

THE PLANNINGHUB

By Appointment to the Government of New South Wales

22 September 2020

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Dear Stephen and James

Town Planning Advice - Purchase of 2-10 Nilson Avenue, Hillsdale, June 1994 by Jazabas Pty Ltd

The Planning Hub has been engaged to provide town planning advice in relation to the purchase of 2-10 Nilson Avenue, Hillsdale in June 1994 by Jazabas Pty Ltd

1.0 What were the commercial/business circumstances in which the 1985 DUAP report was released/distributed? What was the purpose of this report?

In 1985, the Department of Environment and Planning published a comprehensive risk assessment study for the Botany/Randwick industrial complex and Port Botany. The aim of the 1985 study was to identify, quantify and assess the cumulative risk to the surrounding area from the industrial facilities and recommend safety improvements to individual sites as well as land use strategy in the surrounding areas.

From our research, we found that the primary impetus for release the report was due to the fact that the Botany Industrial Area was, at the time, the largest industrial site in Australia and government needed to address the potential hazardous impacts that the site may have on nearby land uses.

Of note, the report aimed to identify the implications to surrounding land and the need to avoid intensification of residential development in the RRZ.

Neither the Botany Local Environmental Plan 1995, nor any regional environmental plan, adopted the recommendations contained in the study.

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3.0 Did the Director General's Requirements give adequate regard to the extent of risks associated with the development?

Pursuant to Section 115C(2) of the applicable version of Environmental Planning and Assessment Act 1979 at the time of lodgement *when preparing a report relating to the granting of an approval under this Division or the modification of such an approval (if an environmental impact statement is required), the Director is to examine the environmental impact statement, the representations made in response to the public exhibition of the statement, any submissions from the proponent and any other thing the Director considers relevant.*

Furthermore, Schedule 3 of the Environmental Planning and Assessment Regulation 1995, the Director General is to ensure that the applicant is aware of all key issues associated with the proposed development.

Given the above, the Director General is under a requirement to consider the relevant land use policies and legislation to ensure that all key issues are identified and assessed within the Applicant's Environmental Impact Statement.

On 16 February 1998, DUAP issued the Director General's Requirements for a replacement chlorine plant, which aim to guide the preparation of the Applicant's EIS. The Director General's requirements did not appropriately address all key issues that were required to inform the Applicant's EIS. Of note, the Director General did not raise transportation hazard issues to be addressed in the EIS, which was required by SEPP 33. Therefore, the Director General's requirements did not require the applicant to appropriately apply the tests set out in SEPP 33 nor HIPAP 6.

4.0 Did the Applicant and the Department of Urban Affairs and Planning (now DPIE) comply with the Conditions of Consent Issued Under Development Application No. 35/98.

In approving DA 35/98, the Minister for Urban Affairs and Planning, Craig Knowles, granted consent to the Orica replacement plant on 6 November 1998. DA 35/98 was subject to number of conditions relating to the construction and ongoing operation of the Chlorine Plan. In relation to Hazard Management, the determination stated:

The reasons for the imposition of conditions are to ensure that potential hazards do not pose an unacceptable risk both on-site and off-site.... provide for environmental monitoring and reporting of the future performance of the development and to protect the environmental amenity of the locality during construction and operation of the plant.

Condition 11 relates to ongoing hazard management and requires:

the Applicant to update the hazard analysis for the Chlor-alkali and derivatives complex... with further updates every three years... *the analysis shall be prepared in accordance with DUAP HIPAP No 6, Guidelines*

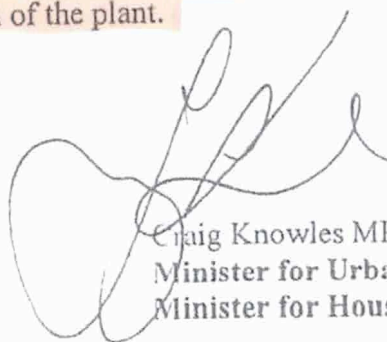
ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

DETERMINATION OF A DEVELOPMENT APPLICATION
PURSUANT TO SECTION 91 OF THE
"UNAMENDED" ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

I, the Minister for Urban Affairs and Planning, in pursuance of section 91 of the Unamended Environmental Planning and Assessment Act, 1979, and Clause 8 of State Environmental Planning Policy No. 34 – Major Employment Generating Industrial Development (SEPP 34), determine the development application referred to in Schedule 1 by granting consent to that application subject to the conditions set out in Schedule 2 (file R98/00010).

The reasons for the imposition of conditions are to ensure that potential hazards do not pose an unacceptable risk both on-site and off-site; ensure that best management practices and technology are adopted in the operation of the facility; provide for environmental monitoring and reporting of the future performance of the development; and protect the environmental and amenity of the locality during construction and operation of the plant.

Sydney, 6.11. 1998



Craig Knowles MP
Minister for Urban Affairs and Planning
Minister for Housing

SCHEDULE 1

Application made by:	Orica Australia Pty Ltd
To:	Minister for Urban Affairs and Planning
In respect of land being:	16-20 Beauchamp Road, Matraville NSW 2036 Lot 1, DP 608153
For the following development:	Installation of replacement Chlor-alkali plant to produce 35,000 tonnes per annum gaseous chlorine.
Development Application	The Development Application DA No. 35/98 lodged with the Department of Urban Affairs and Planning on 30 June, 1998 accompanied by the environmental impact statement (EIS) entitled "Replacement Chlor-Alkali Plant for Orica Australia Pty Ltd", June 1998, prepared by Dames & Moore Pty Ltd.

Applying SEPP 33

HAZARDOUS AND OFFENSIVE DEVELOPMENT
APPLICATION GUIDELINES

Department of Urban Affairs and Planning

Common Queries

RESPONSES TO COMMON QUERIES ABOUT THE POLICY

Question 6.1 — What are the implications of SEPP 33 for an existing development?

SEPP 33 does not apply to existing developments unless a new development application (DA) is required for the site. Such a DA could involve the modification of the existing facilities, the construction of new facilities or the commencement of new uses.

If the proposed use or modifications are considered potentially hazardous or potentially offensive *in their own right*, then SEPP 33 applies.

For potentially hazardous developments, hazards relating to external causes as well as those from the development itself must be addressed. Any preliminary hazard analysis would therefore need to consider hazards from the existing facility.

SEPP 33 would *also* apply if the proposed modifications are not potentially hazardous in themselves, but *interact with the existing facility* in such a way that cumulative hazards (or offence) from the existing facility may be significantly increased. This may in many cases be a matter for judgement by the consent authority.

Question 6.2 — In which land use zones are potentially hazardous industry and potentially offensive industry permitted?

Potentially hazardous industry and potentially offensive industry are permitted in zones where industry or storage establishments are permitted. (Where industry or storage establishments are, as a class of development, prohibited by the land use table, potentially hazardous industry or potentially offensive industry is not permitted.)

Environmental Assessment Requirements

Application Number	DA35/98-Mod-6
Project	Ixom Chlorine Liquefaction Plant
Location	16-20 Beauchamp Road, Banksmeadow within the Bayside local government area
Proponent	IXOM Operations Pty Ltd
Key Issues	Hazards and Risks – the environmental assessment must: - include a Quantitative Risk Analysis (QRA) in accordance with the Department's <i>Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis'</i> demonstrating that the existing chloralkali plant (CAP) with the proposed chlorine liquefaction plant (CLP) ('the modified facility' up to DA 35/98-Mod-6) complies with both the qualitative criteria, in particular the consideration of site location and technology, and the quantitative criteria in the Department's <i>Hazardous Industry Planning Advisory Paper No. 4, 'Risk Criteria for Land Use Safety Planning'</i>. The QRA must also include: - a site layout diagram showing the location of all buildings enclosing the CLP and dangerous goods (DG) storage, and the location of all DG piping to and from these buildings. - a description of all buildings enclosing the CLP and DG storage including: - structural design specifications to enable full containment of major DG release incidents; - building capacities and ventilation rates; - scrubber design specifications including inlet and outlet conditions (flow rates, concentrations, etc.); and - building layout diagrams showing the location of the CLP, DG piping to and from these buildings, DG storage, and staging and parking areas for vehicles associated with DG transport for all operating modes of the modified facility. - a detailed process description of the CLP including: - process flow diagrams; - operating conditions (flow rates, temperature, pressure, state of matter, etc.); - maximum DG quantities for all operating modes of the modified facility; and - overview of mass balance between the CAP and the CLP for all operating modes. - a description of all necessary modifications at the CAP to accommodate the design and operation of the CLP. - major incident hazard identification and details of all safeguards to address these hazards with reference to all relevant engineering standards, codes of practice and best practice especially for chlorine and ammonia. - a QRA assumptions register with justification on the appropriateness of all assumptions. - a list of all potential major incident hazards which may affect both on-site or off-site and the associated consequence distances with corresponding release conditions including and not limited to the total isolatable quantity, flow rate, temperature, pressure and state of matter.

	○ a description of the major incidents control philosophy of the CLP including identification of all preventive and mitigative safety critical engineering safeguards against all major incidents with required reliability for these safeguards where appropriate. ○ justification for all safeguards to minimise the risk from major incidents 'so far as is reasonably practicable' consistent with the intent under the Work Health Safety Regulation 2017 (WHS Regulation). ○ all population assumptions with justification adopted in the QRA. ○ risk analysis for both on-site and off-site consequences <u>from the modified facility</u> for all major incident hazards. ○ the individual and societal risk results for the CLP and the modified facility for the following cases, and compare these results against the most recent Botany Industrial Park (BIP) QRA submitted under DA 30/98 and the most recent CAP QRA submitted under DA 35/98 up to MOD 5: ▪ Case 1: Currently approved operations in the vicinity of the modified facility including the Qenos and Indorama facilities operating at its consent limits and the CLP operating at its expected utilisation intent across both normal operating mode or contingent operating mode; ▪ Case 2: Currently approved operations in the vicinity of the modified facility including the Qenos and Indorama facilities operating at its consent limits and the CLP is only operating at the normal operating mode at all times; ▪ Case 3: Currently approved operations in the vicinity of the modified facility including the Qenos and Indorama facilities operating at its consent limits and the CLP is only operating at the contingent operating mode at all times; ▪ Sensitivity Case 1: Potential future operations replacing the Qenos and Indorama facilities following permanent shut-down of these facilities and the CLP is operating at its expected utilization intent across both normal operating mode or contingent operating mode; and ▪ Sensitivity Case 2: Potential future operations replacing the Qenos and Indorama facilities following permanent shut-down of these facilities and the worst-case scenario (higher risk profile) between the normal operating mode or the contingent operating mode. ○ <u>demonstration that risks from the modified facility</u> will not have an effect on future developments in the vicinity of the modified facility; • address all recommendations from the 2001 Botany/Randwick Industrial Area Land Use Safety Study Overview Report which are relevant to the modified facility; • <u>include a Transport Risk Assessment (TRA) to evaluate the potential impacts from DG transport to and from the modified facility</u> with comparison to the TRA findings from Major Project approval MP 06_0089 MOD 2 (Vopak Bulk Liquids Storage Facility); and • report on the consultation outcomes with: ○ SafeWork NSW in regards to compliance with the requirements for major hazard facilities under the WHS Regulation; ○ the Local Emergency Management Committees as per the <i>State and Emergency Rescue Management Act 1989</i> (SERM Act) for the Bayside LGA and Randwick LGA in regards to emergency planning in the vicinity of BIP; ○ the Regional Emergency Management Officer as per the SERM Act for the Central Metropolitan Region in regards to emergency planning for the credible worst-case scenarios and identify any issues in addressing such scenarios; ○ BIP in relation to the potential future land uses within BIP; and
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GUIDELINES FOR HAZARD ANALYSIS

HAZARDOUS INDUSTRY PLANNING ADVISORY PAPER NO. 6

DEPARTMENT OF URBAN AFFAIRS AND PLANNING
SYDNEY

1. NATURE & OBJECTIVES OF HAZARD ANALYSIS

The objective of hazard analysis is to develop a comprehensive understanding of the hazards and risks associated with an operation or facility and of the adequacy of safeguards. Without such analysis, it is difficult to be confident that design and operation can be carried out with an adequate level of safety.

Whilst hazard analysis reports play a role in providing information to government authorities to enable informed decisions on the acceptability of new or existing activities, the principal output of hazard analysis is the achievement of improved safety and the contribution to safety assurance.

The hazard analysis process encompasses qualitative and quantitative methods. The techniques provide mechanisms for:

- formal identification of hazards;
- analysis of the magnitude and likelihood of possible hazardous incidents; and
- consideration of the relevance and adequacy of proposed safeguards.

Levels of risk may also be quantified and used to form a basis for judgment of the acceptability of the risks imposed by the development and consideration of opportunities for risk reduction.

It is important that the quantification of risk be seen as only one output of the hazard analysis. Quantification of all dimensions of risk is not always possible or necessary to enable judgments to be made on sound hazard management. The results of the various elements of the analytical process — hazard identification, consequence analysis, probability/frequency analysis and risk estimation and analysis — can, and should, be used for 'avoiding avoidable risk', emergency planning, plant modification, etc.

Quantified risk results can be very powerful in:

- assisting the identification of cost-effective risk reduction measures;
- aiding choices between technologies and locations; and
- assisting judgments as to the acceptability of particular facilities and operations in particular locations.

They should not be seen, however, as absolute or objective measures nor as the most significant output of the analytical process. Throughout the

analysis, the qualitative aspects need to be given due attention alongside the quantitative aspects. Analysts must understand the limitations and uncertainties of the analytical methods. Quantification should be avoided where it will not aid rigour in the analysis or it is clearly entirely arbitrary.

Furthermore, neither quantified nor qualitative analysis should be pursued for its own sake. For example, if the earlier steps in the analysis show there to be no hazards of concern, no significant consequences, or frequencies so low as to be considered non-credible, then proceeding with the analysis beyond such points may well be fruitless. **However, due regard must be had to cumulative impacts.**

Hazard analysis is a dynamic process. For new plants it should be integral to design. Recommendations and decisions arising out of an analysis performed early in the life of the project should form the basis of choices and decisions made in later stages. These may include the choice of location for a facility; the consideration of feasible alternative technologies; or further improvement in safeguards incorporated into equipment and operating procedures.

The quality of the hazard analysis depends on the ability of the hazard analyst to understand the plant and processes at the facility and assess what might go wrong. The hazard analyst should draw upon specialised technical expertise to provide guidance where necessary. It is usually appropriate to involve the plant designers and operational personnel in the hazard analysis. An improved understanding amongst company personnel of the hazards associated with their facility, and the resultant improvements in safety, can be an important benefit of a hazard analysis.

The hazard analysis process should be based on the following principles. It should:

- be comprehensive, holistic and systematic

The analysis should provide a comprehensive assessment of the nature of hazards at the facility as a whole. A systematic approach should be used to ensure that all parts of the plant and operations are covered and that interactions between different operations have been considered even where specific equipment or

process units comply with applicable codes and standards. Judgment should be used on the appropriate level of detail.

The analysis should consider, for example, whether natural disasters, deliberate acts or hazardous events in neighbouring sites pose a threat and the potential for the discharge of hazardous materials in waste streams. The study should also cover associated operations such as the transportation of hazardous materials.

The analysis should apply to atypical and abnormal events and conditions. It is not intended to apply to continuous or normal operating emissions to air or water.

- be qualitative, quantitative and site-specific

The hazard analysis approach combines qualitative and quantitative methods specifically tailored to address technical controls, operational and organisational issues and locational issues of a particular facility or operation. Judgment is required on the appropriate methodology and depth of analysis required based on the nature and scale of the development, the type of operations being carried out, the location of the facility and external influences. The analysis should utilise up-to-date assessment tools and techniques.

- be complementary to other safety studies

The hazard analysis should be complementary to other safety studies and integral to the plant design process. Ideally, at least for new development, the hazard analysis and other safety studies should be carried out concurrently and interactively so that the output of one study can be used as an input into another, and all in turn as inputs to the refinement of the design and operating arrangements.

- use consistent and well-documented data collection methods

Data collection and the application of data should be consistent throughout the analysis. All steps taken in the process should be traceable and the information gathered as part of the analysis should be well documented to permit an adequate technical

review of the work to ensure reproducibility, understanding of the assumptions made and valid interpretation of the results.

- review adequacy of safeguards

Throughout the analysis, the adequacy and relevance of safeguards need to be kept under review. An important output of the analysis is the identification of appropriate additional or alternative safeguards.

The types of safeguards which should be considered are:

- operational safeguards such as safety related operating procedures, emergency response procedures, safety monitoring and maintenance arrangements and permit-to-work systems;
- organisational safeguards such as overall safety management systems, training programs and systems for the assessment and documentation of modifications; and
- physical safeguards such as plant hardware, site and plant layout, and separation from neighbouring uses.

Procedures for the documentation and review of operational and organisational safeguards should also be assessed for their adequacy.

- utilise all opportunities for risk reduction

The principle of 'avoiding avoidable risk' should underlie the analyst's approach. Even where other risk criteria are met, both the consequences and likelihood of hazardous incidents should be reduced wherever technically feasible alternatives can be implemented without jeopardising the financial or technical viability of the operation or facility.

WESTFIELD EASTGARDENS

20/02/2019

QUANTIFIED RISK ASSESSMENT



Dangerous Goods Risks

The Eastgardens site is exposed to risk from the Dangerous Goods route running along Denison St, Wentworth St and Bunnerong Road. These risks have been analysed by the initial report by Systra Scott Lister.

The area of Port Botany is undergoing substantial change, with many industries in decline or ceasing operations. This offers opportunities for re-development but can identify conflicts with incumbent industries and port operators desire to remain unconstrained by further residential or commercial development.

The suitability of sensitive developments such as residential in proximity to major industrial hazards such as the Botany Industrial Precinct (BIP) and Port Botany is determined by planning authorities such as Bayside Council and the DPE. Such authorities follow policy of the State Environmental Planning Policy (SEPP) which refers to risk based criteria for the suitability of sensitive developments near major hazards (expressed in documents such as HIPAP 4).

A review of the re-development plans has been performed by council which included the original Systra Scott Lister report on risks to the development from Dangerous Goods traffic coming from Denison St. Council engaged Arriscar Pty Ltd to perform the review. Arriscar are very familiar with the Dangerous Goods model developed by Systra Scott Lister as they have previously performed work with the model under contract from Systra Scott Lister. Additionally in 2016, Arriscar undertook a review of land use safety planning controls due to the proximity of the Botany Industrial Park (BIP) and the transport of Dangerous Goods (DGs) along Denison Street, for Bayside Council. This review drew heavily on the Systra Scott Lister assessments for Bunnings and other developments around Denison St.

In their review Arriscar has raised a number of recommendations to the original report for the Eastgardens re-development. These mainly regard documentation of assumptions, the presentation of results with regard to DPE risk criteria and contributors to fatality risks at the Eastgardens site.

The report makes a number of recommendations, which are reproduced below:

1. Refer to the Department of Planning for an interpretation of 'incremental risk' in societal risk assessment for new developments near major hazard facilities. This will assist in risk criteria compliance with HIPAP No.4.
2. The risk assessment must be updated to account for an increase in building height up to 70m, taking into account the building wake effects in the dispersion calculations. The report must also provide consequence results of incidents at the corner of Wentworth Avenue and Denison Street. Currently Ref.2 does not have consequence calculation results.
3. The existing cumulative F-N curve must be compared with an updated F-N curve including the population from the proposed future development at East Gardens to assess the impact of incremental risk. If the overall F-N curve including the proposed development exceeds the upper limit, the development clearly exceeds acceptable land use safety for the location.

4. The Planning Safety Report must be updated to address (a) risk contributors to the incremental risk and rank them (b) assumed population distribution of the 1640 persons (c) whether the risk was assessed for persons inside and outside the building, and at different levels in the building, and (d) how the risk mitigation in design suggested in Ref.1 have been addressed in the incremental risk assessment.
5. If the updated F-N curve for the area still falls within the ALARP and the incremental risk is deemed marginal, the development cannot be precluded.
6. The emergency response plan for the Westfield East Gardens complex must include response to a dangerous goods transport accident near the intersection of Denison Street and Wentworth Avenue.
7. There must be a public address system in the East Gardens Complex to notify shoppers of the actions to take in the event of a dangerous goods transport accident that may affect the car park on Wentworth Avenue.

Recommendation 5 is just a restatement of the HIPAP 4 and HIPAP 10 criteria. Recommendations 6 and 7 are sensible emergency management provisions that can be integrated in the centre's future emergency management plans. As such recommendations 5, 6 and 7 are not discussed further.

Scentre Group has asked Systra Scott Lister to update the original report to reflect the updated re-development scheme and to address the applicable comments from the Arriscar report. This study addresses those two requests.

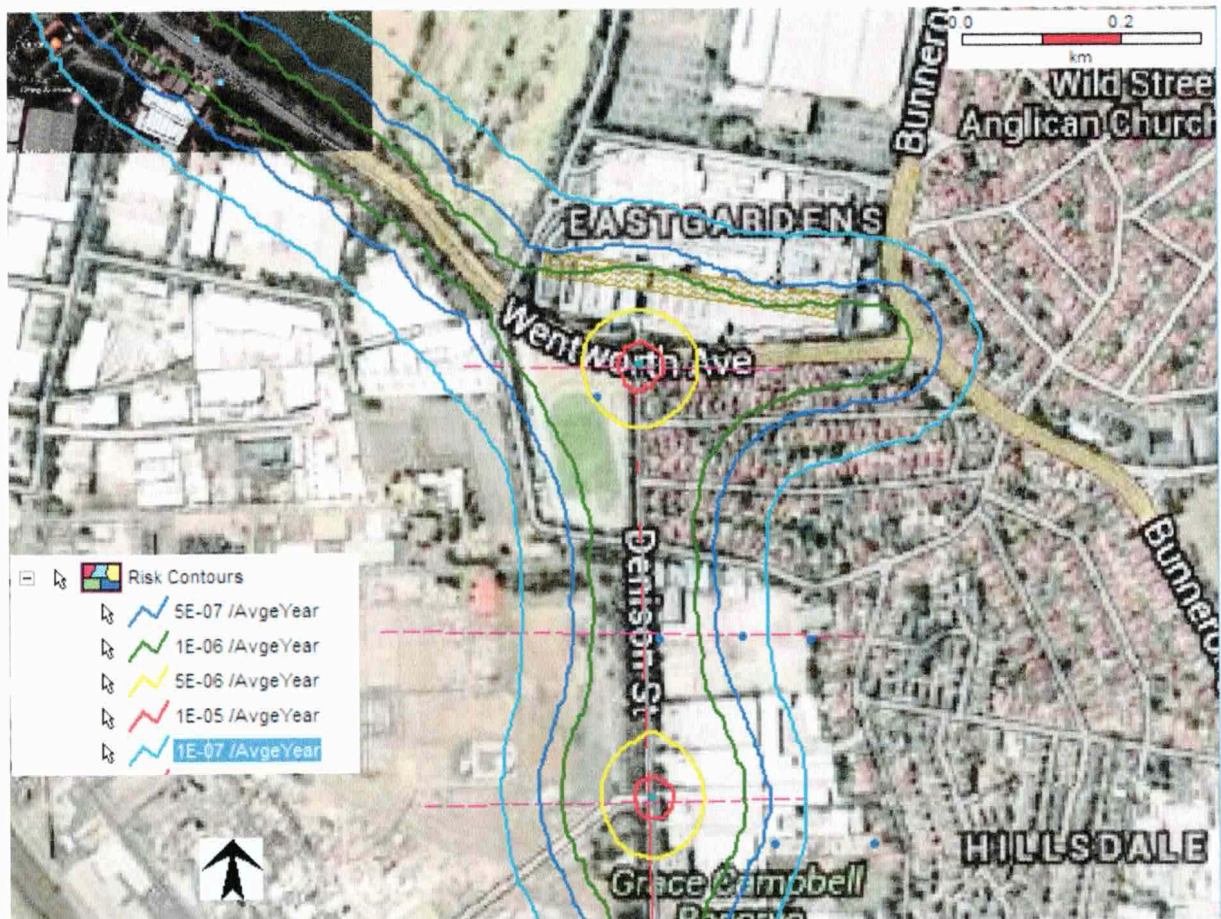


Figure 10 Individual Risk Results for Dangerous Goods Transport on Denison Street & Wentworth Ave

The Dangerous Goods routes have been extended east and west along Wentworth Ave. The working assumption is an even split of traffic east and west.

Note that the individual risk shown in Figure 11 has a small excursion of the 5 in a million contour (yellow line) into the existing parking area of the Eastgardens development, opposite the intersection between Denison St and Wentworth Ave. As this is part of the proposed development area, risk mitigations can be incorporated into the design to ensure an acceptable level of individual risk is achieved. Possible mitigations are discussed in Section 7.

4. RISK ASSESSMENT FRAMEWORK

4.1 NSW Risk Criteria for Hazardous Industries

To keep communities and hazardous industry sufficiently separated the NSW Department of Planning & Environment (NSW DP&E) has developed planning controls based on an assessment of hazards and risks. The NSW DP&E has formulated and implemented risk assessment and land use safety planning processes that account for both the technical and the broader locational safety aspects of potentially hazardous industry. These processes are implemented as part of the environmental impact assessment procedures under the Environmental Planning and Assessment Act 1979 and include the following planning guidelines;

- State Environmental Planning Policy (SEPP) 33 - provides an approach to determine whether industries are to be considered hazardous or offensive, and the level of information required to be submitted to planning authorities to allow a suitable determination to accept or reject the proposal
- HIPAP Series of documents (1 through 10) – In particular HIPAP 4 sets out the Individual and Societal risk criteria relevant to hazardous industries and surrounding land uses.
- Multilevel risk assessment – sets out the appropriate level of detail for a risk assessment study

4.2 Individual Risk

HIPAP 4 sets out the Individual and Societal risk criteria relevant to hazardous industries and surrounding land uses. 'Individual fatality risk' is the risk of death to a person at a particular point if they were to remain there for a year. Table 2 indicates a range of various risks to which people are exposed as the result of various activities.

Consideration of such risks led the department to conclude that if a risk from a potentially hazardous installation is below most risks being experienced by the community, then that risk may be tolerated. This is consistent with the basis of criteria setting used in HIPAP 4 (ref 4), as well as those adopted by most authorities nationally and internationally.

The department has adopted a fatality risk level of one in a million per year (1×10^{-6} per year) as the limit for risk acceptability for residential area exposure. This risk criteria has been adopted by the department when assessing the safety implications of industrial development proposals and when advising on land use proposals in the vicinity of a hazardous industry.

Experience with implementation indicates that the criteria is practical and appropriate, and as such should be maintained. It is necessary, however, to account for variations in the duration of exposure to that risk at any particular point by any one individual. It is also necessary to account for variations in people's vulnerability to the hazard and their ability to take evasive action when exposed to the hazard.

The one in a million criterion assumes that residents will be at their place of residence and exposed to the risk 24 hours a day and continuously day after day for the whole year. In practice this is not the case and this criterion is therefore conservative.

People in hospitals, children at school or old-aged people are more vulnerable to hazards and less able to take evasive action, if need be, relative to the average residential population. A lower risk than the one in a million criterion (applicable for residential areas) may be more appropriate for such cases. On the other hand, land uses such as commercial and open space do not involve continuous occupancy by the same people. The individual's occupancy of these areas is on an intermittent basis and the people present are generally mobile. As such, a higher level of risk (relative to the permanent housing occupancy exposure) may be tolerated. A higher level of risk still is generally considered acceptable in industrial areas.

Accordingly, the following risk assessment criteria are used by the NSW DP&E and planning authorities for the assessment of the safety of location of a proposed development of a potentially hazardous nature, or the land use planning in the vicinity of existing hazardous installations (such as the BIP) :

- (a) Hospitals, schools, child-care facilities and old age housing development should not be exposed to individual fatality risk levels in excess of half in one million per year (0.5×10^{-6} per year).
- (b) Residential developments and places of continuous occupancy, such as hotels and tourist resorts, should not be exposed to individual fatality risk levels in excess of one in a million per year (1×10^{-6} per year).
- (c) Commercial developments, including offices, retail centres, warehouses with showrooms, restaurants and entertainment centres, should not be exposed to individual fatality risk levels in excess of five in a million per year (5×10^{-6} per year).
- (d) Sporting complexes and active open space areas should not be exposed to individual fatality risk levels in excess of ten in a million per year (10×10^{-6} per year).
- (e) individual fatality risk levels for industrial sites at levels of 50 in a million per year (50×10^{-6} per year) should, as a target, be contained within the boundaries of the site where applicable.

7. CONCLUSIONS

Scentre Group are proposing a redevelopment of the Westfield Eastgardens site at Wentworth Avenue in Banksmeadow and have engaged Systra Scott Lister to undertake a quantified risk assessment of the proposed redevelopment scheme.

The risk review uses QRA models available to Systra Scott Lister for DGs transport, and included the Botany Industrial Park (BIP) Risk assessment undertaken by SHERPA Engineering.

Risks from the BIP do not appear to exceed the DPEs criteria for development in the vicinity of hazardous installations, although without access to the BIP QRA model the acceptability of the increment in societal risk cannot be confirmed.

Individual risk from Dangerous Goods has a small excursion of the 5 in a million contour into the existing parking area of the subject site, opposite the intersection between Denison St and Wentworth Ave. This area forms part of the redevelopment proposal and through design engineering appropriate mitigations be can included to reduce this risk to an acceptable level.

In order to meet the incremental societal risk criteria for dangerous goods, it is recommended that the development meets a number of design requirements. These are as follows:

1. The Level 2 conversion of the existing parking areas into retail can be sealed with solid walls to the south, and east and west corners. The internal area will be pressurised from roof mounted HVAC units and have auto sliding doors at entry points to the internal retail mall. Such arrangements are expected to protect occupants from the effects of toxic gases arising from accidents on Denison St or Wentworth Ave.
2. That the new Level 2 retail area built into the existing car park will be oriented such that back-of-house and storage functions are towards the southern façade wall, with the bulk of customers and staff to the North of the façade wall.
3. Construction of new retail areas will have solid steel reinforced concrete walls to the Southern building façade facing Wentworth Avenue. Such walls are to have no glazing and no ventilation ports. Walls will be fire rated to withstand LPG fire radiation of 37kW/m² for 15 minutes. Solid steel reinforced concrete walls on the southern sides of the expanded retail areas are recommended to protect customers from the impacts of flash fires, jet fires and fireballs



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Figure 5. Chlorine Tkr – Rupture – Toxic indoor fatality envelope

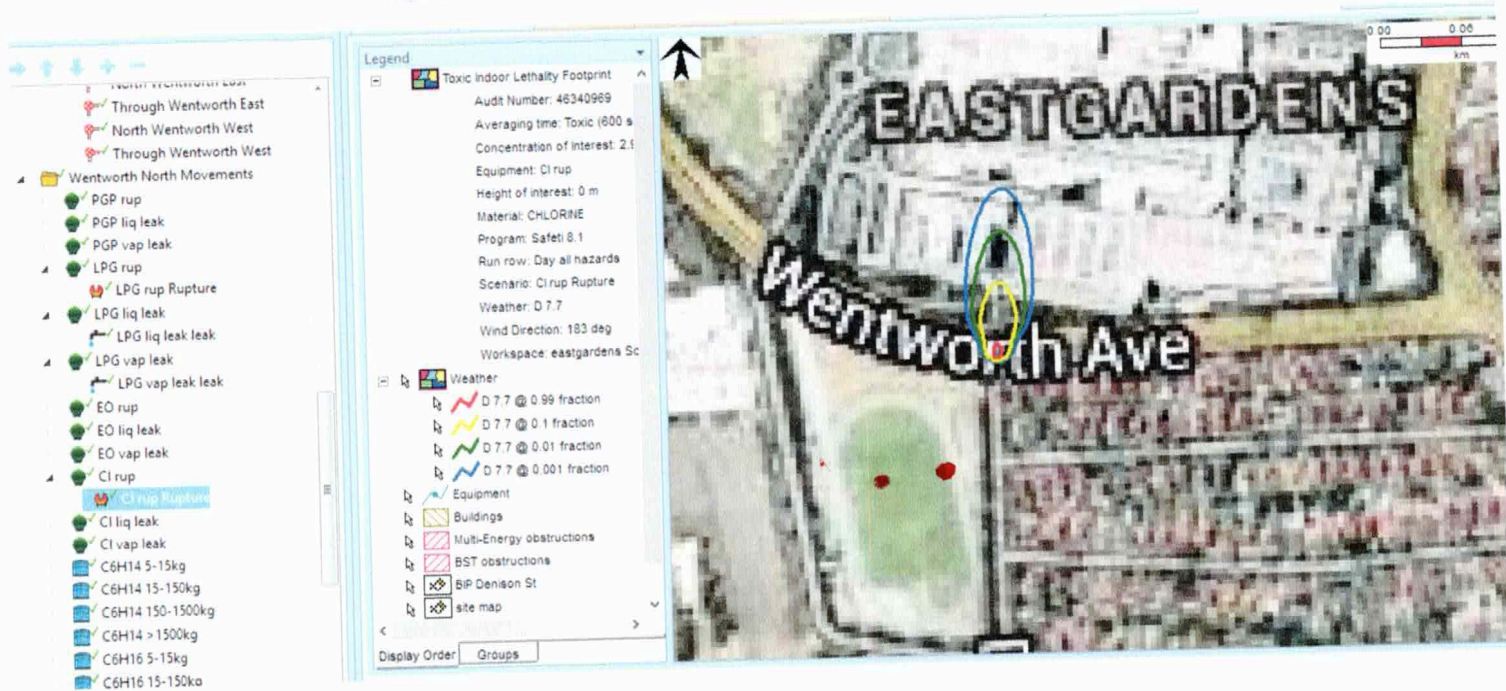
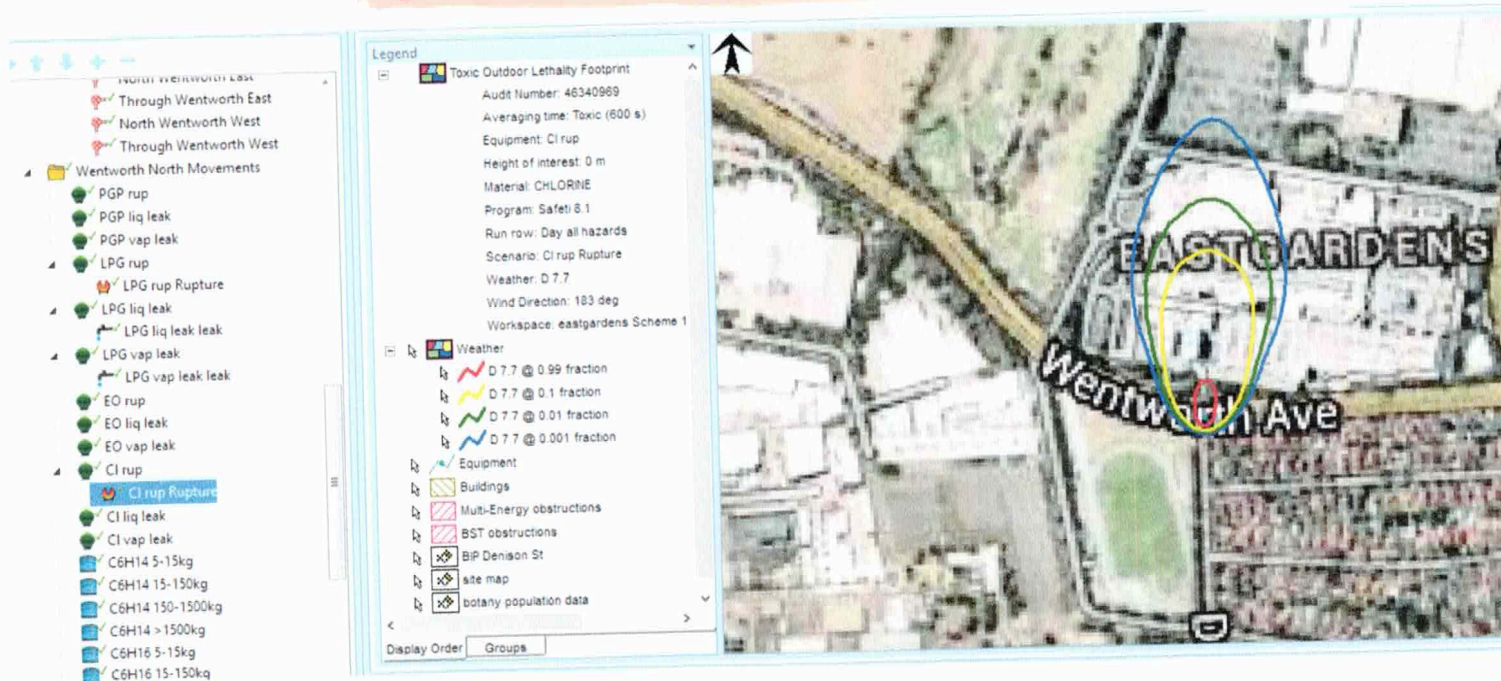


Figure 6. Chlorine Tkr – Rupture – Toxic outdoor fatality envelope





3 REVIEW OF PLANNING RISK ASSESSMENT REPORT

3.1 Overview

The planning risk assessment (Ref.2) broadly covers the following:

- An assessment of the individual risk with respect to risk targets and guidelines in NSW
- An assessment of societal risk from dangerous goods transport on the proposed future development at East Gardens
- Comparison with currently available societal risk criteria, as interpreted by Systra Scott Lister.

The study recommends that the incremental societal risk falls in the 'negligible' risk region of the societal risk criteria and hence the amendment to the BBLEP should not be denied on risk grounds.

3.2 Risk from BIP

Ref. 6 has reviewed the risk contribution from BIP to surrounding land uses based on the BIP risk assessment study (Ref.6) and has concluded that the East Gardens complex falls outside the risk contours specified in the Hazardous Industry Planning Advisory Paper (HIPAP) No.4 for commercial developments.

The present review agrees with this observation, and the risk focus would have to be from DG transport only.

The BIP risk contours are reproduced in Ref.2 and not repeated here.

3.3 Risk from Dangerous Goods Transport

3.3.1 Individual Risk

Ref.4 provides the risk to an individual at locations along the Denison Street and Wentworth Avenue, as a result of a DG transport accident resulting in fire/explosion or toxic release. The report assumes that the individual would be outdoors (most exposed individual).

The risk contour is shown in Figure 5 (Re.6).

The risk criteria for risk to development in the vicinity of hazardous industries in NSW is shown in Table 1 (Ref.7):

Table 1: Individual Fatality Risk Criteria

Land Use	Criteria (per year)
Hospitals, schools, child-care facilities, old age housing	5×10^{-7}
Residential, hotels, motels, tourist resorts	1×10^{-6}
Commercial developments including retail centres, offices and entertainment centres	5×10^{-6}
Sporting complexes and active open space	1×10^{-5}
Industrial	5×10^{-5}



The fatality risk applicable to commercial developments is 5 chances in a million per year.

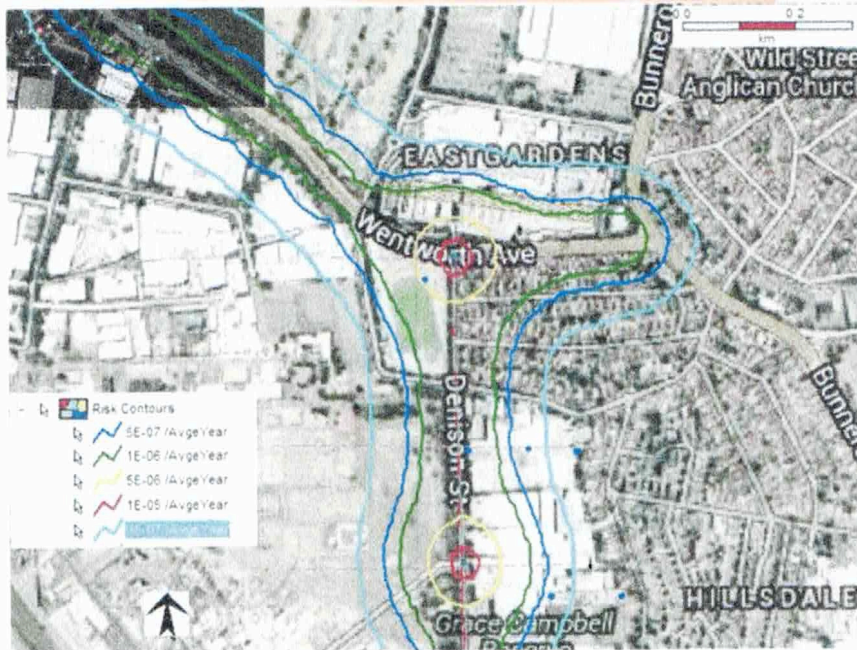


Figure 5: Individual Risk for DG Transport on Denison Street and Wentworth Avenue

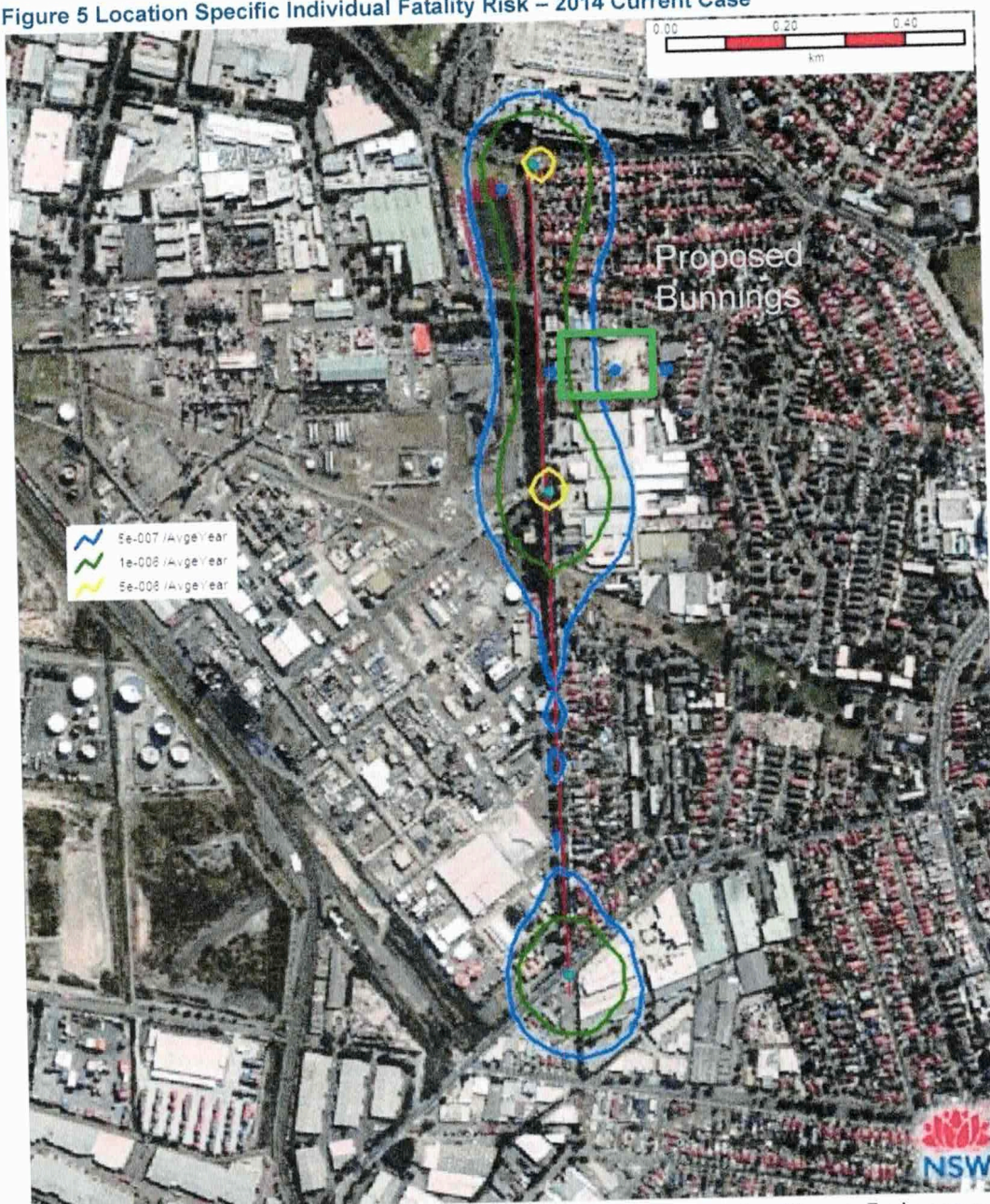
It can be seen from Figure 5 that The 5×10^{-6} per year contour extends into the car park of the East Gardens complex but does not affect the buildings.

At this stage, the applicant has asked for an amendment of the BBLEP only and only a broad outline of the likely developments. It is not known if the development may involve changes to the car parking at the corner of Denison Street and Wentworth Avenue. If no changes are proposed within the 5×10^{-6} p.a. contour area, then the existing risk levels for the pre-existing development would not preclude additional developments to the buildings on the site.

The guidance document Hazardous Industry Planning Advisory Paper (HIPAP) No.11 (Ref.8) states:

"The emphasis in the Transportation Safety Study is on comparative risk assessment, rather than on absolute levels of risk along the route. The general principle should be that no significant increases to existing background risks should be permitted. While individual risk calculations may be appropriate in some circumstances, a societal risk approach is generally more appropriate in the transport risk assessment. It is appropriate to include the population of other road users in the societal risk calculation. Risk criteria are discussed in Hazardous Industry Planning Advisory Paper (HIPAP) No. 4. It should be noted, however, that the individual risk criteria developed in the paper generally relate to risks from fixed installations and judgement should be used in applying them to transport risks."

Figure 5 Location Specific Individual Fatality Risk – 2014 Current Case



As would be expected with the reduction in PGP movements, Figure 5 shows a significant reduction in the footprint of the individual risk contours compared to the 2012 worst case. The 10 chances in a million ($1\text{E}-5$ red line) per year of fatality contour is eliminated from the contour plot, and there is a significant reduction in the 5 chances in a million ($5\text{E}-6$ yellow line) per year fatality risk contour. There is a similar but less pronounced reduction in the 1 in a million ($1\text{E}-6$ green line) per year and 0.5 in a million ($5\text{E}-7$ blue line) fatalities per year contours. This is due to the dominance of chlorine release scenarios in the medium and far field fatality risk. The frequency of chlorine movements has not been changed from the base to the reduced case.

Figure 1. LPG tanker rupture – Flash Fire Envelope – all wind directions

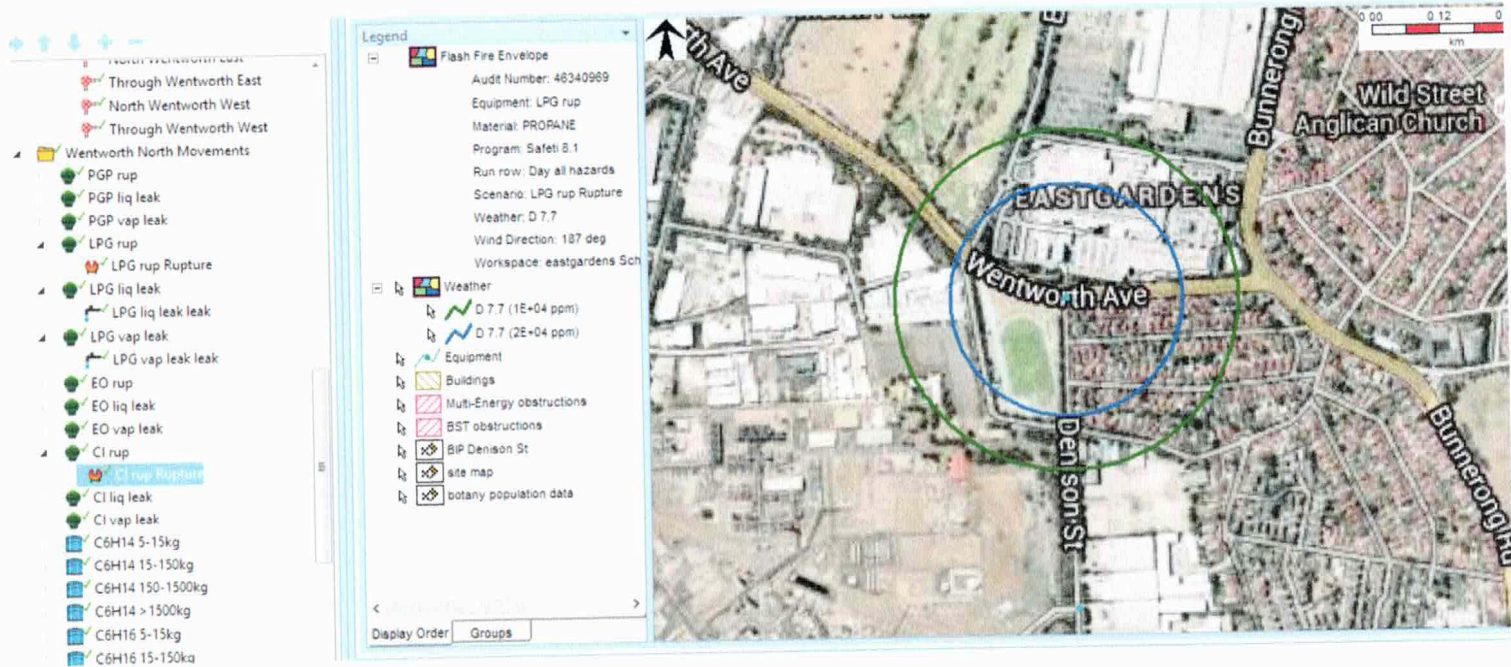


Figure 2. LPG Road Tkr Rupture – Max cloud footprint – wind from the south

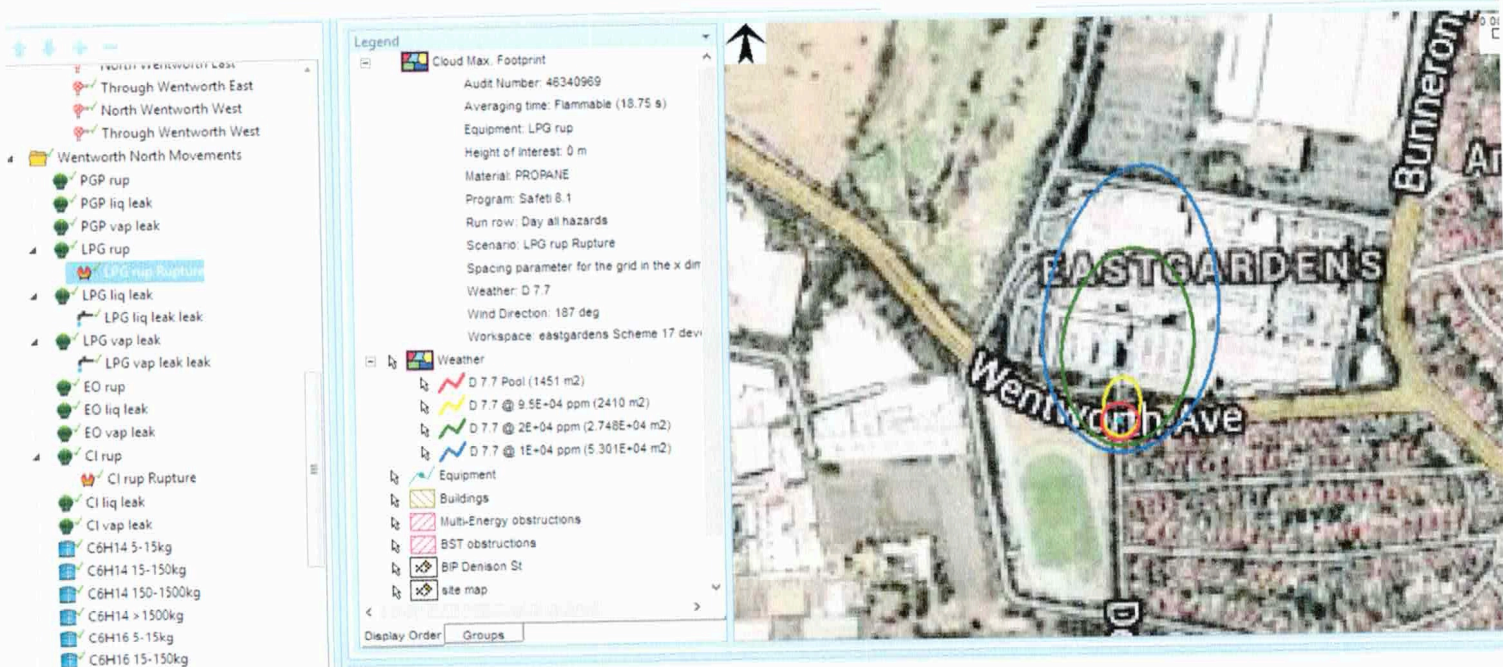


Figure 3. LPG – large leak – Flash fire envelope

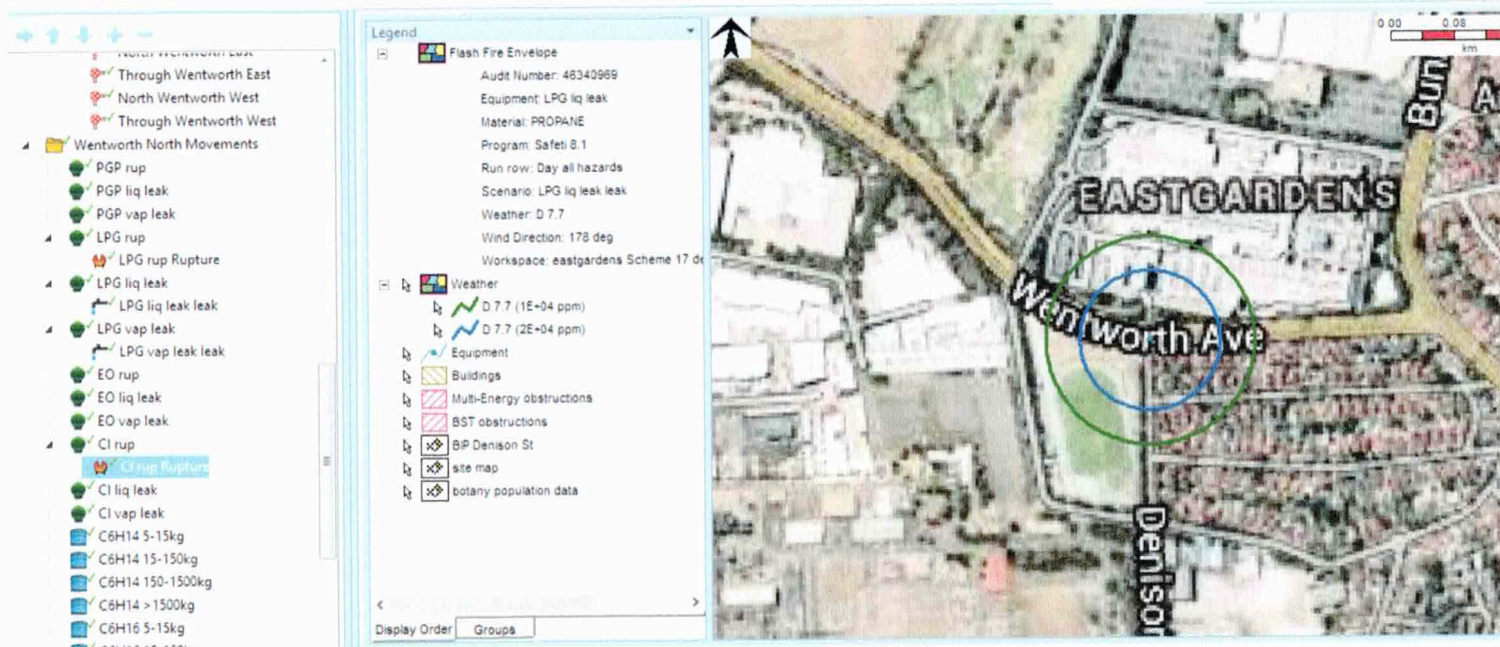
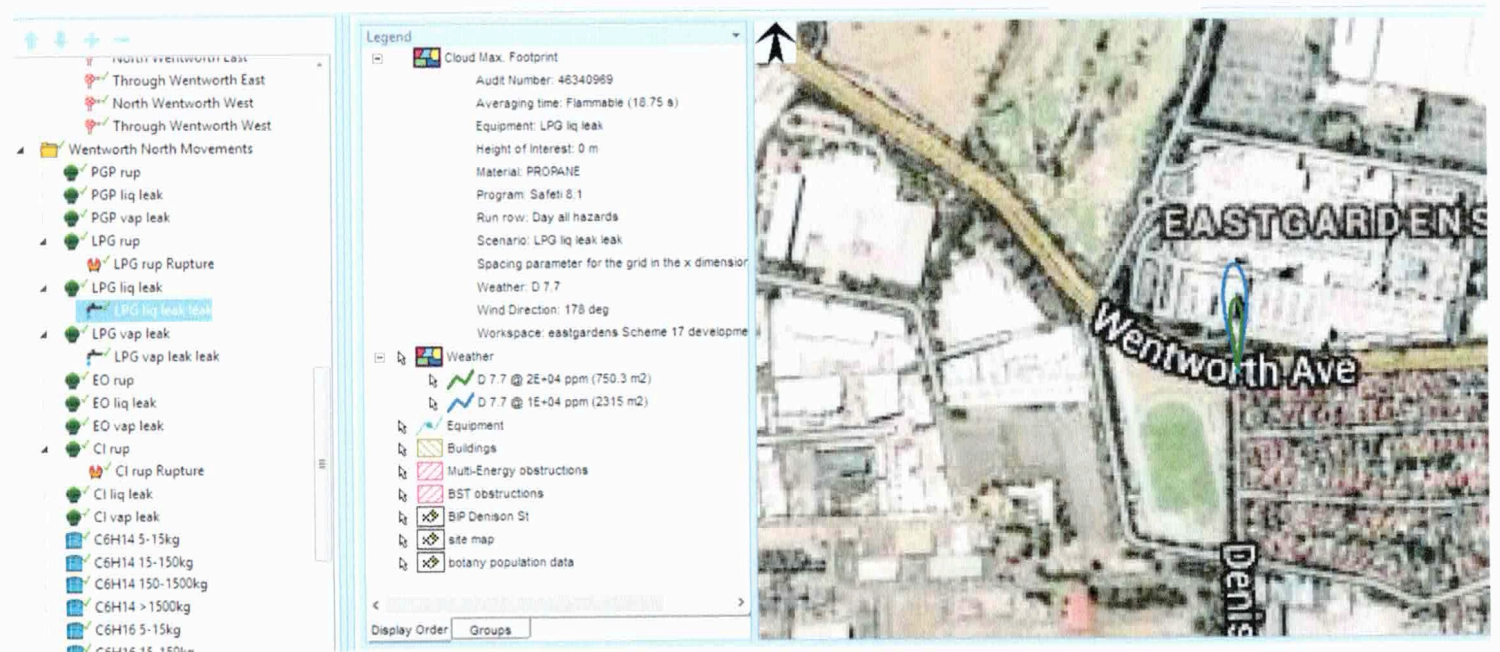


Figure 4. LPG – large leak – Flash fire cloud shape – wind from the south



To address this ambiguity, both interpretations of the societal risk increment have been considered. The risk of the new development on top of all existing populations being assessed against the criteria has been chosen the proposed interpretation (ie interpretation (b) above). This is considered to be the more conservative interpretation of the policy.

Further to this, Systra Scott Lister have tried to engage with the representative from the Department of Planning and Environment who is responsible for assessments in this region, however they do not wish to engage until after the proposal is referred to them during the post Gateway consultation phase.

The methodology applied in this report is consistent with other submissions we have made, where both the total populations plus the additional has been considered as well as the new population on its own. Such submissions have been assessed and approved by DPE, and therefore it is considered appropriate for the purposes of this report.

Recommendation 2

The risk assessment must be updated to account for an increase in building height up to 70m, taking into account the building wake effects in the dispersion calculations. The report must also provide consequence results of incidents at the corner of Wentworth Avenue and Denison Street. Currently Ref.2 does not have consequence calculation results.

Response:

Such modelling capabilities are only just becoming available. For example DNV GL's Phast v8 made the following release statement in October 2018:

Update on addition of 3D Visualization to Phast

The work to include 3D visualization capability to Phast is well advanced. A development version showcased at the Phast/Safeti user conference in London in early October was well received by users.

Key features include:

- Ability to import 3D geometry
- Ability to build your own geometry (currently limited to a few object types)
- View dispersion results in 3D
- View heat flux/radiation shielding results in 3D

Development is ongoing with a view to releasing it in a future version of Phast. Current emphasis is on optimization, improving the feature set and robustness testing.

As such capabilities mature, such modelling can be performed.

It is our view that the hazards most likely to reach the proposed commercial buildings are dense gas releases which stay at lower levels due to the density of gas vs air. Hence the fact that the office buildings are generally raised above the retail podium (apart from the corner building) significantly reduces the potential impact for this commercial office worker population set. It is estimated that only 128 persons would be accommodated below 10m above ground level in the commercial development.

Some representative consequence modelling results are provided with the following figures.

