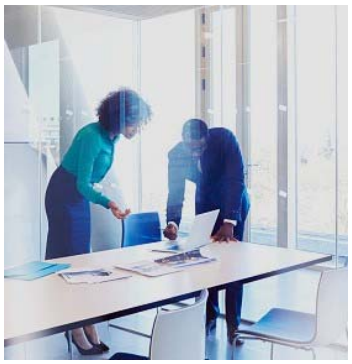
GHD Advisory



Proposed Seniors Housing - Mayfield - PHA

Western Suburbs (Newcastle) Leagues Club

16 January 2019

SUMMARY OF PHA

1. Introduction

1.1 Request for Report

GHD was requested by Graph Build Pty Ltd (Graph Building) on behalf of Western Suburbs (Newcastle) Leagues Club to undertake a Preliminary Hazard Analysis (PHA) and a multi-level risk assessment for a proposed Seniors Housing Project at 32 Industrial Drive, Mayfield North. It is adjacent to the Port of Newcastle (PoN) where hazardous chemicals and explosive materials are handled and stored, and the potential exists for hazardous event consequences to impinge on the Seniors Housing site and impact its residents. The work was requested by the NSW Department of Planning and Environment as part of their assessment of an application by Graph Building for a site compatibility certificate.

1.2 Purpose of this report

The report is to advise on the injury or irritation consequences to seniors at the proposed Seniors Housing Project at 32 Industrial Drive, Mayfield North, arising from a PoN site loss of containment or associated transport incident, and also to recommend site or building design features that could mitigate the impact of such consequences.

1.3 Scope

The scope of the analysis is limited to the proposed Seniors Housing Project at 32 Industrial Drive, Mayfield North, and possible injury or irritation to seniors arising from a PoN site loss of containment or associated transport incident.

1.4 Assumptions

All scenarios relating to a PoN site loss of containment or associated transport incident that could potentially cause injury or irritation to seniors at the proposed facility at 32 Industrial Drive, Mayfield North are described in the Port of Newcastle Land Use Safety Study [Ref 1].

2. Approach

GHD used the Port of Newcastle Land Use Safety Study (PoN Report) as input to the analysis [Ref 1]. The PoN Report provides information on hazardous materials on the PoN site and also on their transport, and describes a range of scenarios where explosions, fires or chemical releases could occur. It assesses the consequences (i.e. potential for fatalities) for each scenario as well as its likelihood, and compares the resulting risk against risk criteria in HIPAP 4. It shows the level of off-site risk to be below the 0.5×10^{-6} p.a. Individual Fatality Risk Criteria contour, and thus acceptable relative to HIPAP 4 criteria. Included in this assessment are some scenarios which may result in loss of life to those off site, but where the risk is acceptably low due to their very low likelihood.

The proposed Seniors Facility is adjacent to the Mayfield Precinct of the PoN site (Figure 1). Industrial Drive is a recognised PoN transport route and there is a high-pressure Jemena gas pipeline adjacent to the proposed site, on the north-side of Industrial Drive (i.e. the PoN side of the road). The GHD analysis recognised that all of the potential PoN causes of injury or irritation to seniors will be in the form of heat radiation (e.g. from a fire), pressure (e.g. from an explosion), or fumes (e.g. from a gas leak) from the PoN site or from its associated transport activities. GHD recognised that many of the scenarios described in the PoN report occur some distance from 32 Industrial Drive, and their effects will be mitigated by distance. The GHD analysis used information from the PoN Report to estimate the level of impact on the Seniors Facility site.

Figure 1 – Location of Seniors Facility (Drawing copied from PoN Report [Ref 1] Section 1.2, Page v)

5. Conclusion

GHD was requested by to undertake a PHA and a multi-level risk assessment for a proposed Seniors Housing Project at 32 Industrial Drive, Mayfield North that is adjacent to the PoN where hazardous chemicals and explosive materials are handled and stored. The potential exists for hazardous event consequences to impinge on the Seniors Housing site and impact its residents.

Industrial Drive is a recognised PoN transport route and there is a high-pressure Jemena gas pipeline adjacent to the proposed site, on the north-side of Industrial Drive (i.e. the PoN side of the road). The GHD analysis recognised that all of the potential PoN causes of injury or irritation to seniors will be in the form of heat radiation (e.g. from a fire), pressure (e.g. from an explosion), or fumes (e.g. from a gas leak) from the PoN site or from its associated transport activities. However, many of the scenarios described in the PoN report occur some distance from 32 Industrial Drive, and their effects will be mitigated by distance. As such, a Seniors housing development in the proposed location is not considered to be an incompatible land use with the PoN operations. Notwithstanding, a number of design features are recommended for low impact scenarios which include:

1. It is recommended that the site and buildings be arranged to facilitate seniors' escape in case of an emergency, and to enable escape through the south-side of the site (e.g. Antill St) if required.
2. Design all buildings to facilitate fresh air control during an emergency. For example:
   (a) Include an actuated damper on air-conditioning fresh air intakes, which can be closed during an emergency.
   (b) Include a control panel in the facility to enable all building exhaust (e.g. toilet, bathroom, laundry and kitchen exhaust systems) and make-up air systems to be turned-off during an emergency.
   (c) Design buildings to minimise leakage of gas or smoke in to the building during an emergency event (Inc. Design enabling staff to know which windows in the Aged Care facility are open and thus need to be closed).
   (d) Actuate fresh air controls (a) & (b) above from a single switch on an emergency panel.
3. The site has been shown to comply with HIPAP 4 requirements for old age housing, and these low impact scenarios are expected to lead to little or no injury and very little irritation to Seniors on the site. Thus the site designers could choose to not adopt any special features to resist radiation or overpressure. However any impact on the site will tend to be greatest along the wall facing Industrial Drive, and it is recommended that it be the focus of any features designed to reduce the impact of radiation or explosion overpressure from the PoN site. Designers could consider measures such as:

   (a) Walls and windows facing Industrial Drive designed to resist -
      - Thermal radiation of 2.3 kW/m^2 (for example, use non-flammable materials and selection of windows with glass designed to minimise the ingress of visible radiation (e.g. coloured glass)).
      - Explosion overpressures of 1.1 kPa (for example, use dense materials such as brick or concrete)
   (b) Arrangement of the site so that residential units are located near to the north-side of the site and aged-care to the south.