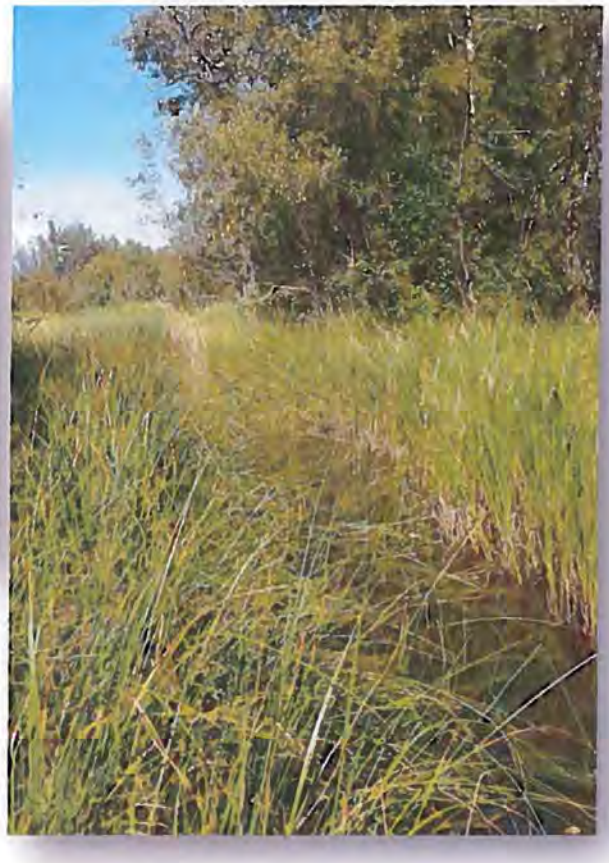
Compensatory Mitigation Plan

Haines Highway Reconstruction Milepost 3.9 to 25.0

Projet 68606 – January 2017

Chilkat River adjoining Haines Highway near MP 8 (above)



11 ½ mile Creek just before it flows under the Haines Highway (right)

Objective

The objective of this document is to describe appropriate mitigation for unavoidable project impacts. Mitigation for unavoidable impacts would, primarily, enhance the highest values of impacted wetlands, by creating and enhancing fish tributaries and creating and enhancing fish habitat in the Chilkat River. The goal is to replace and maintain, at least, the highest values of the impacted wetlands (DOWL HKM 2010); in this case the highest values of the project wetlands are from Aquatic Support functions.

DOT&PF proposes both activities that benefit aquatic resources (installation of culverts to fish passage standards including associated benefits to adjacent wetland areas) and mitigation measures for unavoidable impacts. Generally activities that benefit aquatic resources do not require compensatory mitigation. However, discussions with the Inter-Disciplinary Team and recognition that the project will have unavoidable impacts, permittee-responsible compensatory mitigation is proposed as follows.

The Proposed Action would benefit aquatic resources by, replacing 26 existing culverts with culverts constructed to fish passage standards[1] and consequently improve the value of 70.7 acres of saturated, seasonally or permanently flooded wetlands by installation of fish passage culverts.

The Proposed Action would unavoidably impact

- 22.0 acres of wetlands,
- 4.0 acres of impacts to Other Waters of the U.S. excluding impacts to the Chilkat River,
    - the impact to the Chilkat River includes approximately 7,490 linear feet (LF) of fill on top of previously riprapped slopes and 4,692 LF on top of original ground.

The Proposed Action would have a neutral effect on 3,155 LF of fill in highway ditches[2] and tributaries in realignment sections because the streams will be replaced in-kind in, at least, a 1 to 1 ratio. Similarly, the Revised Proposed Action would also have a neutral effect on 7,490 LF of the Chilkat River stream bank because the stream banks will be replaced in-kind.

Although the functional assessment accurately describes the values of the project wetlands it cannot adequately assesses the functions of riverine areas. The improved functions and values of aquatic resources of riverine areas, including stream creation and/or enhancement, cannot be appropriately assessed so permittee responsible compensatory mitigation is proposed in terms of stream length or acres.

DOT&PF is proposing the following mitigation measures,

1. For impacts to 22.0 acres of wetlands, 70.7 acres of wetlands would be benefited (see mitigation table 5 sheet 38 of 46 and mitigation drawings sheets 1 to 34 of 46).
    a. As a commitment to, and in coordination with, the IDT, 6,818 LF of tributaries would be enhanced/created as close to the 1,195 LF of impacted tributaries as possible. The wetlands would be benefited by the enhanced/created tributaries that improve the wetlands aquatic functions. Locations are shown on the mitigation permit drawings, sheets 1 to 34 of 46 and also shown on *Conceptual Mitigation Opportunities,* attached, and available at http://dot.alaska.gov/sereg/projects/haines_hwy/assets/8.15.2016/Apx-F_EFH_8-9-2016.pdf

2. For impacts to 12,612 LF of Chilkat River new fish habitat enhancements would be installed.
    a. 7,490 LF or 3.0 acres (mitigation table 4, sheet 34 of 46) of existing vegetated rip rap would be replaced in-kind with vegetated rip rap,
    b. 4,692 LF or 0.9 acre of original ground would be mitigated by the creation of 5,945 LF of in-water, river protrusions, ballasted log clusters, and fish wheel sites (see mitigation table 2-1, sheet 36 of 46). These measures are sited as close to the impact sites as possible. Also, offsite mitigation would enhance fish habitat by improve fish passage of a

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[1] DOT&PF and ADF&G. (2001). *Memorandum of Agreement between Alaska Department of Fish and Game and Alaska Department of Transportation and Public Facilities for the Design, Permitting, and Construction of Culverts for Fish Passage.* August 2001. http:// www.dot.state.ak.us/stwddes/desenviron/resources/memos.shtml.

[2] Rearing coho have been observed along the entire roadway even though the highway ditches are not cataloged. Kate Kanouse, personal communication, ADF&G, Dec. 12, 2016

highway culvert at Milepost 7.1 of the Mud Bay Road in Haines. A 60 LF series of step pools would be created immediately downstream of the Highway cross culvert currently perched and blocking fish passage (see mitigation sheets 41 and 42 of 46).

i. 6,005 LF of stream enhancements (5,945 LF, table 2-1 plus 60 LF, Mud Bay stream improvement) are offered as mitigation for 4,692 LF of impacts.

Site Selection

DOT&PF selected the mitigation sites, in consultation with the Interdisciplinary Team (IDT)[3], in order to focus consideration of mitigation opportunities DOT&PF has completed a Wetlands Delineation Report (DOWL HKM 2006), Stream and Habitat Inventory (DOWL HKM 2006a), a Hydrology and Hydraulics report (DOWL HKM 2009) and a Wetlands Function and Values Assessment (DOWL HKM 2012). The IDT encouraged,

- a watershed approach, with permittee responsible mitigation as close to the impact sites as possible, and
- mitigation that focuses on replacing the highest functions of the impacted wetlands and other waters of the US which provide the quality and quantity of water to support the fish habitat in anadromous waters, e.g. improving the aquatic support function of project wetlands.

Fish stream enhancement/creation sites were developed utilizing the background reports cited in *Baseline Data* to propose site concepts with the desired hydrologic and wetlands functions. Final stream enhancement/creation sites were developed in coordination with the IDT and shown in the Mitigation Plan (Inter Fluve rev 2013). Locations and details are shown in the permit mitigation drawings.

Mitigation sites to offset impacts to the Chilkat River were developed in coordination with the Chilkat Indian Village and the IDT to, at least, maintain fish presence and passage by simulating existing Chilkat River fish habitat. Locations and details are shown on the permit mitigation drawings.

The off-site mitigation site on Mud Bay road was selected in coordination with ADF&G and TWC as a site with high potential to improve fish passage and provide rearing habitat.

All mitigation measures are located within the Chilkat River watershed and as close to the impact sites as practicable.

Site Protection

All mitigation measures will be constructed within DOT&PF Right of Way (ROW). Since all the proposed mitigation is within the DOT&PF ROW no conservation easements are necessary.

Baseline Information

DOT&PF performed the following studies to develop ecological characteristics of the proposed mitigation sites,

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[3] The IDT is comprised of members from the US Army Corps of Engineers, National Marine Fisheries Service (NMFS), US Fish and Wildlife Service (FWS), the Alaska Dept. of Fish and Game (ADF&G), the Alaska Dept. of Natural Resource Parks Div., Haines Borough, Takshanuk Watershed Council (TWC).

- a Wetlands Delineation Report (DOWL HKM 2006) was performed to describe existing wetland plant communities, soil conditions and hydrologic conditions,
- a Stream and Habitat Inventory (DOWL HKM 2006a) was performed to describe project area streams, riparian areas and associated habitats,
- a Hydrology and Hydraulics report (DOWL HKM 2009) was performed to describe area drainage patterns and to provide design information for project culverts including fish passage culverts, and,
- a Wetlands Function and Values Assessment (DOWL HKM 2012) to assess impacts to wetlands.

The location of the impact sites are shown on the permit drawings and the location of the mitigation sites are shown on the permit mitigation drawings.

Determination of Credits

Although the functional assessment accurately describes the values of the project wetlands it cannot adequately assesses the functions of riverine areas. The improved functions and values of aquatic resources of riverine areas, including stream creation and/or enhancement, cannot be appropriately assessed so permittee responsible compensatory mitigation is proposed in terms of stream length or acres.

DOT&PF is proposing the following mitigation measures,

1. For impacts to 22. 2 acres of wetlands, 70.7 acres would be benefited in a **3 to 1** ratio.

2. For impacts to 12,612 LF of Chilkat River (Table CM 3, above), new fish habitat enhancements would be installed.

    a. 7,490 LF of existing vegetated rip rap would be replaced in-kind with vegetated rip rap at least a **1 to 1 ratio**,

    b. 4,692 LF or 0.9 acre of original ground (streambank) would be mitigated by the creation of 5,945 LF of in-water, river protrusion, ballasted log clusters, and fish wheel sites. Also, a 60 LF series of step pools would be created immediately downstream of the Mud Bay road cross culvert currently perched and blocking fish

        i. 6,005 LF (5,945 LF plus 60 LF) of stream enhancements are offered as mitigation for 4,692 LF of impacts in a **1.3 to 1** ratio.

Mitigation work plan

The mitigation work plan includes the following items,

- Project **geographic boundaries** are given in Block 16 of the permit application.
- The construction contracts will require a qualified foreman with special expertise and experience in mitigation would oversee all mitigation **construction methods** of the
    - Enhanced/created tributaries. Tributary construction will be primarily by hand with assistance of a tractor with backhoe and front end loader attachments similar to a John Deere (JD) 450.
    - Chilkat River in-water mitigation sites would use

        - Larger excavation equipment to place large rocks and trees would be required. Hand labor to install vegetation and may require the use tractor similar to a JD 450.
    - Off site mitigation near MP 7.1 of the Mud Bay Road will be primarily by hand with assistance of a tractor with backhoe and front end loader attachments similar to a John Deere (JD) 450 to place rocks for the step pools.
    - The **timing** of the construction of the mitigation would be concurrent with each of three highway construction contracts. Construction sequence would be:
        - 1st segment, MP 3.9 to MP 12, begin Fall 2016, finish fall 2018
        - 2nd segment, MP 12 to MP 21, begin as early as fall 2018, end as late as fall 2021
        - 3rd segment, MP 21 to 25.0, begin as early as fall 2021, end as late as fall 2023
    - There are no external **sources of water** to be imported for construction of the mitigation sites.
    - The methods of **establishing the desired plant communities** are by hand under supervision of a qualified foreman with special expertise and experience in mitigation construction.
    - **Invasive species** control is required under Executive Order 13045. An invasive species survey will be performed prior to construction and control will be a contract requirement. Control methods will be selected for each species according to the provisions of the DOT&PF manual *Disposal and Control of Invasive Plant Species,* 2014 available at http://www.dot.state.ak.us/stwddes/desenviron/assets/pdf/resources/se_invasive_final.pdf
    - The **proposed grading plan** for
        - Tributary enhancement/creation are shown in detail in *Conceptual Mitigation Opportunities* available at http://dot.alaska.gov/sereg/projects/haines_hwy/assets/8.15.2016/Apx-F_EFH_8-9-2016.pdf. Supplemental information is in the project *Hydrology and Hydraulics Report* available at http://dot.alaska.gov/sereg/projects/haines_hwy/assets/7.9.13/Hydrology.and.Hydraulics.Report.pdf
        - Chilkat River in-water mitigation proposals are shown on the attached mitigation permit sheets 44 to 46 of 46
        - Step pool construction for the off-site is currently in preliminary design. DOT&PF has surveyed the area and it is the intent to limit the construction area to the extent practicable.

Maintenance Plan

DOT&PF will maintain

- all drainage structures, including fish passage pipes with DOT&PF maintenance staff.
- the mitigation sites during the five year monitoring period. Maintenance activities may include, but not be limited to, addition or removal of woody debris, and/or vegetation planting, etc.

Of note, DOT&PF will not be responsible for damage occurring from acts of force-majeure, i.e

unanticipated debris flows, alteration of drainage patterns due to rebound, etc.

Performance Standards

The performance standards of the mitigation objectives are:

1. Fish stream creation/enhancement shall ensure:
    a) presence of juvenile salmonids
    b) channel stability
    c) natural habitat establishment
2. Fish Passage Culvert installation shall ensure:
    a) migration upstream and downstream for adults and juvenile salmonids
3. Chilkat River mitigation sites shall ensure:
    a) migration upstream and downstream for adults and juvenile salmonids
    b) channel stability
    c) natural habitat establishment
4. Off-site stream habitat improvements near MP 7.1 of the Mud Bay Road shall ensure
    a) presence of juvenile salmonids, if practicable.
    b) channel stability

Monitoring Requirements

A 5 year monitoring plan will be developed by DOT&PF in coordination with ADF&G. The monitoring plan will be made available to the IDT for a 2 week review and comment period and will be approved by DOT&PF after considering comments from the IDT. The monitoring plan will be submitted to the USACE for review and approval prior to construction. ADF&G will collect baseline data prior to construction and will review yearly monitoring data to determine if the performance standards have been achieved.

Long term management plan

DOT&PF is required to maintain all drainage structures, including fish passage pipes with DOT&PF maintenance staff. DOT&PF will commit to repairs of mitigation sites only during the 5 year monitoring program. Additionally, as-built surveys will be conducted and submitted to the IDT, including the USACE, after each of the construction segments is complete.

Adaptive management plan

Based upon results of the yearly monitoring DOT&PF will make repairs, such as channel or stream bank repair, repairs to restore constructed habitats or other similar changes that may impair success of the performance standards.

DOT&PF commits to an adaptive management project with $30,000 to be held in reserve until monitoring on all construction segments is complete.

Financial Assurances

Compensatory Mitigation sites will be constructed as a component of the construction contracts, funded primarily with federal aid. To accept a bid for construction, all bidders must present proof of a performance bond that assures, if the contractor fails to perform the work to completion that funding is available to complete the work.

The Monitoring Plan will be funded with $75,000 of primarily federal aid and includes gathering baseline data. ADF&G will develop the Monitoring Plan under an existing Reimbursable Services Agreement with their sister agency, DOT&PF.

Other relevant information

The Haines Highway Reconstruction, MP 3.9 to MP 25.0 project has received a Finding of No Significant Impact by the lead federal agency, the Federal Highway Administration based on a Final Revised Environmental Assessment. Both documents are available at http://dot.alaska.gov/sereg/projects/haines_hwy/documents.shtml

For location and detail information concerning impacts to wetlands and other waters of the US refer to the project permit drawings, sheets 1 to 41 of 41. For location and detail information concerning mitigation sites refer to project permit mitigation drawings, sheets 1 to 46.

The Wetlands and Stream Functions and Values Assessment report is available at http://dot.alaska.gov/sereg/projects/haines_hwy/documents.shtml

Winter travel on the Chilkat River, circa 1890's

References

ADF&G. (2012). *Haines Highway Mile 25 to the Border: 10-Year Mitigation Monitoring*, Technical Report No. 11-10, available at https://www.adfg.alaska.gov/static/home/library/pdfs/habitat/12_08.pdf

DOWL HKM. (2006). *Wetland Delineation and Wetland Functional Assessment, Vegetation Classification, Wildlife Assessment*, Haines Highway MP 3.5 to 25.3, Haines, Alaska. September 2006, and available at http://dot.alaska.gov/sereg/projects/haines_hwy/documents.shtml

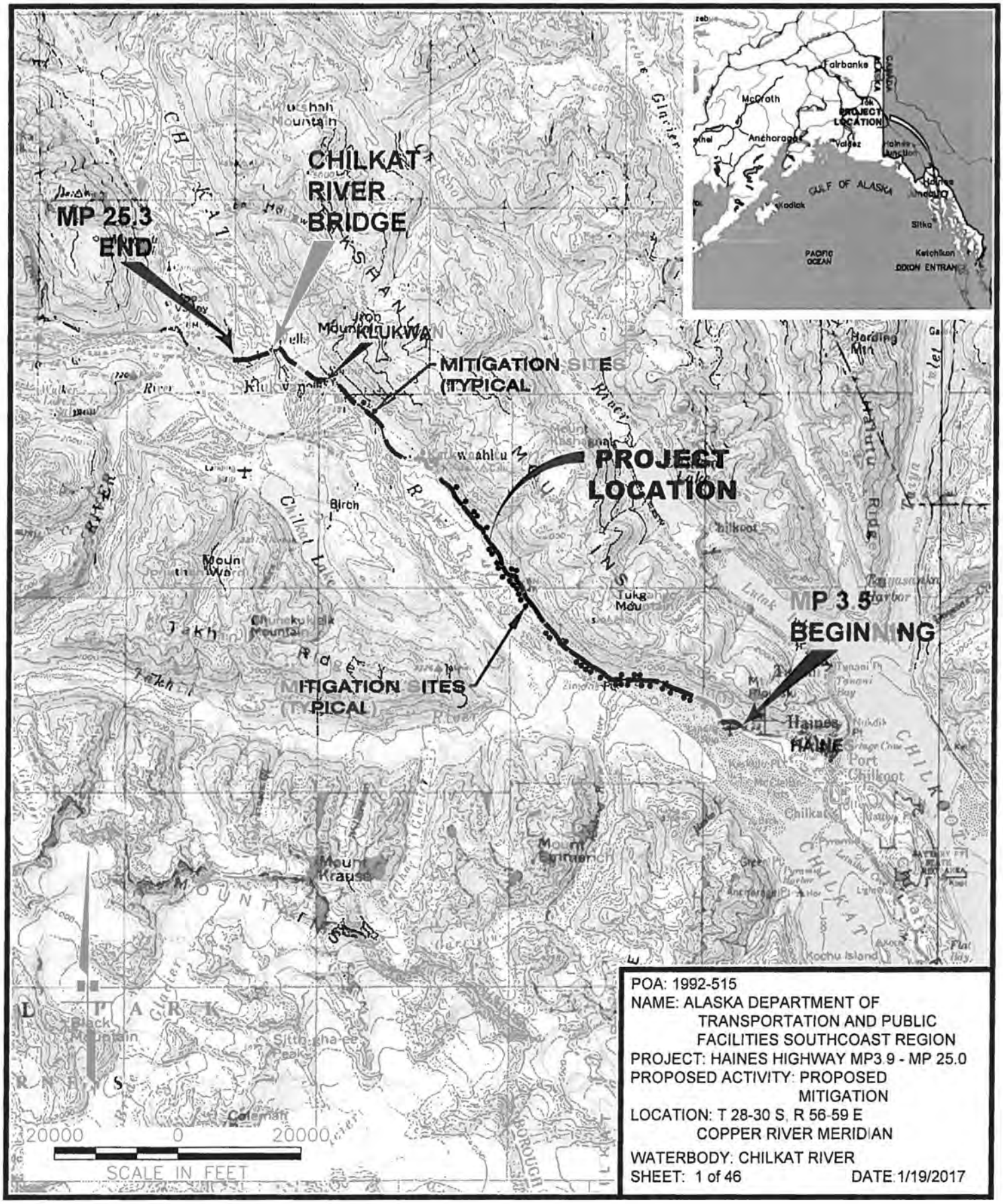
DOWL HKM (2006a) *Stream and Habitat Inventory*, Haines Highway MP 3.5 to 25.3, Haines, Alaska. September 2006, and available at http://dot.alaska.gov/sereg/projects/haines_hwy/documents.shtml

DOWL HKM. (2009). *Location Hydraulic Study and Preliminary Hydrology and Hydraulics Report*, Haines Highway MP 3.5 to 25.3. October 2009.

DOWL HKM. (2012). *Wetland and Stream Functions and Values Assessment, Haines Highway MP 3.5 to MP 25.3*. January 2012, Document submitted with the USACE Section 404 permit application and available at http://dot.alaska.gov/sereg/projects/haines_hwy/documents.shtml

Inter Fluve (rev 2013), *Conceptual Mitigation Opportunities, Haines Highway MP 3.5 to 25.3*, October 2009, Revised June 2013, available at http://dot.alaska.gov/sereg/projects/haines_hwy/documents.shtml

USACE. (2003). *Effects of Riprap on Riverine and Riparian Ecosystems*. USACE, Engineer Research and Development Center, Wetlands Regulatory Assistance Program. ERDC/EL TR-0304.



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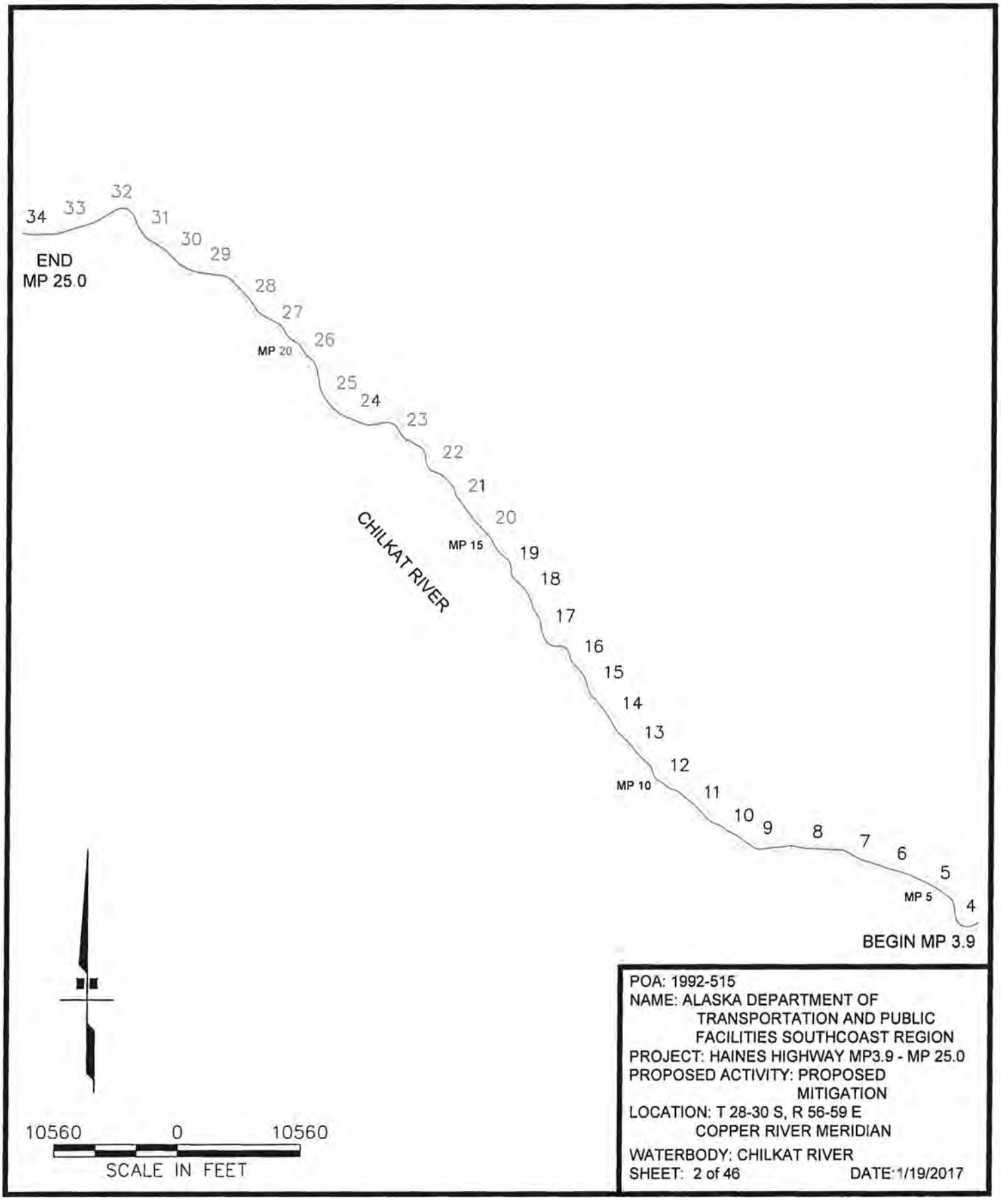
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 1 of 46 DATE:1/19/2017



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LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
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SHEET: 2 of 46 DATE: 1/19/2017

LEGEND


PEM1H WETLANDS IMPACTS


PEM1B WETLANDS IMPACTS


PSS1H WETLANDS IMPACTS


PSS1E WETLANDS IMPACTS


PSS1B WETLANDS IMPACTS

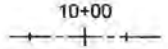

PFO1C WETLANDS IMPACTS


R30W RIVER IMPACTS


BENEFICIAL WETLAND IMPACT AREA

PROPOSED NEW STREAM

EXISTING STREAM



PROPOSED ROAD CENTERLINE AND STATIONING

CUT AND FILL LIMITS

EXISTING RIGHT-OF-WAY

PROPOSED CULVERT REPLACEMENT/ EXTENSION

TRIBUTARY MITIGATION

EXISTING ROAD AND CENTERLINE

ORDINARY HIGH WATER

R30W FILL ID# (TABLE 3)

BALLASTED LOG CLUSTERS (TABLE 2)

FISH WHEEL SITE (TABLE 2)

RIVER PROTRUSIONS (TABLE 2)

BENEFICIAL WETLAND IMPACTS ID (TABLE 6)

TRIBUTARY ENHANCED LENGTH (TABLE 7)

TRIBUTARY CREATED LENGTH (TABLE 7)

MP # MILEPOST

FISH PIPE ID # (TABLE 1)

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NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
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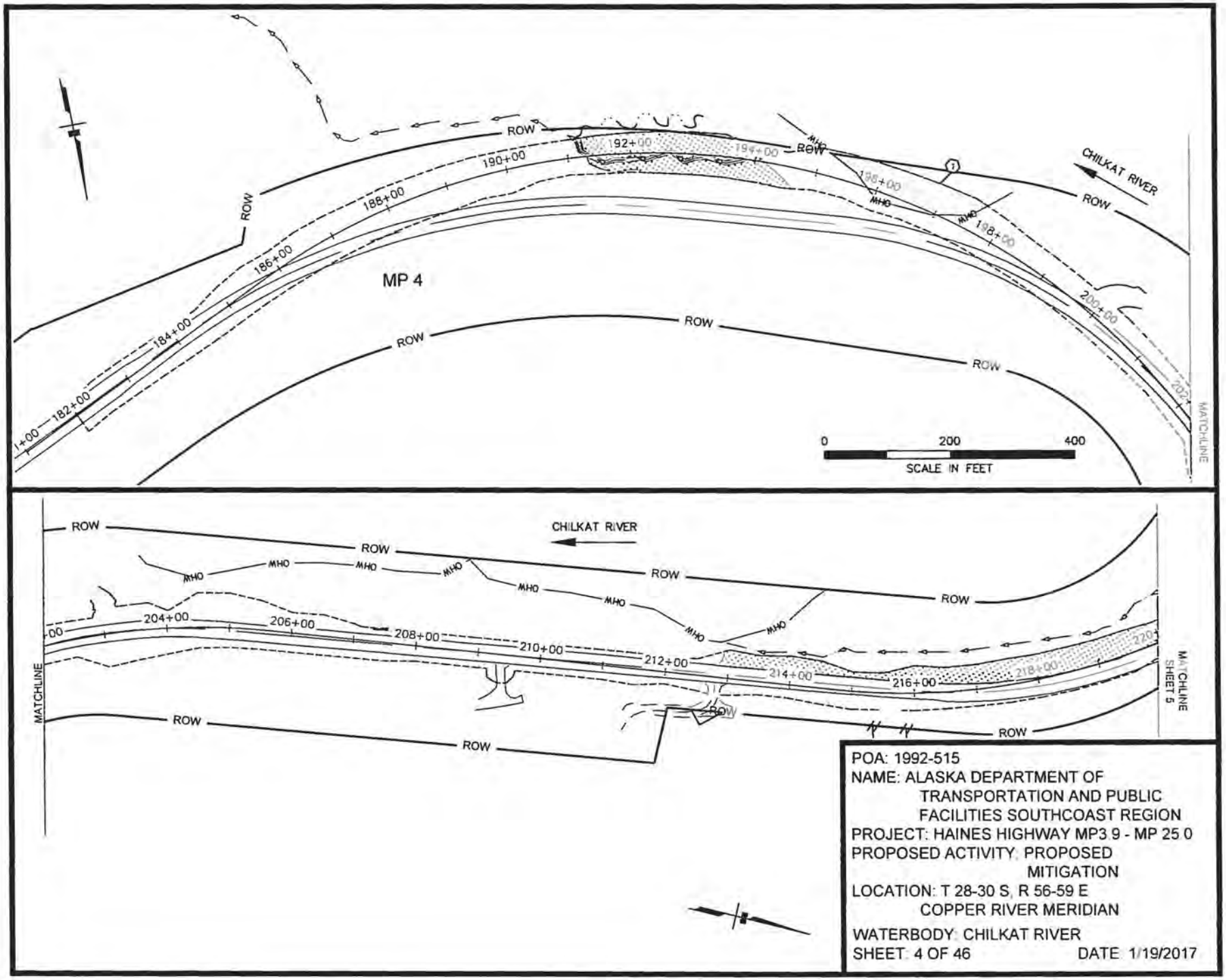
SHEET: 3 OF 46 DATE 1/19/2017



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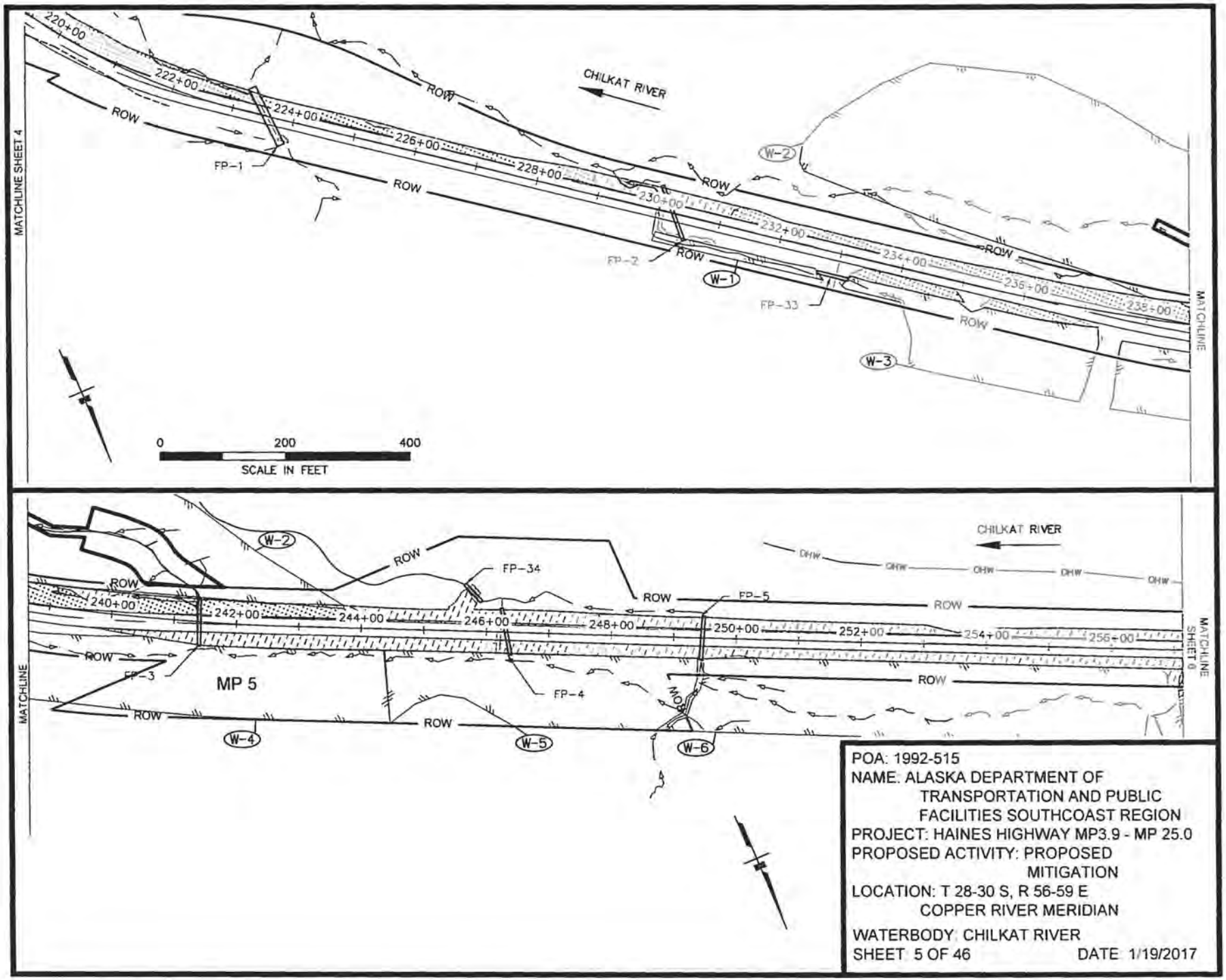
SHEET: 4 OF 46 DATE: 1/19/2017



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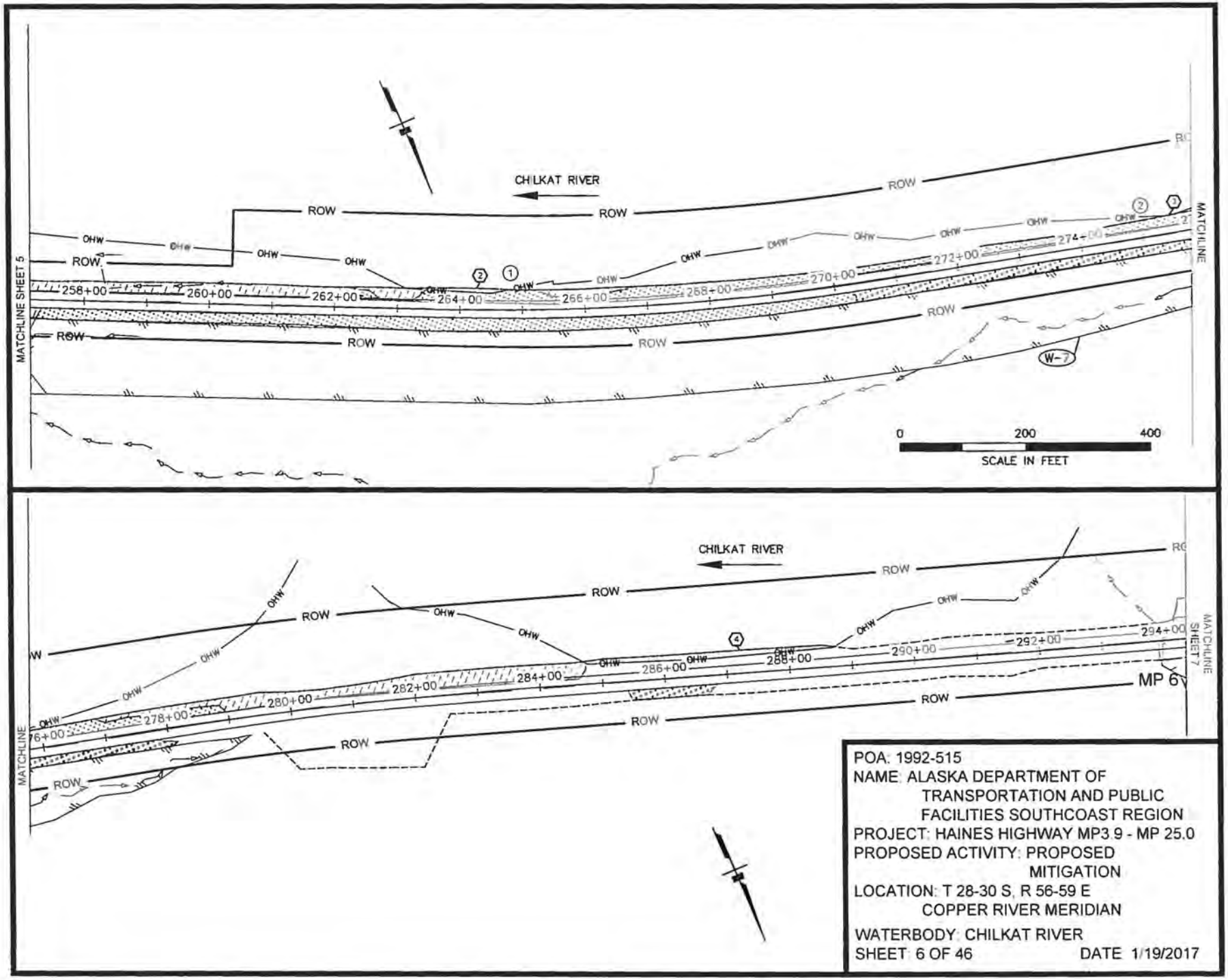

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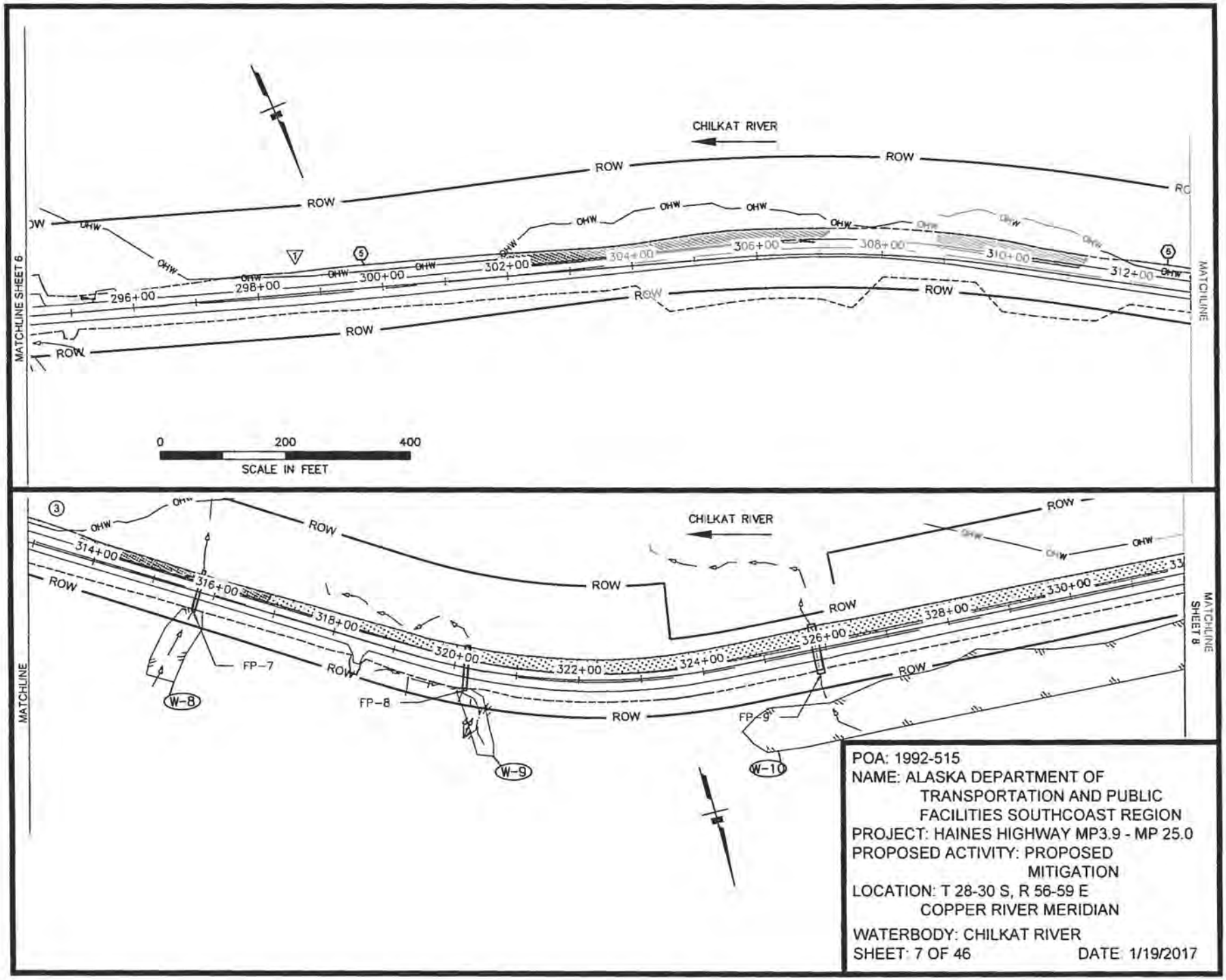

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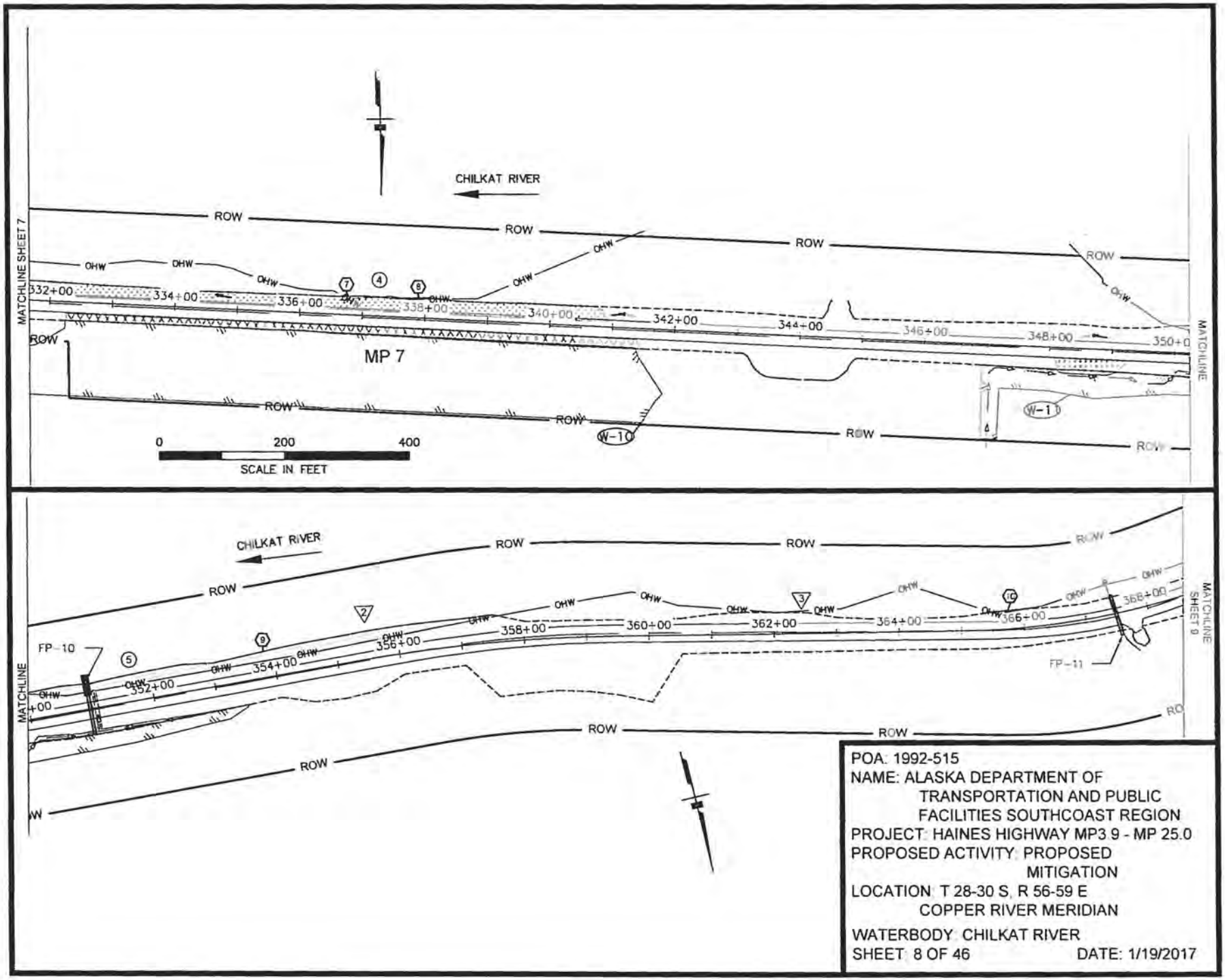

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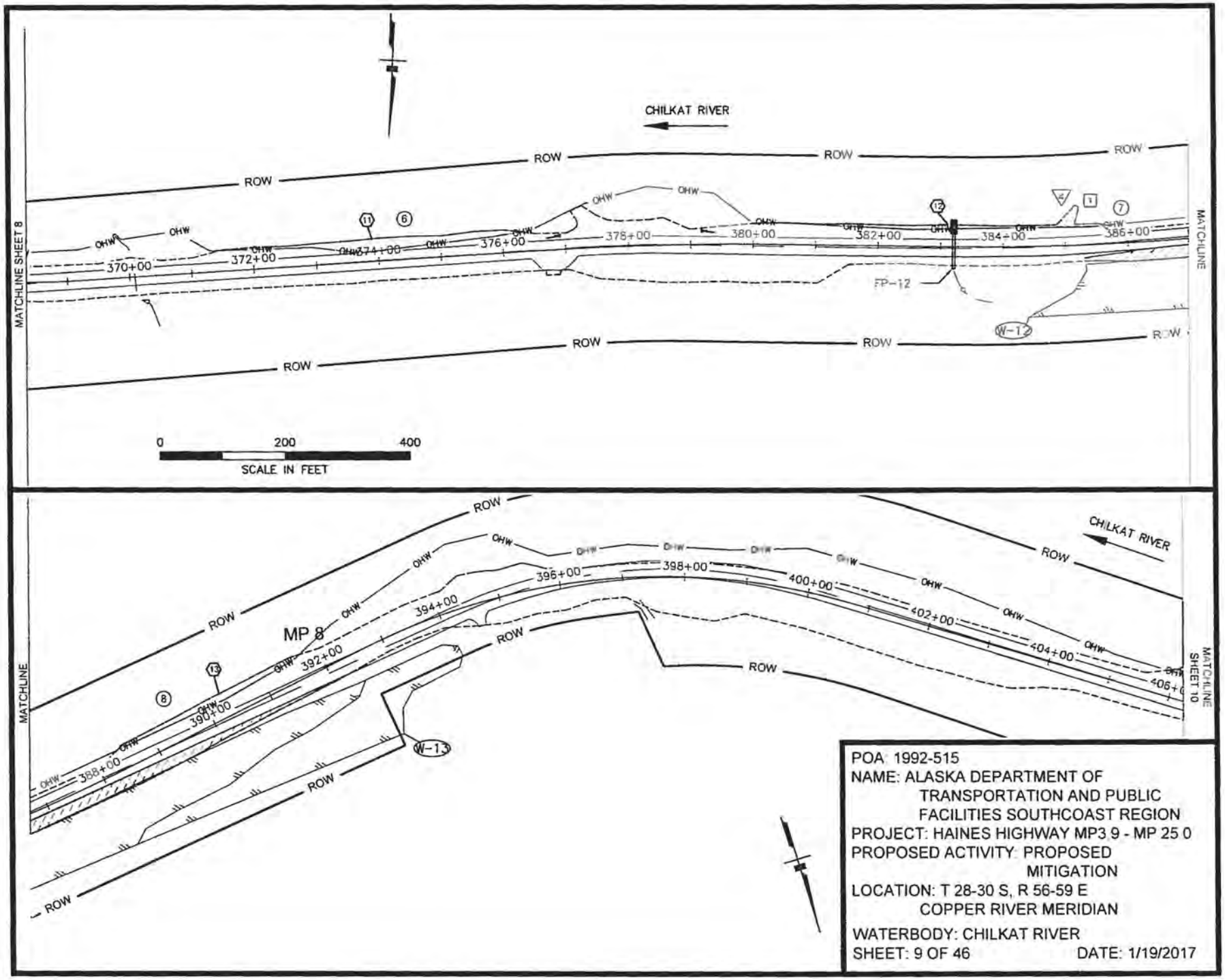

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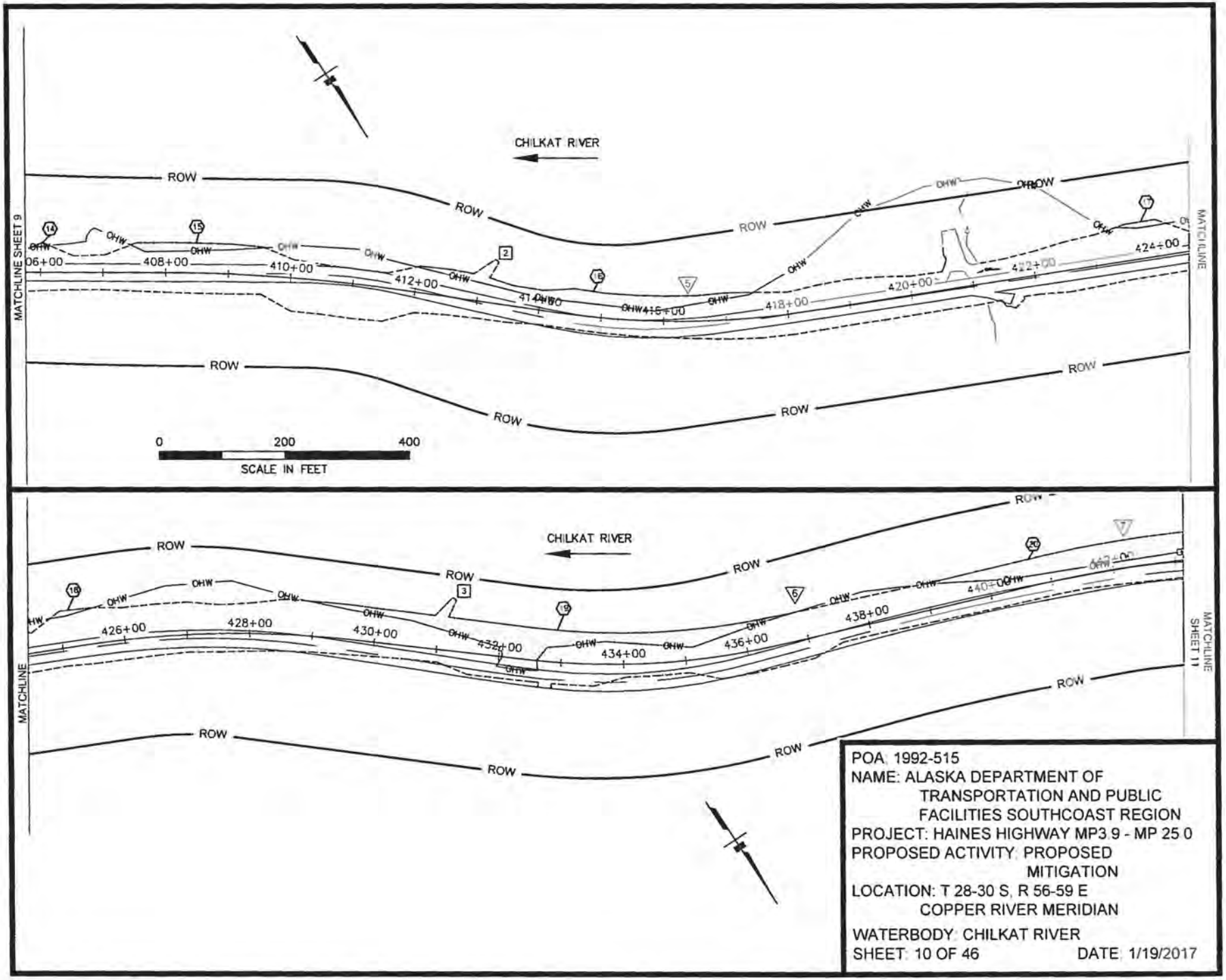

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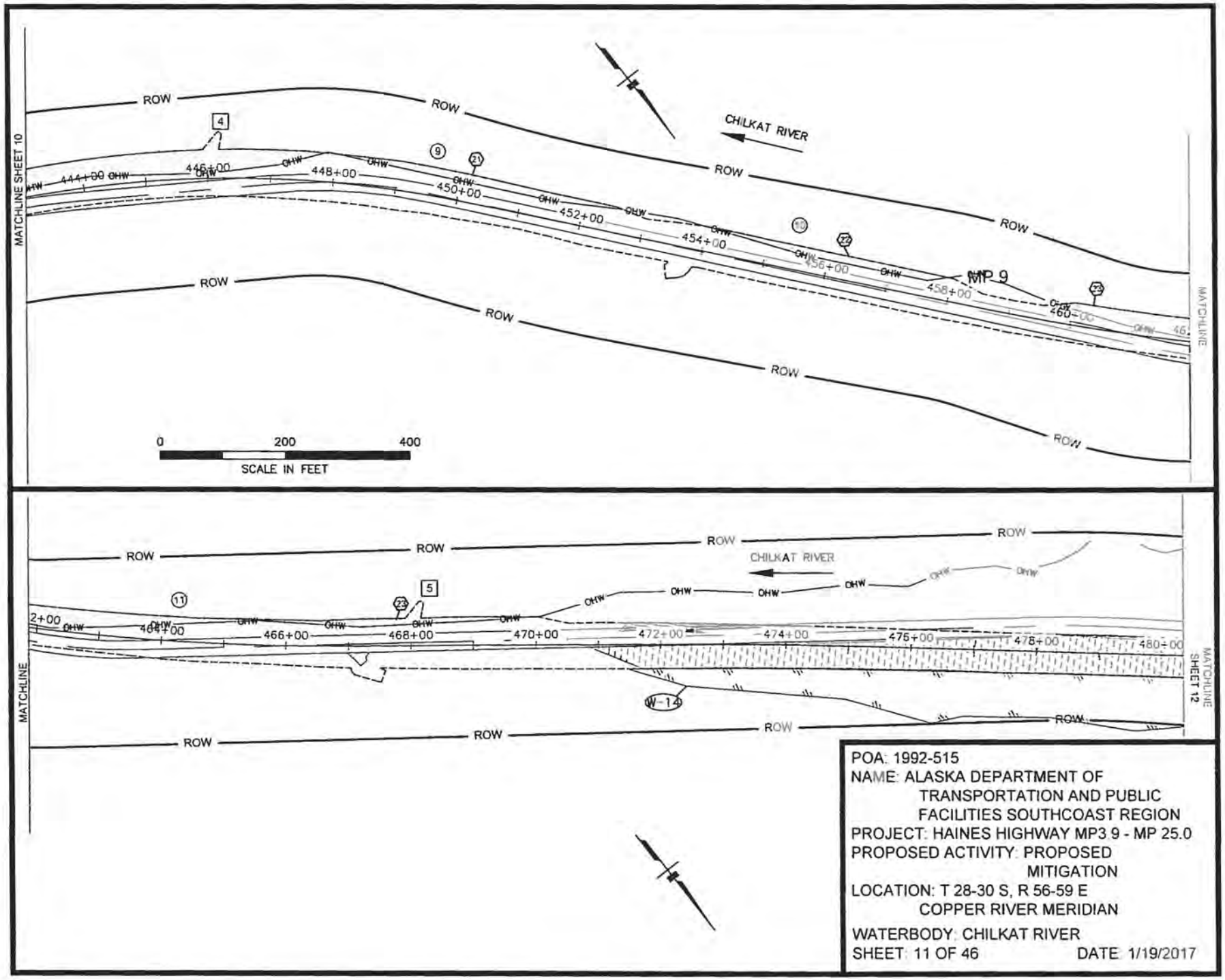

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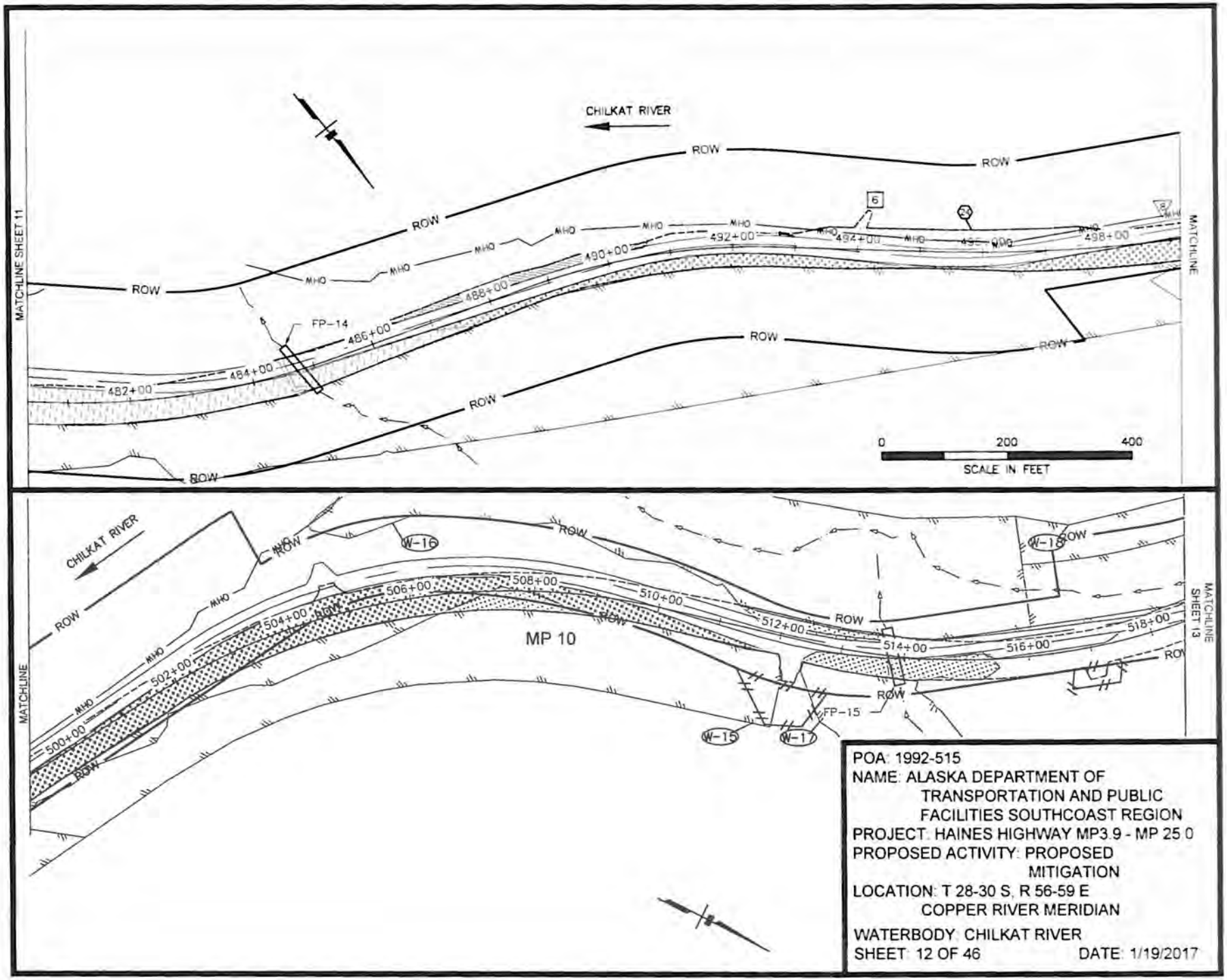

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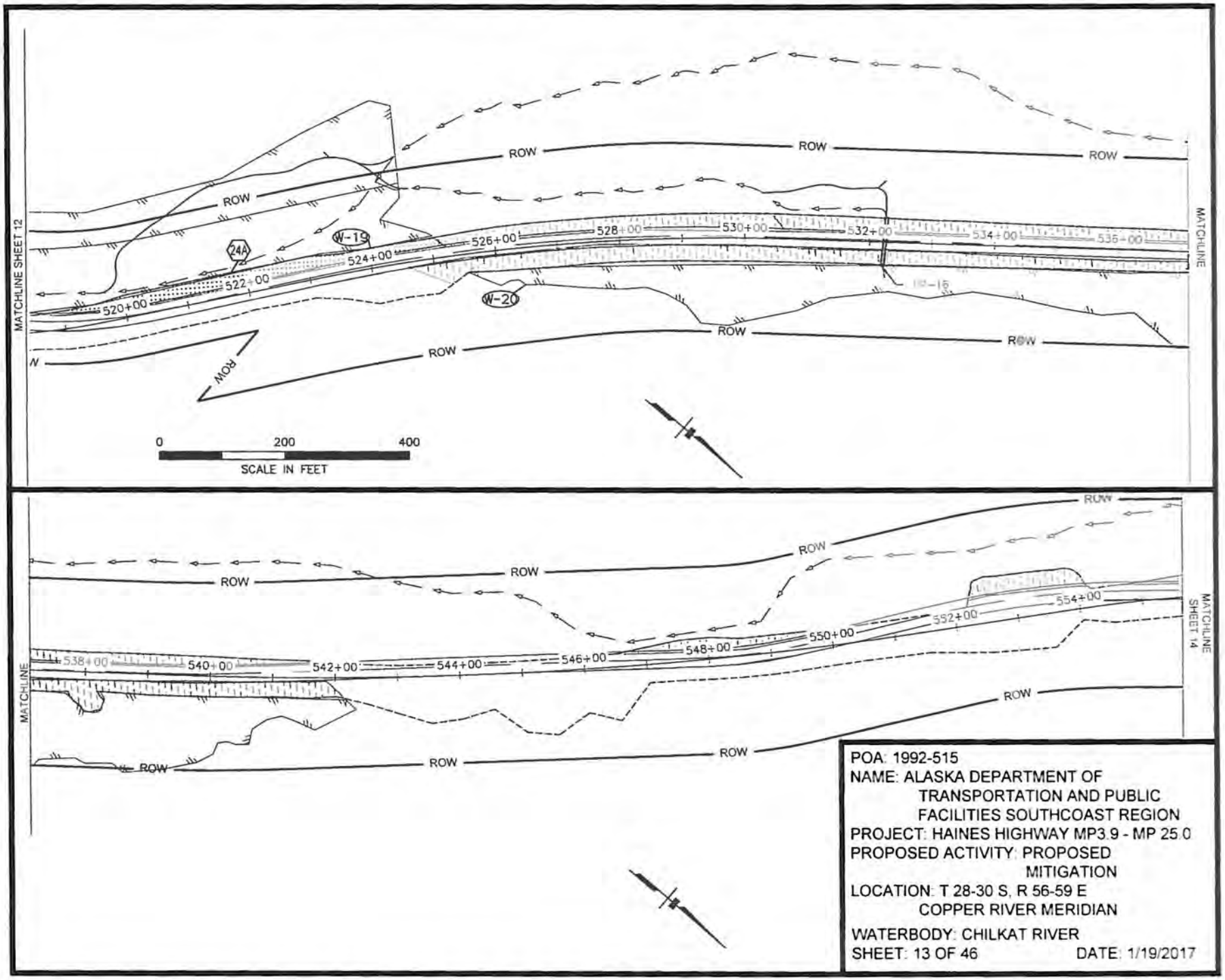

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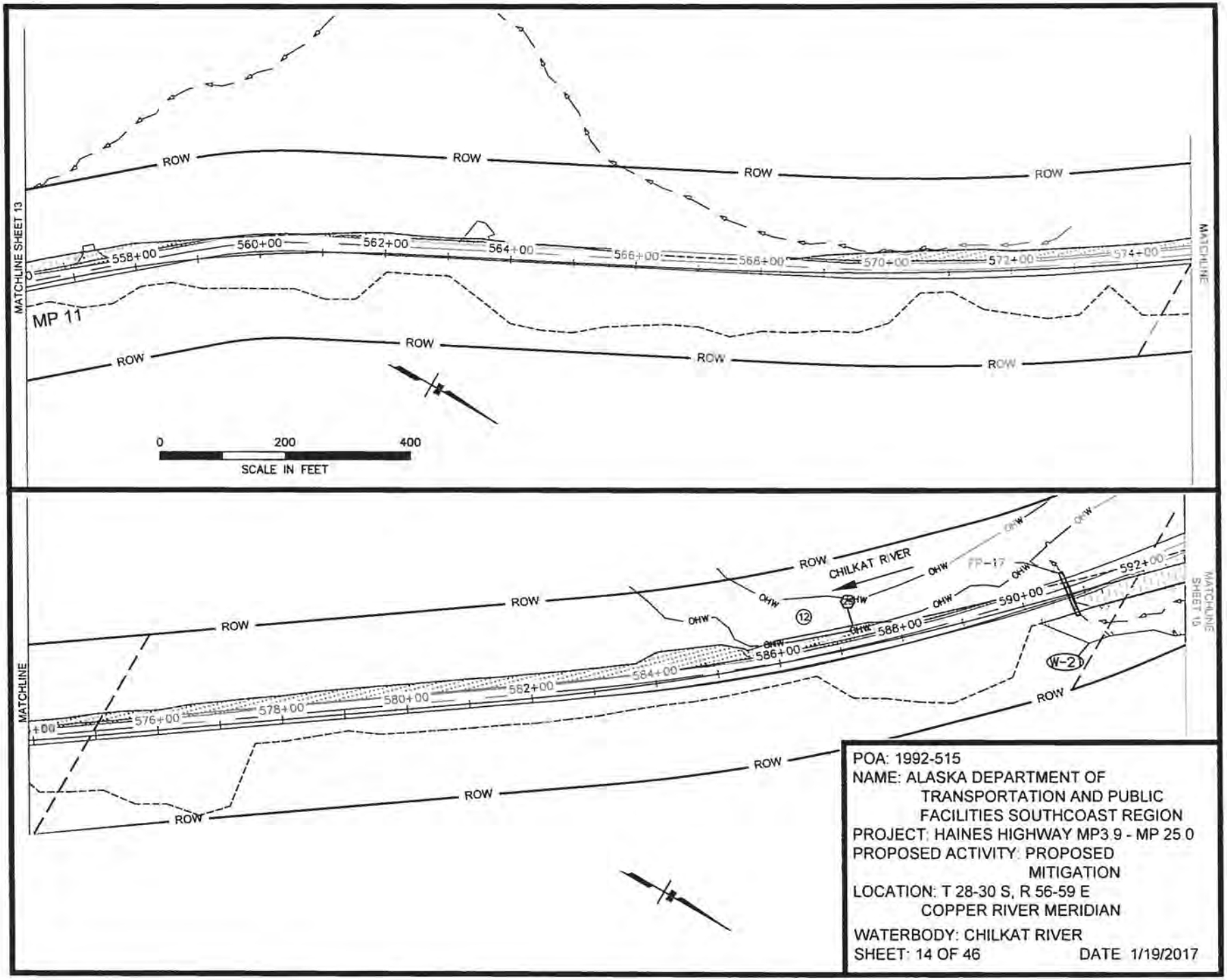

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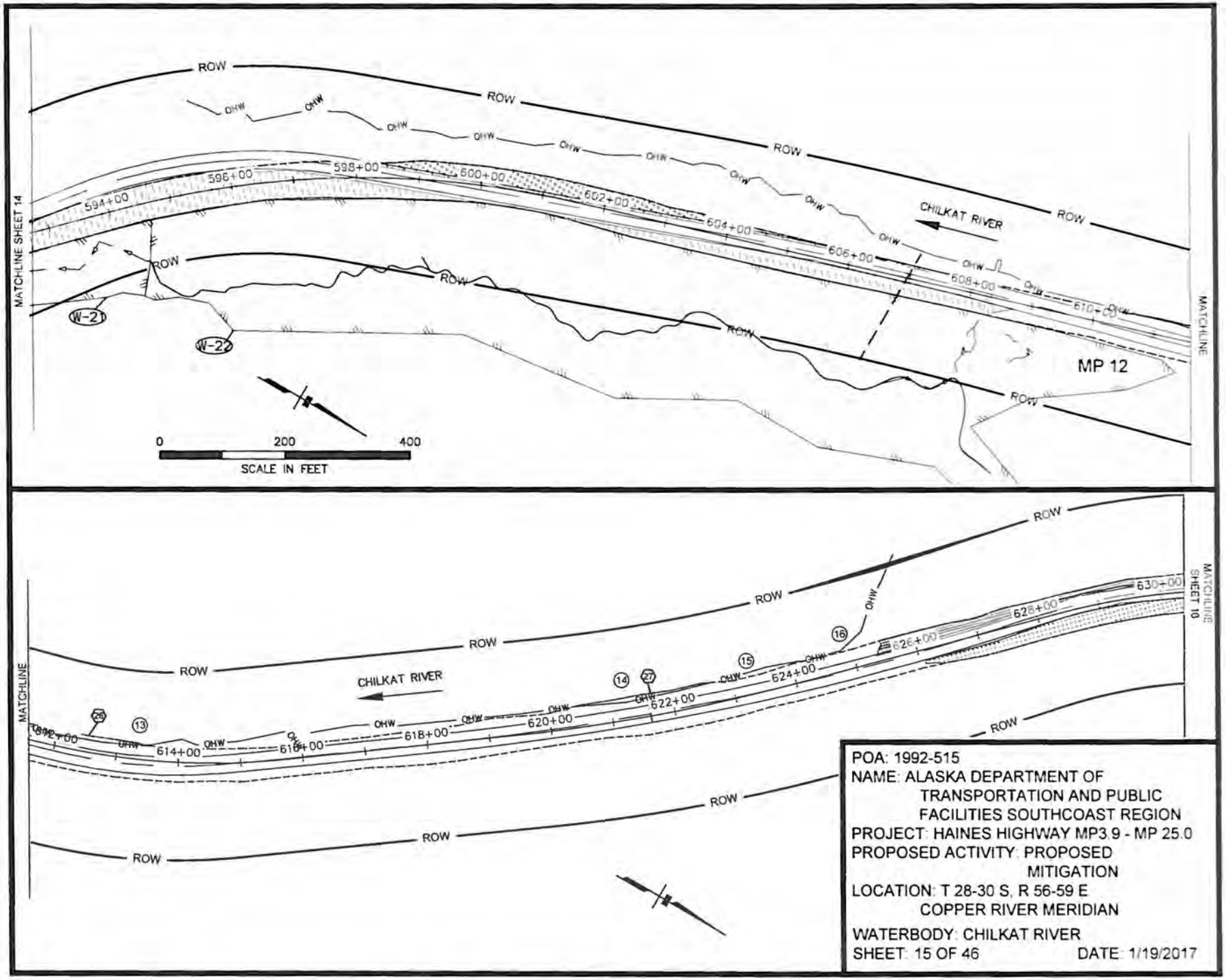
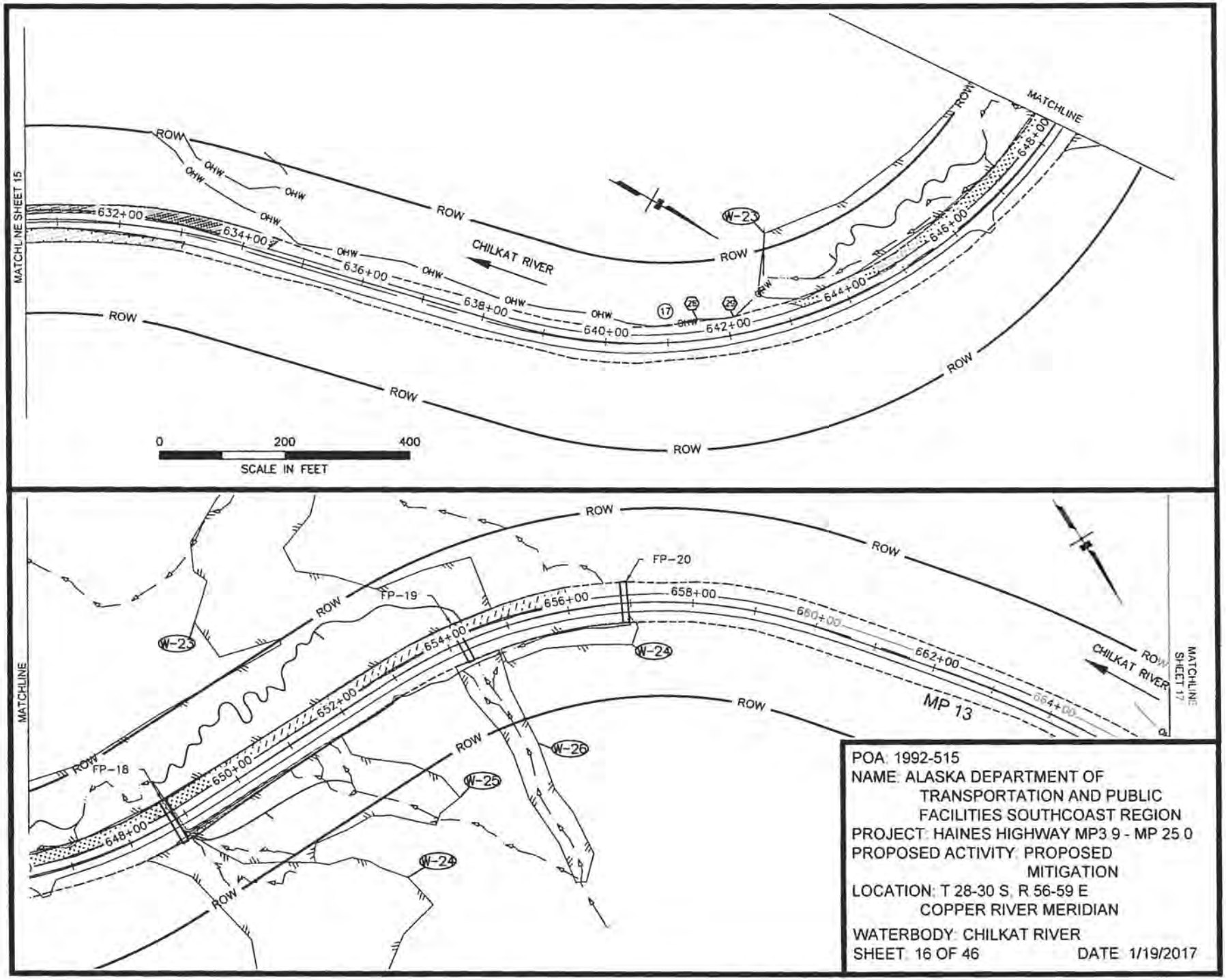
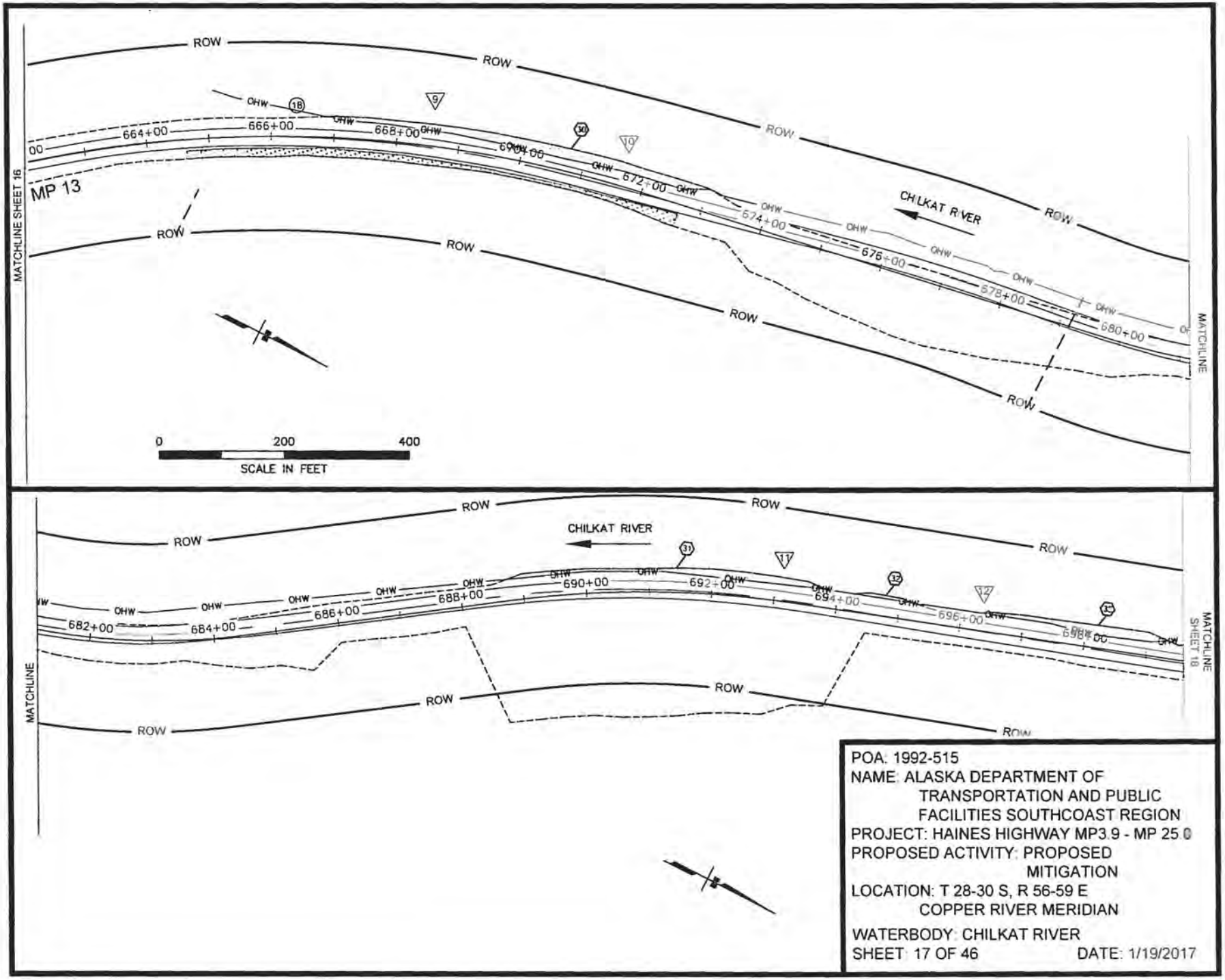
WATERBODY: CHILKAT RIVER
SHEET: 14 OF 46 DATE 1/19/2017

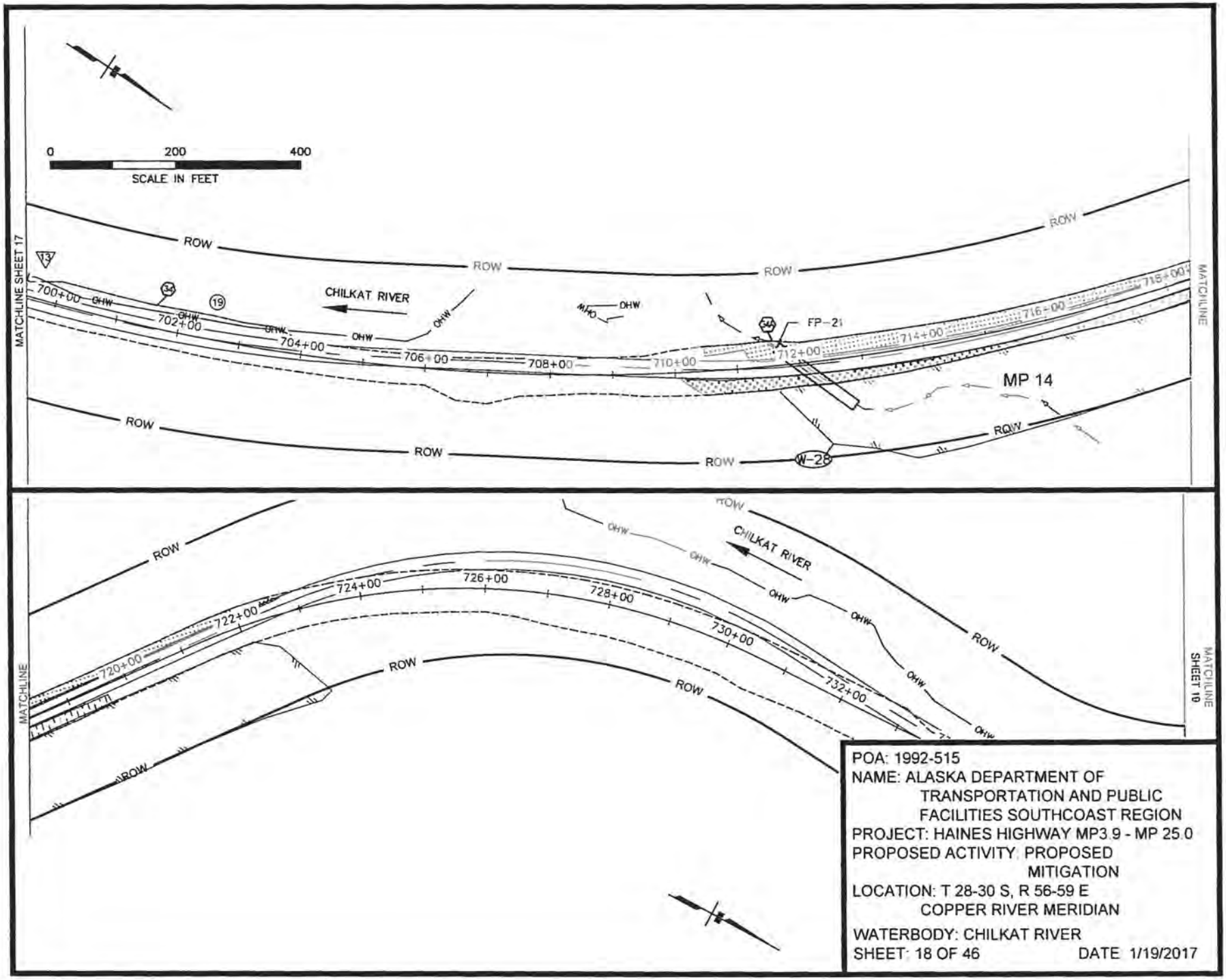

MATCHLINE SHEET 14
ROW
OHW
594+00
596+00
598+00
600+00
602+00
604+00
606+00
608+00
610+00
CHILKAT RIVER
W-21
W-22
MP 12
MATCHLINE
0
200
400
SCALE IN FEET
MATCHLINE
612+00
614+00
616+00
618+00
620+00
622+00
624+00
626+00
628+00
630+00
MATCHLINE SHEET 10
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 15 OF 46
DATE: 1/19/2017



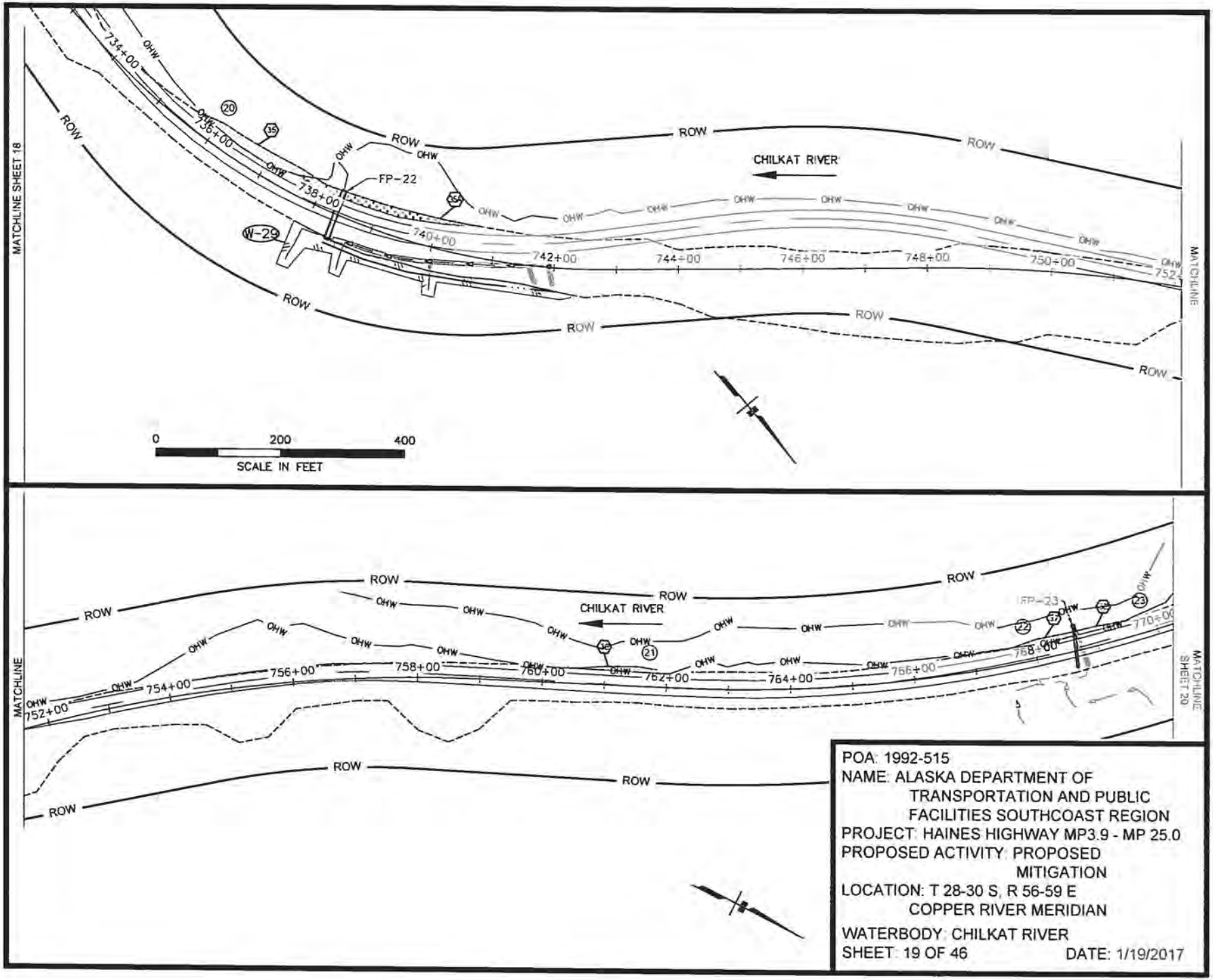
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3 9 - MP 25 0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 16 OF 46 DATE: 1/19/2017



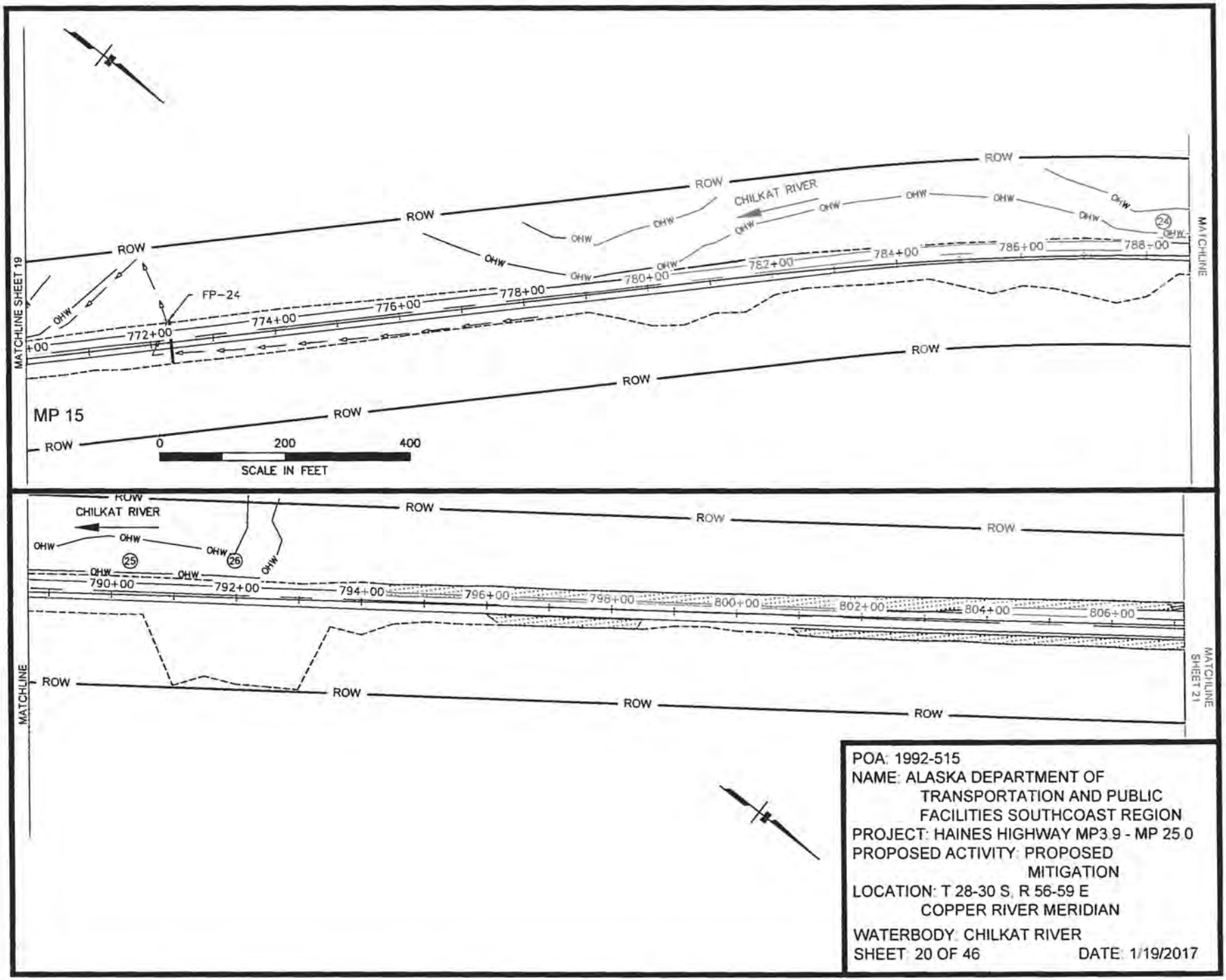
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 17 OF 46 DATE: 1/19/2017



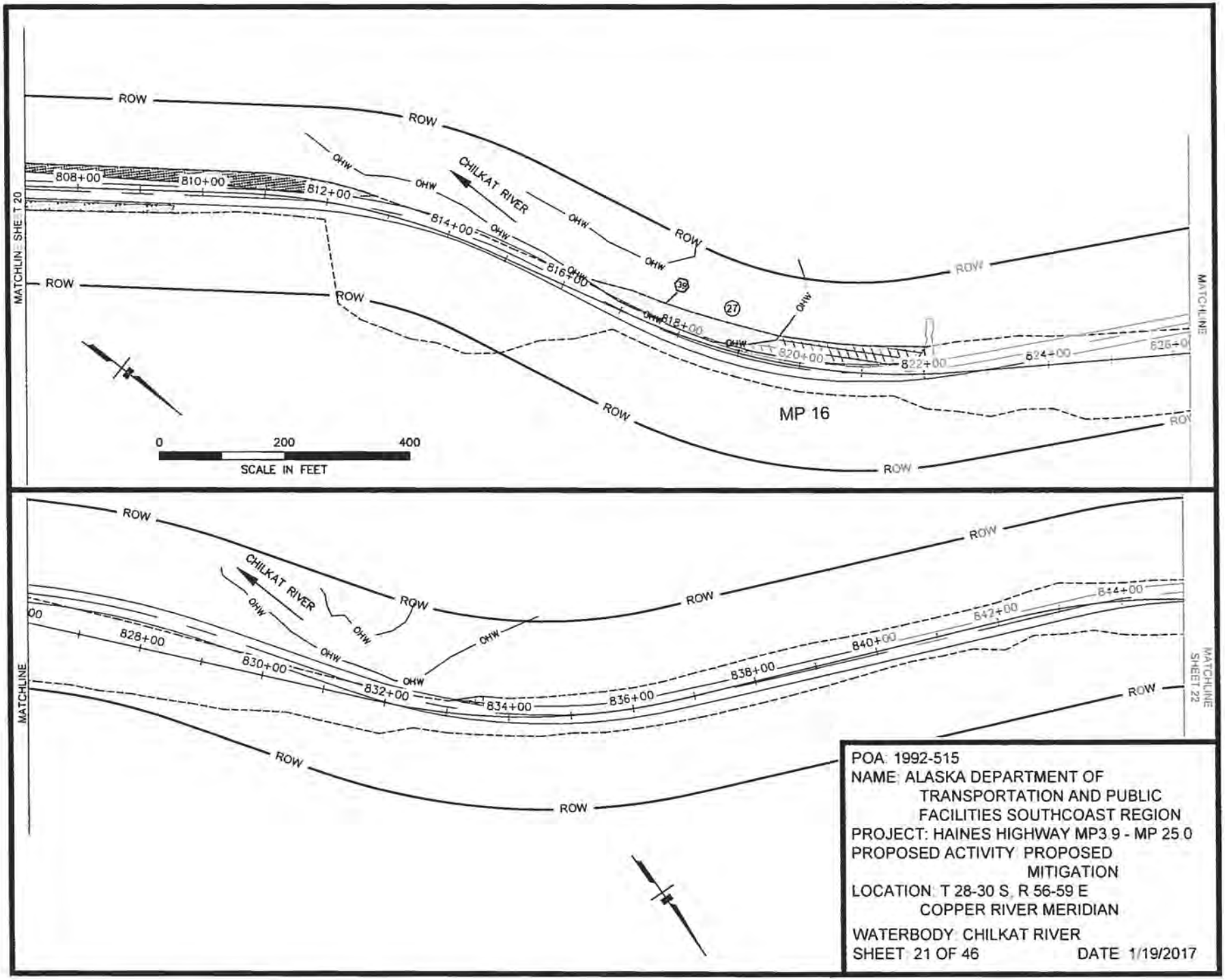
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 18 OF 46 DATE: 1/19/2017



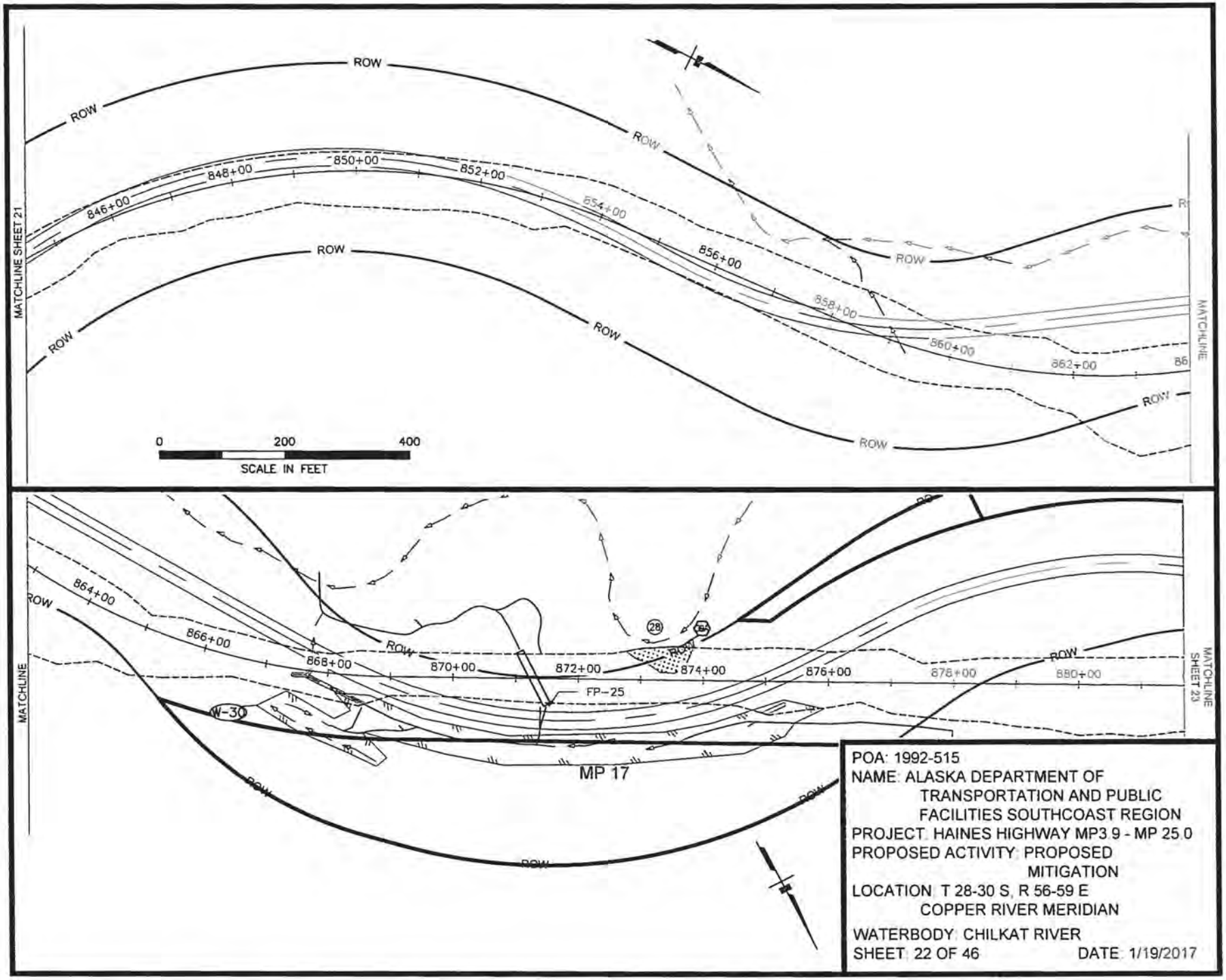
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 19 OF 46 DATE: 1/19/2017



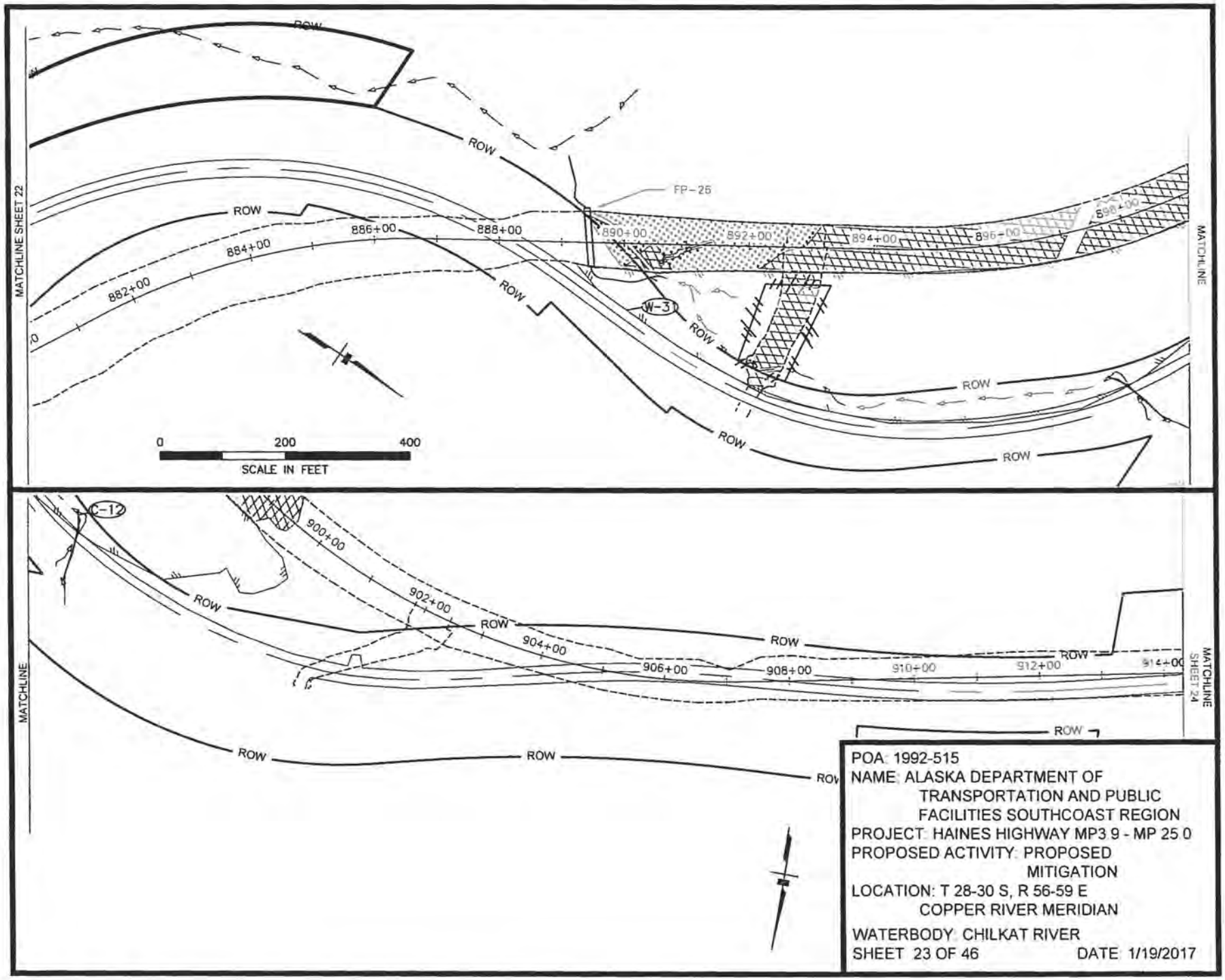
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 20 OF 46 DATE: 1/19/2017



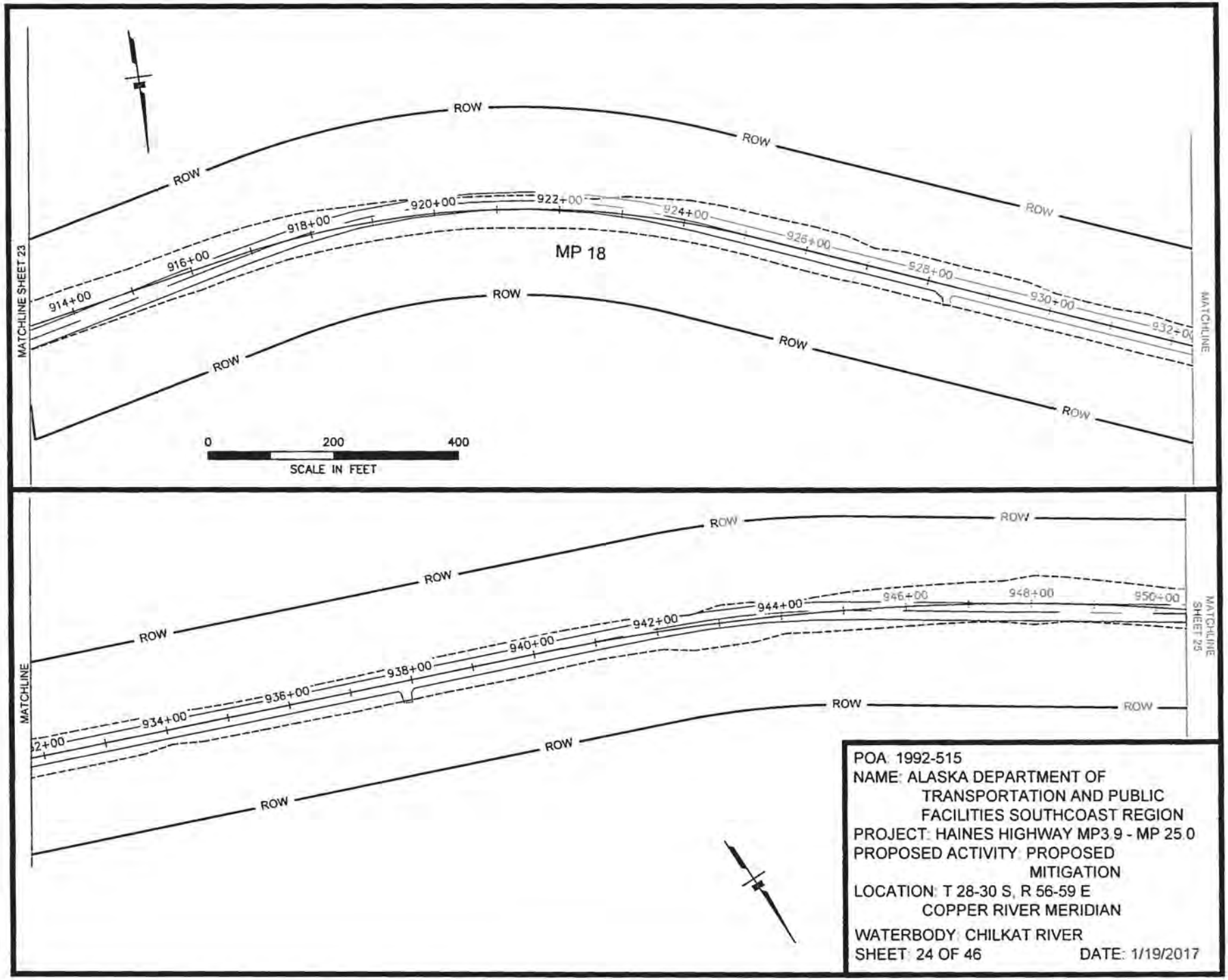
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 21 OF 46 DATE: 1/19/2017



POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 22 OF 46 DATE: 1/19/2017



POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3 9 - MP 25 0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET 23 OF 46 DATE: 1/19/2017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ROW
ROW
ROW
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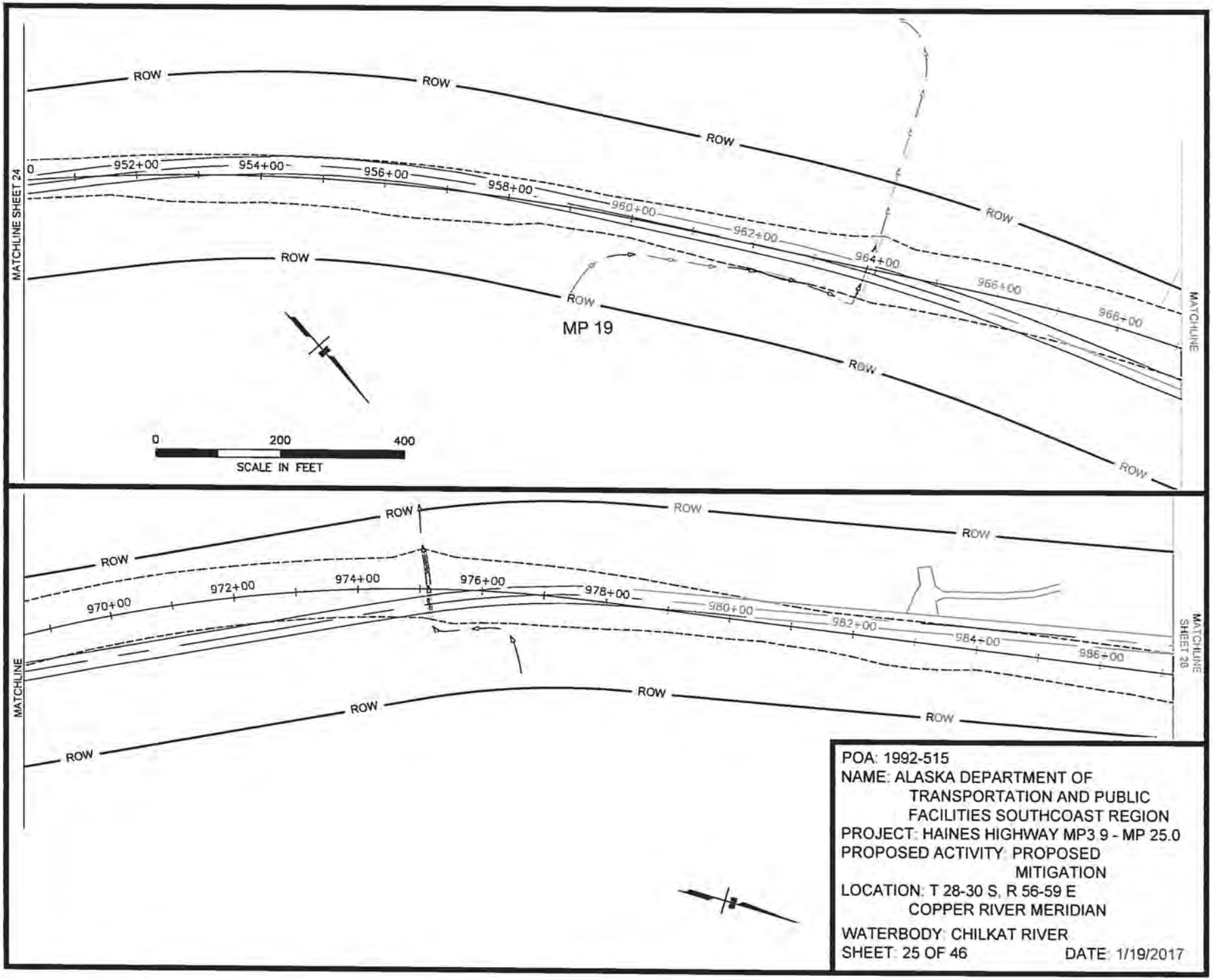
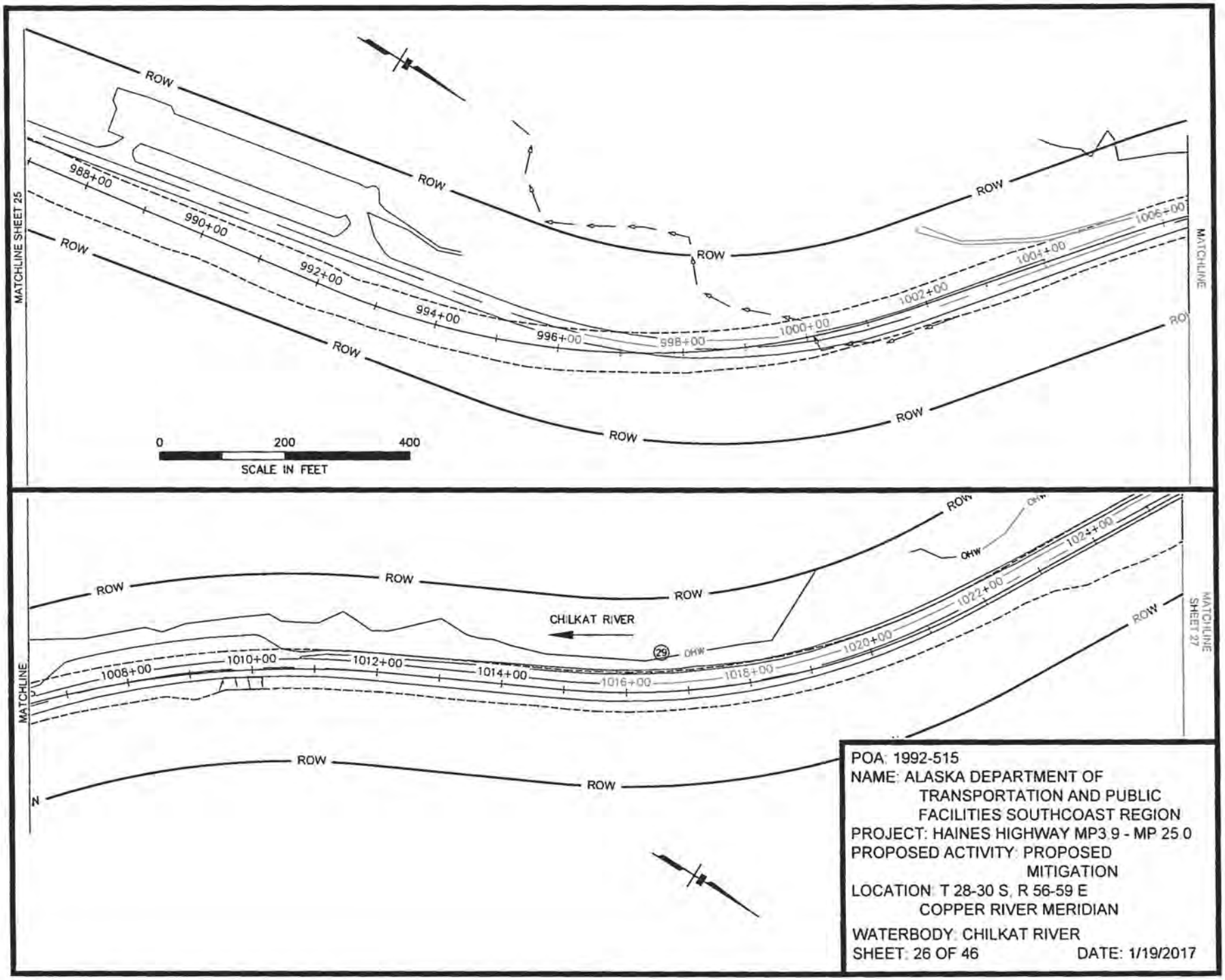
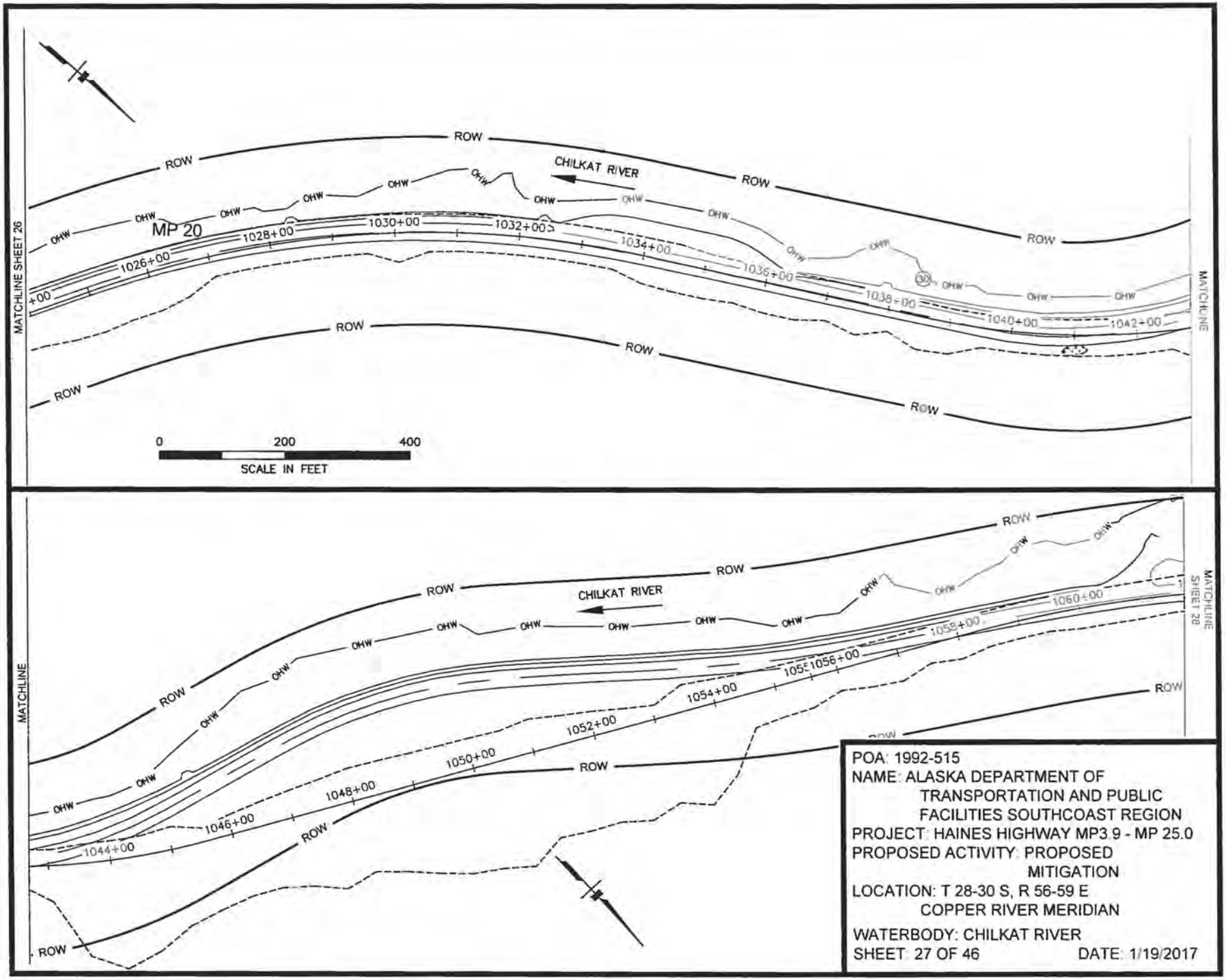
916+00
918+00
920+00
922+00
924+00
926+00
928+00
930+00
932+00
MP 18
ROW
ROW
ROW
ROW
MATCHLINE
0
200
400
SCALE IN FEET
MATCHLINE
ROW
ROW
ROW
ROW
932+00
934+00
936+00
938+00
940+00
942+00
944+00
946+00
948+00
950+00
MATCHLINE SHEET 25
ROW
ROW
ROW
ROW
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 24 OF 46
DATE: 1/19/2017



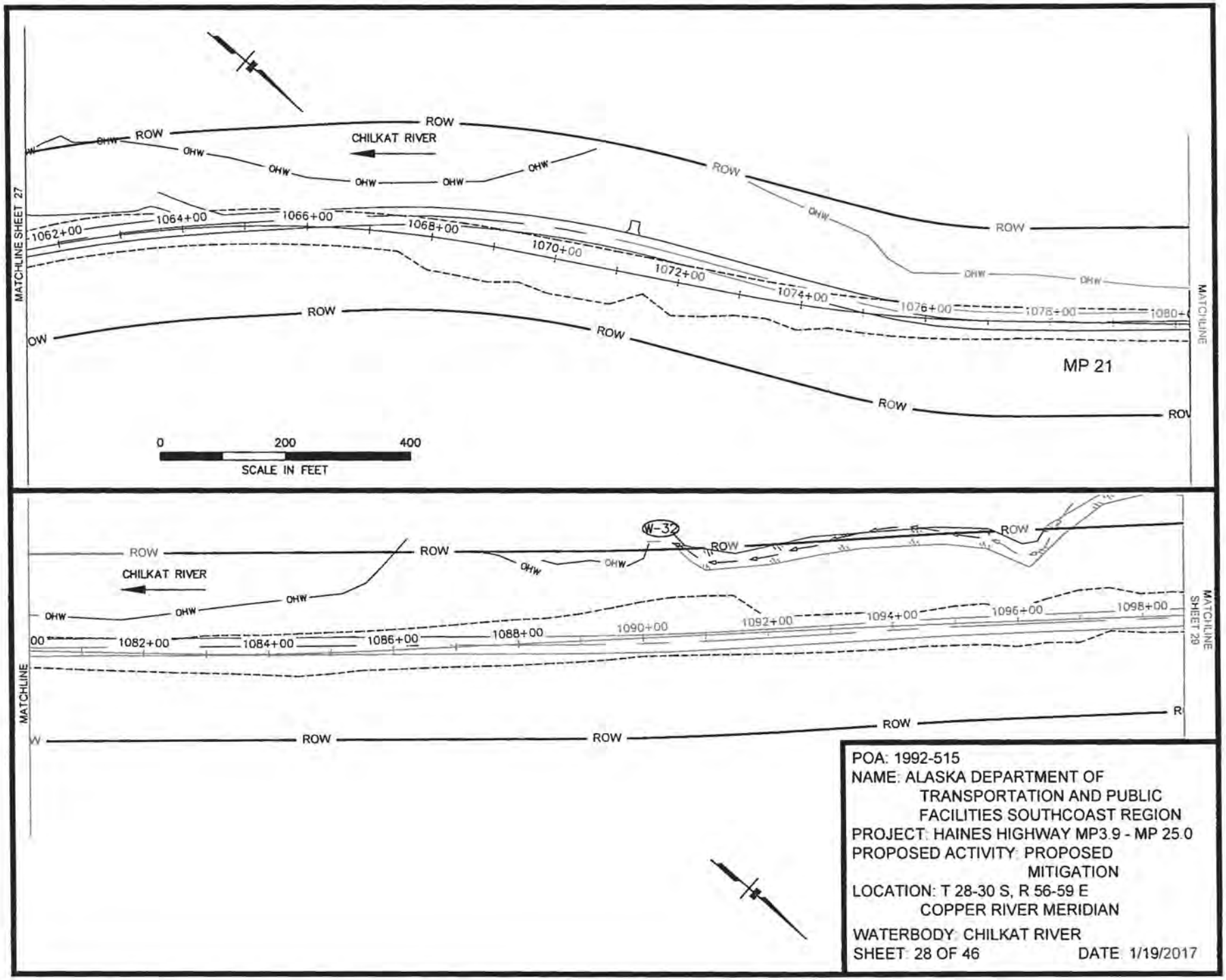
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3 9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 25 OF 46 DATE: 1/19/2017



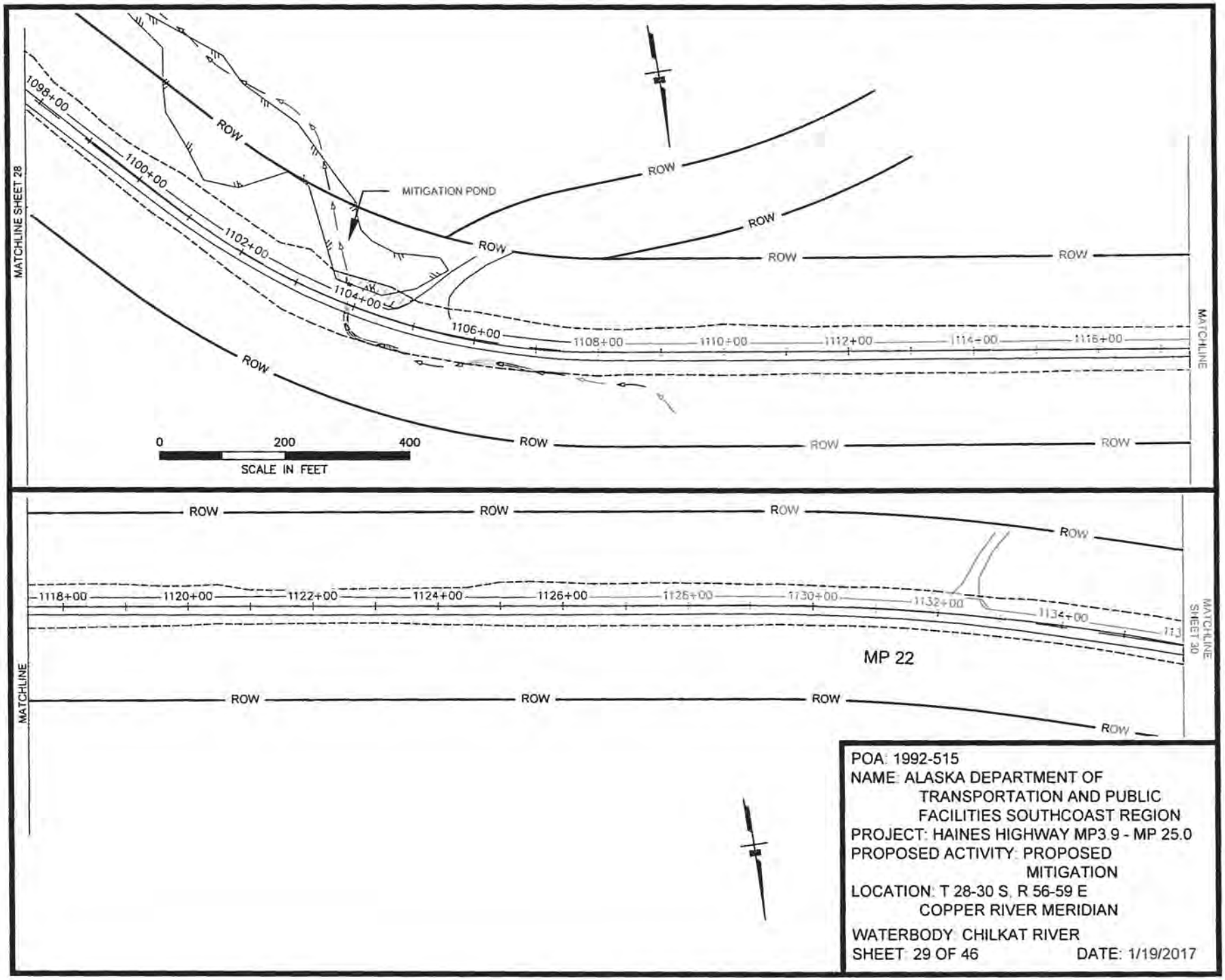
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 26 OF 46 DATE: 1/19/2017



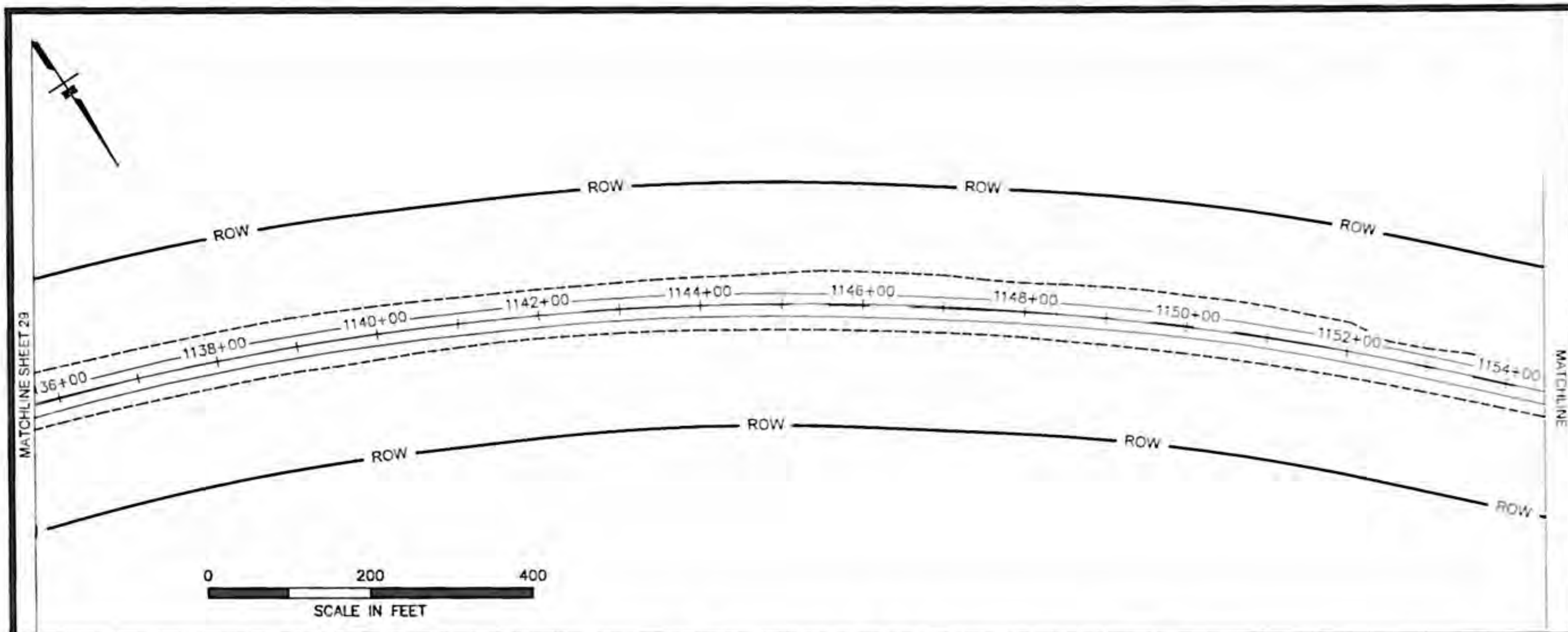
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 27 OF 46 DATE: 1/19/2017

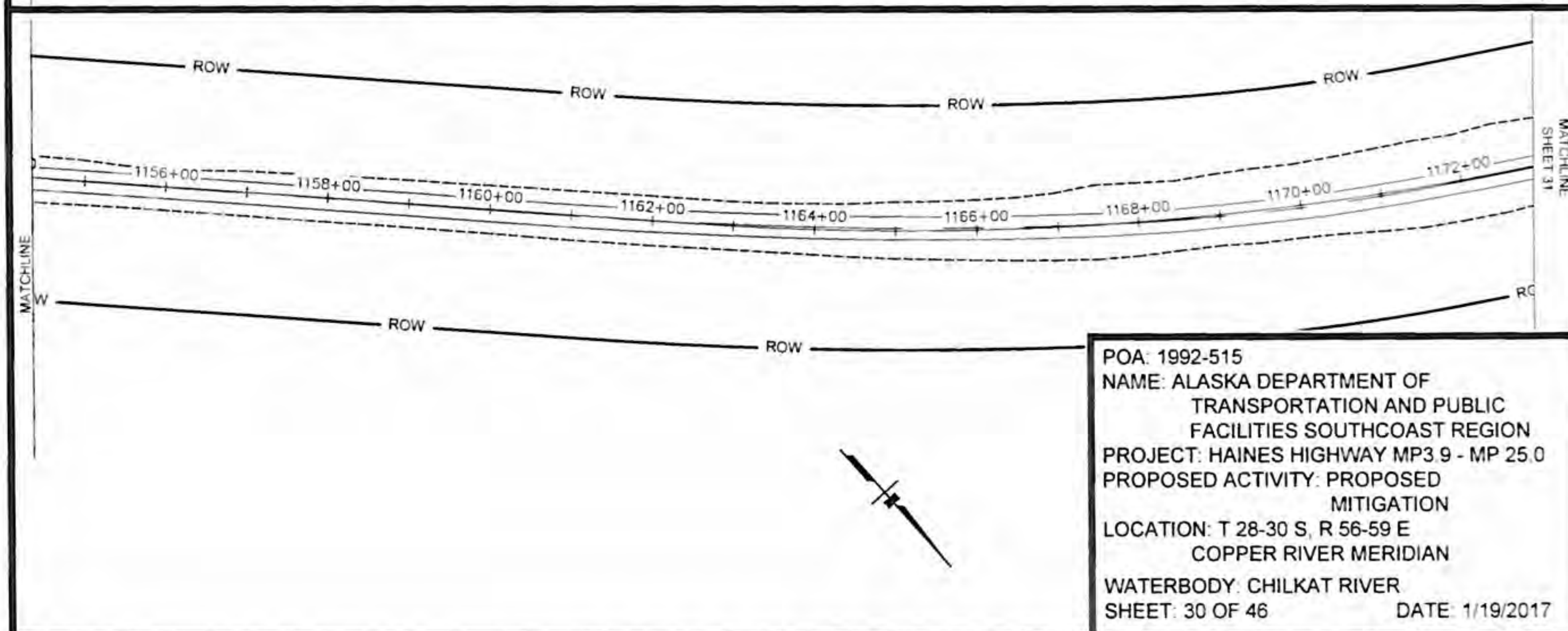


POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 28 OF 46 DATE: 1/19/2017

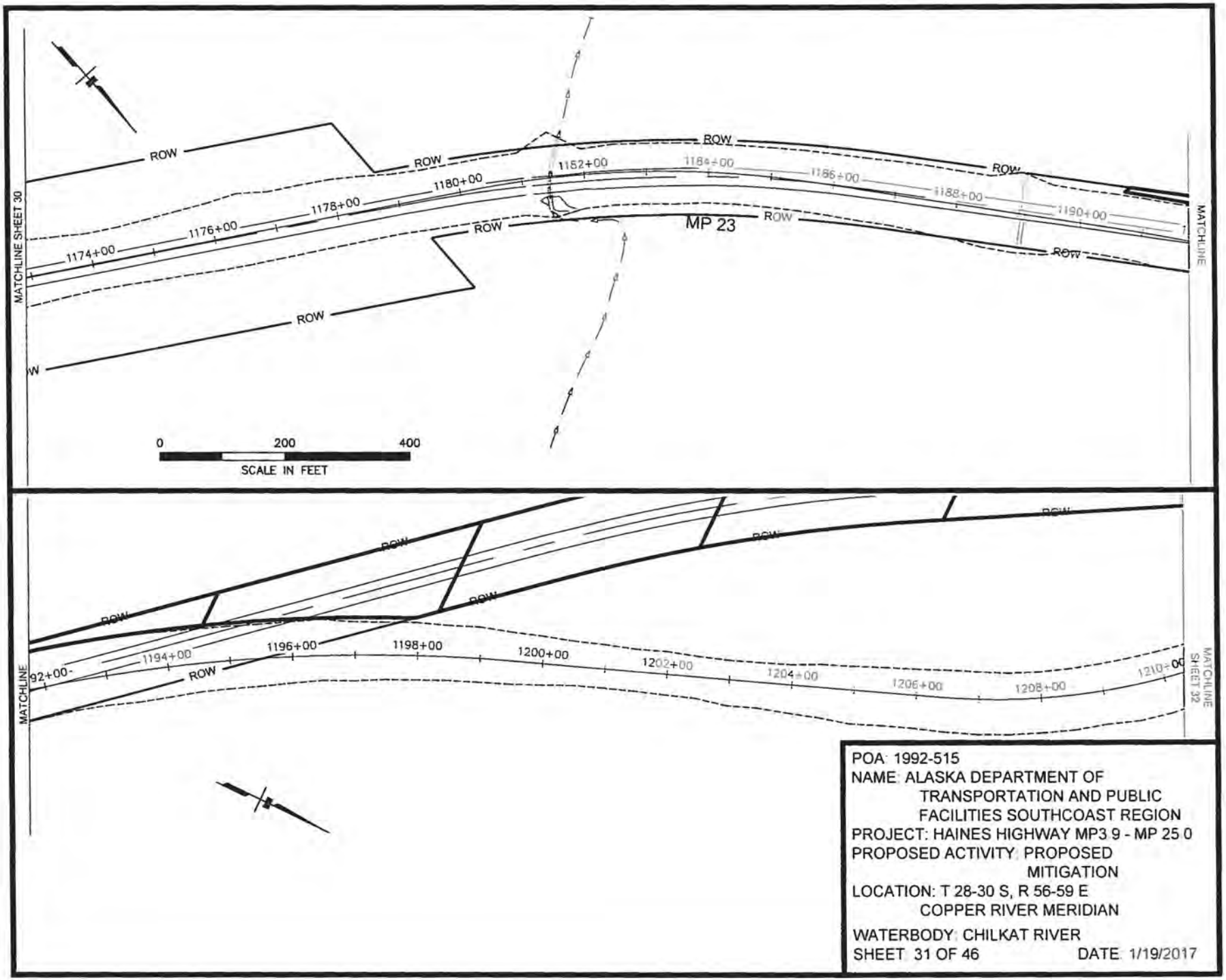


POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 29 OF 46 DATE: 1/19/2017

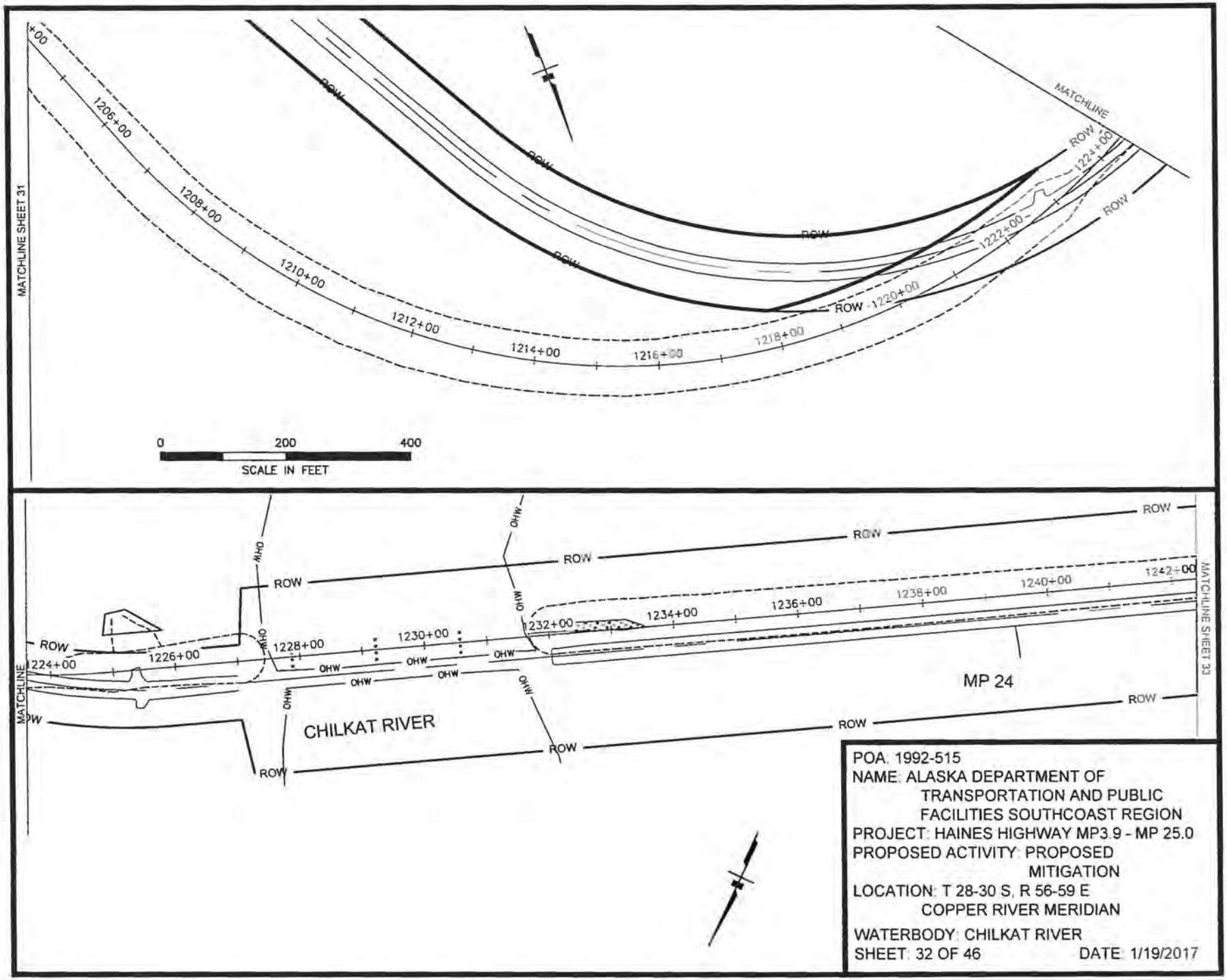




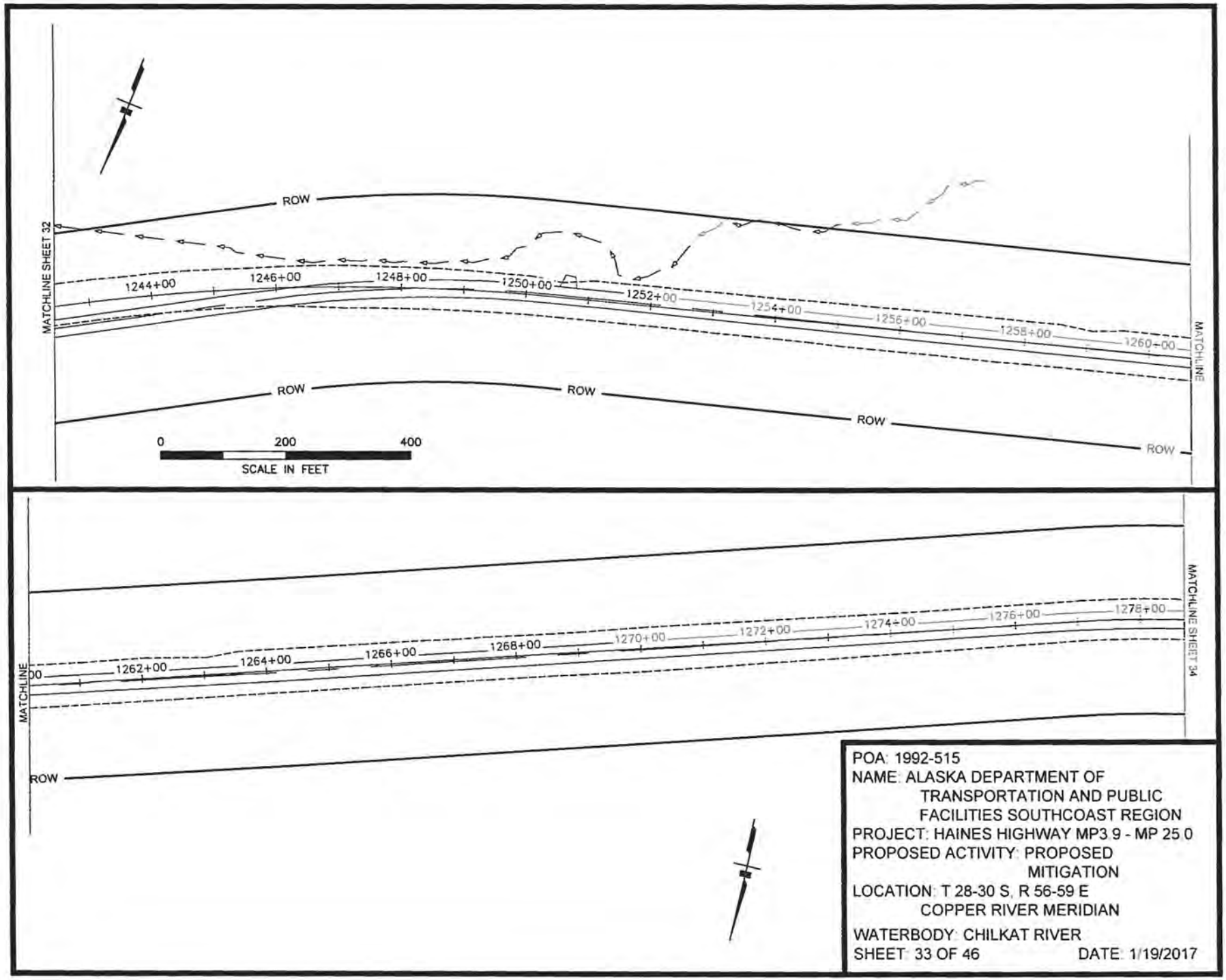
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 30 OF 46 DATE: 1/19/2017



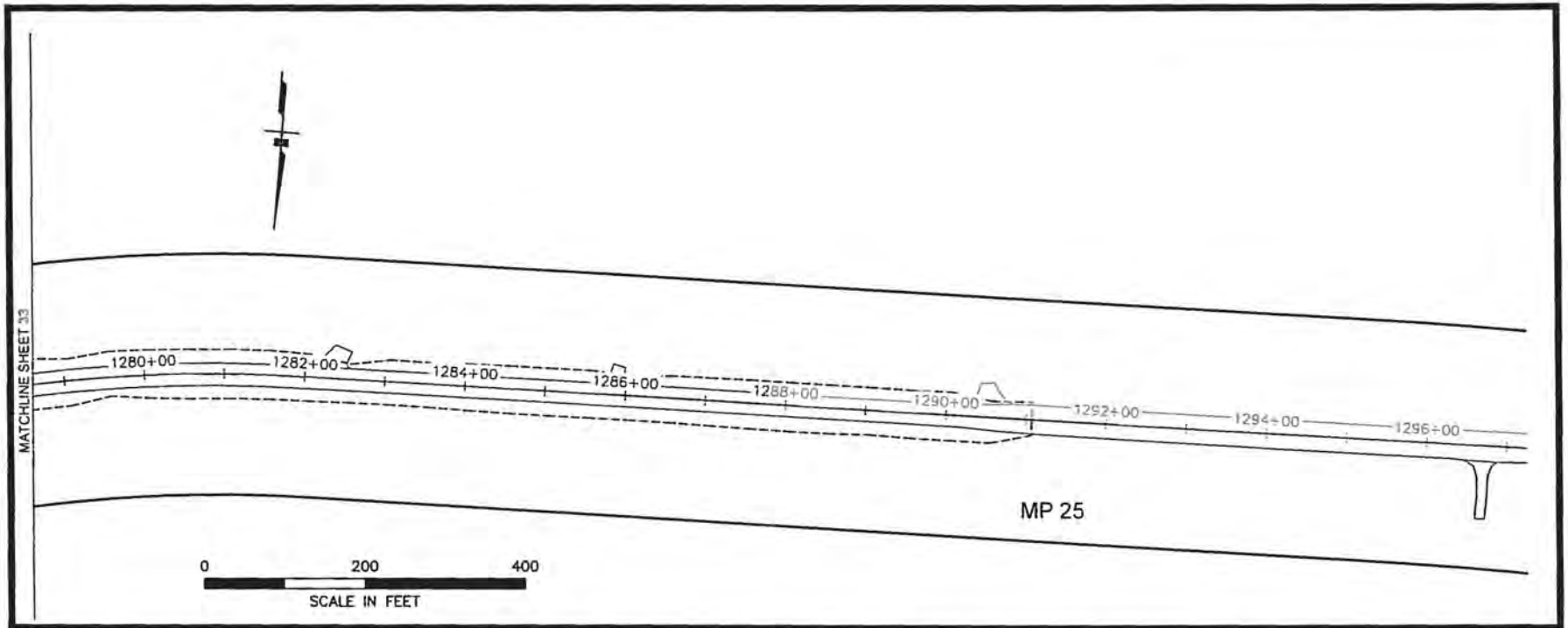
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3 9 - MP 25 0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET 31 OF 46 DATE: 1/19/2017



POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 32 OF 46 DATE: 1/19/2017



POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 33 OF 46 DATE: 1/19/2017



MATCHLINE

POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET 34 OF 46 DATE: 1/19/2017

TABLE 1-1: PROPOSED FISH PIPE CULVERT IMPROVEMENTS							
FISH PIPE	SHEET NUMBER	PROPOSED CL STATION	ADFG CATALOG No.	EXISTING CONDITION	PLANNED IMPROVEMENT	RIVER LENGTH	RIVER AREA
FP-1	5	223+56	115-32-10250-2004	48" CMP	Tier 1; 95"x67" Aluminium Pipe Arch	90	810
FP-2	5	230+23	115-32-10250-2006	24" CMP	Tier 1; 60" CMP	79	158
FP-3	5	241+41	115-32-10250-2006-3003	24" CMP	Tier 1; 60" CMP	62	1,364
FP-4	5	246+31	115-32-10250-2008-3004	36" CMP	Tier 1; 60" CMP	73	183
FP-5	5	249+46	115-32-10250-2006	24" CMP	Tier 1; 60" CMP	66	297
FP-7	7	315+75	Un-cataloged Stream	24" CMP	Tier 1; 60" CMP	60	120
FP-8	7	320+19	115-32-10250-2016	36" CMP	Tier 1; 81"x59" Aluminium Pipe Arch	69	276
FP-9	7	325+84	115-32-10250-2020	48" CMP	Tier 1; 95"x67" Aluminium Pipe Arch	81	324
FP-10	8	350+96	Un-cataloged Stream	24" CMP	Tier 1; 48" CMP	66	1,650
FP-11	8	367+49	115-32-10250-2022	24" CMP	Tier 1; 48" CMP	65	260
FP-12	9	383+21	115-32-10250-2024	36" CMP	Tier 1; 48" CMP	72	288
FP-14	12	484+78	115-32-10250-2028	24" CMP	Tier 1; 95"x67" Aluminium Pipe Arch	77	520
FP-15	12	513+82	115-32-10250-2030-3002	24" and 36" CMPs	Tier 1; 151"x89" Aluminium Pipe Arch	72	720
FP-16	13	532+24	115-32-10250-2030	24" CMP	Tier 1; 60" CMP	76	380
FP-17	14	590+76	115-32-10250-2032	Two 24" CMPs	Tier 1; 72" CMP	63	378
FP-18	16	648+78	115-32-10250-2040	Two 36" CMPs	Tier 1; 8'-10" by 6'-1" arch pipe	69	483
FP-19	16	654+22	115-32-10250-2040	None	Tier 1; 8'-10" by 6'-1" arch pipe	58	406
FP-20	16	656+91	115-32-10250-2042	24" CMP	Tier 1 or Tier 2; design to be completed	67	134
FP-21	18	712+00	115-32-10250-2044	Two 36" CMPs	Tier 1; 12'-7" by 8'-4" arch pipe	119	1,250
FP-22	19	738+37	115-32-10250-2046	24" CMP	Tier 1; 7'-3" by 5'-3" arch pipe	56	336
FP-23	19	768+65	Un-cataloged Stream	36" CMP	Tier 1; 3.5' diameter CMP	56	168
FP-24	20	772+32	11-32-10250-2050	24" CMP	Tier 1 or Tier 2; design to be completed	66	132
FP-25	22	871+28	115-32-10250-2060-3012-4001	6' 1" by 4' 7" Arch Pipe	Tier 1; 11'-7" by 7'-5" arch pipe	85	808
FP-26	23	889+47	115-32-10250-3011	Two 36" CMPs	Tier 1; 9'-4" by 6'-3" arch pipe	129	968
FP-33	5	232+95	115-32-10250-2006	24" CMP	Tier 1; 60" CMP	54	270
FP-34	5	245+78	115-32-10250-2006	24" CMP	Tier 1; 60" CMP	27	135
					TOTAL	1,857	12,818

POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 35 of 46 DATE:1/19/2017

TABLE 2-1: RIVER IMPROVEMENT			
NUMBER	SHEET No.	DOT&PF STATION NUMBERING	LINEAR FEET OF STREAM BENEFIT (RIVER FACE OF IMPROVEMENT)
Balasted Log Clusters			
1	6	264+00-265+00	100
2	6	275+10-276+10	100
3	7	312+00-313+40	140
4	8	336+70-338+25	150
5	8	351+20-352+30	110
6	9	374+00-374+50	50
7	9	385+00-385+50	50
8	9	389+00-390+00	100
9	11	449+20-451+20	200
10	11	455+30-456+70	140
11	11	463+50-465+00	150
12	14	585+30-588+10	280
13	15	612+50-613+50	100
14	15	621+20-622+00	80
15	15	623+00-623+50	50
16	15	624+75-625+30	55
17	16	641+00-642+80	180
18	17	666+50-668+20	170
19	18	702+60-703+60	100
20	19	735+90-738+00	210
21	19	761+75-762+20	45
22	19	767+80-768+30	50
23	19	768+90-770+20	130
24	20	788+50-789+00	50
25	20	790+50-791+00	50
26	20	791+20-792+30	110
27	21	817+00-819+30	230
28	22	873+00-873+50	50
29	26	1016+00-1017+00	100
30	27	1040+00-1042+50	250
BALASTED LOG CLUSTER TOTAL			3,580

TABLE 2-1: RIVER IMPROVEMENT CONTINUED			
NUMBER	SHEET No.	DOT&PF STATION NUMBERING	LINEAR FEET OF STREAM BENEFIT
River Protrusion			
1	7	298+25-300+25	200
2	8	354+80- 356+40	160
3	8	362+00- 363+00	100
4	9	385+00-385+50	50
5	10	415+80-417+20	140
6	10	435+80-437+75	195
7	10	441+00-443+10	210
8	12	497+80-500+00	220
9	17	668+90-670+50	160
10	17	671+80-673+50	170
11	17	692+00-693+50	150
12	17	696+30-698+00	170
13	18	699+80-700+70	90
RIVER PROTRUSION TOTAL			2,015
Fish Wheel			
1	9	385+00-385+50	50
2	10	413+00-413+50	50
3	10	431+00-431+50	50
4	11	446+00-446+50	50
5	11	468+00-468+50	50
6	12	494+00-494+50	50
FISH WHEEL TOTAL			300
Slough Improvement			
1	29	1103+00	50
TOTAL			5,945

POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 36 of 46 DATE: 1/19/2017

TABLE 4: CHILKAT RIVERINE (R30W) IMPACTS AND OTHER RECEIVING WATERS				
ID No.	SHEET No.	REPLACEMENT AREA* (ACRES)	ORIGINAL GROUND AREA** (ACRES)	ORIGINAL GROUND LENGTH (LF)
1	6	0.44		
2	8	0.02		
3	8	0.00		
4	8	0.07		
5	9	0.08		
6	9		0.03	165
7	10	0.00		
8	10	0.00		
9	10	0.24		
10	10	0.00		
11	11	0.11		
12	11	0.06		
13	11	0.06		
14	12	0.00		
15	12		0.05	217
16	12	0.18		
17	12		0.01	154
18	12		0.01	
19	12		0.39	872
20	12	0.57		
21	13		0.10	467
22	13	0.09		
23	13	0.33		
24	14	0.14		
24A***				400
25	16	0.03		
26	17	0.03		
27	17		0.02	221
28	18	0.00		
29	18	0.00		
30	19		0.17	626
31	19		0.09	513
32	19	0.01		
33	19	0.07		
34	20	0.08		
34A***	20			130
35	21	0.06		
35A***	21			400
36	21		0.02	235
37	21		0.01	192
38	21		0.01	
39	23	0.18		
39A***	24			100
TOTAL IMPACTS =		3.0	1.0	4,692
* LF OF VEGETATED RIP RAP PLACED ON VEGETATED RIP RAP				
** LF OF VEGETATED RIP RAP PLACED ON ORIGINAL GROUND				
*** PERMANENTLY FLOODED WETLAND AREAS, THE IMPACT AREAS ARE REPORTED IN TABLES 4 AND 5.				

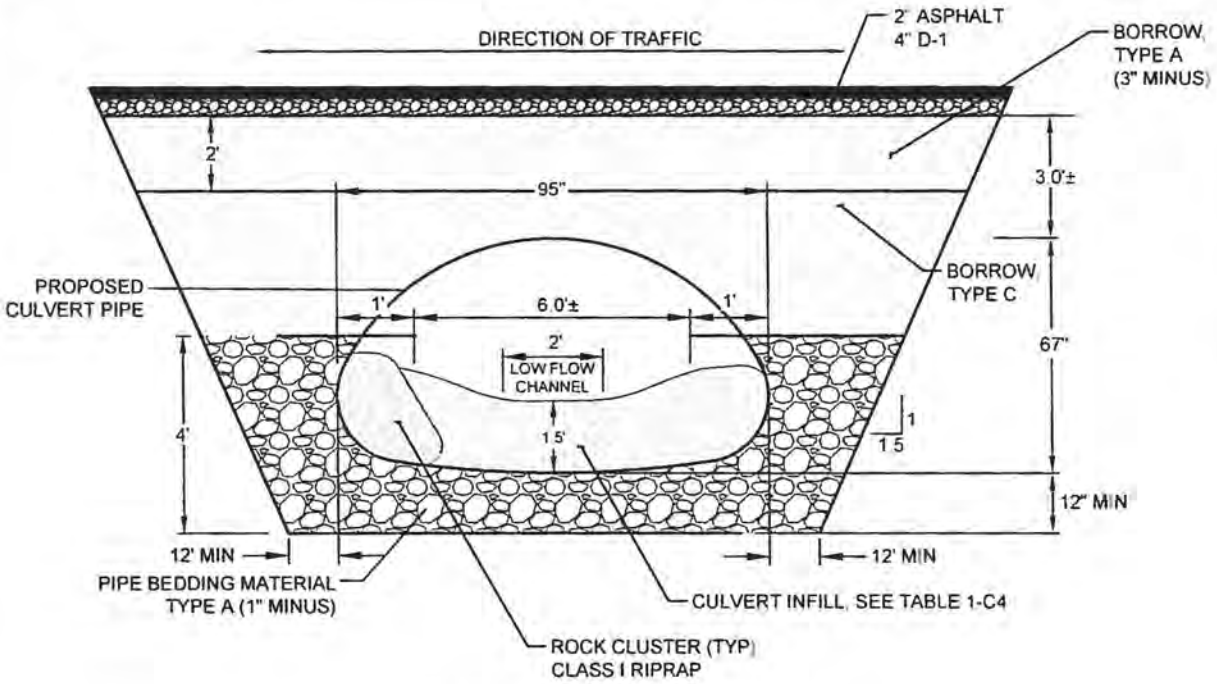
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 37 of 46 DATE:1/19/2017

TABLE 5: WETLAND AREAS BENEFITTED				
ID No	STATION	Acres	Notes	Classification
W-1	230+00-232+83	0.00	FP-2/STREAM ENHANCEMENT ONLY	PEM1H
W-2	232+00-243+73	4.93	STREAM ENHANCEMENT	PSS1H
W-3	233+00-237+30	0.86	FP-33/STREAM CREATION/ENHANCEMENT	PEM1H
W-4	237+60-244+37	1.79	FP-3/STREAM CREATION/ENHANCEMENT	PSS1H
W-5	244+37-249+40	1.16	FP-4	PSS1H
W-6	249+48-270+00	2.17	FP-5	PSS1H
W-7	270+00-279+35	5.34	FP-5	PEM1H
W-8	315+73	0.13	FP-7	PFO1C
W-9	320+22	0.08	FP-8	PEM1H
W-10	324+40-342+00	3.91	FP-9	PEM1H
W-11	346+93-353+50	0.48	FP-10	PEM1B
	367+53	0.00	FP-11/STREAM CREATION ONLY	NA
W-12	384+34-394+32	1.10	FP-12	PSS1H
W-13	384+34-394+33	0.67	FP-13	PEM1H
W-14	471+47-499+00	7.77	FP-14	PSS1H
W-15	499+00-512+08	2.66	FP-14	PEM1H
W-16	512+44-514+26	5.01	FP-15	PEM1H
W-17	504+68-516+04	0.53	FP-15 (SOUTH SIDE)	PEM1H
W-18	516+04-525+08	1.44	STREAM CREATION/ENHANCEMENT	PEM1H
W-19	516+04-525+08	1.77	STREAM CREATION/ENHANCEMENT	PSS1H
W-20	525+48-542+42	2.42	FP-16	PSS1H
W-21	590+10-594+60	0.72	FP-17	PSS1H
W-22	594+60-609+46	7.90	STREAM CREATION/ENHANCEMENT	PSS1H
W-23	642+54-654+84	4.10	STREAM CREATION/ENHANCEMENT	PSS1H
W-24	648+00-648+87	1.29	FP-18	PSS1E
W-25	648+87-651+79	0.95	STREAM CREATION/ENHANCEMENT	PSS1E
W-26	654+35	0.44	FP-20	PSS1E
W-27	654+80-657+07	0.13	FP-20/STREAM CREATION/ENHANCEMENT	PSS1E
W-28	711+60-722+14	3.04	FP-21	PEM1B
W-29	737+80-742+25	0.25	FP-22	PEM1B
	767+35-769+75	0.00	FP-23/STREAM CREATION ONLY	NA
	771+80-778+00	0.00	FP-24/STREAM CREATION ONLY	NA
W-30	866+93-878+27	1.06	FP-25/STREAM CREATION/ENHANCEMENT	PEM1H
W-31	889+19-900+00	4.63	FP-26/POND CREATION	PEM1H
W-32	1090+56-1105+30	1.75	POND CREATION	PSS1E
	TOTAL	70.7		

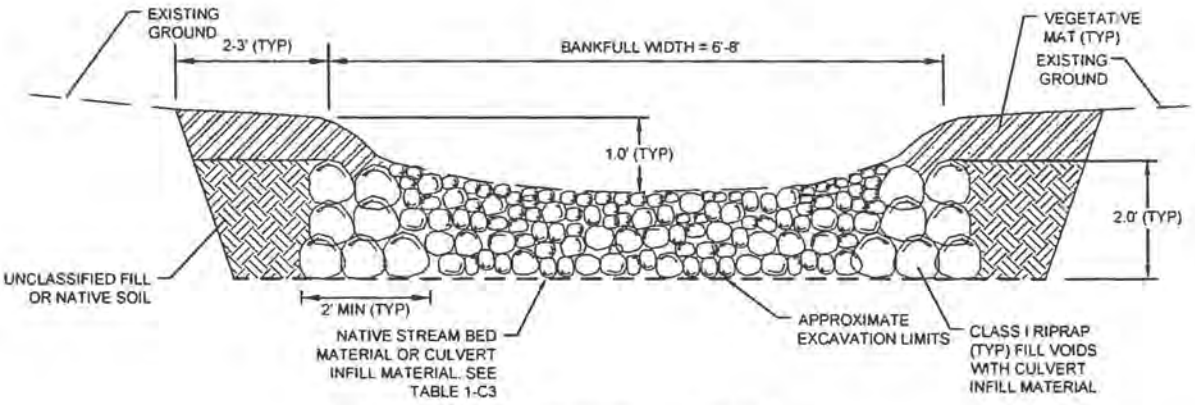
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 38 of 46 DATE:1/19/2017

TABLE 6: TRIBUTARY MITIGATION					
ID No.	SHEET NO.	STATION	FISH PASSAGE CULVERT #	ENHANCED LENGTH (FT)	CREATED LENGTH (FT)
E-1	5	223+90	FP-1	90	
E-2	5	230+51 - 232+70	FP-2	79	
E-3	5	233+00	FP-33	54	
C-1	5	238+50 - 241+40			195
E-4	5	241+43	FP-3	62	
E-5	5	245+25	FP-34	27	
E-6	5	246+25	FP-4	73	
E-7	5	249+43	FP-5	66	
E-8	7	316+00	FP-7	60	
E-9	7	320+00	FP-8	69	
E-10	7	325+80	FP-9	81	
E-11	8	351+00	FP-10	66	
E-12	8	367+50	FP-11	65	
E-13	9	383+25	FP-12	72	
E-14	12	484+75	FP-14	77	
E-15	12	513+90	FP-15	72	
C-2	13	520+00 - 524+00			400
E-16	13	532+00	FP-16	76	
C-3	13	530+00 - 532+00			126
E-17	14	590+75	FP-17	63	
C-4	15	594+25 - 608+00			980
C-5	16	643+00 - 647+00			300
E-18	16	648+90	FP-18	69	
C-6	16	649+00 - 651+00			300
C-7	16	649+00 - 654+50			500
E-19	16	654+25	FP-19	58	
E-20	16	656+80	FP-20	67	
E-21	18	712+00	FP-21	119	
E-22	19	738+25	FP-22	56	
E-23	19	768+75	FP-23	56	
E-24	20	772+00	FP-24	66	
C-8	22	867+50 - 871+50			500
E-25	22	871+10	FP-25	85	
C-9	22	867+50 - 871+50			400
C-10	22	875+00 - 878+00			300
C-11	23	889+50	FP-26		129
E-26	23	890+00 - 898+00	FP-26	800	
C-12	23	897+00			100
E-27		MUD BAY ROAD		60	
TOTALS:				2,588	4,230

POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 39 of 46 DATE:1/19/2017

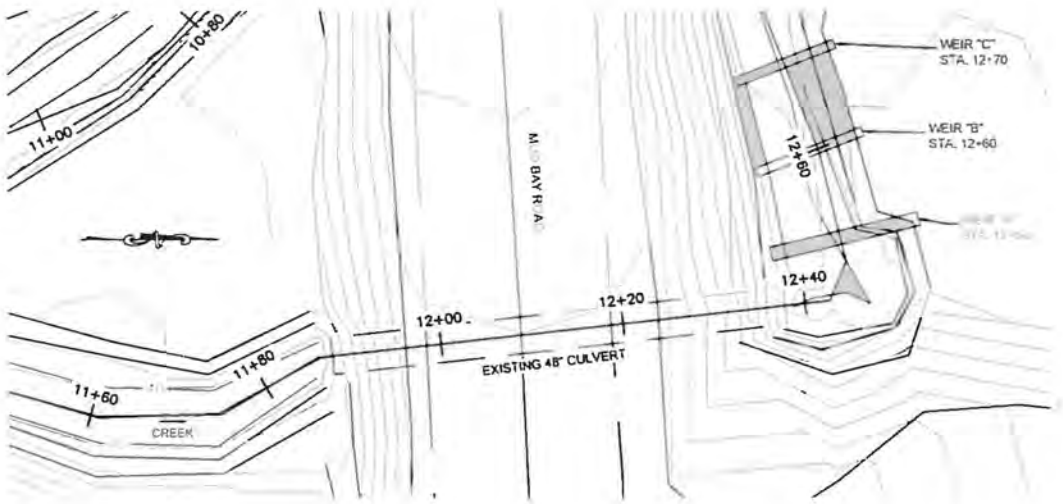


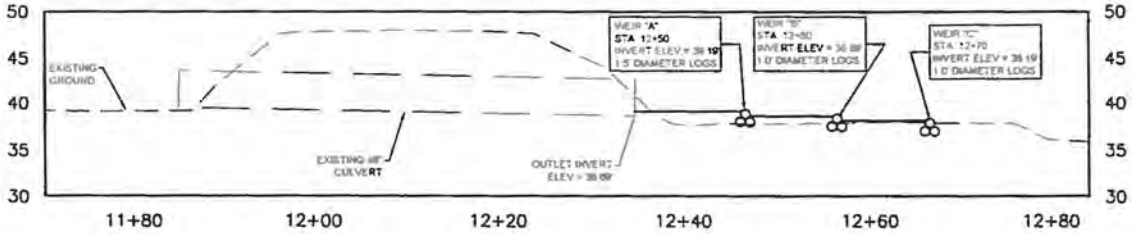
MUD BAY CULVERT CROSS-SECTION



CONSTRUCTED BANK

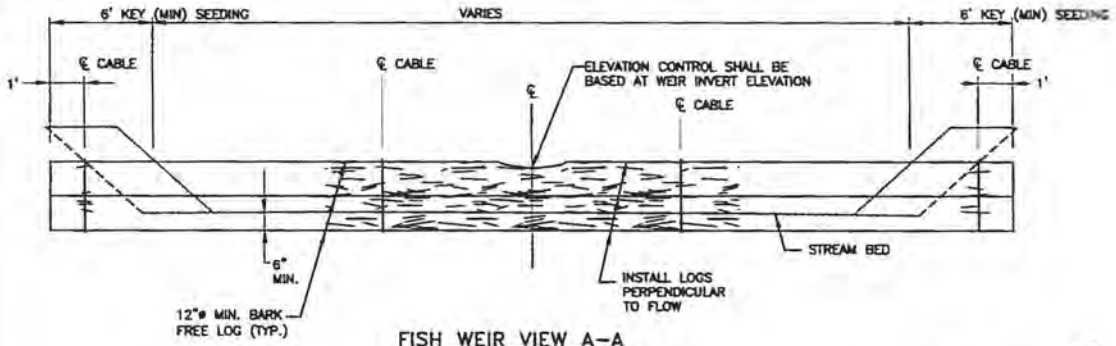
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 40 OF 46 DATE: 1/19/2017



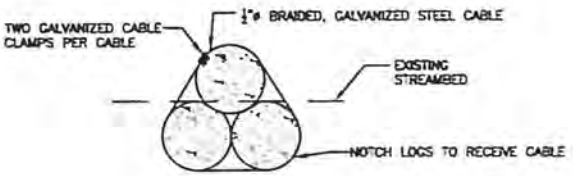


CREEK LOG WEIR PLAN & PROFILE

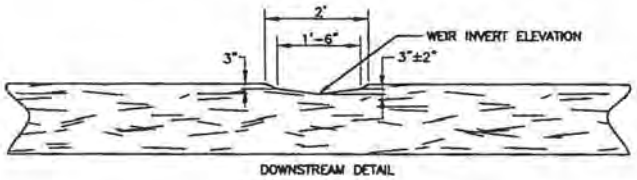
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 41 OF 46 DATE: 1/19/2017



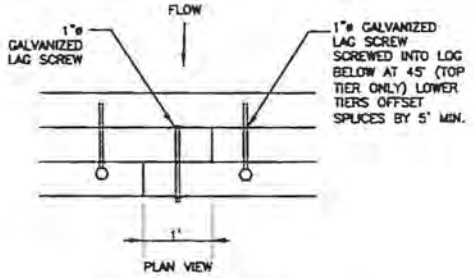
FISH WEIR VIEW A-A



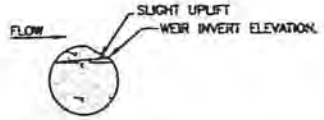
LOG DETAIL



NOTCH DETAIL
SEE SHEET F1 FOR WEIR NOTCH LOCATION

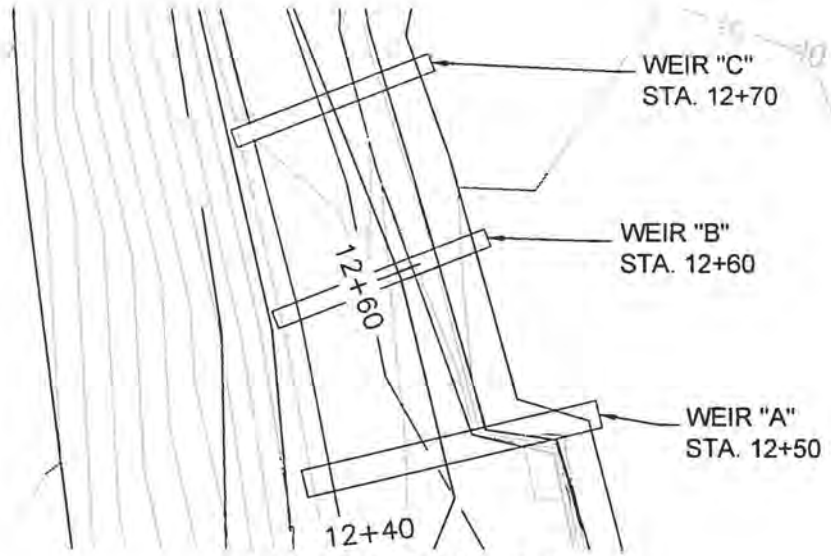


LOG SPLICE DETAIL



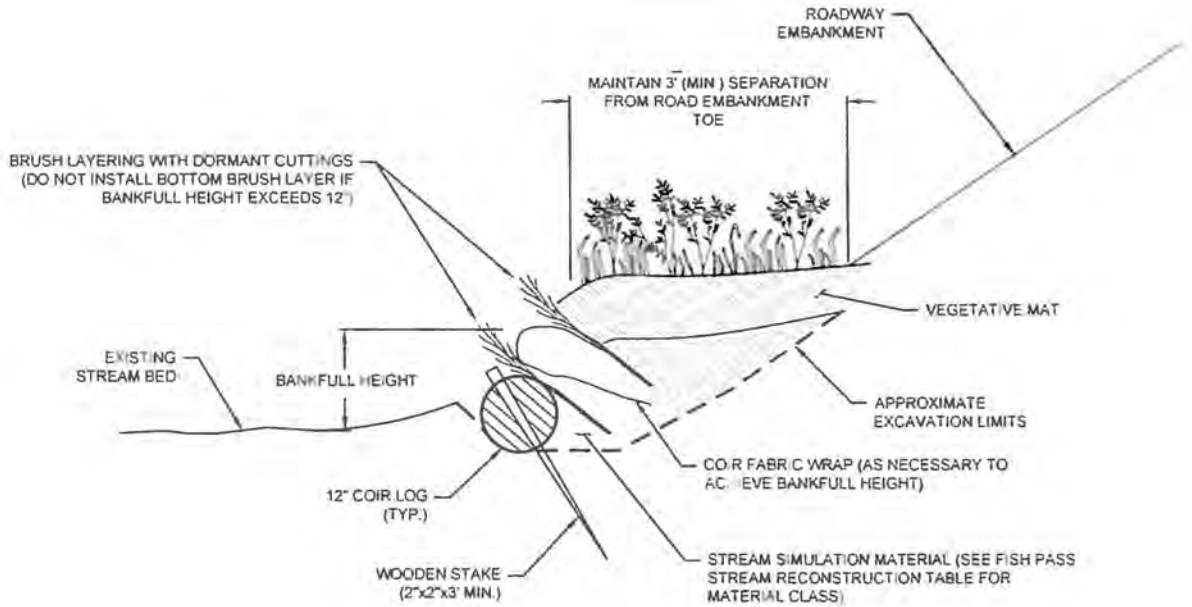
LOW FLOW DETAIL

LOG WEIR DETAILS



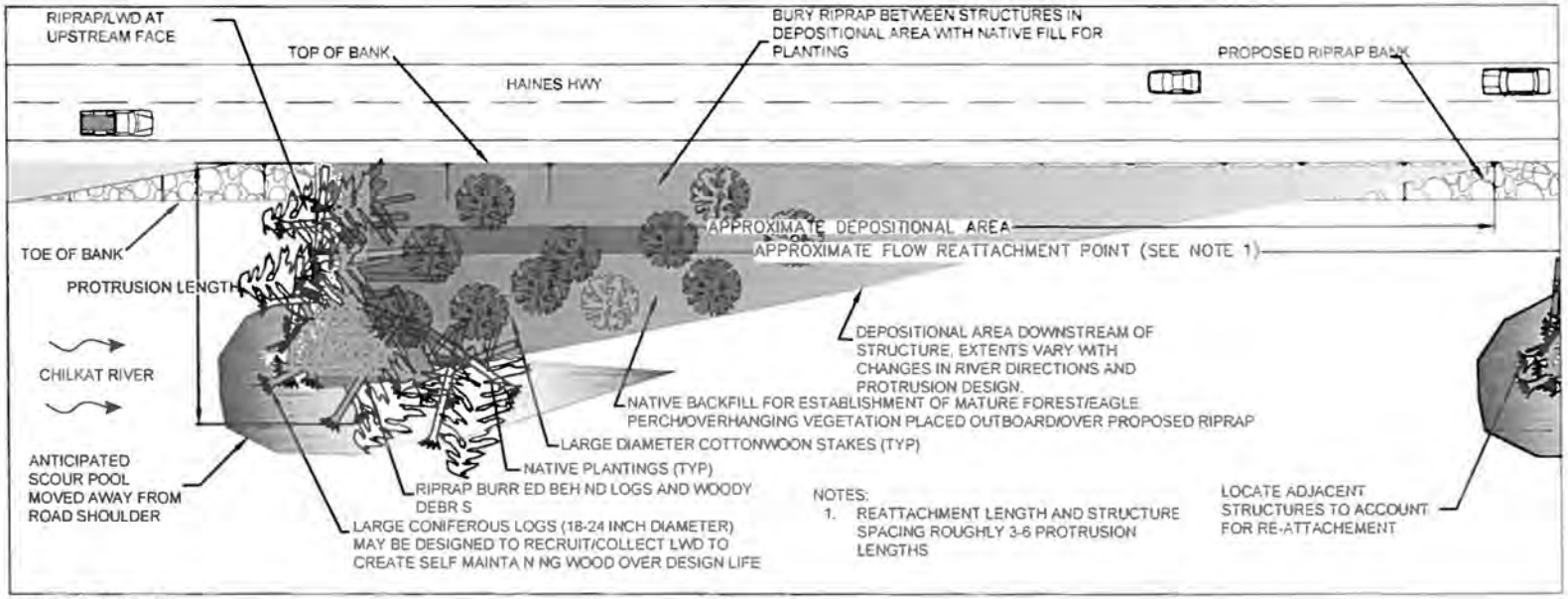
FISH WEIR PLAN VIEW

POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 42 OF 46 DATE: 1/19/2017

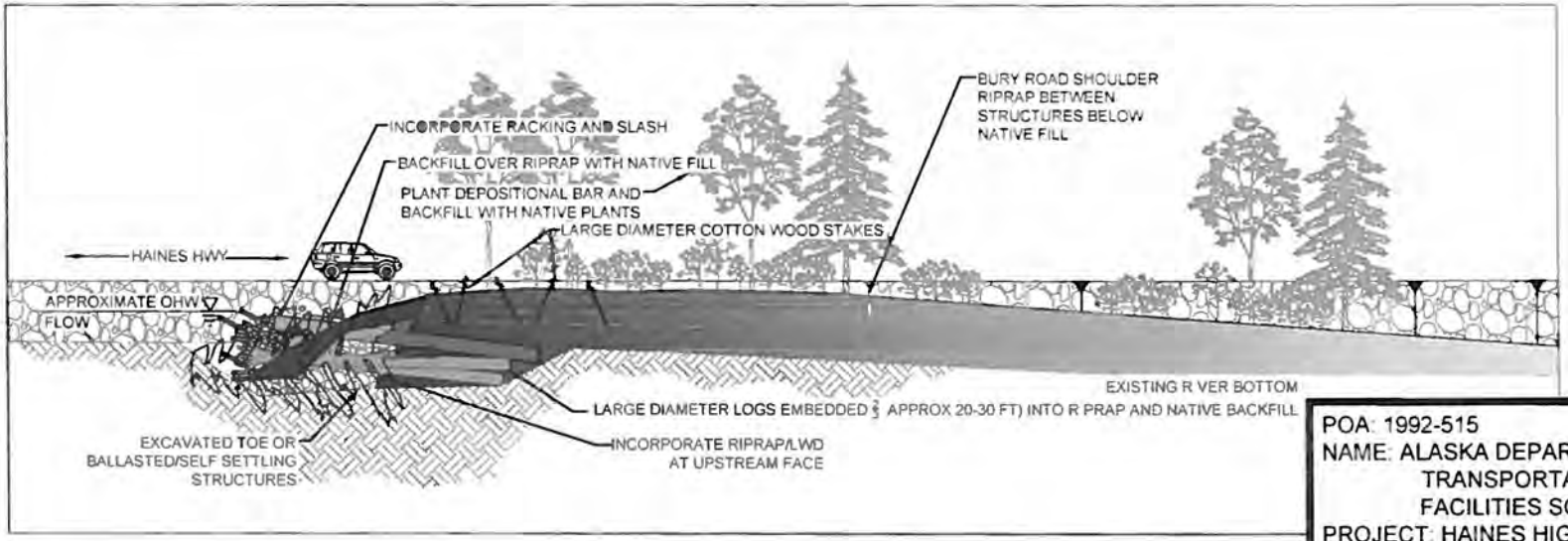


BANK RECONSTRUCTION DETAIL

POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 43 OF 46 DATE:1/19/2017



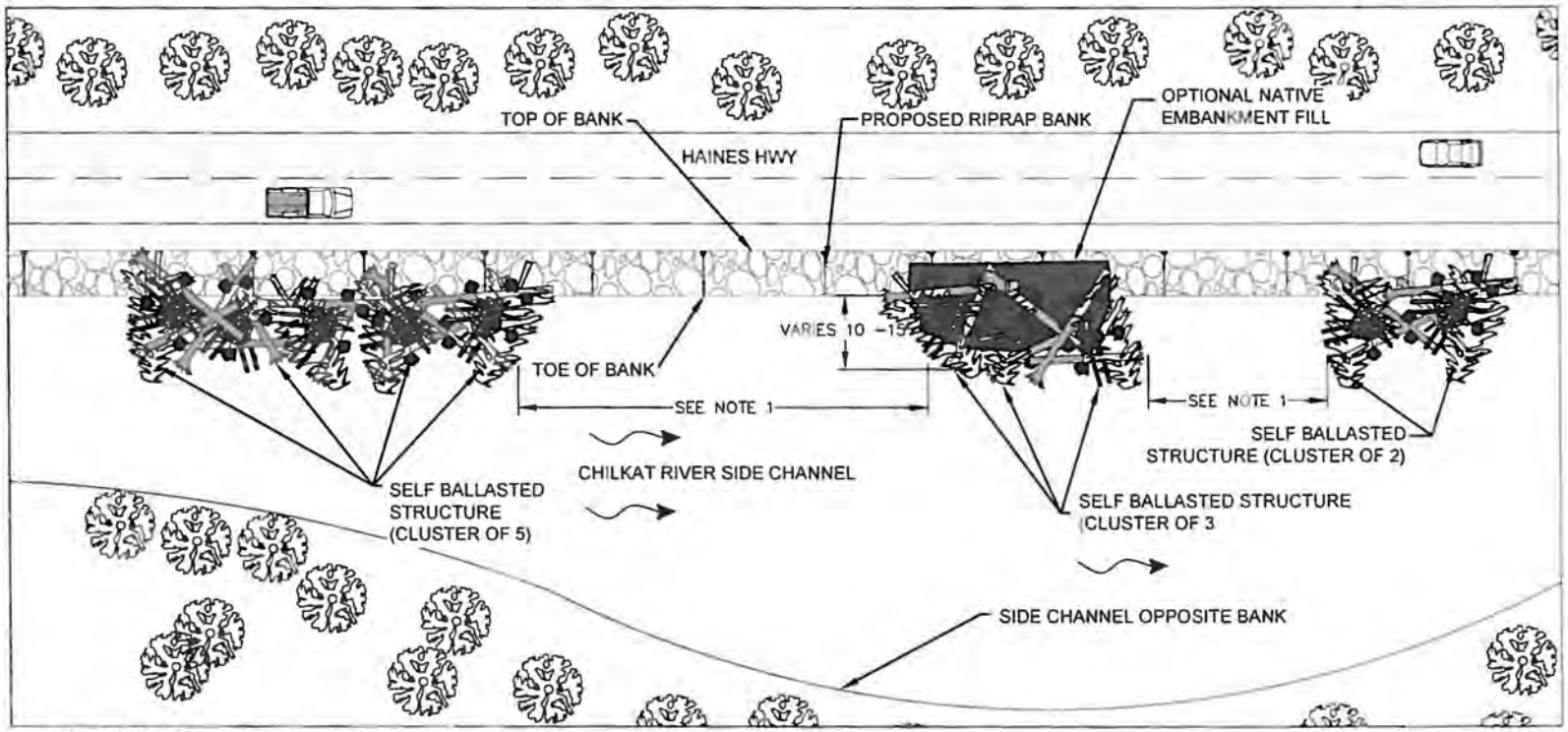
PLAN VIEW



ELEVATION

CONCEPTUAL CHILKAT RIVER PROTRUSION

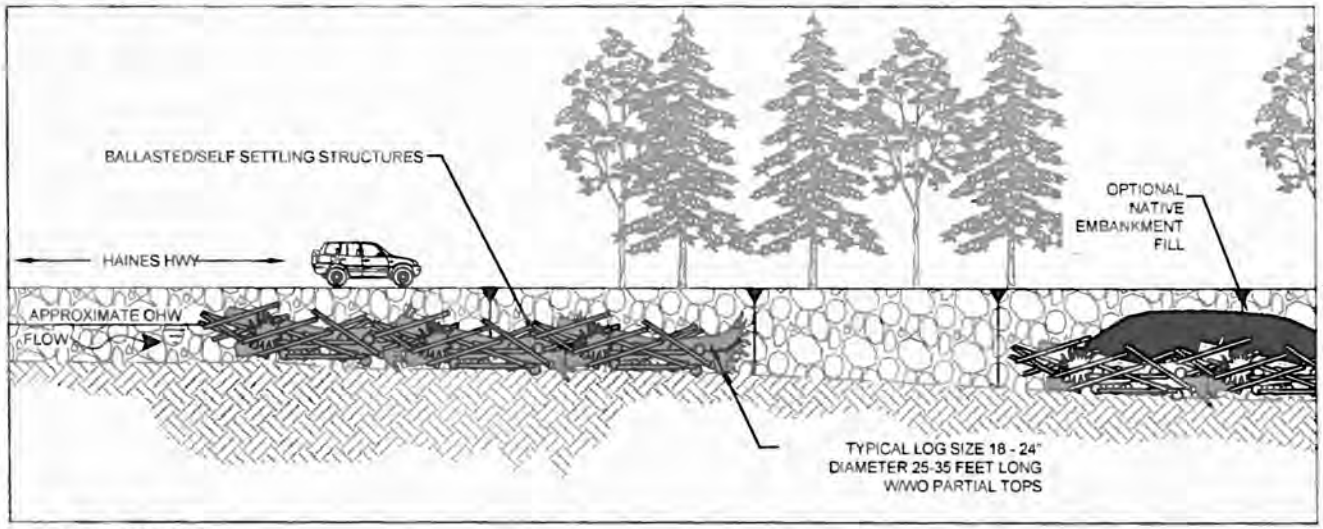
POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT: HAINES HIGHWAY MP3.9 - MP 25.0
PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 44 OF 46 DATE:1/19/2017



PLAN VIEW

LEGEND:

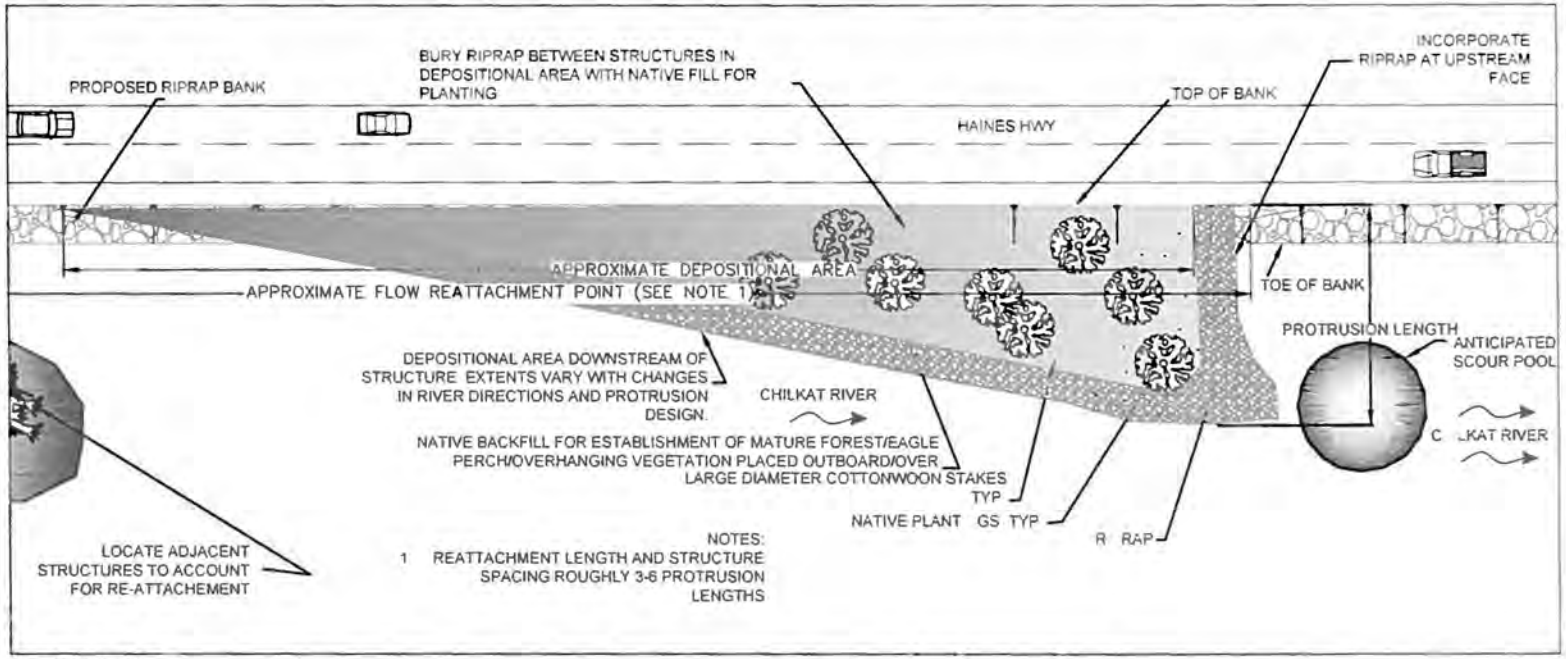
- SLOPE LINE
- NATIVE BACKFILL
- EXISTING GROUND
- RACKING LOGS
- RACKING LOG END
- LOG MEMBER
- PARTIAL TOP
- EXISTING GRADE
- EXCAVATION EXTENTS
- RIPRAP



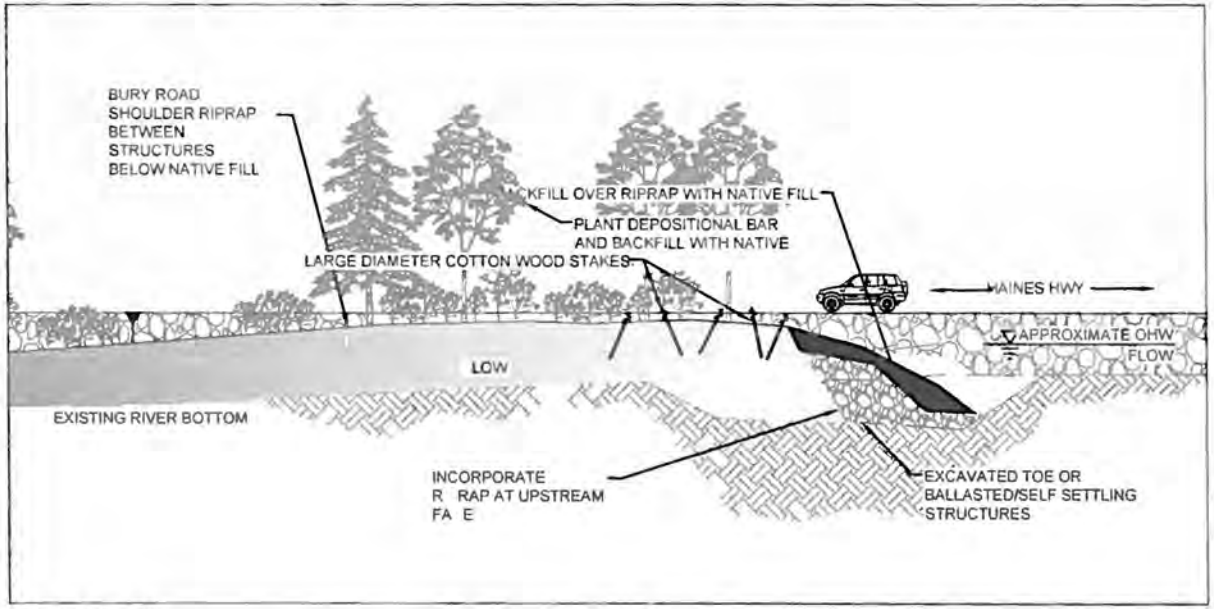
ELEVATION

CONCEPTUAL CHILKAT RIVER BALLASTED LOG CLUSTER

POA: 1992-515
NAME ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
PROJECT HAINES HIGHWAY MP3 9 - MP 25 0
PROPOSED ACTIVITY PROPOSED MITIGATION
LOCATION T 28-30 S R 56-59 E COPPER RIVER MERIDIAN
WATERBODY CHILKAT RIVER
SHEET 45 OF 46 DATE:1/19/2017



PLAN VIEW



ELEVATION

CONCEPTUAL CHILKAT RIVER CONCEPT
FISH WHEEL SITE

POA: 1992-515
NAME: ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES SOUTHCOAST REGION
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PROPOSED ACTIVITY: PROPOSED MITIGATION
LOCATION: T 28-30 S, R 56-59 E COPPER RIVER MERIDIAN
WATERBODY: CHILKAT RIVER
SHEET: 46 OF 46 DATE:1/19/2017