# BACKGROUND REPORT
# ON POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS ASSOCIATED WITH THE PROPOSED TRANSCANADA PIPELINES LIMITED ENERGY EAST PIPELINE PROJECT IN ONTARIO

**March 2014**
**10447**

Prepared for:

Ontario Energy Board
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*The views of the authors expressed herein do not necessarily reflect those of, nor should they be attributed to, the Ontario Energy Board, individual Board Members or Ontario Energy Board staff.*

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# 1.0 OVERVIEW OF ONTARIO ENERGY BOARD PROCESS

The Ontario Minister of Energy has asked the Ontario Energy Board (OEB or the Board) to prepare a report on TransCanada PipeLines Limited's (TransCanada's) proposed Energy East Pipeline project. Specifically, in a letter dated November 12, 2013, the Minister asked the Board to examine and report on the proposed project from an Ontario perspective and to consider the implications of the following.

a) Impacts on Ontario natural gas consumers, in particular those in eastern and northern Ontario in terms of prices, reliability and access to supply.

b) Impacts in Ontario on the natural environment and pipeline safety.

c) Impacts in Ontario on local communities and Aboriginal communities.

d) The short and long-term economic impacts of the project in Ontario.

To support the preparation of this report, the Minister has asked the Board to consult broadly and transparently with the people of Ontario, including local communities, stakeholders, and First Nation and Métis communities, focusing on the above issues and providing a forum for Ontarians to express their views on the proposed Energy East Pipeline project. The key steps in the OEB's planned process are presented in Figure 1. Details regarding each of the steps will be issued in due course.

Figure 1 The OEB's Planned Process


# 2.0 TERA ENVIRONMENTAL CONSULTANTS' ROLE IN THE ONTARIO ENERGY BOARD REVIEW

The OEB has retained TERA Environmental Consultants (TERA) of Calgary, Alberta to provide expert advice on the environmental and socio-economic considerations in relation to the Energy East Pipeline project in Ontario. TERA is a leading provider of environmental consulting services to the Canadian energy industry, with an emphasis on oil and gas pipelines.

TERA has been asked to prepare this Background Report on the proposed Energy East Pipeline project. This report will: briefly describe the regulatory oversight that will apply to the proposed project; provide an overview of the proposed project; outline the environmental and socio-economic considerations typically used to assess such projects; and identify the potential high level environmental and socio-economic impacts of the proposed project within the province of Ontario.

In addition to this Background Report, TERA will also prepare a second report entitled Report on Potential Impacts on Ontario (the Impact Report). The Impact Report will include information TransCanada will file with the National Energy Board (NEB) on the proposed project (see Section 4.0). It will also outline the potential effects on customers in northern and eastern Ontario with regard to environmental and socio-economic considerations in relation to the Energy East Pipeline project.

All materials will be posted on the Board's website.

# 3.0 REGULATORY OVERSIGHT OF THE ENERGY EAST PIPELINE PROJECT

The proposed Energy East Pipeline project falls under the jurisdiction of the NEB, a federal regulatory agency that exercises jurisdiction over interprovincial and international oil and gas pipelines. Pipelines that are designed, constructed, operated, converted or abandoned under NEB jurisdiction must comply

with the requirements of the *NEB Act* and the *National Energy Board Onshore Pipeline Regulations (NEB OPR*), which are enacted by the *NEB Act*. In addition, adherence to the latest edition of Canadian Standards Association (CSA) standard CSA Z662 – Oil and Gas Pipeline Systems (CSA Z662) is a mandatory requirement, as it is incorporated by reference in the *NEB OPR*. Both the *NEB OPR* and CSA Z662 include requirements for pipeline design, materials selection, installation, testing, operation and maintenance, abandonment, etc. Furthermore, new pipeline construction greater than 40 kilometers (km) in length requires an Environmental and Socio-Economic Assessment (ESA) under the *NEB Act* and an assessment under the *Canadian Environmental Assessment Act, 2012* (*CEA Act, 2012*).

The NEB publishes a *Filing Manual*, which is a guide to the information required in an application. Typically, a company first files a project description in advance of its formal application. The project description is not an application and as such, is not binding; rather, it provides preliminary information about an expected application. TransCanada filed its project description with the NEB on March 4, 2014 and indicated that it expected to submit its formal application in the third quarter of 2014. The formal application must outline, among other matters, the engineering design, construction, environmental and pipeline safety considerations. The NEB will assess the application for compliance with the *NEB Act*, its regulations and applicable standards. It may ask for further information during the application process to address any issues specific to the proposed project. For more information on the NEB review process see Appendix A.

If the proposed project is approved, the NEB will monitor compliance during construction and operation by performing compliance verification activities such as inspections, compliance meetings, emergency exercises, audits and investigations.

## 4.0 OVERVIEW OF TRANSCANADA'S ENERGY EAST PIPELINE PROJECT

TransCanada's existing natural gas transmission system consists of several parallel natural gas pipelines stretching more than 14,000 km from the Alberta-Saskatchewan border east to the Québec-Vermont border. TransCanada's Energy East Pipeline project will convert one of these pipelines from carrying natural gas to carrying crude oil. The proposed crude oil pipeline is approximately 4,515 km in length and would carry roughly 1.1 million barrels per day of crude oil from Alberta and Saskatchewan to refineries in Eastern Canada.

The Energy East Pipeline project will include the conversion of approximately 2,997 km of NPS 42 segments of the existing Canadian Mainline from natural gas transmission to the carriage of crude oil, the construction of approximately 1,518 km of NPS 42 new mainline pipe in Alberta, Saskatchewan, Manitoba, eastern Ontario, Québec and New Brunswick to link up with the converted pipe, approximately 72 pump stations and new storage tank terminals including up to 14 new storage tanks at the existing Hardisty Tank Terminal in Alberta, three storage tanks at the proposed Moosomin Tank Terminal in Saskatchewan, up to 12 storage tanks at the proposed Cacouna Tank Terminal in Quebec, and up to 18 storage tanks at the proposed Saint John Tank Terminal in New Brunswick. The project also includes marine terminal and loading facilities at Cacouna, Quebec and Saint John, New Brunswick.

As illustrated in Figure 2, the Energy East Pipeline project is comprised of three pipeline segments. First, new pipeline would be built from Hardisty, Alberta to Burstall, Saskatchewan. Second, the converted pipeline would run from Burstall, Saskatchewan to a point near Iroquois, Ontario. Finally, new pipeline would be built from the point near Iroquois, Ontario to Saint John, New Brunswick. The Energy East Pipeline will deliver oil to existing refineries in Montréal, near Québec City, and in Saint John, as well as the marine terminal and loading facilities.

In Ontario, there will be approximately 1,925 km of NPS 42 pipeline converted to oil service, approximately 104 km of new NPS 42 mainline pipe constructed and the development of approximately 30 pump stations. This means that about 5% of the pipeline in Ontario will be new construction while 95% will be converted pipeline.

The project will be located either within existing rights-of-way or alongside existing linear disturbances, such as pipelines, railways, roads and electrical power lines for the majority of its route. Approximately 66% (*i.e.,* 2,997 km/4,515 km) of the proposed Energy East Pipeline Project is already in the ground and, of the remaining 34% new build portion, more than half will parallel existing rights-of-way.

Subject to regulatory approval from the NEB, construction is anticipated to begin during the first quarter of 2016. The scheduled in-service date for the project is in the fourth quarter of 2018. The exact, detailed route of the proposed pipeline will be determined after the NEB completes its public consultation and regulatory review process.


**Source:** TransCanada PipeLines Ltd. (www.energyeastpipeline.com)

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| tera ENVIRONMENTAL CONSULTANTS | **ENERGY EAST PIPELINE ROUTE IN CANADA** |
| | **BACKGROUND REPORT ON POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS ASSOCIATED WITH THE PROPOSED TRANSCANADA PIPELINES LIMITED ENERGY EAST PIPELINE PROJECT IN ONTARIO** |
| March 2014 | Figure 2 |

# 5.0 GENERAL ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS

Any company that plans to construct a pipeline that is greater than 40 km in length must include an ESA in its Application to the NEB. An ESA is a detailed report that provides information on the baseline environmental and socio-economic setting of the proposed project. The report also predicts potential effects/interactions of pipeline construction and operations on environmental and socio-economic resources, while providing mitigation measures to limit or reduce these potential effects. Finally, the report includes an analysis of potential cumulative effects (*e.g.,* potential effects of pipeline construction and operations in consideration of other construction projects in the area) and provides a significance evaluation to determine the overall impact that all potential residual and cumulative effects will have on the various environmental and socio-economic elements under consideration.

There are specific environmental and socio-economic elements that require detailed information which are outlined in the NEB *Filing Manual*. The following list is an example of some of the biophysical and socio-economic elements that need to be evaluated in an ESA:

- physical environment (landscape and morphology);
- soil and soil productivity;
- vegetation (*e.g.,* rare plants, old growth forests);
- water quality and quantity (surface water and groundwater resources);
- wetlands;
- fish and fish habitat;
- wildlife and wildlife habitat;
- atmospheric environment (air quality);
- acoustic environment (noise);
- marine environment (marine fish and wildlife, including habitat);
- human occupancy and resource use (land use and marine resource use);
- heritage resources (*i.e.,* historical, archaeological or palaeontological resources);
- traditional land and resource use;
- social and cultural well-being;
- human health;
- infrastructure and services; and
- employment and economy.

A preliminary Environmental Protection Plan (EPP) and Environmental Alignment Sheets are also generally developed as part of the ESA to provide mitigation measures to be implemented during the pipeline construction and operations. The EPP generally includes contingency and management plans for various potential scenarios that may be encountered, and provides mitigation measures to be implemented during the different phases of construction and operations. For an overview of pipeline construction and conversion see Appendix B.

# 6.0 POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS FOR THE ENERGY EAST PIPELINE PROJECT

## 6.1 Potential Environmental and Socio-Economic Considerations for New Pipeline Construction

Pipelines are buried utilities and, once constructed, surface activities previously practised on the land are generally able to continue. Based on what is known from other similar pipeline projects, listed below are examples of some potential effects that, without application of mitigative measures, could be associated with the new build portion of the proposed project (*i.e.,* from near Cornwall to the Ontario-Québec border) during and/or after construction:

- lowering of topsoil productivity from mixing of topsoil and subsoil during soil salvaging activities;
- degradation of soil structure and lowering of soil productivity through compaction and rutting;
- loss of topsoil through wind and surface water erosion;
- reduction of surface and/or groundwater quality;
- changes in local hydrology affecting wetland quality and function;
- increase in air emissions during construction and maintenance activities;
- changes to native vegetation composition;
- weed or crop disease introduction and/or spread;
- alteration of wildlife habitat and/or increase in wildlife mortality risk;
- sedimentation of fish habitat and disturbance of fish;
- temporary blockage of navigable waterways;
- sensory disturbance of nearby residents and land users;
- disruption of farming activities;
- alteration of viewsheds;
- disturbance of archaeological sites and artifacts;
- disruption of traditional land and resource use activities of Métis and First Nations (*e.g.,* hunting, plant harvesting, sacred sites);
- change in availability of local accommodation during construction due to influx of temporary construction workers;
- change in capacity of existing emergency services to accommodate pipeline construction needs during construction;
- damage to adjacent pipelines leading to a product release; and
- spill of hazardous materials during construction could result in alteration or contamination of various biophysical elements and may impact human health; and

These types of impacts are generally associated with the construction of a new pipeline. Pipeline companies routinely apply environmental protection measures to mitigate or compensate for

environmental and socio-economic impacts to avoid, limit or reduce potential adverse effects which may result from construction activities.

A more detailed description of potential effects will be available once TransCanada files the ESA for the project and applies for regulatory approval from the NEB.

## 6.2 Potential Environmental and Socio-Economic Considerations for Pipeline Conversion

The steps in pipeline conversion involve fewer disturbances, with localised integrity digs and potential repairs to the pipeline comprising the most disruptive activities. Therefore, some of the above mentioned effects are more likely to occur than others (*e.g.,* those associated with soil and vegetation), although it depends on the specific locations of buried pipelines to be exposed. Examples of potential environmental and socio-economic effects during pipeline conversion, generally at integrity dig locations, may include:

- lowering of topsoil productivity from mixing of topsoil and subsoil during soil salvaging activities;
- degradation of soil structure and lowering of soil productivity through compaction and rutting;
- loss of topsoil through wind and surface water erosion;
- changes to native vegetation composition;
- weed or crop disease introduction and/or spread;
- temporary blockage of navigable waterways (if an instream integrity dig is required);
- sensory disturbance of nearby residents and land users;
- disruption of farming activities;
- difficulty in accessing muskeg areas during non-frozen conditions;
- disruption of traditional land and resource use activities of Métis and First Nations (*e.g.,* hunting, plant harvesting, sacred sites);
- damage to adjacent pipelines leading to a product release;
- spill of hazardous materials during construction and operations could result in alteration or contamination of various biophysical elements and may impact human health;
- deactivation, dismantling and remediation of compressor sites, including the potential to encounter contamination (*e.g.,* hydrocarbons, naturally occurring radioactive materials); and
- establishment of pump stations (approximately 2-4 ha each) at former compressor station sites (if planned).

Engineering and safety considerations will play a substantial role in the success of the pipeline conversion.

## 6.3 Potential Environmental and Socio-Economic Considerations for Pipeline Operations

Activities during the operations phase of a pipeline project can include aerial and ground patrols, vegetation management and integrity digs. The greatest potential for environmental impacts during the operations phase would occur during routine maintenance activities which involve disturbance to the ground surface (*e.g.,* integrity digs).

The potential for spills during operations is reduced by continued monitoring, inspection and maintenance of the pipeline. Potential environmental and socio-economic considerations pertaining to the operations phase of an oil pipeline may include:

- those same considerations presented for integrity digs during pipeline conversion identified above;
- disturbance to pipeline landowners due to maintenance activities such as integrity digs, aerial patrols or right-of-way maintenance;
- difficulty in accessing muskeg areas during non-frozen conditions;
- the health of local residents, land users and/or workers may be affected in the event of an accident or malfunction;
- leaks and spills due to a pipeline failure potentially caused by third-party pipeline damage, internal corrosion or natural disaster (*e.g.,* flooding, erosion), which may result in:
  - property and/or crop damage;
  - reduction in water quality of wetlands, watercourses or waterbodies which may include drinking water sources or recreational waterways;
  - effects on fish and wildlife, and fish and wildlife habitat; and
  - effects on human health and resource use.

## 6.4 Potential Environmental and Socio-Economic Considerations for Pipeline Decommissioning and Abandonment

It is difficult at this time to predict when or how the pipeline and facilities will be decommissioned and/or abandoned at the end of the project's useful life since the project is expected to operate for 40 years or more. The methods of abandonment that will ultimately be implemented for the project will be determined at the time the pipeline is removed from operational service; however, those determinations will be based on the most current sound scientific studies and accepted industry practice at that time. Additionally, decommissioning and abandonment activities will comply with applicable federal and provincial regulatory requirements in force at the time.

## 7.0 SOURCE MATERIAL

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# APPENDIX A

## NATIONAL ENERGY BOARD REVIEW PROCESS

Steps 1 through 10 provide a brief description of the NEB review process for a pipeline project Application.

*Step 1:* Several months (no less than 3 months) prior to Application submission, the proponent company will provide the NEB with a Project Description to determine the scope of potentially interested/impacted parties and identify issues to be considered during the review process. The Project Description generally includes the following information:

- a description of the proposed project and its components;
- a map of the proposed project;
- a discussion of consultation efforts with stakeholders and Aboriginal groups; and
- preliminary potential environmental and socio-economic effects of the proposed project.

*Step 2:* The company will submit the Application to the NEB, which will include an ESA that meets the requirements of the *NEB Act* and the *CEA Act, 2012*.

*Step 3:* The NEB will review the Application and make a decision on the completeness of the Application. When the Application is deemed complete, the NEB will issue a Public Hearing Order.

*Step 4:* Interested parties can apply for intervener status allowing them the opportunity to submit evidence to the NEB. This will be subject to an Information Request process to clarify and confirm evidence.

*Step 5:* A public, oral hearing and final arguments will be conducted, possibly in various locations along the proposed pipeline route.

*Step 6:* The NEB will submit its report to the Federal Cabinet.

*Step 7:* The Federal Cabinet will issue a decision directing the NEB to deny or authorise an approval. If authorised, the approval will allow the proposed project to proceed. Certain approval conditions will be imposed.

*Step 8:* A detailed route hearing is held, if required, to resolve matters related to the schedule and location of the new pipeline.

*Step 9:* Once pre-construction conditions are satisfied, the company must obtain all necessary permits (*e.g.,* other federal, provincial and municipal permits/authorisations/licences).

*Step 10:* Construction begins.

The time required to complete the NEB review process is dependent on the size and complexity of the project and the number of interested parties/interveners involved in the hearing process. However, legislation has been put into place that limits the hearing process to a maximum of 15 months with participation limited to those who are directly affected and those who have relevant information or expertise.

# APPENDIX B

# OVERVIEW OF PIPELINE CONSTRUCTION AND CONVERSION

The following subsections provide a brief overview of the steps involved in constructing a new pipeline and will describe the process of converting a pipeline from natural gas to crude oil service.

## Pipeline Construction

Pipeline construction has been likened to a moving assembly line where a number of sequential activities take place as illustrated in Figure B1:

- the pipeline location is surveyed and flagged, and foreign line crossings (*e.g.,* buried utilities, sewer lines, etc.) are identified and exposed;
- trees and other vegetation (*e.g.,* crops, shrubbery, shelterbelts, etc.) are cleared or mowed from the right-of-way;
- the topsoil is salvaged and stored in windrows or piles along the edge of the right-of-way (Figure B2);
- the ground is graded to provide a level workspace and graded materials are stored in separate windrows from the topsoil;
- the pipe sections are laid out in order ("stringing" the pipe), bent to match ground contours and routing alignments, then welded together;
- the welds are tested and coated;
- the pipeline trench is dug and subsoil is stored adjacent to the trench, separate from the grade material and topsoil;
- the pipe is lowered into the trench, the trench is backfilled with subsoil and the pre-construction ground contours are restored;
- the pipe is pressure-tested with water to ensure it can operate safely;
- the topsoil is replaced evenly over the disturbed right-of-way;
- the work site is cleaned and fences are replaced/erected; and
- the land along the right-of-way is reclaimed.

The pipeline right-of-way or easement is generally 10-25 m wide, with an additional 10-20 m of temporary workspace. In addition to the buried pipeline, there will be construction of above ground facilities to support safe operations including pump stations which help push the oil through the pipeline and isolation valves which allow portions of the pipeline to be shut down, should the need arise.

## Pipeline Conversion

The process of converting a natural gas pipeline to carry crude oil requires an engineering assessment in which the pipeline's operating and construction history is reviewed to ensure suitability for liquid transport. The general steps in pipeline conversion are described below.

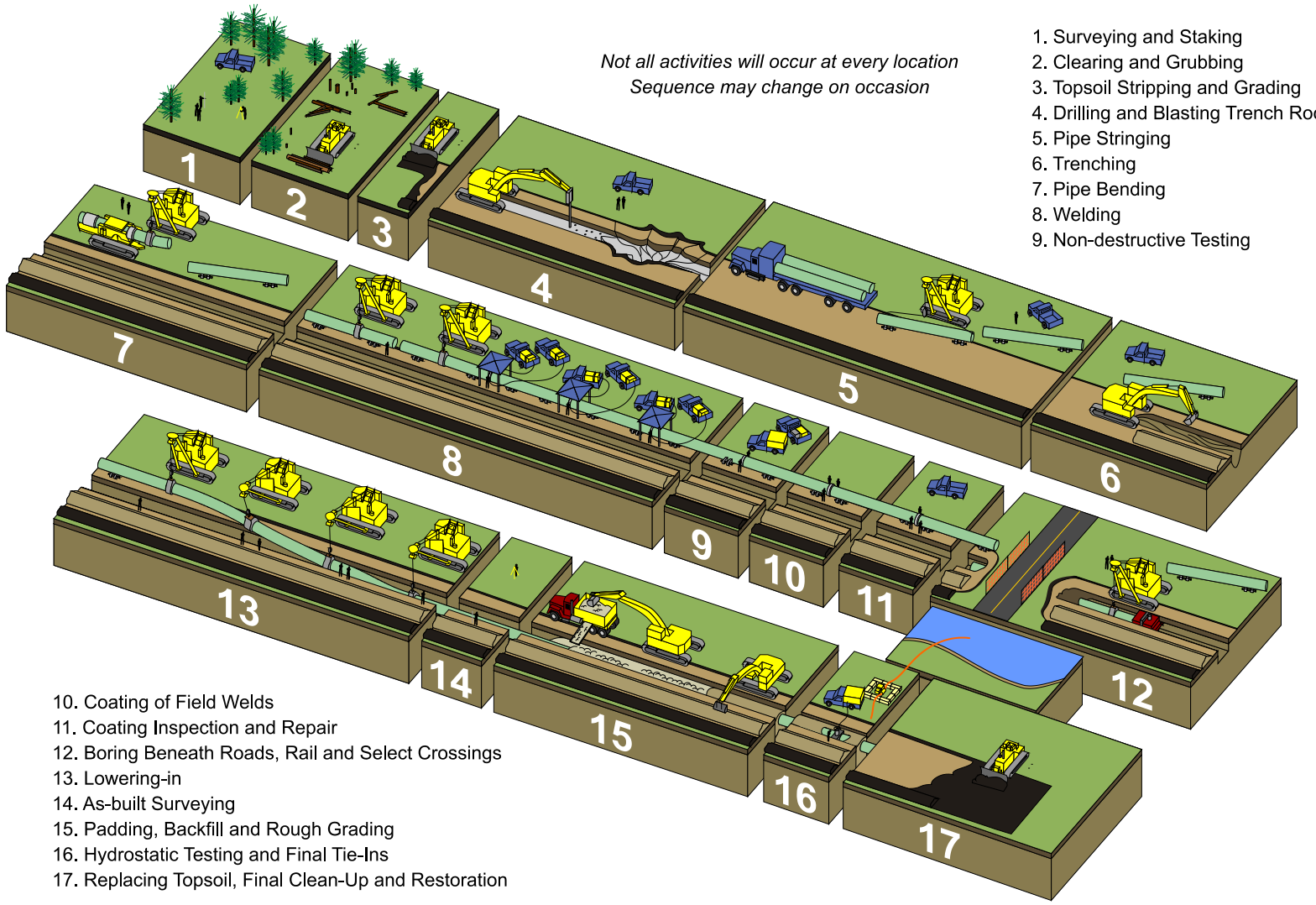
- The portions of pipeline that will be converted must first be isolated from interconnecting pipelines and the natural gas in the pipeline transferred to other natural gas lines.
- This is followed by in-line inspection of the pipe using a "smart pig" tool which runs through the pipeline to inspect the interior of the pipe for any defects that may impact the pipeline's integrity such as dents or wear on the protective coating.

- After the pipeline is inspected, it is cleaned using another type of pigging tool.

- Once the pipeline has been inspected and cleaned, any and all necessary repairs and improvements are carried out. If there are potential defects identified during the in-line inspection, crews will conduct integrity digs that involve exposing and visually inspecting the pipe for indications of damage. If damage is found, the necessary repairs will be conducted immediately. The steps involved in integrity digs are similar to new construction however on a much smaller scale (usually less than 100 m lengths).

- Existing compressor station connections are removed and new pump stations and shut-off valves will be constructed for safe operations of the newly converted portions of pipeline.

- In some cases, the entire pipeline is hydrostatically tested prior to putting the pipeline into new service for oil. Any ruptures are located, repaired and retested.




*Not all activities will occur at every location*
*Sequence may change on occasion*

1. Surveying and Staking
2. Clearing and Grubbing
3. Topsoil Stripping and Grading
4. Drilling and Blasting Trench Rock
5. Pipe Stringing
6. Trenching
7. Pipe Bending
8. Welding
9. Non-destructive Testing
10. Coating of Field Welds
11. Coating Inspection and Repair
12. Boring Beneath Roads, Rail and Select Crossings
13. Lowering-in
14. As-built Surveying
15. Padding, Backfill and Rough Grading
16. Hydrostatic Testing and Final Tie-Ins
17. Replacing Topsoil, Final Clean-Up and Restoration

**Source:** Trans Mountain Pipeline

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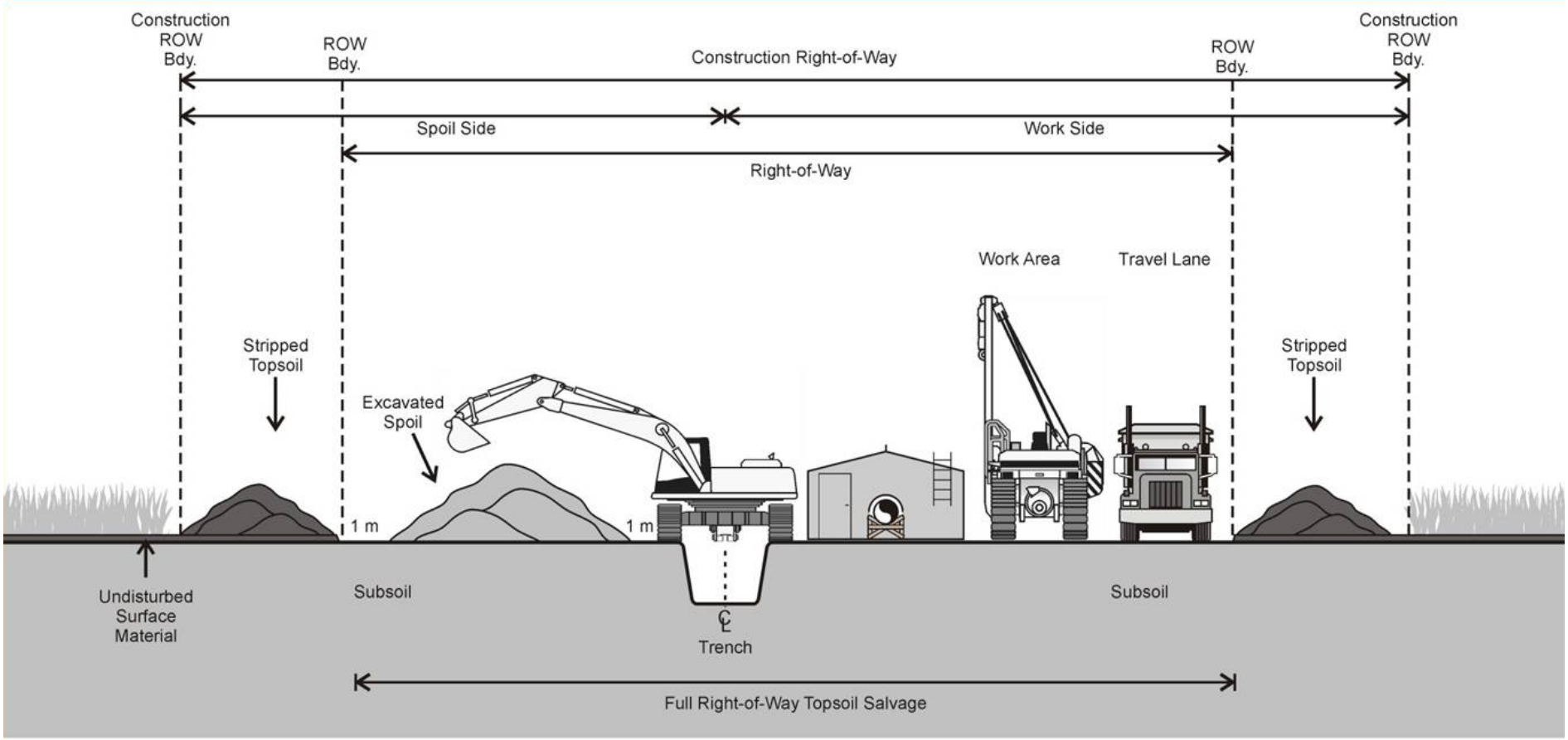
**TYPICAL PIPELINE CONSTRUCTION STEPS**

**BACKGROUND REPORT ON POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS ASSOCIATED WITH THE PROPOSED TRANSCANADA PIPELINES LIMITED ENERGY EAST PIPELINE PROJECT IN ONTARIO**

March 2014 | Figure B1




Profile
(Not to Scale)

**TYPICAL NEW CONSTRUCTION RIGHT-OF-WAY LAYOUT**

**BACKGROUND REPORT ON POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS ASSOCIATED WITH THE PROPOSED TRANSCANADA PIPELINES LIMITED ENERGY EAST PIPELINE PROJECT IN ONTARIO**

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Figure B2