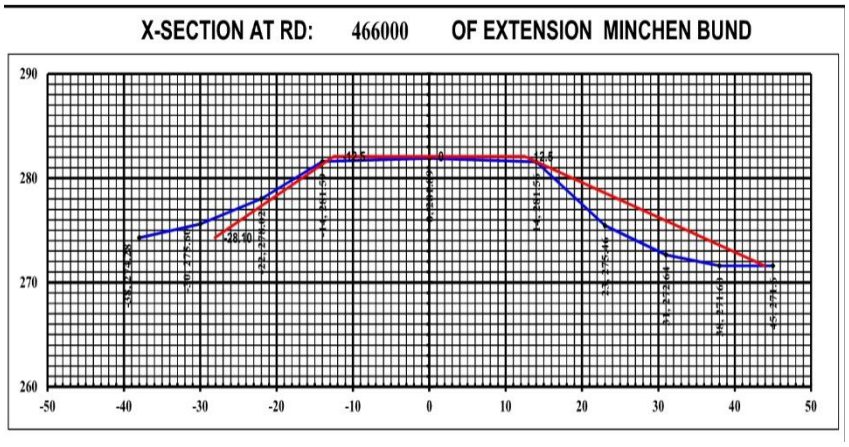
Layout Plan (Source of Satellite Image: Google Earth)




Evaluation[3]

| Category | Quality Score |
|---|---|
| **Emergent Type R** | **5/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

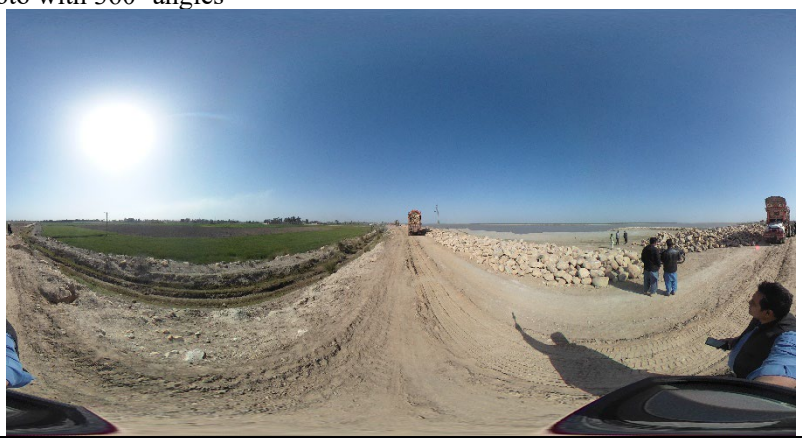
| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 282.0 feet | Not Applicable |
| | H.F. L | 274.83 feet | |
| | Free Board Height | 7.17 feet | |
| | Top Width | 28.00 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | 1:3 | |
| | Longitudinal Length | 1000 feet | |
| | Slope Protection Material | Earthen (clay) | |
| | Covering Material/ Pavement on the Top | Earthen (clay) | |
| | Embankment Material | Earthen (clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | No | |
| Typical Cross Section |   | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| 12/2023 | Erosive action at the bund | There is severe erosive action in this reach at the time of visit |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| 12/2023 | Providing 3 solid stone studs in this reach to avoid erosion on the bund | 79 M | Maintenance and repair works by the PID |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | In progress | | |
| | | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side  | Facing Upstream Side  |
| | General View of Top | |
| | Facing Downstream and Side  | Facing Upstream Side  |
| | General View of Landside | |
| | Facing Downstream and Side  | Facing Upstream Side  |
| | Close View of Deformation  | |

<table>
<tr><td></td><td>Close View of Damages<br>  </td></tr>
<tr><td></td><td>Photo with 360$^0$ angles<br>  </td></tr>
<tr><td rowspan="8">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side (photography was restricted due to security reasons)</td><td>Facing Upstream Side (photography was restricted due to security reasons)</td></tr>
<tr><td colspan="2">General View of Top</td></tr>
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<tr><td colspan="2">Photo with 360$^0$ angles<br>(photography was restricted due to security reasons)</td></tr>
<tr><td rowspan="2">Downstream End of the Bund</td><td colspan="2">General View<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Photo with 360$^0$ angles<br>(Not Available)</td></tr>
<tr><td rowspan="2">Upstream End of the Bund</td><td colspan="2">General View (In the case that the VP is located near the end)<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Photo with 360$^0$ angles<br>(Not Applicable)</td></tr>
</table>

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, and deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 03/1/2024 | Visual Inspection | • Continuous erosion was observed along river side.<br>• Top level is bumpy and uneven.<br>• Natural surface level is 12 feet. below the top level.<br>  <br>Continuous erosion observed along river side | c |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such As Spurs/studs, Sheet Piles for Seepage Control etc and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | YES | The bund body is currently damaged. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 7.2 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Fail | The river touch the bund |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | YES | It's been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Emergent Type R** | |
| | For Evaluation Score | Bund Damage | | 3 | The bund body is currently damaged. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 7.2 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 2 | The river touch the bund |
| | **Quality Score** | | | **5/9** | |

Note) HGL: hydraulic gradient line

Extension Minchin Flood Bund RD 467+000 and RD 468 +000

Creation Date: 03/1/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Bahawalpur Zone | Dalas Canal Division | Rahim Yar Khan Canal Circle |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-005c | Indus River | Indus River | Left |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Extension Minch in Flood Bund | | RD 458+000 to465+000 and RD 450 to 453 | 28°53'06.67"N, 69°95'66.67"E |

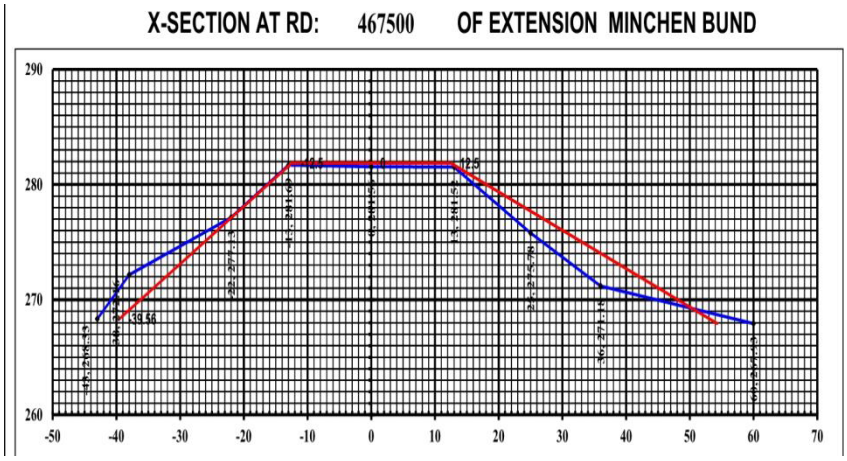
| | |
|---|---|
| Name of Vulnerable Point | RD 458+000 to 465+000 and RD 450 to 453 of Extension Minchin Flood Bund_3 |
| Reason for the Vulnerability | • River drifted towards this reach, now flowing just 100 feet away from the bund, which is the major cause of vulnerability. |
| Flow Condition[1] | • Extreme turbulent flow along the bund 100 feet away from the bund in this reach. |
| Site Condition in the Country Side[2] | • Cropped area towards country side. |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type R** | **2/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 281.69 feet | Not Applicable _ |
| | H.F.L | 274.83 feet | |
| | Free Board Height | 6.86 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | 1:3 | |
| | Longitudinal Length | 1000 ft. | |
| | Slope Protection Material | Earthen (Clay) | |
| | Covering Material/ Pavement on the Top | Earthen (Clay) | |
| | Embankment Material | Earthen (Clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section |   | | |

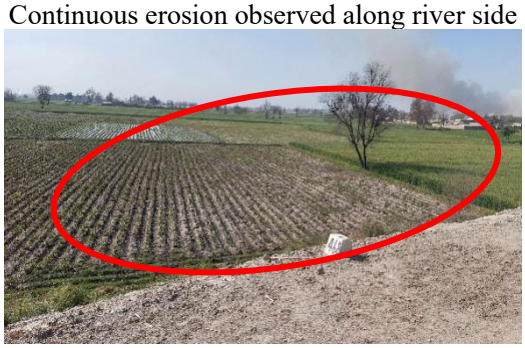
| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | Nil | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

<table>
<tr><th colspan="3">Site Photo</th></tr>
<tr><td rowspan="11">Vulnerable Section</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">Close View of Deformation<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Close View of Damages<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="2">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>(Photographs were not permitted due to security restrictions )</td><td>Facing Downstream and Side<br>(Photographs were not permitted due to security restrictions )</td></tr>
</table>

| | | |
|---|---|---|
| | General View of Top | |
| | Facing Downstream and Side (Photographs were not permitted due to security restrictions ) | Facing Downstream and Side (Photographs were not permitted due to security restrictions ) |
| | General View of Landside | |
| | Facing Downstream and Side (Photographs were not permitted due to security restrictions ) | Facing Downstream and Side (Photographs were not permitted due to security restrictions ) |
| | Photo with $360^0$ angles (Photographs were not permitted due to security restrictions ) | |
| Downstream End of the Bund | General View (Not Applicable) | |
| | Photo with $360^0$ angles (Not Available) | |
| Upstream End of the Bund | General View (In the case that the VP is located near the end) (Not Applicable) | |
| | Photo with $360^0$ angles (Not Applicable) | |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 03/1/2024 | Visual Inspection | • Continuous rosion observed along river side which was 100 feet away from the bund.<br>• Top level is bumpy and uneven.<br>• Natural surface level is 15 feet below the top level.<br>• Cropped area towards country side<br>  <br>Continuous erosion observed along river side<br>  <br>Cropped area towards country side | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 6.9 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Fail | Floodplain length is about 100 feet. |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | YES | It's been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type R** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 6.9 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 1 | Floodplain length is about 100 feet. |
| | **Quality Score** | | | **2/9** | |

Note) HGL: hydraulic gradient line

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | DG Khan Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-006a | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Left Bank of Link No. 1 | | RD 138+000 to 165+000 and 165+000to 194+000_1 | 30°01'37.38"N, 70°77'30.99"E |

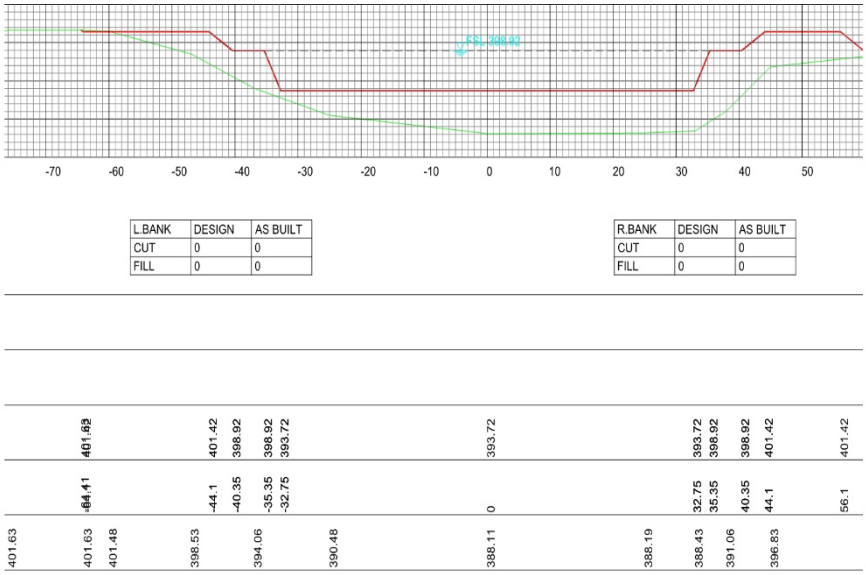
| | |
|---|---|
| Name of Vulnerable Point | Left Bank of Link No. 1 RD 138+000 to 165+000 and 165+000 to194+000_1 |
| Reason for the Vulnerability | • The said reach is no longer vulnerable, as the river is now 4300 feet away from the Left bank of Link Canal No. 1 at this RD.<br>• There is no history of breaching along the left bank of Link number 1 at this RD. |
| Flow Condition[1] | • No flow conditions.<br>• River flows approximately 4300 feet away from this cross spur. |
| Site Condition in the Country Side[2] | • There is a cultivated lands and populated area along country side. |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Monitoring** | **3/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 401.62 feet | Not Applicable – |
| | H.F. L | 395 feet | |
| | Free Board Height | 6.62 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | Left bank of link No. 1 | |
| | Longitudinal Length | 204500 feet | |
| | Slope Protection Material | Stone pitched on river side | |
| | Covering Material/ Pavement on the Top | Earthen (Clay) | |
| | Embankment Material | Earthen (Clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section |   | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | Nil | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>Not Applicable | |
| | Close View of Damages<br>Not Applicable | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, and deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 01/3/2024 | Visual Inspection | • River is approximately 4300 feet away from the spur.<br>• cultivated land is situated on country side and canal on the right side of the embankment.<br>  <br>Cropped area on country side<br>  <br>Canal on the right side of the embankment | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | No | The inundation analysis indicates that the flood damage is not severe. |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 6.6 feet. |
| | | | Bund Width | Fail | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | Fail | Floodplain length is about 4300 feet. |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Monitoring** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 6.6 feet. |
| | | | Bund Width | 1 | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | 1 | Floodplain length is about 4300 feet. |
| | **Quality Score** | | | **3/9** | |

Note) HGL: hydraulic gradient line

Left Bank of Link Number 1 RD 150+000

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | DG Khan Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-006b | Indus River | Indus River | Right |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Left Bank of Link No. I | | RD 138+000 to165+000 and 165+000 to 194+000 | 29° 58.745 N<br>70° 45.681 E |

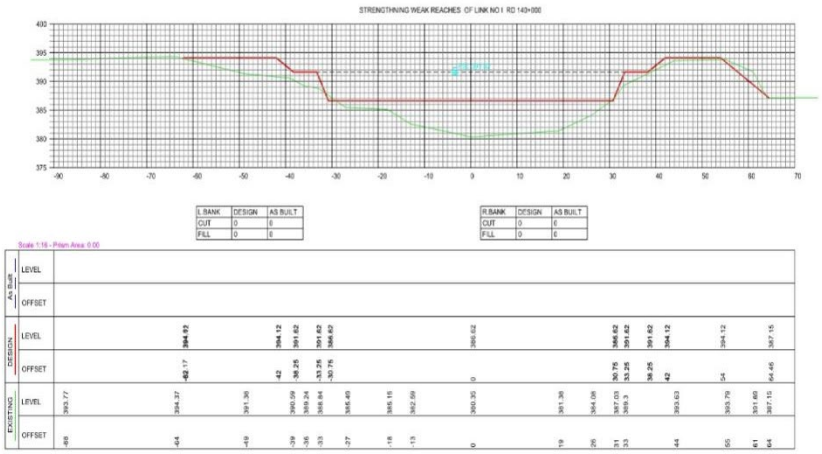
| | |
|---|---|
| Name of Vulnerable Point | Left Bank of Link No. I RD 138+000 to 165+000 and 165+000 to 194+000_2 |
| Reason for the Vulnerability | • The said reach is no longer vulnerable, as the river is approximately 3300 feet. away from the Left bank of Link Canal number 1 at this RD.<br>• There is no breach history of the Left bank of Link number 1 at this RD. |
| Flow Condition[1] | • No flow conditions.<br>• River flows approximately 3300 feet. away from this cross spur. |
| Site Condition in the Country Side[2] | • There is a cultivated land on country side.<br>• Village (Basti) bhai is situated on the right side of the Link Number 1. |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type C** | **3/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 394.92 feet | Not Applicable – |
| | H.F. L | 392.28 feet | |
| | Free Board Height | 2.64 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | Left bank of link number 1 | |
| | Longitudinal Length | 204500 feet | |
| | Slope Protection Material | Earthen (Clay) | |
| | Covering Material/ Pavement on the Top | Pavement on the Top | |
| | Embankment Material | Earthen (Clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | Nil | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>(Not Applicable) | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  <br></td><td>Facing Upstream Side<br>  <br></td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, and deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 01/3/2024 | Visual Inspection | • River is approximately 3300 feet away from this RD.<br>• Cultivated areas is situated on country side and empty canal on the right side of the embankment.<br>  <br>Cropped area on country side<br>  <br>Empty canal on the right side of the embankment | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 2.6 feet. |
| | | | Bund Width | Fail | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | Fail | Floodplain length is about 3,300 feet. |
| | | Topographic Feature | Breach Record | NO | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 2.6 feet. |
| | | | Bund Width | 1 | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | 1 | Floodplain length is about 3,300 feet. |
| | **Quality Score** | | | **3/9** | |

Note) HGL: hydraulic gradient line

The inundation analysis indicates that the flood damage is severe

Left Bank of Link Number 1 RD 165+000

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | DG Khan Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-006c | Indus River | Indus River | Right |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Left Bank of Link No. 1 | | RD 138+000 to 165+000 and RD 165+000 to 194+000 | 29°95'11.67"N, 70°74'66.67"E |

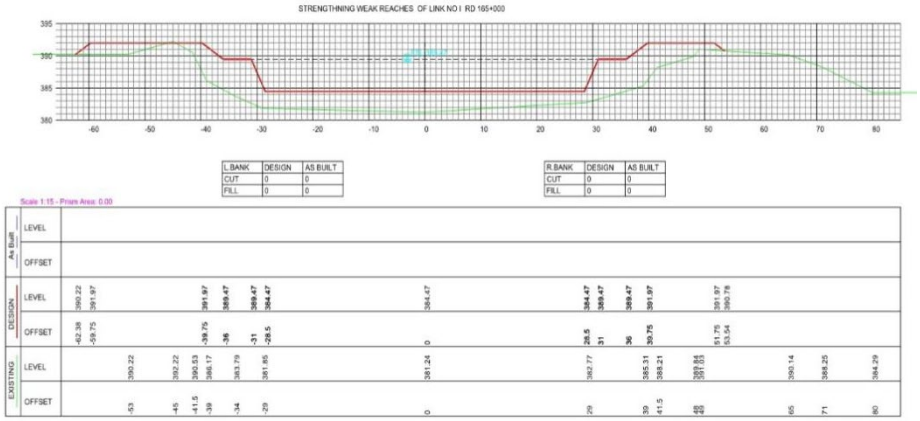
| | |
|---|---|
| Name of Vulnerable Point | Left Bank of Link No. 1 RD 138+000 to 165+000 and 165+000 to194+000_3 |
| Reason for the Vulnerability | • The said reach is no longer vulnerable, as the river is approximately 4600 feet. away from the left bank of link canal number 1 at this RD.<br>• There is no breach history of the left bank of link canal number 1 at this RD. |
| Flow Condition[1] | • No flow conditions.<br>• River flows approximately 4600 feet. away from this cross spur. |
| Site Condition in the Country Side[2] | • There is a cropped area on country side. |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type C** | **3/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 392.22 feet | Not Applicable – |
| | H.F.L | 391.2 feet | |
| | Free Board Height | 1.02 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | Left bank of Link number 1 | |
| | Longitudinal Length | 204500 feet | |
| | Slope Protection Material | Earthen (Clay) | |
| | Covering Material/ Pavement on the Top | Pavement on the top | |
| | Embankment Material | Earthen (Clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section |  | | |



| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | Nil | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

<table>
<tr><th colspan="3">Site Photo</th></tr>
<tr><td rowspan="8">Vulnerable<br>Section</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
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<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">Close View of Deformation<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Close View of Damages<br>(Not Applicable)</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section<br>(Adjacent to the<br>Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
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<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 01/3/2024 | Visual Inspection | • River is situated approximately 4600 feet away from this RD.<br>• Cultivated area is situated on country side and canal on the right side of the embankment.<br>• There is a J-Head spur having length of 6275 fee at this RD.<br>  <br>Cropped area on country side<br>  <br>Canal on the right side of the embankment | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 1 feet. |
| | | | Bund Width | Fail | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | Fail | Floodplain length is about 4,600 feet. |
| | | Topographic Feature | Breach Record | NO | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 1 feet. |
| | | | Bund Width | 1 | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | 1 | Floodplain length is about 4,600 feet. |
| | **Quality Score** | | | **3/9** | |

Note) HGL: hydraulic gradient line

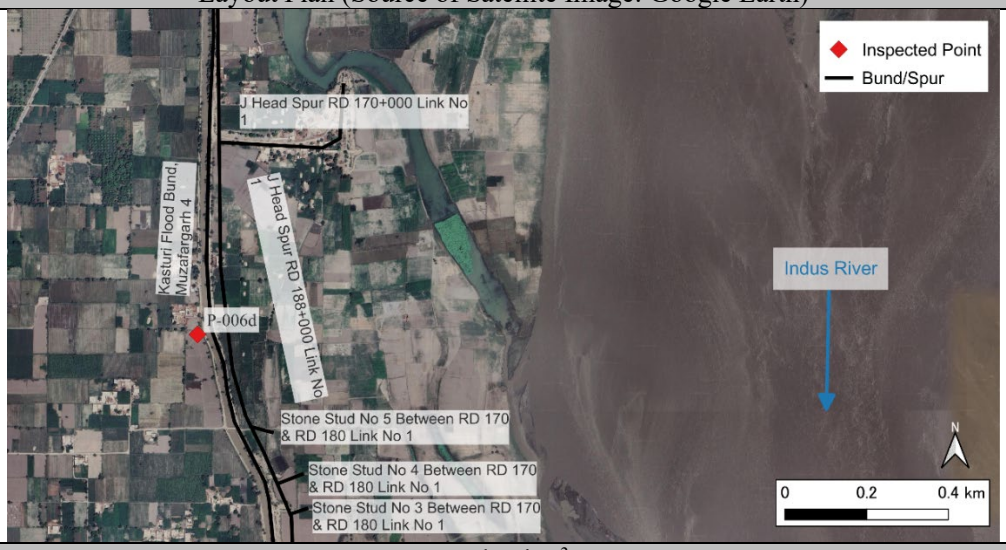
Left Bank of Link Number 1 RD 175+000

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | DG Khan Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-006d | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Left Bank of Link No. 1 | | RD 138+000 to 165+000 and 165+000 to 194+000 | 29°92'03.33"N, 70°75'5."E |

| | |
|---|---|
| Name of Vulnerable Point | Left Bank of Link No. 1 RD 138+000 to 165+000 and 165+000 194+000_4 |
| Reason for the Vulnerability | • The said reach is no longer vulnerable, as the river is approximately 2400 feet. away from the left bank of link canal number 1 at this RD.<br>• There is no breach history of the left bank of link number 1 at this RD. |
| Flow Condition[1] | • No flow conditions.<br>• River flows approximately 2400 feet away from this cross spur. |
| Site Condition in the Country Side[2] | • The cultivated area is situated on country side.<br>• There is a village Nurpur on the country side of the right bank of the link number 1. |

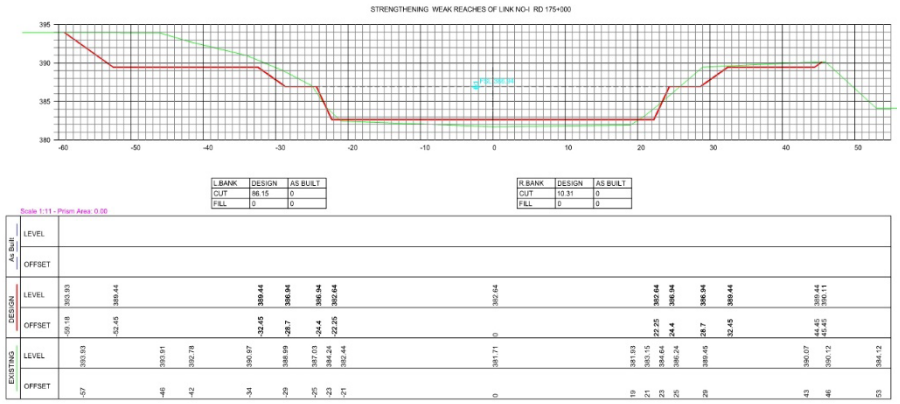
Layout Plan (Source of Satellite Image: Google Earth)




Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type C** | **3/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 393.93 feet | Not Applicable<br>– |
| | H.F.L | 388.5 feet | |
| | Free Board Height | 5.43 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | Left bank of link No. 1 | |
| | Longitudinal Length | 204500 feet | |
| | Slope Protection Material | Earthen (Clay) | |
| | Covering Material/ Pavement on the Top | Pavement on the top | |
| | Embankment Material | Earthen (clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section |  | | |



| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | Nil | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |   |  |
| | Close View of Deformation<br>(Not Applicable) | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
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<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  <br></td><td>Facing Upstream Side<br>  </td></tr>
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</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 01/3/2024 | Visual Inspection | • River is situated approximately 2400 feet away from this RD.<br>• Cultivated area is situated on country side and empty canal on the right side of the embankment.<br>• A reserve stock of stones is available on the left bank of Link Number 1, stretching from RD 174+000 to 184+000.<br>  <br><br>Cultivated area on country side<br>  <br>Empty canal on the right side of the embankment | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 5.4 feet. |
| | | | Bund Width | Fail | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | Fail | Floodplain length is about 2400 feet. |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 5.4 feet. |
| | | | Bund Width | 1 | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | 1 | Floodplain length is about 2400 feet. |
| | **Quality Score** | | | **3/9** | |

Note) HGL: hydraulic gradient line

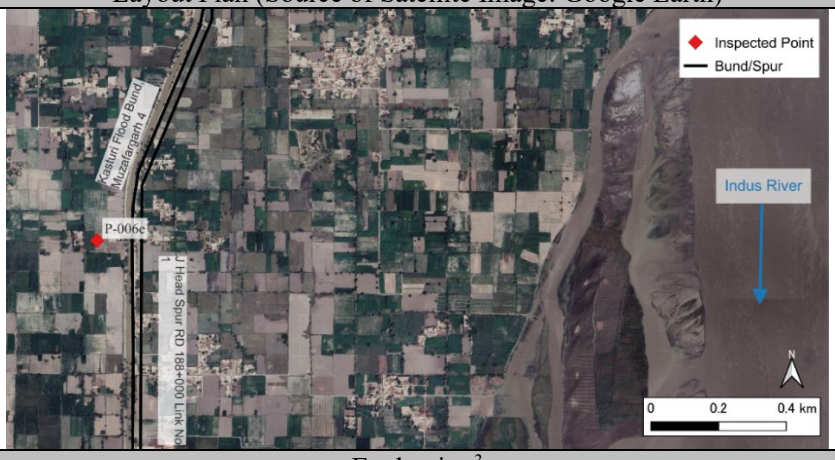
Left Bank of Link Number 1 RD 185+000

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | DG Khan Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-006e | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Left Bank of Link No. 1 | | RD 138+000- to 165+000 and 165+000 to 194+000 | 29°89'95."N, 70°75'5."E |

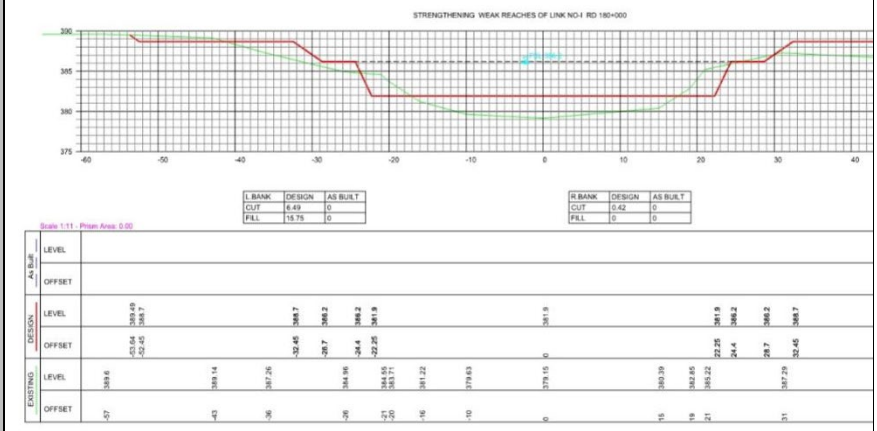
| | |
|---|---|
| Name of Vulnerable Point | Left Bank of Link No. 1 RD 138+000 to 165+000 and 165+000 to194+000_5 |
| Reason for the Vulnerability | • The said reach is no longer vulnerable, as the river is flowing approximately 5000 feet away from the left bank of link canal number 1 at this RD.<br>• There is no breach history of the left bank of link number 1 at this RD. |
| Flow Condition[1] | • No flow conditions.<br>• River flows approximately 5000 feet away from this cross spur. |
| Site Condition in the Country Side[2] | • There is a cultivated lands on country side.<br>• There is a village Ghous Abad on either side of the link number 1. |

Layout Plan (Source of Satellite Image: Google Earth)




| Evaluation[3] | |
|---|---|
| Category | Quality Score |
| **Proactive Type C** | **3/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 389.60 feet | Not Applicable |
| | H.F.L | 385.14 feet | |
| | Free Board Height | 4.46 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | Left bank of link number 1 | |
| | Longitudinal Length | 204500 feet | |
| | Slope Protection Material | Earthen (Clay) | |
| | Covering Material/ Pavement on the Top | Pavement on the top | |
| | Embankment Material | Earthen (Clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | Nil | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

<table>
<tr><th colspan="3">Site Photo</th></tr>
<tr><td rowspan="8">Vulnerable<br>Section</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">Close View of Deformation<br>(Not Applicable)</td></tr>
<tr><td colspan="2">Close View of Damages<br>(Not Applicable)</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
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<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| DD/MM/YYYY | Inspection Type | Description and Photo | **Damage[5]** |
| 01/3/2024 | Visual Inspection | • River is situated approximately 5000 feet away from this RD.<br>• There is a cultivated area on the countryside and an empty canal on the right side of the embankment. Reserve stock of stones on the left bank of link Nnumber 1 from RD 174+000 to 184+000.<br>  <br>Cultivated area on country side<br>  <br>Empty canal on the right side of the embankment | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 4.5 feet. |
| | | | Bund Width | Fail | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | Fail | Floodplain length is about 5000 feet. |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 4.5 feet. |
| | | | Bund Width | 1 | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | 1 | Floodplain length is about 5000 feet. |
| | **Quality Score** | | | **3/9** | |

Note) HGL: hydraulic gradient line

Left Bank of Link Number 1 RD 192+000

Creation Date: 01/3/2024

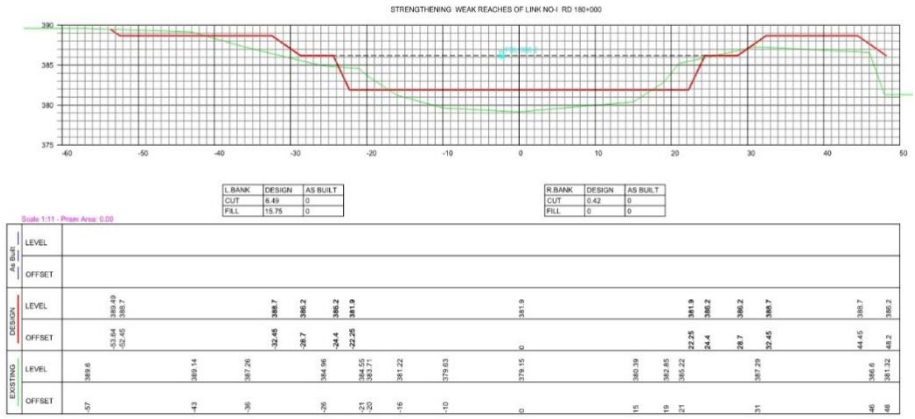
| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | DG Khan Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-006f | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Left Bank of Link No. 1 | | RD 138+000 to165+000 and 165+000 to 194+000 | 29°88'18.33"N, 70°75'66.67"E |

| | |
|---|---|
| Name of Vulnerable Point | Left Bank of Link No. 1 RD 138+000 to 165+000 and 165+000 to194+000_6 |
| Reason for the Vulnerability | • The said reach is no longer vulnerable, as the river is situated approximately 4700 feet away from the left bank of link canal number 1 at this RD.<br>• There is no breach history of the left bank of link number 1 at this RD. |
| Flow Condition[1] | • No flow conditions.<br>• River flows approximately 4700 feet away from this cross spur. |
| Site Condition in the Country Side[2] | • There is a cultivated area on country side.<br>• Cross bridge present at RD 192+130 of link number 1<br>• There is a village Udhana Wala on the country side of the right bank of the link number 1. |

Layout Plan (Source of Satellite Image: Google Earth)


| Evaluation[3] | |
|---|---|
| Category | Quality Score |
| **Proactive Type C** | **3/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 389.60 feet | Not Applicable – |
| | H.F.L | 384.17 feet | |
| | Free Board Height | 5.43 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | Left bank of link number 1 | |
| | Longitudinal Length | 204500 feet | |
| | Slope Protection Material | Earthen (Clay) | |
| | Covering Material/ Pavement on the Top | Pavement on the top | |
| | Embankment Material | Earthen (Clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| | Nil | |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>(Not Applicable) | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
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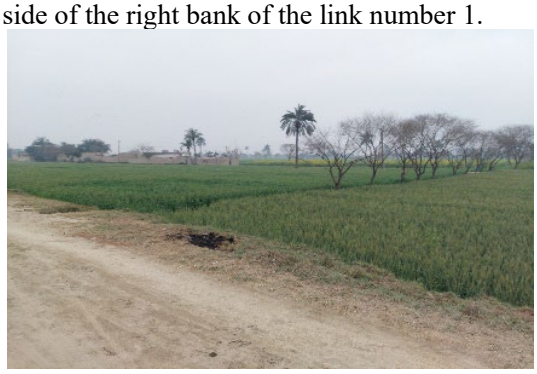
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 01/3/2024 | Visual Inspection | • River is situated approximately 4700 feet away from this RD.<br>• Cultivated area is situated on country side and empty canal on the right side of the embankment.<br>• There is a village Udhana Wala on the country side of the right bank of the link number 1.<br>  <br>Cultivated area on country side<br>  <br>An empty canal is located on the right side of the embankment | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 4.4 feet. |
| | | | Bund Width | Fail | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | Fail | Floodplain length is about 4700 feet. |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 4.4 feet. |
| | | | Bund Width | 1 | Evaluation is not possible based on the typical cross-section. |
| | | | Flood Plain Length | 1 | Floodplain length is about 4700 feet. |
| | **Quality Score** | | | **3/9** | |

Note) HGL: hydraulic gradient line

Jampur Flood Bund RD 7+000

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | Jampur Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-007 | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Jampur Flood Bund | | RD 7+500 to18+000 | 29°78'27.94"N, 70°71'23.54"E |

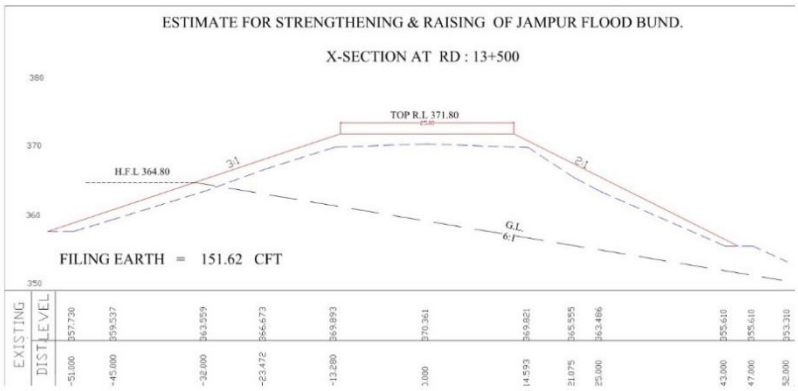
| | |
|---|---|
| Name of Vulnerable Point | Jampur Flood Bund at RD 7+500 to 18+000 |
| Reason for the Vulnerability | • Jampur Flood Bund at this RD is no longer vulnerable, as the river is situated approximately 6 km away from said reach. |
| Flow Condition[1] | • No flow conditions.<br>• River is situated approximately 6 km away from said reach. |
| Site Condition in the Country Side[2] | • Cultivated area is located on the country side, which is approximately 12 feet below the top level of bund.<br>• Village (Basti) Jakhar Imam shah is situated along the country side of the bund. |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type C** | **0/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | | |
|---|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** | |
| | Top Elevation | 371.8 feet | Not Applicable<br><br>- | |
| | H.F.L | 358.90 feet | | |
| | Free Board Height | 12.90 feet | | |
| | Top Width | 25 feet | | |
| | River Side Slope | 1:3 | | |
| | Country Side Slope | 1:2 | | |
| | Longitudinal Length | 171000 feet | | |
| | Slope Protection Material | Earthen (Silty clay) | | |
| | Covering Material/ Pavement on the Top | Earthen (Silty clay) | | |
| | Embankment Material | Earthen (Silty clay) | | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | | |
| Typical Cross Section |  | | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| July-August 2010 | Breaching/over topping | Maximum flood passed in River Indus along Jampur Flood Bund during the year 2010 (959991 Cs:). This caused main breached between RD 37 to 38 and breached randomly between RD 10 to 24 of Jampur Flood Bund. During the year 2010, flood water of River Indus also entered the city of Jampur and Rajanpur which caused the serious damages to Govt./ public property, schools, graveyard etc. |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| 2011 | Maintenance and Repair (M&R) | Not provided by PID | Maintenance and repair Works |
| 2012 | Annual Development Program (ADP) in which Jampur bypass Jampur Flood Bund restored wholly to save the allied villages and irrigation infrastructure. | Not provided by PID | Annual Development Program 2012 of Punjab Irrigation Department (PID) |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation | |
| |  | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
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</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>  |
| | Photo with $360^0$ angles<br>  |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 01/3/2024 | Visual Inspection | • Cultivated area is located on the country side, which is approximately 13 feet below the top level of bund.<br>• Bast Jakhar Imam Shah is located on the country of the bund.<br>• Design parameters (Top level, top width, and side slopes) of the bund was not well maintained.<br>  <br>Cultivated area on the country side<br>  <br>Design parameters of the bund was not well maintained | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | No | The inundation analysis indicates that the flood damage is not severe. |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 7 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Pass | Floodplain length is about 19700 feet. |
| | | Topographic Feature | Breach Record | Yes | It has breached in the past. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 7 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 0 | Floodplain length is about 19700 feet. |
| | **Quality Score** | | | **0/9** | |

Note) HGL: hydraulic gradient line

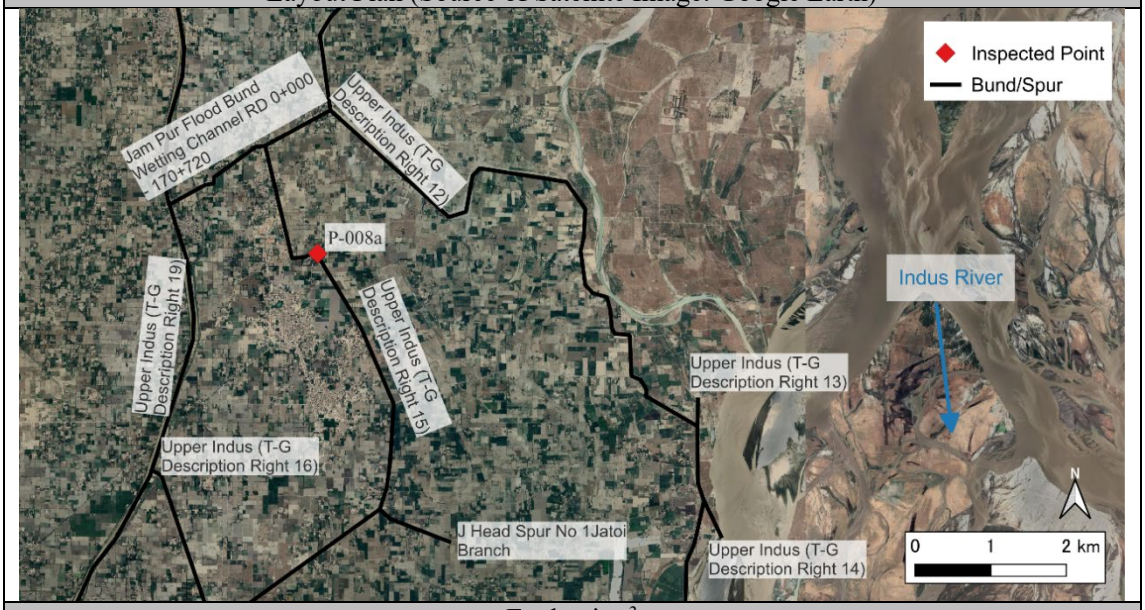
Jampur Flood Bund RD 107+000 to RD 108+000

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | Jampur Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-008a | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Jampur Flood Bund | | RD 107+000 to 113+000 | 29°55'64.77"N, 70°61'11.53"E |

| | |
|---|---|
| Name of Vulnerable Point | Jampur Flood Bund at RD 107+000 to 113+000_1 |
| Reason for the Vulnerability | • Jampur Flood Bund at this RD is no longer vulnerable due to:<br>1. River is approximately 5 km away from said reach<br>2. Jampur Flood Bund is 2nd defense line at the right bank of River Indus. |
| Flow Condition[1] | • No flow conditions. |
| Site Condition in the Country Side[2] | • Cultivated area is present on the country side, which is approximately 15 feet below the top level of bund.<br>• Village Bindri Shoar and Kotla Mughlan rest house are situated on the country side of the bund. |

Layout Plan (Source of Satellite Image: Google Earth)




Evaluation[3]

| Category | Quality Score |
|---|---|
| **Monitoring** | **1/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 357.90 feet | Not Applicable – |
| | H.F.L | 351.30 feet | |
| | Free Board Height | 6.60 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:3 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 171000 feet | |
| | Slope Protection Material | Earthen (Silty clay) | |
| | Covering Material/ Pavement on the Top | Earthen (Silty clay) | |
| | Embankment Material | Earthen (Silty clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section *(Prepared by the team, not provided by PID) |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| July-August 2010 | Breaching/over topping | Maximum flood passed in River Indus along Jampur Flood Bund during the year 2010 (959991 Cs:). This caused main breached between RD 37 to 38 and breached randomly between RD 10 to 24 of Jampur Flood Bund. During the year 2010, flood water of mighty River Indus also entered the city of Jampur and Rajanpur which caused the serious damages to Govt./public property, schools, graveyard etc. |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| 2011 | Maintenance and Repair (M&R) | Not provided by PID | Maintenance and repair Works |
| 2012 | The Annual Development Program (ADP) included the full restoration of the Jampur Bypass Flood Bund to protect the surrounding villages and irrigation infrastructure. | Not provided by PID | Annual Development Program 2012 of Punjab Irrigation Department (PID) |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>(Not Applicable) | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>  |
| | Photo with $360^0$ angles<br>  |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 01/3/2024 | Visual Inspection | • Cultivated area is present on the country side, which is approximately 15 feet below the top level of bund.<br>• Village Bindri Shoar and Kot Mughlan rest house are situated on the country side of the bund<br>• Design parameters (Top level, top width, and side slopes) of the bund was not well maintained.<br>  <br>Cultivated area on the country side<br>  <br>Rain cuts observed on side slopes | A |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | No | The inundation analysis indicates that the flood damage is not severe. |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 6.6 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Pass | Floodplain length is about 16400 feet. |
| | | Topographic Feature | Breach Record | Yes | It has breached in the past. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Monitoring** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 6.6 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 0 | Floodplain length is about 16400 feet. |
| | **Quality Score** | | | **1/9** | |

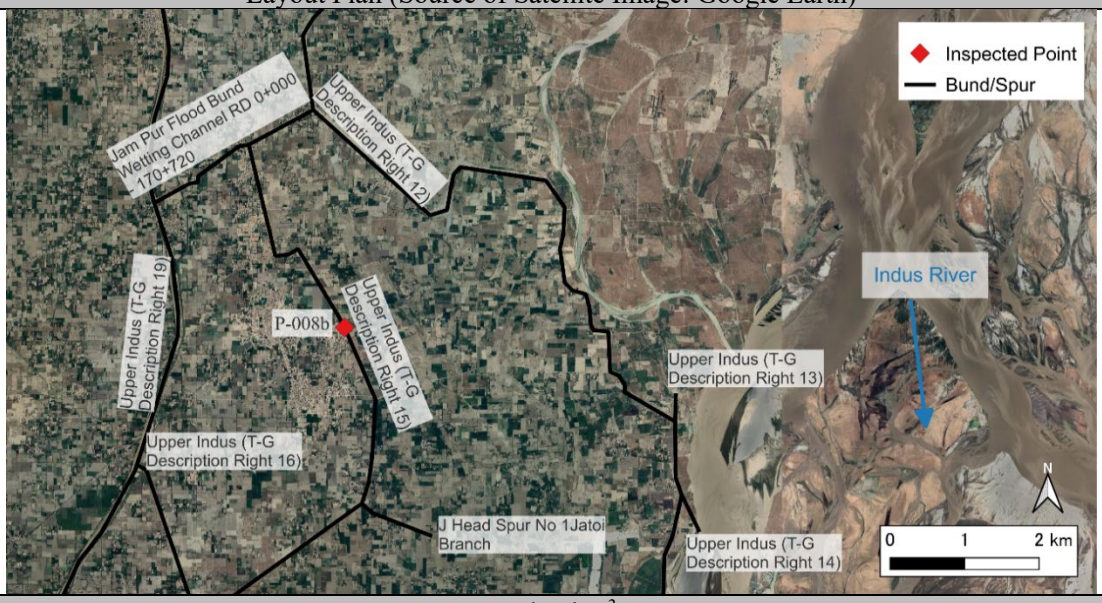
Note) HGL: hydraulic gradient line

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | Jampur Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-008b | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Jampur Flood Bund | | RD 107+000 to 113+000 | 29°54'73.17"N, 70°61'72.68"E |

| | |
|---|---|
| Name of Vulnerable Point | Jampur Flood Bund at RD 107+000 to 113+000_2 |
| Reason for the Vulnerability | • Jampur Flood Bund at this RD is no longer vulnerable due to:<br>1. The river is located 3.5 km away from the said reach. Jampur Flood Bund is 2nd defense line at the right bank of River Indus. |
| Flow Condition[1] | • No flow conditions. |
| Site Condition in the Country Side[2] | • Cultivated area is present on the country side, which is approximately 20 feet below the top level of bund.<br>• Village kotla Mughlan is situated on the country side of the bund. |

Layout Plan (Source of Satellite Image: Google Earth)




Evaluation[3]

| Category | Quality Score |
|---|---|
| **Monitoring** | **1/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 357.90 feet | Not Applicable – |
| | H.F.L | 350.90 feet | |
| | Free Board Height | 7.00 feet | |
| | Top Width | 20 feet | |
| | River Side Slope | 1:3 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 171000 feet | |
| | Slope Protection Material | Earthen (Silty clay) | |
| | Covering Material/ Pavement on the Top | Earthen (Silty clay) | |
| | Embankment Material | Earthen (Silty clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section *(Prepared by the team, not provided by PID) |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| July-August 2010 | Breaching/over topping | Maximum flood passed in River Indus along Jampur Flood Bund during the year 2010 (959991 Cs:).This caused main breached between RD 37 to 38 and breached randomly between RD 10 to 24 of Jampur Flood Bund. During the year 2010, flood water of mighty River Indus also entered the city of Jampur and Rajanpur which caused the serious damages to Govt./public property, schools, graveyard etc. |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| 2011 | Maintenance and Repair (M&R) | Not provided by PID | Maintenance and Repair Works |
| 2012 | Annual Development Program (ADP included the complete restoration of the Jampur Bypass Flood Bund to protect the surrounding villages and irrigation infrastructure. | Not provided by PID | Annual Development Program 2012 of Punjab Irrigation Department (PID) |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>(Not Applicable) | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
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<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | 360 Degrees Photo<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>  |
| | Photo with $360^0$ angles<br>  |

<table>
<tr><th colspan="4">Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration)</th></tr>
<tr><th>DD/MM/YYYY</th><th>Inspection Type</th><th>Description and Photo</th><th>Damage[5]</th></tr>
<tr><td>01/3/2024</td><td>Visual Inspection</td><td>
<ul>
<li>Cultivated area is present on the country side, which is approximately 20 feet below the top level of bund.</li>
<li>Village Kotla Mughlan is situated on the country side of the bund</li>
<li>A gauge pillar is observed on the river side at this RD.</li>
<li>In 2010 flood, Jampur Flood Bund was the 1st defense line and was vulnerable. The bund was breached from RD 70+000 to 75+000.</li>
<li>Design parameters (Top level, top width, and side slopes) of the bund was not well maintained.</li>
</ul>
 <br>Cultivated area on the country side<br>
 <br>Design parameters of the bund was not well maintained
</td><td>a</td></tr>
</table>

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | No | The inundation analysis indicates that the flood damage is not severe. |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 7 feet. |
| | | | Bund Width | Fail | The HGL isn't exposed above the ground, but the soil cover thickness over HGL is less than the guideline value ( 2 feet > Soil Depth ≧0 feet ). |
| | | | Flood Plain Length | Pass | Floodplain length is about 11500 feet. |
| | | Topographic Feature | Breach Record | Yes | It has breached in the past. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Monitoring** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 7 feet. |
| | | | Bund Width | 1 | The HGL isn't exposed above the ground, but the soil cover thickness over HGL is less than the guideline value ( 2 feet > Soil Depth ≧0 feet ). |
| | | | Flood Plain Length | 0 | Floodplain length is about 11500 feet. |
| | **Quality Score** | | | **1/9** | |

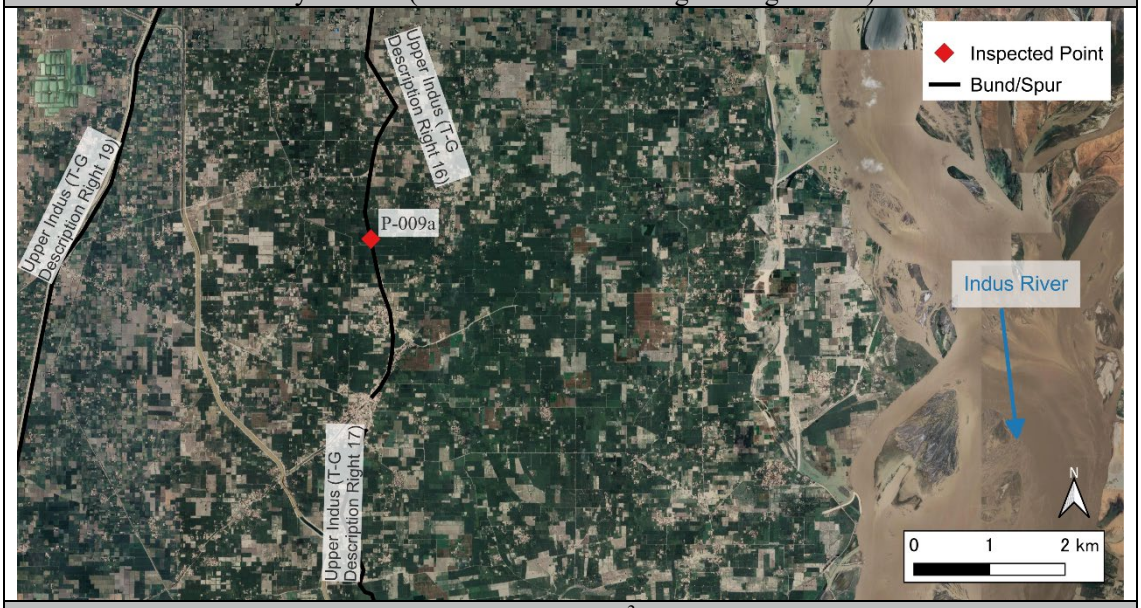
Note) HGL: hydraulic gradient line

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | Jampur Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-009a | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Jampur Flood Bund | | RD 139+000 to 171+000 | 29°46'92.99"N, 70°59'48.59"E |

| | |
|---|---|
| Name of Vulnerable Point | Jampur Flood Bund at RD 139+000 to 171+000_1 |
| Reason for the Vulnerability | • Jampur Flood Bund at this RD is no longer vulnerable due to:<br>1. River is situated approximately 5 km away from said reach<br>2. There is no history of breaches at this location of Jampur Flood Bund. |
| Flow Condition[1] | • No flow conditions |
| Site Condition in the Country Side[2] | • Cultivated area is present on the country side, which is approximately 18 feet below the top level of bund. |

Layout Plan (Source of Satellite Image: Google Earth)




Evaluation[3]

| Category | Quality Score |
|---|---|
| **Monitoring** | **0/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 350.90 feet | Not Applicable – |
| | H.F.L | 343.90 feet | |
| | Free Board Height | 7.00 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:3 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 171000 feet | |
| | Slope Protection Material | Earthen (Silty clay) | |
| | Covering Material/ Pavement on the Top | Metaled road on the top | |
| | Embankment Material | Earthen (Silty clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section *(Prepared by the team, not provided by PID) |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| July-August 2010 | Breaching/over topping | Maximum flood passed in River Indus along Jampur Flood Bund during the year 2010 (959991 Cs:).This caused main breached between RD 37 to 38 and breached randomly between RD 10 to 24 of Jampur Flood Bund. During the year 2010, flood water of mighty River Indus also entered the city of Jampur and Rajanpur which caused the serious damages to Govt./public property, schools, graveyard etc. |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| 2011 | Maintenance and Repair (M&R) | Not provided by PID | Maintenance and repair works |
| 2012 | Annual Development Program (ADP) included the complete restoration of the Jampur Bypass Flood Bund to protect the surrounding villages and irrigation infrastructure. | Not provided by PID | Annual Development Program 2012 of Punjab Irrigation Department (PID) |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| MM/YYYY | Description/Project Name | Cost | Fund Source |
| | Nil | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>(Not Applicable) | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
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</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>  |
| | Photo with $360^0$ angles<br>  |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 01/3/2024 | Visual Inspection | • Cultivated area is present on the country side, which is approximately 18 feet below the top level of bund.<br>• Design parameters (Top level, top width, and side slopes) of the bund was not well maintained.<br>  <br>Cultivated area on the country side<br>  <br>Design parameters of the bund was not well maintained | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | No | The inundation analysis indicates that the flood damage is not severe. |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 7 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Pass | Floodplain length is about 16400 feet. |
| | | Topographic Feature | Breach Record | Yes | It has breached in the past. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Monitoring** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 7 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 0 | Floodplain length is about 16400 feet. |
| | **Quality Score** | | | **0/9** | |

Note) HGL: hydraulic gradient line

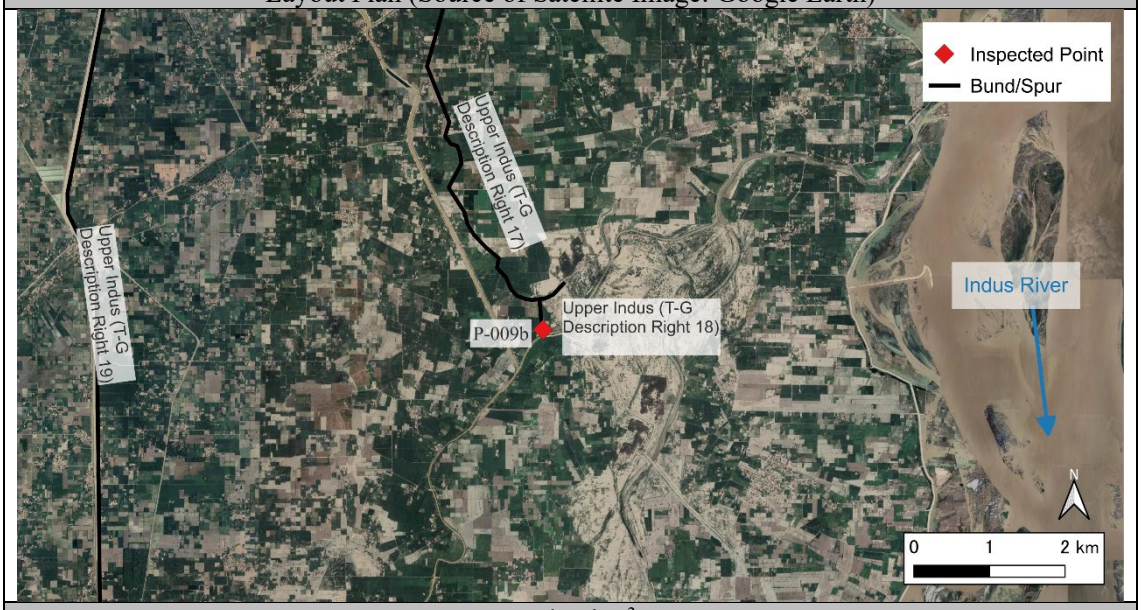
Jampur Flood Bund RD 171+000

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | Jampur Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-009b | Indus River | Indus River | Right |
| **Bund Name** | | **R.D.** | **GPS Coordinates** |
| Jampur Flood Bund | | RD 139+000 to 171+000 | 29°40'52.4"N, 70°60'66.55"E |

| | |
|---|---|
| Name of Vulnerable Point | Jampur Flood Bund at RD 139+000 to 171+000_2 |
| Reason for the Vulnerability | • Jampur Flood Bund at this RD is no longer vulnerable due to:<br>1. River is approximately 9 km away from said reach<br>2. There is no breach history at this location of Jampur Flood Bund. |
| Flow Condition[1] | • No flow conditions. |
| Site Condition in the Country Side[2] | • Cultivated area is present on the country side, which is approximately 10 feet below the top level of bund. |

Layout Plan (Source of Satellite Image: Google Earth)




| Evaluation[3] | |
|---|---|
| Category | Quality Score |
| **Monitoring** | **1/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 344.90 feet | Not Applicable – |
| | H.F. L | 338.70 feet | |
| | Free Board Height | 6.20 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:3 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 171000 feet | |
| | Slope Protection Material | Earthen (Silty clay) | |
| | Covering Material/ Pavement on the Top | Earthen (Silty clay) | |
| | Embankment Material | Earthen (Silty clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section *(Prepared by the team, not provided by PID) |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| July-August 2010 | Breaching/over topping | Maximum flood passed in River Indus along Jampur Flood Bund during the year 2010 (959991 Cs:). This caused main breached between RD 37 to 38 and breached randomly between RD 10 to 24 of Jampur Flood Bund. During the year 2010, flood water of mighty River Indus also entered the city of Jampur and Rajanpur which caused the serious damages to Govt./public property, schools, graveyard etc. |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| 2011 | Maintenance and Repair (M&R) | Not provided by PID | Maintenance and repairworks |
| 2012 | Annual Development Program (ADP) included the full restoration of the Jampur Bypass Flood Bund to protect the surrounding villages and irrigation infrastructure. | Not provided by PID | Annual Development Program 2012 of Punjab Irrigation Department (PID) |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>(Not Applicable) | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
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</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>  |
| | Photo with $360^0$ angles<br>  |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 01/3/2024 | Visual Inspection | • Cultivated area is present on the country side, which is approximately 10 feet below the top level of bund.<br>• Design parameters (Top level, top width, and side slopes) of the bund was not well maintained.<br>  <br>Cultivated area on the country side<br>  <br>Design parameters of the bund was not well maintained | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | No | The inundation analysis indicates that the flood damage is not severe. |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 6.2 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Pass | Floodplain length is about 16800 feet. |
| | | Topographic Feature | Breach Record | Yes | It has breached in the past. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Monitoring** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 6.2 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 0 | Floodplain length is about 16800 feet. |
| | **Quality Score** | | | **1/9** | |

Note) HGL: hydraulic gradient line

Fakhar Flood Bund RD 10+000 to 11+000

Creation Date: 02/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | Jampur Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-010a | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Fakhar Flood bund | | RD 10+000 to 24+500 | 28°95'58.48"N, 70°39'06.66"E |

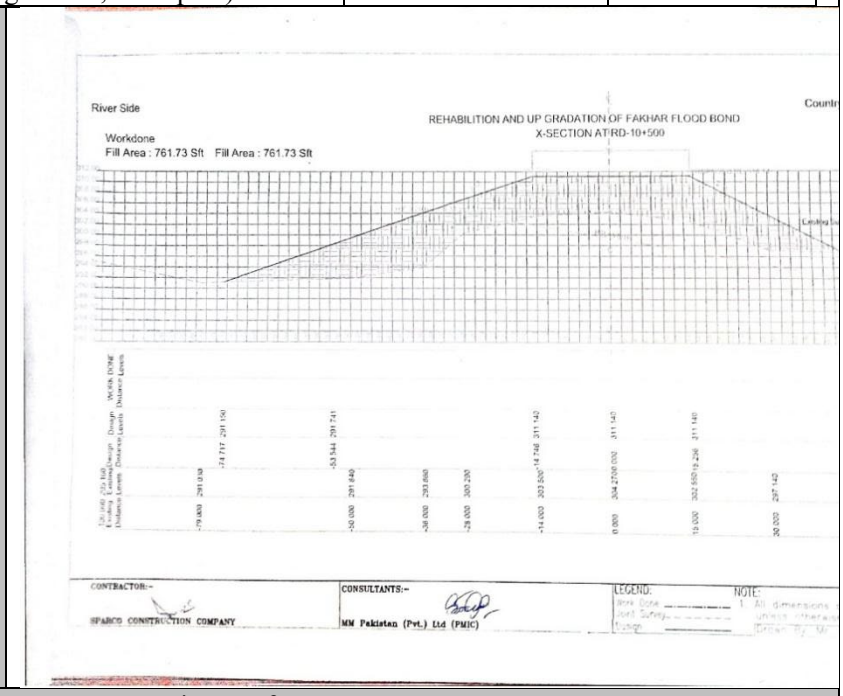
| | |
|---|---|
| Name of Vulnerable Point | Fakhar flood bund at RD 10+000 to 24+500_1 |
| Reason for the Vulnerability | • Fakhar flood bund at this RD was vulnerable in 2010 flood, as the Indus River breached and washed out the entire bund due to overtopping.<br>• This reach is no longer vulnerable, as the main creek of the river is now approximately 12 km away from the said reach. The bund was restored in 2020 to the highest flood level recorded during the 2010 flood. |
| Flow Condition[1] | • No flow conditions. |
| Site Condition in the Country Side[2] | • Cultivated area is present on the country side, which is approximately 18 feet below the top level of bund. |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type R** | **1/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 311.14 feet | Not Applicable _ |
| | H.F.L | 301.35 feet | |
| | Free Board Height | 9.79 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 14250 feet | |
| | Slope Protection Material | Stone pitched on river side | |
| | Covering Material/ Pavement on the Top | Shingle on the top | |
| | Embankment Material | Earthen (Clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section |   | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| 2010 | Breach due to overtopping | Fakhar Flood Bund completely breached due to overtopping. |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| 2011 | Complete restoration of bund | Rs. 15 Million | Maintenance and repair works by PID |
| 2020 | Restoration of bund at highest flood level of 2010 flood. | Rs. 67 Million | Project Implementation Unit (PIU) |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>(Not Applicable | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
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<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
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</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 02/3/2024 | Visual Inspection | • Cultivated area is present on the country side, which is approximately 18feet. below the top level of bund.<br>• Stone pitched on the river side.<br>• There is a Link Road through Benazir bridge from N5 to N55.<br>• Reserve stock of stones is available throughout the length of bund on the river side.<br>  <br>Cultivated area on the country side<br>  <br>Stone pitched on the river side<br>  <br>Reserve stock of stones on the riverside | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 9.8 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Fail | Floodplain length is about 4900 feet. |
| | | Topographic Feature | Breach Record | Yes | It has breached in the past. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type R** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 9.8 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 1 | Floodplain length is about 4900 feet. |
| | **Quality Score** | | | **1/9** | |

Note) HGL: hydraulic gradient line

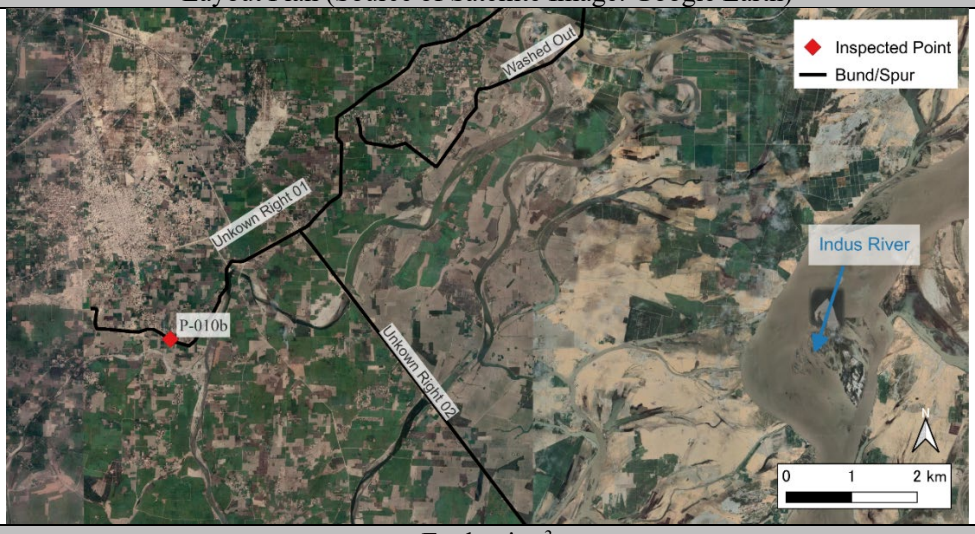
Fakhar Flood Bund RD 19+000 to 20+000

Creation Date: 02/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | Jampur Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-010b | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Fakhar Flood bund | | RD 10+000 to 24+500 | 28°94'17.81"N, 70°37'24.98"E |

| | |
|---|---|
| Name of Vulnerable Point | Fakhar Flood Bund at RD 10+000 to 24+500_2 |
| Reason for the Vulnerability | • Fakhar Flood Bund at this RD was vulnerable in 2010 flood, as the Indus River breached and washed out the entire bund due to overtopping.<br>• This reach is no longer vulnerable, as the main creek of the river is now approximately 17 km away from the said reach. The bund is restored in 2020 to the highest flood level recorded during the 2010 flood. |
| Flow Condition[1] | • No flow conditions. |
| Site Condition in the Country Side[2] | • Cultivated area is present on the country side, which is approximately 18 feet below the top level of bund.<br>• The population of Kot Mithon Sharif city is located near the reach on the countryside side. |

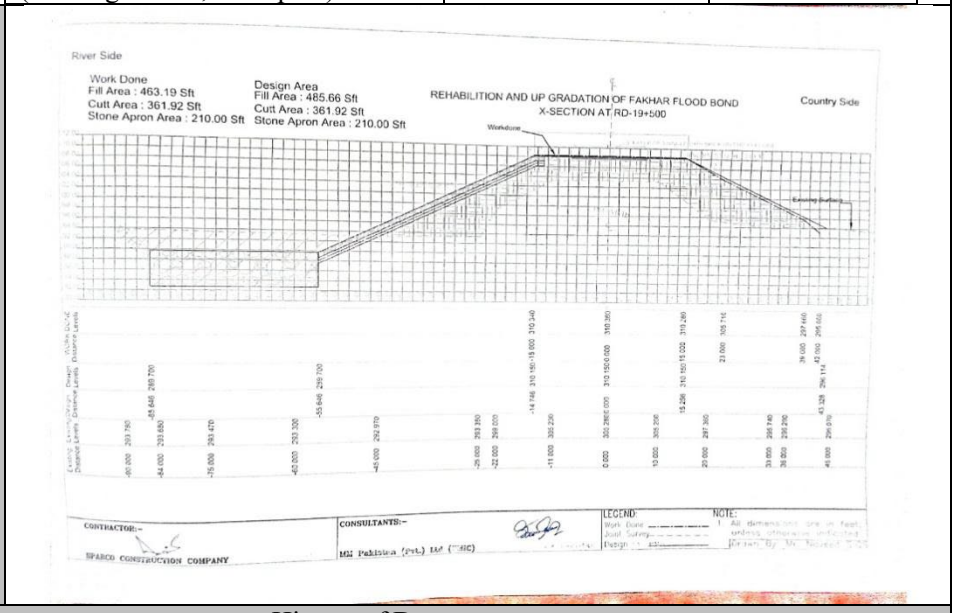
Layout Plan (Source of Satellite Image: Google Earth)




Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type R** | **0/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 310.15 feet | Not Applicable<br>– |
| | H.F. L | 301.35 feet | |
| | Free Board Height | 8.80 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:2 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 14250 feet | |
| | Slope Protection Material | Stone pitched on river side | |
| | Covering Material/ Pavement on the Top | Shingle on the top | |
| | Embankment Material | Earthen (Clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Not Applicable | |
| Typical Cross Section |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| 2010 | Breach due to overtopping | Fakhar Flood Bund was completely breached due to overtopping. |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| 2011 | Complete restoration of bund | Rs. 15 Million | Maintenance and repair works by PID |
| 2020 | Restoration of bund at highest flood level of 2010 flood | Rs. 67 Million | Project Implementation Unit (PIU) |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>(Not Applicable) | |
| | Close View of Damages<br>(Not Applicable) | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
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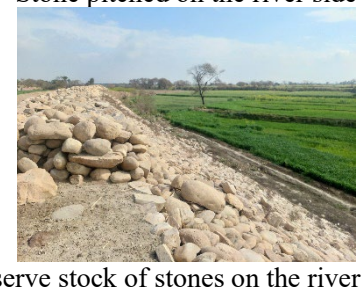
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| DD/MM/YYYY | Inspection Type | Description and Photo | **Damage[5]** |
| 02/3/2024 | Visual Inspection | • Cultivated area is present on the country side, which is approximately 18 feet below the top level of bund.<br>• Stone pitched has been applied on the river side.<br>• There is a Link Road through Benazir bridge from N5 to N55.<br>• A reserve stock of stones is present throughout the length of bund on the riverside.<br>• The population of Kot Mithon Sharif city is located near the reach on the countryside side..<br>  <br><br>Cultivated area on the country side<br>  <br><br>Stone pitched on the river side<br>  <br>Reserve stock of stones on the river side | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 8.8 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Pass | Floodplain length is about 56,000 feet. |
| | | Topographic Feature | Breach Record | Yes | It has breached in the past. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type R** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 8.8 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 0 | Floodplain length is about 56,000 feet. |
| | **Quality Score** | | | **0/9** | |

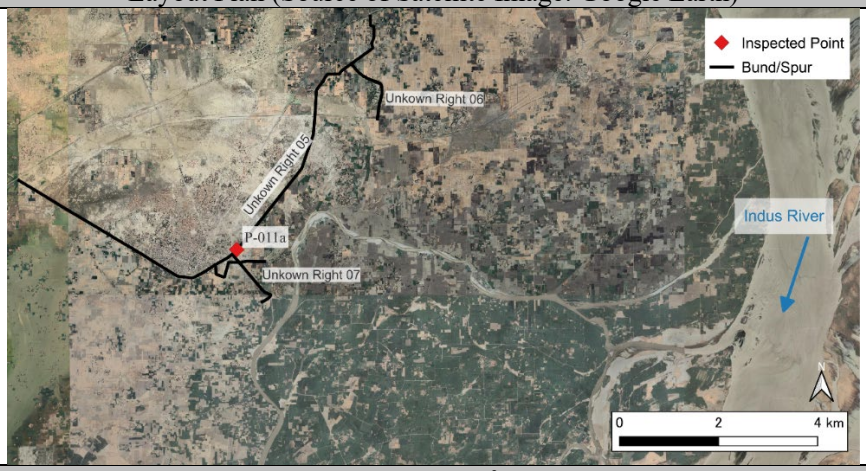
Note) HGL: hydraulic gradient line

Rojhan Flood Bund RD 16+000 to 17+000

Creation Date: 02/3/2024

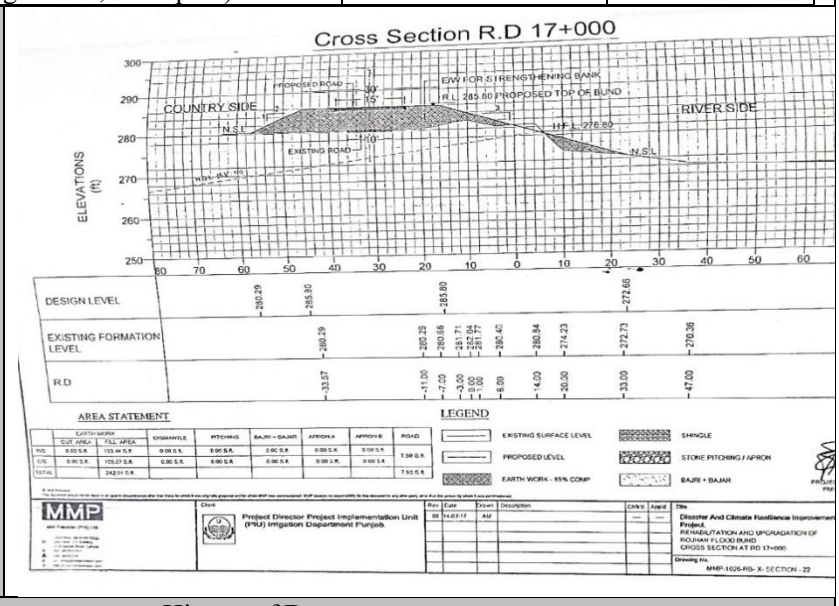
| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | Jampur Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-011a | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Rojhan Flood Bund | | RD 10+000 to25+000 | 28°68'76.86"N, 69°96'59.07"E |
| Name of Vulnerable Point | Rojhan Flood Bund RD 10+000 to 25+000_1 | | |
| Reason for the Vulnerability | • Rojhan Flood Bund at this RD was vulnerable in 2010 flood, the Indus River rose to top level of the bund.<br>• This reach is no longer considered vulnerable, as the main creek of the river is now approximately 2 km away from the said reach.<br>• The site has been restored in 2020 at the highest flood level of 2010 flood. | | |
| Flow Condition[1] | • No flow conditions. | | |
| Site Condition in the Country Side[2] | • Adjoining settlement of Rojhan city is present near the reach on either side of the bund from RD 9+000 to RD 16+000.<br>• There is a barren land on the country side. | | |

Layout Plan (Source of Satellite Image: Google Earth)




| Evaluation[3] | |
|---|---|
| Category | Quality Score |
| **Proactive Type C** | **1/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 280.66 feet | Not Applicable – |
| | H.F.L | 275.40 feet | |
| | Free Board Height | 5.26 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:3 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 61250 feet | |
| | Slope Protection Material | Earthen (clay and sand) | |
| | Covering Material/ Pavement on the Top | Metaled road | |
| | Embankment Material | Earthen (clay andsand) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Nil | |
| Typical Cross Section |   | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| 2010 | Side slope and top width disturbed | The Indus River touched the bund up to the top level and disturbed the riverside slope and top width. |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| 2020 | Restoration of bund (River side slope and top width) | RS. 90 Million | Project Implementation Unit (PIU) |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name with its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |

<table>
<tr><th colspan="3">Site Photo</th></tr>
<tr><td rowspan="8">Vulnerable<br>Section</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">Close View of Deformation<br>Not Applicable</td></tr>
<tr><td colspan="2">Close View of Damages<br>Not Applicable</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">Photo of $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
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<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
</table>

| | |
|---|---|
| | Photo of $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo of $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo of $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 02/3/2024 | Visual Inspection | • Adjoining population of Rojhan city is present on both side of the bund.<br>• Metaled road runs along the top, connecting Rojhan to Miran Pur village.<br>• Cultivated area are present on the river side.<br>• There is a barren land on the country side.<br>  <br>Adjoining population<br>  <br>Metaled road on top<br>  <br>Cropped area on theRiver Side | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Fail | Free board height is 5.3 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Pass | Floodplain length is about 6600 feet. |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 1 | Free board height is 5.3 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 0 | Floodplain length is about 6600 feet. |
| | **Quality Score** | | | **1/9** | |

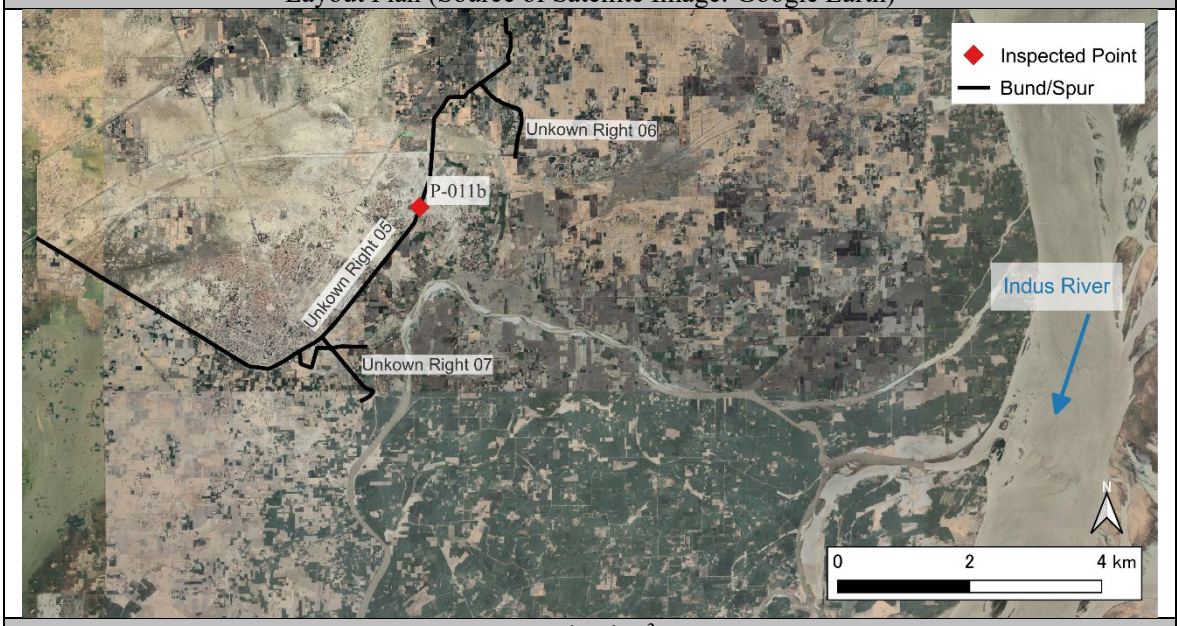
Note) HGL: hydraulic gradient line

Creation Date: 02/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | Jampur Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-011b | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Rojhan Flood Bund | | RD 10+000 to 25+000 | 28°70'44.98"N, 69°98'01.15"E |

| | |
|---|---|
| Name of Vulnerable Point | Rojhan Flood Bund at RD 10+000 to 25+000_2 |
| Reason for the Vulnerability | • Rojhan Flood Bund at this RD was vulnerable in 2010 flood, the Indus River rose to the top level of the bund.<br>• Now this reach is no longer vulnerable, as main creek of river is approximately 12 km away from said reach.<br>• The site has been restored in 2020 at the highest flood level of 2010 flood. |
| Flow Condition[1] | • No flow conditions. |
| Site Condition in the Country Side[2] | • Mud lumps/heaps can be found on both sides of the bund<br>• Adjoining population of Rojhan city is present near the reach towards the river side. |

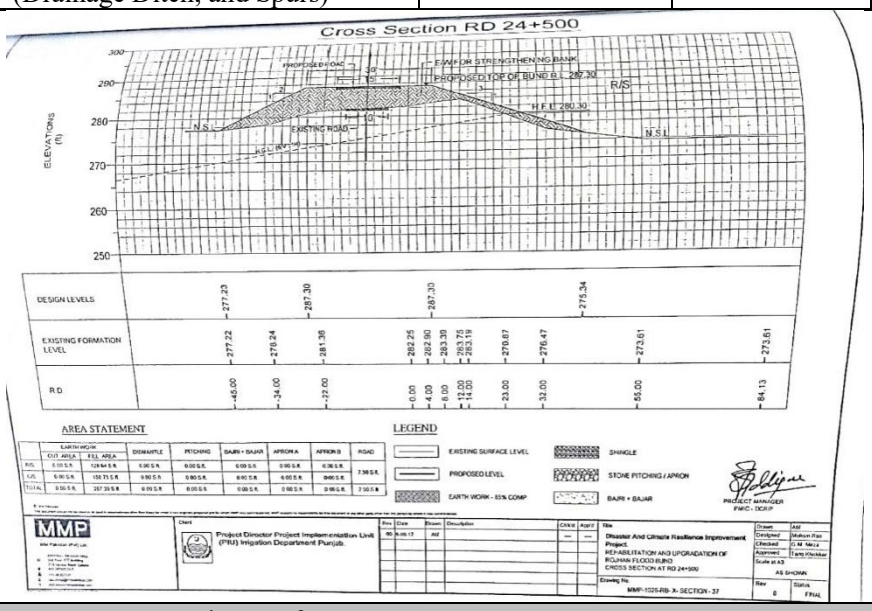
Layout Plan (Source of Satellite Image: Google Earth)




Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type C** | **0/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 283.75 feet | Not Applicable – |
| | H.F. L | 275.40 feet | |
| | Free Board Height | 8.35 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:3 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 61250 feet | |
| | Slope Protection Material | Earthen (Hard clay and sand) | |
| | Covering Material/ Pavement on the Top | Metaled road | |
| | Embankment Material | Earthen (Hard clay and sand) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Nil | |
| Typical Cross Section |   | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| 2010 | Side slope and top width disturbed | The Indus River reached the top level of the bund, and disrupting the riverside slope and reducing the top width. |
| | | |

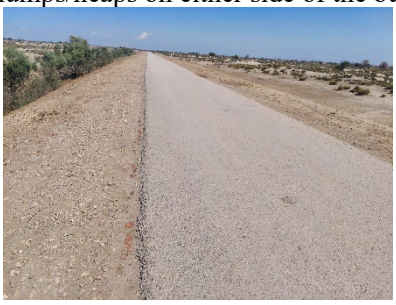
| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| 2020 | Restoration of Bund (River side slope and top width) | RS. 90 Million | Project Implementation Unit (PIU) |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |

| **Site Photo** | | |
|---|---|---|
| Vulnerable Section | General View of River Side | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Top | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | General View of Landside | |
| | Facing Downstream and Side | Facing Upstream Side |
| |  |  |
| | Close View of Deformation<br>Not Applicable | |
| | Close View of Damages<br>Not Applicable | |

<table>
<tr><td></td><td colspan="2">Photo with $360^0$ angles<br>  </td></tr>
<tr><td rowspan="6">Typical Section (Adjacent to the Vulnerable Point)</td><td colspan="2">General View of River Side</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Top</td></tr>
<tr><td>Facing Downstream and Side<br>  </td><td>Facing Upstream Side<br>  </td></tr>
<tr><td colspan="2">General View of Landside</td></tr>
<tr><td>Facing Downstream and Side<br> 
</td><td>Facing Upstream Side<br>  </td></tr>
</table>

| | |
|---|---|
| | Photo with $360^0$ angles<br>  |
| Downstream End of the Bund | General View<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |
| Upstream End of the Bund | General View (In the case that the VP is located near the end)<br>(Not Applicable) |
| | Photo with $360^0$ angles<br>(Not Applicable) |

| Observation Record[4]<br>(Current status, effect of countermeasure, development of erosion, deformation, deterioration) | | | |
|---|---|---|---|
| **DD/MM/YYYY** | **Inspection Type** | **Description and Photo** | **Damage[5]** |
| 02/3/2024 | Visual Inspection | • Mud lumps/heaps can be found on both sides of the bund<br>• Adjoining population of Rojhan city is present near the reach towards the river side.<br>• Metaled road runs on top is towards Rojhan to Miran Pur village.<br>  <br>Mud lumps/heaps on either side of the bund<br>  <br>Metaled road on top | a |

[4] *Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund*

[5] *a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified*

| Evaluation Process | | | | | |
|---|---|---|---|---|---|
| **DD/MM/ YYYY** | **Item** | | | **Result** | **Reason** |
| | Criteria For Evaluation Flow | Flood Damage | | Yes | The inundation analysis indicates that the flood damage is severe |
| | | Bund Damage | | NO | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | Pass | Free board height is 8.4 feet. |
| | | | Bund Width | Pass | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | Pass | Floodplain length is about 39400 feet. |
| | | Topographic Feature | Breach Record | No | There is no breach record. |
| | | | Flow Impact | NO | It hasn't been affected by strong water flow since before 2010 flood. |
| | **Category** | | | **Proactive Type C** | |
| | For Evaluation Score | Bund Damage | | 0 | There is no significant damage at present. |
| | | Bund Dimension | Bund Height | 0 | Free board height is 8.4 feet. |
| | | | Bund Width | 0 | The soil cover thickness over HGL exceeds the guideline value (Soil Depth≧2 feet ) |
| | | | Flood Plain Length | 0 | Floodplain length is about 39400 feet. |
| | **Quality Score** | | | **0/9** | |

Note) HGL: hydraulic gradient line

Creation Date: 01/3/2024

| Province | Zone | Division | Circle |
|---|---|---|---|
| Punjab | Dera Ghazi Khan Zone | Jampur Construction Division | Project Circle DG Khan |
| **Sr. No.** | **River Name** | **River System** | **Bank** |
| P-012 | Indus River | Indus River | Right |
| **Bund Name** | | **R.D** | **GPS Coordinates** |
| Jampur Flood Bund | | RD 21+000 to RD 22+000 | 29°75'11.86"N, 70°69'05.49"E |

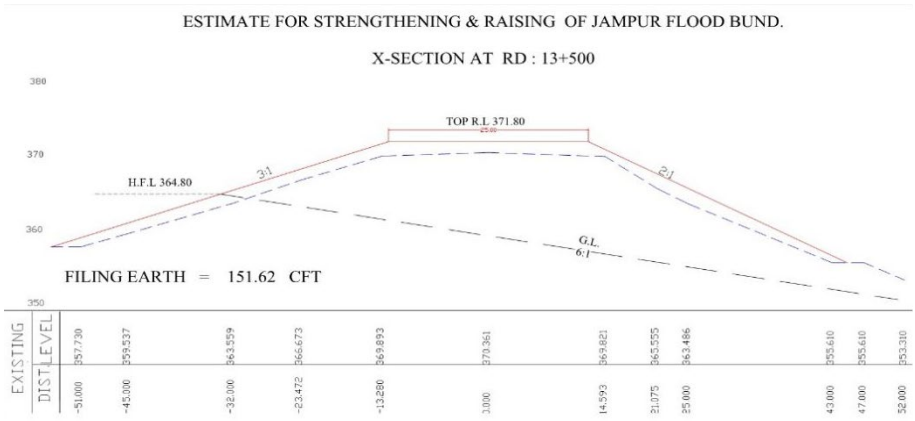
| | |
|---|---|
| Name of Vulnerable Point | Jampur Flood Bund RD 21+000 to RD 22+000 |
| Reason for the Vulnerability | • Jampur Flood Bund at this RD was vulnerable as in 2010 flood, the Indus River breached the bund at this section. |
| Flow Condition[1] | • No flow conditions. |
| Site Condition in the Country Side[2] | • Shero Minor is flowing towards country side of the bund.<br>• Cultivated area is situated on the country side which is approximately 15 feet below the top level of bund.<br>• Village Dulhar is situated on the country side of the bund. |

Layout Plan (Source of Satellite Image: Google Earth)


Evaluation[3]

| Category | Quality Score |
|---|---|
| **Proactive Type R** | **1/9** |

*1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points*
*2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)*
*3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase*

| Basic Information of the Bund | | | |
|---|---|---|---|
| Basic Dimensions and Materials | **Item** | **Existing** | **Proposed** |
| | Top Elevation | 371.80 feet | Not Applicable – |
| | H.F. L | 364.80 feet | |
| | Free Board Height | 7.00 feet | |
| | Top Width | 25 feet | |
| | River Side Slope | 1:3 | |
| | Country Side Slope | 1:2 | |
| | Longitudinal Length | 171000 feet | |
| | Slope Protection Material | Earthen (Silty clay) | |
| | Covering Material/ Pavement on the Top | Earthen (Silty clay) | |
| | Embankment Material | Earthen (Silty clay) | |
| | Ancillary Structure (Drainage Ditch, and Spurs) | Nil | |
| Typical Cross Section |  | | |

| History of Damages | | |
|---|---|---|
| **MM/YYYY** | **Type of Damage** | **Description** |
| 2010 | Breach due to overtopping | Jampur flood bund breached between RD 21+000 to RD 22+000 due to overtopping. |
| | | |
| | | |

| Record of Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| 2010 | The bund between RD 21+000 and RD 22+000 has been fully restored. | Not provided by concerned official | Maintenance and Repair works by PID |
| | | | |
| | | | |
| | | | |

| Plan for Rehabilitation/ Improvement | | | |
|---|---|---|---|
| **MM/YYYY** | **Project Name and its Description** | **Cost** | **Source of Funding** |
| | Nil | | |
| | | | |
| | | | |