



2 Formal consent

2.1 Within an easement

The promoter of any works (see Section 11) within an easement (or within 3m of asset location) shall provide Cadent with details of the proposed works including a risk assessment and method statement of how the work is intended to be carried out. Work shall not go ahead until formal written consent has been given by Cadent. This will include details of Cadent's protection requirements, contact telephone numbers and the emergency telephone number. On acceptance of Cadent's requirements, the promoter of the works shall give Cadent at least 14 days notice before commencing work on site.

In addition to formal written consent, an easement crossing agreement (deed of indemnity) may be required. This shall be discussed with the Cadent responsible person prior to the commencement of the works.

2.2 Within a highway

Work shall be notified to Cadent in accordance with the requirements of The New Roads and Street Works Act (NRSWA) and HSG47. The promoter of any works within the highway should provide Cadent with details of the proposed works, including a risk assessment and method statement of how the work is intended to be carried out. This shall be submitted at least 14 days before the planned work is to be carried out. If similar works are being carried out at a number of locations in close proximity, a single risk assessment and method statement should be adequate depending on the nature of the works. Work should not go ahead until formal written consent has been given by Cadent. This will include details of Cadent's protection requirements, contact telephone numbers and the emergency telephone number.

3 Health, safety and environmental considerations

3.1 Safe control of operations

All working practices shall be agreed by Cadent prior to work commencing. All personnel working on site shall be made aware of the potential hazard of the asset and the actions they should follow in case of an emergency.

3.2 Deep excavations

Special consideration should be given to the hazards associated with deep excavations when working within or at a close proximity to the asset.

3.3 Positioning of plant

Unless written authority has been given by Cadent, mechanical excavators and any other powered mechanical plant shall not be sited or moved over an asset location.

Mechanical excavators and any other powered mechanical plant shall not dig on one side of the asset when the cab of the excavator positioned on the other side. Mechanical excavators, any other powered mechanical plant, and other traffic shall be positioned far enough away from the asset trench to prevent trench wall collapse.

3.4 Risk assessment

Works in the vicinity of gas assets may have an impact on the safety of the general public, site workers, Cadent staff and contractors, and may affect the local environment. Anyone (e.g. contractors, site workers, farmers, local authorities etc.) working close to the asset, shall carry out suitable and adequate risk assessments. The risk assessment must have acceptance from the Cadent responsible person prior to the commencement of work, to ensure that all such issues are properly considered and risks mitigated.

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4 Location of gas assets

Cadent asset records shall be consulted to establish the indicative location of the gas assets in relation to the promoters work area.

Prior to site work commencing the gas assets should be located to verify the indicative location.

This should be carried out through non-intrusive methods utilising pipe locators. Once located the gas assets should be marked out at regular intervals using asset location markers with triangular flags (see Appendix A) or other suitable methods.

The requirements for trial holes to locate the asset or determine levels at crossing points shall be determined on site by the Cadent responsible person.

For assets exceeding 2 bar, the excavation of all trial holes shall be monitored by Cadent. For assets not exceeding 2 bar, this monitoring will be at the discretion of the Cadent responsible person. Any changes shall be agreed by Cadent.

Safe digging practices, in accordance with HSE publication HS(G)47 should be followed. Direct and consequential damage to gas plant can be dangerous both to employees and to the general public

5 Temporary and permanent protective measures

No temporary or permanent protective measures, including the installation of concrete slab protection, shall be installed over or near to the Cadent asset without the prior permission of Cadent. Cadent will need to approve the material, dimensions and method of installation of the proposed protective measure.

The method of installation shall be confirmed through the submission of a formal written method statement from the contractor to Cadent. Where permanent slab protection is to be applied over the asset, Cadent will normally carry out a coating survey of metallic assets to check that there is no existing damage to the coating prior to the slab protection being put in place.

Cadent shall therefore be given at least 14 days notice prior to the laying of any slab protection to arrange for this survey to be carried out.

Generally, due to the need for future access to below 2 bar gas assets, permanent slabs are not permitted but, can be approved at Cadent's discretion.

The safety precautions detailed in section 3 and either section 6 or 7 of this document should also be observed during the installation of the asset protection.



6 Working in the vicinity of a gas asset exceeding 2 bar

6.1 Excavation

6.1.1 In proximity to an asset in an easement

Following location and marking of the asset in agreement with the Cadent responsible person, powered mechanical excavation may be used no closer than 3 meters (See Figure 1). The use of toothed excavator buckets vastly increases the potential for damage to assets, therefore only toothless buckets shall be used.

Any fitting, attachment or connecting pipework on the asset shall be exposed by hand. If third parties are using any form of trench support system they shall ensure that none of the components are in contact with the Cadent asset.

Consideration may be given to a relaxation of these limits or lower risk excavation methods by agreement with the Cadent responsible person on site.

Where sufficient depth of cover exists and the absence of attachments and projections has been confirmed (e.g. valve spindles, pressure points etc.) and following evidence from hand dug trial holes, light tracked vehicles may be permitted to strip topsoil to a depth of 0.25 metres, using a toothless bucket. No topsoil or other materials shall be stored within the easement without the written permission of Cadent. No fires are allowed in the easement strip or close to above ground gas installations.

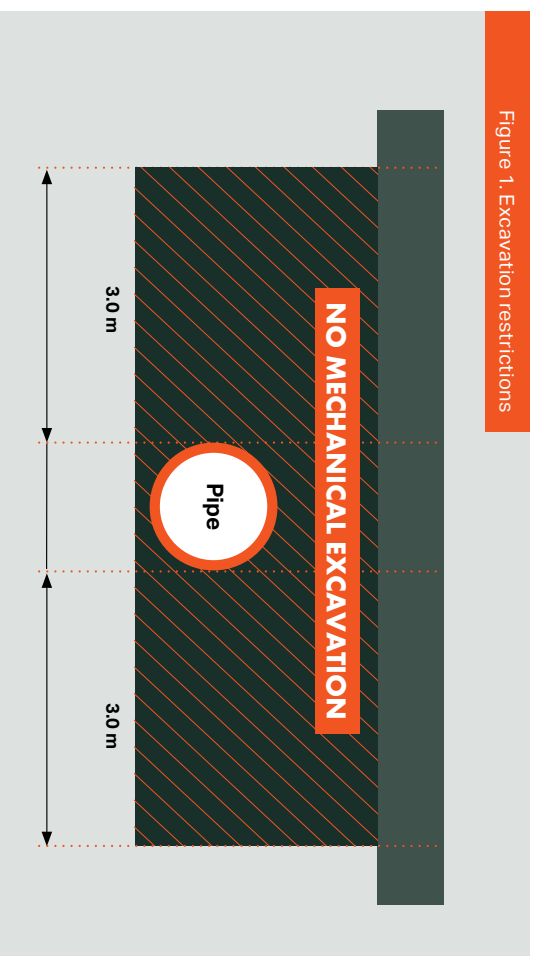


Figure 1. Excavation restrictions

After the completion of the work, the level of cover over the asset should be the same as that prior to work commencing, unless otherwise agreed by Cadent.

No new service shall be laid parallel to the asset within the easement. In special circumstances, and only with formal written agreement from Cadent, this may be relaxed for short excursions where the service shall be laid no closer than 0.6 metres.

Where work is being carried out parallel to the asset, within or just alongside the easement, suitable barriers shall be erected for protection between the works and the asset to prevent encroachment.

6.1.2 In proximity to an asset in the highway

Following location and marking of the asset in agreement with the Cadent responsible person, powered mechanical excavation may be used no closer than 3 meters (See Figure 1).

The use of toothed excavator buckets vastly increases the potential for damage to assets, therefore only toothless buckets shall be used.



Any fitting, attachment or connecting pipework shall be exposed by hand. If third parties are using any form of trench support system they shall ensure that none of the components are in contact with the Cadent asset.

Removal of the bituminous or concrete highway surface layer by mechanical means is permitted to a depth of 0.3 metres, unless any attachments or projections are present on the asset (e.g. valve spindles, pressure points etc.). The use of chain trenchers is not permitted within 3 metres of the asset. The Cadent responsible person may need to be present to monitor this work. Where the bituminous or concrete highway surface layer extends below 0.3 metres deep, it shall only be removed by hand-held power assisted tools under the observation of Cadent.

In special circumstances, consideration may be given to a relaxation of these rules by agreement with the Cadent responsible person and only whilst they remain on site.

6 Working in the vicinity of a gas asset exceeding 2 bar

6.1.3 Crossing over an asset (Open cut)

Where a new service is to cross over the asset, a clearance distance of 0.6 metres between the crown of the asset and underside of the service should be maintained. If this cannot be achieved, the service shall cross below the asset. (see section 6.1.4).

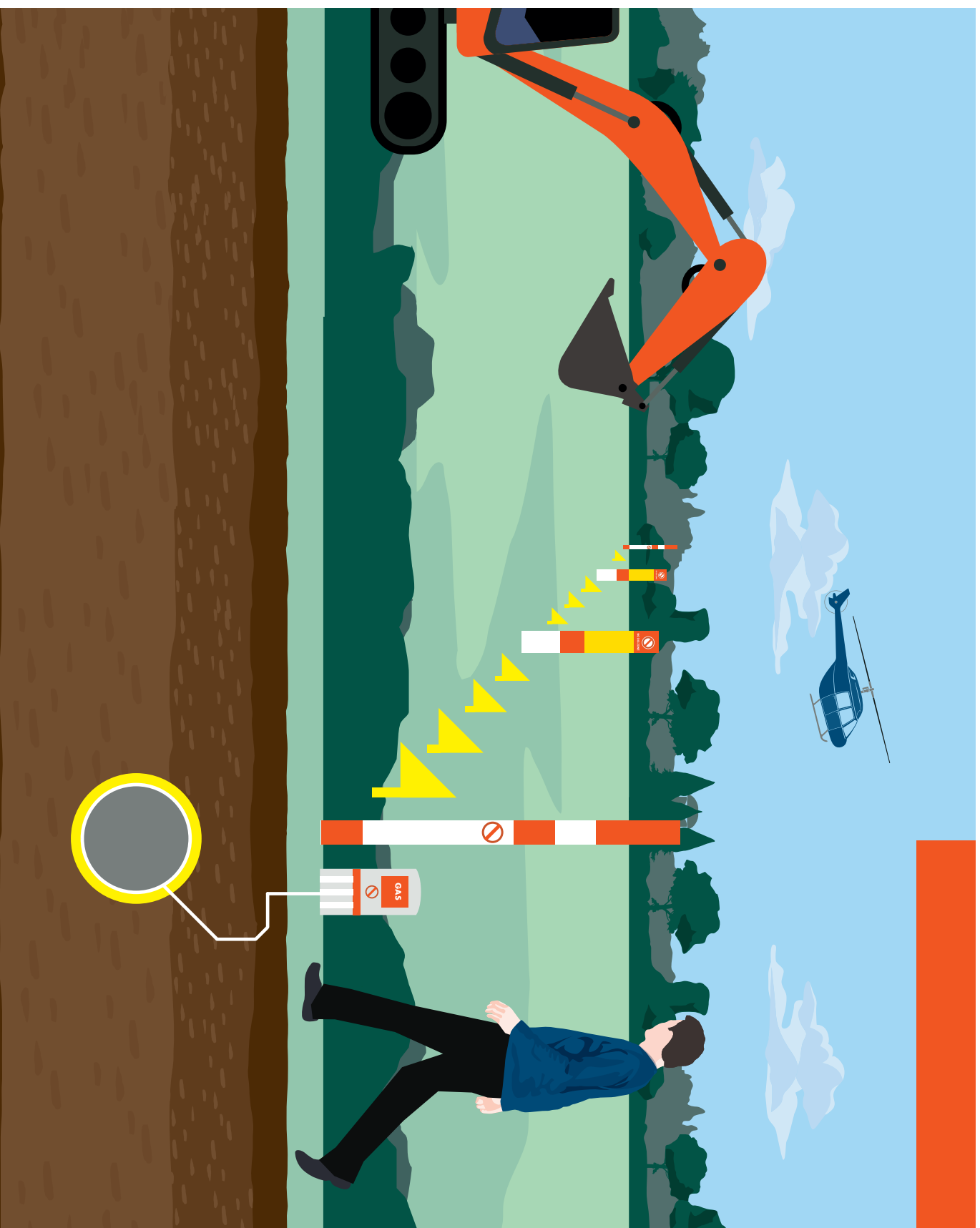
In special circumstances, this distance may be reduced at the discretion of the Cadent responsible person on site.

6.1.4 Crossing below an asset (Open cut)

Where a service is to cross below the asset, a clearance distance of 0.6 metres between the crown of the service and underside of the asset shall be maintained. Where lengths of pipe greater than one metre are to be exposed, the Cadent responsible person shall be consulted.

The exposed asset/s should be suitably supported and protected by matting and timber cladding. Any supports shall be removed prior to backfilling.

In special circumstances, this clearance distance may be reduced at the discretion of the Cadent responsible person on site.



6 Working in the vicinity of a gas asset exceeding 2 bar

6.1.5 Cathodic protection

Cathodic protection (CP) is applied to Cadent's buried steel pipe and is a method of protecting assets from corrosion by maintaining an electrical potential between the pipe and anodes placed at strategic points along the asset.

Where a new service is to be laid and similarly protected, the party installing the CP system will undertake tests to determine whether the new service is interfering with the cathodic protection of the Cadent asset.

Should any cathodic protection posts or associated apparatus need to be moved to facilitate third party works, at least 14 days notice shall be given to Cadent. Cadent will undertake this work and any associated costs will be borne by the third party.

6.1.6 Installation of electrical equipment

Where electrical equipment is being installed close to Cadent's buried steel assets, the effects of a rise of earth potential under fault conditions shall be considered by the third party and a risk assessment and method statement shall be submitted to Cadent for approval, prior to the works.

The installation of electrical cables parallel to Cadent assets may induce currents into the asset. This may interfere with the effective operation of the cathodic protection system.

In these instances, Cadent will require the promoter of the works to conduct pre and post energisation potential surveys of Cadent's asset. The costs for any stray current mitigation systems required will be borne by the third party promoter.

6.2 Construction traffic

Where existing roads cannot be used, construction traffic should ONLY cross the asset at agreed locations. Notices shall be placed directing traffic to the crossing points. Post and wire fencing shall be erected at all crossing points. The fence should cover the width of the easement and extend a further 6 metres along the length of the easement on both sides. (See figure 2)

The asset shall be protected, at the crossing points by a suitable method agreed with the Cadent responsible person prior to installation. The third party shall review ground conditions, vehicle types and crossing frequencies to determine the type and construction of the raft required.

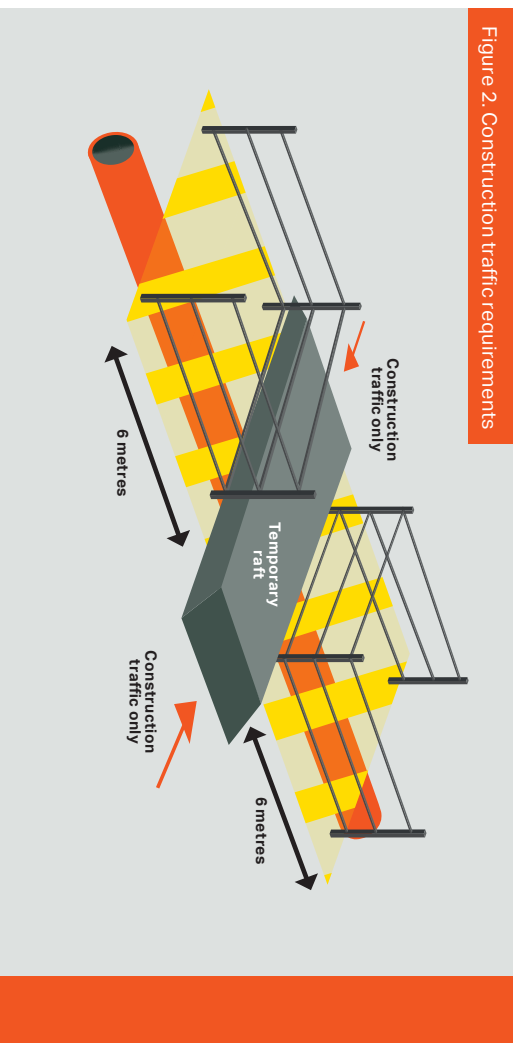
For larger scale projects, or permanent solutions, a protection slab may be required.

6.3 Specific activities

This section details the precautions that need to be taken when carrying out certain prescribed activities in the vicinity of the asset. The promoter of works is required to consult Cadent when intending to undertake one of the listed activities and/or further advice is required on whether the work has the potential to affect the asset. The table to the right shows, for some specific activities, the prescribed distances where the advice of Cadent shall be sought (see sections 6.3.1 to 6.3.13 for further details)

Activity	Distance within which Cadent advice shall be sought
Piling	15 m
Surface mineral extraction	100m
Landfilling	100 m
Demolition	150 m or 400m for structure mass > 10000 tonnes
Blasting	500 m if the MIC is greater than 200 kg 250 m if the MIC is greater than 10 kg but less than 200 kg 100 m if the MIC is 10 kg or less.
Deep mining	1000 m
Wind turbine	Not permitted within 1.5 times the turbine mast height from the nearest edge of a pipeline (please see www.ukopa.co.uk)

Figure 2. Construction traffic requirements



6 Working in the vicinity of a gas asset exceeding 2 bar

6.3.1 Trenchless techniques

Where trenchless techniques are being considered, a formal risk assessment and method statement shall be produced. This risk assessment and method statement shall be formally agreed with Cadent prior to the commencement of the work. Please provide Cadent with at least 14 days notice as the Cadent responsible person may wish to be present to monitor this work.

6.3.2 Changes to depth of cover

The depth of cover over Cadent's asset shall not be altered. Cadent shall be consulted for any activity proposed that will lead to a change in cover over the asset. Expert advice may need to be sought, which will be determined by the Cadent responsible person.

6.3.3 Piling

No piling shall be allowed within 15 metres of an asset without an assessment of the vibration levels at the asset. The peak particle velocity at the asset shall be limited to a maximum level of 75 mm/sec. The promoter of the works should provide Cadent the anticipated vibration levels prior to the work commencing. The ground vibration should be monitored by the promoter to verify the anticipated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set at suitable increments to provide a forewarning of limit exceedance. The promoter shall retain records of ground vibration levels for provision of the Cadent responsible person on request.

Where ground conditions include silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the asset shall be made. Expert advice may need to be sought, which can be arranged through Cadent.

6.3.4 Demolition

No demolition should be allowed within 150 metres of an asset, or 400 metres for a structure mass greater than 10,000 tonnes, without an assessment of the vibration levels at the asset. The peak particle velocity at the asset shall be limited to a maximum level of 75 mm/sec.

The promoter of the works should provide Cadent the anticipated vibration levels prior to the work commencing. The ground vibration should be monitored by the promoter to verify the anticipated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set at suitable increments to provide a forewarning of limit exceedance. The promoter shall retain records of ground vibration levels for provision of the Cadent responsible person on request.

Where ground conditions include silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the asset shall be made. Expert advice may need to be sought, which can be arranged through Cadent.

6.3.5 Blasting

The Maximum Instantaneous Charge (MIC) dictates the distance at which an assessment of the vibration levels (at the located asset) is required. The measured distances are as follows:

- 500 m if the MIC is greater than 200 kg
 - 250 m if the MIC is greater than 10 kg but less than 200 kg
 - 100 m if the MIC is 10 kg or less.
- The peak particle velocity at the asset shall be limited to a maximum level of 75 mm/sec.

The promoter of the works should provide Cadent the anticipated vibration levels prior to the work commencing. The ground vibration should be monitored by the promoter to verify the anticipated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set at suitable increments to provide a forewarning of limit exceedance. The promoter shall retain records of ground vibration levels for provision of the Cadent responsible person on request.

Where ground conditions include silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the asset shall be made. Expert advice may need to be sought, which can be arranged through Cadent.



6 Working in the vicinity of a gas asset exceeding 2 bar

6.3.6 Surface mineral extraction

An assessment shall be carried out on the effect of surface mineral extraction activity within 100 metres of an asset. Consideration should also be given to extraction around other plant and equipment associated with assets (e.g cathodic protection ground beds).

Where the mineral extraction extends up to the asset easement, a stable slope angle and stand-off distance between the asset and slope crest shall be determined by Cadent.

The easement strip should be clearly marked by a suitable permanent boundary, such as a post and wire fence. Additionally, where appropriate, slope indicator markers shall be erected to facilitate the verification of the recommended slope angle as the slope is formed, by the third party. The asset easement and slope needs to be inspected periodically to identify any signs of developing instability. This may include any change of slope profile including:

- bulging,
- the development of tension cracks on the slope or easement,
- any changes in drainage around the slope.

The results of each inspection should be recorded.

Where surface mineral extraction activities are planned within 100 metres of the asset but do not extend up to the asset easement boundary, Cadent shall assess

whether this could promote instability in the vicinity of the asset. This may occur where the asset is routed

across a natural slope or the excavation is deep. A significant cause of this problem is where the groundwater profile is affected by changes in drainage or the development of lagoons.

Where the extraction technique involves explosives, the provisions of **section 6.3.5 apply**.

6.3.7 Deep Mining

Assets routed within 1 km of active deep mining may be affected by subsidence resulting from mineral extraction. The determination of protective or remedial measures will normally require expert assistance, which can be arranged through Cadent.



6 Working in the vicinity of a gas asset exceeding 2 bar

6.3.8 Landfilling

The creation of slopes outside of the asset easements may promote instability within the vicinity of the asset. Cadent should carry out an assessment to determine the effect of any landfilling activity within 100 metres of an asset. The assessment is particularly important if landfilling operations are taking place on a slope in which the asset is routed.

6.3.9 Pressure testing

Hydrostatic testing of a third party asset should not be permitted within 8 metres either side of a Cadent asset, to provide protection against the effects of a burst. Where this cannot be achieved, typically where the third party asset needs to cross a Cadent asset, one of the following precautions would need to be adopted:

- Limiting of the design factor of the third party pipeline to 0.3 at the asset's nominated maximum operating pressure (MOP), and the use of pre-tested pipe, or
- the use of sleeving, or
- Cadent conduct risk analysis of pipe failure

In either case, the third party shall submit their site specific risk assessment and safe system of works for consideration by Cadent.

6.3.10 Seismic surveys

The promoter of works shall advise Cadent of any seismic surveying work in the vicinity of an asset that will result in peak particle velocities in excess of 50 mm/ sec at the asset.

The promoter of the works should provide Cadent the anticipated vibration levels prior to the work commencing. The ground vibration should be monitored by the promoter to verify the anticipated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set at suitable increments to provide a forwarning of limit exceedance. The promoter shall retain records of ground vibration levels for provision of the Cadent responsible person on request.

6.3.11 Hot work

Where the Cadent's metallic gas asset has been exposed, welding (or other hot works that may involve naked flames) should not be carried out in proximity of the gas asset. This may be reduced if suitable protection and precautions has been agreed with Cadent.

If the gas asset is PE (or a PE asset is contained within a metallic sleeve) welding, or other hot works that may involve naked flames, should not take place within 0.5 m of the gas asset. This may be reduced if suitable protection and precautions have been agreed with the Cadent responsible person to prevent against the effects of sparks, radiant heat transfer etc.

The Cadent responsible person will be present to monitor all welding, burning or other 'hot work' that takes place.

6.3.12 Wind turbines

Wind turbines shall not be sited any closer than 1.5 times the proposed height of the turbine mast away from the nearest edge of the asset.

6.3.13 Solar farms

Solar farms can be built adjacent to assets but never within the easement. Advice shall be sought from Cadent at the early stages of design to ensure that electrical interference, security, future access and construction methods can be mutually agreed.

6.4 Backfilling

No backfilling should be undertaken without Cadent's agreement to proceed. The Cadent responsible person will stipulate the necessary consolidation requirements. Some equipment may not be suitable for use over or around the asset due to the adverse effects of excessive compaction and vibration levels. The Cadent responsible person will be able to advise on suitable equipment. Third parties undertaking work shall provide Cadent with 48 hours notice, or shorter only if agreed with Cadent, of the intent to backfill over, under or alongside the asset.

This requirement should also apply to any backfilling operations that:

- are within 3 metres of the asset, or
- could influence the ground stability.

Any damage to the asset or coating shall be reported to Cadent in order that damage can be assessed and repairs can be carried out.

Minor damage to pipe coating and test leads will be repaired by Cadent free of charge. If the asset has been backfilled without the knowledge of the Cadent responsible person, the third party will need to re-excavate to enable the condition of the asset coating to be assessed.

7 Working in the vicinity of a gas asset not exceeding 2 bar

7.1 Excavation

7.1.1 Working in vicinity of iron pipework

Where excavation work this is deeper than 1.5 metres is within 8 metres of grey iron mains an integrity assessment will be required by the Cadent responsible person.

Care should be taken to ensure that any cast iron asset is suitably protected and supported during the works. This is due to the susceptibility of the pipe material to fracture and joint leakage.

Precautionary measures should be agreed with the Cadent responsible person before exposing an iron fitting, for example, bend, tee or cap, etc. This is to ensure that fittings that are not self-anchored are adequately protected against failure during excavation.

7.1.2 In proximity to an asset in an easement

Excavation with a powered mechanical excavator should not be carried out until the asset has been located using vacuum or hand excavation. All mechanical excavation should be undertaken whilst utilising a banksman and shall not be permitted within 0.5 metres of the asset.

The use of toothed excavator buckets vastly increases the potential for damage to assets, therefore only toothless buckets shall be used.

Any fitting, attachment or connecting pipework shall be exposed by hand. If third parties are using any form of trench support system they shall ensure that none of the components are in contact with the Cadent asset.

Consideration may be given to a relaxation of these limits or lower risk excavation methods by agreement with the Cadent responsible person on site.

Where sufficient depth of cover exists and the absence of attachment and projections has been confirmed (e.g. valve spindles, pressure points etc.) and following evidence from hand dug trial holes, light tracked vehicles may be permitted to strip topsoil to a depth of 0.25 metres, using a toothless bucket.

No topsoil or other materials shall be stored within the easement without the written permission of Cadent. No fires are allowed in the easement strip or close to above ground gas installations.

After the completion of the work, the level of cover over the asset should be the same as that prior to work commencing, unless otherwise agreed with by Cadent.

No new service shall be laid parallel to the asset within the easement. In special circumstances, and only with formal written agreement from Cadent, this may be relaxed for short excursions where the service shall be laid no closer than 0.6 metres.

Where work is being carried out parallel to the asset, within or just alongside the easement, suitable barriers shall be erected for protection between the works and the asset to prevent encroachment.

7.1.3 In proximity to an asset in the highway

Excavation with a powered mechanical excavator should not be carried out until the asset has been located using vacuum or hand excavation.

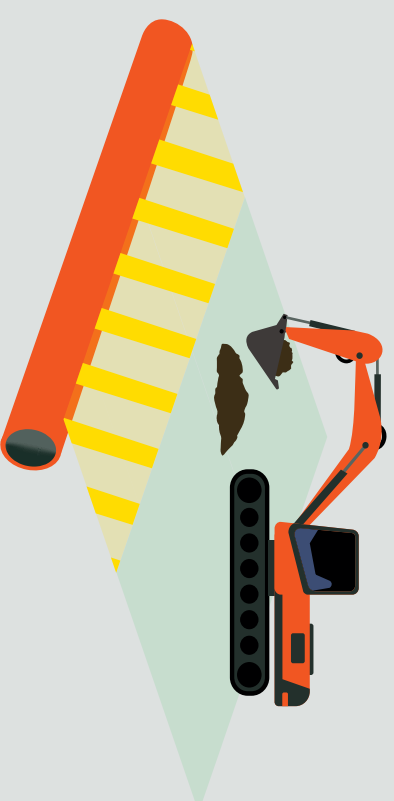
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Removal of the bituminous or concrete highway surface layer by mechanical means is permitted to a depth of 0.3 metres, unless any attachments or projections are present on the asset (e.g. valve spindles, pressure points etc.). The use of chain trenchers to do this is not permitted within 3 metres of the asset. The Cadent responsible person may need to be present to monitor this work. Where the bituminous or concrete highway surface layer extends below 0.3 metres deep, it shall only be removed by hand-held power assisted tools under the observation of Cadent.

In special circumstances, consideration may be given to a relaxation of these rules by agreement with the Cadent responsible person on site and only whilst they remain on site.



7 Working in the vicinity of a gas asset not exceeding 2 bar

7.1.4 Crossing over an asset (Open cut)

Where a new service is to cross over the asset a minimum clearance distance of 1.5 times the diameter or 0.3 metres, whichever is greater should be maintained. If this cannot be achieved, the service shall cross below the asset, see **Section 7.1.4.**

In special circumstances, this distance may be reduced at the discretion of the Cadent responsible person on site.

7.1.5 Crossing below an asset (Open cut)

Where a service is to cross below the asset, a minimum clearance distance of 1.5 times the diameter or 0.3m, whichever is greater, between the crown of the new service and underside of the asset shall be maintained. The exposed asset/s should be suitably supported and protected by matting and timber cladding. Any supports shall be removed prior to backfilling.

7.1.6 Cathodic protection

Cathodic protection (CP) is applied to some buried steel pipes and is a method of protecting assets from corrosion by maintaining an electrical potential between the asset and anodes placed at strategic points along the asset. Where a new service is to be laid and similarly protected, the party installing the CP system will undertake tests to determine whether the new service is interfering with the cathodic protection of the Cadent asset.

Should any cathodic protection posts or associated apparatus need moving to facilitate third party works, appropriate notice, at least 14 days, shall be given to Cadent. Cadent will undertake this work and any associated costs will be borne by the third party.

7.1.7 Installation of electrical equipment

Where electrical equipment is being installed close to Cadent's buried steel asset, the effects of a rise of earth potential under fault conditions shall be considered by the third party and a risk assessment and method statement shall be submitted to Cadent for approval, prior to the works.

The installation of electrical cables parallel to Cadent assets may induce currents into the asset. This may interfere with the effective operation of the cathodic protection system. In these instances, Cadent will require the promoter of the works to conduct pre and post energisation potential surveys of Cadent's asset. The costs for any stray current mitigation systems required will be borne by the third party promoter.

7.2 Construction traffic

Where existing roads cannot be used, construction traffic should ONLY cross the asset at agreed locations. Notices shall be placed directing traffic to the crossing points. Post and wire fencing shall be erected at all crossing points.

The fence should cover the width of the easement and extend a further 6 metres along the length of the easement on both sides. **(See figure 2)**

The asset shall be protected, at the crossing points, by a suitable method agreed with the Cadent responsible person prior to installation. The third party shall review ground conditions, vehicle types and crossing frequencies to determine the type and construction of the raft required.

For larger scale projects, or permanent solutions, a protection slab may be required.

7.3 Specific activities

This section details the precautions that need to be taken when carrying out certain prescribed activities in the vicinity of the asset. The promoter of works is required to consult Cadent when intending to undertake one of the listed activities and/or further advice is required on whether the work has the potential to affect the asset. The table to the right shows, for some specific activities, the prescribed distances where the advice of Cadent shall be sought **(see Sections 6.3.1 to 6.3.13 for further details)**

Activity	Distance within which Cadent advice shall be sought
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Deep mining	1000 m
Wind turbine	Not permitted within 1.5 times the turbine mast height from the nearest edge of a pipeline (please see www.ukopa.co.uk)

7 Working in the vicinity of a gas asset not exceeding 2 bar

7.3.1 Trenchless techniques

Where trenchless techniques are being considered, a formal risk assessment and method statement shall be produced. This risk assessment and method statement shall be formally agreed with Cadent prior to the commencement of the work. Please provide Cadent with at least 14 days notice as the Cadent responsible person may wish to be present to monitor this work.

7.3.2 Changes to depth of cover

The depth of cover over Cadent's asset shall not be altered. Cadent shall be consulted for any activity proposed that will lead to a change in cover over the asset. Expert advice may need to be sought, which will be determined by the Cadent responsible person.



7.3.3 Piling

No piling shall be allowed within 15 metres of an asset without an assessment of the vibration levels at the asset.

For steel or PE assets, the peak particle velocity at the asset shall be limited to a maximum level of 75 mm/sec.

For ductile or cast iron assets, the peak particle velocity shall be limited to a maximum level of 25 mm/sec.

The promoter of the works should provide Cadent the anticipated vibration levels prior to the work commencing. The ground vibration should be monitored by the promoter to verify the anticipated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set at suitable increments to provide a forewarning of limit exceedance. The promoter shall retain records of ground vibration levels for provision of the Cadent responsible person on request.

Where ground conditions include silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the asset shall be made. Expert advice may need to be sought, which can be arranged through Cadent.

7.3.4 Demolition

No demolition should be allowed within 150 metres of an asset for 400m for a structure mass greater than 10000 tonnes without an assessment of the vibration levels at the asset.

For steel or PE assets, the peak particle velocity at the asset shall be limited to a maximum level of 75 mm/sec.

For cast iron or ductile iron assets, the peak particle velocity at the asset shall be limited to a maximum level of 25 mm/sec.

The promoter of the works should provide Cadent the anticipated vibration levels prior to the work commencing. The ground vibration should be monitored by the promoter to verify the anticipated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set at suitable increments to provide a forewarning of limit exceedance. The promoter shall retain records of ground vibration levels for provision of the Cadent responsible person on request.

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7.3.5 Blasting

The Maximum Instantaneous Charge (MIC) dictates the distance at which an assessment of the vibration levels (at the located asset) is required. The measured distances are as follows:

- 500 m if the MIC is greater than 200 kg
- 250 m if the MIC is greater than 10 kg but less than 200 kg
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For steel or PE assets, the peak particle velocity at the asset shall be limited to a maximum level of 75 mm/sec.

For ductile or cast iron assets, the peak particle velocity at the asset shall be limited to a maximum level of 25 mm/sec.

The promoter of the works should provide Cadent the anticipated vibration levels prior to the work commencing. The ground vibration should be monitored by the promoter to verify the anticipated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set at suitable increments to provide a forewarning of limit exceedance. The promoter shall retain records of ground vibration levels for provision of the Cadent responsible person on request.

Where ground conditions include silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the asset shall be made. Expert advice may need to be sought, which can be arranged through Cadent.

7 Working in the vicinity of a gas asset not exceeding 2 bar

7.3.6 Surface mineral extraction

An assessment shall be carried out on the effect of surface mineral extraction activity within 100 metres of an asset. Consideration should also be given to extraction around plant and equipment associated with assets (e.g cathodic protection ground beds).

Where the mineral extraction extends up to the asset easement, a stable slope angle and stand-off distance between the asset and slope crest shall be determined by Cadent. Where an easement exists, the easement strip should be clearly marked by a suitable permanent boundary, such as a post and wire fence. Additionally, where appropriate, slope indicator markers shall be erected to facilitate the verification of the recommended slope angle as the slope is formed, by the third party. The asset easement and slope needs to be inspected periodically to identify any signs of developing instability. This may include any change of slope profile including:

- bulging,
- the development of tension cracks on the slope or easement,
- any changes in drainage around the slope.

The results of each inspection should be recorded.

Where surface mineral extraction activities are planned within 100 metres of the asset but do not extend up to the asset easement boundary, Cadent shall assess whether this could promote instability in the vicinity of the asset.

This may occur where the asset is routed across a natural slope or the excavation is deep. A significant cause of this problem is where the groundwater profile is affected by changes in drainage or the development of lagoons.

Where the extraction technique involves explosives, the provisions of **Section 7.3.5** apply.

7.3.7 Deep mining

Assets routed within 1 km of active deep mining may be affected by subsidence resulting from mineral extraction. The determination of protective or remedial measures will normally require expert assistance, which can be arranged through Cadent.

7.3.8 Landfilling

The creation of slopes outside of the asset easements may promote instability within the vicinity of the asset. Cadent should carry out an assessment to determine the effect of any landfilling activity within 100 metres of an asset. The assessment is particularly important if landfilling operations are taking place on a slope in which the asset is routed.

7.3.9 Pressure testing

Pressure testing should not be permitted within 8 m of an asset unless suitable precautions have been taken against the effects of a pipe failure.

7.3.10 Seismic surveys

The promoter of works shall advise Cadent of any seismic surveying work in the vicinity of PE or steel assets that will result in peak particle velocities in excess of 50 mm/sec at the asset or for ductile or cast iron assets that will result in peak particle velocities in excess of 25 mm/sec at the asset.

The promoter of the works should provide Cadent the anticipated vibration levels prior to the work commencing. The ground vibration should be monitored by the promoter to verify the anticipated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set at suitable increments to provide a forewarning of limit exceedance. The promoter shall retain records of ground vibration levels for provision of the Cadent responsible person on request.

7.3.11 Hot work

Where the Cadent's metallic gas asset has been exposed, welding (or other hot works that may involve naked flames) should not be carried out in proximity of the gas asset. This may be reduced if suitable protection and precautions has been agreed with Cadent.

If the gas asset is PE (or a PE asset is contained within a metallic sleeve) welding, or other hot works that may involve naked flames, should not take place within 0.5 metres of the gas asset. This may be reduced if suitable protection and precautions have been agreed with the Cadent responsible person to prevent against the effects of sparks, radiant heat transfer etc.

The Cadent responsible person will determine the need to remain on site to monitor all welding, burning or other 'hot work' that takes place.

7.3.12 Wind turbines

Wind turbines shall not be sited any closer than 1.5 times the proposed height of the turbine mast away from the nearest edge of the asset.

7.3.13 Solar Farms

Solar Farms can be built adjacent to assets but never within the easement. Advice shall be sought from Cadent at the early stages of design to ensure that electrical interference, security, future access and construction methods can be mutually agreed.



7 Working in the vicinity of a gas asset not exceeding 2 bar

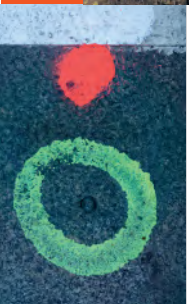
7.4 Backfilling

No backfilling should be undertaken without Cadent's agreement to proceed. The Cadent responsible person will stipulate the necessary consolidation requirements. Some equipment may not be suitable for use over or around the asset due to the adverse effects of excessive compaction and vibration levels. The Cadent responsible person will be able to advise on suitable equipment. Third parties undertaking work shall provide Cadent with 48 hours notice, or shorter notice only if agreed with Cadent, of the intent to backfill over, under or alongside the asset. This requirement should also apply to any backfilling operations that:

- are within 3 metres of the asset, or
- could influence the ground stability.

Any damage to the asset or coating shall be reported to the Cadent responsible person in order that damage can be assessed and repairs can be carried out.

Minor damage to pipe coating and test leads will be repaired by Cadent free of charge. If the asset has been backfilled without the knowledge of the Cadent responsible person, the third party will need to re-excavate to enable the condition of the asset coating to be assessed.



8 Working in the vicinity of an Above Ground Installation (AGI)

Where excavations are to be made within 10 metres of the perimeter of an associated gas installation, appropriate protection methods should be determined and recorded by the Cadent responsible person.

At least 14 days notice is required as Cadent may wish to be on site when specific activities are being undertaken.

In addition to this, the safety advice detailed in either section 6 or 7 shall be observed when working in the proximity of an AGI. Access to the gas asset should be maintained at all times.

9 Action in the case of damage to the asset

If the Cadent asset is damaged, even slightly, and even if no gas leak has occurred, then the following precautions shall be taken immediately:

- Shut down all plant and machinery and extinguish any potential sources of ignition.
- Evacuate all personnel from the vicinity of the asset
- Notify Cadent using the free 24 hour emergency telephone number 0800 111999
- Notify the Cadent responsible person immediately using the contact telephone number provided.
- Ensure no one approaches the asset.
- Do not try to stop any leaking gas.
- Provide assistance as requested by Cadent, or emergency services to safeguard persons and property.

10 References

NRSWA	New Roads & Street Works Act
HS(G)47	HSE Guidance 'Avoiding Danger from Underground Services'
IGEM/SR/18	Safe Working Practices to Ensure the Integrity of Gas Pipelines and Associated Installations (Institution of Gas Engineers)

11 Glossary of Terms

Easement	Easements are negotiated legal entitlements between Cadent and landowners and allow Cadent to lay, operate and maintain assets within the easement strip. Easement strips may vary in width, typically between 6 and 25 metres depending on the diameter and pressure of the pipeline. Consult Cadent for details of the extent of the easement strip where work is intended.
Liquefaction	Liquefaction is a phenomenon in which the strength and stiffness of the soil is reduced by earthquake shaking or other rapid loading. Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. When liquefaction occurs, the strength of the soil decreases and the ability of the soil to support assets are reduced.
Promoter of works	The person or persons, firm, company or authority for whom new services, structures or other works in the vicinity of existing Cadent assets are being undertaken.
Cadent responsible person	The person or persons appointed by Cadent with the competencies required to act as the Cadent representative for the purpose of monitoring the particular activity.
Banksman	Another person who assists the machine operator to drive from a position where they can safely see into the excavation and warn the driver of any services or other obstacles. This person should remain outside of the operating radius of the excavator arm and bucket.

Appendix A

Asset location markers



Emergency

If you hit an asset, whether the damage is visible or not, or in the event of an emergency, call the National Gas Emergency Service immediately on

0800 111 999*

*All calls are recorded and may be monitored

If you are planning to do work near or in the vicinity of an asset, please contact the Plant Protection team for free on:

**0800 688 588*
plantprotection@cadentgas.com**

Cadent Plant Protection
Block 1
Brick Kiln Street
Hinckley
LE10 0NA

Self service for plant enquiries

beforeyoudig.nationalgrid.com

This is a free online enquiry service giving results within minutes from a grid reference, postcode or street name. This site allows you to submit enquiries about activities and work that you are planning, which may have an impact on the Cadent gas distribution and networks.

linesearchbeforeudig.co.uk

This is a free online enquiry service giving instant results from a grid reference, postcode or street name. If your result is within a zone of interest, you can click directly through to **cadentgas.com/digging-safely**.

Note

Linesearch service is not available for all Cadent assets. Therefore, please click on the Cadent link or call Plant Protection to ensure you have all the available information.

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