APPENDIX G RATIONALE FOR THE SELECTION OF ROW WIDTH

TABLE OF CONTENTS

LIST OF FIGURES

1.0 CONSTRUCTION RIGHT-OF-WAY (ROW)

The proposed Project would be constructed under various seasonal and terrain conditions. The construction right-of-way (ROW) widths proposed for the Alaska LNG Project (Project) are the minimum widths required to effectively, efficiently, and safely construct large-diameter pipelines. Given the seasonal weather and terrain conditions, the size of the pipe and the size and weight of equipment required to install it, the Project will require a minimum flat ROW width of 110 feet. The ROW width selected aims to strike a balance between the disturbance footprint of the ROW and the efficiencies afforded by a wider ROW. A more efficient construction process reduces the duration of construction, which in turn reduces construction impacts to communities.

Construction ROW widths will be further refined as the route centerline is updated, additional geotechnical data is developed, and the construction execution plan finalized. The following cases represent the majority of expected construction scenarios. It is also expected that some of the final centerline would pass through restricted areas, which may reduce construction ROW widths.

1.1 Pipeline Construction in Alaska and ROW Width Implications

In both winter and summer, the construction seasons in Alaska have very restrictive start and stop dates controlled by prevailing climatic conditions. This forces each season's pipeline construction schedule into a very confined window for either summer or winter. In order to fit as much pipeline work into each seasonal window, the different work crews in the same spread must be very closely spaced in time and distance. In other words, a crew may only be spaced a few days apart even though their work activities are different. If the lay rate is a mile per day, then only a few miles may separate the trenching crew in front and the back-fill crew behind the welding. However, because crews such as ditching crews may be spread out over several miles for safety (drilling and shooting) and ditching efficiency (so excavators make a minimum number of moves), then it is apparent that the crews may be very close and sometimes in sight of each other.

This is known as a "tight" spread where the spacing of the crews is abnormally close. This sometimes allows more pipe to be laid in the total time allotted than if the spread were "loose" and the crews widely separated. If the spread were loose, then more schedule days could be wasted by having more days (or distance) separating each crew.

In the Lower 48, with longer seasons, especially in the south, many days or even a week may separate each crew (more than a week in some cases). In a long construction section of nearly 100 miles it is not unusual in the Lower 48 for the first crew (clearing) to be at the end of the spread while the last crew (restoring ranchers' fences) is just starting at the beginning of the section. So all pipeline crews are spread out over 100 miles. With a normal spacing of access roads on such a spread, it is entirely possible that each crew will have an access point ahead and behind it without any other crews in between. On such spreads, material deliveries for each crew do not have to pass other crews. Access for service vehicles is also possible and each crew can easily leave the ROW according to its particular shift length.

Due to construction season start and finish constraints in Alaska, crews on the Project would be very closely spaced. As a result, pipeline construction activity would block travel down the ROW. Crews such as drill/shoot crews and pipe lay/welding crews for example, completely block the ROW for any other vehicles to pass. As a result, additional ROW width would be required to provide unimpeded access down the ROW so that construction progress is not limited to the speed of the crew at the front of the construction spread. This issue is further exacerbated when there are long areas of ROW with no access, which is often the case along the pipeline route. Separate travel lanes are required where there is no external point of access to the ROW via off-ROW access roads.

1.1.1 Winter Construction

In Alaska, even though the winters are long, the actual season length for winter pipeline construction is often much shorter due to the time needed to freeze the active layer prior to ice pad construction or to freeze organic soils hard enough to allow for deeper frost packing. At the end of the season, when spring "break-up" arrives in Alaska, streams and rivers are swollen, drainages are often diverted due to aufeis, and a ROW that was once frozen hard will turn to mud in a matter of days depending on the temperature and orientation of the terrain to the sun.

In most areas, pipeline work along an entire ROW cannot continue during break-up. In addition, the ROW has to be cleaned up and temporary or permanent erosion control measures have to be in place prior to break-up. Certainly some isolated crews, such as tie-ins, can complete their work in the midst of the cleanup and erosion control work, but for the most part, all work would have to be complete by the start of break-up.

The time needed for freeze-up and the fact that all work has to be completed and erosion control in place prior to break up means that the winter construction season is relatively short. Winter seasons are longer farther north in Alaska, but given that frost depth may not be deep enough until late December or January, and that break-up may happen in late April on Alaska's North Slope, early April in Interior Alaska, and the end of March in South Central Alaska, the winter construction season is typically only three to four months long.

As a result of the short winter construction window, the average amount of pipe planned to be laid in winter construction seasons is only 44 miles:

- 60-mile winter season average length on the North Slope north of the Brooks Range;
- 40-mile winter season average length in Interior Alaska; and
- 36-mile winter season average length in South Central Alaska.

In order to completely string, bend, set up, weld, coat, ditch, bed, lower in, tie-in, backfill, clean up and install erosion control in the three- to four-month winter construction season, the crews should be very closely spaced. If there were to be approximately 14 major crews, and they are each spaced an average of three days apart, then the last crew would not start until mid-February. If the average section length in the winter is 44 miles, then the last crew (erosion control) starting in mid-February and making a mile per day of progress would not finish until 44 days later or the end of March or early April allowing for weather contingencies.

1.1.2 Summer Construction

In Alaska, much of the summer construction work cannot start until after break-up is over and soils have dried up enough to support construction equipment. The end of summer construction for pipeline work is dictated by the onset of "freeze up" in September or October when hydrotesting is no longer possible. Freezing soil temperatures also impact the ability to perform final restoration. Therefore, the summer construction season is restricted on either end by the completion of break-up and the start of freeze-up. Alaskan summers are very short.

Summer seasons are longer in the south, and extremely short on the North Slope north of Atigun Pass in the Brooks Range. North of Atigun Pass, the summer pipeline construction season is typically mid-May through September. In Interior Alaska, typically construction can start May 1 and hydrotesting must be completed by early October. In the Alaska Range typically work can start June 1 after snow melt, and must end in early October. Southcentral Alaska and the Kenai Peninsula have the longest summer season, from April until November.

As a result, the average amount of pipe planned to be laid in summer construction seasons is 53 miles more than in winter, reflecting slightly longer seasons and fewer weather contingencies. However, the amount of time for summer construction is bracketed by prevailing climatic constraints.

- 45-mile summer season average length on either side of Atigun Pass;
- 60-mile summer season average length in between the Brooks Range and Alaska Range; and
- 53-mile summer season average length in Southcentral Alaska.

In addition to the pipeline activities that are performed in the winter, in the summer it is necessary to not only do the cleaning, hydrostatic testing, and drying of that summer's pipe lay, but the pipe laid in the preceding winter must also be cleaned, tested, and dried. The same is true of restoration. In the summer, restoration of the preceding winter's work must be completed as well as that of the summer spread. Just as in the winter, the crews should be extremely closely spaced in order to complete all the pipeline activities before freeze-up.

1.1.3 Wetlands Construction

The Mainline route has approximately 372 miles of wetlands of various types on the entire 779-mile onshore portion of the Project. This is 48 percent of the entire onshore route. There are several unique features of wetlands in Alaska on the proposed Project route that are not found on pipeline routes in the lower 48. Two in particular have a significant influence on ROW construction methodology (or mode).

First, much of the wetlands on the route are underlain by permafrost, often of a thaw-unstable or thaw-sensitive condition (fine-grained soils with high ice content). Approximately 75 percent, of the 372 miles of wetlands are underlain by thaw-sensitive permafrost. Permafrost is often the reason for creation of the surface wetland. Very low annual precipitation rates in the Subarctic region, and particularly in the Arctic (which has desert-like precipitation rates), would at first indicate that there should be few wetlands. However, what surface water there is cannot drain into the subsurface soils because of the presence of permafrost. The fact that many wetlands are underlain by thaw-sensitive permafrost dictates that the ROW mode selected is one that is the most appropriate for safe construction in permafrost terrain and with consideration for long-term pipeline integrity within permafrost.

Secondly, many of the shrub or forested wetlands along the route are found on hillsides. Where the pipeline route is perpendicular to the slope and not parallel or directly up or down a slope, a cross slope condition is created and the ROW would be required to be leveled by cutting from the upslope side of the ROW and putting the fill on the downslope side of the ROW. Having a level ROW is paramount. Wetlands overlain on the thaw-sensitive permafrost on these side slopes also must be removed. The

ROW surface, the pipe laid/welded upon it, and the bottom of the ditch must all be parallel for the pipe to fit into the ditch. Therefore, the ROW surface must be level or nearly so (within +/- 2 percent cross slope grade).

Even seemingly "flat" wetlands in Alaska are usually not. They often have a small but hydrologically significant gradient to them. This is particularly important in areas with thaw-unstable permafrost where flowing water in the ditch can easily physically or thermally erode the permafrost. For instance, the Arctic tundra is usually considered "flat" but in the 57 miles of the southernmost construction section of the route (south of the coastal plain along the foothills of the Brooks range), the elevation gain is over 500 feet from the coast to the foothills.

For instance, because of the presence of thaw-unstable permafrost, creating an open trench filled with water for a push site in Alaska is the least desirable condition. Even in areas with thaw stable permafrost or no permafrost, with wetlands that often have a significant longitudinal slope or a cross slope, the open ditch filled with flowing water is a condition to be minimized as it may lead to draining, erosion, or siltation of surrounding vegetation if the water leaves the ditch. In fact, the string bogs in Southcentral Alaska are often perched on bluffs and preventing the water from leaving the site is essential. Furthermore, for the Project, 47 percent of the route is winter construction preventing consideration of a push-pull method during that season.

If all wetland construction ROW on the pipeline route were narrower than the proposed 110 feet, then all the crews would have to travel and work lock-step down the ROW. In the morning, in all areas with relatively distant access point spacing and especially in isolated areas with no access, the crews would have to travel down the ROW to their worksites in the exact order in which the equipment and crews are located and needed. No vehicle could travel any faster than the slowest vehicle. Additionally, all crews would have to work the same shift length because those that worked a 10-hour shift could not get past those working 11 or 12 hours to get back to camp.

The welding crew or firing line production would be severely impacted because there would not be enough room for a sideboom with a welding shack to get around all of the other sidebooms and shacks. All 6 to 10 welding stations would have to always move in order and not be allowed to pull out and pass a shack still welding, this would curtail welding production.

Access for emergency vehicles, inspection personnel, and service vehicles such as fuel trucks, mechanics trucks, service oilers, and tire trucks would be severely restricted. Those crews that depend on material deliveries, such as the stringing crew and the bedding and padding crews, would have to be so far out ahead of other crews to avoid having their stringing trucks and gravel trucks blocked that there would be a real disconnect.

All of these problems are manageable in the Lower 48 where often the wetlands are not so prevalent, or if there are extensive wetlands, specialty equipment or techniques can be used that are unsuitable for Alaska. Reducing ROW width to 75 feet on a project where 47 percent of the route is wetlands, access is extremely limited, the construction season duration is so climatically limited, and the crews are so tightly spaced is not feasible.

1.1.4 Summary

The average amount of pipe that is planned to be laid in the winter (44 miles) and in the summer (53 miles) is very short compared to similar projects in the Lower 48, especially when contemplating 779 miles of pipe lay. The length of pipe to be laid in each season has been pared down to match the winter and summer construction seasons.

The width of the construction ROW must enable construction equipment, crew buses, service vehicles, stringing trucks, winch trucks, bedding/padding trucks, pickup trucks, emergency vehicles, and inspectors to travel up and down the ROW without being blocked by tightly spaced crews. Without the longer seasonal duration common in the Lower 48, the crews in Alaska must be spaced so closely together that traffic must be able to get around construction congestion on the ROW. If the Project is confined to 372 miles of 75-foot ROW in all wetlands, and not allowed either travel lanes or bypass lanes throughout, then there would have to be a major reassessment of the lay rates, overall schedule duration, number of pipeline spreads/contractors, pipe ordering/delivery schedule, labor availability due to increased workforce, additional camp mobilization, equipment availability, etc. Either the number of construction spreads would have to be increased to lay the same amount of pipe in the same amount of time, or the construction schedule would have to be likely doubled to use the same number of contractors/spreads and lay less pipe in each season. There would likely be very significant social impacts because the construction effort would take two years longer, or there would be added pipeline spreads meaning thousands of additional workers.

1.2 Construction Right-of-Way

The construction ROW for the Project is divided into five main areas and a number of subareas, depending on the specific construction situation.

- Spoil Area – part of the “flat” ROW and typically 41.5 feet – includes:
  - Trench spoil;
  - Organics spoil (if applicable); and
  - One half of the trench.
- Work Area – part of the “flat” ROW and typically 68.5 feet – includes:
  - One half of the trench;
  - Pipe stringing and bending; and
  - Welding shelters and passing area.
- Grading Area – approximately 40 feet – includes:
  - Cut and/or fill slope areas; and
  - Storage of loose surface material, where applicable.

In some areas, the ROW alone would not provide sufficient space for the construction equipment and personnel to move around. That may be because access to nearby existing roads is limited and far between, or because that access leads to the wrong side of an open ditch, making it impossible for vehicles to reach their destinations. Therefore, additional space would be required in a few selected areas for:

- Travel Lane – 20 feet on working side; and
- Bypass Lane –15 feet on spoil side.

At this time, it is estimated that one quarter of the route would need to be supported by travel lanes, while another 15 percent would require bypass lanes.

1.3 Additional Temporary Work Spaces

In addition to the ROW, additional temporary work space (ATWS) would be required during construction at crossings (i.e., waterbodies, roads, railroads, utilities, etc.), at side bends, and to store snow or timber. The ATWSs are constrained to specific sites and are not of any significant length, thus are not part of the determination of the ROW width.

Typical dimensions for the ATWS are provided in Resource Report No. 1, Appendix E, in drawings for ROW configurations E-42, E-43, and E-45.

The extent of any snow management areas is still under evaluation, but would be applicable on the North Slope and in any other area where the ROW would be subject to blown snow that would become an impediment to safe construction.

1.4 Components of the Right-of-Way

An overview of the components of a construction ROW are provided in Figure 1.

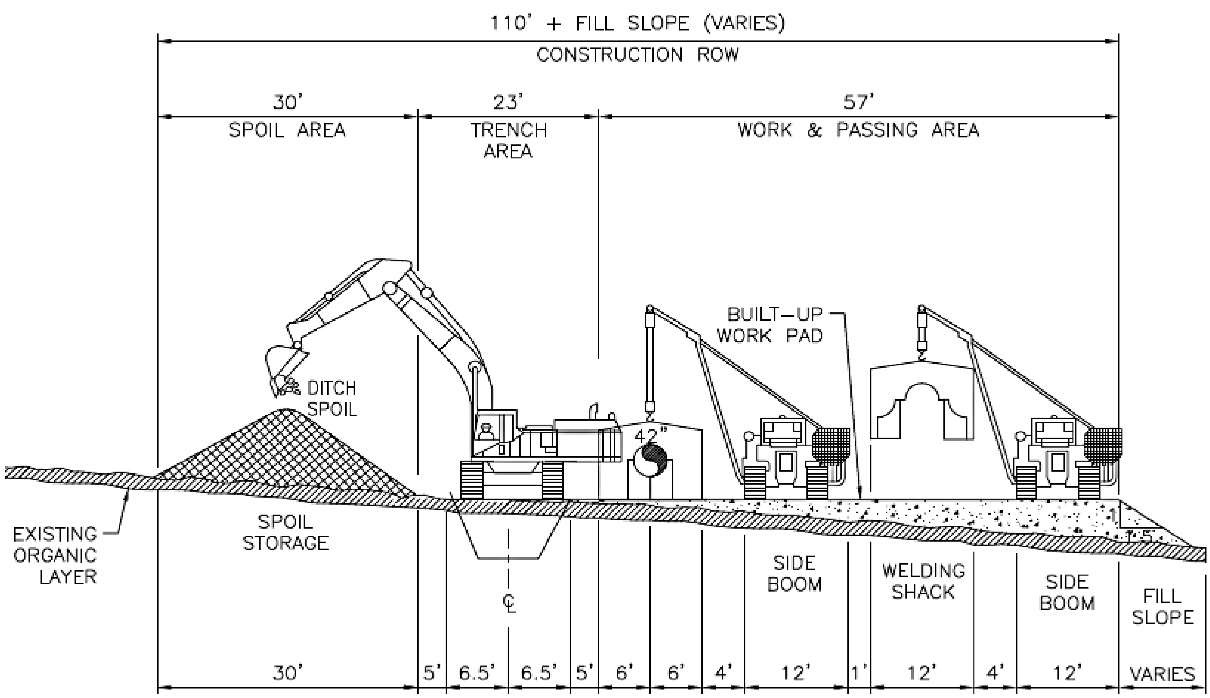

FIGURE 1 Construction Right-of-Way

1.4.1 Spoil Area

The volume of trench spoil generated would be dependent on the type of in-situ material in which the trench would be excavated, the shape of the trench, and the type of equipment used to excavate the trench. The volume generated in surficial materials, such as glacial till, would expand upon excavation by up to 20 to 30 percent, whereas the spoil generated in bedrock will bulk 40–60 percent or more, depending on rock sizes produced by blasting and excavation.

The spoil volumes generated by a wheel or chain trencher would be less than the spoil generated by a tracked excavator track hoe due to vertical trench walls. Trencher-excavated trench shape is very consistent. Track hoe excavated trench shape varies depending on the materials being excavated, back slope requirements, and individual operator skill/preferences. The spoil generated by a wheel or chain trencher in surficial materials would bulk at approximately 20 percent because the spoil is of a smaller size and more granular, whereas the spoil generated by a track-hoe would bulk at approximately 20 percent larger because of the larger soil aggregates. A placement factor is also built into the spoil storage calculation. A placement factor of 10 percent is used for spoil placed by a wheel or chain trencher because the spoil is placed by the machine and a consistent 3-foot setback from the trench can typically be maintained. A 30 percent placement factor is used for spoil placed by a track hoe, since the spoil is placed under the control of the equipment operator and the setback can vary by a few feet from the desired 3-foot setback.

The slope of the spoil windrow is assumed to be at the angle of repose (34°), or approximately 1.5:1. The bulking and placement factors are taken into account when determining the required spoil pile width. Depending on the soil type and excavation method, spoil piles may vary from 20 feet to 42 feet wide for wet to saturated soils that collapse under their own weight.

In some areas, the top layer of organic material would be stripped ahead of trenching and would be stored on a separate pile outside the spoil area.

1.4.2 Trench Subarea

The trench area width for a backhoe trench is based on a 7-foot-deep trench with trench walls at a 2:1 slope yielding an open trench width of 13 feet. This area is wide enough to accommodate a 13-foot-wide tracked trenching machine and is excavated as the trencher advances.

The trench width for a chain trencher is based on a 5-foot-wide chain digging ladder. Trench width in drill and shoot sections could exceed 13 feet depending on overbreak and blasting characteristics of frozen soils or bedrock. Vertical trench walls would be permissible in winter construction in frozen soils.

The buffer zone would be a 5-foot-wide buffer on either side of the trench to provide additional width for trench in locales where it needs to be deeper or to accommodate overbreak from trench blasting and, under normal conditions, to avert trench wall failure due to sloughing of the active layer during summer construction in permafrost or due to ground pressure from loading of equipment and spoil pile.

The width of the trench subarea would be split between the spoil area and the work area.

1.4.3 Work Area

The work area would consist of a welding shelter area and a primary work area used for sideboom operations, totaling 57 feet in width.

The pipe and welding shelter area (29 feet) would also be dedicated to stringing, bending and set-up, welding, and coating the pipe before lowering in. When trenching behind pipelay, the pipe must be set back from the trench to make room for maneuverability of trenching equipment, including wheel-trenchers, excavators, and dozers equipped with rippers. The trenching and ripping equipment must be able to work without damaging the welded pipe strings (Figure 2).

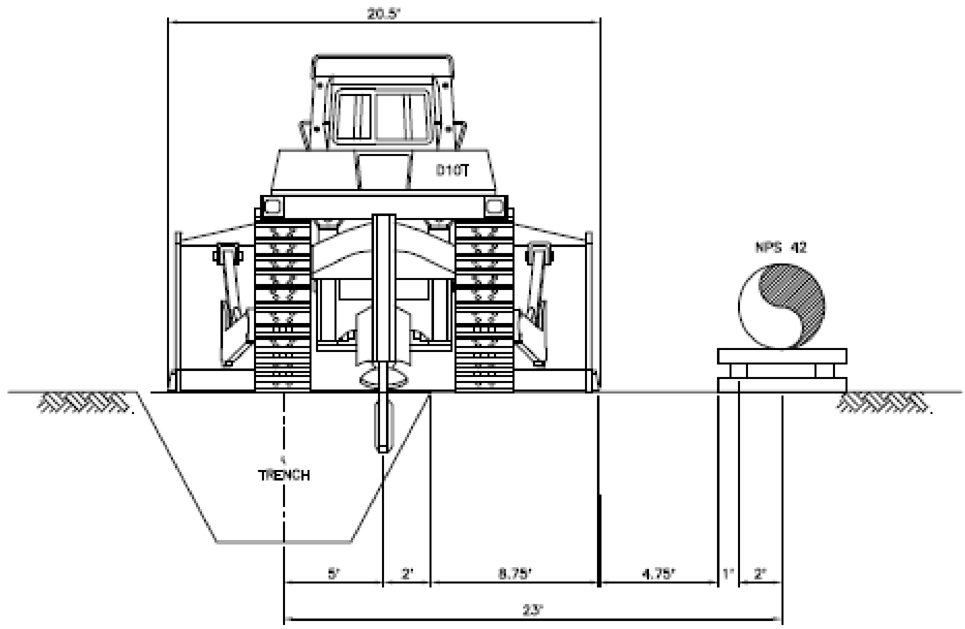

FIGURE 2 Dozer with Single Shank Ripper

When ripping the trench line with a dozer, the single-tooth ripper would require sufficient space between ripping passes to efficiently rip the full width of the trench. The spacing must be wide enough to prevent the tracks of the dozer from getting bogged down in the previously ripped soil. The width of the ripping lane combined with the 20.5-foot-wide dozer blade would leave a safety buffer between the blade and the pipe skids of 4.75 feet. The ripper would also need to have the option to rip the trench on an angle for improved efficiency.

The primary work area would serve as a passing zone for equipment and materials moving up and down the ROW, such as welding shacks, maintenance vehicles, and fuel trucks. Sidebooms carrying welding shacks would require 28 feet of room while leap-frogging around other welding shacks during welding operations.

1.4.4 Grading Area – Where Required

Building a flat surface for safe construction across side slopes, consists of "cut" and "fill" when working in stable soil (and applying ROW Modes 5A or 5B – Section 1.5.3), or placing fill with the corresponding "fill" slope when working on thaw-sensitive terrain (and using ROW Mode 4 – Section 1.5.4). The space required for these slopes, cut or fill, depends on the angle of the side slope. The steeper the slope, more land is going to be required to make those slopes safe and stable. Given that there are multiple angles for side slopes, it is not possible to have a single width to cover all these areas. The widths provided in Section 1.5 are representative of most situations, and include a large majority of the different ROW widths encountered along the Mainline.

1.4.5 Optional Travel Lane – Where Required

The travel lane (20 feet) would be located on the outside of the primary work area, and would be required for safe and efficient movement of pipe haulers, personnel, inspection staff, and other construction support vehicles in remote sections of the ROW that lack closely spaced access roads (more than 5 miles apart). The lane would also be used for emergency vehicles. The travel lane must remain unobstructed to allow traffic to pass working crews and move along the ROW in a timely manner.

1.4.6 Optional Bypass Lane – Where Required

The bypass lane (15 feet) would be located on the outside of the spoil area. Bypass lanes are required when access to the ROW is from the spoil side to allow equipment and personnel movement and access to the working side at pipe string breaks. They are also used for allowing excavators and trenchers to bypass each other while working.

1.5 Construction Modes

1.5.1 Ice Work Pad Right-of-Way – North Slope (Winter)

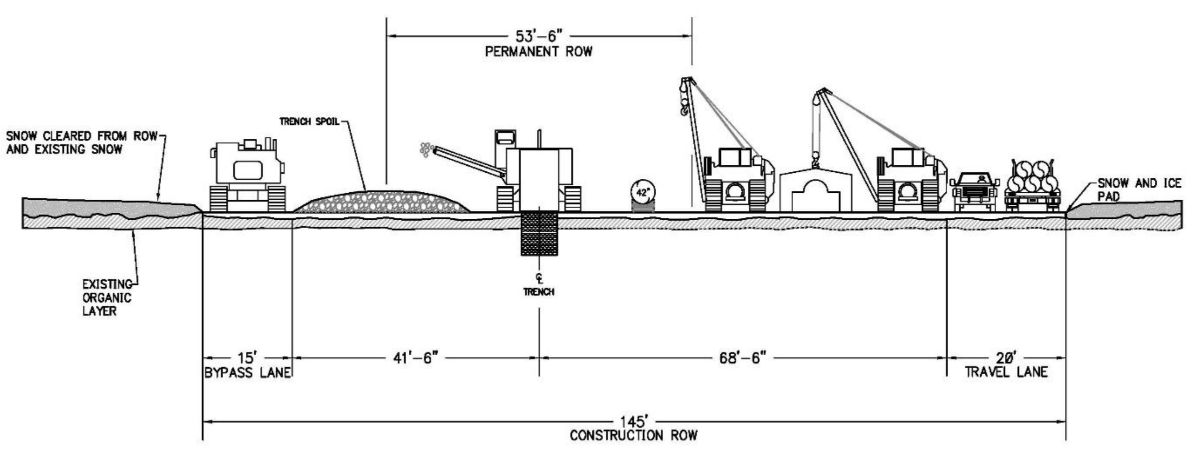

FIGURE 3 Right-of-Way Configuration for Winter Construction Using Ice Work Pad

There are decades of experience of building ice pads over wetlands on the Arctic tundra. An ice work pad protects the vegetation and wetland with a 6-inch layer of solidly frozen ice. Although the ice pad ROW mode is 145 feet wide, inclusive of a travel lane and bypass lane, the only impact to the wetland vegetation is the ditch line, approximately 6 feet if a trencher is used and less than 15 feet if the permafrost is shot and backhoes are used. The ditch spoil is placed on ice and is put back in the ditch without disturbing the vegetation under the spoil pile.

Use of ice pads is limited by availability of water from lakes, and ice pads must be built on flat terrain.

The ROW for winter construction using an ice work pad (Figure 3) would be made up of two zones: spoil area with bypass lane (56.5 feet), and work area with travel lane (88.5 feet), for a total of 145 feet.

The width of the ROW along this stretch—from milepost (MP) 0.0 to MP 56.6—includes the travel lane (20 feet) on the working side due to limited access from the highway and the bypass lane (15 feet) on the spoil side to facilitate the excavation activities.

Finally, ATWS may be required on each side of the ROW for snow removal and storage.

1.5.2 Winter Frost-Packed Right-of-Way

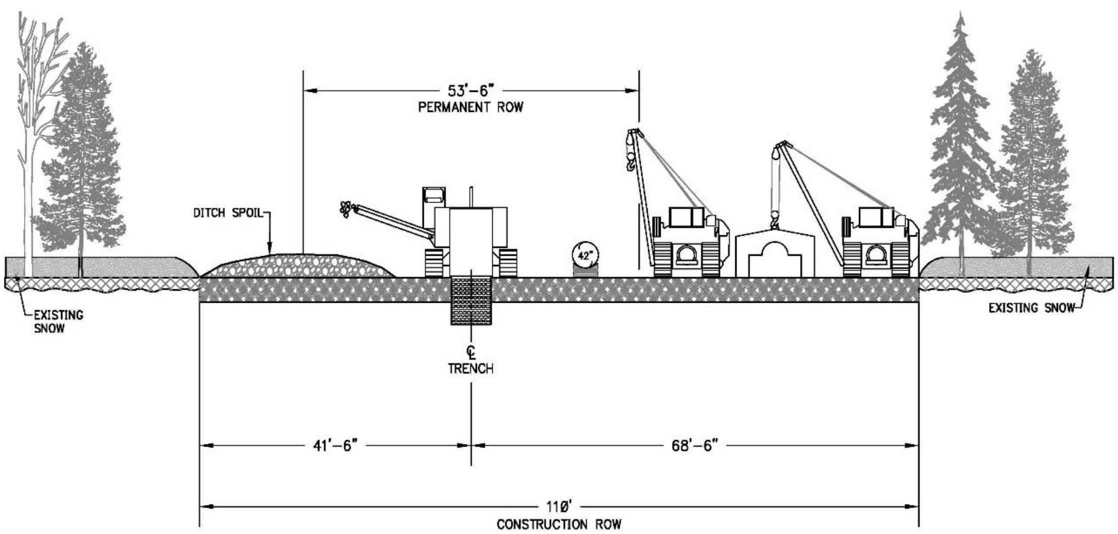

FIGURE 4 Configuration for Winter Construction Using Frost Packed Right-of-Way

Frost packing is the freezing of the vegetation, topsoil, root systems, and subsoil down to a depth whereby the frost-packed material either meets permafrost or is deep enough to support construction equipment. Other than compacted snow, there is no ice layer (no imported water) over the vegetation.

With a frost-packed ROW, the vegetative mat is frozen and preserved. Ditch spoil is placed on compacted snow over frost-packed vegetation giving a good separation layer that is highly visible during backfill for the equipment operators to see.

There are 69 miles of ROW where the frost-packed ROW mode would be used in wetlands. As more detailed work is done, the extent of frost-packed ROW may increase and along with it, the amount of wetlands protected by this ROW mode.

Similar to the ice pad ROW mode the disturbed area outside of the ditch line is minimal. Thus although the nominal ROW width is 110 feet, plus travel and bypass lanes where required, the disturbed area is confined to the ditch line.

The ROW for winter construction using a frost-packed working surface (Figure 4) would be made up of two zones: spoil area (41.5 feet) and work area (68.5 feet), for a total of 110 feet.

Again, in some locations, it would be necessary to add a travel lane (20 feet) on the working side and/or a bypass lane (15 feet) on the spoil side; and ATWS may be required on each side of the ROW for snow removal and storage.

1.5.3 Graded Cross Slopes Right-of-Way (Summer or Winter)

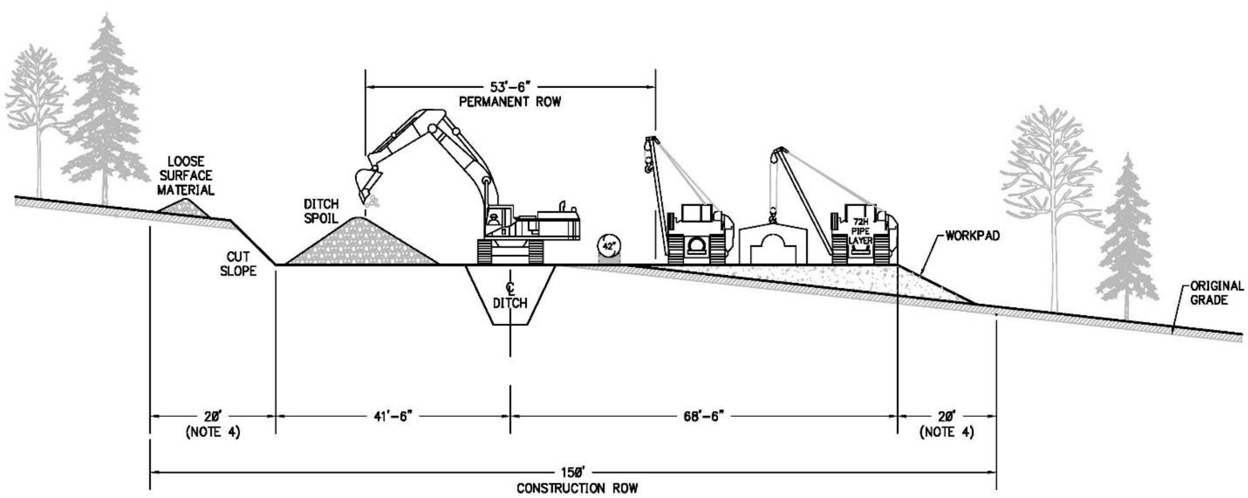

FIGURE 5 Right-of-Way Configuration for Graded Right-of-Way

Conventional graded ROW (Figure 5) requires a minimum footprint of flat 110 feet to install a 42-inch-diameter pipeline. Included in the 110-foot wide footprint would be the trench and trench buffer area, which would be 23 feet wide. The minimum width of a graded work surface (work area plus travel area) would be approximately 68.5 feet, which would allow for standard productivity rates to occur, and the minimum width of spoil storage would be approximately 41.5 feet.

Additional ROW may be required for storing loose surface material on the uphill side, and for the fill slope on the downhill side. The total ROW width for Mode 5A is estimated as 150 feet, although there could be instances that due to very steep cross slopes, the cut/fill area may result in a wider ROW.

As before, in some locations, it would be necessary to add a travel lane (20 feet) on the working side and/or a bypass lane (15 feet) on the spoil side. Also, for winter construction, ATWS would be required on each side of the ROW for snow removal and storage.

1.5.4 Granular Work Pad over Thaw-Sensitive Permafrost Right-of-Way (Winter or Summer)

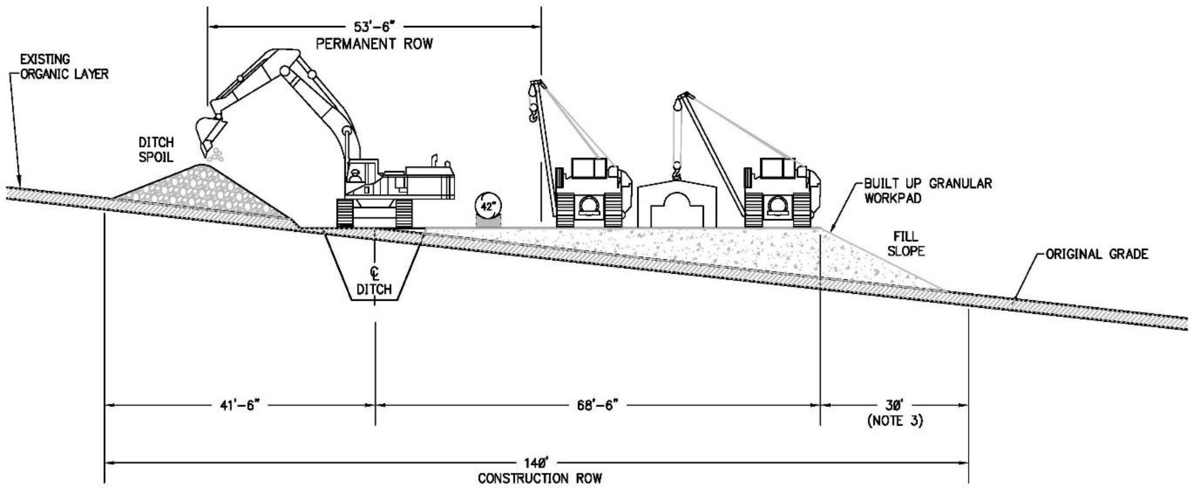

FIGURE 6 Right-of-Way Configuration Using Granular Work Pad

The ROW for summer or winter construction using a granular work pad (Figure 6) would be made up of two zones: spoil area (41.5 feet) and work area (68.5 feet). The granular work pad would extend across the entire work area with a depth sufficient to support construction equipment without rutting the underlying active layer of the permafrost. A thin granular traction pad may also be required over the trench.

Additional ROW would be required for the fill slope on the downhill side, the extension of which depends on the angle of repose of the fill material. The total ROW width for Mode 4 is estimated as 140 feet, although there could be instances that due to steep cross slopes, the grading area may result in a wider ROW.

As before, in some locations, it would be necessary to add a travel lane (20 feet) on the working side and/or a bypass lane (15 feet) on the spoil side. Also, for winter construction, ATWS may be required on each side of the ROW for snow removal and storage.

The spoil storage area would be 30 feet wide and sometimes may require an extra 15-foot-wide ATWS area for loose surface material storage (not shown). During rehabilitation, any stored surface material would be spread over the backfilled ditch.

1.5.5 Mountain Grade Cut Right-of-Way (Summer)

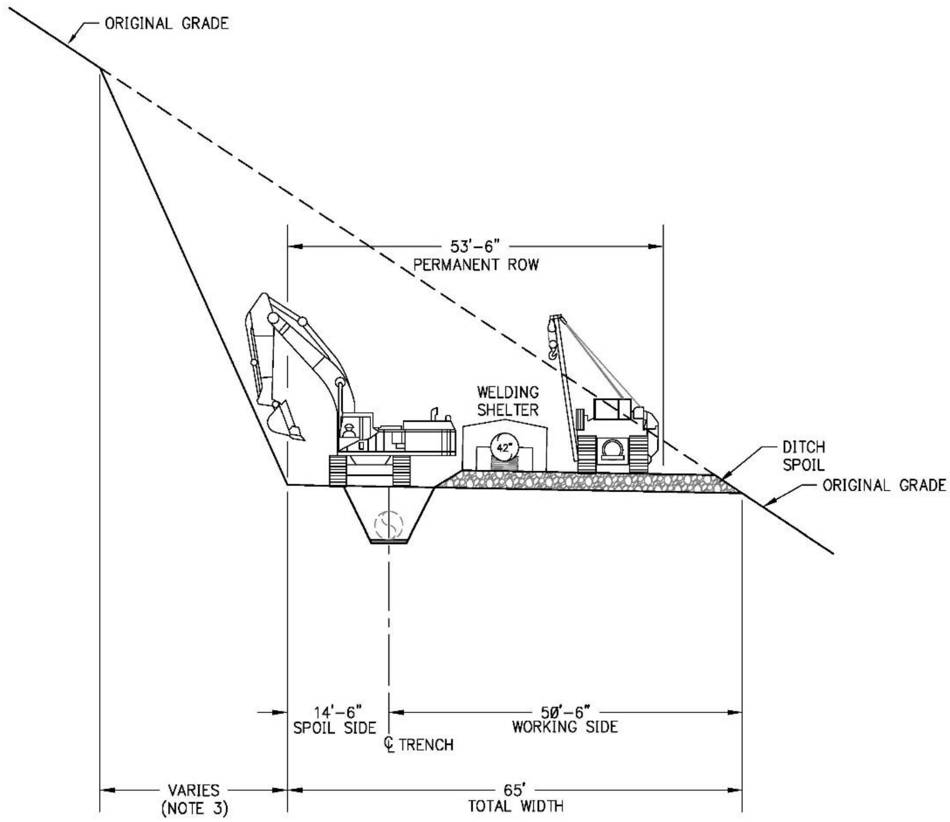

FIGURE 7 Right-of-Way Configuration for Mountain Cut

A mountain cut ROW mode is used when the side slopes are so steep that they exceed the angle of repose of fill material such that any fill is not possible and the entire ROW, although narrow, has to cut or be notched into the hillside (Figure 7). This mode is specifically designated for mountain side hilling east of the Nenana River or for summer work in the Glitter Gulch bypass section. When the side hill is too steep to allow for trench spoil storage, the spoil would be hauled from the ROW and transported to another location.

The cut slope angle varies with terrain and competency of rock. The ROW width, in turn, varies based on the degree of the side slope and includes the side hill cut, and may be as little as 30 feet or as wide as 100 feet or more in very steep areas.

It is expected that this mode would be applied to just a few miles over the entire length of the Project, and would be constructed using very small crews over a very long period of time in the summer. Because of the narrow ROW, only one crew and construction activity at a time could reasonably take place.

1.5.6 Matted Summer Wetlands Right-of-Way

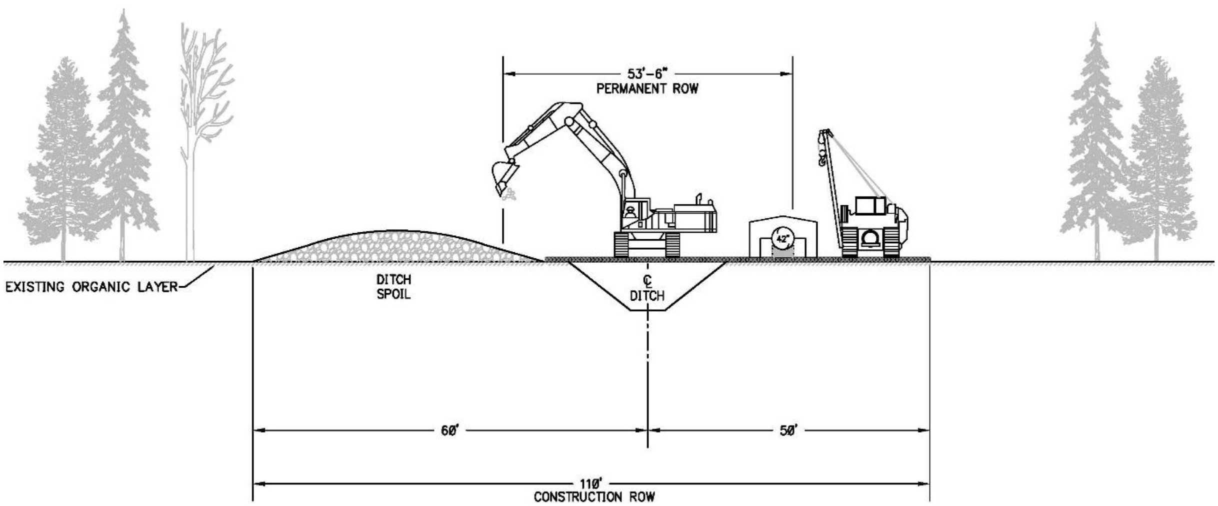

FIGURE 8 Right-of-Way Configuration for Summer Wetland

Inundated wetlands and deep bogs on flat terrain crossed in the summer would be crossed using mats on the working side. This would require a minimum footprint of 110 feet through wetlands and there would be no travel or bypass lanes (Figure 8). The footprint would allow for the excavation of an oversized trench, the storage of wet spoil, and a matted, elevated work surface for pipe welding and a primary work lane. Depending upon the ditch width, the disturbed area would consist of the ditch line and the spoil area and would be about 80 feet wide.

The spoil side is wider than usual to allow for the swelling of the spoil from what is expected to be a very wide ditch due to depth and the loose, submerged organic soils. When half of the ditch is subtracted from the 50-foot working side, it leaves only about 30 feet to lay the pipe. This is quite restrictive and would mean the ROW would be blocked while any crew is working off of mats.

The width of the work surface through wetlands has been reduced compared to the other modes. The elevated work surface would be set far enough back from the trench to avoid interference with trench excavation, welding, and lowering-in equipment. There might only be sufficient room on the elevated work surface for a single lane of equipment; therefore, large construction equipment might not have enough room to pass equipment operating on the work surface. On the other hand, there may be enough room for utility traffic such as fuel trucks, inspection vehicles, and emergency vehicles to pass.

There should also be at least 3 feet of separation between the trench wall and the elevated matted surface to prevent collapse of the trench wall due to the weight of the work surface (mats, mineral soil), pipe, and equipment. The stability of the elevated work surface may be enhanced by an interception ditch on the far side of the work surface to naturally dewater the wetland. This interception ditch and generated spoil may occupy approximately 12 feet of footprint (not shown).

1.5.7 Point Thomson Gas Transmission Line (PTTL) Aboveground Pipeline on Vertical Support Members (VSMs) (Winter)

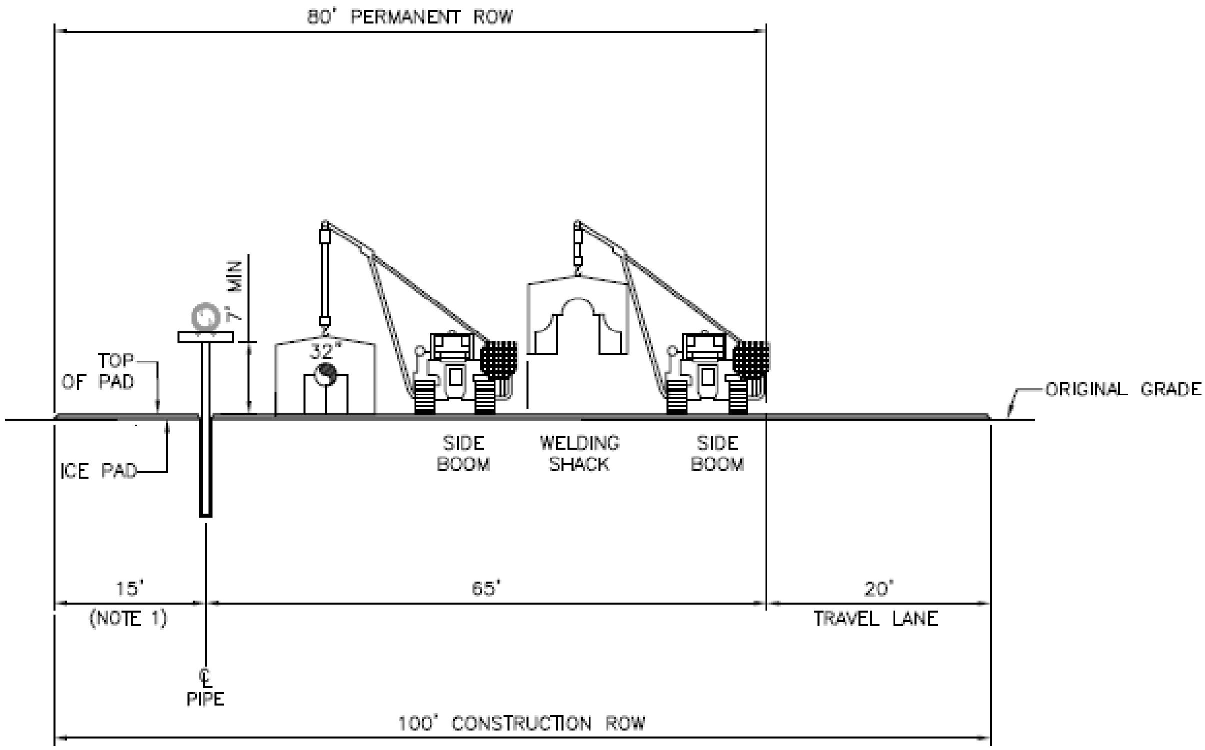

FIGURE 9 Right-of-Way Configuration for the Point Thomson Gas Transmission Pipeline

The Point Thomson Gas Transmission Line (PTTL) would be installed during winter. The ROW for the aboveground PTTL winter construction would be made up of three areas: vertical support member (VSM) area (28 feet), weld shelter area (12 feet), work area (40 feet), and a travel lane (20 feet) (Figure 9).

ATWS would be required on each side of the ROW for snow removal and storage.

2.0 Permanent Right-of-Way

The Project entity would acquire permanent easement for both the Mainline and the PTTL. The Project entity would request from the corresponding landowners a 50-foot-wide easement along the Mainline, and an 80-foot wide easement along the PTTL.

The Project entity has identified the need to retain a permanent ROW of 80 feet for the PTTL pipeline. That width would be necessary to allow safe passage for inspection and maintenance equipment and the performance of occasional pipeline and VSM repairs and adjustments.

Where practical, the pipelines would generally follow along or collocate with other infrastructure corridors (e.g., aboveground and belowground third-party utilities; roads; and highways). The existing infrastructure corridors provide access to the pipeline facilities in some areas; however, a significant portion of the permanent ROW would be located within geographically remote areas and would be accessed mainly by helicopter. Project aviation standards require a stable and flat landing surface with minimum dimensions of 100 feet by 100 feet, cleared of trees and tall growth. In conjunction with the 100-foot square cleared landing area, Project procedures require additional clearing to allow for safe helicopter access/egress to these locations. The amount of additional clearing around the ROW is shown on Appendix E of Resource Report No. 1 (drawing E-106).

Routine vegetation maintenance would be conducted periodically to allow for operations access for planned inspections and other maintenance activities. Vegetation would be actively maintained within a 30-foot corridor, 15 feet on either side of the pipeline of low ground cover vegetation. For the remaining 20 feet of the 50-foot-wide easement, vegetation would not be normally maintained for pipeline operations and maintenance purposes.