

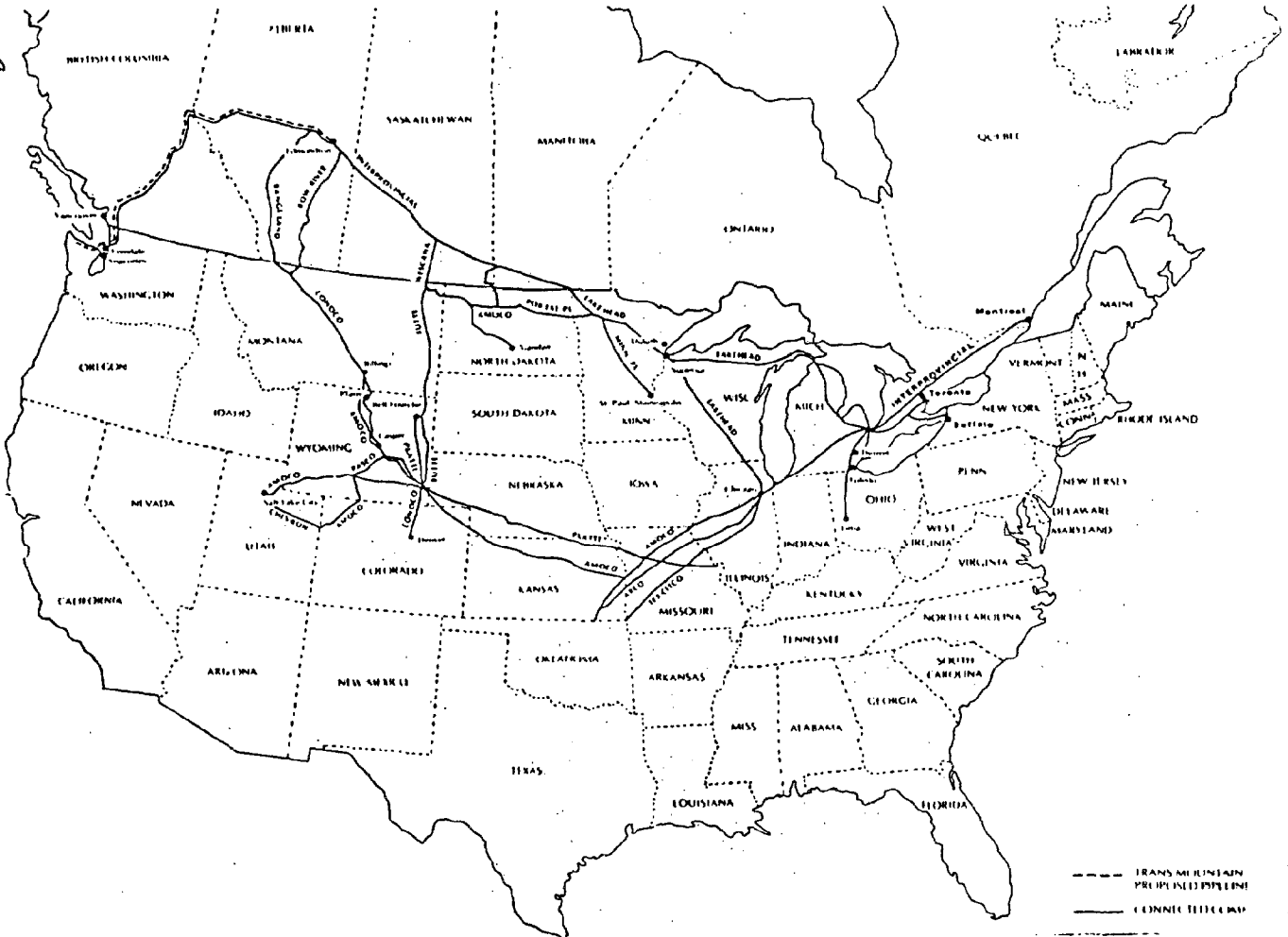
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REVIEW AND ANALYSIS OF THE PROPOSED TRANS MOUNTAIN OIL PIPELINE TO BE CONSTRUCTED WITHIN SKAGIT CO.

FOR

SKAGIT COUNTY

Washington State, Department of Ecology.



BY

LEONARD AND BOUDINOT, INC.
CONSULTING ENGINEERS
BURLINGTON, WASHINGTON

APRIL 30, 1981

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April 30, 1981

Mr. Robert C. Schofield
Planning Director
Skagit County Planning Department
County Administration Building
Mount Vernon, WA 98273

Reference: Review and analysis of that portion of the Trans Mountain Oil Pipeline to be constructed within Skagit County

Dear Mr. Schofield:

As per our agreement dated March 3, 1981, we submit herewith our report on that portion of the Trans Mountain Oil Pipeline proposed to be constructed in Skagit County.

Our analysis of the documents submitted by Trans Mountain Oil Pipeline Corporation has been primarily from an engineer's perspective. We have raised questions which have not been sufficiently answered in the Trans Mountain documents and have attempted to identify those particular impacts relating to specific conditions in Skagit County.

In the course of our review we met with private individuals, public agencies, and utility companies to elicit their impressions of the proposed oil pipeline construction. Letters from various agencies and companies are included in the appendix of this report.

We look forward to participating with Skagit County in future meetings and hearings concerning this project.

Yours very truly,

LEONARD AND BOUDINOT, INC.

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INTRODUCTION

The following report is based on our review of all documents, maps, and exhibits submitted by the Trans Mountain Oil Pipeline Corporation. Our study has included interviews with Dike and Drainage District Commissioners, City and County officials, officials of the U.S.D.A. Soil Conservation Service, officials of the State Department of Ecology, and owners of private property through which the pipeline will pass. We have met with Mr. Trevor Durrant, Manager of Administration and Planning, of the Trans Mountain Oil Pipeline Corporation. We have also conducted a field reconnaissance of the entire proposed pipeline route in Skagit County.

In presenting our observations, questions, and concerns, we realize that the information submitted by Trans Mountain does not contain a detailed final pipeline design. Additional engineering studies and a final design must be submitted and will be reviewed by Skagit County officials. Many of our questions and concerns should be answered in the final plans.

MAJOR CONCERNS

Of the many impacts on Skagit County, we feel there are six major concerns of which the county should be aware:

Oil Spill

The first and most pervasive concern is the threat of an oil spill from rupture of the pipeline or leakage at the Burlington tank farm. The environmental impacts associated with an oil spill have been addressed in considerable detail in the six volumes of the Trans Mountain Oil Pipeline Corporation report. We are concerned that adequate analysis of the physical conditions of the environment through which the pipeline passes has not been made. We feel that more precise engineering information concerning soil conditions, ground water table conditions, fault lines, river and stream conditions, and pipeline right-of-way conflicts is necessary to adequately evaluate the structural integrity of the pipeline and tank farm components. We have some concerns about the remote computer operation of the Burlington tank farm (Volume II, Part 1, Page 2-121) and the lack of full-time personnel at the Burlington tank farm. We are concerned with the potential liquefaction of the fine grained soils in the Skagit lowlands due to earthquakes and the resultant loss of support for the pipeline. We need much more information on the directional drilling technique proposed for the Skagit River crossing and an examination of alternative construction techniques for the Skagit River crossing.

We realize that the Corps of Engineers, Department of Ecology, Department of Fisheries, and Environmental Protection Agency will all be reviewing this pipeline proposal and will be evaluating the oil spill risks. For this reason a detailed study of oil spill impacts in Skagit County is not a part of this report.

River Crossings

A list of major river and stream crossings is given in Volume II,

Part 1, Page 2-47. Nine crossings are listed for Skagit County:

<u>Milepost</u>	<u>Stream Name</u>
95	Carpenter Creek (Fisher Slough)
100	Britt Slough
101.4	Skagit River
104.1	School House Slough
105.4	Heggens Slough
106.1	Indian Slough
111.3	Samish River
118.1	Friday Creek
118.7	Friday Creek

In the appendix of this report photographs P-1, P-2 and P-3 show the pipeline crossing location on Carpenter Creek (Fisher Slough) and photographs P-9 and P-10 show the Skagit River crossing location.

Our greatest concern is with the Skagit River pipeline crossing. The Trans Mountain report indicates that this crossing will be made using a directional drilling technique. This is briefly described in Volume II, Part 2, Page 4-12. No alternative construction methods for this crossing are discussed in the report and no alternative river crossing sites are investigated. A copy of the plan and profile of the Skagit River crossing is included on Page A-3 in the appendix of this report. This drawing is a revision of the drawing shown in Volume III, Part 1, Page A-81 of the Trans Mountain report.

The geophysical survey of the Skagit River crossing was made in December 1979 by Harding-Lawson Associates. Results of their investigation are in Volume III, Part 1, Section A, Page A-196. Their report indicates that the river was flooding at the time of the investigation and that they had difficulty obtaining sufficient information on soil conditions below the river bed. Mr. Trevor Durrant indicated that additional soils information from soil borings has subsequently been obtained but is not included in the report. From the results of the preliminary geophysical investigations the report concludes that soils are sufficiently dense to allow for construction of the river crossing using the directional drilling technique.

We have the following concerns:

1. As shown on Page A-3 of the appendix of this report, it is proposed to directionally drill 1,450 lineal feet or approximately the distance between the river dikes. Letters from Dike District Nos. 1 and 3 are included on Pages A-8 and A-9 of the appendix; and photograph P-7 shows the dike south of the river. The Dike District Commissioners are concerned that the pipeline will not be deep enough under the dikes and that the boring will take place too close to the toe of the dikes. Photograph P-8 shows the area adjacent to the south dike where it is assumed that the drilling will take place.
2. The Trans Mountain report makes no mention of seepage barriers or trench cut off walls in the pipeline under the dikes. Both Dike Districts request some kind of baffle plates around the pipe or seepage barriers.
3. Insufficient information concerning the directional drilling technique has been presented in the Trans Mountain report. It is, therefore, difficult to address possible concerns. The depth of the pipeline below the river bottom appears to be sufficient but we question the ability to control the diameter of the hole being drilled and are concerned with voids being created along the pipeline route.
4. We are concerned that the soils conditions under the river may preclude the directional drilling method. We have inspected well logs for wells adjacent to the river in the vicinity of the pipeline crossing, and have spoken with local well drillers and with Dike and Drainage District Commissioners. There is the possibility of encountering areas of saturated silty fine sands or quicksand. A complete soils investigation should be presented to Skagit County for review.
5. Due to the concerns of the Dike Districts and the information from well logs, we think the possibility exists that directional drilling may have to be abandoned and either open cut the river crossing or mining may have to be resorted to. The impacts and

mitigative measures of the alternate methods of crossing should be studied.

The oil pipeline is proposed to be constructed four feet below the maximum scour depth on all other rivers and streams (Ref. Volume II, Part 1, Section 7, Page 7-10). No information is given on how the maximum scour depth will be determined or on design flood flows on each river and stream. Mitigative measures for stream crossings are discussed in Volume II, Part 1, Section 7.1.3.3. We wish to note that some of these same mitigative measures should be applied to drainage district ditches crossed by the pipeline. The report points out that some rivers such as the Samish will be resistant to construction impacts because of their normally high turbidity levels. It is hoped that this will not allow less stringent controls on construction across the Samish River. Plan, profile, and details of the Samish River crossing are shown on Page A-4 in the appendix of this report.

Burlington Tank Farm

The Burlington tank farm and pumping station is to be constructed on 36 acres of land south of the Skagit Regional Airport. Access to the site will be by Ovenell Road and possibly by a new access road to the airport proposed to be constructed east of the tank farm site. A complete report on the tank farm and pump station is included in Volume III, Part 3, Section N.

Our concerns with the Burlington tank farm can be grouped in two categories: Impacts of construction and impacts during operation.

Construction Impacts: The Trans Mountain report (Volume III, Part 3, Section O, Pages 0-9 and 0-10) indicate that the Burlington tank farm will act as a staging area for the pipeline construction from West Pass (milepost 89) north to the tank farm. Pipe will be barged to Anacortes, and then trucked to the Burlington tank farm for storage. A total of 46 miles of pipe will be stored at the Burlington site and then trucked from the site to the pipe laying crews.

Little information is given in the report on the impacts or procedures for storing pipe, materials, and equipment at the Burlington tank farm site. We are concerned with the impact of truck traffic on Highway 20, Highway 537 (Farm-to-Market Road), and the Ovenell Road. The intersection of Highway 537 and Ovenell Road is just over the crest of a hill on Highway 537 which blocks sight of the intersection. This creates a particular hazard with turning trucks. Ovenell Road is surfaced with gravel and crushed rock and is not constructed to handle heavy truck traffic. Photograph P-12 in the appendix of this report shows Ovenell Road. Further analysis of access problems to the tank farm site is needed. Adverse impacts on transportation facilities is discussed in Volume II, Part 1, Section 7, Page 7-28, but no mention is made under mitigative measures of any road improvements necessitated by the pipeline construction. We do not agree with the traffic analysis conclusions that there does not appear to be any significant project related impacts at this site. (Ref. Volume III, Part 2, Section K and Volume II, Part 2, Page 4-174)

The report indicates that approximately 400 construction workers will be working out of the Burlington tank farm site (Ref. Volume III, Part 3, Section O, Page 0-10). It also states that a total of 239 construction workers from outside the area are expected to be in Skagit County in the twenty-second and twenty-third months of the construction (Ref. Volume II, Part 2, Page 4-134). There is insufficient analysis of the impact of these construction workers on the tank farm site.

Impacts of the Completed Tank Farm and Pumping Station: When completed and in operation, the Burlington tank farm and pumping station will be operated by computers located in Vancouver, B.C. and at Low Point. Control of all pumps and valves will be remote and sensors will transmit data back to the computers through a communications system (Ref. Volume II, Part 1, Page 2-122). Three operations personnel and three maintenance personnel would be stationed at the Burlington tank farm.

We have the following concerns:

1. It is a concern that an operation as complex, expensive, and potentially devastating to the environment has no onsite personnel at the Burlington tank farm during periods when the tanks are being filled or emptied. Will the pipeline operators in Vancouver and Low Point be able to contact emergency services personnel if their computer system indicates an emergency at the Burlington tank farm or pumping station? How will security be handled at the tank farm site?
2. The report indicates that the entire tank farm and pump station site will be diked and will be covered with an impervious blanket to prevent seepage into the soils. Storm water runoff will be controlled on the entire site and will be discharged at the southeast corner of the site into Drainage District No. 19 ditches. Insufficient information has been given in the report concerning runoff quantity and quality. It is understood that oil-water separators will be used, but how will these be operated and what controls will there be on the quality of discharged storm water? Retention of peak runoff will be required by the county, as will control of runoff during construction.
3. A buffer of trees surrounding the tank farm and pumping station is mentioned in the report (Ref. Volume II, Part 2, Pages 4-125 and 4-233). This buffer will help to contain the glare of the site lighting. No buffer of trees is shown on the tank farm plan in Volume III, Part 3, Section N, Page N-7. Photograph P-11 in the appendix of this report shows the east boundary of the proposed tank farm site. Is the proposed vegetative buffer to be on the 36 acres of Trans Mountain property? Will light and glare from the tank farm site have any effect on the operation of the Skagit Regional Airport? Volume II, Part 2, Section 3, Page 3-324 describes the Skagit Regional Airport at Bayview. A discussion of the visual impact of the Burlington tank farm is given in Volume II, Part 1, Page 4-228.

Depth of Burial of Oil Pipeline

Typical pipeline trench and backfill requirements are shown in the Trans Mountain report in Figure 2-40 in Volume II, Part 1, Section 2, Page 2-109. This diagram indicates that trench depths will vary from a maximum of 48 inches to a minimum of 30 inches. Because of the large diameter of the proposed pipe, the pipeline route will create a barrier for drainage and other utilities from the south border to the north border of the county. In interviews with local utility companies, city and county officials, farmers, and private property owners, considerable conflict with existing oil pipelines due to their shallow depth of burial has been indicated. A minimum of 48 inches of cover over the proposed pipeline should be required. In addition, the final pipeline design should be evaluated for potential conflicts with future utility extensions in Skagit County.

More information is needed to properly evaluate the maximum scour depth at rivers and streams. At most major drainage ditches a burial depth of 4 feet below the bottom of the ditch should be adequate to prevent future obstruction of ditch cleaning. The proposed 30-inch burial depth for the pipeline across agricultural lands is too shallow to allow for the construction of adequate drains and for modern day agricultural practices.

Easements

The first five miles of the proposed pipeline route through Skagit County will require new right-of-way easements (Ref. Volume I, Page 2-77). We are concerned that in the process of negotiation for these easements the pipeline route may be changed and other impacts will need to be investigated.

A recommendation has been made by Dike District No. 3 that the pipeline be routed next to the Burlington Northern Railroad in the south part of Skagit County. Questions have been asked why the Trans Mountain oil pipeline is not following the Olympic Pipeline right-of-way.

In the Burlington to Laurel segment of the pipeline an additional construction easement 30 feet wide will be necessary. The existing

right-of-way through most portions of this segment is 50 feet wide. South of the Stackpole Road a 50-foot wide permanent easement and a 20-foot wide temporary construction easement will be required (Ref. Volume II, Part 1, Page 2-101). In segments where there is the existing 20-inch oil pipeline the new 36-inch pipe is proposed to be located 10 feet away from the existing pipe and approximately 30 feet from the edge of the 50-foot easement (Ref. Volume II, Part 1, Page 2-103).

We have obtained a few copies of the existing Trans Mountain easements and noted that not all easement agreements allow for the construction of a second pipeline.

Construction Inspection and Plan Review

During our interviews City and County Public Works Departments, Drainage Districts, Dike Districts, utility companies, and private property owners have all expressed a concern for protection of their interests during the construction. We recommend that a qualified consultant be appointed by the county to represent the concerns of the county and of all special districts crossed by the pipeline. This individual or firm should have authority to stop the construction, and should be in direct contact with the top officials of the Trans Mountain Oil Pipeline Corporation. The cost of this construction inspection should be borne by the Trans Mountain Oil Pipeline Corporation.

Many of the people interviewed in Skagit County related stories of other pipelines which have crossed the county and the relationships they have had with the contractors doing the construction. Due to the pressure of keeping the job moving, many contractors are insensitive to local property owners' concerns. Local property owners and city, county, and district officials have been frustrated in the past at not having a person to contact to express their individual concerns about the construction.

CONCERNS

Ground Water

We anticipate that construction of the pipeline through the low areas of Skagit County will be in areas where the ground water table is encountered. On the pipeline route map in the appendix, areas with a probable shallow ground water table have been shaded. Impacts on ground water table conditions could be substantial and need to be discussed in greater detail.

Concerns: Soils in the upland areas of Skagit County are generally impervious clays or glacial till. Ground water will tend to follow the pipeline trench and may cause drainage problems in agricultural lands in the transition zone between flat and uphill pipe segments. Seepage along the pipeline trench should be controlled and trench cut off walls surrounding the pipe should be used.

Where the ground water table is high some form of trench dewatering may have to be used. This lowering of the ground water table may cause settling of adjacent lands, may impact adjacent crop land, may lead to increased turbidity in local drainage ways, may affect wells in the vicinity, and may cause contamination of surface waters due to the intrusion of septic tank wastes into the dewatering areas. (Ref. Volume II, Part 1, Pages 1 through 8; Volume II, Part 1, Section 7, Page 7-15)

In the Trans Mountain report, Volume II, Part 1, Pages 3-23i, 3-23j and 3-23k, areas of shallow ground water in Skagit County are shown. No indication is made of shallow ground water in the southern segments of the pipeline. In Volume II, Part 1, Pages 3-125, 3-135 and 3-136, there is a list of 24 wells in Skagit County along the proposed pipeline route and maps showing the location of these wells. A discussion of ground water in the Skagit River basin is presented on Pages 3-144, 3-145 and 3-146.

An oil spill could have a tremendous impact on the ground water table

and on the permeable soils through which the ground water passes. Oil spills might occur not only from the pipeline, but also from the construction equipment. Potential ground water contamination in Skagit County is discussed in Volume II, Part 1, Page 4-77 and on Pages 4-301 and 4-304. Mention is made of lining the pipe trench with bentonite clay or polyethylene sheets to prevent the downward and lateral migration of spilled or leaked oil. (Ref. Volume II, Part 1, Section 7, Page 7-15)

Residential and Public Areas

In traversing Skagit County the pipeline passes through some residential areas and very close to the Allen Elementary School. (See picture P-14 in the appendix of this report.) There is little or no discussion in the report of the impacts of the construction on these areas or of any potential hazards. The majority of the residential neighborhoods are from milepost 102 to milepost 104, as shown on map plates 1 and 2 in the appendix of this report.

Concerns: The impact of constructing the oil pipeline through residential areas needs to be carefully examined. In addition to the noise, dust, and hazards of heavy equipment, there may be more far reaching consequences of construction close to buildings. The impact of the trench excavation on existing septic system absorption fields should be addressed. The potential damage to structures due to vibrations from heavy equipment or settlement due to trench dewatering is not mentioned. There is insufficient information concerning restoration of ground surfaces after the pipeline is constructed.

Construction schedules given in the report indicate that pipeline construction past the Allen Elementary School may occur during months when school is in session. Disruption of the school should be considered as well as potential hazards to the school children.

No mention is made of measures during construction to limit access to private property during periods when the pipe laying crew is passing through.

Odors

The Burlington tank farm will be a source of odors. The primary source of odors from the tank farm will be volatile sulfur bearing constituents of crude oil mainly composed of hydrogen sulfide and mercaptans. The report states that impacts of odors are not expected to extend beyond about 1 or 2 kilometers from the source, but that odors should not be detectable beyond a few hundred meters from the source.

Report Reference: Volume II, Part 1, Section 4, Pages 66 and 67.

Concerns: Portions of the Skagit Golf and Country Club residential subdivision are located within 1.8 kilometers of the proposed tank farm, as is the terminal area of the Skagit Regional Airport.

Electric Power

Power from Puget Sound Power and Light Company will be required to operate the Burlington and Laurel pumping stations, the cathodic protection systems for the pipeline, the communications systems, and the tank farm support facilities. The report indicates that Puget Sound Power and Light Company has approved these power system additions and has stated that providing power is not a problem.

Report Reference: Volume II, Part 1, Section 4.2.6.1.1, Page 4-193 and Page 4-198 (table of electrical energy requirements).

Concerns: Once in operation the Trans Mountain oil pipeline will be a priority user of electric power. In the event of power shortages due to low water levels in the reservoirs, will Trans Mountain power requirements cause or further aggravate power shortages to existing commercial and residential customers? Is it possible that this could increase power rates?

On Page 4-194 it states that a 1½-mile extension of 115 KV transmission line will be required to serve the Burlington pumping station. This transmission line extension is proposed to be built along existing pipeline right-of-way. In checking pipeline easements in Skagit County, we have not found that they allow construction of power transmission lines. If this is the case, new easements would have to be negotiated. Much of the

pipeline right-of-way crosses agricultural land, which may be impacted by location of a power transmission line.

Waste Disposal for Tank Farm

The Burlington pumping station and tank farm will have a permanent work force of approximately six. Sanitary waste will be disposed of with a septic tank system. During construction several hundred construction workers will work out of the Burlington tank farm site. Holding tanks and portable toilets will be used during the construction.

Report Reference: Volume II, Part 1, Section 4, Page 4-207; Volume II, Part 1, Section 3, Page 3-357.

Concerns: Septic tank and absorption field systems may be difficult to install at the Burlington tank farm site due to impermeable soils and high ground water table conditions. It should be noted that the city of Burlington sanitary sewers exist approximately 3,000 feet to the east along the Ovenell Road from the proposed tank farm.

Drainage District and Dike District Concerns

The proposed pipeline route through Skagit County crosses fourteen major drainage ditches in four drainage districts and four major dikes in two dike districts. Commissioners of the drainage and dike districts were interviewed and letters from Dike District Nos. 1 and 3 are included in the appendix of this report. Photographs P-1 and P-7 show Dike District No. 3 dikes, and photographs P-2, P-3, P-4, P-5 and P-6 show Drainage District No. 17 ditches. Photograph P-13 shows a Drainage District No. 14 ditch. All photographs are included in the appendix of this report.

The drainage district commissioners indicated that a minimum burial of 4 feet below the bottom of their ditches would be sufficient for the pipeline in most cases. It was pointed out that maintenance of Fisher Slough (pipe milepost 95.1) is done with a drag line and a greater depth for this pipeline crossing may be necessary.

Drainage district commissioners were concerned that construction of the pipeline would not impede or block the flow in the ditches and that

when completed, the ditches would be put back in the same condition. Several of the drainage districts operate and maintain buried drains across agricultural property. The proposed minimum depth of burial of 30 inches for the pipeline will obstruct these drains and will cause considerable obstruction to future field drain construction. The pipeline should be buried a minimum of 48 inches across all agricultural lands. Any field drains or tile lines crossed by the pipeline shall be repaired adequately and shall be protected against settlement of the pipe trench soils.

If it is necessary to lower the ground water table by some form of trench dewatering, ground water discharged into the drainage district ditches shall not contain sand or silt; shall not contain effluents from septic systems; and shall not cause erosion along the drainage ditches (Ref. Volume II, Part 1, Section 7 and Volume II, Part 1, Pages 4-10 and 4-81).

Dike and drainage districts will require that construction through their facilities shall be done in the period from June 15 through October 15. This is the dry period when the ground water table is the lowest and when flooding is least likely. Several commissioners interviewed pointed out that soils along the proposed route tend to behave as quicksand when excavating below the ground water table. Particularly in the Fisher Slough area this could pose some difficult construction problems.

Utilities and Roads

In our interviews for this report we met with the Skagit Utility Coordinating Council and city, county, and utility company officials. The principal concern expressed by all persons interviewed was the proposed depth of burial of the pipeline. Thirty inches cover over the pipe is not enough clearance for construction of other utilities. Most utilities are required by their franchise to have a minimum burial of 30 inches. This puts them in direct conflict with the proposed pipeline for any future utility extensions.

Other concerns were for electrolysis of metallic pipelines and for loss of stability caused by trench dewatering or excavation close to

existing underground utility lines.

City and county officials should be contacted by Trans Mountain prior to final design of the pipeline to determine requirements for road crossings.

Agricultural Land

Our review of the pipeline route through the Skagit Valley Delta farmlands reveals that approximately 140 acres of prime farmland will be disturbed during the construction period. We have discussed the possible effects of this route with Peggy Olds of the Soil Conservation Service, with farmers at our meetings with various dike and drainage districts, and also with other farmers who owned property when the Trans Mountain pipeline was put in from Canada to the refineries at March Point.

We think that past experience has shown that there is crop loss extending as long as five years. Existing easements which Trans Mountain has at this time require the compensation for only the immediate crop disturbed during the construction period. The only thing that can be done for farmers with existing easements across their property is to bring whatever pressure is available by the county to encourage Trans Mountain to mitigate the possible long term impacts. Past experience has noted substantial disregard for the season of construction or the destruction done during that period. Once the pipeline contracts have been let, it will be hard for Trans Mountain to control the timing of the construction, but possibly contracts could be structured to permit construction only from June through September. One drawback for the pipeline company would be of course the greater crop loss during the summertime than during the wintertime; however, the destruction to the fragile topsoil would be considerably less if done during the summer.

Another major existing problem and future problem is the disruption of field drains which will be frequently encountered within the entire sixteen miles of lowlands traversed. The Soil Conservation Service has much of the information on the location of existing tile field drains. Many of these systems were installed with federal cost sharing funds, which committed the owners to maintain the drains for a minimum of ten

years or pay back the federal money used for their project.

One of the major problems is the depth of the existing pipeline with a 30-inch cover, which is nearly exactly where most field drains are installed. The new proposed pipe should be installed at a depth which will allow field drains above it. Certainly a 40-inch pipe prohibits any field drains being installed below the bottom elevation of that pipe. A typical plan and profile of field drains and how the pipeline would affect them are shown on Page A-5 in the appendix of this report.

There should also be given consideration to the method of notification of the property owners when the construction actually begins. One of the previous problems in this regard was the lack of notification to lease holders of property who first discovered the fact that their crop was going to be removed when the construction crew appeared on the site. That cannot be simply answered with the statement that Trans Mountain will pay for crops removed. There is much more impact on the farmer than just the loss of a 75-foot strip of corn or peas. Since the construction may occur at about the same time they have field work to perform, a 75-foot swath interfering with their operation can be costly in ways which are not easily determined and probably not compensable.

In summary, consideration should be given to disruption of field drain tiles, a change in the drainage characteristics of the soil due to heavy construction machinery, loss of fertility, unexpected disruption of lease hold farmers, and the possible large accumulative cost to the farm community in legal negotiations regarding losses that will occur.

Restoration and Cleanup

After construction of the pipeline, restoration and cleanup of the pipeline right-of-way will be necessary.

Report Reference: Volume II, Part 1, Pages 2-90, 2-107 and 2-117; Volume II, Part 2, Page 7-3.

Concerns: Very little mention is made of the restoration procedures

and cleanup activities that will be implemented after the construction. In some places it will be necessary to construct temporary roads across private properties along the pipe right-of-way. Removal of these roads and restoration of the ground surface needs to be addressed. Several property owners interviewed for this report have expressed concerns about the right-of-way cleanup.

In discussion of agricultural lands in the Trans Mountain report it is mentioned that double ditching will be used to avoid mixing topsoil with sub soils. It is not mentioned, however, if topsoil will be removed and stockpiled from areas where roads will be built. Topsoils can be damaged and lose their fertility due to rutting and compaction caused by heavy equipment.

Mention is made in Volume II, Part 2, Page 7-3 of drainage and erosion control in the pipeline right-of-way after construction. It is stated that temporary mulching and planting will be used during construction and permanent revegetation will be established after construction is complete. No information is given on the types of revegetation, how soon after construction revegetation will take place, or how long revegetation will be maintained to assure that it is growing.

QUESTIONS

1. How much Alaska North Slope oil is anticipated to be exchanged for Canadian crude oil along the Canadian pipeline route?
2. Can Canadian crude be shipped back to North Puget Sound refineries after new pipeline is completed?
3. The Burlington tank farm will provide storage for crude oil for all four refineries in the North Puget Sound area. Does Trans Mountain have commitments from any of these refineries for supplying them with crude oil? If commitments are not obtained, will the Burlington tank farm be built? Are commitments from the North Puget Sound refineries critical to the feasibility of the Trans Mountain proposal? (Ref. Volume II, Part 1, Page 2-16)
4. After the pipeline is in operation, what will be the origin of oily water drained from the storage tanks at the Burlington tank farm? What is the estimated quantity of oily water drained at the Burlington tank farm? (Ref. Volume II, Part 1, Page 2-70)
5. A 2,000,000-gallon reservoir for fire fighting water is proposed at the Burlington tank farm. Where will the water be obtained to fill this reservoir? If a well or wells are drilled to serve the tank farm, how much water must be obtained to satisfy potable water requirements and to replenish the fire water reservoir? (Ref. Volume II, Part 1, Page 2-76)
6. Will laboratory testing facilities be provided at the Burlington tank farm for checking the treated wastewater before discharge into Drainage District No. 19 ditches? What monitoring and control will there be of treated runoff from the tank farm site?
7. Will the Burlington tank farm be manned 24 hours a day, and what special security precautions (other than fencing) will be taken at the Burlington tank farm?

8. Will there be any explosives or sources of radiation at the Burlington tank farm during the pump station, tank farm, or pipeline construction? (Ref. Volume I, Page 3-3)
9. Corrosion protection for the oil pipeline will be facilitated by using ground beds for the cathodic protection system. Where will these ground beds be positioned along the pipeline in Skagit County, and what impact will they have on the surrounding land uses? (Ref. Volume II, Part 1, Page 2-79)
10. The Trans Mountain Oil Pipeline Corporation does not have right-of-way south of the Stackpole Road in Skagit County. Have there been any negotiations with property owners in this area for acquiring right-of-way easements? Have there been any negotiations for acquiring construction easements along the entire pipeline through Skagit County?
11. What flood volume is going to be used in designing the Skagit River crossing? The 100-year flood volume used by the Corps of Engineers is 230,000 cubic feet per second.

OBSERVATIONS

1. The first five miles of the proposed pipeline route through Skagit County will require new right-of-way easements (from south county line to Stackpole Road).
2. In Volume I, Page 2-80a, the Trans Mountain report states that the pipeline does not pass through any of the city of Mount Vernon. Recently annexed acreage to the south of the city takes in a portion of the proposed pipeline route.
3. The city of Burlington land use map shown as Figure 2-34e in Volume I does not show the correct city limits.
4. The existing Trans Mountain pumping station will be dismantled and relocated at the new pump station site.
5. Major stream crossings in Skagit County are listed in Volume II, Part 1, Page 2-47. There are two unnamed crossings. These crossings are School House Slough and Heggens Slough.
6. Major utility pipe crossings in Skagit County are listed in Volume II, Part 1, Page 2-49. Two natural gas pipelines and one oil products line are listed, but the 36-inch and 24-inch city of Anacortes water mains along Bennett Road at pipeline milepost 104.1 are not mentioned. These pipelines are shown in Section A-7 of the appendix of this report.
7. The fire protection system for the tank farm is discussed in Volume II, Part 1, Page 2-75.
8. Wells will be developed for providing the fresh water requirements at the Burlington tank farm. (Ref. Volume II, Part 1, Page 2-76)
9. Measures will be taken to protect other metallic pipelines crossed by the proposed Trans Mountain pipeline. (Ref. Volume II, Part 1, Page 2-79)

10. The pipeline route through the Skagit lowlands passes through what are considered archeologically sensitive areas. A map showing archeologically sensitive areas is shown in Volume II, Part 2, Section 3, Page 3-399.
11. All water used to hydrostatically test the pipeline and oil storage tanks will be treated and disposed of in Canada. (Ref. Volume II, Part 2, Page 4-71)
12. The report indicates that major road crossings and railroad crossings will be bored and cased with a steel pipe larger than the diameter of the oil pipeline. Secondary roads will be bored or open cut and the oil pipeline installed without a casing. (Ref. Volume II, Part 1, Pages 2-110 and 2-111)
13. A geologic map of Washington showing fault lines in Skagit Valley is shown in Volume II, Part 1, Page 3-10. Earthquakes in the Skagit Valley area are discussed on Pages 3-41 and 3-42.
14. The pipeline route in the southern part of the county passes very close to the Skagit River Delta bird and wildlife sanctuaries.
15. In Volume II, Part 1, Page 3-155 is a table showing discharge data for major stream crossings. The Skagit River is shown to have a maximum discharge of 144,000 cubic feet per second in the period from 1940 to 1977.
16. It is estimated that 456 pounds of oil products per day will be lost by evaporation from tanks, valves, seals, and pipeline equipment at the Burlington tank farm (Ref. Volume II, Part 1, Pages 4-33, 4-34 and 4-35). These emissions are compared with a net reduction in emissions due to fewer oil tankers calling at the March Point refineries.
17. The report indicates that the Friday Creek pipeline crossings will probably aggravate existing water quality problems, which include low summer flows, high water temperatures, and siltation. (Ref. Volume II, Part 1, Page 4-85)

18. Volume II, Part 1, Page 4-149 has a table showing peak construction employment in Skagit County at 399 workers. Of this, 104 will be non local workers and 295 will be local workers.
19. Volume II, Part 1, Page 4-157 has a table showing estimated sales tax revenue from construction. Skagit County is estimated to receive \$141,000 in sales tax revenues.
20. Volume II, Part 1, Page 4-156 has a table showing the estimated annual property tax liability of the Trans Mountain project. It is shown that Skagit County would receive approximately \$4 million annually based on 1979 average taxes.
21. Volume II, Part 1, Page 4-292 has a map showing potential structural damage from a Burlington storage tank explosion. It indicates that general light structural damage could occur within 2,200 feet of the tank farm. This would include portions of SR-20 as well as a substantial portion of the Skagit Regional Airport.

APPENDIX

- A-1 R. W. Beck and Associates Report
- A-2 Pipeline Route Maps
- A-3 Plan and Profile of Proposed Skagit River Pipe Crossing
- A-4 Plan and Profile of Proposed Samish River Pipe Crossing
- A-5 Typical Field Tile Drains Plan and Profile
- A-6 Skagit County Public Works Department Letter
- A-7 City of Anacortes Letter
- A-7a City of Mount Vernon Letter
- A-8 Dike District No. 1 Letter
- A-9 Dike District No. 3 Letter
- A-10 Continental Telephone of the Northwest Letter
- A-11 Photographs
- A-12 References and Interviews

R. W. BECK AND ASSOCIATES

ENGINEERS AND CONSULTANTS

PLANNING
DESIGN
RATES
ENVIRONMENTAL
ECONOMICS
MANAGEMENT

TOWER BUILDING
7TH AVENUE AT OLIVE WAY
SEATTLE, WASHINGTON 98101
206-622-5000

GENERAL OFFICE
SEATTLE, WASHINGTON
206-622-5000

FILE NO. WW-1577-ZZ1-MX
6B

April 29, 1981

Leonard and Boudinot Inc.
Professional Engineers and Land Surveyors
P.O. Box 327, 612 East Fairhaven
Burlington, Washington 98233

Gentlemen:

Subject: Trans Mountain Oil Pipeline
Review of Proposed Construction
Skagit County, Washington

Pursuant to the terms of our agreement for professional services, we submit herewith a letter report with our comments on the design and construction aspects for that portion of the proposed Trans Mountain Low Point Project located in Skagit County, Washington.

The basis for our comments relative to the design and construction aspects of the proposed Project are from the following sources: (1) a brief review of documents submitted by the Trans Mountain Oil Pipeline Corporation to the Energy Facility Site Evaluation Council, State of Washington, in application for site certification of the Trans Mountain Low Point Project, filed August 21, 1979, revised December 31, 1980; (2) a field reconnaissance of the proposed route through Skagit County; and (3) a meeting with Trans Mountain engineers in their Seattle office.

The documents submitted by the Trans Mountain Oil Pipeline Corporation, a total of six volumes, with the application for site certification are to be utilized in preparation of the Environmental Impact Statement for the Trans Mountain Low Point Project by the Energy Facility Site Evaluation Council, State of Washington. The probable environmental impacts of the Project were addressed in considerable detail. The engineering aspects of the Project as addressed in the documents are of a preliminary nature. The scope of the Project is defined by written text and preliminary drawings depicting many of the facilities proposed for construction. The preliminary engineering appears to have been completed in conformance with the American Code for Pressure Piping, Liquid Petroleum Transportation Systems (ANSI/ASME B 31.4). This code is the standard of the industry and would further be adhered to in preparation of the final design of the proposed Project. The need for additional investigations and studies as a prerequisite to final design and construction are

addressed. Final design is not a prerequisite for site certification of a proposed oil pipeline project.

The field reconnaissance revealed no visible complications that would indicate the need for an alternate routing from the standpoint of pipeline integrity. Minor adjustments in alignment may be necessary during final design for the purpose of facilitating construction or to achieve the best possible location for pipeline integrity. South of the Burlington Tank Farm, the route traverses farm and pasturelands. The land is flat and there is no possibility of lateral earth movements (earthslides) that could result in damage to the pipeline. North of the Burlington Tank Farm, the proposed pipeline follows the route of an existing Trans Mountain oil pipeline. The existing line has been in operation since the late 1950's and to this time there have been no incidents to indicate that the soils along the route are not stable. With proper attention to construction procedures, it is reasonable to assume that a second pipeline can be constructed alongside the existing pipeline without adverse results.

Generally, the pipeline route through Skagit County is not difficult terrain for the construction of an oil pipeline. There is the possibility of encountering groundwater in trenching operations, but with construction in the fall of the year and the utilization of proper dewatering equipment, this will present no problem. It is anticipated that pipe crews will be able to lay from 1.0 to 1.5 miles of pipe per day once the operation is underway. Construction crews will be organized to complete all operations as they progress across the County, starting with right-of-way clearing and completing construction with right-of-way restoration.

The primary concern in locating aquatic pipeline crossings is to select a site where the pipeline will be stable. The pipeline can be placed at a large number of locations along the length of rivers and drainage channels and satisfy this criterion. The determining factor becomes the routing of the pipeline as a whole. By application of sound engineering practices during site selection and final design, a stable pipeline can be achieved with minimal adverse environmental impacts upon the stream and the surrounding area. To the best of our knowledge, public access will not be impeded and aesthetic impacts will be minimal at any one of the crossings as proposed. It must also be pointed out that the Skagit and Samish River crossings will be subject to review and approval by state and Federal agencies. The final design for each crossing must meet their stringent requirements before construction is allowed. It is also the prerogative of affected drainage districts to exercise the same requirement before allowing the crossing of drainage facilities.

Aquatic crossings by the oil pipeline in Skagit County consist of the crossing of the Skagit and Samish Rivers and the crossing of drainage channels in the area south of the Burlington Tank Farm. The Samish River and drainage channel crossings are not difficult crossings to construct. As pipeline construction is scheduled for the fall when streamflow is at a minimum, the crossings will, in all probability, be made by open cut of the trench

crossing the channel. This method has two advantages from the standpoint of construction. It is the most economical method for construction of an aquatic pipeline crossing. It also affords the capability to control construction methods and operations which will result in a completed facility of known stability. The pipe under the streambed can be well founded to insure stability of the installation and the channel can be restored to a condition equal to or better than existed prior to construction.

The Skagit River crossing is located west of and to the south of the City of Mount Vernon, approximately 1.5 miles north of the point of convergence of the north and south delta channels. The width of the crossing, from levee to levee is approximately 1,450 feet, and Trans Mountain is proposing to use directional boring for construction of the entire crossing from the outside of the levee on each side of the river. Directional boring is a relatively new technique for constructing installations of this nature. Directional boring has, however, been utilized for many years in the oil industry for drilling oil wells. With the advent of new instruments and modifications to boring machines, the method has been adapted for onshore construction of aquatic crossings such as the Skagit River. Trans Mountain engineers have advised that this method has been successfully utilized several times in the recent past for similar installations. They have also advised that subsequent to preparation of the application for site certification, additional geotechnical investigations have been made at the proposed site for the Skagit River crossing. The findings of these investigations indicate soils underlying the river are of sufficient strength to successfully permit construction of the proposed crossing by directional boring. In addition, the wall thickness of the pipe will be increased at the river crossing, a check valve will be installed on the north bank, and a remote controlled motor-operated block valve will be installed on the south bank. The pipe strength has been increased for added safety, and in the event of a break in the pipe, the quantity of oil spilled will be limited to that in the pipe under the river between the two valves.

By visual inspection, the site selected for the Burlington Tank Farm appears satisfactory. The site is located on high ground above the delta plain, and as such the underlying soils should be suitable for the proposed construction. The site is now heavily timbered. With controlled clearing, the completed facility should be screened from view within the immediate area. It may be visible from locations at a distance from the site and from areas of higher elevation.

Preliminary plans call for the Tank Farm to be completely bermed on all sides to form an impoundment area of adequate size to contain all stored materials. The entire impoundment area will be sealed on the inside to prevent contamination of groundwater by the downward migration of oil from spills or overflows within the area. Provisions will be made at the site for treatment of surface water runoff prior to release into natural drainageways.

The low lying lands south of the Burlington Tank Farm appear to be subject to high groundwater levels throughout most of the year. This condition

should be verified during final design and provisions made in the design to prevent flotation of the pipeline and contamination of the groundwater by oil. The liquefaction characteristics of native soils should also be investigated and provisions made to provide negative bouyancy should it be deemed necessary. There is also evidence that the pipeline crosses a fault in Skagit County. The activity of the fault is unknown and will have to be determined so that provisions can be made in the pipeline design to resist forces induced in the pipe by the movement of the earth. Negative bouyancy to prevent pipeline flotation can be provided by weighting the pipeline. Groundwater contamination can be minimized by lining the trench with an impervious material and constructing trench blocks at intervals along the pipeline. The possibility of the existence of these conditions has been addressed in the site certification application documents and are to be investigated in detail in the final design. It is believed that all four of these conditions are of such consequence as to warrant review of the final design and supportive data by the County for assurance that preventative measures have been provided where necessary.

It should also be pointed out that the pipeline passes within 0.5 mile of the Skagit River intake for the City of Anacortes' water supply treatment plant. Should oil enter the river above the plant site, the water supply for the City of Anacortes could be effected.

The proper design and construction of a pipeline, or any engineering project, are both essential to successful completion of the Project. Professional and technical observations during construction assure that the work, when accepted, is substantially in accordance with the contract documents. The responsibility for monitoring the pipeline construction is not addressed in the site certification application documents. Transcripts of Trans Mountain answers to questions posed by the Department of Ecology do make mention of the subject to the extent that (1) "Discussions are now underway with counties regarding construction monitoring. We anticipate that various state and Federal agencies will monitor such things as archaeological resources, state highway crossings and, of course, marine facility," and (2) "Trans Mountain and its contractors will employ personnel for the exclusive purpose of insuring that the pipeline and associated facilities are built to specification. There would be special inspectors for x-ray of welds, tie-ins, backfill, etc. In addition, an environmental inspector will be employed by Trans Mountain to insure that special environmental mitigation measures are incorporated." This is not a clear definition of who will be responsible for construction monitoring. A combination of both would be satisfactory. It is advised that there be an understanding pertaining to the division of these responsibilities prior to start of construction.

In summation, the comments stated herein concerning the construction of the proposed Trans Mountain oil pipeline within Skagit County does not, in our opinion, present any insurmountable problems that cannot be accommodated during final design and construction. It is recommended that the County review the final design of the Trans Mountain pipeline and insist on adequate construction inspection and restoration. There is always the risk of

Leonard and Boudinot Inc.

(5)


April 29, 1981

an oil spill occurring from a facility in spite of preventive measures. However, the impacts can be greatly mitigated when the "state of the art" for oil pipeline construction is applied to the design and during construction. This is evidenced by the successful record of many miles of existing oil pipelines throughout the United States.

If we can be of further assistance in answering any questions that the Commissioners may have, please advise.

Very truly yours,

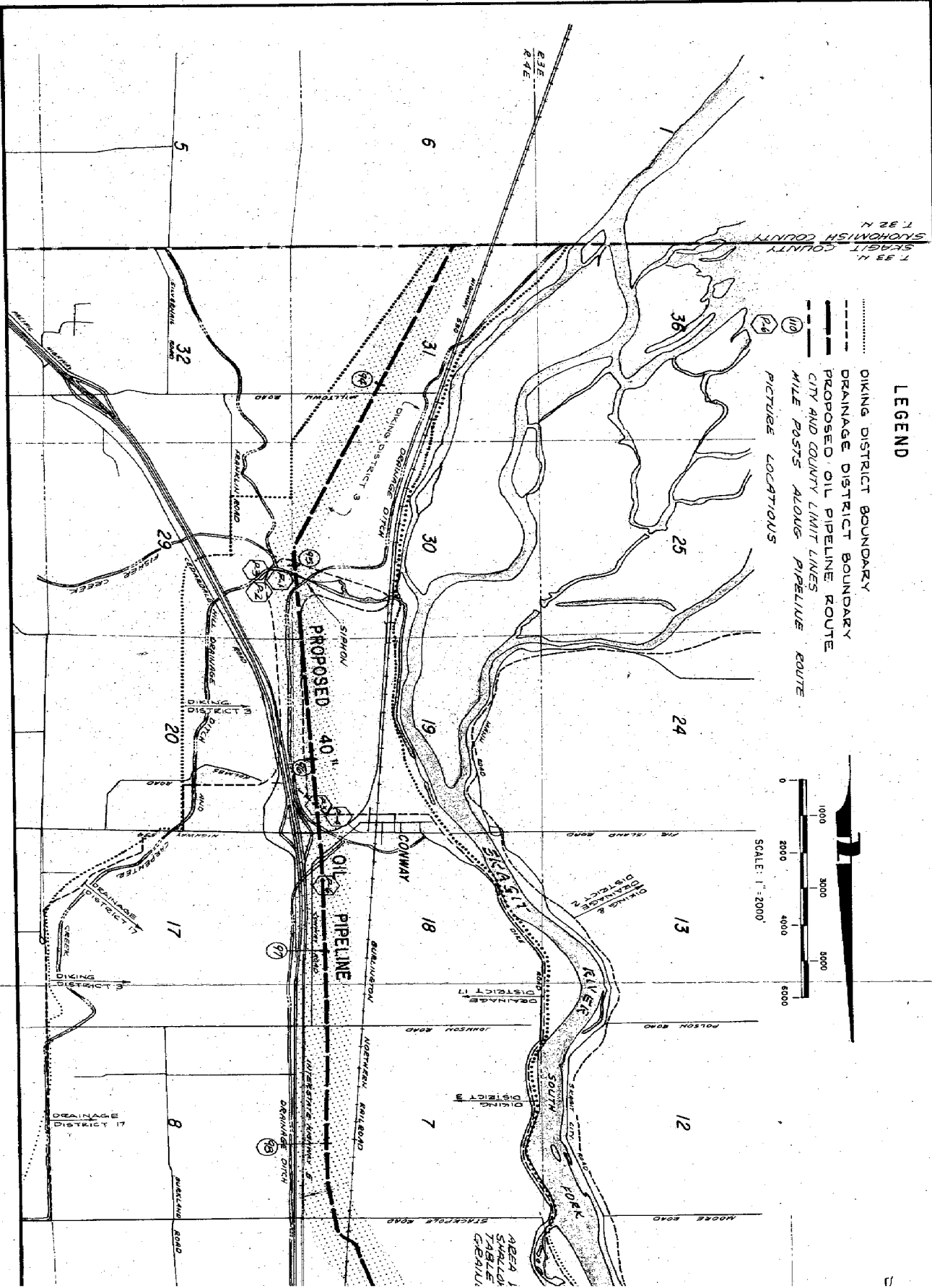
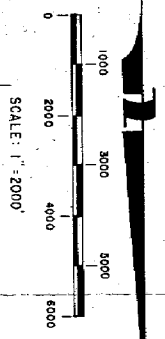
R. W. BECK AND ASSOCIATES


Ray F. Scoffield
Principal Engineer

RFS/bb

LEGEND

- DIKING DISTRICT BOUNDARY
- DRAINAGE DISTRICT BOUNDARY
- PROPOSED OIL PIPELINE ROUTE
- CITY AND COUNTY LIMIT LINES
- MILE POSTS ALONG PIPELINE ROUTE
- ⊙ PICTURE LOCATIONS



AREA 1
SHALL
TABLE
GRAVITY

1000

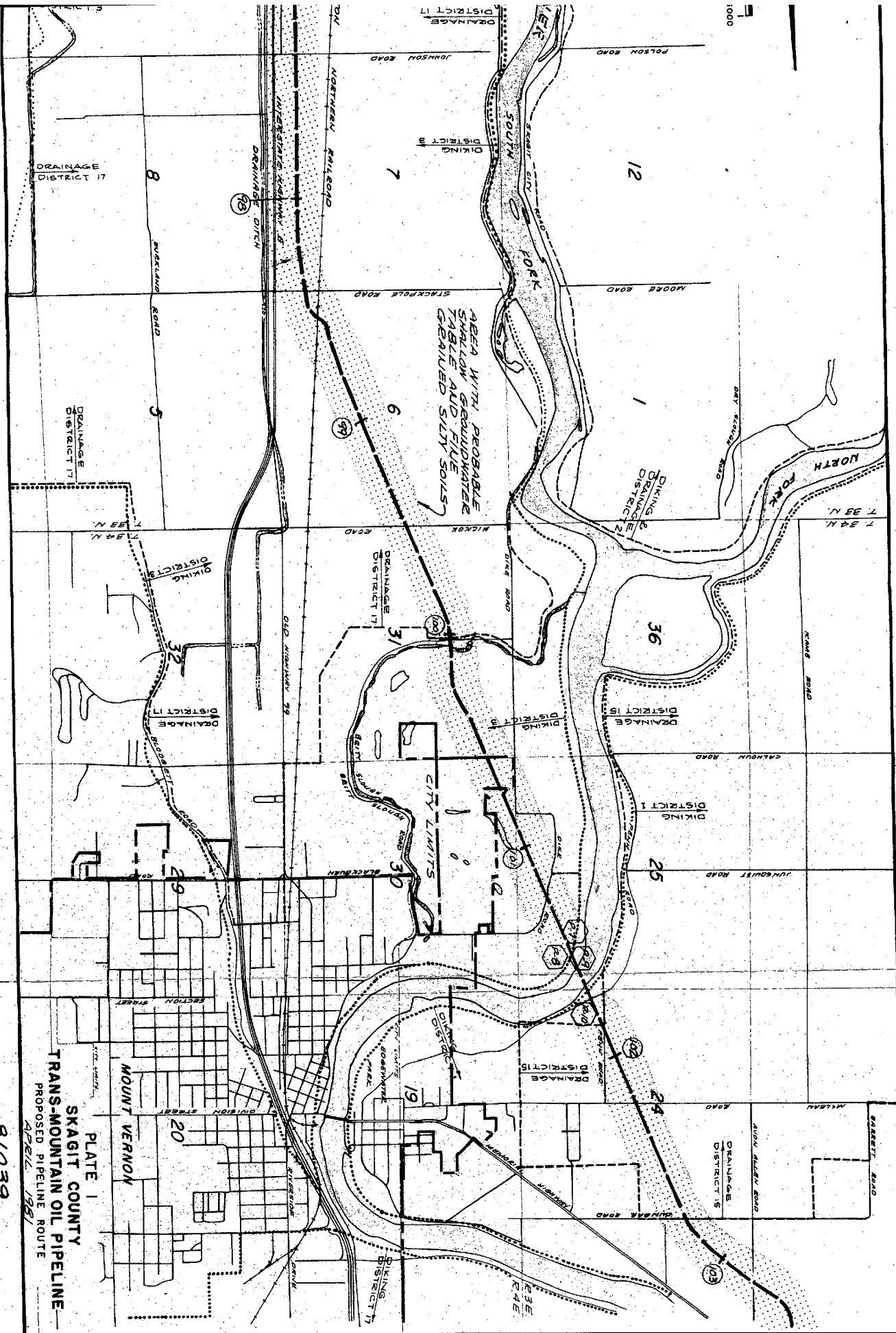
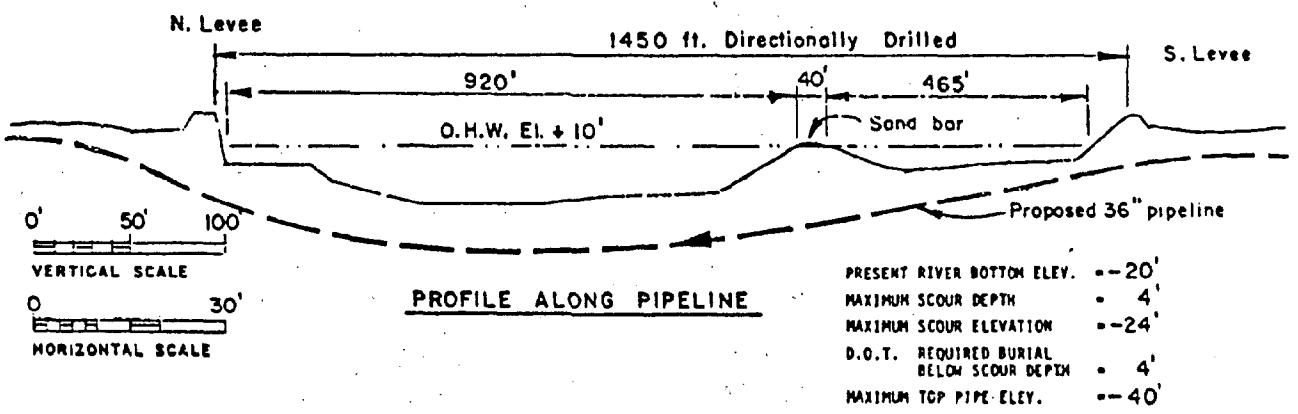
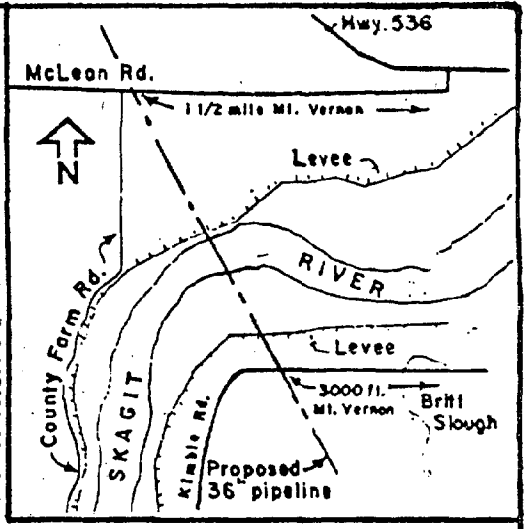
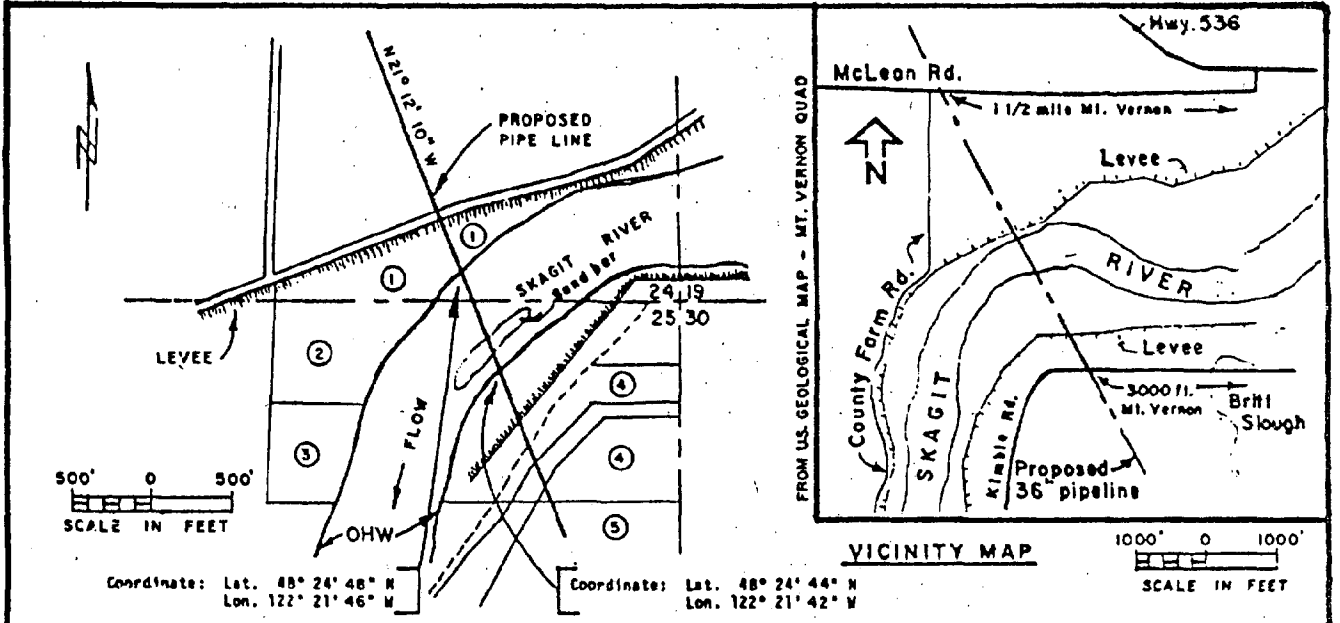


PLATE I
 SKAGIT COUNTY
 TRANS-MOUNTAIN OIL PIPELINE
 PROPOSED PIPELINE ROUTE
 APRIL 1961

81039



- NOTES**
1. Proposed 36" pipeline to be installed by directional drilling.
 2. Approximate excavation volume 400 cu. yds.
 3. Excavated material to be placed on uplands.

071-OYB-2-006531

PURPOSE: To transport crude oil from storage area at Low Point in Washington to inland refineries and to refineries in Puget Sound.

DATUM: M.G.V.D. = 0.0' (1929)

ADJACENT PROPERTY OWNERS:

1	M. F. M. Kurth	3	Norman J. Brann
2	Ralph Oosterhoof	4	Edna Stredge
		5	Edward Lundgren

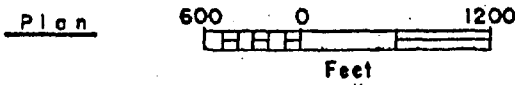
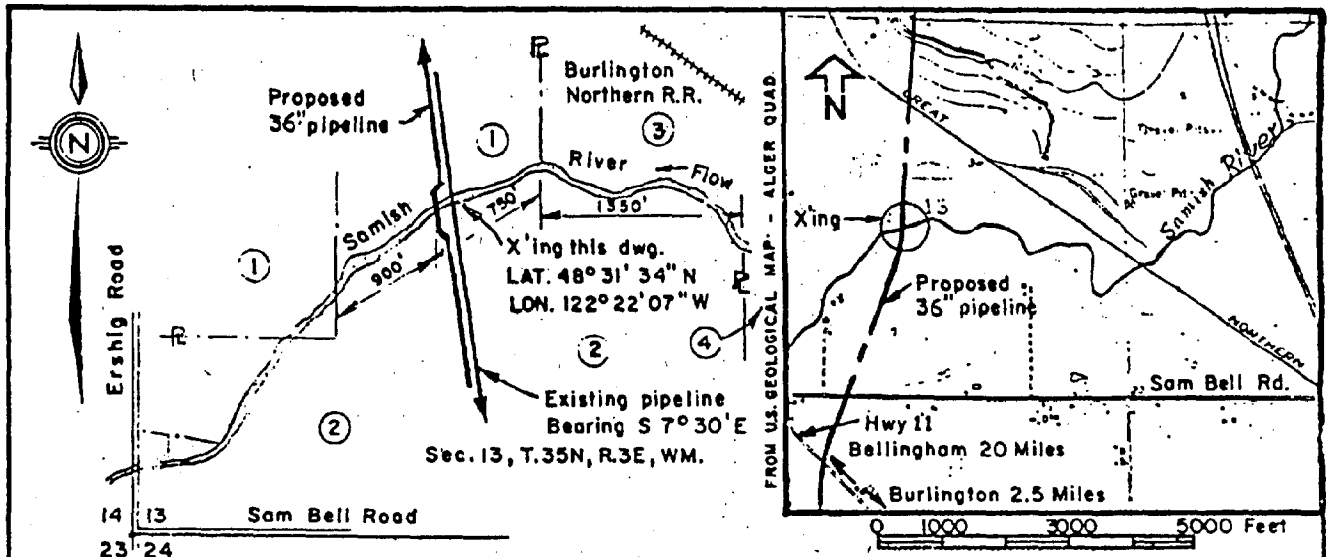
PROPOSED SUBMARINE PIPELINE IN SKAGIT RIVER, NEAR MT. VERNON

PIPELINE MILE 101.6 (RIVER MILE 8.5)

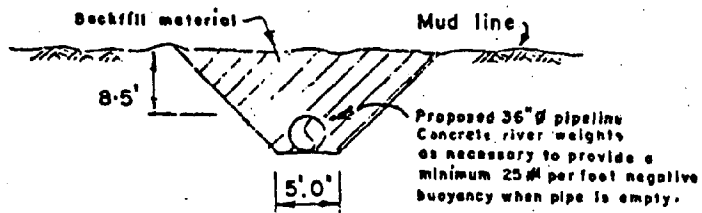
COUNTY OF SKAGIT STATE OF WASHINGTON

APPLICATION BY TRANS MOUNTAIN OIL PIPE LINE CORPORATION

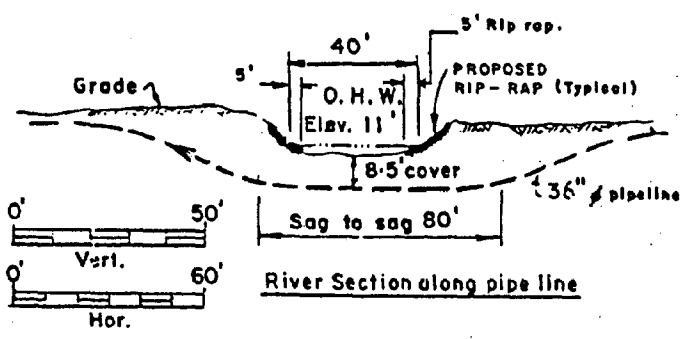
SHEET 6 OF 14 DATE: 10 April, 1980
Rev: 17 Feb. 1981



VICINITY MAP



No scale Section thru trench



River Section along pipe line

NOTES:

1. PROPOSED 36" PIPELINE TO BE RUN PARALLEL TO AND 100 FT. FROM EXISTING 20" PIPELINE WITHIN THE CROSSING.
2. R - PROPERTY LINE
3. EXCAVATE TRENCH WITH BACKHOE, DRAGLINE & CLAMSHELL.
4. APPROX. EXCAVATION VOLUME = 600 c.y. CONSISTING OF SAND, GRAVEL, COBBLES & OCCASIONAL BOULDERS. APPROX. BACKFILL VOLUME = 570 c.y.
5. EXCAVATED MATERIAL TO BE USED FOR BACKFILL. EXCESS MATERIAL TO BE PLACED ON UPLANDS.
6. PLACE RIP RAP ON NORTH & SOUTH BANK TO A MINIMUM THICKNESS OF 2 FT. AND EXTEND ACROSS WIDTH OF CONSTRUCTION DISTURBED AREA TO A MAXIMUM 100 FT. APPROX. RIP RAP VOLUME = 400 c.y.

PRESENT SLOUGH BOTTOM ELEV.	+ 8'
MAXIMUM SCOUR DEPTH	+ 4.5'
MAXIMUM SCOUR ELEVATION	+ 3.5'
D.O.T. REQUIRED BURIAL BELOW SCOUR DEPTH	+ 4'
MAXIMUM TOP PIPE ELEV.	- 0.5'

Purpose: To transport crude oil from Low Point, WA., to inland refineries.

Datum: N.G.V.D. = 0.0' (1929)

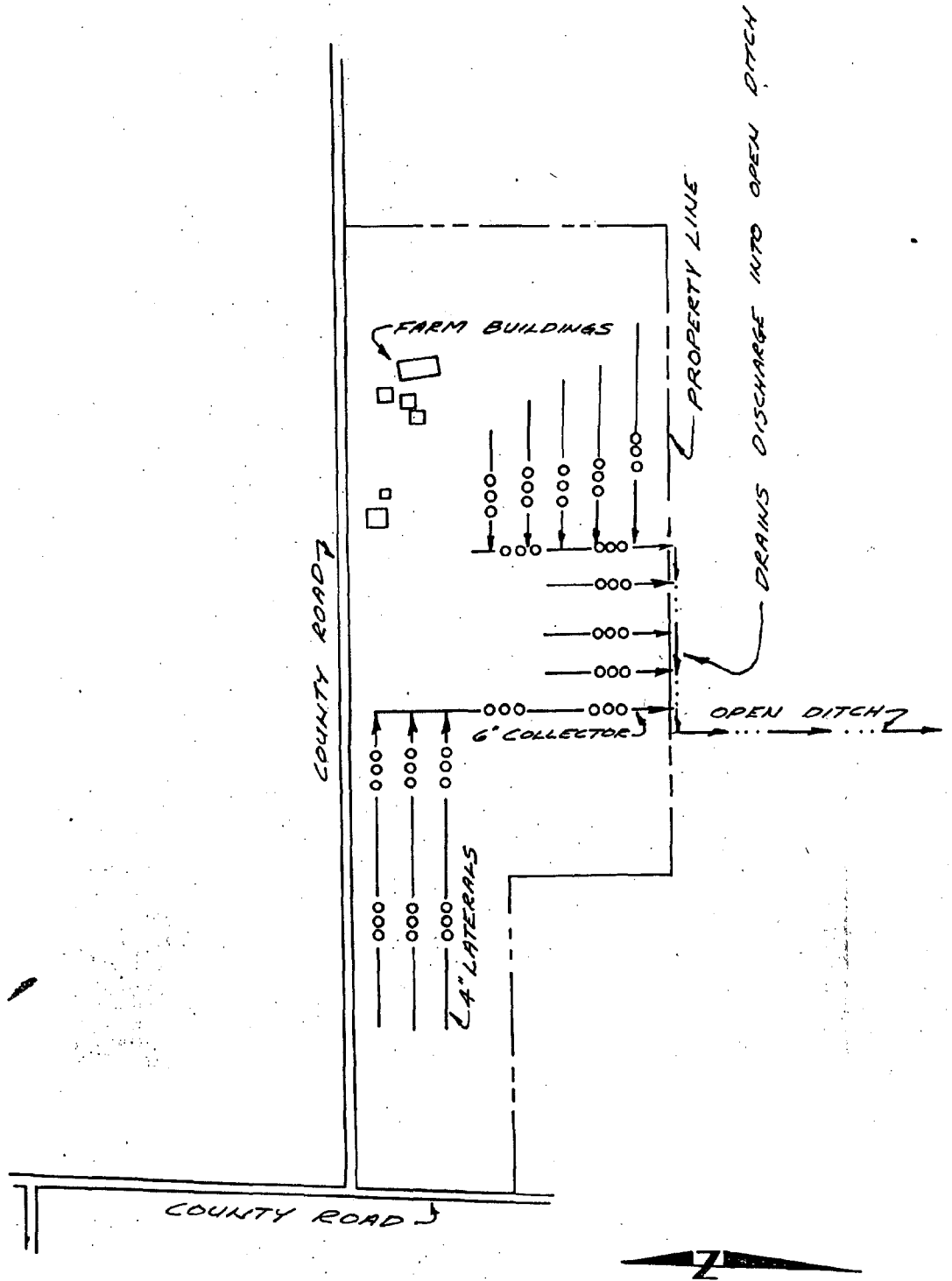
ADJACENT PROPERTY OWNERS

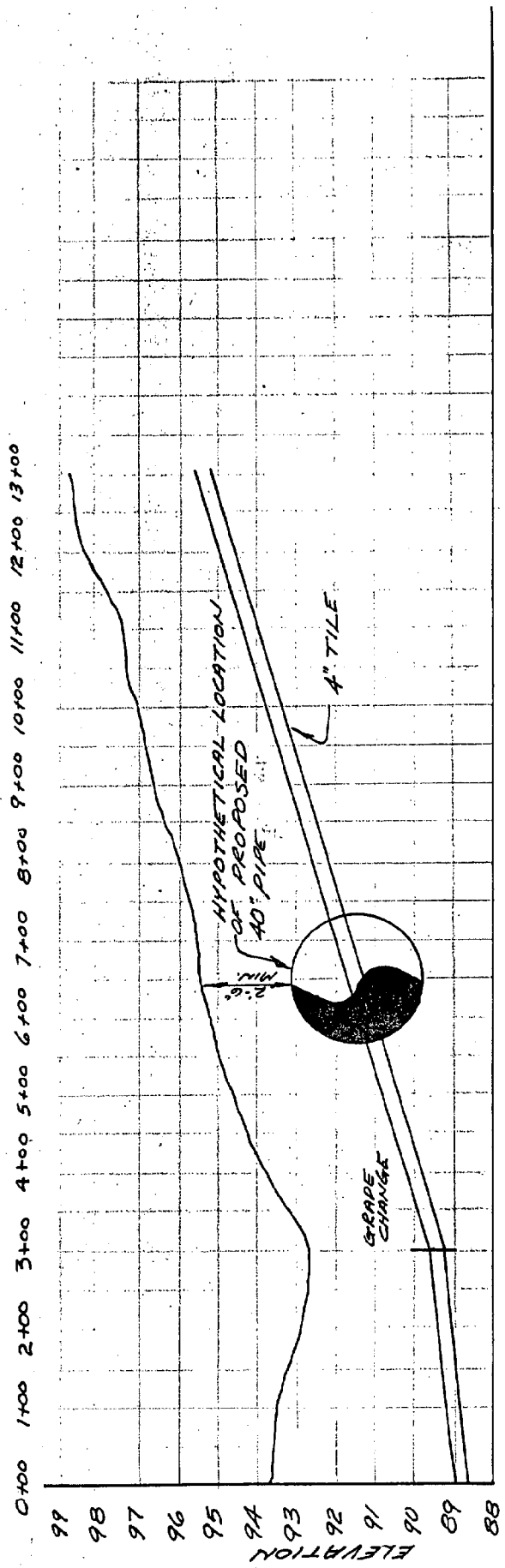
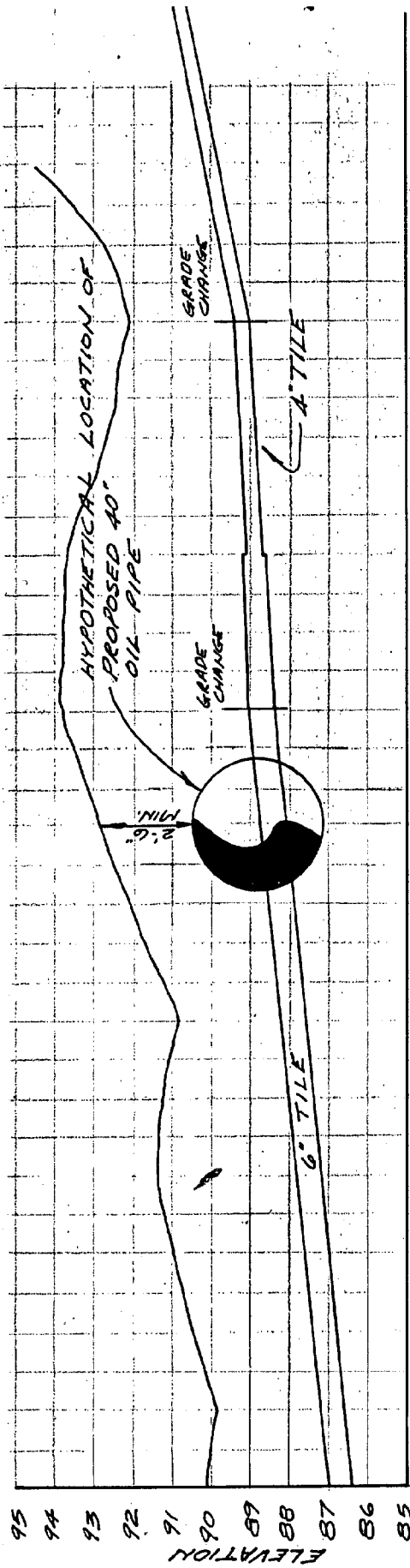
- | | |
|------------------|-----------------|
| 1 Robert Hills | 3 Elvin Sandell |
| 2 Monica O'Bryan | 4 Einar Kuntzen |

071-0YB-2-006531

PROPOSED SUBMARINE PIPELINE IN SAMISH RIVER, NEAR ALGER
 PIPELINE MILE 111-2 (RIVER MILE 6.1)
 COUNTY OF SKAGIT STATE OF WASHINGTON
 APPLICATION BY TRANS MOUNTAIN OIL PIPE LINE CORPORATION
 SHEET ...7... of 14. DATE: 10 April, 1980
 REVISED: 10 Mar. 1981

TYPICAL FIELD TILE DRAINS
PLAN





TYPICAL FIELD DRAIN PROFILES

SKAGIT COUNTY PUBLIC WORKS DEPARTMENT

County Administration Building • P.O. Box 396 • Mount Vernon, WA 98273

W. Eugene Sampley, P.E.
Director

(206) 336-9400

Judith A. LaFollette
Asst. Director
Permit Center

(206) 336-9410

John B. Ensley
Asst. Director
Operations

(206) 755-9531

Jack C. Rafter, P.E.
Asst. Director
Engineering

(206) 336-9400

April 23, 1981

Leonard and Boudinot, Inc.
P. O. Box 327
Burlington, WA 98233

Re: Proposed Trans Mountain Oil
Pipeline

Dear Bob:

The following is a list of our comments pertaining to the above referenced project.

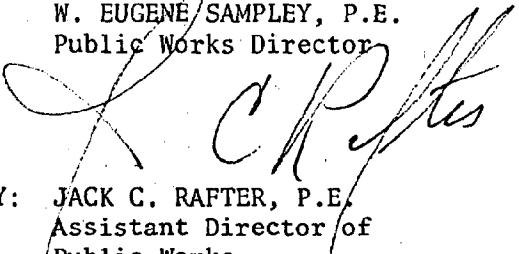
1. Since this pipeline crosses several county roads, we should alert the pipeline company of the following:
 - a. Roads that can be open cut.
 - b. Requirements for repairing roadway.
 - c. Road closure procedure.
 - d. Traffic control.
 - e. Permit franchise requirements.
2. The pipeline crosses Dike District 1 and 3 and they will have certain requirements for going through their dikes.
3. The pipeline will also cross some drainage district ditches. I am sure they will have some concerns.
4. We have always had good cooperation with Trans Mountain but we have had problems with other line owners. When the line is placed across open areas, it is placed close to the ground surface and all requests to cross the line have to be approved by the utility. This is fine if you assume the utility will cooperate and negotiate an agreement mutually acceptable. This has not always been the case and if they will not cooperate, the utility has

Leonard and Boudinot, Inc.
April 23, 1981
Page 2

unreasonable control of land use on and across their easement as well as the adjoining property.

Very truly yours,

W. EUGENE SAMPLEY, P.E.
Public Works Director

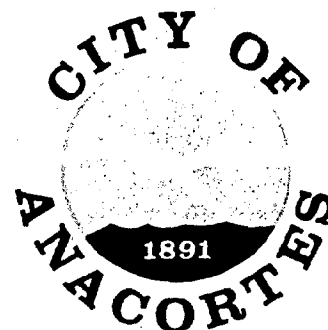


BY: JACK C. RAFTER, P.E.
Assistant Director of
Public Works

JCR:bjs

CITY OF ANACORTES, WASHINGTON
98221

April 17, 1981



Mr. John Leonard
Leonard & Boudinot, Inc.
612 East Fairhaven
Burlington, WA 98233

RE: Trans-Mountain Pipeline

Dear John:

Enclosed are utility maps showing the area where the proposed Trans-Mountain Pipeline will cross the City's 36" and 24" transmission lines in the vicinity of Bennett Road and Memorial Highway.

This letter also will acknowledge our meeting with you of April 15, 1981, to discuss possible problems and/or solutions for the proposed crossing. I would like to offer the following comments with regard to the proposal:

1. In reviewing the proposed project with you and considering the location of the pipeline in regards to the river, river dikes, and the City's intake structure, it appears that a possible oil spill from a break in the pipeline would not become a major problem to the City.
2. An area of concern is possible electrolysis and deterioration of our pipelines from being in close proximity to the Trans-Mountain lines. This would be especially true if Trans-Mountain protects their pipelines with a cathodic protection device. Even the close proximity of the pipelines, while of similar material, could set up possible differences in electrical potential. I would request that upon completion of the project (assuming it is built) that Trans-Mountain have a recognized corrosion engineer or engineering firm test the potential between the pipelines and provide a letter to my office assuring the City that no electrolysis potential exists or if it does exist what measures will be taken to mitigate the problem.
3. Another concern that we have is with puncturing of our waterlines during the installation of the Trans-Mountain line. Both the 24" and 36" pipelines operate at pressures between 150 and 180 PSI and provide water to three cities including the City of Anacortes, two oil refineries, and NAS Whidbey on Whidbey Island. Prior to making the crossing, we would require

ADMINISTRATION
P.O. BOX 547
(206) 293-5171

FIRE DEPARTMENT
1011 12TH STREET
(206) 293-5171

POLICE DEPARTMENT
1011 12TH STREET
(206) 293-5171

PUBLIC LIBRARY
1209 9TH STREET
(206) 293-2700

MUSEUM OF HISTORY
1305 8TH STREET
(206) 293-5171

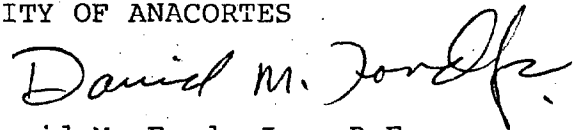
Mr. John Leonard
April 17, 1981
Page 2

that the exact depth of both pipelines be determined by physical excavation of the lines. A representative of the City's Public Works Department is to be present when the excavation is made. City personnel will physically locate the horizontal alignment of both pipelines.

I hope the above and the enclosed provide you with the information necessary to proceed with your investigations. If you have any questions or require additional data or wish to discuss the project further, please let me know. Any new information which you might receive or additional progress on the project, I would be interested in knowing.

Sincerely yours,

CITY OF ANACORTES

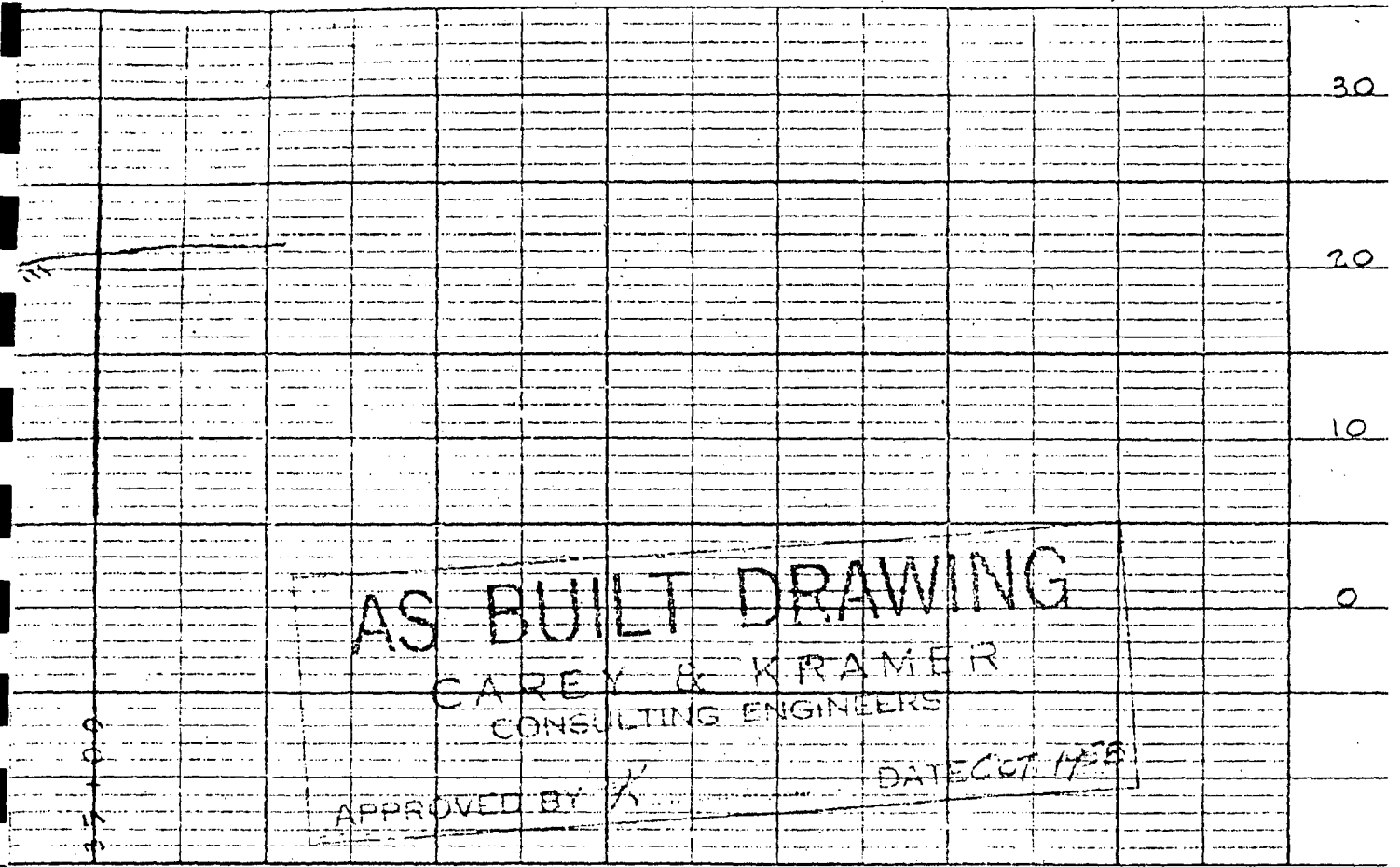


David M. Ford, Jr., P.E.
Director of Public Works

DMF:sg

Enclosures

cc: Robert Olander
Bruce Bell

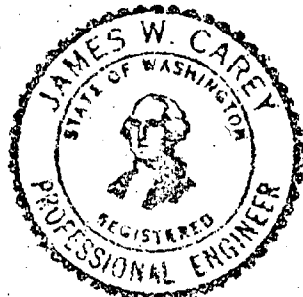


AS BUILT DRAWING

CAREY & KRAMER
CONSULTING ENGINEERS

APPROVED BY *[Signature]* DATE *[COT 11/58]*

MATCH LINE NO. 3
CONT. FROM ABOVE



CITY OF ANACORTES
IMPROVEMENTS TO WATER SUPPLY SYSTEM
UNIT NO 7

SCHEDULE "C"
AVON PIPE LINE SECTION
PLAN & PROFILE - STA. 38+08 TO 45+00

CAREY AND KRAMER
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

REVISIONS

DES. BY: J.T.S.
DWN. BY: J.T.S.
CHK. BY:
APPV. BY: *[Signature]*

DATE:
APR 14 1958
SCALE: VERT. 1"=10'
HORIZ. 1"=40'

DRAWING NO
5805-08

35+00

AVON SECT

STA 38+08

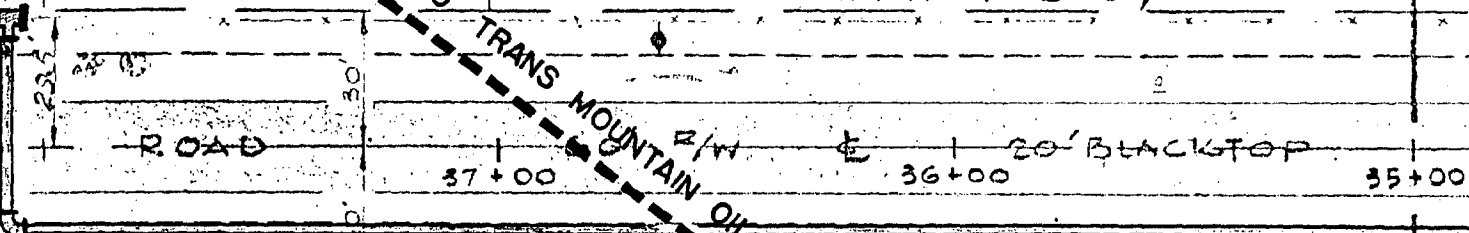
38+00 36+00 37+00

FOR REQUIREMENTS AS TO SCHEDULING & TIME ALLOWED TO MAKE CONNECTIONS SEE SPECS

FOR CROSSOVER AND CONNECTION TO EXIST. 24" PIPE LINE AT STA. 38+08 SEE DET. DWG NO. 5805-

R.P. - STA. 36+55

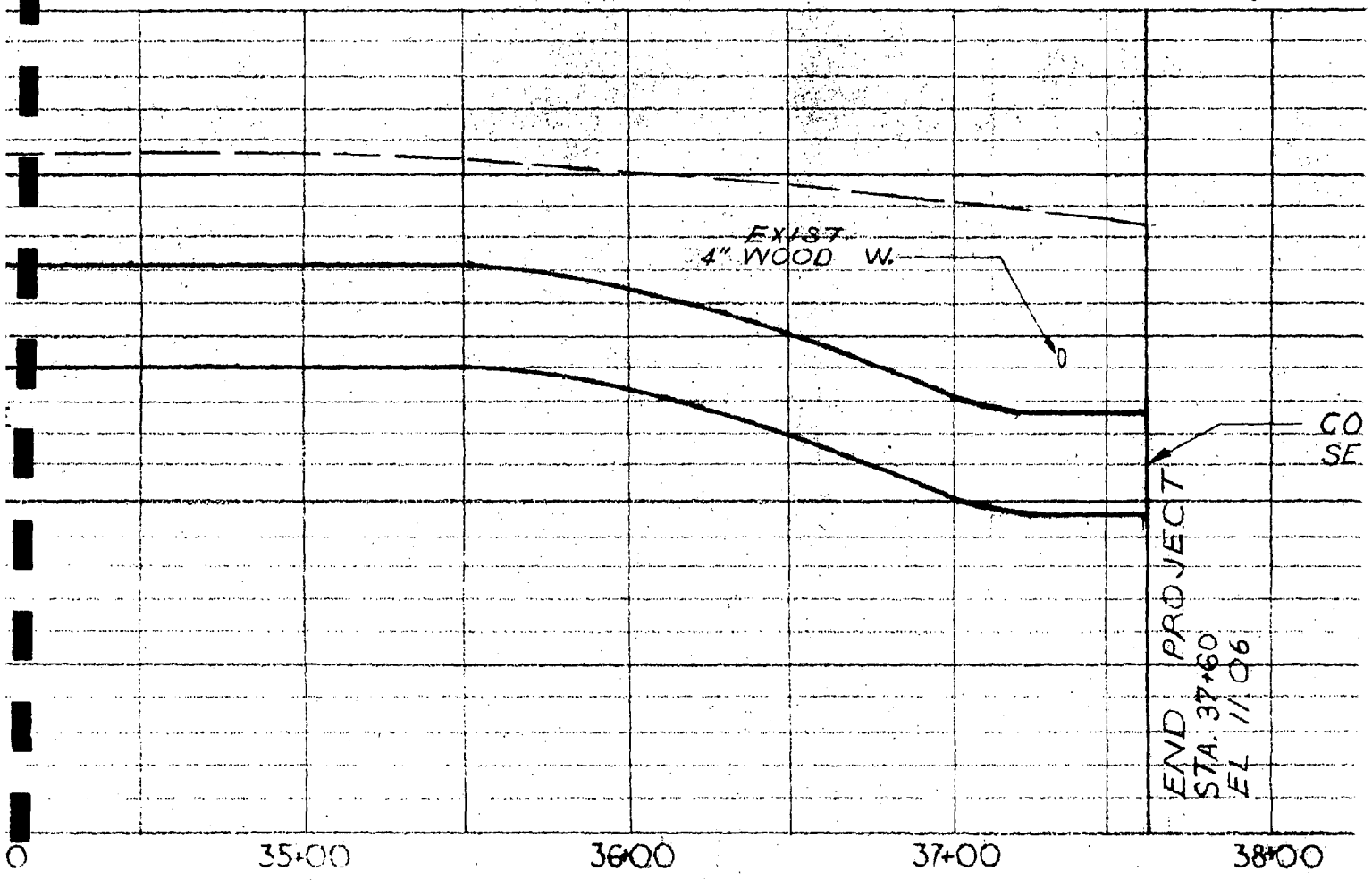
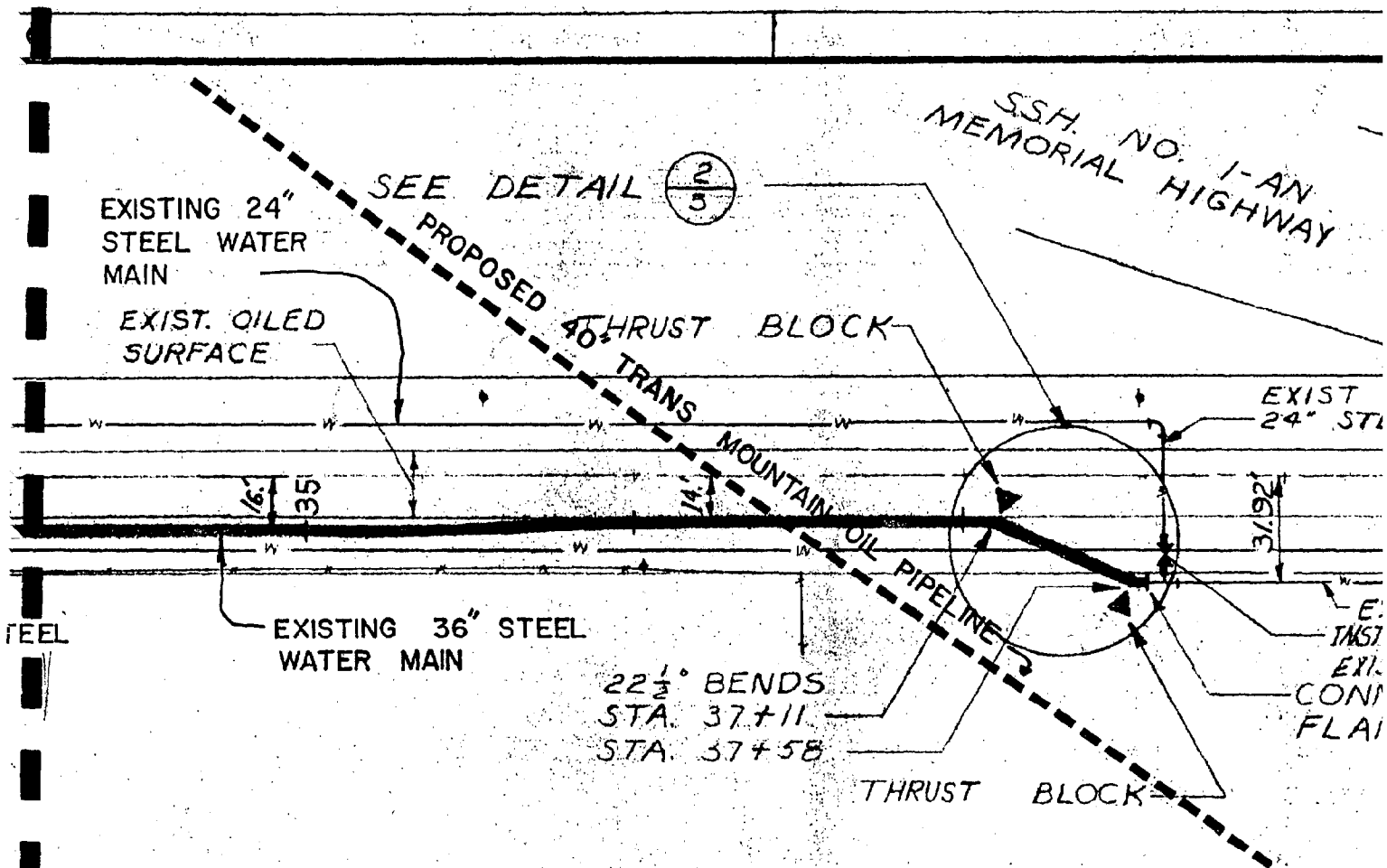
MATCH LINE NO. 3 CONT. FROM ABOVE



SCHD. C CONTR. LIMIT

EXACT LOCATION, ELEVATION, & O.D. OF EXIST. 24" PIPE AT STA. 38+08 TO BE DETERMINED BY CONTRACTOR IN THE FIELD.

EXIST. WATER SUPPLY LINE - 24" ST. NORTH R/W LINE



City of **Mount**

Post Office Box 809

Vernon, Washington 98273 • Telephone 336-6585

RUTH E. GIDLUND, MAYOR
MICHAEL WOODMANSEE, CITY TREASURER
DON SEMRAU, CITY ENGINEER
LARRY MOLLER, CITY ATTORNEY
RONALD MAYNOCK, BUILDING OFFICIAL

May 18, 1981

Leonard & Boudinot, Inc.
612 East Fairhaven Avenue
Burlington, Washington 98233

ATTN: Bob Boudinot

RE: Trans-Mountain Oil Pipeline

Dear Bob:

This letter is to confirm our conversation of April 13, 1981, concerning your review of the E.I.S. for the proposed Trans-Mountain Pipeline.

The pipeline as proposed would include approximately 750 feet in length through property owned by the City of Mount Vernon and recently annexed to the City. Olympic Pipeline also has a pipe within an easement over this City property.

You mentioned the construction plan includes double ditching through agricultural property. Said City property is in agricultural use and will most likely remain in this use. We would most certainly be interested in preserving the agricultural topsoil. The City property is now leased to a farmer for cropping, so any proposed construction will have to be preceded by an agreement for crop damage.

As I understand it, there are no detail design plans available at this time, however, the proposed minimum depth to the top of the pipe is to be 40". This depth would be acceptable.

The City wishes to use this property for municipal sludge disposal so we will be concerned about backfill of the pipeline trench as that might relate to ground water quality and leachates.

Sorry to be so slow in sending you this letter. It was an easy one to set aside and you did not keep calling me.

Sincerely,



Don Semrau, PLS & PE
City Engineer

DS:ch

William A. Roozen, Commissioner
Dike District No. 1
1599 Beaver Marsh Road
Mount Vernon, WA 98273
April 21, 1981

Mr. John Leonard
Leonard and Boudinot, Inc.
P.O. Box 327
Burlington, WA 98233

Reference: Trans Mountain Pipeline

Dear Mr. Leonard:

This letter is to reiterate the concerns we expressed at our meeting of April 15, 1981, with you, Robert Boudinot, and Dike District No. 1 Commissioners, Bill Roozen, Tom Shane, and Robert Dean. We are very concerned that residents in our Dike District are protected at all times from any failure or disruption of the dikes along the Skagit River. We would like Trans Mountain Oil Pipeline Corporation to be put on notice at this time that we will impose certain requirements to protect our dikes and that we have the following questions for which we request an answer.

1. Question: Why can't Trans Mountain Oil Pipeline Corporation use the same right-of-way that Olympic Pipeline uses, thereby having only one right-of-way through the county rather than two?
2. Question: How far back from the outside of the dikes will the boring procedure take place? The cross section indicates drilling from edge of dike to edge of dike. This could endanger our dikes.
3. Question: What is the name, address, and office phone number of the chief executive officer of Trans Mountain Oil Pipeline Corporation?
4. In our opinion steel baffle plates around the pipe should be installed at each end of the pipeline crossing. If baffles are not proposed, we would like a full explanation.
5. If our dikes are cut for any reason, we will demand that the opening not exceed a 48 hour period.

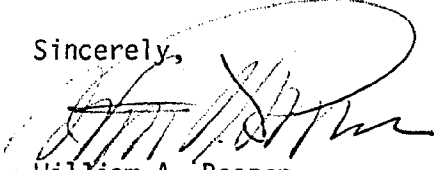
Mr. John Leonard
Page 2
April 21, 1981

6. If the dikes are cut, we will require that a D-8 bulldozer or equal in good condition be at the site one day prior to the dike opening, all during the operation, and one day after the dike cut.
7. If the dikes are cut, the dozer operator shall be available on a one hour call basis for one day prior to, during, and one day after the dike opening.
8. The dike will be repaired with material and construction conforming to State of Washington specifications, including 96 percent compaction and a clay core.
9. Any riprap disturbed will be replaced with two foot diameter or greater riprap rock choked with two inch crushed rock.
10. The surface of the disturbed dike will be covered with adequate topsoil and seeded with pasture mix at 20 pounds per acre.
11. The Dike District must have hold harmless agreement from the Trans Mountain Oil Pipeline Corporation and the pipeline contractor or contractors.
12. If a dispute arises between Trans Mountain Oil Pipeline Corporation and Dike District No. 1, Trans Mountain Oil Pipeline Corporation shall agree to pay all legal fees for the litigation.
13. The Dike District will have a professional engineer inspecting all construction work in the vicinity of the river crossing. This engineering time will be paid for by Trans Mountain Oil Pipeline Corporation. It is also to be emphasized that the Dike District will choose their inspecting engineer.

The above points should not be considered our only concerns. I am sure that additional points will be considered as your design proceeds.

In summary, Dike District No. 1 is not looking for any compensation due to this project, but are seeking the total protection for the people within the Dike District. This is the job we are charged with and we will do our utmost to fulfill our responsibility.

Sincerely,



William A. Roozen
Dike District Commissioner

Richard Smith, Commissioner
Dike District No. 3
1849 Dike Road
Mount Vernon, WA 98273
April 24, 1981

Mr. John Leonard
Leonard and Boudinot, Inc.
P.O. Box 327
Burlington, WA 98233

Reference: Trans Mountain Pipeline

Dear John:

Thank you for the meeting with myself and Mr. Olson regarding the Trans Mountain Pipeline route through our Dike District No. 3. From our past experience with other pipeline construction projects through our district, we are quite familiar with the problems that the construction of this large pipeline will encounter. I would like to point out the following concerns:

1. Regardless of the method of construction across the Skagit River, whether it be drilled or open cut, we will require two seepage barriers within our dike area on the pipe. If the pipeline is drilled under the river as proposed, there is no way of knowing the final diameter of the hole excavated under the dike, so pipe must be exposed and barriers installed.
2. We note from the plans that the pipe is not very deep under the dike and may need to be deeper at that point.
3. There is a surface crust on the soil through this general area of 5 to 6 feet, below which you will encounter quicksand. Any excavation within that quicksand area is extremely difficult and causes large cave-in areas. Olympic Pipeline encountered severe difficulty crossing underneath Old Highway 99 at the time they constructed their pipeline.
4. We would recommend the pipeline be routed next to the railroad between Conway and the Stackpole Road.
5. At Fisher Slough, we wish to point out that the pipeline must be quite deep under the bottom of the slough, since maintenance of that slough requires use of a drag line for excavation of sediment. We want the pipeline deep enough to allow that maintenance excavation to continue.
6. Trans Mountain Pipeline must be aware that crossing Fisher Slough will require working within the quicksand area below the surface

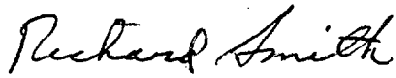
Mr. John Leonard
Page 2
April 24, 1981

crust which will probably pose more difficulty than is expected. Depending upon the success of that boring operation, we may require that seepage barriers be installed on each side of the slough crossing.

7. We do not want above ground structures on any of the dikes.
8. There shall be no construction at the Fisher Slough crossing or the Skagit River prior to June 15 or after October 15. It is very important that the integrity of this dike be maintained at all times during the period of potential flooding.

The foregoing items are the main concerns which come to mind at this time and should not be taken as our only items of concern. Prior to any construction at Fisher Slough or the Skagit River, the proper agreement must be prepared and signed by our district commissioners and the Trans Mountain Pipeline Company. We do not look forward to having this pipeline crossing our farms within the district, but we realize that other routes out of the farmland are probably impractical.

Sincerely,


Richard Smith



**Continental Telephone
of the Northwest**

Engineering Department
P.O. Box 579
Mount Vernon, Washington 98273

April 24, 1981

Leonard and Boudinot Inc.
612 E. Fairhaven Ave.
Burlington, Wash. 98233

Attention Bob Boudinot

Gentlemen:

Our company suggests that most conflict with our facilities would be avoided if the proposed Trans-Mountain pipeline was at a minimum 48" depth.

It appears roughly that the line may cross our cables in about ten locations. There may also be several poles requiring relocation.

I hope this information may be of use. Again, thanks for the advance notice of the project.

Sincerely,

Bob Knight
Dist. Engineering Mgr.

BK/pa



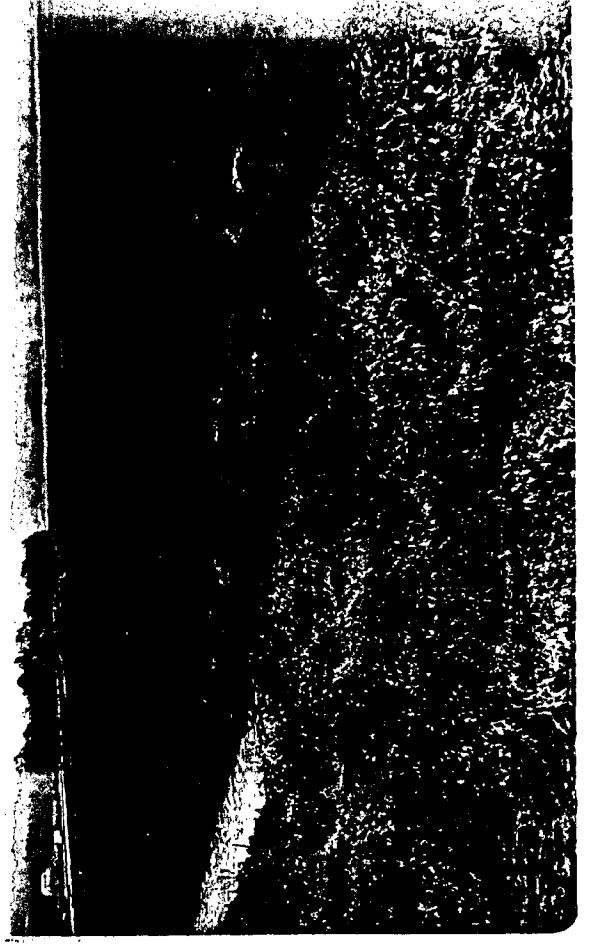
P-1 Dike District No. 3 dike along Fisher Slough MP 95.1

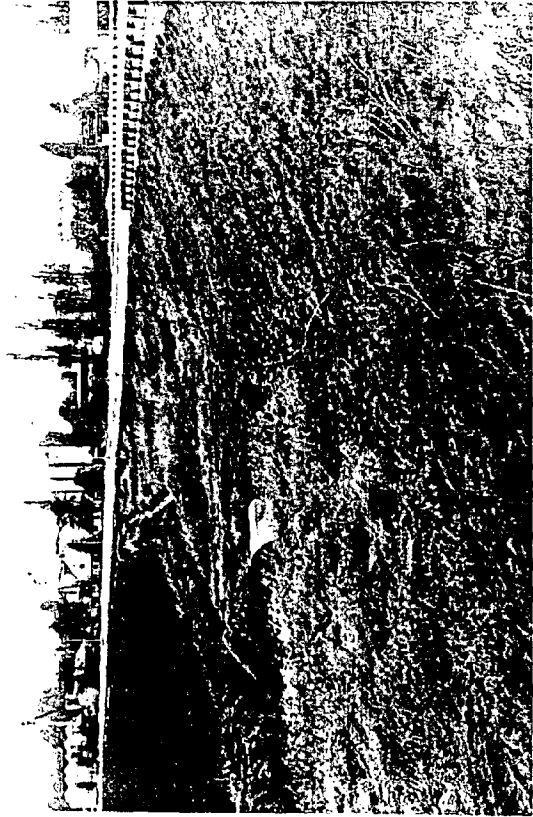
P-3 Fisher Slough MP 95.1



P-2 Fisher Slough MP 95.1

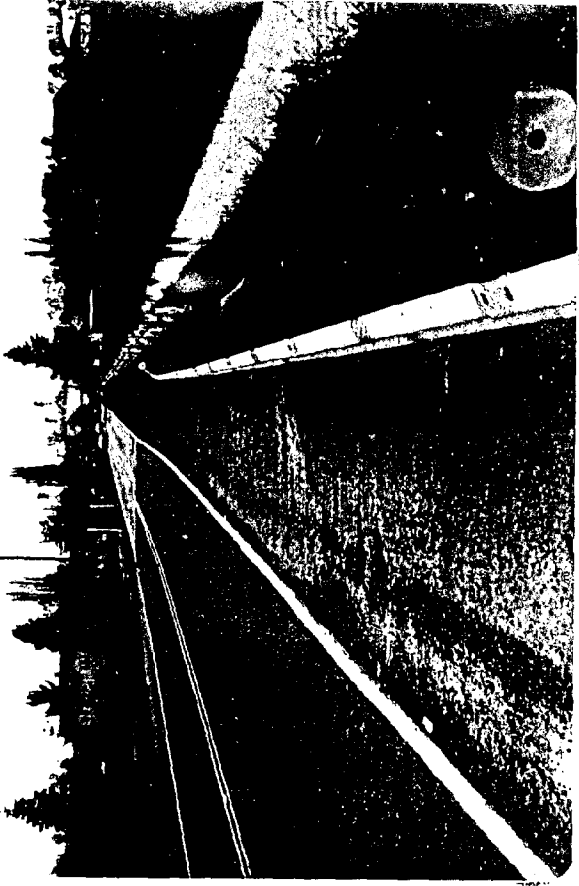
P-4 Drainage District No. 17 ditch southwest of I-5 Conway Interchange MP 96.3





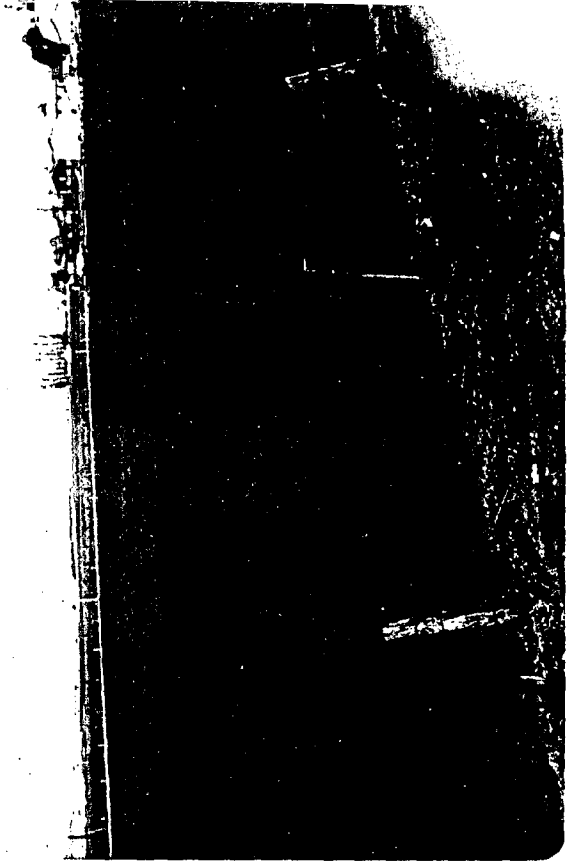
P-5 Culvert in Drainage District No. 17 ditch southwest of I-5 Conway Interchange MP 96.3

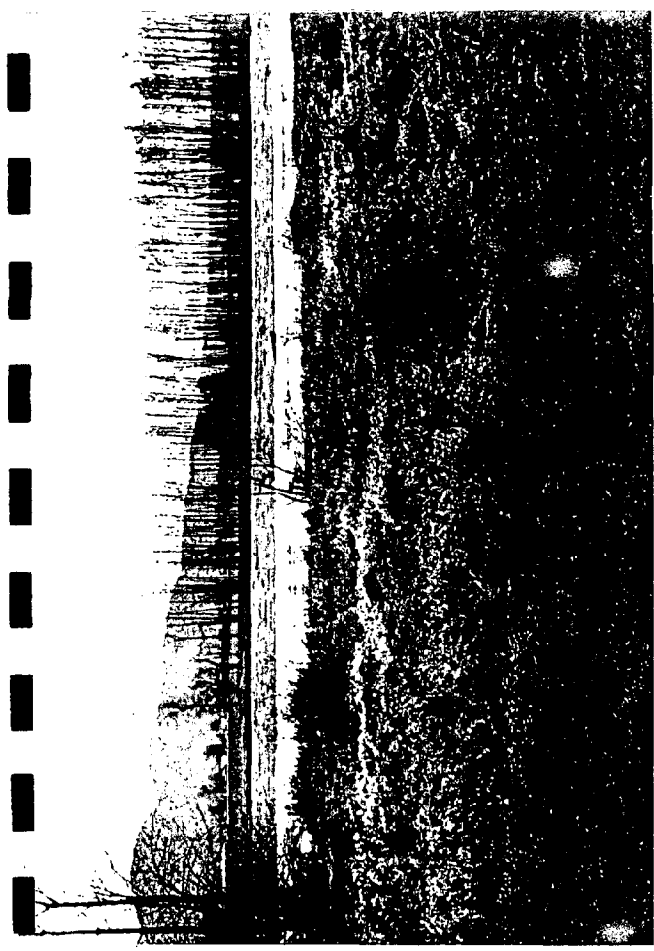
P-7 Dike District No. 3 dike south of Skagit River MP 101.4



P-6 Drainage District No. 17 ditch west of I-5 MP 96.5

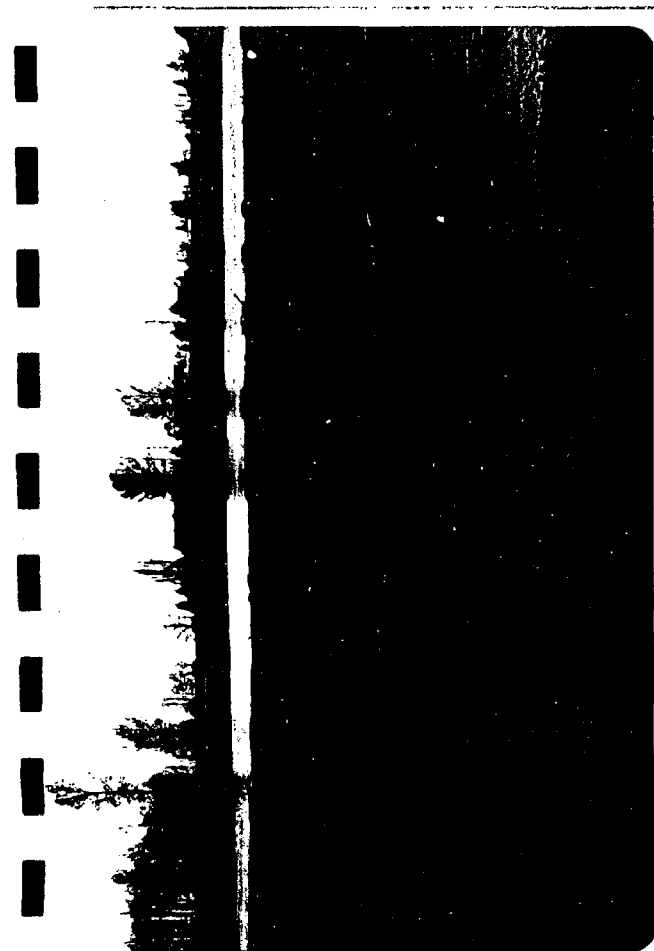
P-8 Location of boring pit south of Skagit River MP 101.





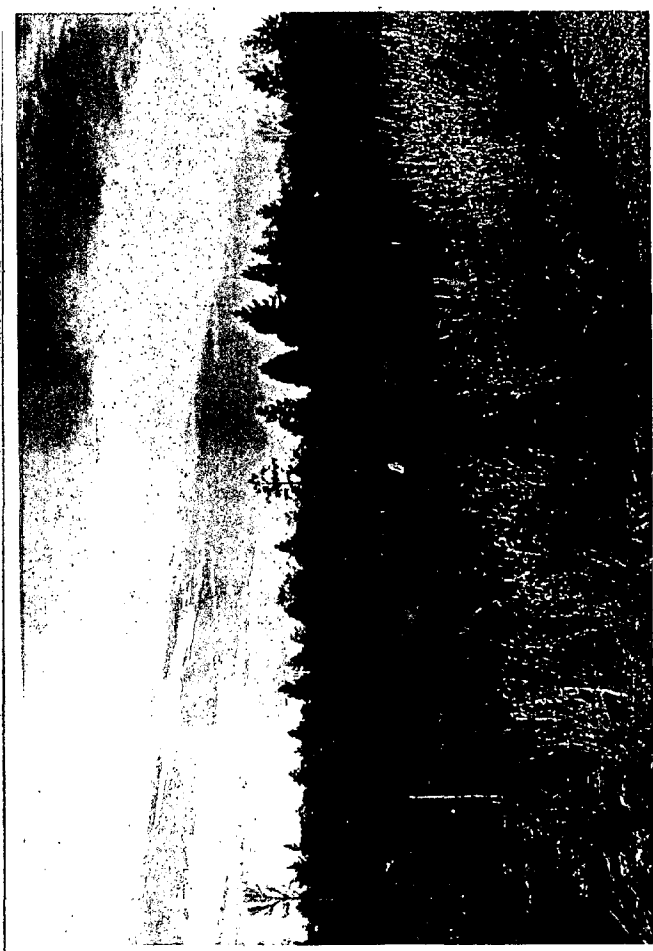
P-10 Skagit River crossing looking south MP 101.7

P-12 Burlington tank farm site to south of Ovenell Road
(left of road in picture)



P-9 Skagit River crossing looking north MP 101.6

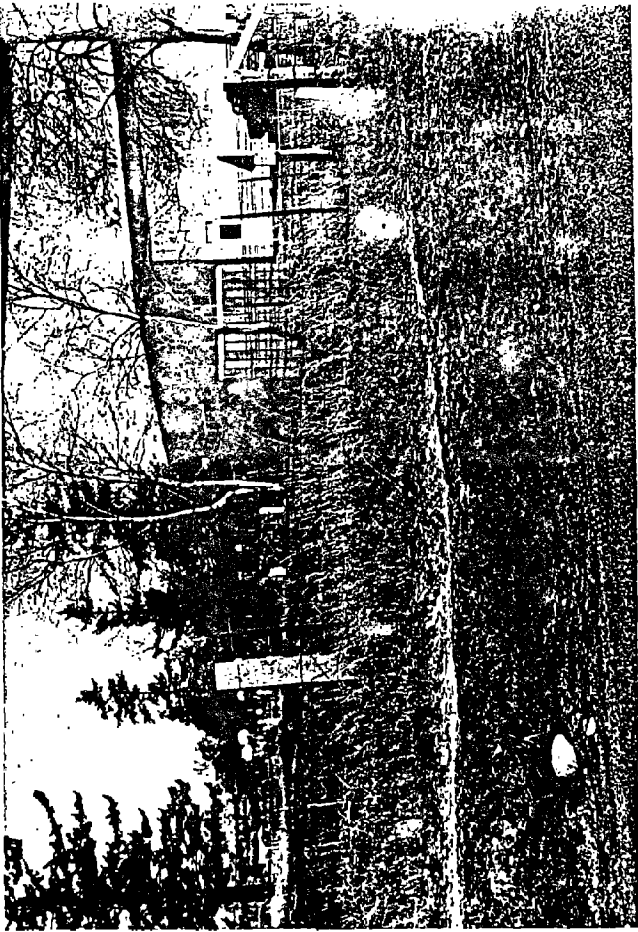
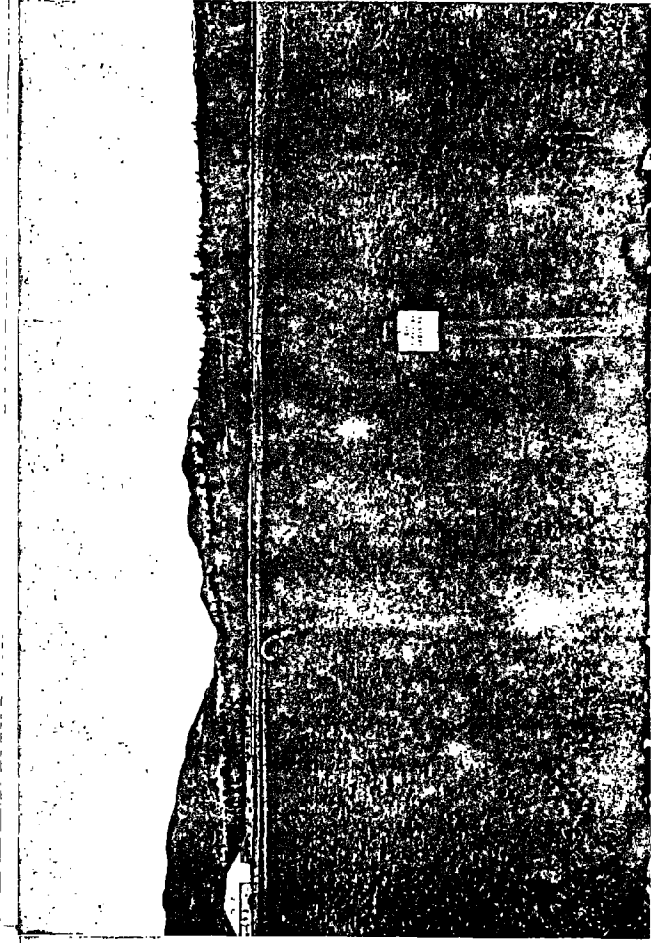
P-11 Burlington tank farm site looking west from Ovenell
Road MP 106.0





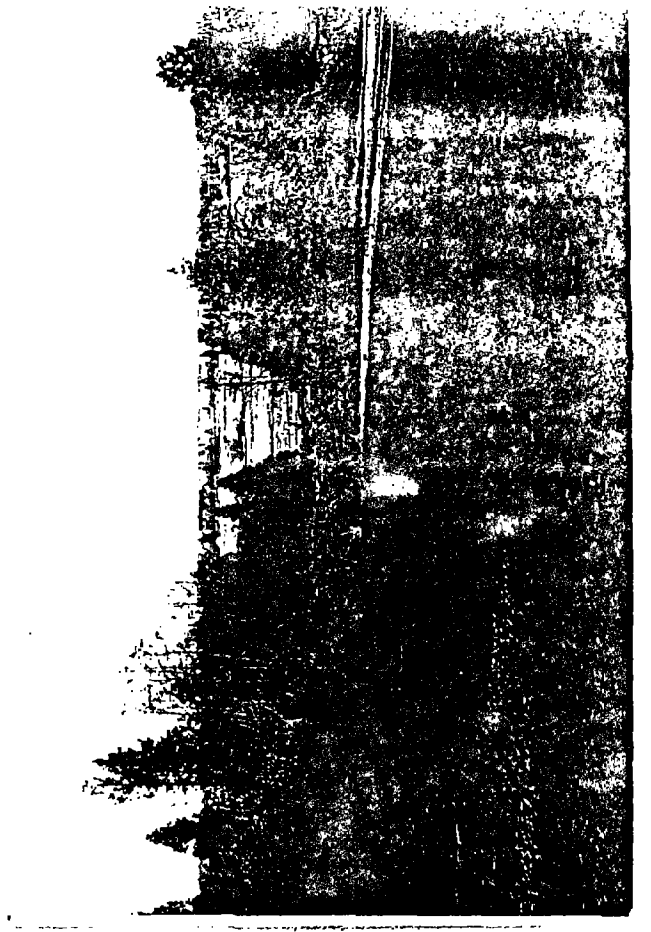
P-13 Drainage District No. 14 ditch looking west from Avon-Allen Road MP 109.3

P-15 Existing 20-inch pipeline right-of-way north of Bell Road MP 110.8



P-14 Allen Elementary School MP 110.3

P-16 Existing 20-inch pipeline right-of-way looking south from Bow Hill MP 111.8



REFERENCES AND INTERVIEWS

1. Skagit County Public Works Department: Meeting with Mr. Jack Rafter, Assistant Director of Engineering, March 27, 1981
2. City of Mount Vernon: Meeting with Mr. Don Semrau, City Engineer, April 15, 1981
3. City of Anacortes: Meeting with Mr. Robert Olander, City Manager, and Mr. David M. Ford, Director of Public Works, April 15, 1981
4. Port of Skagit County: Meeting with Mr. Daniel O'Donnell, Manager, April 28, 1981
5. U.S.D.A. Soil Conservation Service: Meeting with Ms Peggy Olds, District Manager, April 22, 1981
6. Trans Mountain Oil Pipeline Corporation: Meeting with Mr. D. Trevor Durrant, April 9, 1981
7. Department of Ecology: Telephone conversation with Mr. Steve West, April 10, 1981
8. Skagit County Public Utility District No. 1: Meeting with Mr. Jack Doty, Manager, April 27, 1981
9. Dike District No. 1: Meeting with Mr. William Roozen, Mr. Robert Dean, Jr., and Mr. Tom Shane, April 15, 1981
10. Dike District No. 3: Meeting with Mr. Richard Smith, Commissioner, April 23, 1981
11. Drainage District No. 14: Meeting with Mr. Roger Knutzen, April 27, 1981
12. Drainage District No. 17: Phone conversation with Mr. Charles Waltner, April 20, 1981
13. Drainage District No. 19: Meeting with Mr. Nick Aarstad and Mr. Harold Abbott, April 21, 1981
14. Skagit County Utility Coordinating Council: Meeting with utility companies at Coordinating Council regular meeting, April 23, 1981
15. Meeting with Mr. Dennis O'Brien, private property owner, April 28, 1981

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