

REPORT

LAND USE SAFETY PLANNING ADVICE

PROPOSED WAREHOUSE DEVELOPMENT AT 49 STEPHEN RD

ESR AUSTRALIA & NEW ZEALAND

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ABBREVIATIONS

BIP	Botany Industrial Park
CAP	ChlorAlkali Plant
CLP	Chlorine Liquefaction Plant
DG	Dangerous Goods
DPHI	Department of Planning, Housing and Infrastructure
HIPAP	Hazardous Industry Planning Advisory Pape
QRA	Quantitative Risk Assessment
SSD	State Significant Development
TfNSW	Transport for NSW

1. INTRODUCTION

1.1. Background

ESR Australia & New Zealand (ESR) is proposing a multilevel warehouse development at 49-61 Stephen Rd, Banksmeadow (State Significant Development SSD-65924461). The development will be located to the west of the Botany Industrial Park (BIP) and is located within a societal risk overlay area advised by the Department of Planning, Housing and Infrastructure (DPHI). The overlay was based on the BIP 2018 Quantitative Risk Assessment (QRA) Ref [1].

Due to the cessation of Qenos and Indorama facilities at the BIP, the risk level near the north of the BIP is materially lower compared to the results reported in the 2018 BIP QRA. The IXOM ChlorAlkali Plant (CAP) in the south of the BIP is now the primary contributor to offsite risk. IXOM has recently submitted an SSDA to modify the CAP to provide a Chlorine Liquefaction Plant (CLP). The IXOM application (DA35/98-Mod-6) includes a QRA covering the CAP and proposed CLP which provides the most applicable publicly available risk profile for the areas around the BIP, Ref [2].

ESR has requested Sherpa Consulting Pty Ltd (Sherpa) conduct a risk review with respect to the reduced BIP risk profile to determine:

- If the proposed warehouse will satisfy the relevant land use safety planning requirements for developments in the vicinity of hazardous facilities specified in Hazardous Industry Planning Advisory Paper (HIPAP) No. 10 *Land Use Safety Planning risk* Ref [3].
- Whether the population associated with the proposed warehouse development will have any material effect on the societal risk.

1.2. Scope and objectives

The scope includes:

- Comparison of the 2018 BIP risk profile with the most recent risk profile as shown in the IXOM QRA.
- Assessment of the individual risk posed by the IXOM operations at the location of the proposed warehouse development to determine compliance with applicable HIPAP No. 10 criteria.
- Assessment of the impact of the additional warehouse population on societal risk reported in the IXOM QRA.

The overall objective is to determine whether the most recent risk profile has any material effect on the proposed warehouse development hence whether any development constraints relating to risk management may need to be applied.

1.3. Exclusions, assumptions and limitations

The exclusions, assumptions and limitations that apply to this report are summarised in Table 1.1.

Table 1.1: Exclusions, assumptions and limitations

Item	Scope area	Exclusion, assumption or limitation
1	BIP risk profile	As no updates have been made to the 2018 BIP risk profiles to reflect changes in BIP operations, this study used the IXOM risk profile provide in a Quantitative Risk Assessment (QRA) report prepared in 2025 for a proposed modification. This approach is considered appropriate as the IXOM is now the primary contributor to BIP offsite risk.
2	Risk posed by other developments	The scope is limited to evaluating the impact of existing hazardous facilities (i.e. BIP) on the proposed development with respect to the HIPAP No. 10 criteria. The review excludes any risks unrelated to the BIP, i.e. any risks from other sites, pipelines etc.
3	Risk assessment level	The risk assessment is limited to a qualitative review based on the available risk studies. No additional risk modelling has been undertaken
4	Risk from proposed warehouse development	The proposed development is for general goods warehousing and does not include storage and handling of Dangerous Goods (DG); therefore, it is not potentially hazardous and is not a source of risk. Should DG usage be proposed, an additional development application would be required, and any risk implications would require further evaluation.
5	Land use	The risk assessment relates to industrial land use only of the proposed warehouse site. Results of this review cannot be extrapolated to other types of land use (e.g. residential). Should change in land use be proposed in future, an updated assessment would be required.

2. STUDY BASIS

2.1. Proposed development description

The proposed development is located within the established industrial precinct of Banksmeadow. The site is irregular in shape, with an area of 48,186 m², and is surrounded predominantly by industrial and warehouse uses, with residential areas located further to the west. The development will feature two 2-storey warehouse buildings with integrated office spaces.

The location of the warehouse is shown in Figure 2.1. The proposed development is not adjacent to the BIP facility, with a separation distance of approximately 240m from the nearest BIP boundary and 740 m from the IXOM facilities.

2.2. HIPAP No. 10 risk criteria

HIPAP No. 10 specifies risk criteria for new development in the vicinity of potentially hazardous facilities (such as the BIP) and provides guidance for application of the criteria. Three type of risk criteria are provided:

- Individual fatality risk which is a measure of the fatality risk at a location. This does not account for specific populations or probability of presence and can be regarded as the risk at a location (i.e. would be equal to the risk to a person assuming 24 hour occupancy, 365 days per year). This is a function of the source of risk and is unaffected by the characteristics of a development. The risk criteria are defined for different sensitivities of land use. In this case, only the criterion applicable to industrial land uses i.e. 50×10^{-6} per year, is relevant.
- Individual injury risk which is a measure of the risk of injury at a location, is similar to the individual fatality risk definition but applies to injury impacts. The criteria provided in HIPAP No. 10 for injury risk are applicable only to residential and sensitive land uses and are not applicable to the warehouse development.
- Societal risk is a measure of the probability of incidents number of people who may be affected. As per HIPAP No. 10, where a development proposal involves a significant intensification of population in the vicinity of such a potentially hazardous facility, the change in societal risk needs to be taken into account, even if individual risk criteria are met. The societal risk is assessed based on the following guidance:
 - If the incremental societal risk remains below the negligible line, the proposal will meet the societal risk requirements.
 - If the incremental risks extend to the ALARP region, relocating of people should be considered. If there is still a significant portion of the societal risk plot within the ALARP region after reducing the population, the proposed development should only be approved if benefits clearly outweigh the risks.

2.3. BIP risk profile

A comprehensive QRA has been periodically conducted to estimate the cumulative offsite risk associated with the BIP operations with the latest public report issues in 2018. The individual fatality risk contours and societal risk profile from the 2018 QRA are shown in Figure 2.2 and Figure 2.3. Since 2018, there have been several changes to BIP operations and associated risk including:

- Qenos and Indorama ceased operations at the BIP and removed their hazardous inventories in 2024.
- IXOM has proposed the construction of a Chlorine Liquefaction Plant (CLP) within the CAP under a SSD modification application (DA35/98-Mod-6). The application is under assessment by DPHI.

The QRA conducted for the CLP modification application is publicly available and presents the current and future risk associated with IXOM facilities. This QRA already incorporates population data for the ESR development site in the societal risk calculation. The IXOM QRA risk profile is the basis for the assessment of the proposed warehouse development.

2.4. Population change due to warehouse development

Societal risk is dependent on the population within the surrounding area.

To assess the potential impact of the proposed operation on BIP societal risk, the populations considered in the previous QRAs and proposed in the warehouse design were reviewed and compared, as summarised in Table 2.1.

Table 2.1: Population change in proposed development area

Study	Day population	Night population	Reference
2018 BIP QRA	112	0	Transport for NSW (TfNSW) - population density of approximately 23.3 people/ha for daytime and zero population for nighttime. Residential population is negligible in this area.
2025 IXOM QRA	158	0	TfNSW - population density of approximately 32.9 people/ha for daytime and zero population for nighttime. Residential population is negligible in this area.
Proposed warehouse (this report)	240	0	Warehouse design (parking spaces). This does not account for short term / transient populations during shift changes etc.

Figure 2.1: Proposed development location in relation to the BIP

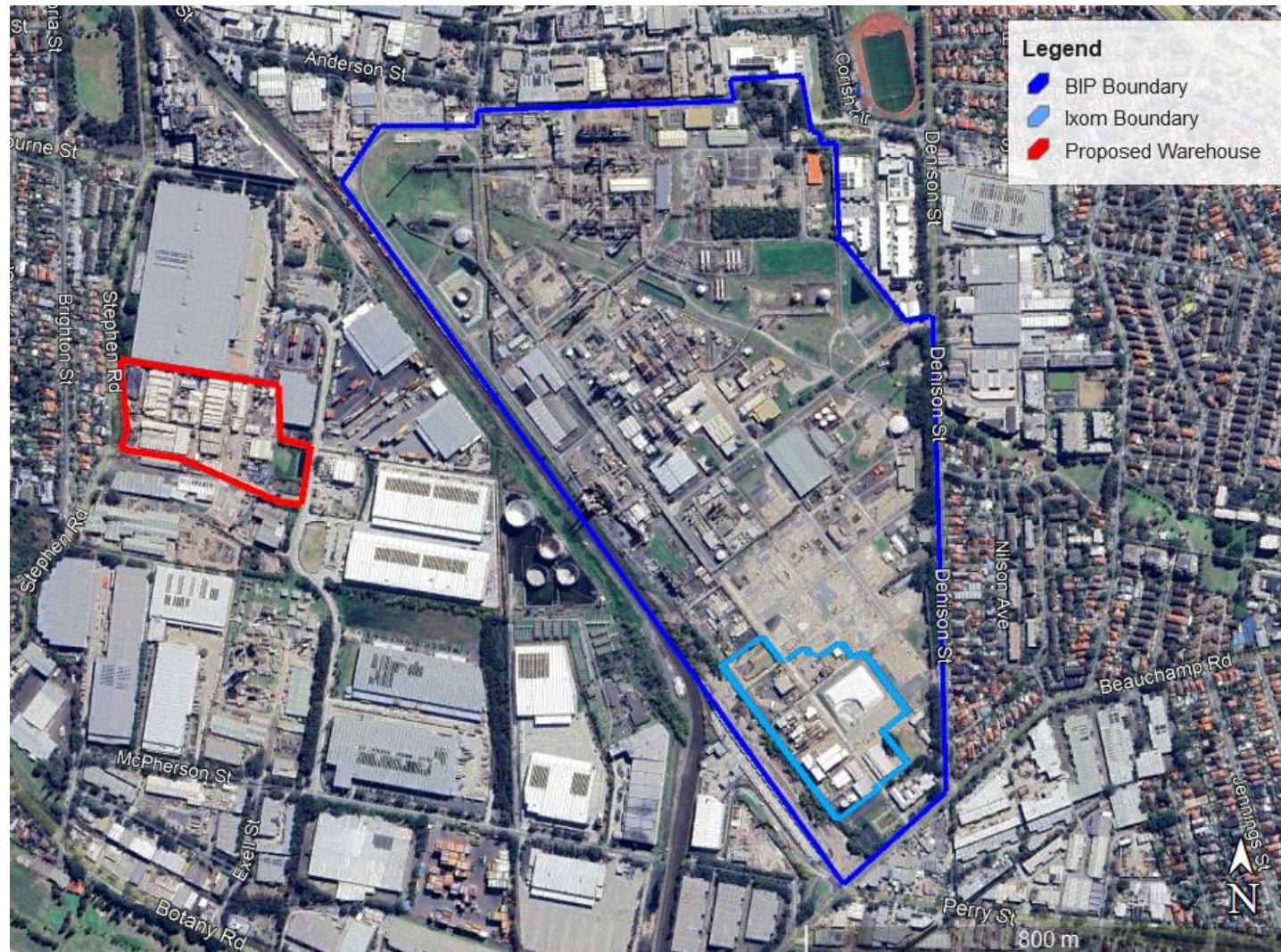


Figure 2.2: BIP QRA 2018 cumulative individual fatality risk, Ref [1]

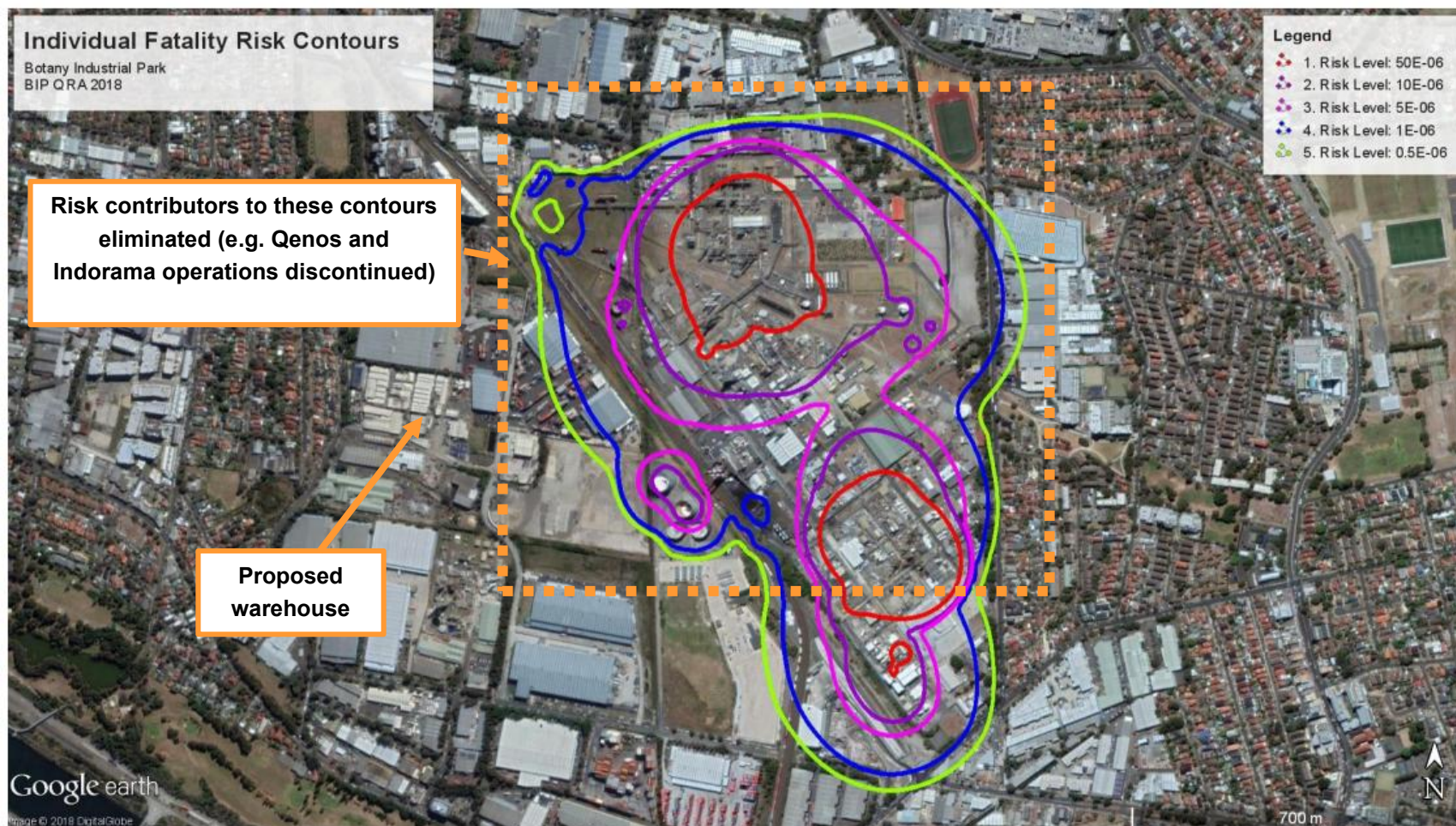
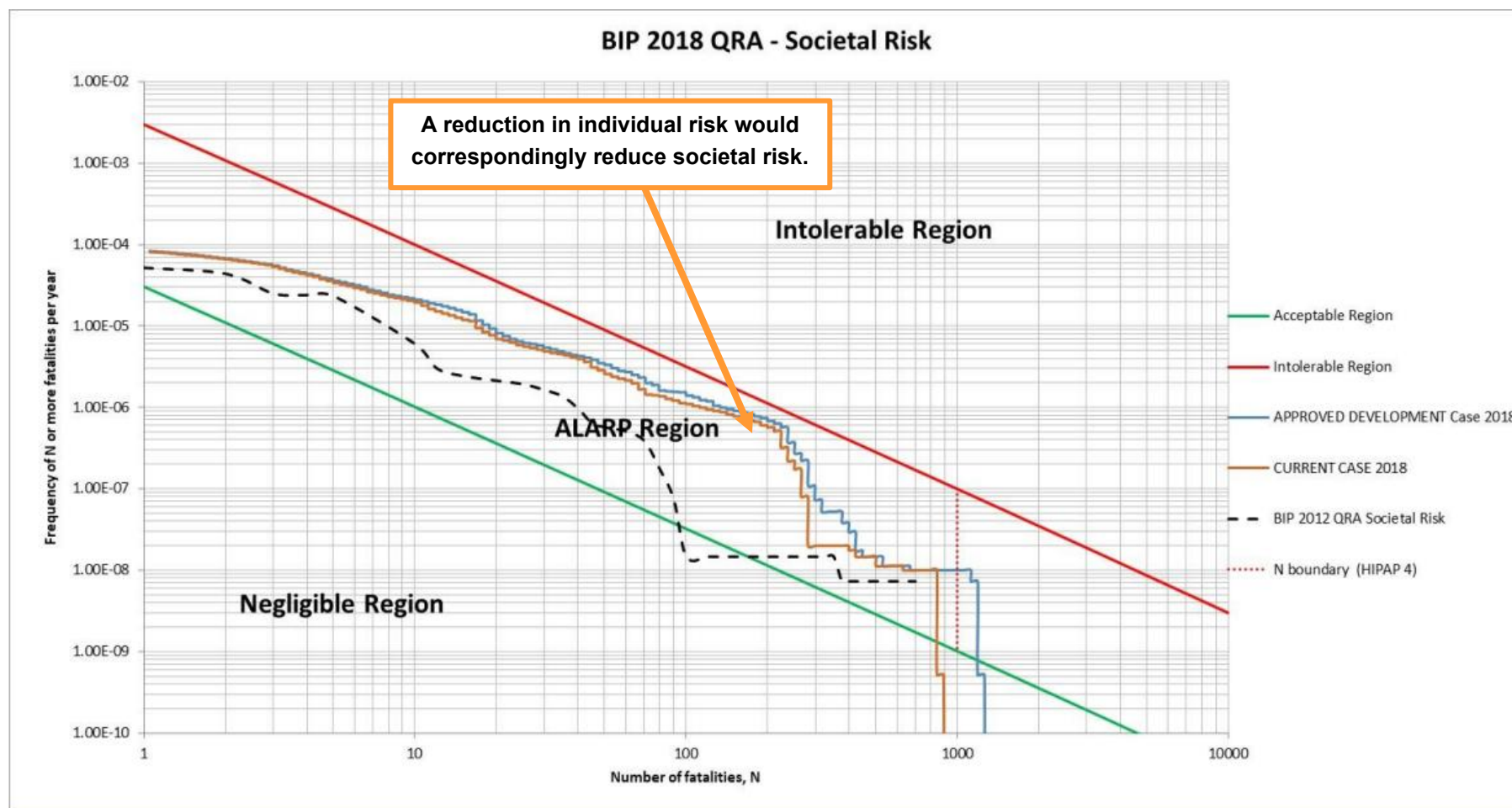


Figure 2.3: BIP QRA 2018 cumulative societal risk, Ref [1]



3. RISK REVIEW

3.1. Individual risk

The 2025 IXOM risk contours, presented in Figure 3.1, account for the removal of Qenos and Indorama facilities on the BIP as well as accounting for the potential IXOM CLP modification to the existing CAP. These are significantly smaller than the BIP QRA 2018 contours presented in Figure 2.2.

The individual fatality risk at the proposed development location is well below 50×10^{-6} per year. This complies with the relevant HIPAP No. 10 individual fatality risk criterion for industrial land uses.

3.2. Societal risk

The societal risk results from the 2018 BIP QRA, shown in Figure 2.3, indicates encroachment to the ALARP region. However, the cessation of the Qenos and Indorama reduces the individual offsite risk and, consequently, the societal risk as shown in the IXOM QRA societal risk results as per Figure 3.3.

The 2025 IXOM QRA societal risk assessment includes:

- Risk from the existing CAP and the future CLP, which are the primary contributors to the BIP offsite risk.
- The most recent population datasets in areas surrounding the BIP available from the 2021 Census.
- An allowance for future general industrial populations in the areas of the BIP formerly occupied by Qenos and Indorama.

The 2025 IXOM QRA societal risk calculation already incorporates a daytime population of approximately 158 people at the warehouse site. The population is expected to increase to approximately 240 people (i.e. an increase of less than 100 people).

Figure 3.2 illustrates the location of the proposed warehouse relative to the IXOM individual fatality risk contours. Due to the significant separation distance between the proposed warehouse location and the IXOM facility, the individual fatality risk at the warehouse location is approximately 1×10^{-9} per year.

Figure 3.3 maps the frequency and additional population onto the societal risk curve from the IXOM QRA. The proposed development may extend the f-N curve to the right at low frequencies (i.e. between 1×10^{-10} and 1×10^{-9} per year); however, the societal risk curve will remain within the negligible region.

3.3. Conclusion

A qualitative review has been undertaken informed by publicly available QRA studies for the BIP as operational in 2018 and only the IXOM facilities (existing CAP and proposed CLP) in 2025.

Based on the review of the most recent risk profile for the BIP (i.e. the IXOM QRA), it is concluded that:

- Hazardous facilities previously located closer to the proposed warehouse site (i.e. Qenos and Indorama) have ceased operations. The proposed development area is well separated from the remaining hazardous installations within the BIP (i.e. approximately 740 m away from the IXOM facility). The individual fatality risk at the location of the proposed warehouse is approximately 1×10^{-9} per year which is well below the applicable risk criterion for industrial land uses of 50×10^{-6} per year.
- Given the low level of individual fatality risk at the proposed warehouse location, any resulting change to the societal risk due to an increase in population at the 49 Stephen Rd site is minor and societal risk will remain in the negligible region. The additional population in the proposed warehouse development has minimal effect on the overall societal risk remaining from the BIP, as represented by the IXOM QRA.

It can be concluded that there are no material risk impacts on the proposed warehouse development site at 49-61 Stephen Rd from the IXOM facilities. No specific constraints to design or population at the proposed warehouse site are required to manage the risk from the BIP.

Note that the results of this review cannot be extrapolated to other types of land use (e.g. residential). Should change in land use be proposed at this site in future, an updated risk assessment would be required.

Figure 3.1: IXOM future individual fatality risk (contingent case) – reproduced from 2025 IXOM QRA, Ref [2]

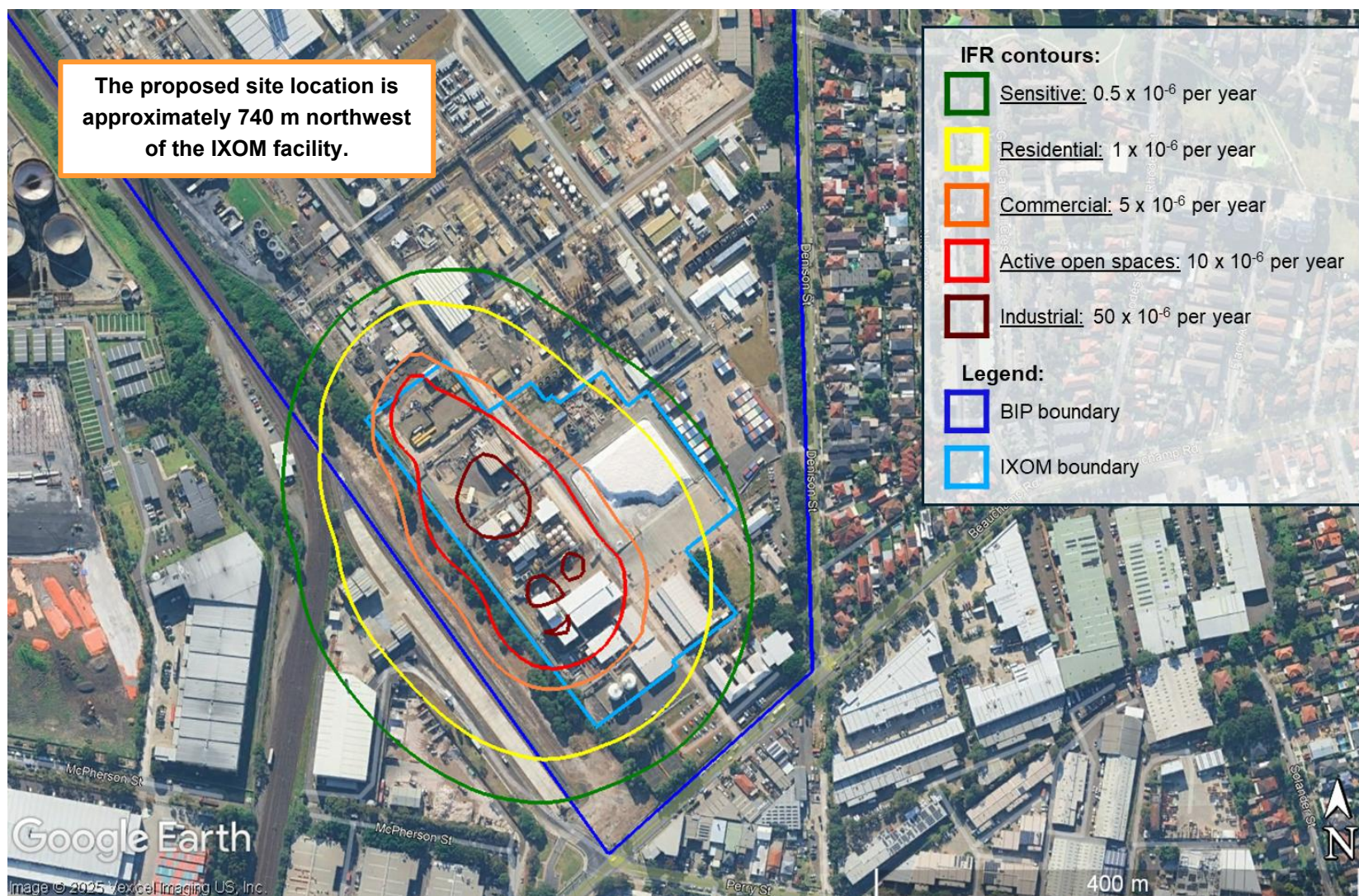
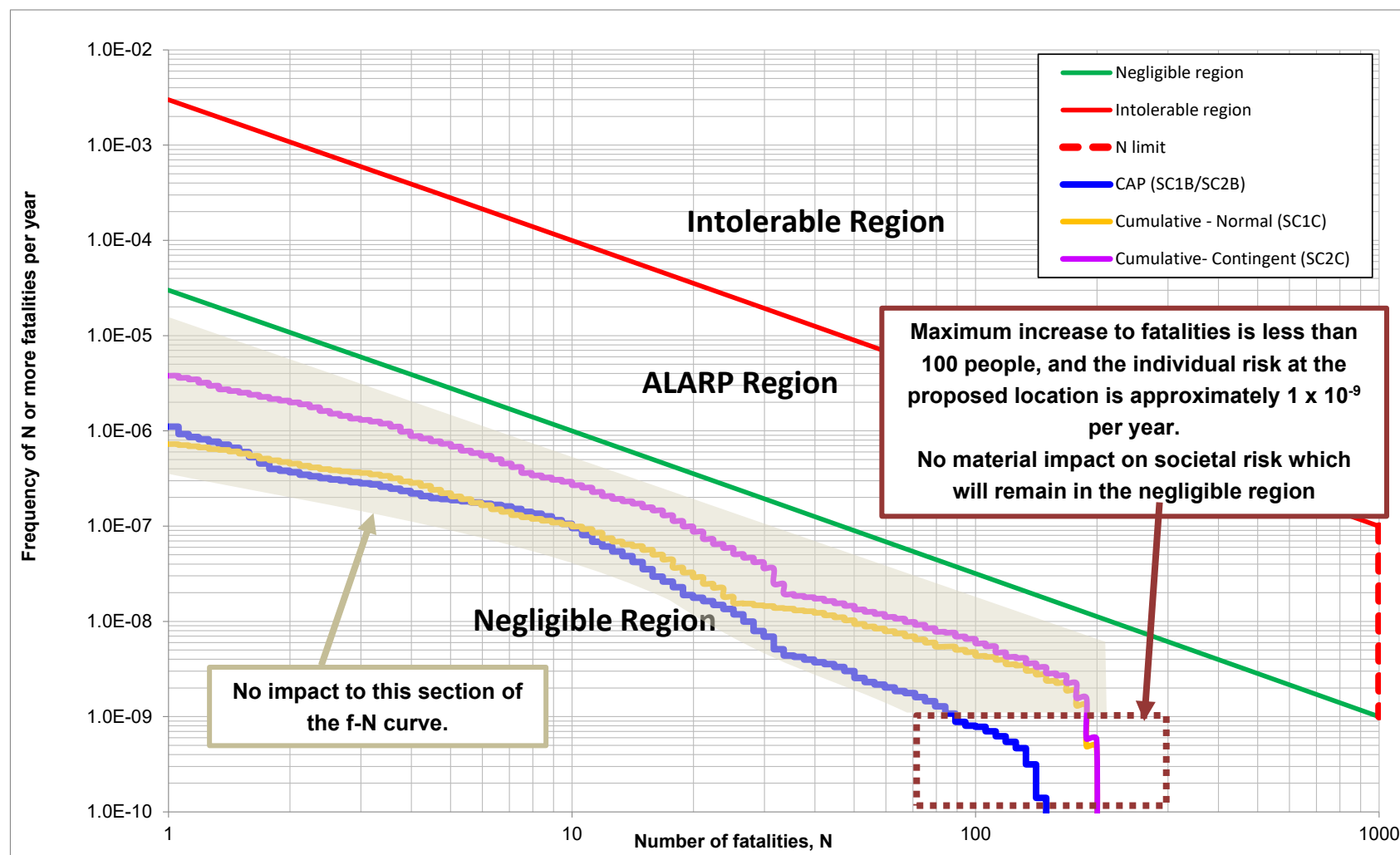


Figure 3.2: Zoomed-out view of Figure 3.1 also showing proposed warehouse location



Figure 3.3: Societal risk – 2025 IXOM QRA, Ref [2]



APPENDIX A. REFERENCES

- [1] Sherpa Consulting Pty Ltd, "Botany Industrial Park Quantitative Risk Assessment (QRA) Report, Document Number: 21158-RP-001, Rev 1," <https://www.planning.nsw.gov.au/sites/default/files/2023-03/quantitative-risk-assessment-2018-botany-industrial-park-report.pdf>, 2018.
- [2] Sherpa Consulting Pty Ltd, "Quantitative Risk Assessment Report: Proposed Chlorine Liquefaction Plant - Modification to Chloralkali Facility," 21838-RP-002, Rev 5 <https://www.planningportal.nsw.gov.au/major-projects/projects/mod-6-chlorine-liquefaction-plant>, March 2026.
- [3] NSW Department of Planning, "Hazardous Industry Planning Advisory Paper No. 10 - Land Use Safety Planning," 2011.