

10. Guide to the Air quality planning scheme policy

Brisbane City Plan 2014 (City Plan) has been developed by Brisbane City Council in consultation with the community and guides how land in Brisbane can be used and developed.

This guide is designed for air quality specialists and developers to explain how the Air quality planning scheme policy in City Plan applies to preparing air quality reports for a development application.

This guide provides an overview of the content and rationale of the [Air quality planning scheme policy](#) contained within City Plan. It also explains the key changes in relation to air quality assessment from the previous *Brisbane City Plan 2000*.

[City Plan](#) and its [Air quality planning scheme policy](#) help to deliver the goals and objectives of the [Brisbane. Clean, Green, Sustainable plan](#). For more information on the key issues for Brisbane's air quality refer to [Brisbane. Clean, Green, Sustainable](#).

Tools to help you understand City Plan

City Plan, available on Council's website, consists of the [interactive mapping tool](#) and the [ePlan](#). The [interactive mapping tool](#) shows a property's details so these can be considered in development planning. The interactive mapping tool allows you to search by suburb, street, street number or lot description and print relevant details to help you read the [ePlan](#). The ePlan contains the planning scheme details and hyperlinks to help you find the planning information that relates to a proposed development.

For information on how to use City Plan, refer to City Plan [Supporting documents and online tools](#).

Air quality planning scheme policy

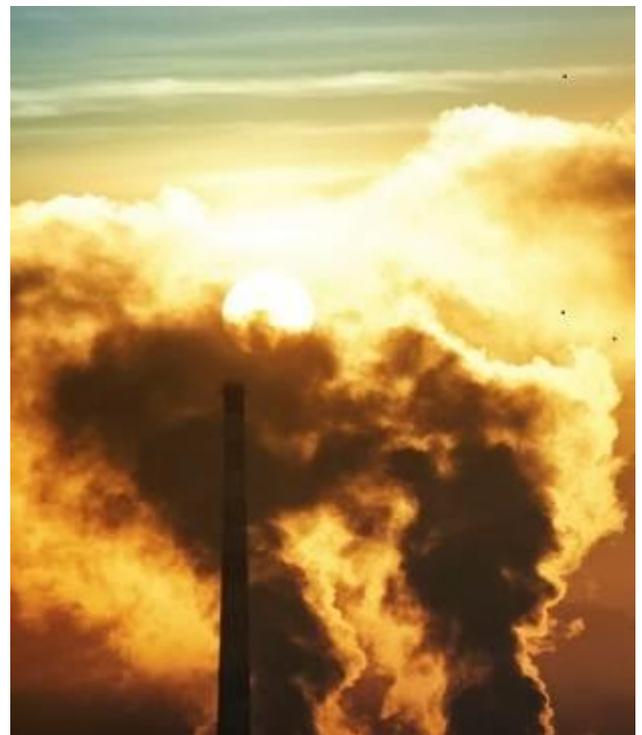
Role of the Air quality planning scheme policy

The [Air quality planning scheme policy](#) contributes to achieving the strategic outcomes of City Plan by:

- avoiding the release of harmful industrial pollutants into Brisbane's air
- protecting the health and wellbeing of occupants of sensitive uses from exposure to industrial pollutants
- protecting existing lawful industrial uses from encroachment by incompatible sensitive uses. The policy contains assessment methods for preparing an air quality impact report, including how to assess ambient air quality, odour and health risk.

It also covers the management of ambient (outdoor) air only. It is not for evaluating or managing workplace health and safety exposure or indoor air quality. The policy does not specify minimum performance requirements or types of technology that should be used to control air pollution.

City Plan uses performance-based assessment, which requires the applicant to demonstrate that the proposed or existing activity contains sufficient measures, through identification of the following in order of location, design, minimising toxicity and control, to meet the required criteria.



Changes from *Brisbane City Plan 2000*

The content of City Plan relating to air quality is different from *Brisbane City Plan 2000*. One of the key changes is that each code includes air quality (planning) criteria, odour criteria and health risk criteria, where it is appropriate for the type of development under that code. The table below summarises the key changes in relation to air quality requirements between *Brisbane City Plan 2014* and *Brisbane City Plan 2000*.

<i>Brisbane City Plan 2000</i>	<i>Brisbane City Plan 2014</i>
Requirement for local air quality modelling over a local emission threshold.	Emission threshold approach has been replaced by improved zoning and industry definitions. May require air quality modelling to achieve performance outcomes, depending on industry zone and definition.
Requirement for regional impact assessment over a regional emission threshold.	Emission threshold removed, however may require consideration of regional photochemical impacts in some circumstances.
Special requirements for fossil fuel power generation, incineration or extractive industry.	All industries are assessed with the same consideration to level of assessment and industry definition and must demonstrate that they meet the performance outcomes for air quality.
Minimum emissions performance for air quality and greenhouse gas.	New developments are required to avoid or minimise air pollutants or reduce toxicity of air emissions. All developments emitting air pollutants are expected to implement some form of emissions control.
Health risk assessment required for toxic pollutants over National Pollutant Inventory reporting thresholds.	Tiered assessment approach used to evaluate specific compounds and certain industries for health risk assessment.
Different design ground level concentrations for general and sensitive populations.	Air quality (planning) criteria are the same for any sensitive use. The criteria are contained in the relevant codes not the Air quality planning scheme policy.
Offsets of air pollutants for regional air pollutants.	Removed from Air quality planning scheme policy .
Specific requirements for assessing child care centres in the Child care centre code.	Provisions for air quality impacts on child care centres relate to proximity to major roads, intersections and industry and are included in the Transport air quality corridor overlay, Transport air quality corridor overlay code, Industrial amenity overlay and the Industrial amenity overlay code.



Related City Plan codes for air quality

City Plan calls up the [Air quality planning scheme policy](#) in a number of codes. Each of these codes contains air quality, odour and health risk criteria for pollutants relevant to the use covered by the code. Table 1 below lists these codes and the relevant assessments for each.

Note: Not all assessments are required for each code, e.g. the Service station code does not require a health risk assessment. Only the pollutants or assessment criteria listed in the code need to be assessed.

Table 1 – Relevant codes for air quality assessment

Code	Ambient air quality assessment	Odour assessment	Health risk assessment
Extractive resources overlay code	✓	✗	✗
Industrial amenity overlay code	✓	✓	✓
Transport air quality overlay code	✓	✗	✗
Caretaker's accommodation code	✓	✓	✓
Centre or mixed use code	✓	✓	✗
Community facilities code	✓	✓	✗
Extractive industry code	✓	✗	✗
Industry code	✓	✓	✓
Multiple dwelling code	✓	✓	✗
Service station code	✓	✓	✗
Special purpose code	✓	✓	✗
Specialised centre code	✓	✓	✗
Rural activities code	✗	✓	✗

Air quality impact reports

An air quality impact report is used to demonstrate that development complies with the air quality, odour or health risk criteria stated in the air quality performance outcomes of the codes listed in the above table.

Section 2 of the [Air quality planning scheme policy](#) identifies the matters an air quality impact report needs to address and the information it needs to contain.

An air quality impact report assists Council to:

- verify the details of the proposed development, including proposed air emission prevention and control measures
- evaluate whether the impacts on air quality have been properly assessed
- evaluate whether the relevant criteria can be achieved.

There are two assessment scenarios that may require the preparation of an air quality impact report.

1. Where the development emits air pollutants, the air quality impact report needs to describe the impact of the air emissions from the development on sensitive uses.
2. Where the development is a sensitive use exposed to air pollutants, the air quality impact report needs to describe the impact of air quality on the development.

Where the development is for a new or changing industrial use, the air quality report should be a comprehensive record of the:

- characteristics of the development, such as stack height, stack location, stockpile location, pollutant emissions and air emission prevention and control measures
- assessment methodology used
- justification for the selection of models and input data
- results of the assessment.

The report needs to include sufficient detail so that the predicted impacts can be reproduced or included in a cumulative air impact assessment. It must address all elements required in the policy, including determining whether an odour or health risk assessment is required.

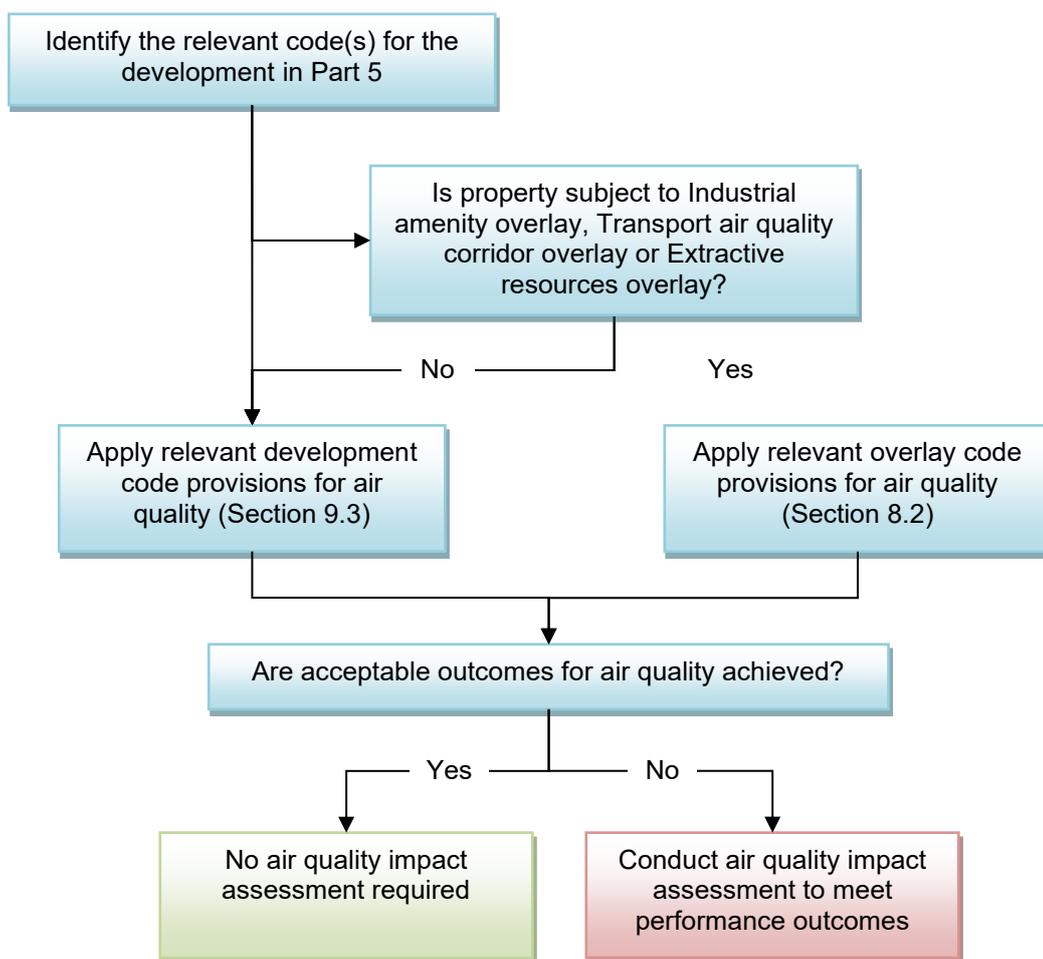
Where the development is for a sensitive use and assessed under the Industrial amenity overlay code, the air quality assessment is to include an evaluation of all potential sources of air pollution relevant to the development. The report must identify features of the development that reduce resident exposure to air pollution.

Where a major road is in proximity to the development, this should be considered in the assessment and modelling if road-related pollutants are emitted from the development or industry.

It is recommended that a suitably experienced air quality scientist or engineer conduct the air quality, odour or health risk assessment. This will help to ensure that the input data, assessment methodologies and interpretation of results are properly appraised.

The flowchart in [Figure 1](#) identifies where an air quality impact report would be required for an industrial use or for development of a sensitive use.

Figure 1 – Requirement for an air quality impact report for an industrial use or a development of a sensitive use



Modelling proposition

Section 2.1 of the [Air quality planning scheme policy](#) outlines the requirements for when the author of an air quality impact report proposes a variation to the modelling methods outlined in the policy.

For applications where the air quality assessment is problematic, or where alternative models are required for the task, the applicant needs to submit a modelling proposition to Council. The modelling proposition gives flexibility in selecting non-standard models or approaches to ensure the most comprehensive and appropriate assessment outcome for the development.

The intention of the modelling proposition is to ensure that Council is aware of the alternative model or methodology proposed before a development application is lodged, and it gives Council an opportunity to comment on or revise the proposed methodology. Most applications will not require a modelling proposition prior to submitting a development application.

Emissions inventory

Section 3 of the [Air quality planning scheme policy](#) outlines the requirements for the emissions inventory phase of conducting an air quality, odour or health risk assessment. The emission estimation methods for the pollutants of concern are shared for the air quality, odour or health risk assessment outcomes.

The emissions inventory needs to present a complete record of the air emissions from the site. The sources of pollutants to be considered must include fugitive emissions (such as wind eroded dust from an unpaved road), as well as point source emissions (such as from a stack or water treatment plant). The report should identify the worst-case emissions and/or operating conditions from the site to ensure that the health and wellbeing of occupants of sensitive uses is protected.

Sources of emissions data

Many new developments do not have site-specific air emissions data available. The [Air quality planning scheme policy](#) specifies a hierarchy of six methods to be followed when estimating air emissions. These are the recommended order of information sources that would be the most reliable and representative to determine potential air quality impacts from a development.

You may need to use any of the emission estimation methods with care to ensure that it represents the relevant processes on site. It is your responsibility to ensure that all emission parameters are consistent including flowrate, stack temperature, stack diameter and velocity.

The use of emissions measurement data for existing sources may not be representative of the peak emissions from the site. This is because the measurements are often only available periodically (e.g. once or twice per year) and are highly dependent on operating conditions and, in some cases, the process inputs or products. If using site emissions data, the limitations of the data set must be clearly justified in the air quality impact report.

Emission rates must also account for variability in the process conditions and operating hours. Where unusual operations or start up and shut down conditions may occur regularly throughout the year, and may lead to higher air quality impacts, the worst-case emissions should be explicitly addressed in the emission scenarios modelled.

The stated emission rates may be used in specifying approval conditions. The emission rates used in modelling and determining compliance with air quality, odour and/or risk assessment guidelines should therefore represent the worst expected emissions from the site and reflect the proposed emission control devices to be used.

Equivalency factors

Mixtures of polycyclic aromatic compounds (PAH) and dioxins, furans and dioxin-like polychlorinated biphenyls are evaluated using equivalency methods. The potency equivalency factors for PAH are commonly used to represent the toxicity of a mixture against benzo(a)pyrene, which is the most common PAH. The factors used in Table 1 of the Air quality planning scheme policy are from the Office of Environmental Health Hazard Assessment (OEHHA) and are widely respected and used in jurisdictions around Australia.

Mixtures of dioxins, furans and dioxin-like polychlorinated biphenyls are evaluated using toxic equivalency factors to represent the individual compounds toxicity relative to 2,3,7,8-tetrachlorodibenzodioxin. The World Health Organisation (WHO) table of toxic equivalency factors (Table 2) is used world-wide to facilitate the assessment of this group of compounds.

Types of emission sources

Emissions to air can generally be described as point, area, volume or line sources. These descriptions are used in the air quality models and each source type is modelled differently to reflect its dispersion characteristics. The information required to represent the emission source depends on the source type modelled and the model selected.

Examples of point sources are tall stacks, short stacks and vents that discharge vertically. Tall stacks are generally those that are more than 30-50 m high and are not affected by the aerodynamic effect of building wakes. These allow the plume to freely disperse downwind. Short stacks and vents are affected to varying degrees by the building wakes, causing the plume to recirculate around the structure and potentially resulting in high concentrations of pollutants close to the stack. Many of the dispersion models allow you to enter the building dimensions so that the potential for wake effects can be incorporated into the dispersion model results.

Area sources are used to describe horizontal surfaces that uniformly emit air pollutants such as wastewater treatment ponds, unpaved surfaces, landfills, stockpiles and spoil dump areas. Care must be taken to ensure that the distance to a receptor is not too similar to the dimension of the area source modelled as inadvertent model error may result.

Volume sources are used to model three-dimensional emissions of pollutants. Examples are well mixed fugitive emissions from open buildings, doorways or windows.

Long, thin sources such as roof vents and roads are represented by line sources. Not all dispersion models can properly model this type of source. Buoyant line sources, such as a hot roof vent, need special treatment with an appropriate model to represent the thermal buoyancy of the source.

Air quality controls

A new or upgraded industrial development is expected to implement some form of air emission prevention or control measures to avoid or minimise the release of air pollutants. The use of no emission controls is not acceptable or consistent with the intent of City Plan to protect the health and amenity of residents and to protect Brisbane's air quality.

The proposed air emission controls should be included in dispersion modelling. Where emission parameters change as a result of the control technology implemented, the modelled parameters need to reflect these changes, e.g. a reduced stack exit temperature may arise when a wet scrubber is used.

For all emission control methods proposed for the development, the operator is responsible for ensuring that the stated performance can be maintained throughout the plant service life. This may require regular servicing and filter changes however these operational matters are outside the scope of the Air quality planning scheme policy.

Modelling of an industry where emission rates are uncertain, such as when using the Industrial amenity overlay code for residential development, may conservatively assume that no control or minimal controls are used. Any assumptions should be stated in the air quality impact report.

The emission control measures for industry are, in many instances, those that would be considered industry standard practice. Examples include the use of an appropriately designed spray booth for spray painting or bagfilter for dust extraction at a silo. The air quality impact report should demonstrate the measures undertaken to reduce air emissions from the site, and that these meet the minimum performance expected in the industry.

Processes that reduce the toxicity of pollutants released to air compared to other contemporary industrial plants, are also suitable emission reduction measures. This may be achieved through substituting a feedstock for less toxic materials or eliminating a toxic intermediate product or by-product. The comparison to other typical

industrial plants in the industry should be documented in the air quality impact report.

For sites that may have high levels of air emissions, are close to sensitive uses or where toxic air pollutants are released, best practice air emission controls are expected. These measures may be more advanced than the industry standard (for example the use of activated carbon filters on the spray booth outlets for spray painting) or may be additional to the industry standard measures.

Modelling assessment

The assessment of air impacts for air quality, odour or health risk assessment outcomes all rely on air emissions and dispersion modelling to estimate the airborne concentrations of the pollutants of concern. Air quality modelling methods, detailed in Section 4 of the policy, are therefore common for these outcomes.

The methodologies proposed in the [Air quality planning scheme policy](#) are intended to represent industry practice for air quality modelling. If improved methodologies, techniques or assumptions are available, these can be included in the modelling proposition prior to detailed assessment.

Dispersion model selection

The [Air quality planning scheme policy](#) outlines the preferred air quality models that are available for routine assessment of air quality impacts. It is your responsibility to select an appropriate model for the situation, being mindful of the nature of the emissions from the site, the location of the site and receptors.

The policy outlines the situations where Council does not support the use of specific models or certain model options.

Where proprietary or modified versions of public access software are available, Council supports the use of the official release version from the model developer or a recompiled version that is equivalent. For example, the use of the CALPUFF modelling system should use the latest US EPA standard version unless model features in modified or updated versions are required.

The commonly used air quality models (AUSPLUME, CALPUFF, TAPM and AERMOD) allow you to predict air quality impacts for a year or multiple years and are suitable for predicting short-term and long-term impacts. However some models, such as fluids models, are based on an assumed set of initial conditions including wind direction, wind speed and atmospheric stability. Care should be taken when comparing the results from these types of models to a statistical measure (e.g. using the 99.9th percentile one hour average concentration of a pollutant) as these are based on a year of data which captures the impacts arising from a range of meteorological conditions. Multiple model scenarios may be required to represent the variation in wind conditions expected to affect air quality at a sensitive use.

Meteorological data

The meteorological data used in any air quality model must be appropriate to the location of the site, available datasets and the specific requirements of the dispersion model that is used for air quality, odour or health risk assessment.

The [Air quality planning scheme policy](#) outlines the preferred methodologies to select sources of meteorological data and process the data to suit the model requirements. A blend of observational data and modelled prognostic data may be appropriate in some circumstances. Council does not support the use of single point meteorological data (such as those compatible with AUSPLUME or AERMOD) as the only input to CALPUFF, as the three-dimensional CALMET windfields are preferred.

Air quality (planning) criteria

City Plan intends to capture pollutants that are of key concern to the health of the Brisbane population. The health and amenity effects of air pollutants vary widely. To reflect this, City Plan groups the relevant criteria under three different headings:

1. air quality (planning) criteria
2. odour criteria
3. health risk criteria.

The air quality (planning) criteria were derived from a range of information sources, considering their relevance to Brisbane. A hierarchy approach was used to select the sources of the air quality (planning) criteria as follows:

- *Queensland Environmental Protection (Air) Policy 2008*
- *National Environment Protection Measure (Ambient air quality) 2003*
- *Approved methods for the modelling and assessment of air pollutants in New South Wales 2005.*

The air quality (planning) criteria used are not to be considered a no-effect level for health impacts. These were derived using risk-based methods to set limits to protect human health.

Air quality (planning) criteria are to be used in a modelling assessment to evaluate the predicted impacts of industrial development in conjunction with background sources of air pollution. A brief explanation of the health outcomes protected by the air quality (planning) criteria is provided in the table below.

Health outcome protected	Explanation
Health and wellbeing	Health outcomes due to short-term or long-term non-cancer impacts, such as respiratory disease or cardiovascular disease.
Protecting aesthetic environment	Nuisance dust and odour. Dust impacts are mostly due to larger particles (around 20 µm in size).
Odour	Detectable odour, irrespective of whether pleasant or offensive in nature.
USEPA extremely toxic	Substance that may cause an adverse effect to biological systems, may affect the performance of the whole organism or reduces an organism's ability to respond to an additional environmental challenge.
IARC Group 1 carcinogen (known human carcinogen)	Substance with adequate human data to demonstrate the causal association of the agent with human cancer.
IARC Group 2A carcinogen (probable human carcinogen)	Substance that is probably carcinogenic to humans and has demonstrated animal evidence of cancer but limited human evidence of cancer.
USEPA Group B1 carcinogen (probable human carcinogen)	Substance that is probably carcinogenic to humans and has demonstrated animal evidence of cancer but limited human evidence of cancer.

The carcinogenic compounds to be evaluated according to City Plan were selected from the known or probable human carcinogen categories. Substances that are not classifiable as to the carcinogenicity to humans were not considered in the selection of the air quality (planning) criteria.

Some of the one hour average air quality (planning) criteria for compounds that have a long-term carcinogenic potential were taken from *Approved methods for the modelling and assessment of air pollutants in New South Wales 2005*. These were derived from exposure data, e.g. from occupational health exposure for 40 hours per week, and converted to short-term criteria using a safety factor (as documented in the Victorian *State Environment Protection Policy (Air Quality Management)*).

While carcinogenic impacts are usually due to long-term exposure to a compound, the use of one hour average criteria can be useful as a management tool for peak situations. Ambient concentrations that exceed these criteria may require a health risk assessment to fully evaluate the potential for carcinogenic health impacts.

The provisions of City Plan only cover the potential for adverse health impacts on human health at sensitive uses. It does not consider the effects on ecosystems, crops or other land uses. The Queensland *Environmental Protection (Air) Policy* should be referred to for air quality objectives that protect the health and biodiversity of ecosystems for protected areas, non-protected areas, natural areas, semi-natural vegetation, forests or uncultivated areas.

Modelling chemical transformations

Some circumstances may require modelling of chemical transformations, primarily the relationship between oxides of nitrogen (NO_x) emitted from a source and nitrogen dioxide (NO₂) that is the primary pollutant of concern for health.

The Air quality planning scheme policy outlines several methods for estimating the amount of NO₂ at a sensitive use. The most conservative method of assuming that all NO_x is converted to NO₂ at the sensitive use may suffice for many applications to demonstrate compliance with the air quality (planning) criteria. When using the ozone limiting method, care should be taken to ensure that the meteorological data used is concurrent with the air quality data.

More complex situations that require the use of regional photochemical modelling are recommended to be referred to Council in a modelling proposition prior to conducting the work. This type of modelling requires the use of comprehensive datasets of all emissions of photochemical precursors from industrial, commercial, domestic, transport and natural sources. In addition, the model domain needs to be sufficiently large to enable the replication of daily cycles of wind patterns and the ageing of photochemical pollutants. The assessment must be carried out by suitably experienced modellers.

Cumulative air quality

Air pollutants arising from any source have the potential to affect air quality at sensitive uses. All assessments must evaluate the background (existing) air quality in the vicinity of the development. The background assessment only needs to include the types of pollutants that are emitted from the development if the development is a source of air pollution, or that may affect sensitive uses (for a residential development). This may be achieved through the use of background measurements of air quality that are relevant to the site location, the modelling of other industrial or transport sources that generate the same pollutants or a combination of these techniques.

The Queensland Government currently operates six air quality monitoring locations in the Brisbane area. Other data may be available from short-term monitoring campaigns or on-site monitoring. You are responsible for evaluating the suitability of this data for the development, considering the location of the measurements, types of pollutants measured and the duration of the measurements. The Air quality planning scheme policy outlines the preferred method for data handling to be used in an air quality impact report.

Where other industrial developments are in the vicinity of the development, or where multiple sources may affect air quality at the sensitive use being assessed, these sources of air pollutants may need to be included in dispersion modelling. Cumulative modelling may also be required where monitoring data is inadequate, e.g. where development is proposed near a busy road that is not represented in monitoring data results.

In some circumstances the source(s) of air pollutants may be approved for development but not operating at the time of the assessment. The developer is to treat the approved source(s) in the air quality assessment as though they were operational as per the stated emissions.

Odour impact assessment

Odour criteria

Odour criteria were derived from the Queensland Government guideline Odour impact assessment from developments.

The guideline supports the use of odour surveys and analysis of odour complaints to evaluate existing odour impacts. However, these are not a reliable indicator of quantitative impacts, due to the subjective nature of odour nuisance and varying sensitivities of the population. The use of the odour criteria is appropriate for evaluation of new or expanding industrial sources of odour.

Triggers for odour assessment

The [Air quality planning scheme policy](#) contains a list of odorous compounds that require an odour assessment (Table 3). These compounds are known to be odorous and are potentially released from the types of industries located in Brisbane. The odour impact of these compounds is to be compared to the corresponding air quality (planning) criteria if available.

Any mix of odorous compounds (whether listed individually in Table 3 or not) is also to be evaluated against the odour criteria.

Health risk assessment criteria

Health risk criteria relevant to pollutants have a demonstrated toxicity or carcinogenicity for humans. These are to be used to evaluate either a facility in isolation, or the cumulative impact of the facility with other industrial, commercial or residential sources and background levels of pollutants.

Health risk assessment criteria are used for the evaluation of lifetime cancer risk, chronic hazard index and acute hazard index. These protect against different health outcomes that may occur from exposure to toxic air pollutants. It is important to note that these do not represent an actual occurrence of disease but rather indicate the risk of the disease occurring based on the scenario assessed. The health risk criteria are different for incremental exposure (due to a single source of pollution) and for cumulative exposure (in combination with background sources or existing levels of pollution). This approach was adopted because, for many of the toxic air pollutants of interest, routine monitoring of airborne concentrations is not undertaken. In this instance the incremental health risk criteria are appropriate. The results of the incremental health risk criteria are to be presented for each health risk assessment.

For pollutants where either monitoring data are available or a cumulative air quality impact assessment can be undertaken (e.g. in an industrial precinct with other sources of the same toxic air pollutants), the cumulative health risk criteria should be used. The cumulative health risk criteria are also to be used where more than one pollutant emitted from the facility has the same health endpoint. For example, beryllium, chromium (VI) and inorganic arsenic have all demonstrated a risk of developing lung cancer. It is the responsibility of the suitably qualified person conducting the assessment to determine what health endpoints are to be considered (based on the nature of the pollutants released) and whether the cumulative health risk criteria are to be applied.

The chronic hazard index and acute hazard index criteria were derived from the enHealth Environmental health risk assessment guidelines for protection of health outcomes that are non-carcinogenic. The cancer risk criteria were derived from enHealth Environmental health risk assessment for protection of carcinogenic health outcomes. These target risk criteria are supported by the risk thresholds proposed in the CAPCOA Health risk assessments for proposed land use projects document and are widely used for health risk assessments.

The cumulative health risk criterion for cancer risk was taken from the enHealth Environmental health risk assessment target risk level for multiple chemical exposures, namely one in 100,000. Protection of health due to the facility in isolation was assigned a safety factor of 10, resulting in an individual cancer risk criteria of one in a million.

The cumulative acute or chronic hazard index criteria for cancer risk was taken from the generally adopted criteria of one, taken from the enHealth Environmental Health risk assessment guidelines.

Protection for health due to the facility in isolation was assigned a safety factor of two, resulting in individual acute or chronic hazard index criteria of 0.5.

Triggers for health risk assessment

The [Air quality planning scheme policy](#) introduces a method for screening the predicted health risk impacts. This helps to avoid the use of health risk assessments where they are not warranted, e.g. for a minor emission of a toxic compound that does not impact at sensitive zones.

A screening health risk assessment is required if any of the following apply:

- it is specified in the performance outcome of the referring code
- the industry is listed in Table 4 of the [Air quality planning scheme policy](#)
- any of the pollutants emitted to air are listed in Table 5 of the [Air quality planning scheme policy](#).

The industries nominated in Table 4 were chosen on the basis of potential for health risk impacts if improperly sited or managed. The level of risk to human health from a specific site depends on the scale of the industry and the design and pollution control features employed.

A full health risk assessment is required if any of the following apply:

- any of the pollutants emitted to air exceed the air quality (planning) criteria in the referring code, inclusive of background concentration
- any of the pollutants emitted to air exceed 80% of the air quality (planning) criteria in the referring code, excluding background concentration
- any of the pollutants emitted to air exceed the short-term or long-term screening concentrations in Table 5 of the Air quality planning scheme policy.

The health risk assessment screening concentrations are used to evaluate the potential for health effects to occur and were derived from the Texas Effects Screening Levels. These levels were adopted because the levels were derived for the same purpose as the Air quality planning scheme policy, namely as a screening method to determine the extent of health risk assessment required.

A predicted ambient air concentration in excess of the screening level for short-term or long-term impacts indicates that a more detailed analysis of the potential health impacts is required. This triggers a full health risk assessment. In the event of a discrepancy between the screening concentrations and the air quality (planning) criteria, the more conservative approach is to be adopted. For example, a full health risk assessment would be required if one of the screening methods is triggered.

A full health risk assessment is triggered where air dispersion modelling predicts an exceedance of 80% of the air quality (planning) criteria, excluding background. This has been specified as the health response and consequently air quality (planning) criteria are based on total exposure to the pollutant, i.e. where an individual may be exposed from more than one industrial, commercial or residential source (including roads). The trigger of 80% of the criteria has been used in the absence of any information on other pollutant sources, to provide a conservative assessment of total impacts.

Selection of 80% of the criteria as the trigger without background is not applicable where routine ambient air quality measurements of the pollutant are undertaken, e.g. PM_{2.5}. This trigger is intended to be applied for pollutants where representative background data are unavailable (i.e. the pollutant is not routinely monitored). It is not to be applied where multiple industrial sources may contribute to ambient exposure levels. In these circumstances, all industrial emissions should be explicitly included in a cumulative air quality impact assessment.

If a specific toxic air pollutant is emitted to air and is not listed in the air quality (planning) criteria or Table 5 in the [Air quality planning scheme policy](#), Council should be contacted for advice on whether the pollutant is to be included in a screening health risk assessment and a full health risk assessment.

Sources of data

Due to the specialised nature of human health risk assessment, much of the reference material used to develop a health risk assessment is derived from overseas sources. It is important to take care to use data relevant to Australian conditions in the assessment.

Where possible, Australian data sources relevant to the scenario being investigated should be used for data on the activities and nature of people. The enHealth Environmental health risk assessment Guidelines for assessing human health risks from environmental hazards provides advice for selecting sources of toxicological data, environmental health criteria and data for exposure assessments. The enHealth Australian exposure factor guide 2012 document also has detailed data for exposure assessment.

Multipathway health risk assessment

Many pollutants that trigger a health risk assessment would only require assessment of the inhalation pathway, i.e. the exposure route is by direct inhalation of the airborne pollutant. In these circumstances, a multipathway health risk assessment would not be required.

For substances, such as heavy metals, the multipathway approach is required as these may deposit onto surfaces and the exposure may be by ingestion, skin contact or direct inhalation of the pollutant. The multipathway health risk assessment requires careful, expert consideration of the various exposure parameters that are needed in the assessment.

Where a cumulative impact assessment is required for multiple pathways, the background sources of pollutant exposure must be relevant to the pathways considered. This may include background concentrations of pollutants in soil or water that can be directly sampled and measured.

More information

For more information about City Plan visit www.brisbane.qld.gov.au and search for *Brisbane City Plan 2014*, or phone Council on (07) 3403 8888.

Disclaimer: The content of this information sheet is a summary and has been prepared to assist the reader to understand City Plan. Please refer to the full City Plan document, entitled [Brisbane City Plan 2014](#), on [Council's website](#) for further detail.

