# Holden Mine Site Fact Sheet
# Wetlands East of Tailings Pile 3

An approximately 2.9-acre riparian wetland is located directly east of Tailings Pile 3 and adjacent to the south bank of Railroad Creek.

## USFS DECISION TO PARTIALLY REMEDIATE THE WETLAND AND LEAVE SOME TAILINGS IN PLACE

- In 2012, a visual inspection was performed to evaluate the presence of tailings in the Wetlands East of Tailings Pile 3 (MWH 2013). Findings from this evaluation noted that "the majority of the wetland surface soils overlay some tailing of various thicknesses and depths," and that "In general, the thickness of tailings layer present is greatest adjacent to TP-3 and diminishes to the east, exhibiting a pattern characteristic of the combination of windblown tailings and some runoff transport of material from TP-3."
- In 2015, a memorandum from the USFS Remediation Program Manager was provided to Rio Tinto, titled "Clarification of the Remedy Prescribed for the Westland East of Tailings Pile 3" (USFS 2015). This memorandum was prepared in response to a February 9, 2015, letter from Intalco seeking clarification on the remedial action to address the tailings present in the wetland.
    - The concern raised by Intalco was that "pursuing removal of the buried layers and associated residual contaminants of concern would result in the unintended and undesired consequences by removal of established riparian habitat, and thus set back the recovery of these otherwise functional wetlands."
    - The selected remedy for this wetland in the Record of Decision (ROD; USFS 2012, Page 2-103) includes "the removal of visibly contaminated soil" and "eliminating the adverse effects of runoff and sediment transport from the tailings pile and shallow contaminated groundwater impacted by leaching from the tailings pile."
    - The USFS's interpretation of the ROD remedy for the wetland in the 2015 memorandum included the following:
        - "The Forest Service understands that the phrase 'removal of visibly contaminated soil" means excavating tailings in those areas of the wetland where tailings are observed at the land surface. The Forest Service does not understand the ROD to require removal of tailings that occur in deeper subsurface layers or lenses that have, through natural processes, been covered by soils or organic materials where vegetation is not visibly impacted."
        - "The area of visibly contaminated soil that needs to be removed appears to be limited to the western margin of the wetland. In this area, visible tailings occur at the surface and the wetland is characterized by sparse and/or stressed vegetation."
        - "The Forest Service believes that attempting to locate and excavate the subsurface layers and lenses of tailings in the rest of the wetland where normal wetland vegetation predominates would unnecessarily destroy existing wetland habitat that should continue to recover without the removal of thin buried tailings deposits."
    - The USFS memorandum also noted that the ROD acknowledges that this wetland is a relatively rare riparian wetland within the Railroad Creek drainage area.
    - The USFS memorandum directed Intalco that the removal of tailings within the wetland be limited to the area "between the eastern toe of the tailing pile and the margin of the wetland here tailings observed at the surface and signs of distressed vegetation cease."

- This decision reflects a net environmental benefit approach by the USFS, recognizing the ecological value of the wetlands function.

**THE SCARCITY AND ECOLOGICAL VALUE OF THE WETLAND**

Conditions regarding the wetlands present near the Holden Mine Site were documented in the *Holden Mine Remediation Project Waters of the US and Wetlands Impact Assessment and Mitigation Plan Findings* (Confluence 2020).

- There is a relative scarcity of wetland areas in the Railroad Creek valley/drainage area and the entire Lake Chelan area.
- The Railroad Creek subbasin covers 41,553 acres and the creek flows approximately 20 miles from its glacial headwaters to the outlet in Lake Chelan. The Holden Valley is in the Railroad Creek subbasin, approximately 10 miles upstream from Lake Chelan.
- The gradient of Railroad Creek in the Holden Valley is much flatter than the remainder of the Railroad Creek subbasin, which has resulted in the formation of a developed floodplain with wetland habitat in this valley.
- Holden Valley represents one of the few valley floodplains within the water resource inventory area (WRIA) 47—the Chelan Watershed—and features wetland habitat that is largely absent throughout the Chelan Watershed.
- There have been 24 delineated wetlands previously identified within the project area. Two of these delineated wetlands were classified as riverine wetlands, with the Wetlands East of Tailings Pile 3 being one of these riverine wetlands. The remainder of the delineated wetlands were classified as either depressional or slope wetlands.
- The Wetlands East of Tailings Pile 3 is rated a Category I wetland using the 2014 Wetland Rating System for Eastern Washington. Overall, there are currently five Category I wetlands present in the project area.
- The Washington State Wetland Rating System categorizes wetlands based on specific attributes such as rarity, sensitivity to disturbance, and the functions they provide. Category I wetlands are the highest-rated wetlands.

**PHASE 1 REMEDIATION ACTIVITIES IN THE WETLAND**

- East seep collection structures were installed along the boundary between Tailings Pile 3 and the wetland to collect five contaminated seeps (Shallow Zone groundwater) present in this area. The collected flow is conveyed to the Mine Water Treatment Plant for treatment.
- A portion of the wetland was filled to construct East Bypass Bridge and Holden Village Bypass Road. This filling bisected the wetland area, but the two areas remain hydrologically connected by two 48-inch-diameter culverts beneath the road.
- A South Tailings Pile 3 Borrow Area diversion channel was constructed and the water from this diversion channel can be used to supplement water flow to the wetland through a surface water distribution line. The contribution of flow to the wetland is controlled with a valve with the remaining diverted water discharged to surface drains and into Railroad Creek.
- Approximately 0.4 acres of the western portion of this wetland was remediated, which included the removal of shallow sediments impacted by mine tailings and restoration of the wetland (Stantec 2016, USFS 2016).

- The area where removal and restoration activities occurred was based on the extent described in a 2015 USFS memorandum (USFS 2015). The removal area extent as delineated and approved by the USFS is shown on Figure 1-2 from Stantec 2016, provided as Attachment 1.
- Shallow sediments in this area were removed to the depth of groundwater (approximately 2 to 3 feet below ground surface).
- To restore the wetland following excavation, the area was backfilled with topsoil and at least 1 foot of amended topsoil/compost at the surface to bring the area up to grade. Large woody debris was also placed, and the area was planted with native vegetation and seeded.

## WETLAND MONITORING ACTIVITIES AND RESULTS

- **Surface water sampling:** Samples collected in two locations in the wetland during PSVP monitoring events from 2019 to 2021 exceeded surface water-based criteria for several contaminants of concern (COCs; Floyd|Snider 2022).
  - The wetland currently receives water from both groundwater discharge (Shallow Zone and Intermediate Zone groundwater) and the South Tailings Pile 3 Borrow Area diversion channel.
  - The contributing sources of COCs to the wetland surface water include: (1) impacted groundwater discharging from Tailings Pile 3, and (2) residual tailings material remaining in the upper few feet of soil in the unremediated portion of the wetland.
  - Wetland surface water sample locations:
    - Sample location (SW-TP3-East 1) is in the western part of the wetland that was remediated during Phase 1, near the East Seep collection structures, and near a perforated pipe that discharges clean water from the South Tailings Pile 3 Borrow Area diversion channel.
    - Sample location (SW-TP3-East 2) is located farther east in the wetland and downstream of SW-TP3-East 1 and is in an area where tailings remain in shallow soil and where iron precipitate is visible at the surface.
  - Greater COC concentrations are observed at SW-TP3-East 2 compared to SW-TP3-East 1.
- **Wetland remediation area inspections:** A general inspection of the remediated portion of the wetland has been performed twice a year since 2020 in accordance with the Phase 1 Operations and Maintenance Plan (Floyd|Snider 2021) and the Wetlands East of TP3 Remediation Plan (Stantec 2016). This includes the following:
  - A qualitative spring survey to assess the general condition of the area, including flood damage, plant mortality, and the need for maintenance.
  - A late summer (middle to end of growing season) survey along established transects to collect qualitative and quantitative information on vegetation and survivorship of the planted stock, and to further assess the need for maintenance or adaptive measures.
  - Key observations from these inspections and any proposed recommended maintenance items are documented twice a year in the spring and fall Operations and Maintenance Activities Memorandums.
    - No significant concerns have been identified during these inspections to date.
- The surface water distribution line that runs from the South Tailings Pile 3 Borrow Area diversion channel to the wetland is inspected annually (Floyd|Snider 2021).

## PHASE 2 IMPLEMENTATION CONCERNING THE WETLAND

- Phase 2 implementation under all of the evaluated alternatives would prevent the discharge of impacted groundwater from Tailings Pile 3 to the wetland.
- The presence of tailings in the wetland may cause continued, but lower-level, exceedances of surface water-based criteria in the wetland surface water.
- The East Seep collection structures would no longer be needed following the implementation of Phase 2 and these structures would be abandoned.
- Based on the conceptual site model and numerical modeling, the wetland water balance will be sufficiently sustained with (unimpacted) groundwater discharge from areas to the south of the wetland and excess water from the South Tailings Pile 3 Borrow Area diversion channel following the implementation of Phase 2. The water balance will be further assessed during remedial design.
- Construction of a barrier wall in the vicinity of the wetland under Alternative 2 is expected to require the filling of an estimated 1,250-square-foot portion of this wetland. This wetland impact is estimated to last for a 3-year period during the Alternative 2 construction and, following construction, this impacted wetland area would be restored. No impact to the wetland is expected during the construction of Alternative 3A.

## REFERENCES


Confluence Environmental Company (Confluence). 2020. *Rio Tinto Holden Mine Remediation Project Waters of the US and Wetlands Impact Assessment and Mitigation Plan*. April 30.

Floyd|Snider. 2021. *Phase 1 Operations and Maintenance Plan for Holden Mine*. Prepared for Rio Tinto AUM Company, on behalf of Intalco. March.

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MWH. 2013. *Wetlands Characterization East of Tailing Pile 3 Summary Report, Holden Mine, Chelan County, Washington.* August.

Stantec. 2016. *Wetlands East of TP3 Remediation Plan, Holden Mine Site, Chelan County, Washington*. August 30.

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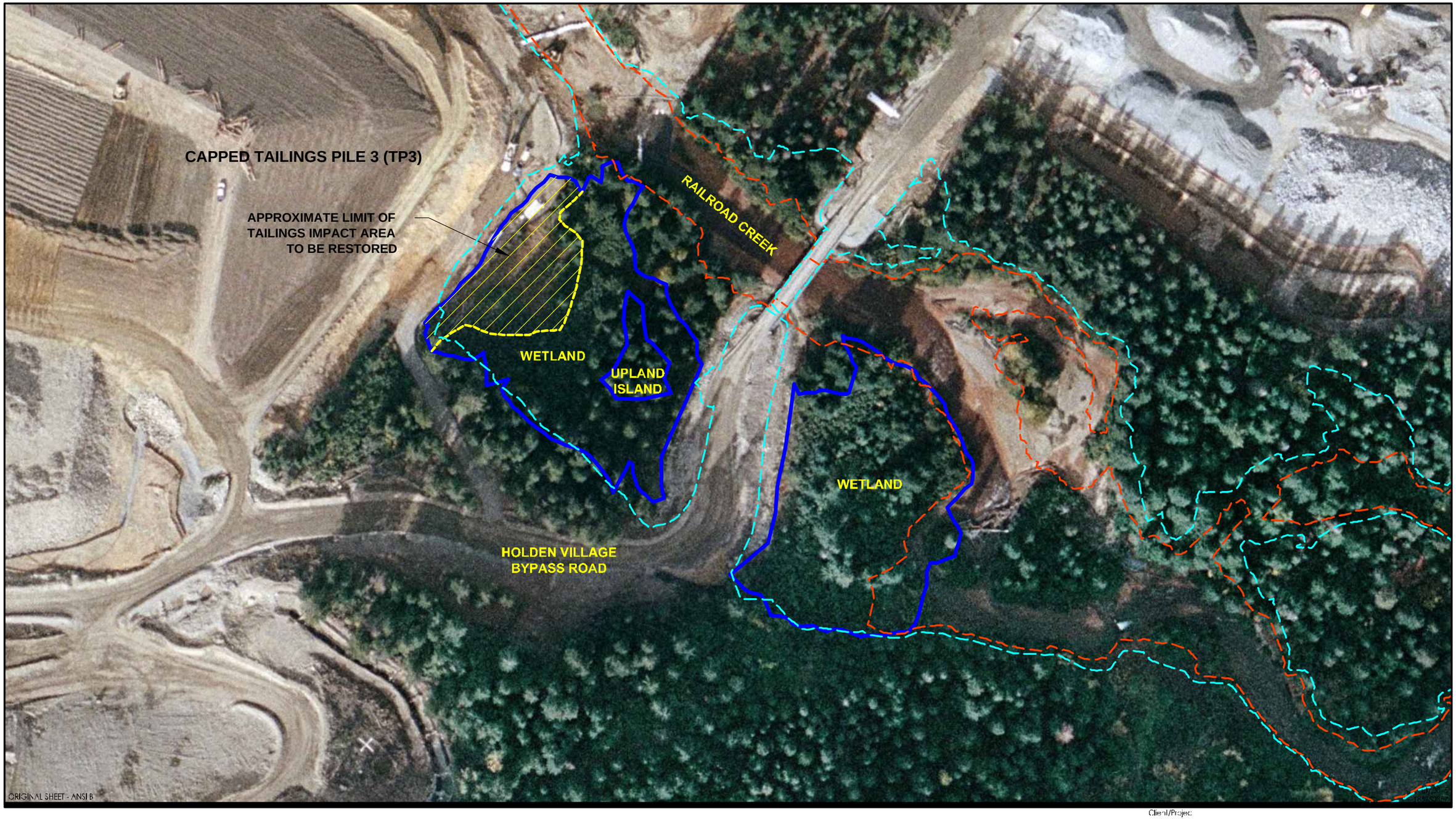


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## Legend

- EXISTING WETLAND WTP3
- EXISTING 2 YR FLOODPLAIN
- EXISTING 100 YR FLOODPLAIN

## NOTES:

1. AERIAL ORTHOIMAGERY FROM 2014 PROVIDED BY INTALCO.
2. WETLAND DELINEATION RESULTS DERIVED FROM FIELD DATA COLLECTED BY MWH JUNE, 2011.
3. EXISTING 2 YR AND 100 YR FLOODPLAIN MODELED BY OTHERS AS PART OF OVERALL HOLDEN MINE SITE RECLAMATION.
4. APPROXIMATE LIMIT OF TAILINGS IMPACT AREA WITHIN WETLAND 1 DELINEATED BY OTHERS, AND SHALL BE DETERMINED IN FIELD PRIOR TO ANY CONSTRUCTION ACTIVITIES.

Client/Project:
Rio Tinto
Holden Mine
Wetland WTP3 Restoration

Figure No.
1-2

Title
Existing Conditions
Wetland WTP3