
Department of Planning and Environment

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Draft Guideline for planning proposals near High Pressure Dangerous Goods pipelines

Guideline

April 2022



Acknowledgement of Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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Introduction

This guideline is designed to assist planning authorities, pipeline operators and proponents identify and consider safety risks for planning proposals in the vicinity of high-pressure dangerous goods (HP DG) pipelines. It also provides information to proponents on requirements in terms of land use safety risk considerations at the planning proposal stage.

This guideline relates to the main HP DG pipelines in NSW identified in [Clause 66C \(3\) of State Environmental Planning Policy \(Infrastructure\) 2007](#) (Infrastructure SEPP), which contain natural gas (methane), gasoline (liquid petroleum), ethane and jet fuel.

Natural gas and gasoline are used primarily as a fuel, ethane is principally used as a raw material for the manufacture of ethylene and jet fuel is used to power aircraft. The exact locations of HP DG pipelines are withheld from the public to protect them from targeted damage and ensure community safety.

Background

HP DG pipelines exist in the NSW built environment and some traverse the State. They are subject to potential hazards – mainly from leaks, due to:

- mechanical failures, including material defects or design and construction faults
- corrosion, including both internal and external corrosion
- ground movement and other failures, including ground movement due to earthquakes, heavy rains/floods or operator error, and other natural hazards such as lightning
- third party activity, including damage from heavy plant and machinery, or damage from drills/boring machines or hot tapping.

The impact of a potential hazard is described as its risk profile. The risk profile is generally determined by the type of material being transported, the size of a HP DG pipeline, its operating pressure, and the size and sensitivity of the population near a pipeline. In extreme circumstances, potential consequences of pipeline failure include asphyxiation, fires, vapour cloud explosions, toxic smoke and explosions in confined spaces.

Understanding risks in land use planning

A generic risk analysis, undertaken to investigate potential land use impacts from the HP DG pipelines in operation within NSW, has informed the identification of land use safety risk consideration distances for **planning proposals** near HP DG pipelines. These distances are described in the next section.

Within the NSW planning system, [Hazardous Industry Planning Advisory Paper No 4 - Risk Criteria for Land Use Safety Planning](#) (HIPAP 4) sets out the **risk criteria** for land use safety planning and

Hazardous Industry Planning Advisory Paper No 10 - Land Use Safety Planning (HIPAP 10) reiterates these criteria in the context of **proposed developments** in the vicinity of potentially hazardous infrastructure, such as HP DG pipelines.

Although HIPAP 4 and HIPAP 10 apply to development applications, their principles and criteria are also considered applicable for planning proposals, which are the type of proposals covered by this guideline.

Risks can be considered in a qualitative and quantitative manner. Qualitative risk criteria consider risk acceptability by principles, such as whether there may be a more suitable location or layout for the proposal. Quantitative risk criteria measure risk in terms of the potential for individual injury or fatality risks and societal risks.

Individual risk analysis can determine whether risks from a potential hazard source are too high for an individual when taking into account the person's vulnerability/sensitivity. This will determine whether a location is suitable for certain land uses.

Societal risk describes the risk of incidents from an existing hazard source that could potentially injure many people within a broader location. This consideration is relevant if the proposal introduces a significant population or is surrounded by a large population.

Risk specialists must be engaged to undertake quantitative risk analyses. In the context of this guideline, these analyses should consider the specifications of the pipeline, locality and surrounding land uses and populations, in accordance with Hazardous Industry Planning Advisory Paper No 6 – Hazard analysis (HIPAP 6), and compared against the HIPAP 4 risk criteria.

Section 9.1 Direction

A Ministerial direction under Section 9.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) is proposed to be developed that requires councils to consider risks to and from HP DG pipelines for planning proposals near this infrastructure. Accordingly, this guideline applies to planning proposals near HP DG pipelines.

The Department of Planning and Environment will also adopt the application of the direction in considering risk when undertaking its functions of preparing environmental planning instruments and for strategic and precinct planning.

The proposed direction (and this Guideline) will apply to planning proposals that are:

- within a defined proximity of the HP DG pipeline – meaning that a portion of, or all the planning proposal area is within the land use safety risk consideration distance from a pipeline; **and**
- proposed sensitive uses or proposals involving significant population increase – meaning that the planning proposal seeks to introduce sensitive uses or vulnerable people (such as child care or hospitals) or other uses that may result in a significant population increase on land that is within the land use safety risk consideration distance from a pipeline (e.g. multi-dwelling housing).

Proximity to HP DG pipelines

Table 1 outlines distances from HP DG pipelines that encompass the application area for the direction and this guideline. These distances were established through the generic risk analysis.

Table 1 - Land use safety risk consideration distances* (m) from either side of the pipelines

Gasoline pipeline	Natural gas pipeline	Ethane pipeline	Jet fuel pipeline
140	200	140	140

(*Distances measure from the centreline of the pipeline)

Proposals near HP DG pipelines that must consider land use safety risks

Planning proposals that introduce a sensitive use or that may result in a significant population increase include (but are not limited to):

- proposals with sensitive uses such as hospitals and health services facilities; schools or childcare centres; or aged care facilities
- changes of use that would introduce vulnerable occupants, such as those that would be difficult to evacuate in an emergency (such as occupants of aged care or a childcare centre)
- proposals that would see a significant increase in the population, such as residential apartment buildings/complexes, townhouses or commercial buildings/complexes, or a planning proposal proposing large-scale land subdivision
- proposals that significantly increase the working population of an area including strata industrial units and multi-storey industrial development.

Proposed changes to how land is used that will see similar numbers of occupants as existing uses are unlikely to be classified as a significant population increase.

While planning proposals introducing sensitive uses or a significant population increase near a HP DG pipeline must consider land use safety risks, other proposals near a HP DG pipeline may also need to consider risk consistent with HIPAP 6 – Hazard Analysis and compared against the HIPAP 4 risk criteria, if a planning authority deems this appropriate.

Planning authorities or proponents requiring further information or clarification on identifying a planning proposal that is required to consider risk consideration from a HP DG pipeline should contact the department’s hazard team via email at hazards@planning.nsw.gov.au.

Notifying a proponent that a planning proposal is to consider land use safety risk

To avoid delays and costs associated with planning proposals, proponents should engage as early as possible with the relevant planning authority through a pre-lodgement meeting to determine if the relevant land will require a consideration of pipeline risks.

Where this is the case, the planning authority must notify the proponent as soon as practical. Maps and spatial data that identify the land use safety risk consideration distances will be provided to all relevant planning authorities. For the protection of the HPDG pipeline infrastructure and the community, this information is not made publicly available.

Process to consider risk

Step 1: Determine if a proposal needs to consider risk

When a council (or other relevant planning authority) is made aware of a planning proposal, they can use pipeline location information provided by the department to ascertain if the proposal is within the land risk safety consideration distance.

Step 2: Notify proponent

Councils will need to notify proponents if a consideration of risk associated with HP DG pipelines is required.

Step 3: Consider risks

If the proposal is within the land risk safety consideration distance, and is proposing to introduce sensitive uses or a use that will significantly increase population in the area, a proponent will need to ensure that risks associated with the infrastructure are considered.

This will require the proponent to engage a qualified risk specialist to prepare a quantitative risk assessment in accordance with this guideline and HIPAP 6. The assessment will demonstrate consistency with the quantitative and qualitative risk criteria as provided in HIPAP 4 and:

- is site-specific
- considers the existing and proposed population, individual risk factors and recommended setbacks (see Table 4 below)
- if more than one pipeline is in the vicinity of the proposal, assesses the risk of propagation between the pipelines
- illustrates a comprehensive understanding of the hazards and risk associated with the operation of the pipeline and its operation parameters.

Step 4: Contact the department

If required, council should contact the department's hazards team for further information at hazards@planning.nsw.gov.au.

Considering risk

Site specific quantitative risk analyses must be undertaken by a qualified risk specialist. The information outlined below was established by a generic risk assessment of selected HP DG pipelines in NSW, and is intended to establish baseline recommendations for site-specific quantitative risk assessments. Site specific quantitative risk assessments may provide differing recommendations from those outlined below. It is important to note that recommendations differing from those in this Guideline do not make them inconsistent with this Guideline or make a proposal inappropriate for approval. There may be site specific features or mitigating factors that affect the suggested setback distances.

Population and societal risk considerations

The existing and proposed population should be considered in terms of population density, which can be determined from Census data. It represents the population divided by the area of a lot or suburb. Table 2 shows 2016 Census data and corresponding population density ranges.

Table 2 – Population density range

Typical building types for the density range	Proportion of Greater Sydney (2016 Census)	Population density range
Separate house	74%	0 to 5,500 people per km ²
Townhouses, semi-detached or apartment blocks up to 2 storeys	6%	5,500 to 10,500 people per km ²
Apartment blocks more than 3 storeys	20%	10,500 -16,300 people per km ²

When considering societal risk, consider both employment and residential populations. The existing employment population is available through [Transport for NSW's Journey to Work data](#) and could be used as a guide.

In the event where societal risk, as it relates to both the existing and proposed population, exceeds the societal risk criteria, this may require the scale of the development or built form to be reconsidered or other mitigation measures be included. Approval of a planning proposal will be assessed based on its merits with consideration of other factors such as economic or social benefits and environmental impacts. Pipeline risks is only one of the considerations.

Individual risk consideration

Individual risk considers the risk profile of the hazard to an exposed individual. It is location-specific and usually illustrated as risk contours, whereby the closer the risk source, the higher the risk level. HIPAP 4 defines NSW individual fatality risk criteria (Table 3) that considers the different vulnerability of recipients and it is the only individual fatality risk criteria to be considered for pipeline risks.

HIPAP 4 also details the individual risk criteria for injury. Generally, the risk from existing pipelines are low enough that individual risk of injury does not need to be assessed for pipeline risk.

Table 3 - Individual fatality risk criteria

Land use	Suggested criteria (risk in a million per year)
Hospitals, schools, childcare facilities, seniors housing	0.5
Residential, hotels, motels, tourist resorts	1
Commercial developments, retail centres, offices and entertainment centres	5
Sporting complexes and active open space	10
Industrial	50

Setback distances

Where individual risk criterion for a relevant land use cannot be met, a setback will usually be required. The recommended setback distances are provided in Table 4. The setback distances provide a reference for a planning proposal in the vicinity of a pipeline, indicating whether there is land use compatibility issues with the pipeline.

A site-specific risk analysis should be undertaken that considers the pipeline specifications including diameter and maximum allowable operating pressure. This outcome of the risk analysis will determine the setback distance specific to the planning proposal.

Table 4 - Recommended setback distances* (m) for land uses from either side of the pipeline

Land uses	Gasoline pipeline	Natural gas pipeline	Ethane pipeline	Jet fuel pipeline
Residential land uses	Not required	Not required	85	Not required

Land uses	Gasoline pipeline	Natural gas pipeline	Ethane pipeline	Jet fuel pipeline
Sensitive uses (e.g. school, hospital, childcare, aged care)	60	100	115	60

(*Distances measure from the centreline of the pipeline)

(*Distances measure from the centreline of the pipeline)

Multiple HP DG Pipelines

Some areas are affected by multiple HP DG pipelines. The risk exposure from multiple pipelines will need to be evaluated on a case-by-case basis.

A quantitative risk assessment in accordance with HIPAP 6 will likely be required to assess the potential risk from all existing pipelines. The findings from the risk study may also provide useful information to individual developer and could potentially influence the design layout consideration for subsequent development applications. For proposals located near multiple HP DG pipelines it is encouraged to contact the relevant planning authority and the Department as early as possible to discuss and identify the potential implication to the proposal.

Consistency with this Guideline

If a proposal does not align with the recommended setback distances in Table 4 and/or introduces a population density more intensive than the population group in Table 2, this does not mean a proposal is inconsistent with this Guideline and cannot be supported by a planning authority.

A site-specific risk analysis may support the merit of the proposal and allow for alternative approaches to ensure risks have been appropriately considered and mitigated. For example, a proposal may revise the site layout or orientation of buildings in response to site-specific risk analysis or may establish a maximum population for uses within the proposal.

Other alternatives may include providing more protection to the pipeline itself, such as concrete casing around the pipeline or reducing the risk of damage to the pipeline by setting limits on the size of excavators used when undertaking site preparation and construction works.

Consideration of AS 2885

All HP DG pipelines licensed under the *Pipelines Act 1967* are required to comply with Australia Standard AS 2885 – Pipelines – Gas and Liquid Petroleum (AS 2885). Pipeline operators are accountable for the safety and the integrity of the pipeline system and its safety management.

Part 0 to Part 5 AS 2885 details requirements for the design, construction and operations of a pipeline. Part 6 relates to pipeline safety management and explains pipeline operators' requirements when development is encroaching on existing pipelines.

The requirements under Part 6 of AS 2885 differ from the land use safety consideration principles under the planning framework as described in *State Environmental Planning Policy No 33 – Hazardous and Offensive Development* and the associated HIPAP 10 guideline. However, satisfying requirements under AS 2885 is equally important to ensure the risk to the pipeline is appropriately mitigated.

AS 2885 outlines a measurement length area from a specific pipeline is defined based on the worst-case impact distance from the pipelines without consideration of the likelihood of occurrence of such event. It is often referred as measurement length and established in accordance with Part 0 of AS 2885.

AS 2885 requires pipeline operators to define measurement lengths from their assets that outline the worst-case scenario impact distance in the case of pipeline failure. The measurement length is established based on a consequence analysis, it sets out an area larger than the area described in the guideline, which is a risk-based approach.

Some developments near HP DG pipelines may require a review of a pipeline operator's safety management study to mitigate any potential hazards to and from the existing pipeline from the proposed development.

A planning authority should seek to notify and gather advice from pipeline operators as early as possible on planning proposals where risks need to be considered. This assists pipeline operators to effectively fulfill their requirements under AS 2885, and efficiently begin the process of reviewing a safety management study if required. Information and feedback from pipeline operators will also assist planning authorities in their assessment of risk consideration.