# PROCEDURE

# Third Parties Completing Under Track Bores and Excavating On V/Line Leased Land

**DOCUMENT INFORMATION**

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| **Document ID** | NIPR-2659.1 |
| **Revision number** | 01 |
| **Owned by** | Network Development, Assets and Maintenance |
| **Date of issue** | 6/05/2025 |

## Table of Contents

# 1 Purpose

This document establishes the minimum actions required regarding third party installation of undertrack bores and other undertrack excavation.

# 2 Scope

All Infrastructure managed by V/Line under the Service Level Agreement.

# 3 Definitions, Acronyms and Abbreviations

Definitions, acronyms and abbreviations commonly used throughout this document are provided in Table 1 below.

***Table 1 – Definitions, acronyms and abbreviations used in this procedure***

| Term | Definition |
|---|---|
| **Horizontal Directional Drilling (HDD)** | Horizontal Directional Drilling also known as Directional Boring is a trenchless method for installing a pipe that serves as a conduit for liquids, gasses, signalling and telecommunication cables etc. HDD is a multi-stage process consisting of site preparation, equipment setup, drilling a pilot bore, pulling the pipe through the drilled hole and grouting the annulus between the pipe and borehole. HDD can start and end at ground level – no shaft or pit is required.<br>• A steerable drill is used to bore a pilot hole.<br>• The pilot hole is reamed out, as necessary, and stabilised with a drilling fluid to efficiently support the borehole.<br>• The pipe is pulled into the hole as the drill is withdrawn and remaining voids backfilled with grout. |
| **Micro-tunnelling** | Microtunnelling is a method of installing utility tunnels and underground service pipes to a high accuracy using a microtunnel boring machine (MTBM) without disturbing the ground above the tunnel. The pipes are generally installed behind the MTBM simultaneously via pipe jacking operation.<br>Microtunnelling process typically involves excavation of a launching shaft and a receiving shaft, MTBM to bore a tunnel through the ground, removing slurry of excavated soil through the launching shaft, installation of pipes into the tunnel and grouting the annulus. |
| **Pipe Jacking** | Pipe jacking is a method for installing underground service pipes using powerful hydraulic jacks to drive/push pipes through the ground behind a shield at the same time as excavation is taking place at the face.<br>Pipe jacking process typically involves excavation of a launching shaft and a receiving shaft, driving pipes using powerful hydraulic jacks, removing excavated soil from the launching shaft and grouting the annulus.<br>Pipe jacking is primarily used as an alternative to open cut or microtunnelling methods. Pipe jacking method involves installing shorter and smaller diameter pipes. It is less expensive, but causes more surface excavation/disturbance than microtunnelling.<br>Microtunnelling and pipe jacking are both trenchless technology and choosing the best method depends on factors such as geotechnical |

| Term | Definition |
|---|---|
| | condition, pipe diameter, installation length, ground disturbance tolerance, access requirements and cost. |
| **Danger Zone** | As per CAMG-2 *Site Access Guide*<br>All space within 3 metres horizontally from the nearest rail and any distance above or below this zone including being on the line unless a Position of Safety exists or can be created. |
| **Position of Safety (POS)** | As per CAMG-2 *Site Access Guide*<br>A place where people or equipment cannot be struck by rail traffic. |
| **Track Force Protection Co-ordinator (TFPC)** | As per CAMG-2 *Site Access Guide*<br>The qualified person appointed to assess and implement worksite protection arrangements on site. |
| **Track Force Protection** | "Track Force Protection (controlled rail traffic movements)" is used to indicate a situation whereby rail traffic would only pass the boring location at reduced train speed and while drilling is paused. |

# 4 Requirements for Boring and Excavation Within the Rail Corridor

Ensure adherence to these guidelines to maintain safety compliance and efficient project execution.

## 4.1 Undertrack Boring

### 4.1.1 Standards Compliance

- All bores under track must comply with V/Line standards and with AS 4799 *Installation of underground utility services and pipelines within railway boundaries*.
- Bore Hole Diameter and Train Running:
    - Less Than 100 mm Diameter: May be completed while trains are running, adhering to rail safe-working procedures.
    - Greater Than 100 mm Diameter: Preferably completed when no trains are running. Applicants must meet specific standards and requirements for these conditions.
- Applicant contractors must demonstrate their capability to adhere to all relevant standards for under track bores.
- Prior to commencing any HDD activities, a HDD Execution Plan must be completed, submitted and accepted by V/Line. This shall include assessment of Frac-Out Risk and identify the required response in event of Frac Out.

### 4.1.2 Angle of Bores Crossing Under Tracks

- Ensure that all pipelines crossing under railway tracks do so at a 90° angle, unless otherwise approved in writing by V/Line.

### 4.1.3 Pit Location

- No third-party pit may be located on V/Line land.
- All temporary or permanent pits closer then 5m from railway track centreline must comply with all relevant clearance standards, including:
    - NIST-012.2 *Specification for Signalling Supply, Construction and Installation*
    - NIST-012.2.1 *Standard for Construction of Cable Route and Signalling Civil Works*
    - NIST-0001 *Structure Gauge Envelopes – Minimum Clearances for Infrastructure Adjacent to the Railway*.
- All pits for use in boring operations must be located:
    - clear of the Danger Zone (3m from nearest outer rail),
    - where they do not impact any existing V/Line access or asset,
    - at least 10 meters from any V/Line embankment or other earthwork where they may impact the stability of the existing earthworks or infrastructure
    - such they do not impact on any track formation (ie go through or otherwise disturb the capping layer).

### 4.1.4 Ground Settlement

- Contractors performing any drilling or excavation works shall be deemed responsible for any ground movement or settlement that can reasonably be attributed to the excavation.
- Contractors must rectify and restore the ground to V/Line's satisfaction. If the contractor fails to do so, V/Line will carry out the necessary work and invoice the contractor.

### 4.1.5 Construction Methodologies

- Contractors must consult with V/Line regarding construction methodologies before beginning work to ensure alignment with their requirements.

### 4.1.6 Service Location

- All underground services within the V/Line lease areas must be located and provided for prior to commencement of excavation.
- Note that underground obstacles below V/Line track may not all be listed on Before You Dig Australia. Contractors must independently determine whether any obsolete services or other such obstacles are present.

### 4.1.7 Geotechnical Investigation

- At least four (4) boreholes must be drilled for geotechnical analysis within the rail reserve. The borehole shall be at least 1 m deeper than the proposed excavation depth.
- All geotechnical boreholes shall be outside the Danger Zone.
- At least two (2) of these geotechnical bores must be on each side of the tracks.

### 4.1.8 Design Compliance

- Approval from VicTrack or other third parties does not constitute V/Line approval.
- Design and construction must be based on the verified location of services and the geotechnical data obtained as a result of the required investigations.

## 4.2 HDD – Holes greater than 100 mm diameter

### 4.2.1 Encasing Pipe

A TFPC must be on site as soon as the bore head enters the rail reserve. Track Force Protection (controlled rail traffic movements) shall be in place from the time the bore first reaches the toe of the ballast on one side of the track. The protection shall remain in place until such time as the encasing pipe has been installed from the exit pit back to the entry pit at the toe of the ballast and the grouting between the borehole and encasing pipe has been completed. If a construction shift ceases prior to completing the encasing pipe installation and grouting, Track Force Protection (controlled rail traffic movements) shall remain in place until after the passage of the last train and be back in place before the passage of the first train.

### 4.2.2 Service Pipe without Encasing Pipe

A TFPC must be on site as soon as the bore head enters the rail reserve. As per Figure 1, Track Force Protection (controlled rail traffic movements) shall be in place from the time the bore commences to travel from the toe of the ballast on one side of the track. The protection shall remain in place until such time as the service pipe has been installed from the exit pit back to the entry pit at the toe of the ballast and the grouting between the borehole and service pipe has been completed. If a construction shift ceases prior to completing the service pipe installation and grouting, Track Force Protection (controlled rail traffic movements) shall remain in place until after the passage of the last train and be back in place before the passage of the first train.

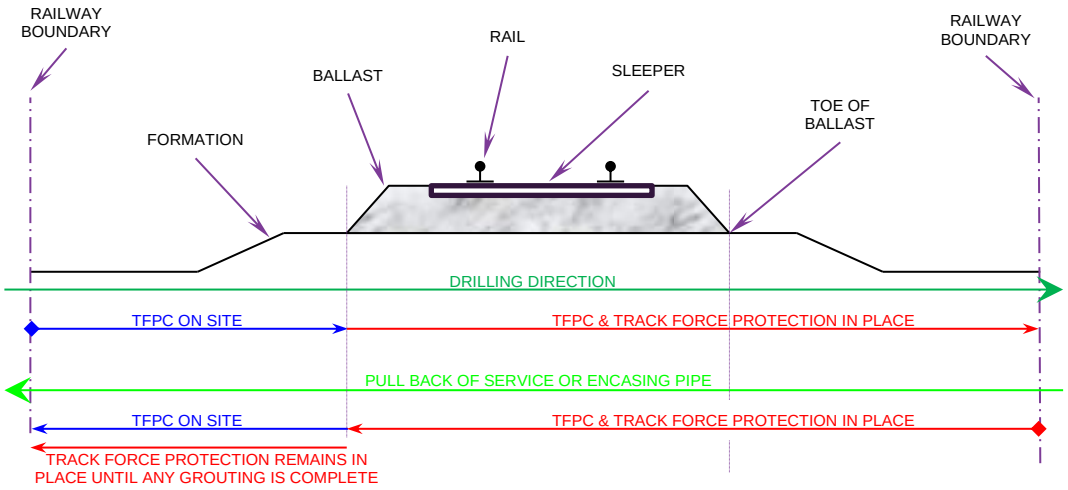


***Figure 1 – Schematic of HDD and Track Force Protection***

## 4.3 Pipe Jacking & Micro-Tunnelling – Holes Greater than 100 mm Diameter

As per Figure 2, a TFPC must be on site as soon as the cutter head enters the rail reserve. Track Force Protection (controlled rail traffic movements) shall be in place from the time the cutter head reaches the toe of the ballast on one side of the track until it reaches the toe of the ballast on the other side of the track. If a construction

shift ceases prior to completing the installation from one side of the toe of the ballast to the other side of the ballast, then the encasing or service pipe must be pushed right up to the cutter head to ensure there is no void between the pipe and the cutter head, and at this point the Track Force Protection (controlled rail traffic movements) can cease. Once drilling continues the Track Force Protection (controlled rail traffic movements) must be in place again until it reaches the opposite side of the ballast and from this point onwards an on-site TFPC presence will be sufficient. If the annulus between the borehole and encasing/service pipe needs to be grouted, then it must be grouted with Track Force Protection (controlled rail traffic movements) in place.

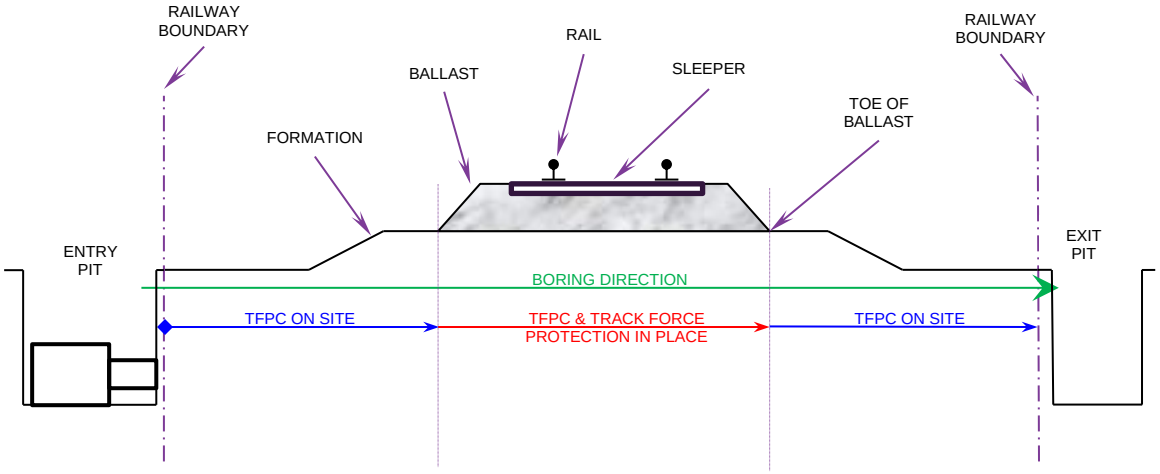


***Figure 2 – Schematic showing when to use Track Force Protection during Pipe Jacking or Microtunnelling***

## 4.4 Monitoring

### 4.4.1 Track Monitoring

Track monitoring shall be undertaken for all under track bores including HDD, pipe jacking and microtunnelling of greater than 100 mm diameter.

A Monitoring Action Plan shall be prepared prior to the commencement of any under track boring and grouting works. The Monitoring Action Plan shall include:

- monitoring methods to detect anomalies such as vertical settlement, horizontal movement, slumping and sloughing,
- monitoring frequency,
- data recording and reporting methods,
- notification and intervention levels,
- actions to be taken for each notification and intervention levels, and
- monitoring after the completion of works.

The track must be monitored at all times during all under track boring and grouting works to ensure that the geometry of the track is not compromised. The third party must make arrangements to have a competent person monitor the rail, by sight as well as string-lining (and comparison against limits provided within V/Line's track geometry standard NIST-2706) where possible anomalies are suspected. In addition – or in the absence of suitably qualified personnel for observing track geometry degradation – the track geometry monitoring may be performed by utilising surveying equipment, covering 20 m of track on either side of the bore (40 m in total) at 2 m

intervals (as per Figure 3). The measurements from any survey must be recorded at regular intervals and must be available to V/Line upon request. If a construction shift ceases prior to completing the installation of the encasing pipe or service pipe, track monitoring shall remain in place until after the last train and shall be reinstated prior to the first train passes.

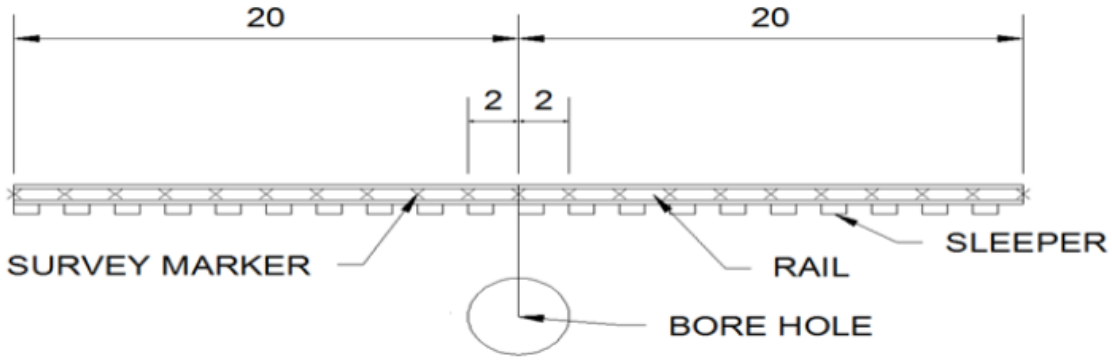


***Figure 3 – Typical track monitoring during undertrack boring***

## 4.5 Frac-out Monitoring

A 'frac-out' is the eruption of drilling fluid to the ground surface during horizontal directional drilling (HDD), impacting on the immediate surrounds.
Frac outs generally occur when the pressure within the bore exceeds the pressure of the overburden soil material, or the fluid finds an alternate path of least resistance within the ground (such as cracks, loose material such as creek gravel, animal burrows and decommissioned infrastructure).

A frac-out may contain contaminated material from the subsurface and can therefore be classified as a spill, even if the drilling fluid is inert. Spills in Victoria, including frac-outs, can be considered a reportable incident under EPA regulations.

### 4.5.1 Prior to Drilling

All personnel involved in HDD must implement measures to prevent frac-outs, especially in environmentally sensitive areas including waterways. Adequate planning, personnel, equipment, and monitoring must all be factored into preventing associated impacts.

The risk of frac-out shall be assessed prior to drilling. Geotechnical surveys, software modelling and supplier expertise can assist in the identification of potential risks.

Site specific environmental management procedures shall be prepared where a HDD is being used and NIMG-2741 shall be complied with.

SPPR-4348 may be referenced for further information on Frac Out Management and assessment.

### 4.5.2 Responses to Frac Outs

Any untested material is to be transported and disposed of as waste code T130-H Sludge and slurries including drilling mud with hazardous substances.

Sludges and slurries, including drilling mud, are classified as, at a minimum, a priority waste under the Environment Protection Regulations 2021. This waste is required to be disposed of at a location licensed to accept it.

Under Section 133 of the Environment Protection Act 2017 it is an offence to deposit industrial waste at a place or premises unless the place or premises is authorised to receive industrial waste.

# 5 Reference Documents

This procedure should be read and applied in conjunction with the following documents:

## 5.1 V/Line Documents

| Doc ID | Title | Relationship |
|---|---|---|
| **NIST-0001** | Structure Gauge Envelopes – Minimum Clearances for Infrastructure Adjacent to the Railway | Peer |
| **NIST-012.2.1** | Standard for Construction of Cable Route and Signalling Civil Works | Peer |
| **NIST-012.2** | Specification for Signalling Supply, Construction and Installation | Peer |
| **SAPR-73** | Excavation, Trenching, Penetration and Services Management | Peer |
| **SPPR-4348** | Frac-out Management Procedure[1] | Peer |
| **CAMG-2** | Site Access Guide | Peer |
| **NIST-2706** | Track Geometry | Peer |
| **NIST-2659** | Earthworks and Drainage | Parent |
| **NIMG-2741** | Third Party Safety and Environmental Management Handbook | Peer |

## 5.2 Other Documents and Standards

| Reference | Title |
|---|---|
| **AS 4799-2000** | Installation of underground utility services and pipelines within railway boundaries |

# 6 Document History

| Rev | Prepared/Revised by | Date | MoC |
|---|---|---|---|
| **01** | Peter Bartle - Senior Engineer – Rail Management | 6/05/2025 | N/A |
| | **Change description:**<br>• New document produced from previous uncontrolled document. | | |

[1] While the current scope of SPPR-4348 (Rev2) indicates required compliance from Third Parties; advice at the time of publication of this document from the Document Owner and the V/Line Environment Team is that mandatory compliance of SPPR-4348 by third parties is not required as V/Line does not have operational control over the associated HDD works and that NIMG-2741 governs the obligations of third parties with relation to their obligations in the event of an incident.