

Modification 6 of the IXOM Chlor-Alkali Plant – Chlorine Liquefaction Plant

State Significant Development Modification Assessment Report (DA35/98-Mod-6)

July 2026





Acknowledgement of Country

The Department of Planning, Housing and Infrastructure acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and 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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Modification 6 of the Chlor-Alkali Plant – Chlorine Liquefaction Plant
(DA35/98- Mod-6) Assessment Report

Published: July 2026

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Preface

This assessment report provides a record of the Department of Planning, Housing and Infrastructure's (the Department) assessment and evaluation of IXOM's application to modify the Chlor-Alkali Plant development consent (DA35/98) for construction and operation of a Chlorine Liquefaction Plant located in the Bayside local government area. The report includes:

- a description of the proposed modification
- an assessment of the modification against government policy and statutory requirements, including mandatory considerations
- a demonstration of how matters raised by the community and other stakeholders have been considered
- an assessment of the likely environmental, social and economic impacts of the modification
- an evaluation which weighs up the likely impacts and benefits of the modification, having regard to the proposed mitigation measures, community views and government advice, and provides a view on whether the impacts are, on balance, acceptable
- a recommendation to the decision-maker, along with the reasons for the recommendation, to assist them in making an informed decision about whether the consent should be modified and any conditions that should be imposed.

Executive Summary

Modification

IXOM Operations Pty Ltd (the Applicant) operates a Chlor-Alkali Plant (CAP) at 16-20 Beauchamp Road, Matraville in the Bayside local government area (LGA). The CAP is located in the southern part of the Botany Industrial Park, which has operated as a major industrial complex since 1941. The CAP produces a range of chlorine-based products for water disinfection and industrial processes.

The modification seeks to construct and operate a Chlorine Liquefaction Plant (CLP) at the site to supply liquid chlorine for water disinfection. A CLP previously operated on the site until it was decommissioned in the early 2000s.

The proposed CLP would have a maximum production capacity of 50 tonnes per day. There would be no change to the total chlorine production volumes from the existing facility, being 35,000 tonnes per annum. The CLP would be housed inside a new containment building fitted with air quality treatment equipment. All liquid chlorine storage, handling and filling operations would be undertaken inside the containment building.

Statutory context

Development consent for the CAP was granted on 6 November 1998 by the former Minister for Urban Affairs and Planning. Therefore, the Minister for Planning and Public Spaces (Minister) may modify the consent.

The Department is satisfied the proposed modification is within the scope of section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and does not constitute a new development application.

Engagement

The Department exhibited the modification from 3 September 2025 until 23 September 2025. The Department received 17 submissions from the public including 6 unique submissions, 1 form letter (with 11 entries) and 10 from special interest groups. The majority of public submissions were from residences living near the site. Submissions were also received from Bayside Council and Randwick City Council.

There were a total of 11 objections to the modification, 6 in support and 2 providing comments. Bayside Council initially objected but later advised it was satisfied with the modification, leaving a total of 10 objections. Advice was received from 12 government agencies, with all providing comments.

Key concerns raised in public submissions related to public safety and the potential risks from the CLP being close to residential areas. Several submissions commented in detail on the hazard and risk

scenarios that were assessed, dangerous goods transport risk, and the importance of public awareness of emergency notification and incident response procedures. Several submissions requested an independent expert be engaged to assess the safety of the proposal.

Public submissions supporting the modification were from water utility organisations, highlighting the importance of strengthening the supply chain for critical chemicals used in water disinfection.

Bayside Council initially requested the Department halt its assessment of the modification until all potential risks are fully quantified, mitigated and managed. Randwick City Council questioned whether the modification could be considered ‘substantially the same’ as the original development and raised concerns about the risk profile, dangerous goods transport and cumulative impacts.

Government authorities requested clarifications on the hazards and risk assessments, air quality and contamination. Several government authorities noted the importance of securing the supply chain for critical water treatment chemicals.

The Applicant provided a Submissions Report (SR) on 31 March 2026 addressing the issues raised and responding to questions from the Department on the Quantitative Risk Assessment and Dangerous Goods Transport Risk Assessment. The SR was made public on the Department’s website and was provided to Councils and relevant government authorities for advice.

Following a review of the SR, Bayside Council advised the SR had satisfactorily addressed the health and public safety concerns previously raised, and noted Bayside Council was satisfied with the proposed modification. Randwick City Council reiterated its original concerns and provided recommended conditions. The Environment Protection Authority and SafeWork NSW recommended conditions for the modification.

Assessment

The potential hazards and risks associated with the modification is the key assessment issue. The Department conducted a detailed analysis of the Applicant’s Quantitative Risk Assessment and Dangerous Goods Transport Risk Assessment with reference to baseline studies. Clarifications were sought on these studies to ensure the assumptions reflected worst-case scenarios to ensure a level of conservatism in the assessment.

The hazard and risks studies showed the modified facility would improve the management of chlorine storage on site, by enclosing all chlorine storage, handling and filling activities inside a containment building fitted with air quality treatment equipment. The risks of the modified facility, including the existing CAP and the CLP considered cumulatively, would remain below the land use safety risk criteria at all off-site receivers under all operating conditions.

The dangerous goods transport risk assessment demonstrated the modification would have little effect on the risk profile, as dangerous goods transport risk is dominated by liquefied petroleum gas (LPG) tanker movements unrelated to the IXOM facility.

The Department has recommended a range of conditions to ensure continual monitoring and management of hazards and risks from the modified facility including:

- pre-construction studies to ensure the risk reduction measures and critical safeguards for the CLP are implemented in the detailed design
- pre-commissioning studies covering emergency and safety management
- post-commissioning verification monitoring on the air quality treatment equipment
- limits on storage quantities and transport routes
- 3 yearly independent hazard audits
- 5 yearly quantitative risk assessments to verify the extent of risk from the overall facility does not extend beyond that assessed for this modification.

The Department's assessment of other issues including contamination, air quality, noise, traffic, flooding and greenhouse gas concluded the modification would comply with relevant criteria and would not result in adverse environmental impacts. The Department has recommended conditions for remediation, noise, construction, traffic and stormwater management.

Conclusion

Overall, the Department's assessment concludes the modification is appropriate on the basis that:

- the hazard and risks of the modified facility have been thoroughly assessed and would comply with the land use safety risk criteria detailed in the Department's *Hazardous Industry Planning and Advisory Paper No.4 Risk Criteria for Land Use Safety Planning* (HIPAP 4)
- it would meet air quality impact assessment criteria at all off-site receiver locations
- it would comply with the existing noise limits for the IXOM facility
- the additional traffic movements would be adequately accommodated on the road network
- the site can be remediated to be made suitable for the proposed industrial land use
- it would improve national supply chain resilience for critical water treatment chemicals.

As such, the Department considers the modified project is in the public interest and recommends that the consent is modified subject to conditions.

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1 Introduction

The modification application seeks to modify the Chlor-Alkali Plant consent (DA35/98) to permit construction and operation of a chlorine liquefaction plant.

The application was lodged on 27 August 2025 by IXOM Operations Pty Ltd (IXOM) pursuant to section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

A detailed overview of the proposed modification is provided in **Section 2**.

1.1 Background

The Applicant operates a Chlor-Alkali Plant (CAP) at 16-20 Beauchamp Road Matraville, in the Bayside local government area, see **Figure 1** and **Figure 2**.



Figure 1 | Regional Context

The CAP is in the Botany Industrial Park, which has operated as a major industrial complex since 1941. The major operators within the Botany Industrial Park (BIP) included Orica, Qenos, Huntsman and Indorama. These petro-chemical manufacturers have now largely ceased operations with IXOM the remaining chemical manufacturer in the BIP.

The CAP, located in the southern part of the BIP, produces chlorine which is used in the manufacture of hydrochloric acid, sodium hypochlorite and ferric chloride on the site. These products are used in water disinfection and industrial processes.

The original CAP and a chlorine liquefaction plant (CLP) were commissioned in 1944. In 1998, the former Minister for Urban Affairs and Planning, granted consent (DA35/98), to replace the existing mercury cell CAP with a modern membrane cell CAP. The consent also included closure of the existing CLP, and a reduction in chlorine production capacity from 50,000 tonnes per year to 35,000 tonnes per year.

Following closure of the CLP at the BIP in 2002, all liquid chlorine was produced at IXOM's facility in Laverton, Victoria. Liquid chlorine is currently transported from Laverton to the BIP for on-site storage and distribution to NSW customers.

The Applicant, and the Water Services Association of Australia, has identified supply chain risks associated with a single production facility for liquid chlorine, noting its vital importance in water disinfection. In response, the Applicant proposes to modify the existing consent to construct a new CLP in the BIP.

1.2 Subject Site

The site is legally described as Lots 1101, 1102, 1103 and 1104 DP 1227173. The site is 8 kilometres (km) south of the Sydney central business district and covers 6.75 ha of industrial zoned land within the 73 ha BIP.

The site is bound by industrial land to the north, south and west. The residential suburb of Hillsdale is located to the east, on Denison Street. The nearest residences are around 200 m from the CAP.

The CAP is accessed via Gate 3 located on Denison Street and then internal roads within the BIP. Transport of raw materials and products to and from the site utilise Denison Street, Beauchamp Road and Botany Road to the south, and Denison Street and Wentworth Avenue to the north.

The BIP has legacy contamination in the soils and groundwater from historical operations. The contamination is managed by the site owner Orica under a Voluntary Management Proposal approved by the Environment Protection Authority under the *Contaminated Land Management Act 1997*. An active groundwater remediation program is ongoing across the site.



Figure 2 | IXOM site within the BIP

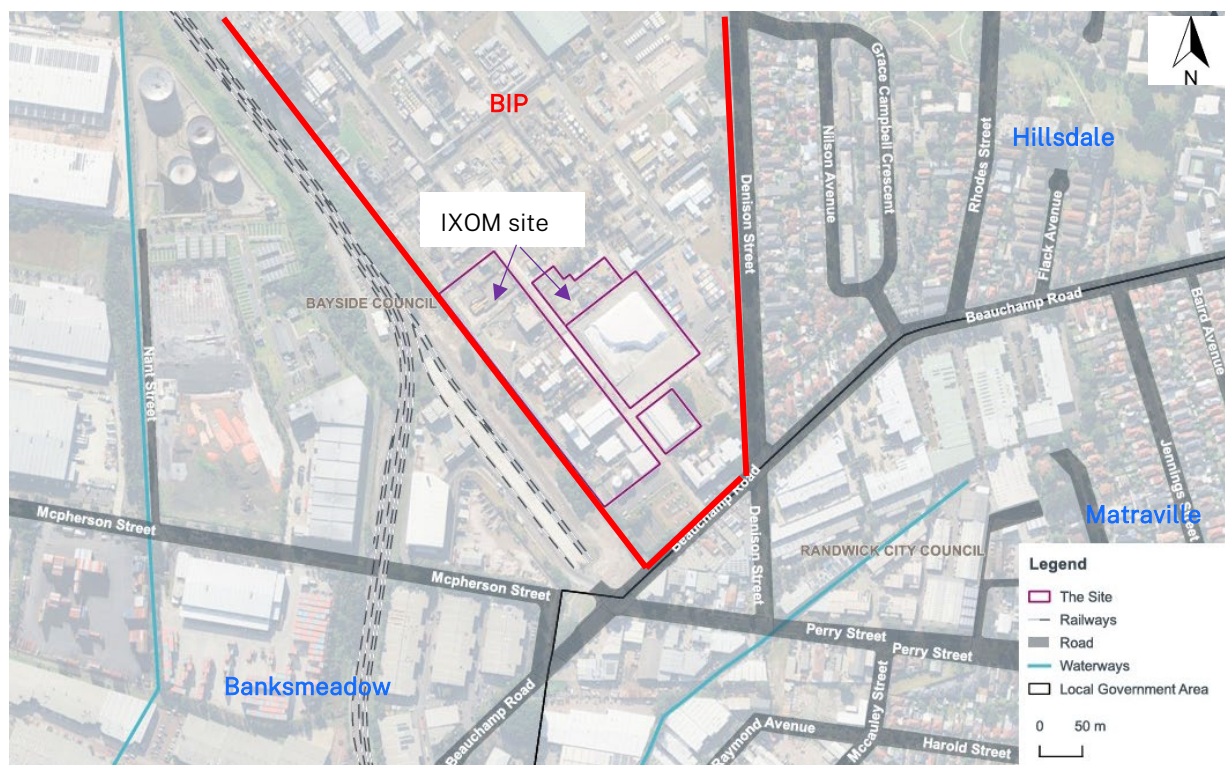


Figure 3 | Local Context

1.3 Approval History

On 6 November 1998, development consent was granted by the former Minister for Urban Affairs and Planning for a replacement Chlor-Alkali Plant (DA35/98). The development consent permits:

- replacement of the mercury CAP with a membrane cell CAP
- modernisation of brine treatment, chlorine drying and compression systems and installation of a new caustic evaporation system
- relocation of the caustic soda loading facility
- closure of the CLP and liquid chlorine storage tanks
- ongoing temporary storage of liquid chlorine from the Laverton facility in Victoria, in drums, cylinders and road tankers at the CAP site
- reduction of chlorine production capacity from 50,000 tonnes per annum (tpa) to 35,000 tpa

The consent has been modified on 5 occasions (see **Table 1**).

Table 1 | Summary of Modifications

MOD	Description	Decision-maker	Type	Date
MOD 1	• replace and relocate the sodium hypochlorite loading bay • upgrade the hypochlorite storage facility and increase storage capacity	Department	96(1A)	9 January 2006
MOD 2	• demolish the decommissioned CAP building	Department	96(1A)	6 June 2006
MOD 3	• dismantle and remove structures, relocate hypochlorite plant and install two additional storage tanks and bunding	Department	96(1A)	29 September 2009
MOD 4	• decontaminate and demolish disused storage tanks • construct two new storage tanks and bunding	Department	75W	10 September 2012
MOD 5	• construct a repack facility for packaging sodium hypochlorite, sodium hydroxide and hydrochloric acid, new bunded storage and pipelines	Department	75W	26 October 2018
MOD 7	• install a new gas-fired boiler	Department	4.55(1A)	Under assessment

2 Proposed Modification

2.1 Modification Overview

The modification seeks to construct and operate a chlorine liquefaction plant (CLP) at the existing IXOM facility. There would be no change to the total chlorine production volume on the site. The modification is described in full in the Modification Report in **Appendix B**, summarised in **Table 2** and is illustrated in **Figure 4** and **Figure 5**.

Table 2 | Key Aspects of the modification

Project Element	Approved Development	Proposed Modification
Total chlorine production	35,000 tonnes per annum of chlorine products	No change
Remediation	-	On-site containment of asbestos impacted soils and installation of a vapour barrier under the new CLP containment building
Chlorine liquefaction plant (CLP)	Closure of the CLP and liquid chlorine storage tanks	- Construct and operate a new CLP on block L, with a maximum production capacity of 50 tonnes per day (tpd) - CLP to be housed in a new containment building 60 m long x 33 m wide x 15.7 m high with a concrete floor, steel frame and colorbond sheeting maintained under negative pressure - Containment building includes a scrubber system and 18.7 m high emissions stack - CLP to have two operating scenarios: - Normal operation to meet NSW demand - Contingent operation to compensate for loss of production at the Laverton CLP.
Liquid chlorine storage	Liquefied chlorine is transported to the site from Laverton in 33 kg and 70 kg cylinders and 920 kg drums	Two stock tanks, with one storing up to 50 tonnes of liquefied chlorine and one to remain empty on standby

Project Element	Approved Development	Proposed Modification
	Storage of liquefied chlorine on site in one 13 tonne tanker for no more than 6 months in a 12-month period	drums and cylinders for chlorine storage to be housed in the new CLP containment building
Liquid chlorine transport	Distributed via 13 tonne tankers	- A chlorine tanker loading station, two drum and two cylinder filling stations - Distributed via 13 tonne tankers
Sodium hypochlorite loading bay	Located in block L	Relocated to block Q with construction of a new internal driveway and hardstand
Product plants	- Chlorine electrolysis - Hydrochloric acid plant - Ferric chloride plant - Sodium hypochlorite plant	No change
Traffic	76 heavy vehicle movements per day (mpd) 100 light vehicle mpd - Two, eight-day salt delivery campaigns per year, each involving 1,000 heavy vehicle mpd	- Six additional heavy vehicle movements per week (mpw) during normal operations - Twelve additional heavy vehicle mpw and 4 additional light vehicle mpw during contingent operations
Access	Primarily through Gate 3 with options to access via Gates 1 and 4	No change
Hours of operation	24 hours, seven days a week for 350 days a year	No change
Employment	45 operational employees	No change during normal operations. Up to 11 additional staff during contingent operations.

2.2 Applicant's Justification for the Proposed Modification

The Applicant advised it is the sole domestic manufacturer of liquefied chlorine for water treatment in Australia with the Applicant's Laverton facility in Victoria supplying most of Australia. The Water Services Association of Australia has identified this as a critical risk to supply. If there was an outage at the Laverton plant, Australia would face critical shortages and be subject to risks associated with imports including shipping disruptions and regulatory restrictions. The Applicant advised that a second liquefied chlorine production and packaging plant would secure the national supply chain for this critical water treatment chemical. The Applicant also advised the proposed location is preferred given the existing CAP has the necessary infrastructure, raw material availability and industrial zoning.

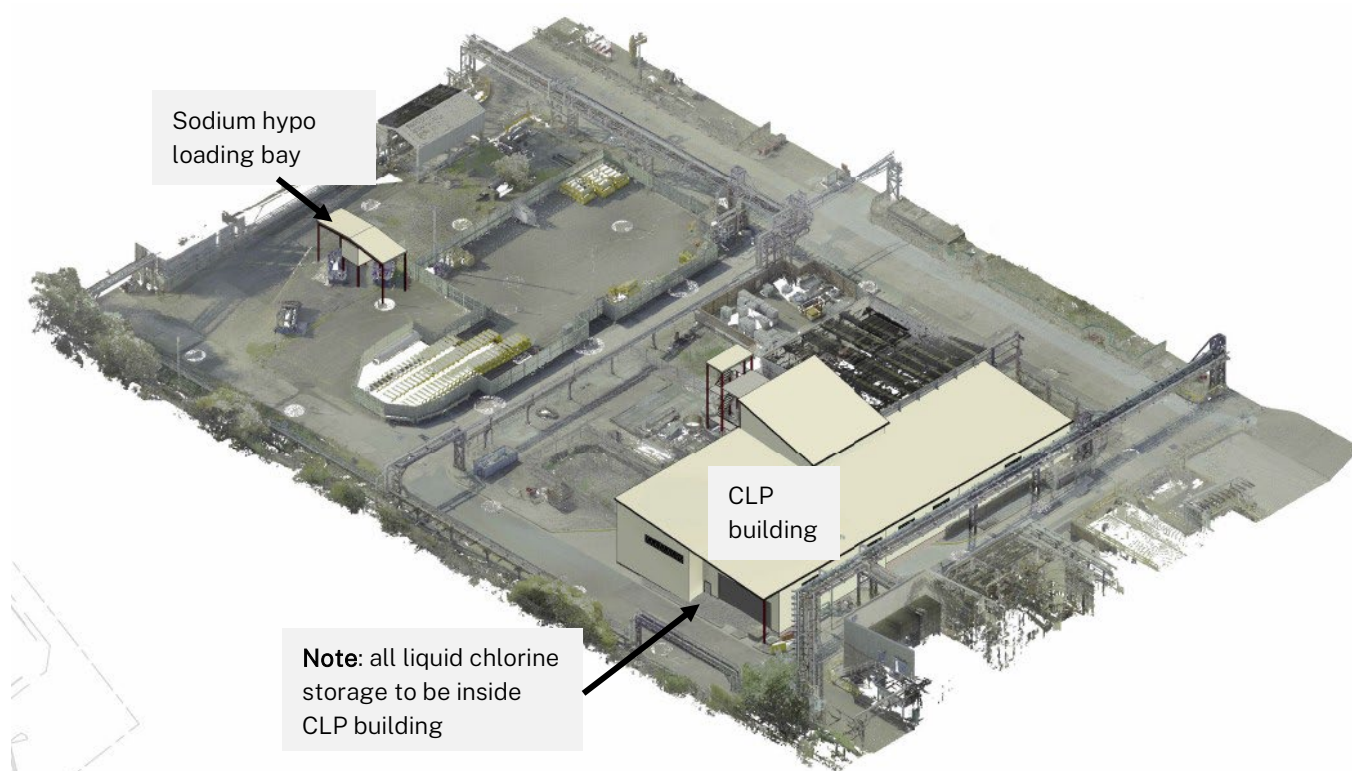


Figure 4 | Indicative Schematic of Modification Layout

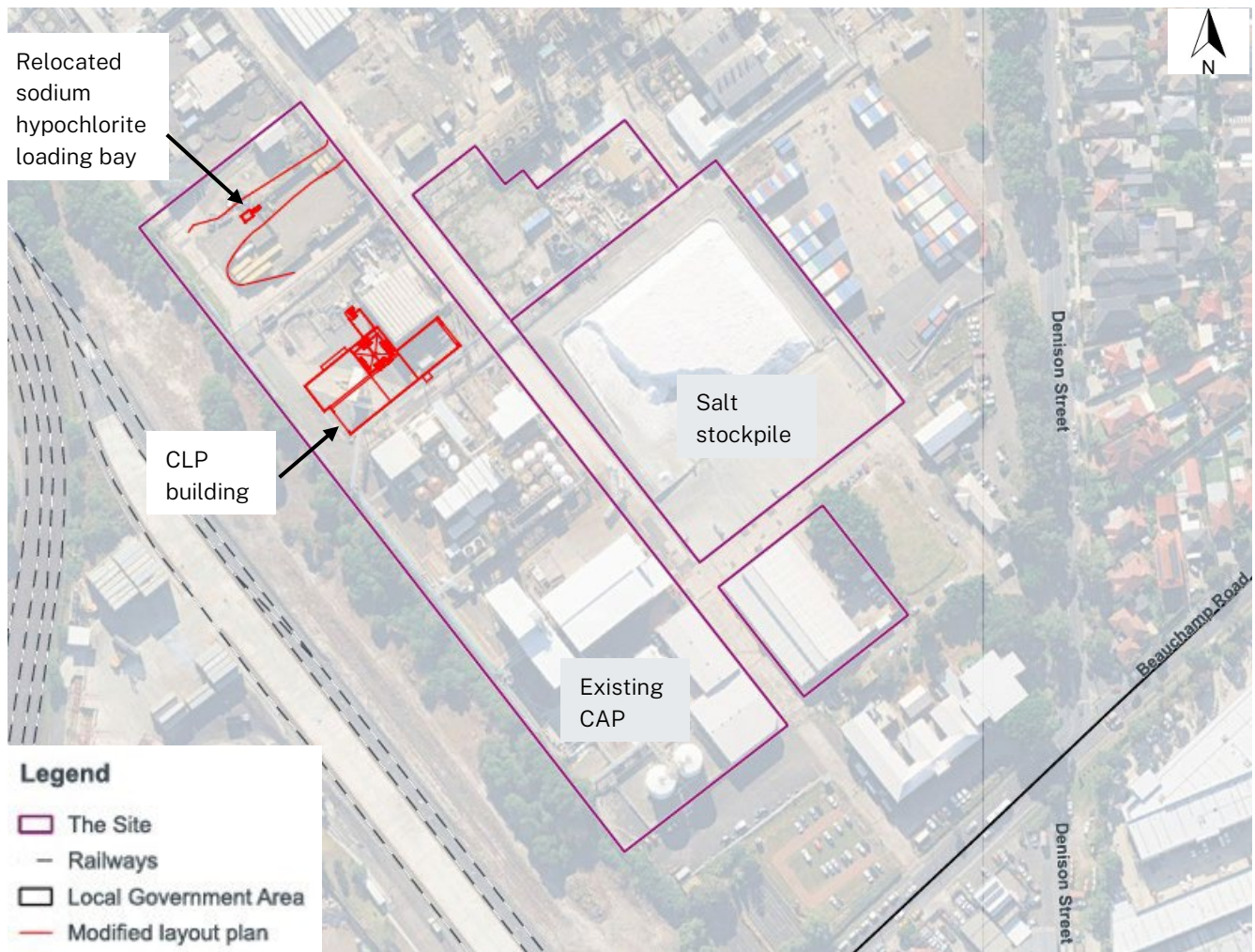


Figure 5 | Modified Site Layout

3 Statutory Context

3.1 Scope of Modification and Assessment Pathway

Table 3 provides details of the assessment pathway under which the modification is sought.

Table 3 | Assessment Pathway

Consideration	Description
Scope of modification	Other modification The Department has reviewed the scope of the modification and considers that it is substantially the same as the development consented to under DA 35/98, as modified. A CLP previously operated on the site and was de-commissioned in 2001. Storage and transport of liquefied chlorine has continued on the site as permitted under DA35/98 as

Consideration	Description
	modified. The proposed modification proposes construction and operation of a new CLP, with total chlorine production volumes to remain consistent with the existing limits under DA35/98. The Department is satisfied the proposed modification is within the scope of section 4.55(2) of the EP&A Act and does not constitute a new development application. Accordingly, the Department considers that the application should be assessed and determined under section 4.55(2) of the EP&A Act rather than requiring a new development application to be lodged.
Consent Authority	Minister for Planning and Public Spaces The Minister is the consent authority under section 4.5(a) of the EP&A Act.
Decision-maker	Delegate position Under the Minister's delegation of 9 March 2022, the Director, Industry Assessments, may determine the application under delegation as: - the application has not been made by a person who has disclosed a reportable political donation under section 10.4 of the EP&A Act - there are less than 15 public submissions (other than a council) in the nature of objections, and - Council has not made a submission by way of objection under the mandatory requirements for community participation listed under Schedule 1 of the EP&A Act. Bayside Council initially objected to the modification but following its review of the Applicant's Submissions Report, Bayside Council advised it was satisfied with the proposal.

3.2 Other Approvals and Authorisations

The CAP operates under an Environment Protection Licence (EPL 20547) issued by the NSW Environment Protection Authority under section 42 of the *Protection of the Environment Operations Act 1997*. The EPL covers chemical production, chemical storage, waste processing (non-thermal treatment) and waste storage.

The Department has consulted with and considered the advice of the EPA in its assessment of the modification application. The EPA recommended several conditions be incorporated into the modified consent (see **Sections 5 and 6**) and advised a variation to the EPL is required if the modification is approved.

3.3 Mandatory Matters for Consideration

The Department undertook a comprehensive assessment of the application against the mandatory matters for consideration as part of the original assessment of DA35/98 (under section 90 of the EP&A Act, as in force at the time). This modification application does not result in significant changes that would alter the Department's consideration of the mandatory matters for consideration under section 4.15(1) of the EP&A Act and conclusions made as part of the original assessment.

3.4 Biodiversity Development Assessment Report

Clause 30A(2)(c) of the Biodiversity Conservation (Savings and Transitional) Regulation 2017 requires all SSD modifications to be accompanied by a Biodiversity Development Assessment Report (BDAR) unless the authority or person determining the application is satisfied that the modification will not increase the impact on biodiversity values (as identified in the BC Act and in the Biodiversity Conservation Regulation 2017).

The modification is located on a cleared industrial site and does not require any vegetation removal. The CLP would be located on the site of the existing sodium hypochlorite loading bay, and the loading bay would be relocated to an area of existing container storage. As there is no vegetation removal, the Department is satisfied the modification will not increase the impact on biodiversity values and consequently a BDAR is not required to accompany the modification application.

4 Engagement

4.1 Exhibition of the Modification

After accepting the modification request and report, the Department:

- made the documents publicly available on the NSW planning portal
- publicly exhibited the modification from 3 September 2025 until 23 September 2025 on the NSW planning portal
- notified each person who made a submission in relation to the original development application
- notified and invited comment from relevant government authorities and Bayside and Randwick Councils.

During the assessment, the Department attended a site visit on 29 September 2025 and liaised with key government authorities including Bayside Council and SafeWork NSW.

4.2 Submissions and Advice

During the public exhibition period, the Department received 17 submissions from the public including 6 unique individual submissions, 10 special interest group submissions and one form letter submission of which there were 11 entries. Submissions were received from Bayside Council and Randwick Council, and advice was provided by 12 government authorities. Of the 17 public submissions and 2 Council submissions there were a total of 11 objections, 6 in support and 2 providing comments. Bayside Council initially objected but later advised it was satisfied with the modification, leaving a total of 10 objections. A summary of the advice and submissions is provided below with a link to the full copies provided in **Appendix C**.

4.3 Summary of Advice Received from Government Authorities

Table 6 summarises the advice received from the 12 government authorities.

Table 4 | Summary of Government Authority Advice

Authority	Advice Summary
Environment Protection Authority (EPA)	Requested further information on the greenhouse gas assessment, a mass balance with production volumes for normal and maximum scenarios, environmental and waste management, and engagement of a Site Auditor. Recommended conditions for the exhaust stack design, testing and post-commissioning verification, compliance with existing noise limits, chlorine storage, safety management and verification of scrubber performance.
SafeWork NSW	Requested verification of scrubber performance during detailed design and measures for leakage identification. Recommended conditions for chlorine storage, maintenance of chemicals for managing worst-case leakage, design to relevant standards, and integration of safety control measures.
Fire and Rescue NSW (FRNSW)	Reviewed the modification and provided no comments or recommendations.
Transport for NSW (TfNSW)	Raised no objections as the modification is not expected to have a significant impact on the State classified road network.
Port Authority of NSW	Advised it had no comments on the proposal.
Department of Climate Change, Energy, the Environment and Water -	Reviewed the flood impact risk assessment and noted the proposed building floor levels meet the required probable maximum flood level.

Authority	Advice Summary
Conservation Programs and Heritage Regulation (CPHR)	Recommended the modification report be updated to demonstrate there would be no impact on biodiversity values.
Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW Cth)	Recognised the importance of dependable access to safe and clean drinking water and adequate sanitation services. Commended the Applicant's efforts to strengthen supply chain resilience for liquid chlorine to mitigate risks associated with supply disruptions.
Commonwealth Department of Industry, Science and Resources	Noted that access to safe drinking water is critical to the health and wellbeing of Australians. Reliance on a single domestic facility for supply of liquefied chlorine presents exposure for the supply chain. The modification would diversify the supply of a key chemical in water treatment.
Sydney Trains	The site is not in proximity to Sydney Trains operated rail lines. Recommended referral to the Australian Rail Track Corporation.
Airservices Australia	Raised no comments. Recommended the application be submitted to the airport operator for an assessment of obstacles in the designated area.
Power and Water Corporation (NT)	Supported construction of the CLP, noting it would improve supply chain resilience for critical products and mitigate risks with supply disruptions.
Water Corporation (WA)	Provided support for construction of the CLP, to increase sovereign supply and ensure continuing of critical water treatment chemicals for essential services.

The modification was referred to the Australian Rail Track Corporation and no comments were provided.

4.4 Summary of Council Submission(s)

Both **Bayside Council** and **Randwick City Council** objected to the modification. A summary of the issues raised by Councils is provided in **Table 7**.

Table 5 | Summary of issues raised by Councils

Council	Submission summary
Bayside	Bayside Council lodged its submission as an objection. The submission requested the Department halt its assessment until a comprehensive and legally compliant application is provided. Council noted the potential risks of the proposal and its

Council	Submission summary
	location in a densely populated area. Requested all potential risks are fully quantified, mitigated and managed. Raised questions about the adequacy of the assessment in relation to: • cumulative quantitative risk assessment • worst-case toxic gas release dispersion modelling • major hazard facility safety management, emergency and incident response plans • contamination and interaction with ongoing remediation works in the BIP • transport risk assessment and off-site consequences of an accident.
Randwick City	Objected to the modification based on increased public risk. Questioned whether the proposal could be considered 'substantially the same' as the original development and suggested that a new application would be more appropriate than a modification. Other concerns were raised in relation to: • the change in risk profile in relation to the Banksmeadow recycling yard • consideration of off-site vapour contamination risks • dangerous goods transport risk assessment, traffic count data for Denison Street • noise impact assessment.

4.5 Summary of Public Submissions

Of the public submissions received:

- 4 unique submissions and 8 form letter submissions were from residents within 5 km of the site, and
- 2 unique submissions and 3 form letter submissions were from residents between 5 km – 10 km from the site.

The submissions from special interest groups included two community groups and several State utilities (drinking water providers). **Table 8**, **Table 9** and **Table 10** summarise the key issues raised.

Table 6 | Special interest group submissions on the modification

Position	Submitters	Key Issues
Object	• No Overdevelopment Pagewood and Eastgardens	• Original 1998 consent considered unlawful, failed to consider transport risk

Position	Submitters	Key Issues
	Kogarah Bay Progress Association	- Unacceptable fatality risks from chlorine transport accidents - Residents on Wentworth Avenue and Bunnerong Road are highly vulnerable, no buffer zone, plant should be relocated - Not in the public interest
Support	- Seqwater - Sydney Water - Veolia - Melbourne Water - TasWater - Gippsland Water	- Support the project as it would strengthen national production capacity of liquefied chlorine gas - Reduces reliance on a single production site, providing contingency and safeguarding against disruptions - Important in the context of the Australian Government's Sovereign Manufacturing Capability Plan which identifies water treatment chemical as critical to national interests
Comment	- Water Services Association of Australia - Suez	- Modification would improve supply chain resilience for the critical chemical used for water disinfection - Improves sovereign supply chain resilience, removes the need to rely on imports and mitigates risks associated with shipping disruptions

Table 7 | Key issues Raised in Individual Public Submissions

Issue	Detail
Health and safety risks	- severe consequences of worst-case chlorine release scenarios - risks associated with transport of chlorine, recommend transport restrictions - risks to residents, schools, Eastgardens shopping centre and athletics field - request the Safety Case be published
Cumulative impacts	- impacts with other industrial operations - interaction with legacy contamination

Issue	Detail
Emergency notification	- request for emergency notification and incident response details to be published - recommend real-time chlorine monitoring at site boundary
Independent review	recommend independent expert be engaged to assess the viability and safety of the chlorine plant close to residences

Table 10 | Key issues Raised in Form Letter Submissions

Key Issue	Detail
Original 1998 consent unlawful	- Original 1998 consent did not consider transport risk - Chlorine is highly toxic and transport along Denison Street, Wentworth Avenue and Bunnerong Road puts residents at risk
Unacceptable fatality risks	Further studies recommended in 2019 risk assessment never completed
No buffer zone to residences	Not best practice to locate chlorine plant near residences
Not in the public interest	- Plant should be relocated away from residential area - Modification should be refused to protect the safety of the community.

4.6 Submissions Report

The Applicant provided a Submissions Report on 31 March 2026 (see **Appendix B**). The Submissions Report was referred to Councils and agencies for advice and was made publicly available on the NSW planning portal.

The Submissions Report also included additional information to respond to questions raised by the Department on hazards and risks including the consideration of alternatives, consultation with the Local Emergency Management Committee, clarifications on the Quantitative Risk Assessment, monitoring and risk reduction measures and the dangerous goods transport risk assessment and alternative route analysis.

4.7 Council and Agency Advice on Submissions Report

The following advice was received on the Submissions Report (SR):

- Bayside Council** – advised it was satisfied with the SR and the proposal. Noted the SR satisfactorily addressed the environmental health and public safety concerns raised by

Council including questions on the Quantitative Risk Assessment and Dangerous Goods Transport Risk Assessment. Council recommended a condition requiring compliance with the long-term environmental management plan for contamination.

- **Randwick Council** – repeated its concerns about whether the modification can be considered ‘substantially the same’ development as the 1998 consent, the change in risk profile in relation to Banksmeadow recycling yard, the method for the dangerous goods transport risk assessment, cumulative risk assessment, contamination and noise. Despite this position, Council recommended conditions for an independent risk audit, restriction of public access, vehicle management and movement counts, contamination, noise and community notification.
- **EPA** – advised the issues previously raised were addressed and provided recommended conditions for air quality verification, noise, contamination, environmental management and chemical storage. The EPA advised that an EPL variation would be required.
- **SafeWork** – provided detailed recommended conditions for the modification covering scrubber performance, building leak protection and incident response.

The Submissions Report also adequately responded to the questions raised by the Department in relation to hazards and risk.

5 Assessment

The Department has assessed the merits of the proposed modification. During this assessment, the Department has considered the:

- Modification Report and Submissions Report provided to support the proposed modification (see **Appendix A**)
- the Department’s assessment report for the original DA and subsequent modification applications (see **Appendix A**)
- submissions and advice from the public, government authorities and Councils (**Appendix A**)
- relevant environmental planning instruments, policies and guidelines
- requirements of the EP&A Act, including the objects of the EP&A Act.

The Department considers the key assessment issues are hazards and risk, contamination and air quality. The Department’s assessment of other issues is provided in **Section 5.2**.

5.1 Hazards and Risks

5.1.1 Background

Under a 1998 Ministerial consent (DA30/98) covering the BIP, operators must submit periodic Quantitative Risk Assessments to assess that the cumulative risks from their operations remain similar, and compatible with surrounding land uses. The most recently published *2018 Botany Industrial Park Quantitative Risk Assessment* found that population encroachment in the vicinity of the BIP was at a level that could reach an intolerable level, implying that changes to operations in the BIP or changes in land use surrounding the BIP, must be carefully considered.

In 2024, Qenos and Indorama permanently shut down their facilities in the BIP. The Department confirmed with SafeWork NSW that these facilities had ceased all dangerous goods (DG) operations in 2025. The permanent shutdown of these facilities has significantly reduced the cumulative risks from the BIP with IXOM being the only remaining facility involved in DG operations.

5.1.2 Hazards from the existing IXOM facility

Existing facility

The existing IXOM facility comprises of a CAP capable of producing up to 35,000 tonnes per year of gaseous chlorine through salt electrolysis. Currently, all gaseous chlorine is used directly within the facility to produce sodium hypochlorite, ferric chloride and hydrochloric acid. Caustic soda is also produced from the CAP without reaction with chlorine. These products are then loaded into tankers or packaged into containers for road transport to water treatment facilities and industrial customers.

The existing facility also stores and handles liquid chlorine in cylinders, drums and one tanker for up to half a year at outdoor designated areas. These vessels are filled at IXOM's chlorine liquefaction facility in Laverton, Victoria and are transported by road for distribution primarily to water treatment facilities.

Dangerous goods

Chlorine is classified as a DG Class 2.3 toxic gas under the *Australian Dangerous Goods Code* (ADG Code). An uncontrolled release of chlorine may lead to toxic impacts which could potentially result in irritation, injury or fatality to people beyond the boundary of the overall facility. Although chlorine is also classified as a DG sub-risk 5.1 oxidising substance and a DG sub-risk 8 corrosive substance under the ADG Code, the impacts associated with these sub-risks are localised and unlikely to extend beyond the boundary of the overall facility. Therefore, the risks associated with the toxic impacts of chlorine have been assessed for the CAP plus the proposed CLP.

Sodium hypochlorite, ferric chloride, hydrochloric acid and caustic soda are classified as DG Class 8 corrosive substances under the ADG Code. An uncontrolled release of these materials does not

immediately lead to large emissions of toxic gases unless these materials are mixed with incompatible materials. In such cases, chlorine gas could be emitted. Therefore, the risks associated with the toxic impacts of chlorine due to potential mixing of incompatible materials have also been assessed.

5.1.3 Proposed CLP

The main purpose of the modification is to improve national supply chain resilience of the production and distribution of liquid chlorine especially for water treatment facilities. If IXOM's facility in Laverton is unable to supply liquid chlorine, the proposed CLP would be able to provide contingent supply. Therefore, the CLP is designed to operate in either one of the following modes:

- normal mode to produce liquid chlorine for filling chlorine tankers only; or
- contingent mode to produce liquid chlorine for filling chlorine cylinders, drums and tankers.

As described by the Applicant, it is expected that the CLP will operate in normal mode most of the time and contingent mode only when the Laverton facility is unable to supply liquid chlorine. Between these operating modes, contingent mode involves a higher level of liquid chlorine handling and therefore, is considered the worst-case operating mode from a hazard and risk perspective.

Both operating modes involve the following changes to the overall facility:

- a new CLP to produce liquid chlorine from gaseous chlorine
- a new pipe connection to supply a portion of gaseous chlorine from the existing CAP to the new CLP
- new plant and equipment for filling liquid chlorine from the CLP into cylinders, drums and tankers
- a new containment building to enclose all areas associated with liquid chlorine operations, being the CLP, liquid chlorine filling plant and equipment, and all areas associated with the storage and handling of chlorine cylinders, drums and tankers
- the transport of chlorine cylinders, drums and tankers from the containment building primarily to water treatment facilities by road.

As the modification includes a new containment building, all existing outdoor storage and handling of chlorine cylinders, drums and tankers will be relocated into this building. Relocating these vessels inside the new containment building presents a significant safety improvement since an uncontrolled release of chlorine from these vessels would initially be contained inside the building and would not lead to immediate outdoor dispersion of chlorine which could impact off-site. Therefore, the new containment building provides an immediate safeguard against existing scenarios associated with the release of chlorine from these vessels, thus significantly reducing the risks from the existing activities.

Additional risks and critical safeguards for the CLP

Notwithstanding the safety improvement of the new containment building, the following components from the modification generate additional risks from the overall facility:

- the new CLP capable of producing up to 50 tonnes of liquid chlorine per day and storing up to 50 tonnes of liquid chlorine
- the new pipe connection between the new CLP and the existing CAP which contains gaseous chlorine
- operations involving the filling of liquid chlorine from the CLP to 70-kg cylinders, 920-kg drums and 13-tonne tankers, and
- the storage and handling of up to 2 chlorine tankers within the containment building.

A comparison of the production rates and storage quantities associated with chlorine operations for the overall facility before and after the modification is summarised in **Table 11**.

Table 11 | Chlorine operations for the overall facility before and after MOD-6

Chlorine operation	Existing facility before Modification 6	Overall facility after Modification 6
Maximum gaseous chlorine production rate	35,000 tonnes per year	35,000 tonnes per year (no change)
Maximum liquid chlorine production rate	None	50 tonnes per day (new operation)
Maximum storage of liquid chlorine	None	50 tonnes (new operation)
Maximum storage of 70-kg chlorine cylinders	100 cylinders	100 cylinders (no change)
Maximum storage of 920-kg chlorine drums	200 drums	200 drums (no change)
Maximum storage of 13-tonne chlorine tankers	1 tanker up to 4,380 hours per year (0.5 tankers over an annual period)	2 tankers (an increase of 1.5 tankers over an annual period)

A range of risk reduction and mitigation measures such as gas detection systems, emergency shutdown systems and bunding are included as part of the design of the modification. Amongst these measures, the Department considers the following to be critical safeguards:

- the containment building to enclose all areas associated with liquid chlorine operations, storage and handling. The building will be designed to operate under negative pressure and be equipped with a chlorine scrubber to prevent chlorine releases which may cause toxic impacts beyond the boundary of the overall facility

- the new CLP includes 2 separate insulated storage tanks with each tank capable of storing the maximum 50 tonnes of liquid chlorine. Only one tank will operate on duty while the other tank will remain empty and available on standby for chlorine leak containment in the event of an emergency. Both tanks will also be located inside the containment building.

5.1.4 Assessment against Chapter 3 of the Resilience and Hazards SEPP

The modification involves additional DG processes at an existing development which is considered potentially hazardous under Chapter 3 of *State Environmental Planning Policy (Resilience and Hazards) 2021* (formerly SEPP 33). Moreover, the modification includes an increase in DG storage quantities and DG transport movements beyond the thresholds specified in the Department's *Applying SEPP 33*. Therefore, the modification by itself is also considered potentially hazardous under the SEPP. To address the requirements under the SEPP, the following reports were submitted as part of the Modification Report:

- a Quantitative Risk Assessment (QRA) prepared in accordance with the Department's *Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis'* to identify, analyse and assess the hazards and risks from the modification. The QRA also includes risk assessments of the overall facility before and after the modification, for both CLP operating modes and considers changes in surrounding land uses (i.e. permanent shutdown of Qenos and Indorama facilities within the BIP)
- a Dangerous Goods Transport Risk Assessment (DGTRA) to analyse and compare the change in risk of DG transport movements along Denison Street before and after the modification.

Quantitative Risk Assessment of the overall facility before and after MOD-6

Due to the complexity of the modification, the Applicant consulted extensively with the Department on the scale, design and safeguards of the modification prior to finalising the QRA. The Department confirmed that the assumptions adopted in the QRA are reasonably conservative. These assumptions include:

- the reliability of the containment building based on conservative operating conditions
- the scrubber design capacity being capable to mitigate the worst-case chlorine release from the containment building to a level which will not result in toxic impacts beyond the boundary of the overall facility
- modelling the consequence areas and toxic impacts of chlorine releases using reasonably conservative methods and toxic concentrations
- estimating the chlorine release frequencies and the performance of safeguards based on typical liquid chlorine facilities.

While the Department is satisfied that the QRA is reasonably conservative, the Department requested further information on the design specifications for the critical safeguards. In particular, the Department requested the Applicant provide verification that the design specification for the chlorine

discharge concentration leaving the scrubber will not result in toxic impacts beyond the boundary of the overall facility. Additionally, the Department requested the Applicant address the potential for chlorine release if the integrity of the containment building is compromised.

Subsequently, the Applicant updated the QRA as part of the Submissions Report (SR) to provide the requested information. From the updated QRA and SR, the Applicant provided additional modelling basis and results to verify that the design specification for the chlorine discharge concentration leaving the scrubber will not result in toxic impacts beyond the boundary of the overall facility at ground-level. The Applicant also clarified that the integrity of the containment building will be tested prior to commissioning of the building and will be maintained throughout the operational phase. The Department is satisfied with the Applicant's responses and considers the updated QRA to be appropriate for establishing the risk results of the overall facility after the modification.

Risk assessment of the overall facility after the modification against the HIPAP 4 land use safety risk criteria

The risks from the overall facility after the modification for both CLP operation modes were assessed against the Department's *Hazardous Industry Planning Advisory Paper No. 4, 'Risk Criteria for Land Use Safety Planning'* (HIPAP 4). HIPAP 4 requires the risk assessment to demonstrate that the potential irritation, injury and fatality risks to an individual, propagation risk to neighbouring developments and risk to the surrounding community are within acceptable levels for the location of the development. The individual risk is used to assess the risk from the development to different types of land uses based on vulnerability. The societal risk is used to assess the risk from the development to the surrounding community.

Individual risk

The QRA assessed the risks from the overall facility after the modification for both CLP operation modes and found that the risks comply with all individual risk criteria specified in HIPAP 4 for irritation, injury, fatality and propagation for all land uses ranging from industrial, active open space, commercial, residential and sensitive. The individual fatality risk contours corresponding to the HIPAP 4 criteria for the modification only (contingent mode being the worse-case operating mode from a hazards and risk perspective) are shown on **Figure 6** and the overall facility with the modification (contingent mode) are shown on **Figure 7**.

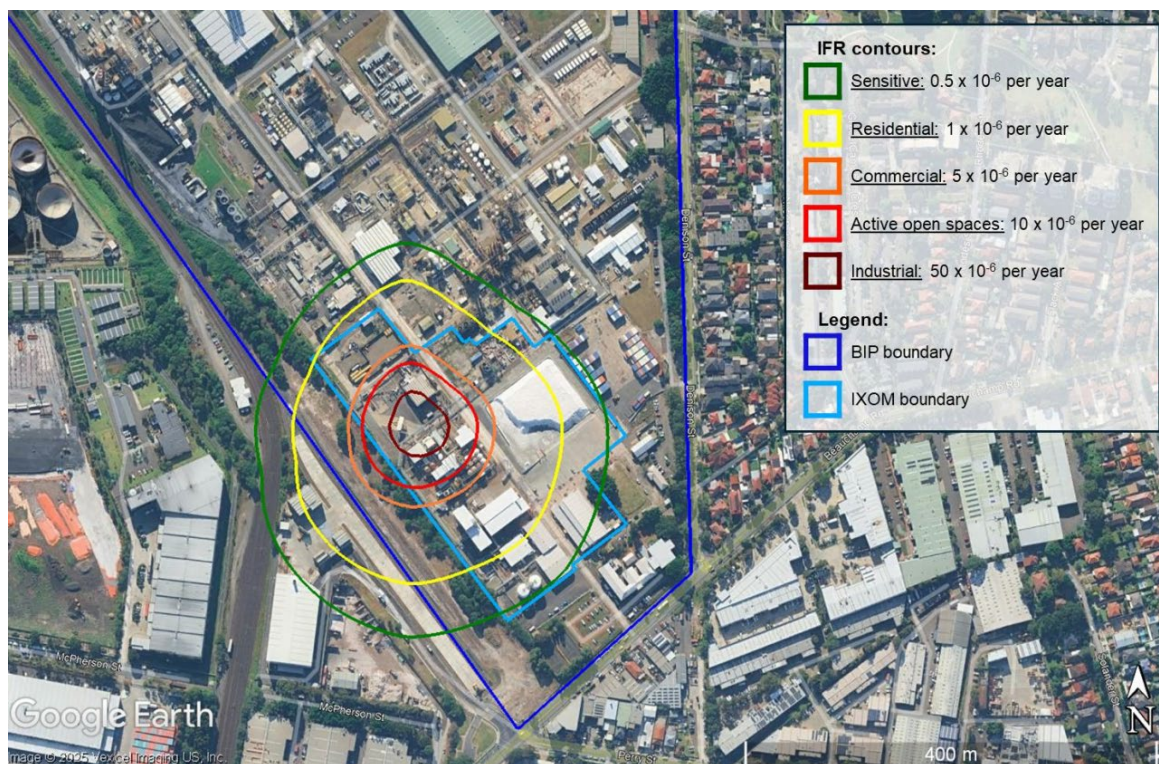


Figure 6 | Individual fatality risk contours MOD-6 only (contingent mode)

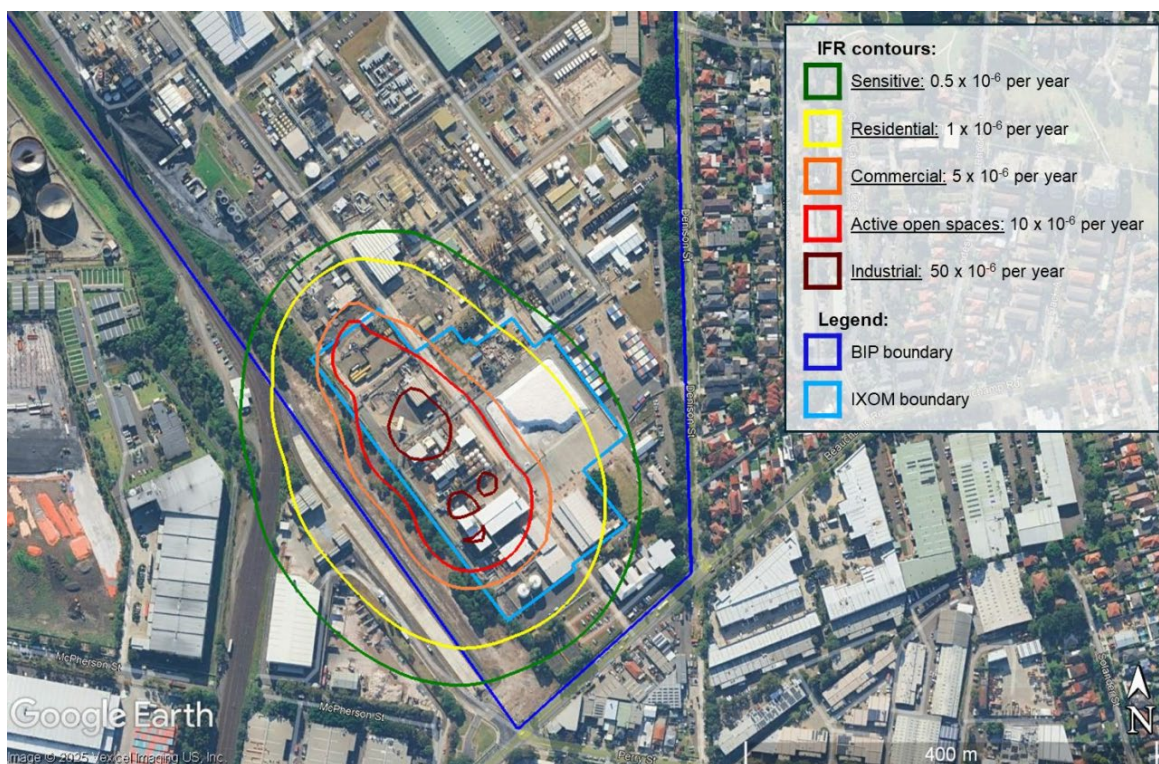


Figure 7 | Individual fatality risk contours overall facility with MOD-6 (contingent mode)

Additionally, when comparing the individual toxic injury and irritation risks from the overall facility before and after the modification for both CLP operation modes, the Department notes a significant reduction in the extent of these risk contours as shown in **Figure 8** and **Figure 9**. These results

demonstrate the benefits of the modification in reducing toxic injury and irritation risks to surrounding land uses, especially the benefits of the new containment building which encloses all liquid chlorine operations. A similar result is noted when comparing the individual fatality risk from the overall facility before and after the modification but for normal mode only.

The Department notes a slight increase in the extent of the individual fatality risk contour for contingent mode at the southern-end of the overall facility after the modification. Although the risk for contingent mode complies with the HIPAP 4 individual fatality risk criteria, this finding demonstrates that the risk reduction benefits of the modification are fully realised for normal operation mode only (i.e. reduction of individual irritation, injury and fatality risks). Therefore, the Department expects the Applicant to operate the CLP as described, being normal mode most of the time, and contingent mode only when the Laverton facility is unable to supply liquid chlorine, ensuring that the risks from the modified facility to surrounding land uses is reduced as low as reasonably practicable. To ensure that this expectation is met, a condition is recommended requiring the Applicant to notify the Planning Secretary at least one month prior to commencement of contingent mode, provide the reasons for contingent mode, and the start and end dates for operating in contingent mode.

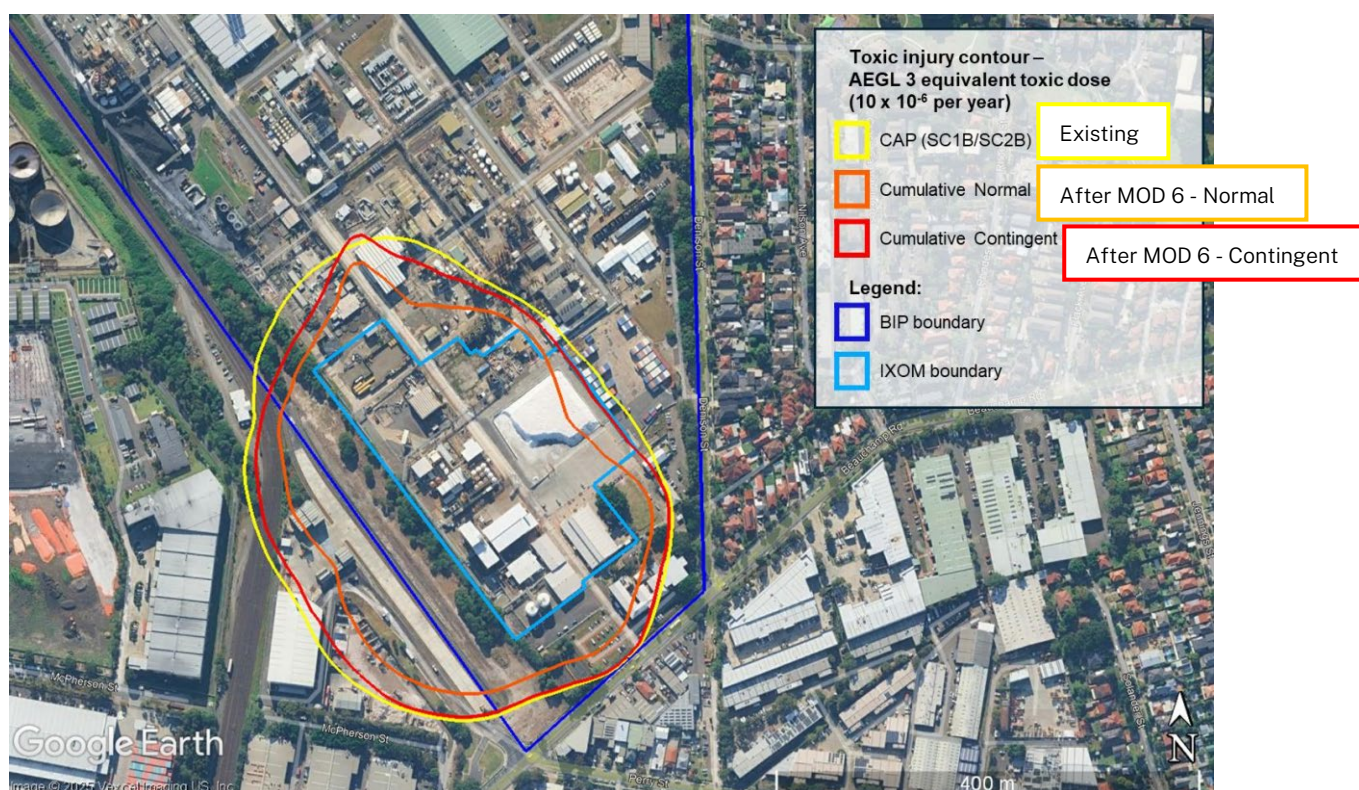


Figure 8 | Individual toxic injury risk contours overall facility, before and after MOD-6 (normal and contingent modes)

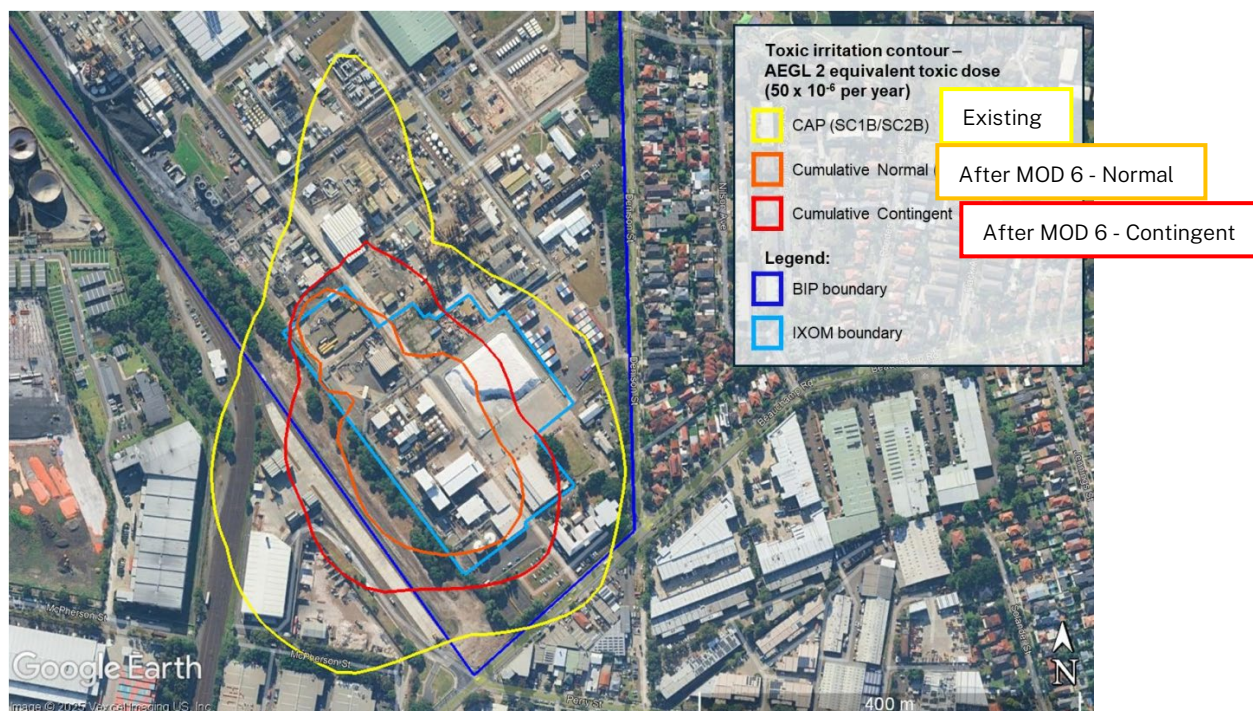


Figure 9 | Individual toxic irritation risk contours overall facility, before and after MOD-6 (normal and contingent modes)

Societal Risk

To assess the societal risk, a data set to describe the population surrounding the overall facility is required. The QRA adopted general population data based on the most recent 2021 Census from the Australian Bureau of Statistics for residential population and the most recent 2025 Travel Zone Projection from TfNSW for employment population, representing population in commercial and industrial land uses which may not be fully counted in the 2021 Census. The general population data was supplemented by specific population data which are available for specific locations such as the nearby Eastgardens and Bunnings Warehouse. The Department considers the population data set adopted in the QRA to be acceptable and consistent with the approach in prior periodic Quantitative Risk Assessments submitted for the BIP under the 1998 Ministerial consent (DA30/98).

The QRA also adopted an assumption of up to 40 people per hectare for land which will be vacated by Qenos and Indorama following permanent shutdown of their facilities within the BIP. As the vacated land will be expected to be used for industrial uses such as warehouses, the Department considers this assumption to be reasonable to represent these future land use cases.

The societal risk curves for the overall facility before and after the modification for both CLP operation modes are presented together with the societal risk criteria specified in HIPAP 4 as shown in **Figure 10**. The societal risk curves for the overall facility after the modification for both CLP operation modes are within the negligible region specified in the HIPAP 4 societal risk criteria. Therefore, the overall facility after the modification, complies with the HIPAP 4 societal risk criteria. The Department

confirms that the critical safeguards from the modification will be effective to reduce the risk profile of the overall facility.

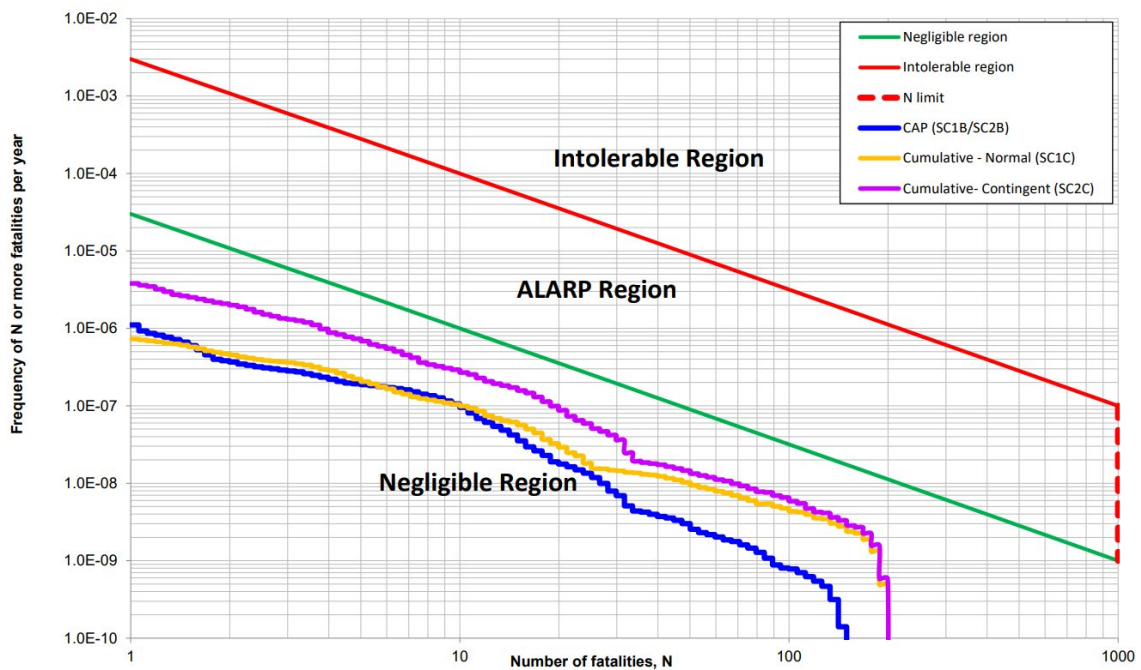


Figure 10 | Societal risk curves for the overall facility before and after MOD-6 (normal and contingent modes)

The Department compared the societal risk curves in **Figure 10** with the societal risk curves in the most recently published *2018 Botany Industrial Park Quantitative Risk Assessment* as shown in **Figure 11**. From this comparison, the Department notes that the societal risk from the BIP has significantly reduced following the permanent shutdown of the Qenos and Indorama facilities.

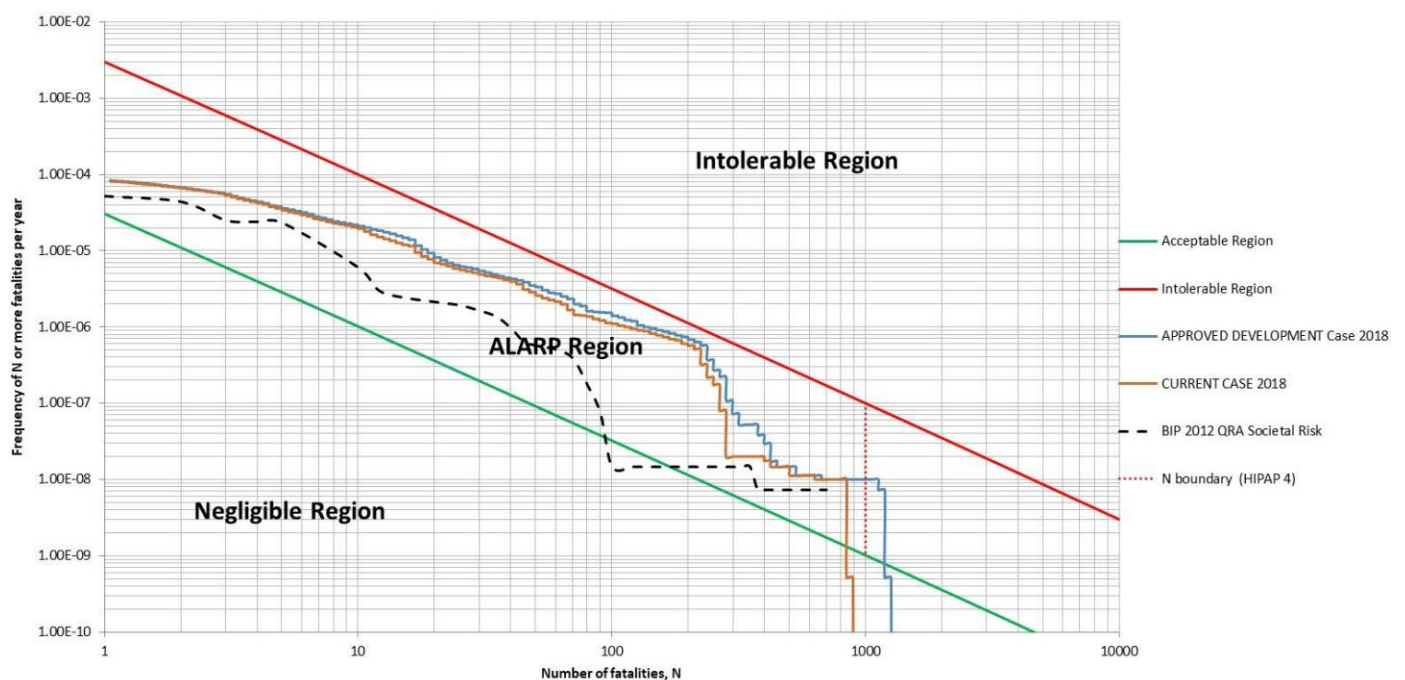


Figure 11 | Societal risk curves from the 2018 Botany Industrial Park Quantitative Risk Assessment.

Recommended conditions

Notwithstanding the QRA risk results, the Department expects the Applicant to verify the final design, including all risk reduction measures and critical safeguards, to confirm they will achieve the design specifications considered in the QRA. The Department has recommended the Applicant provide a Final Hazard Analysis (FHA) for the Planning Secretary's approval prior to commencement of construction of the CLP.

The Department has also included a condition requiring a Fire Safety Study (FSS) to ensure the fire protection measures for the overall facility remain adequate and meet the requirements of FRNSW, noting the facility will be decoupled from utilities provided from now-closed operators in the BIP.

Ongoing periodic Hazard Audits are also required to ensure continual operational safety throughout the life of the overall facility.

Therefore, the Applicant is required to undertake a range of Hazard studies at various stages of the modification, particularly at the pre-construction, pre-commissioning and post-startup stages. The key studies include and are not limited to:

- an FSS ensuring the implementation of acceptable fire protection measures to the satisfaction of FRNSW
- an Hazard and Operability Study (HAZOP) consistent with the Department's relevant guideline
- an FHA based on the final detailed design of the overall facility after the modification and in accordance with HIPAP 6
- Safety Management System (SMS) and Emergency Plan (EP)
- 3-yearly independent Hazard Audits to ensure continual operational safety and compliance of the overall facility.

Additionally, the Department considers it important to monitor the risks from the BIP to surrounding land uses. The Department expects the Applicant to continue submitting 5-yearly periodic QRAs for the overall facility as is already required under the 1998 (DA30/98) consent for the BIP. Given that IXOM is now the only remaining DG operations within the BIP, the Department recommends the requirement for 5-yearly QRAs be included in IXOM's consent, along with a requirement for IXOM to publish the findings from the QRAs on its public website.

5.1.5 Transport of dangerous goods from the IXOM facility along Denison Street

Background

A DGTRA for Denison Street was originally prepared in 2015 as part of a local development application for a Bunnings Warehouse in Hillsdale and updated for Modification 2 of Major Project MP 06_0089 approved in 2018 (i.e. modification of the Vopak bulk liquids storage facility at Port Botany). MOD-6 of the IXOM facility will increase the number of vehicle movements associated with the transport of

liquid chlorine along Denison Street. Therefore, the Modification Report includes a further update to the DGTRA for Denison Street to compare the change in risk of DG transport movements along Denison Street due to the modification, with the 2018 Vopak study as the baseline.

The Department notes that there is no widely accepted quantitative risk criteria for DG transport both internationally and in NSW. Therefore, the DGTRA estimated the DG transport risk along Denison Street with reference to the individual fatality and societal risk criteria for potentially hazardous fixed facilities described in HIPAP 4, similar to the approach previously adopted for the Vopak facility and Bunnings Warehouse.

Dangerous goods transport risk before and after MOD-6

While the CLP will operate either in normal or contingent mode, contingent mode will result in the highest number of vehicle movements associated with the transport of liquid chlorine from the overall facility. Therefore, the DGTRA only considered the number of vehicle movements during contingent mode. The Department considers this approach to be conservative and acceptable.

The annual number of vehicle movements considered in the DGTRA before and after the modification are summarised in **Table 12**. The annual number of LPG tanker movements has been reduced following permanent shutdown of the Qenos facility in 2024. The DGTRA estimated a reduction in the annual number of LPG tanker movements from 4,521 tankers to 1,500 tankers due to this shutdown, with the remaining movements originating primarily from Port Botany. The DGTRA retained the annual number of petrol tanker movements at 7,712 tankers considered in the 2018 Vopak study.

Table 12 | Annual DG transport movements along Denison Street before and after MOD-6

DG transport vessels and vehicles	Annual number of movements before MOD-6	Annual number of movements after MOD-6
DG Class 2.3 toxic gases (13-tonne chlorine tanker)	4 tankers	187 tankers (increase)
DG Class 2.3 toxic gases (70-kg chlorine cylinders and 920-kg chlorine drums using flatbed truck)	484 trucks	520 trucks (increase)
DG Class 2.1 flammable gases (LPG tanker)	1,500 tankers (reduced from 4,521 tankers after shutdown of the Qenos facility)	1,500 tankers (no change)

DG transport vessels and vehicles	Annual number of movements before MOD-6	Annual number of movements after MOD-6
DG Class 3 flammable liquids (petrol tanker)	7,712 tankers	7,712 tankers (no change)

While the Department is satisfied that the DGTRA for the modification adopted a reasonably conservative approach which is similar to the 2018 Vopak study, the Department requested the Applicant:

- verify that the consequences of chlorine releases from cylinders, drums and tankers estimated in the DGTRA aligns with the QRA
- extend the scope of the DGTRA to include the entirety of Denison Street up to the Wentworth Avenue intersection at the northern-end and down to the Beauchamp Road intersection at the southern-end
- investigate possible alternative exit locations from the BIP to minimise the risks associated with the transport of liquid chlorine
- address all public and agency submissions regarding DG transport, particularly providing reasons on the findings that the existing individual fatality risk contours along Denison Street (i.e. before the modification) do not exactly align with the original 2015 study, and verification of statistics regarding DG transport movements along Denison Street.

Subsequently, the Applicant updated the DGTRA as part of the SR to provide the requested information. From the updated DGTRA and SR, the Applicant updated the modelling of chlorine release consequences to align with the QRA, extended the scope to include the entirety of Denison Street and provided analysis of six possible exit locations from the BIP for the transport of liquid chlorine to confirm that the existing arrangement of using Gate 3 would minimise the risks.

To address the findings of the existing individual fatality risk contours not exactly aligning with the original 2015 study, the Applicant updated the DGTRA to include comparison and justification of the differences in the assumptions and approach adopted in the original 2015 study leading to the non-alignment. Additionally, the SR provided clarification that the modification would not increase the overall (i.e. non-DG and DG) heavy vehicle movements from the facility due to the existing facility currently operating significantly below the levels considered in prior traffic studies. Therefore, the DG transport movements adopted in the updated DGTRA remain conservative. The Department is satisfied with the Applicant's responses and considers the updated DGTRA to be appropriate for establishing the risk results along Denison Street after the modification.

Comparison of DG transport risk along Denison Street before and after the modification

The DGTRA evaluated the DG transport risk along Denison Street before and after the modification with reference to the individual fatality risk criteria for potentially hazardous fixed facilities described in HIPAP 4. The DGTRA found that the individual fatality risk associated with the transport of liquid chlorine alone after the modification does not exceed the criteria for all land uses ranging from industrial, active open space, commercial, residential and sensitive.

However, when this transport of liquid chlorine is considered together with all existing DG transport movements, a slight increase in individual fatality risk is noted at the northern-end of Denison Street after the modification, as shown in Figure 12. Notwithstanding, the extent of the individual fatality risk contour corresponding to the criteria for residential land uses remains similar before the modification as shown in **Figure 12**.

This finding is primarily due to the DG transport risk being dominated by the existing movement of LPG tankers not related to IXOM's operations, rather than the transport of liquid chlorine. The Department agrees that the increase in the transport of liquid chlorine due to the modification is not a dominating factor which would materially change both the individual fatality and societal risk for DG transport along Denison Street.

Recommended conditions

One of the key assumptions adopted in the DGTRA and analysed in the possible exit locations from the BIP is specifying that chlorine tankers must exit through Gate 3, turning right into Denison Street and heading south towards the Beauchamp Road intersection. This route will minimise the risks to populated areas along the northern end of Denison Street and along Wentworth Avenue. Therefore, the Department has included a modifying condition of consent requiring all chlorine tankers to exit through Gate 3 and turn right into Denison Street. As the consequence of a chlorine release from flatbed trucks transporting 70-kg cylinders and 920-kg drums is significantly lower compared to 13-tonne tankers, the Department considers the condition need only restrict chlorine tanker movements.

5.1.6 Advice from agencies

The existing facility is a Major Hazard Facility (MHF) currently licenced under Chapter 9 of the *Work Health and Safety Regulation 2025*. Therefore, the Department consulted closely with SafeWork NSW throughout the assessment. SafeWork considered the MHF requirements of the overall facility can continue to be met when the modification is implemented. The final detailed design of the modification, especially chlorine scrubber design and containment building integrity, will be subject to further review by SafeWork during final design, to satisfy the relevant MHF requirements. In this context, the Department expanded the recommended condition for a Final Hazard Analysis (FHA), requiring the Applicant to consult with SafeWork NSW prior to finalising the detailed design of the modification and report on the outcomes in the FHA.

The advice from NSW EPA regarding the storage, handling and containment of DG and hazardous materials is broadly consistent with the advice from SafeWork NSW. Additionally, the Local Emergency Management Committee and FRNSW did not raise any significant concerns at this stage. Although FRNSW did not specify a requirement for a Fire Safety Study (FSS), the Department recommends a FSS be prepared to ensure that fire protection measures remain acceptable after decoupling from utilities provided by now-closed facilities in the BIP.



Figure 12 | Individual fatality risk contours for DG transport along Deniston Street

Bayside Council raised no significant concerns after considering the additional information provided by the Applicant through the SR and the updated QRA and DGTRA. Although there remain some outstanding concerns with Randwick Council, the Department considers that the Applicant has adequately addressed these concerns through the SR and updated QRA and DGTRA. While Bayside Council and Randwick Council remain uncertain with statistics on DG transport movements along Denison Street, the Department considers the level of DG transport movements adopted in the updated DGTRA to be the worse-case scenario, and the updated DGTRA has conservatively estimated the risk profile on this basis. To ensure that the transport of liquid chlorine from the IXOM facility does not exceed the level considered in the updated DGTRA, the Department has included a condition of consent requiring the Applicant to provide details of annual vehicle movements including dangerous goods, in an Annual Report for the overall facility and publish this report on IXOM's website.

5.1.7 Department's consideration

The Department reviewed the QRA, the DGTRA, additional information, public submissions and advice received from agencies. The Department is satisfied that the overall facility after the modification

complies with all risk criteria specified in HIPAP 4, provided the Applicant implements the modification in a manner which is consistent with the design described in the QRA including the risk reduction and mitigation measures, and critical safeguards. The Department is also satisfied that the modification will not significantly increase the DG transport risk along Denison Street, provided the Applicant transports liquid chlorine from the facility in a manner consistent with the DGTRA.

In this context, the Department considers the Applicant has scaled the modification appropriately given its existing location. The Department concludes that through the existing and recommended conditions of consent and with the Applicant implementing all safety measures as described, the hazards and risks from the overall facility after the modification can be continually monitored and managed to acceptable levels.

5.2 Contamination

5.2.1 Background

The site has been in use as a major industrial complex since the 1940s, with known soil and groundwater contamination. The site and broader BIP are a declared remediation site under the *Contaminated Land Management Act 1997*. A groundwater cleanup project has been ongoing since 2006, managed by the former site operator Orica. The primary contaminants in groundwater include chlorinated hydrocarbons (CHC) from chemical manufacturing and storage.

Soils on the BIP are contaminated with mercury and other heavy metals from the former CAP which used mercury cell technology until it was replaced by the current, membrane cell CAP in 2001. A range of remediation works have been undertaken, including excavation and disposal of mercury impacted soils, installation of a cut-off wall, and cap and contain measures for residual soils. An on-going maintenance order is in place for maintaining ground surfaces, the containment area and to monitor vapours. The remediation works were undertaken on blocks A, M and G, which are located adjacent to the proposed modification area on block L. Historical investigations indicated mercury concentrations in soils on block L were below the health investigation level for industrial land use.

5.2.2 Potential Impacts and Remediation

Earthworks are proposed for construction of the CLP containment building and relocated sodium hypochlorite loading bay to a maximum depth of 1.5 metres below ground level (mbgl). Hardstand would be established on both sites. The containment building would be enclosed, and the loading bay would be open. The modification has the potential to encounter contaminated soils during excavation, and contaminated soil vapours could enter the containment building.

A detailed site investigation (DSI) and remedial action plan (RAP) were prepared for the modification. An EPA Accredited Site Auditor was engaged during the assessment process, providing Interim Audit Advice (IAA) detailing the suitability of the RAP.

The DSI identified CHCs and mercury in soils on the site and bonded asbestos fragments on the surface. Testing of soil vapours indicated elevated concentrations of mercury and CHCs, which pose an inhalation risk if vapour intrudes into buildings. An RAP was prepared detailing the remedial works required to manage the risks associated with the modification. The RAP proposes:

- on-site containment of asbestos impacted soils and mercury contaminated soils below the hardstand, and
- installation of a vapour barrier under the hardstand of the CLP containment building to prevent mercury and CHC vapour intrusion into the building.

The RAP details procedures for certification of the vapour barrier installation, human health and environmental management during remediation, material tracking, vapour sampling and validation.

The Site Auditor's IAA confirmed the sampling undertaken as part of the DSI was adequate to inform development of the RAP. The IAA confirmed the mercury and CHC concentrations in soil vapour could pose a health risk for occupants of a building constructed on the site and require remediation. The IAA also noted the site is unlikely to be a contributor to significant mercury impacts in groundwater at the BIP, and source removal works for mercury are not warranted.

In relation to the RAP, the IAA confirmed the approach is acceptable and subject to successful implementation and validation, would make the site suitable for the proposed industrial use. The IAA recommends the Applicant prepare for the Auditor's review, a construction quality assurance plan and materials tracking plan. The Auditor also recommends the long-term environmental management plan include an asbestos register and management plan.

5.2.3 Department's Consideration

The Department reviewed the contamination studies and advice from the Site Auditor, EPA and Council. The site has operated as an industrial complex for 85 years, with the modification proposing continued industrial use consistent with the site's zoning. The history of contamination across the BIP is well understood and there is an on-going groundwater remediation project to manage contamination from historical industrial operations.

The modification proposes excavation to construct hardstand and building foundations that has the potential to encounter mercury and chlorinated hydrocarbon impacted soils, which also present a vapour risk for the proposed containment building. The RAP proposes appropriate measures to manage these risks, by containing contaminated materials and installing a vapour barrier underneath the CLP building. The EPA Accredited Site Auditor reviewed the RAP and confirmed it meets relevant

contaminated land management guidelines and is appropriate for managing risks associated with contaminated soil vapours.

The EPA recommended detailed conditions for the modification and Council recommended that implementation of the LTEMP be included as a condition. The Department's assessment concludes the contamination risks have been adequately identified, and the proposed remediation strategy would make the site suitable for the ongoing industrial use and minimise soil vapour risks for occupants of the CLP building. The Department has recommended conditions requiring continued engagement of the Site Auditor, preparation of a quality assurance plan for the vapour barrier and provision of a Site Audit Statement on successful completion of the remediation works. With these conditions in place, the Department's assessment concludes the site would be made suitable for the intended ongoing industrial use.

5.3 Air Quality

5.3.1 Background

The existing CAP plant is regulated by an EPL which includes emission limits and monitoring requirements for key air quality pollutants including chlorine and hydrogen chloride. Chlorine is the key air quality pollutant associated with the production of liquefied chlorine and the filling of tankers, drums and cylinders.

5.3.2 Air Quality Modelling

The Applicant provided an air quality assessment (AQA) prepared in accordance with the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW 2022*. The AQA modelled emissions from the existing CAP, using maximum emission rates for conservatism. For the proposed CLP stack, modelling considered maximum operations (if the Laverton facility is offline) and an emergency scenario (if there was a chlorine gas release).

Specific control measures incorporated into the design to minimise emissions include:

- maintaining the CLP containment building under negative pressure
- fitting a scrubbing system on the CLP building to capture and treat any chlorine gas emissions, with an 18.7 m high exhaust stack to disperse treated air
- a gas detection system for identifying leaks at very low concentrations
- keeping roller doors closed on the vehicle entry and exit points to the CLP building
- ensuring all tanker, drum and cylinder filling occurs inside the CLP containment building
- ensuring drivers or operators are not in attendance for the duration of filling a chlorine tanker.

The AQA modelling predicted stack emissions from the CLP would be below existing stack limits even in the event of the highest load. Ground level concentrations of chlorine gas would be well below the impact assessment criterion of 50 $\mu\text{g}/\text{m}^3$ at all residential and industrial receiver locations under maximum operations, with the project contributing only a small percentage of total emissions from the site (see **Figure 13**). Under an emergency scenario, ground level concentrations would be below the criterion at residential and industrial receivers, with the CLP stack the larger contributor to total site emissions under this scenario (see **Figure 14**).



Figure 13 | Ground level chlorine concentrations (maximum operation)



Figure 14 | Ground level chlorine concentrations (emergency scenario)

The EPA reviewed the AQA and recommended conditions for the design of the exhaust stack and for a post-commissioning verification study including emissions sampling and comparison with the *Protection of the Environment Operations (Clean Air) Regulation 2021*. The EPA also recommended conditions requiring the storage of a sufficient quantity of chemicals for the scrubber to treat the worst-case storage tank leak.

Several public submissions raised concerns about the risks and consequences of chlorine releases from the site. This is discussed in the assessment of hazards and risks in Section 5.1.

The Department reviewed the AQA and advice from the EPA and considers the air quality assessment was prepared in accordance with relevant guidelines and adequately considered cumulative impacts from existing operations plus the modification. The AQA considered maximum operating conditions (if the Laverton facility is offline) and an emergency scenario (if there was a chlorine gas release). Under both scenarios, the modified development would comply with the impact assessment criteria at all off-site receivers. The modification incorporates specific elements to control air emissions including a containment building for all filling activities and storage, maintained under negative pressure and with leak detection systems in place. The enclosure of chlorine storage vessels presents an improvement over existing conditions at the site.

The Department has included the EPA's recommended conditions for the stack design, post-commissioning verification and chemical storage. The Department's assessment concludes the modification would not adversely impact on air quality.

5.4 Other issues

Table 8 | Assessment of other issues

Findings and conclusions	Recommended conditions
Noise	
- Noise from the CAP and the broader BIP, is regulated by the EPL. - The existing noise limits at the nearest residential receivers are L_{Aeq} 65, 55 and 50 decibels (dB) in the day, evening and night-time periods, respectively. These limits apply to all plant and equipment in the BIP. - The nearest residences to the IXOM plant are located 80 m to the east across Denison Street. - The Applicant provided a noise impact assessment (NIA) for the modification, modelling worst-case operations with all plant and equipment operating simultaneously during day, evening and night-	- Comply with standard hours for construction works - Modify existing noise limit conditions to be consistent with the limits in the EPL

Findings and conclusions	Recommended conditions
time periods. Noise measurements of the existing CAP, and the CLP at Laverton were used to validate the modelling. • The NIA predicted the modified development would comply with the existing noise limits at all residential receiver locations for all time periods during worst-case operating conditions. • Road traffic noise levels, when maximum truck movements were considered, would comply with the Road Noise Policy (with a <0.1 dBA increase in noise level). • Noise during construction was predicted to comply with the Interim Construction Noise Guideline during earthworks, foundations and building construction. Construction works would be limited to standard day-time hours. • Randwick Council questioned aspects of the NIA, noting concerns about potential night-time noise impacts on residential amenity. Noise impacts were not raised as a concern in public submissions. • The Department considers the NIA has adequately modelled the potential noise impacts from the existing CAP plus the proposed CLP. The model was verified via noise measurements and demonstrated the modification would comply with existing noise limits in the EPL. The EPA, as the authority responsible for regulating noise from the site, noted the NIA had adequately assessed the noise impacts of the modified development, and recommended the EPL conditions continue to apply. • The Department's assessment concludes the modification would not materially increase noise from the site or on the road network. The Department recommends the existing noise limits in the consent be updated to align with the EPL.	
Traffic	
• The Applicant prepared a Traffic Impact Assessment (TIA) that estimated the modification would result in 3 additional truck movements in the AM peak and 3 additional movements in the PM peak for normal operations. Under emergency operations this would increase to 6 in the AM peak and 6 in the PM peak.	• Prepare a construction environmental management plan

Findings and conclusions	Recommended conditions
• The TIA noted the additional traffic would have minimal impact on the operation of the road network and no road upgrades are required. • Construction traffic volumes are also expected to be minimal and would be controlled via a construction traffic management plan. Construction works would be limited to standard day-time hours. • TfNSW noted the modification would not impact on the State road network and both Councils did not raise traffic capacity impacts as a concern (dangerous goods transport risk is discussed in Section 5.1). • The Department considers construction and operation of the modification would result in minor additional traffic movements that would not impact on the capacity of the road network. • The Department recommends an environmental management plan be provided to manage the construction phase.	
Flooding	
• The Applicant provided a Flood Impact Risk Assessment (FIRA) that identified the site as flood affected during the 1% Annual Exceedance Probability (AEP) and the probable maximum flood (PMF) events. • The modification has a high hazard rating due to its industrial classification and storage of hazardous substances and therefore must meet prescriptive flood planning controls detailed in the Bayside Development Control Plan 2022 (BDCP). • The FIRA noted the modification would meet the flood planning controls in the BDCP with implementation of a bund wall around the CLP building, to mitigate all flood events. • CPHR reviewed the FIRA and noted it had demonstrated the site is low flood risk and flood impacts are within the values allowable in the Bayside LGA. CPHR noted the proposed building floor level meets the required PMF level and protection to the flood planning level (1% AEP + 500 mm of freeboard) would be achieved by use of a low bund wall. • Council's only comment on flooding noted that chemical storage must be protected from inundation in all flood events. • The Department reviewed the FIRA and agency advice and noted the modification would meet flood planning controls and would not change flood levels or velocities off-site.	• Ensure any structures below the flood planning level are constructed from flood compatible materials.

Findings and conclusions	Recommended conditions
The Department's assessment concludes the modification would not result in adverse flooding impacts and recommends a condition requiring any structures below flooding planning levels to be built with flood compatible materials.	
Greenhouse Gas	
- An updated Greenhouse Gas Assessment (GHGA) was submitted in the Applicant's SR, responding to comments from the EPA and to correct a calculation error in the original assessment. - The modified facility (CAP plus CLP) would generate 60,867 tonnes of carbon dioxide equivalent (t CO_{2-e}) per year with the modification contributing 2,550 t CO_{2-e} of the total emissions. Emissions from the modification (CLP) represents 0.0022% of annual NSW emissions and 0.0006% of annual Australian emissions. - The EPA confirmed the modification does not trigger the requirements in the EPA's Guide for Large Emitters and advised the EPA may require a Climate Change Mitigation and Adaption Plan via the EPL in the future. - The Department considered the GHGA and notes the modification would result in a negligible change in greenhouse gas emissions from the overall facility.	No conditions recommended.

6 Evaluation

The Department's assessment has considered the relevant matters and objects of the EP&A Act, advice from government agencies, Councils and public submissions and the Applicant's Modification Report and Submissions Report. The Department considers the proposed modification is appropriate on the basis that:

- the hazard and risks of the modified facility have been thoroughly assessed and would comply with the land use safety risk criteria detailed in the Department's *Hazardous Industry Planning and Advisory Paper No.4 Risk Criteria for Land Use Safety Planning* (HIPAP 4)
- it would meet air quality impact assessment criteria at all off-site receiver locations
- it would comply with the existing noise limits for the IXOM facility

- the additional traffic movements would be adequately accommodated on the road network
- the site can be remediated to be made suitable for the proposed industrial land use
- it would improve national supply chain resilience for critical water treatment chemicals.

Key issues raised by Councils and in public submissions related to the hazards and risks associated with the modification and the transport of dangerous goods along Denison Street. The Department undertook a detailed analysis of the Applicant's Quantitative Risk Assessment and Dangerous Goods Transport Risk Assessment with reference to baseline studies. Clarifications were sought on these studies to ensure the assumptions reflected worst-case scenarios to ensure a level of conservatism in the assessment. The hazard and risks studies showed the modified facility operating under normal conditions would improve the management of chlorine storage on site, by enclosing all chlorine storage inside a containment building fitted with air quality treatment equipment. Under contingent operating scenarios, if the IXOM Laverton facility is offline, the risks of the modified facility would remain below the land use safety risk criteria at all off-site receivers.

The dangerous goods transport risk assessment demonstrated the modification would have little effect on the risk profile, as dangerous goods transport risk is dominated by LPG tanker movements unrelated to the IXOM facility.

The Department has recommended a range of conditions to ensure continual monitoring and management of hazards and risks from the modified facility including:

- pre-construction studies to ensure the risk reduction measures and critical safeguards for the CLP are implemented in the detailed design
- pre-commissioning studies covering emergency and safety management
- post-commissioning verification monitoring on the air quality treatment equipment
- limits on storage quantities and transport routes
- 3 yearly independent hazard audits
- 5 yearly quantitative risk assessments to verify the extent of risk from the overall facility does not extend beyond that assessed for this modification.

The Department has also recommended conditions for remediation, construction, traffic and stormwater management.

The Department is satisfied the modification should be approved subject to conditions.

7 Recommendation

It is recommended that the **Director, Industry Assessments**, as delegate of the Minister:

- **considers** the findings and recommendations of this report
- **determines** that the application DA35/98-MOD-6 falls within the scope of section 4.55(2) of the EP&A Act
- **forms the opinion** under clause 30A(2)(c) of the Biodiversity Conservation (Savings and Transitional) Regulation 2017 that a BDAR is not required to be submitted with this application as the application will not increase the impact on biodiversity values on the site
- **accepts and adopts** the findings and recommendations in this report as the reasons for making the decision to approve the modification
- **agrees** with the key reasons for approval listed in the notice of decision
- **modifies the consent** for the IXOM Chlor-Alkali Plant (DA35/98-MOD-6), subject to the conditions in the attached instrument of modification.
- signs the attached instrument of modification (**Appendix D**).

Recommended by:



20 July 2026

Deana Burn

Specialist Planner

Industry Assessments

8 Determination

The recommendation is **adopted** by:



21 July 2026

Joanna Bakopanos

A/Director, Industry Assessments

Glossary

Abbreviation	Definition
Applicant	IXOM Operations Pty Ltd
Council	Bayside Council
CPHR	Conservation Programs and Heritage Regulation Group of NSW DCCEEW
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
Department	Department of Planning, Housing and Infrastructure
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
FRNSW	Fire and Rescue NSW
Heritage	Heritage NSW, within NSW DCCEEW
LGA	Local Government Area
Minister	Minister for Planning and Public Spaces
Planning Secretary	Secretary of the Department of Planning, Housing and Infrastructure
SafeWork	SafeWork NSW
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TfNSW	Transport for NSW

Appendices

Appendix A – List of Referenced Documents

The Department has relied upon the following key documents during its assessment of the proposed development. These documents can be found at the following link: [MOD 6 Chlorine Liquefaction Plant | Planning Portal - Department of Planning and Environment](#)

Modification Application

- Chlorine Liquefaction Plant Modification Report prepared by Element dated 13 August 2025

Submissions and Advice

- Included in the above link

Submissions Report

- Chlorine Liquefaction Plan Submissions Report prepared by Element dated 30 March 2026

Department’s Assessment Report for DA35/98

Under ‘Archive’ Determination folder at:

- [Orica Chlor-Alkali Plant | Planning Portal - Department of Planning and Environment](#)

Appendix B – Submissions and Government Authority Advice

All submissions and government agency advice can be found here: [MOD 6 Chlorine Liquefaction Plant | Planning Portal - Department of Planning and Environment](#)

Appendix C – Community Views for Draft Notice of Decision

Table 9 | Key issues and how they have been considered

Issue	Consideration
Hazards and Risk - Unacceptable fatality risks - No buffer to residences - Not in the public interest	Assessment The hazard and risks studies showed the modified facility would improve the management of chlorine storage on site, by enclosing all chlorine storage, handling and filling activities inside a containment building fitted with air quality treatment equipment. The risks of the modified facility, including the existing Chlor-Alkali Plant and the Chlorine Liquefaction Plant considered

Issue	Consideration
	cumulatively, would remain below the land use safety risk criteria at all off-site receivers under all operating conditions. The dangerous goods transport risk assessment demonstrated the modification would have little effect on the risk profile, as dangerous goods transport risk is dominated by liquefied petroleum gas (LPG) tanker movements unrelated to the IXOM facility. Recommended conditions: • pre-construction studies to ensure the risk reduction measures and critical safeguards for the CLP are implemented in the detailed design • pre-commissioning studies covering emergency and safety management • post-commissioning verification monitoring on the air quality treatment equipment • limits on storage quantities and transport routes • 3 yearly independent hazard audits • 5 yearly quantitative risk assessments to verify the extent of risk from the overall facility does not extend beyond that assessed for this modification.
Cumulative impacts • Interaction with other industrial operations • Interaction with legacy contamination	Assessment: IXOM is the only chemical manufacturer remaining in the Botany Industrial Park, with Qenos and Indorama closing their operations in 2025. These closures have reduced the overall risk profile from the BIP. The modification would not increase off-site risk from the IXOM facility and would comply with all land use safety risk criteria. The modification includes remediation works to ensure contaminated soils are contained and a vapour barrier is installed to prevent contaminated vapour intrusion into the containment building. An accredited Site Auditor reviewed the Remediation Action Plan and issued interim audit advice confirming the RAP is suitable for remediating the site for the proposed industrial use. Recommended conditions: • Appoint an accredited Site Auditor to independently validate the remediation works.

Issue	Consideration
	Remediate the site and provide a Site Audit Statement to confirm the site is suitable for the proposed industrial use.
Emergency notification	Assessment: As above for hazards and risks. Recommended conditions: pre-commissioning studies covering emergency and safety management.
Independent review	Assessment: As above for hazards and risks. Recommended conditions: 3 yearly independent hazard audits 5 yearly quantitative risk assessments to verify the extent of risk from the overall facility does not extend beyond that assessed for this modification.
National supply chain resilience	Assessment: The modification would improve supply chain resilience by providing a second liquid chlorine production facility to supply critical water treatment chemicals. The modification would minimise risks associated with disruption in supply from IXOM's Laverton facility and reduce reliance on imports.

Appendix D – Recommended Instrument of Modification

See separate document titled 'Instrument of Modification' under the 'Determination' tab at [MOD 6 Chlorine Liquefaction Plant | Planning Portal - Department of Planning and Environment](#)