Technical Memorandum

TEMPORARY IMPACTS TO WETLANDS DURING THIRD RUNWAY EMBANKMENT CONSTRUCTION

Seattle-Tacoma International Airport
Third Runway Project

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Prepared For:
The Port of Seattle, and
Parametrix, Inc.

Prepared By:
HNTB Corporation

Temporary Impacts to Wetlands during Third Runway Embankment Construction

Introduction

Construction of the Third Runway will require filling low areas west of the current airfield to raise the existing grade to approximately 400 feet MSL. This construction will require unavoidable placement of fill in existing wetlands. Temporary impacts to wetlands will result from facilities needed to meet water quality standards for construction runoff, construction dewatering, construction access, and construction staging. The facilities and activities that will result in temporary impacts to wetlands and streams are discussed below and summarized in Table 1.

Temporary construction in some of the wetlands west of the toe of the runway embankment is unavoidable because certain construction activities must occur outside (west of), but in close proximity to the footprint of the embankment where wetlands are located. Construction impacts to wetlands west of the embankment are considered temporary because following completion of construction, these impacts will be removed and the wetland areas restored to pre-construction conditions. Where feasible and consistent with FAA requirements regarding wildlife attractants, existing wetlands will be enhanced (i.e. wetlands dominated by non-native vegetation will be replanted with native species). Permanent facilities west of the runway embankment, such as storm water detention facilities, will generally be constructed outside of existing wetlands.

Storm water runoff from construction areas requires water quality treatment facilities to prevent water quality impacts to Miller Creek due to potential sedimentation. The proposed storm water treatment facilities must be constructed in low areas (which are often wetlands) and parallel to the embankment footprint (which requires crossing wetlands) to intercept construction runoff prior to entering Miller Creek. Specific storm water facilities that must be placed at the toe of the embankment slope include:

- erosion control fencing
- collection and conveyance swales
- sedimentation ponds
- pumping facilities (including power generators)
- treatment facilities (including pumps and power generators).

Additional facilities required to monitor and maintain the storm water facilities include the following. These facilities will be sited to avoid wetlands as much as possible:

- support facilities (including a trailer, parking, and material storage)
- access driveways.

In addition, the following construction activities may occur near the proposed toe of slope. These activities will also be sited to avoid wetlands, however, minor wetland

impacts may occur due to temporary access roads and drainage features to support these facilities:

- contractor office space
- construction material storage
- materials testing laboratory
- concrete batch plant
- construction equipment parking and servicing

These temporary construction facilities will be removed following completion and stabilization of the embankment. Following project completion, the wetlands will be restored by:

- removing fill material
- restoring drainage patterns and directing surface water to the wetlands
- hydroseeding disturbed areas
- replanting areas with native trees and shrubs.

Storm Water Management During Construction

This section describes the temporary drainage facilities required to meet water quality standards for the project during construction. Runoff from the embankment construction area generally flows south and west, eventually draining to one of three drainage basins. The three drainage basins within the third runway project area are:

- Miller Creek Drainage (MC)
- Walker Creek Drainage (WC) (a sub-drainage basin of Miller Creek)
- Des Moines Creek Drainage (DC)

The existing varying terrain and the proposed grading limits within the Miller Creek drainage basin require that the basin be divided into two sub-basins: Miller Creek North (MCN) and Miller Creek South (MCS). In order to manage construction runoff, temporary sedimentation ponds and treatment facilities will be constructed to serve each of the drainage basins. Plan views of the drainage basins and the conceptual construction storm water management system are depicted in Figure 1 through Figure 4.

Storm water runoff will generally be collected and conveyed to the sedimentation ponds by gravity-flow rock- or grass-lined swales. However, the lowest portions of the Miller Creek basin and the Walker Creek basin are wetlands (Wetland 37 and 44 respectively). To reduce impacts to these wetlands, construction runoff draining to these low areas will be collected in small collection ponds (sumps) and pumped to larger sedimentation ponds located upslope. The larger, upslope facilities are located in non-wetland areas to reduce wetland impacts and reduce the risk of potential encroachment into wetlands. The sumps needed to collect runoff were sized and located to reduce wetland impacts, yet provide an adequate margin of safety to prevent unauthorized storm water discharge to wetlands during emergency conditions (i.e. extreme storm events or power failures).

In order to collect runoff from the outer edge of the embankment and beyond the proposed Security Road, a temporary outer collection swale will be constructed (Figures 5-8). The swale is intended to have dual uses. First, it will collect construction runoff from the outermost portion of the embankment during the initial phases of construction and route the water to a sedimentation and treatment facility until the ground surface is established. Secondly, after establishment of the new embankment side slopes, the swale may be used as a distribution channel to direct clean runoff water to specific wetlands. Water may be distributed to wetlands using a variety of techniques, including point discharges, perforated pipe, porous rock berms, or infiltration swales. Portions of the outer swale will remain following construction to replace the conveyance functions of drainage channels filled by the project.

To service the outer collection channel during construction, as well as to provide construction access along the silt fence and the outermost fill slope, a temporary access road will be constructed (Figures 5-8). The access road will generally be constructed at or very near existing grade to minimize ground disturbance. It will not be paved and it is not intended to be used as a construction haul road.

Table 1. Temporary Construction Impacts to Wetlands Resulting From Construction of the Third Runway Embankment.

Wetland Number	Description of Facility	Purpose and Need
R2	Pond outlet pipe.	Outlet pipe from MCN-a detention pond must discharge to Miller Creek to maintain drainage basin boundary. Construction access to install pipe is required.
A5	Temporary access drive, outer collection swale, silt fence.	A swale at the edge of the construction area is necessary to collect and convey runoff to the MCN-b pond. A temporary access road will allow service and maintenance in the swale and allow installation and maintenance of a silt fence. The road, swale and fence will be removed following construction and soil stabilization.
35d	Temporary access drive, outer collection swale, silt fence, pumping facility.	A swale at the edge of the construction area is necessary to collect and convey runoff to the MCN-c holding pond. Water from the MCN-c pond will be pumped to the MCN-b pond for treatment if necessary. A temporary access road will allow service and maintenance in the swale and allow installation and maintenance of the silt fence. The road, swale and fence will be removed following construction and soil stabilization.
18	Temporary access drive, outer collection swale, holding pond (MCN-c), silt fence.	A swale at the toe of the proposed slope is necessary to collect and convey runoff to the MCN-c holding pond. The holding pond will collect construction runoff up to approximately elevation 350. Water from the pond will be pumped to the MCN-b pond for treatment if necessary. A temporary access road will allow service and maintenance in the swale and the pond, and will allow installation and maintenance of the silt fence. The road, swale, pond, and fence will be removed following construction and soil stabilization.
37a	Temporary access drive, Interim sump (MCN-d), Pumping facility, silt fence.	A swale at the toe of the proposed slope is necessary to collect and convey runoff to the MCN-d sump. The sump will only collect construction runoff originating from the lowest portion of the embankment, up to approximately elevation 250. Water from the sump will be pumped to the MCN-b pond for treatment. After construction of the adjacent embankment (during the first 1-2 years of construction,) the sump will be removed and the wetland restored. A temporary access road will allow service and maintenance in the swale and the sump, and will allow installation and maintenance of the silt fence. To reduce wetland impacts, no access road will be provided in the extreme lowest portion of the embankment. The road, swale, sump, and fence will be removed following construction and soil stabilization.
Water B	Temporary access drive, outer collection swale, silt fence.	A swale at the edge of the construction area is necessary to collect and convey runoff to the MCN-c pond. A temporary access road will allow service and maintenance in the swale and allow installation and maintenance of the silt fence. The road, swale and fence will be removed following construction and soil stabilization.

Table 1. Temporary Construction Impacts to Wetlands Resulting From Construction of the Third Runway Embankment (continued).

Wetland Number	Description of Facility	Purpose and Need
A12	Temporary access drive, outer collection swale, silt fence.	A swale at the edge of the construction area is necessary to collect and convey runoff to the MCN-c pond. A temporary access road will allow service and maintenance in the swale and allow installation and maintenance of the silt fence. The road, swale and fence will be removed following construction and soil stabilization.
A13	Temporary access drive, outer collection swale, silt fence.	A swale at the toe of the proposed slope is necessary to collect and convey runoff to the MCN-c pond. A temporary access road will allow service and maintenance in the swale and allow installation and maintenance of the silt fence. The road, swale and fence will be removed following construction and soil stabilization.
41a	Temporary access drive, outer collection swale, Miller Creek South pond (MCS), silt fence.	A swale at the toe of the proposed slope is necessary to collect and convey runoff to the MCS pond. A temporary access road will allow service and maintenance in the swale and the pond and allow installation and maintenance of the silt fence. The pond is necessary for sedimentation and treatment of runoff from the southern portion of the Miller Creek drainage basin. The pond is located in the lowest area so it will collect runoff from the embankment to the east as well as staging areas to the north, west, and south[1].
41b	Temporary access drive, outer collection swale, silt fence.	A swale at the edge of the construction area is necessary to collect and convey runoff to the MCS pond. A temporary access road will allow service and maintenance in the swale and the pond and allow installation and maintenance of the silt fence. The road, swale, pond and fence will be removed following construction and soil stabilization.
44a	Temporary access drive, outer collection swale, interim sump pond (WC-b), silt fence.	A swale at the edge of the construction area is necessary to collect and convey runoff to the WC-b sump. A temporary access road will allow service and maintenance in the swale and the pond and allow installation and maintenance of the silt fence. Access to the extreme lowest portion of the Walker Creek basin will be provided only from the south to reduce impacts to the wetland. The sump will collect water from outside the toe of the retaining wall where it will be pumped to the Walker Creek sedimentation pond (WC-a.) After the retaining wall is constructed and the surrounding ground reestablished, the sump will be removed and the ground restored.

[1] Because this wetland will be impacted throughout the duration of runway construction (4 - 5 years, the impact is considered permanent and included in on-site and off-site mitigation plans. This wetland will not be restored following construction.

Construction Dewatering

Two types of construction dewatering may occur during construction of the runway embankment. The first involves interception of existing ground water flow and the second involves localized drawdowns of the shallow water table.

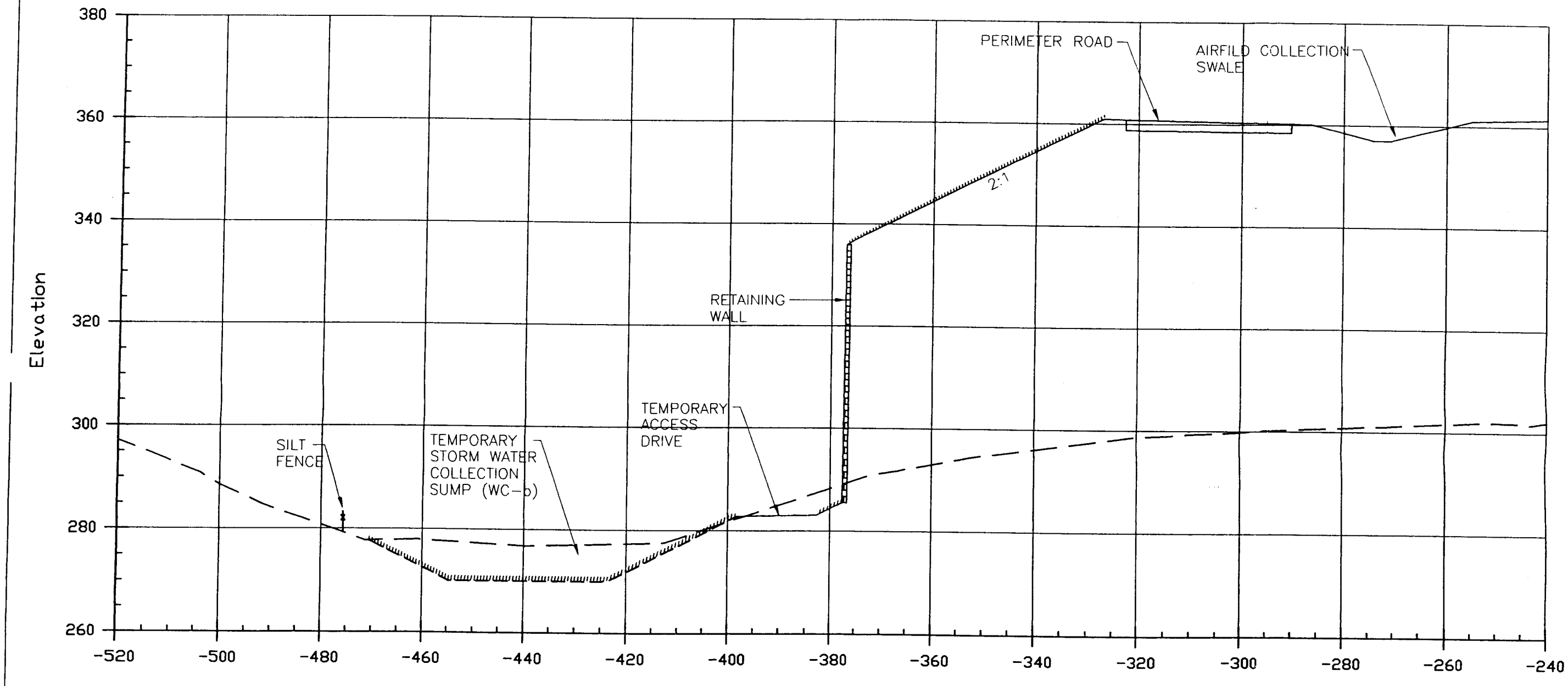
Prior to beginning construction, any existing surface flows through the work area will be routed through or around work areas via temporary piping. This will allow clean runoff water to be intercepted and discharged to the creek or wetlands and will reduce the amount of construction runoff needing water quality treatment.

Dewatering of ground water in isolated areas within the embankment will be necessary in areas where excavation of existing unsuitable material is needed. Based on preliminary geotechnical investigations, excavation of unsuitable material will be necessary for structural and seismic stability beneath the proposed retaining walls and in areas where existing soils may cause stability or settlement problems in the constructed embankment.

Removal of soft sub-soils (unsuitable material) will consist of excavating the unsuitable materials to depths where firm bearing soils are present. The excavation areas will be backfilled with structural fill or foundation material suitable for supporting the anticipated loads. Prior to excavating and backfilling, temporary wells or well points will be bored to draw down the surrounding water table. The draw down area will be localized by strategic placement of the wells, adjustment of the pump rates from the wells, or installation of temporary sheet piling. Water from the wells will be discharged to the surrounding wetlands or creek outside of the construction area as long as water quality is maintained. Hoses, sprinklers, spreaders or other methods will be utilized to distribute the water as necessary to adjacent wetlands.

The dewatering wells will be in operation at specific work areas (such as at the retaining wall areas) for as long as necessary to allow completion of any excavation of unsuitable material, foundation construction and embankment placement. The wells will be removed after the foundation is completed or the embankment grade is sufficiently above the natural ground water table that further construction activities will not be adversely affected by ground water. After removal of the wells, the ground water will be allowed to return to its natural elevation.

Due to the short duration of the dewatering operations coupled with the mitigating measures, significant adverse impacts to wetlands are not expected. The localization of the drawdown areas to the minimum size needed for construction, the re-distribution of groundwater to adjacent wetlands, and the routing of water from upslope areas to wetlands downslope of the construction will prevent significant dewatering impacts from occurring in downslope wetlands.



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SECTION D-D

STATION 143+00

FIGURE 3.2.2-8

CREEK BUFFER

9TH AVE SOUTH

18

MCN-A

POND
MCN-b

A6

35d

A8

SOUTH 160TH STREET

MATCHLINE – SHEET 2

RETAINING WALL

MC SEDIMENTATION POND

PUMPING FACILITY

WETLAND

CONSTRUCTION IMPACT LINE

PERMANENT ROAD

TEMP ACCESS DRIVE

PERMANENT SWALE

TEMP SWALE

TOE OF EMBANKMENT

100' 0 100' 200'
SCALE: 1"=100'

N

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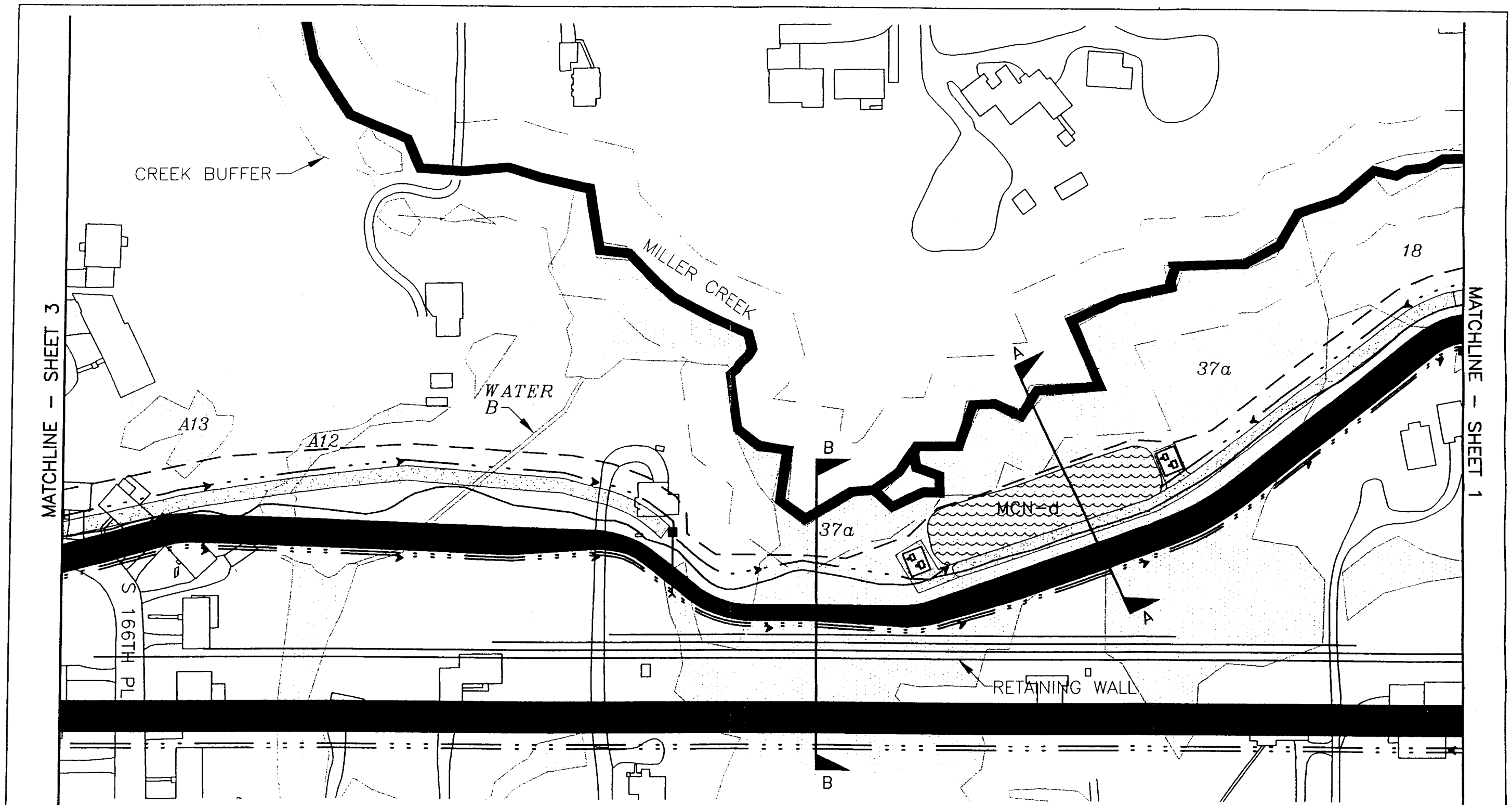
SEA-TAC INTERNATIONAL AIRPORT

TEMPORARY WETLAND IMPACTS

FIGURE 3.2.2-1 SHEET 1 OF 4



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TEMPORARY WETLAND IMPACTS

FIGURE 3.2.2-2 SHEET 2 OF 4

MATCHLINE – SHEET 2

SOUTH 171ST STREET

SOUTH 170TH STREET

MCS

10TH AVE SOUTH

41a

41b

C

C

S 168TH ST

MATCHLINE – SHEET 4

SEDIMENTATION POND

PUMPING FACILITY

WETLAND

CONSTRUCTION IMPACT LINE

PERMANENT ROAD

TEMP ACCESS DRIVE

PERMANENT SWALE

TEMP SWALE

TOE OF EMBANKMENT

100' 0 100' 200'

SCALE: 1"=100'

N

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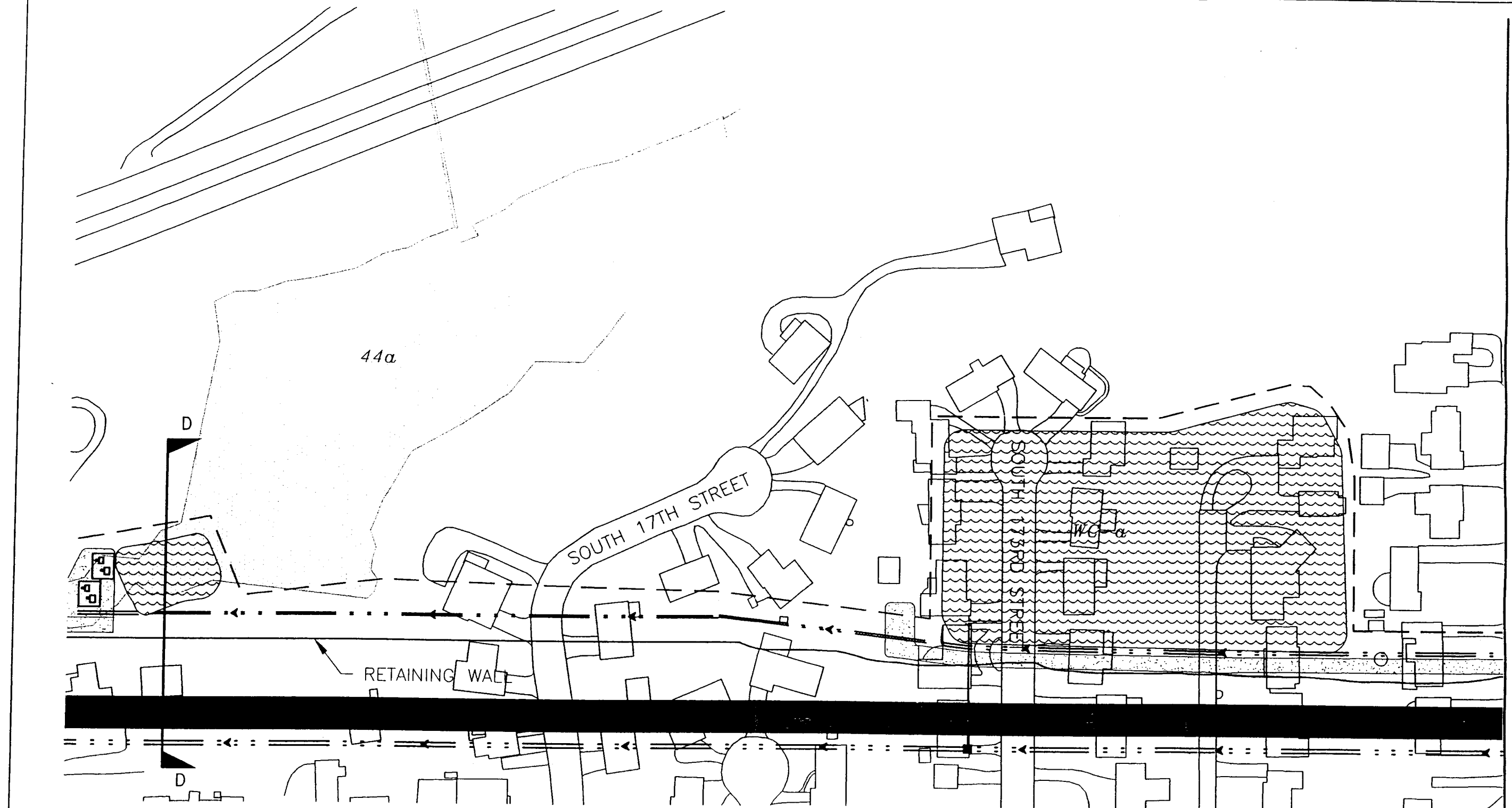
TEMPORARY WETLAND IMPACTS

FIGURE 3.2.2-3 SHEET 3 OF 4



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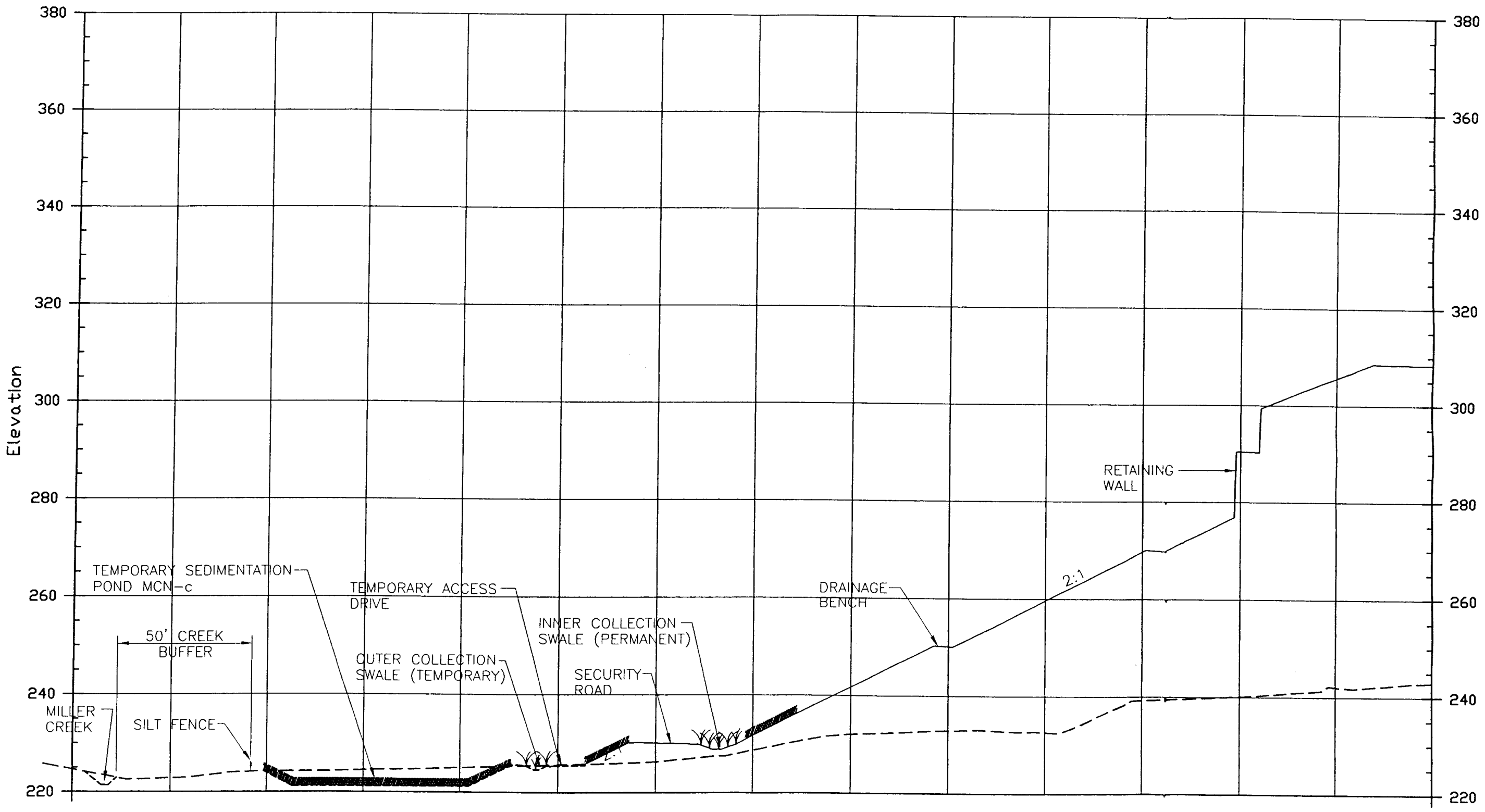
TEMPORARY WETLAND IMPACTS

FIGURE 3.2.2-4 SHEET 4 OF 4



SECTION A-A

STATION 184+00 (PERPENDICULAR TO FILL SLOPE)

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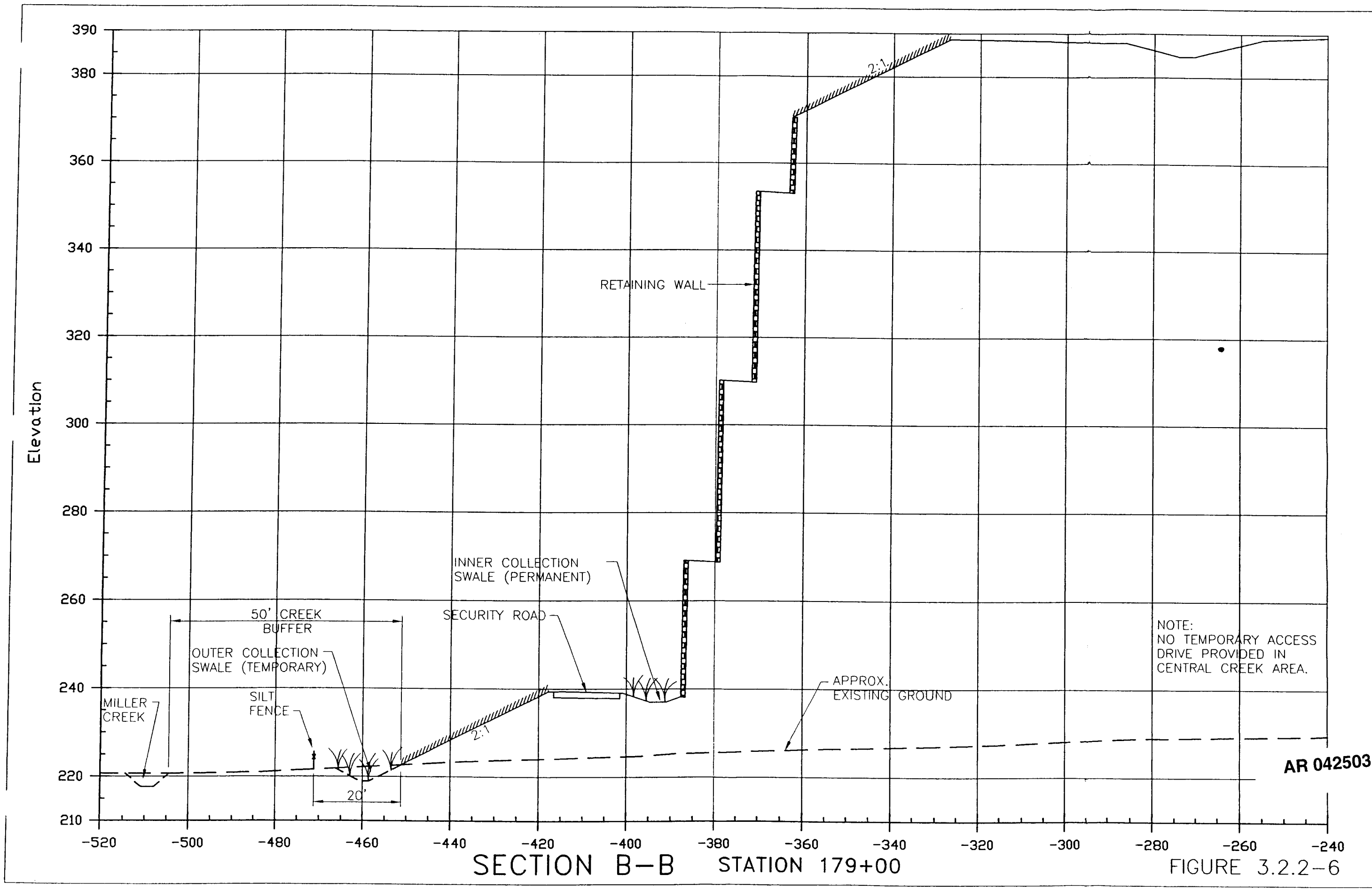
FIGURE 3.2.2-5



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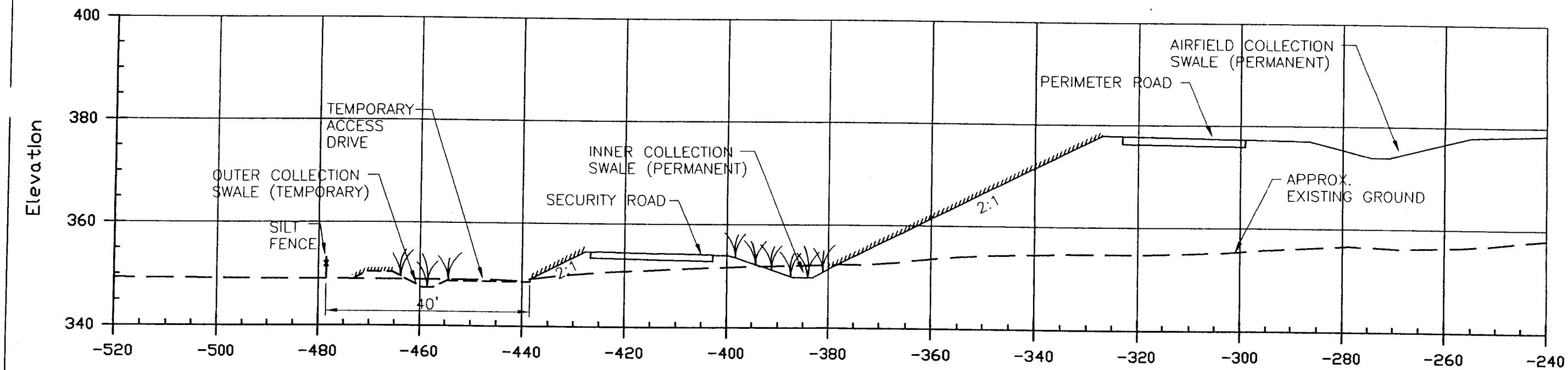
SECTION B–B STATION 179+00

FIGURE 3.2.2–6



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SECTION C–C
STATION 165+00

FIGURE 3.2.2–7