Drafting and Design Presentation Standards
Volume 2: Road Design Development Presentation

Part 1: Concept Phase Drawings

October 2015
### Amendment Register

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<th>Date</th>
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1 Concept phase drawings

1.1 General

Concept phase drawings provide project information on a broad high level scale, generally for planning and community consultation purposes. Typical applications for concept phase drawings are:

- road corridor development planning/route planning
- project proposals, options analysis, business case
- community consultation, newsletters, public displays
- report style drawings and sketches.

1.2 Concept phase drawings presentation

Where applicable, Transport and Main Roads route planning drawings (road corridor development planning) shall be produced on the standard Road Design Detail A1 size title sheet. Refer to Volume 1 of the Drafting and Design Presentation Standards Manual (DDPSM), Chapter 2: Appendix D – TMR Drawing Sheets, using the current Transport and Main Roads customisation package. All text and line work shall be legible when produced in A3 format and shall meet the requirements of Volume 1 of the DDPSM.

1.2.1 Reference Points (RP)

The drawings shall show:

- the preceding RP and the following RP
- the distance to the start of the project from the preceding RP
- the distance from the start to the end of the project, and
- the distance from the end of the project to the following RP.

(Refer to the example below).

<table>
<thead>
<tr>
<th>Reference Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preceding RP</td>
</tr>
<tr>
<td>10A/5</td>
</tr>
</tbody>
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The chainages are to be shown on the drawings in kilometres to two decimals from the start of the gazettal.

1.2.2 Adjoining plans

Each road development plan must bear a reference to the preceding and/or succeeding plan. This reference shall be given in the form “Joins Plan ---”. Where practicable the join line shall be parallel to and near the right and/or left hand margin of the drawing. An overlap between drawings is permissible and desirable as long as a join line is shown.
2 Road corridor development planning/route planning

2.1 Purpose

The purpose of road corridor development planning/route planning is to preserve the corridor along State Controlled Roads (SCR) in order to facilitate the upgrade of road infrastructure to meet the current and future needs of an expanding urban area.

The primary aim of the study is to identify transport issues for the SCR corridor and to define likely future land requirements.

2.2 Objectives

The primary objective of the road corridor development planning/route planning study is to:

- identify transport issues for the SCR corridor
- identify likely future land requirements, and
- create an appropriate design that establishes the future road reserve boundaries for future preservation opportunities.

Adequate assessment of all key issues that influence the decision making processes need to be included in the study process.

2.3 Typical drawing list

- Locality plan and drawing list (refer 2.4)
- Typical cross sections and details (refer 2.5)
- Plan and longitudinal section (refer 2.6)
- Requirement lines (refer 2.7)
- Intersection layout (refer 2.8)
- Public utility plant (refer 2.9)
- Annotated cross sections (refer 2.10)

2.4 Locality plan and drawing list

This drawing is the ‘cover sheet’ for the drawing set and provides a locality plan and drawing list.

Considerations

  Locality plan

  - Scale – select scale to show project site relative to landmarks
  - Use background map that adequately shows extent of project and its relationship to local area, for example, cadastral boundaries (if not available then use DCDB), photo mosaic, etc.
  - Orientate the locality plan to match the project plans (where possible)
  - Add names of streets, creeks, local landmarks and so on
  - Include north point
Drawing list

- Add drawing list attribute to standard sheet
- Include all drawings in the scheme
- Continue on additional sheet/s if necessary
Figure 2.4(a) - Locality plan and drawing list – example 1
Figure 2.4(b) - Locality plan and drawing list – example 2
Figure 2.4(c) - Route planning – example
2.5  **Type cross section and details**

This drawing details the nominal type cross section profile for the project and identifies the project extents in cross section form. The type cross section drawings may contain additional details which are relevant to the cross section profile.

**Considerations**

- Scale – select scale to adequately show detail and fit page
- Show fully dimensioned type cross sections
- Label traffic lanes, auxiliary lanes, shoulders, median separation, etc.
- Show edge drainage treatments – K&C, table drains, swales
- Show median treatments
- Show roadside barrier treatments
- Show pavement details
- Show verge rounding
- Show fencing – noise barriers, footpaths
- Identify existing and proposed boundaries
- Show cut/fill slopes
- Identify subsoil pavement drainage
- Show relative location of control lines
- Use various type sections as necessary to cover alternative treatments throughout project
- Extent over which each type cross section applies
Figure 2.5 - Type cross sections and details – example
2.6 Working Plan and longitudinal section

Working Plan and longitudinal section drawings detail the road geometry and vertical profile for the project. Construction details may be included in the drawing.

In regard to vertical geometry, it is important to note that the department of Transport and Main Roads is adopting the use of K values instead of using radii values to define vertical curves, as per the current Austroads Guide to Road Design – Part 3, and this K value concept will be reflected eventually in the forthcoming revision of Volume 3 Part 3 of the Road Planning and Design Manual.

Considerations

Scale
- Usually 1:1000 (Horizontal) and 1:200 (Vertical) at A1

Background
- Aerial photogrammetry augmented with ground topographical survey (if available)

Drawing
- Show proposed roadway alignment including K&C, medians, islands, footpaths, batters
- Show Cadastral boundaries in red colour (if not available then use DCDB)
- Provide horizontal alignment and vertical profile details (use K values for vertical geometry)
- Show design speed details on the longitudinal table
- Show land requirement boundaries
- Show proposed land requirement lines (generally offset 5 – 10 m from toe/top of batters)
Figure 2.6 - Plan and longitudinal section - example
2.7 Requirement lines

The requirement line drawing shows the land requirement lines needed to accommodate the proposed road alignment. Refer to Volume 1 of the Drafting and Design Presentation Standards Manual, Chapter 4: Right of Way for presentation details.

Considerations

Scale

- Usually 1:1000 at A1

Drawing

- Show proposed roadway alignment including K&C, medians, islands, footpaths, batters (grey line)
- Show cadastral boundaries in red colour (if not available then use DCDB)
- Show proposed land requirement lines (generally offset 5 – 10 m from toe/top of batters)
- Show land descriptions, for example lot and RP numbers
- Show area required. Label as ‘About’ (Abt)
- Show co-ordinates of land requirement line
- Hatch area of land required
Figure 2.7 - Requirement lines - example
2.8 **Intersection layout**

This drawing details the intersection layout and the proposed intersection controls, for example traffic signals, roundabout and so on.

The provision for cyclists and pedestrians are indicated on the drawings.

**Considerations**

**Scale**
- Usually 1:500 (Horizontal) at A1

**Background**
- Aerial photogrammetry augmented with ground topographical survey

**Drawing**
- Show proposed intersection layout including K&C, pavement markings, medians, islands, footpaths, batters
- Show pedestrian and cyclist facilities
- Show cadastral boundaries in red colour (if not available then use DCDB)
- Show proposed land requirement lines (generally offset 5 – 10 m from toe/top of batters)
Figure 2.8(a) - Intersection layout – example 1
Figure 2.8(b) - Intersection layout – example 2
2.9 Public utility plant

This drawing shows the location of the public utility plant (PUP) in relation to the proposed road layout. This information is generally plotted from Dial Before You Dig information and other service authority data.

Considerations

Scale
- Usually 1:1000 (Horizontal) at A1

Background
- Aerial photogrammetry augmented with ground topographical survey

Drawing
- Show proposed roadway alignment including K&C, medians, islands, footpaths, batters
- Show all existing and proposed PUP
- Show cadastral boundaries in red colour (if not available then use DCDB)
- Show proposed land requirement lines (generally offset 5 – 10 m from toe of batters)
Figure 2.9 - Public utility plant - example
2.10 **Annotated cross sections**

The annotated cross sections are provided to indicate the extents of the construction works necessary to complete the project works. They provide the designer and the client with a better understanding of the issues involved in resolving land requirement issues, for example property access and so on.

**Considerations**

**Scale**
- Usually 1:200 at A1 (consider 1:250 at A1 depending on the size of the cross sections)
- Usually 50 m intervals between cross sections
- Natural scale (not exaggerated)

**Drawing**
- Cross section template is available from the Transport and Main Roads 12D Model Customisation User Library
- Show existing and proposed boundary lines
- Show existing ground levels and proposed finished levels
Figure 2.10 - Annotated cross sections - example
3 Options analysis, business case

3.1 Options analysis

3.1.1 Purpose of options analysis

The purpose of an options analysis includes:

- Reviewing the project proposal and developing a clear understanding of the problem and the outcomes required by the customer (outcome specification).
- Identifying all plausible problem solution options (technical and non-technical).
- Developing and assessing solution options using a value management approach that assesses impacts, benefits and cost to a level of detail that enables a comparative evaluation to clearly determine the preferred option.
- Ensuring project environmental sustainability through appropriate environmental assessment and management.
- Selecting the 'preferred solution' to satisfy the required operational performance outcome described in the project proposal, ensuring that it is within the defined outcome scope of the project.
- Defining the solution scope of the preferred option:
  - record of this stage of the project
  - recommend the preferred option.

3.1.2 Options analysis drawings

Option analysis drawings can be as simple as a series of lines diagrams on an aerial photo background, depicting alternative alignments and as complex as a 3D alternative intersection layout drawing (for example, roundabout vs traffic signals).

The drawings should be of sufficient detail to clearly identify to the customer the:

- scope of the project
- project alternatives, for example alignments, intersection layouts, structures
- project issues and conflicts, for example river crossings, PUP conflicts
- project risks
- land acquisition requirements
- community issues
- project benefits.
Figure 3.1(a) - Options analysis drawings – example 1
Figure 3.1(b) - Options analysis drawings – example 2
Figure 3.1(c) - Options analysis drawings – example 3
Figure 3.1(d) - Options analysis drawings – example 4
Figure 3.1(e) - Options analysis drawings – example 5
3.2 Business case

3.2.1 Purpose of a business case

The purpose of the business case is to:

- Review
  - the proposal to develop a clear understanding of the customer’s requirement (outcome specification)
  - the solution options analysis report to understand the reasons for selecting the preferred option (solution), and
  - the scope of the preferred option.
- Develop the preferred option as a documented single problem solution ensuring that it is within the scope of the project, including conducting road safety audit (feasibility).
- The business case will include appropriate investigations, consultations and development to establish the project cost (to within ± 20% of final project cost).
- Ensure development of the preferred option achieves:
  - environmental sustainability through appropriate environmental assessment and management (refer to the Road Project Environmental Manual for guidance)
  - economic solution through good design practices
  - constructability practically and efficiency.
- Prepare the business case report to seek approval for:
  - delivering the preferred solution option
  - delivering the construction budget
  - including the project on the RIP as a construction project.
- Proceed to the next phase that is, the development phase.
- Develop the justification for including the project in the RIP.
- Put together a handover package to facilitate the transition to the next phase.
- Develop a draft project plan for directing and controlling project activities after the business case has been accepted.
- Develop a plan for the orderly termination of the project if the business case is not accepted.

3.2.2 Business case drawings

Transport and Main Roads development business case drawings should usually be produced on the standard Road Design Detail A1 size title sheet. Refer to the Drafting and Design Presentation Standards Manual, Volume 1, Chapter 2: Appendix D – TMR Drawing Sheets, using the current Transport and Main Roads customisation package. All text and line work shall be legible when produced in A3 format and shall meet the requirements of Volume 1 of the DDPSM.

Drawings that accompany a business case study should essentially be designed and presented to achieve the necessary detail and accuracy of the project cost estimate and provide confidence of the feasibility of the project.
3.2.3 **Typical drawing list**

A typical drawing list for a business case study could include:

- locality plan and drawing list
- typical cross sections
- plan and longitudinal section
- intersection layout
- public utilities
- annotated cross sections.

3.2.4 **Locality plan and drawing list**

This drawing is the ‘cover sheet’ for the drawing set and provides a locality plan and drawing list.

**Considerations**

**Locality plan**

- Scale – select scale to show project site relative to landmarks
- Use background map that adequately shows extent of project and its relationship to local area, for example cadastral boundaries (if not available then use DCDB), photo mosaic, etc.
- Orientate the locality plan to match the project plans (where possible)
- Add names of streets, creeks, local landmarks, and so on
- Include north point

**Drawing list**

- Add drawing list attribute to standard sheet
- Include all drawings in the scheme
- Continue on additional sheet/s if necessary
Figure 3.2 - Locality plan and drawing list – example
3.3 Type/typical cross sections

A type cross section details the nominal cross section profile of the road (it represents the standard on a straight and delivers consistency of profile). A project may have more than one type cross section to cover different requirements, for example: “A - Roadway Excavation and Embankment”, “B - Floodway Formation”. There may also be more than one Roadway Excavation and Embankment type in a project, for example: “A - Roadway Excavation and Embankment” and “B - Roadway Excavation and Embankment”.

Typical cross sections are actual project cross sections representing design details to be adopted at particular locations and possibly in like situations if there is no separate typical cross section. These drawings identify the project extents in cross section form. Typical cross section drawings are generally required for complex projects where there are considerable cross sectional changes throughout the job. The typical cross section drawings may contain additional details which are relevant to the cross section profile, for example pavement tie-ins, kerb details, etc.

Considerations

- Scale – select scale to adequately show detail and fit page
- Show fully dimensioned type/typical cross sections
- Label traffic lanes, cycle lanes, parking, shoulders, footpaths and so on
- Show edge drainage treatments – K&C, table drains, swales
- Show median treatments
- Show roadside barrier treatments
- Show verge rounding
- Show fencing location – boundary fence, noise barriers
- Identify existing and proposed boundaries
- Show cut/fill slopes
- Identify subsoil pavement drainage
- Show relative location of control lines
- Use various type/typical sections as necessary to cover alternative treatments throughout project
  Identify the extent over which each type/typical cross section applies
Figure 3.3(a) - Type cross sections – example
Figure 3.3(b) - Typical cross sections – example
3.4 Working Plan and longitudinal section

Working Plan and longitudinal section drawings detail the road geometry and vertical profile for the project. Construction details may be included in the drawing.

In regard to vertical geometry, it is important to note that the Department of Transport and Main Roads is adopting the use of K values instead of using radii values to define vertical curves, as per the current Austroads Guide to Road Design – Part 3, and this K value concept will be reflected eventually in the forthcoming revision of Volume 3, Part 3 of the Road Planning and Design Manual.

Considerations

Scale

- Usually 1:1000 (horizontal) and 1:200 (vertical) at A1

Background

- Aerial photogrammetry augmented with ground topographical survey (if available)

Drawing

- Show proposed roadway alignment including K&C, medians, islands, footpaths, batters
- Show cadastral boundaries in red colour (if not available then use DCDB)
- Provide horizontal alignment and vertical profile details (use K values for vertical geometry)
- Show design speed details on the longitudinal table
- Show land requirement boundaries
Figure 3.4(a) – Working plan and longitudinal section – option analysis example – sheet 1 of 2
Figure 3.4(c) - Plan layout – example
Figure 3.4(d) - Plan and detail – example
3.5 Intersection layout

This drawing details the intersection layout including the proposed intersection controls, for example traffic signals, roundabout and so on.

The provision for cyclists and pedestrians are indicated on the drawings.

Considerations

Scale

• Usually 1:500 (horizontal) at A1

Background

• Aerial photogrammetry augmented with ground topographical survey

Drawing

• Show proposed intersection layout including K&C, pavement markings, medians, islands, footpaths, batters
• Show pedestrian and cyclist facilities
• Show cadastral boundaries in red colour (if not available then use DCDB)
Figure 3.5 - Intersection layout - example
3.6 Public utility plant

These drawings show the location of the public utility plant in relation to the proposed road layout. This information is generally plotted from Dial Before You Dig information and other service authority data. Where survey is available the location of the PUP should match the surveyed location.

These concept phase drawings should identify potential service conflicts which will require further investigation at the design development phase. PUP conflict plans are required to highlight important considerations for the design and also to facilitate discussions with utility service providers.

Depending on the complexity of each project, PUP conflict drawings may be complemented with tables containing specific conflict details, these tables are to be included within the set of drawings - refer to Figures 3.6(c).

Considerations

Scale
- Usually 1:1000 (horizontal) at A1

Background
- Aerial photogrammetry augmented with ground topographical survey may be used

Drawing
- Show proposed roadway alignment including K&C, medians, islands, footpaths, batters
- Show all existing and proposed PUP with possible services conflicts
- Show cadastral boundaries in red colour (if not available then use DCDB)
- If PUP conflicts are complex then include a table with conflict details
Figure 3.6(a) - Public utility plant – example - sheet 1 of 3
Figure 3.6(b) - Public utility plant – example - sheet 2 of 3
<table>
<thead>
<tr>
<th>Conflict No.</th>
<th>Service Type</th>
<th>Drg No.</th>
<th>Service Description</th>
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<td>M123</td>
<td>CH</td>
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<td>M123</td>
<td>CH</td>
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</tr>
</tbody>
</table>

**Figure 3.6(c) - Public utility plant – example - sheet 3 of 3**

**Volume 2, Part 1, Chapter 3: Options analysis, business case**

**Schedule of Potential Service Conflicts**

- Conduct: Analysis of potential service conflicts
- Description: Business case

**Abbreviations**

- AS: AS/NZS
- BS: British Standard
- DIN: Deutsches Institut für Normung
- JIS: Japanese Industrial Standard
- NF: Norme Française
- UL: Underwriters Laboratories
- IEEE: Institute of Electrical and Electronics Engineers
- ANSI: American National Standards Institute
- VDE: Verein Deutscher Elektrotechniker
-IEC: International Electrotechnical Commission

**Notes**

1. For services not listed refer to the Protocol Document.
3.7 **Annotated cross sections**

The annotated cross sections are provided to indicate the extent of the construction works necessary to complete the project works. The annotated cross sections provide the designer and the client with a better understanding of the magnitude of the works involved in providing for the preferred option.

**Considerations**

**Scale**

- Usually 1:200 at A1 (consider 1:250 at A1 depending on the size of the cross sections)
- Usually 50 m intervals between cross sections
- Natural scale (not exaggerated)

**Drawing**

- Cross section template is available from the Transport and Main Roads 12D Model Customisation User Library
- Show existing and proposed boundary line
- Show existing ground levels and proposed finished levels
Figure 3.7 - Annotated cross sections - example
4 Community consultation, newsletters, public displays

Community consultation, newsletter and public display drawings for stakeholder and community consultation have a wide and diverse group of people who need to be informed of the project issues and impacts.

These include:

- District personnel
- Other government departments
- Local government
- Business operators
- Residents/community
- Affected groups, clubs and so on
- Design consultant’s staff
- Federal government:
  - funding for AusLink projects.

4.1 Use of drawings

Concept phase drawings are mainly utilised for the following purposes:

- To consult with stakeholders and the community
  - letter drops and/or internet.

- For public displays
  - displays in shopping malls, library, local government and so on.

- To identify the total impacts of the project
  - proximity to existing residential, commercial and recreation facilities
  - roads/streets to be relocated or access changed
  - land requirements
  - changed traffic control
  - improvements to road network.

- To support options analysis and business case reports.

4.2 Styles of presentation

Community consultation, newsletter and public display drawings should be tailored to suit the intended recipient and should be easy to understand by non-technical personnel. Try to keep it simple and stylised, and not too much detail to confuse the audience (technical stuff for technical staff/engineers, and basic stuff for general public).
They should include:

- limit the use of any boundary markings, unless they are requested for a particular project
- always use the current department’s logo and government branding
- adequate naming of landmarks, streets, businesses and recreational areas
- simple but prominent appropriate notes
- a north point
- locality plan or direction and distance to next town (where applicable).

Consider:

- level of intensity of background
- choosing/experimenting with overlay colours to provide contrast
- using perspective views if beneficial.

**4.3 Drawing background details**

**Note:** Colour and photo backgrounds assist in readability for the target audience.

- Photographic image of existing layout
  - use high resolution quality images
  - easy to visualise.
- Conventional ground survey
  - provides complete accurate data.
- Photogrammetric aerial survey
  - provides coverage of larger band of study.
- Cadastral boundaries
  - minimum detail – least desirable.
- Combination of above.
4.4 **Examples of community consultation, newsletter, factsheets and public display drawings**

A few examples of community consultation, newsletters and public display drawings are shown below.

**Figure 4.4(a) - Community consultation/public display – example 1**
Figure 4.4(b) - Community consultation/public display – example 2
Figure 4.4(c) - Community consultation/public display – example 3
Figure 4.4(d) - Community consultation/public display – example 4

Rothwell Intersection Upgrade Project

Moreton Bay Rail Project – Rothwell Station precinct access
**Figure 4.4(e) - Community consultation/public display – example 5**
Figure 4.4(f) - Community consultation/public display – example 6
Figure 4.4(g) - Community consultation/newsletter/factsheet – example 1 - front page

Draft plan released

The Department of Transport and Main Roads is releasing a draft plan to detail the planned changes between the Cunningham Highway and Devonvale Creek and the upgrade of the Cunningham Highway through Devonvale Creek to meet motorway design criteria.

Get involved

- webinar workshops
- public display area
- public notice boards
- information packs

See Inside for more information on
- public display area
- online notice boards

Transport and Main Roads

www.transport.qld.gov.au

The layout plan is currently under development and will be discussed at the upcoming community consultation meetings. The project is expected to be completed by 2023.
Figure 4.4(i) - Community consultation/newsletter/factsheet – example 2

**Kin Kora Intersection Upgrade**

The $25 million Kin Kora intersection upgrade has been funded by the Australian and Queensland Governments to remove the current roundabout and construct a new traffic signal controlled intersection at Gladstone’s busiest intersection.

**Construction Timeframe**

- The construction works, including the relocation of underground services, began and almost were completed in December 2016.
- Construction of the roundabout is expected to be complete by early 2017.

**Project Overview**

- The Kin Kora roundabout is the second busiest intersection in Gladstone, with approximately 12,000 vehicles per day.
- The objective of the Kin Kora intersection upgrade is to improve safety and reduce delays for motorists and pedestrians.
- The upgrade will include the construction of a roundabout and signal-controlled intersection, with pedestrian crossings and a dedicated bus lane.

**Further Information**

For further information on the Kin Kora intersection upgrade, visit the Department of Transport and Main Roads website.

- Phone: 07 4772 4772
- Email: transportmail@mainroads.qld.gov.au
- Website: www.mainroads.qld.gov.au
North Brisbane Bikeway Stage 2 and 3

The North Brisbane Bikeway is a critical cycle corridor in Greater Brisbane due to the current lack of existing facilities and its potential to contribute to moving people through the congested northern suburbs of Brisbane.

Department of Transport and Main Roads is currently undertaking design of the North Brisbane Bikeway Stage 2 and the Department of Transport and Main Roads is currently undertaking design of the North Brisbane Bikeway Stage 2 and 3.

Benefits to the community

- Cycling is not just a transport issue. It has significant benefits for health, the environment and tourism, as well as having positive local impacts in connecting communities.
- A high-quality dedicated bikeway will encourage more cycling and walking across all ages and abilities. This term will mean fewer cars will be on the road.
- Segregated cycle facilities will reduce the need for interaction between motorists and cyclists on roads, and between cyclists and pedestrians on footpaths. This improves the safety, comfort, amenity and travel time for everyone.

Priority cycle and pedestrian crossings

- A feature of the North Brisbane Bikeway Stages 2 and 3 is the inclusion of priority pedestrian and cycle crossings at a number of intersections. These crossings operate similarly to pedestrian-protected crossings, providing people walking and cycling with priority over vehicles when crossing the street.
- The crossings will consist of a raised platform and coloured road surface to identify give way areas and the cycle crossing. This space has been provided to allow vehicles to stop safely, clear of the crossing.
- The priority crossings are proposed for road users with low volumes of vehicles turning and low turning speeds.
- Visit the TRC website to see a summary of the priority crossings in action.

Other sections of the North Brisbane Bikeway

- Construction of the Northern Bikeway has commenced, with Stage 1A - Section 3 between Victoria Avenue and Victoria Park, Hornet and Stret in the space where a proposed bikeway will be constructed.
- Stage 1A - Sections 3 between Victoria Avenue and Victoria Park, Hornet and Stret in the space where a proposed bikeway will be constructed.
- Stage 1B - Sections 3 between Victoria Avenue and Victoria Park, Hornet and Stret in the space where a proposed bikeway will be constructed.
- Stage 1B - Sections 3 between Victoria Avenue and Victoria Park, Hornet and Stret in the space where a proposed bikeway will be constructed.

Get involved

- The Department is currently working with Brisbane City Council to finalise the design of Stage 2, which will see various improvements to the bikeway, including
- The Department is currently working with Brisbane City Council to finalise the design of Stage 2, which will see various improvements to the bikeway, including
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Where to from here?

- The project team will continue to refine the design over coming months, with construction on track to commence in 2022.
- For more information, please contact the North Brisbane Bikeway Project Team.
When will it be built?

Construction of the conversion planning layout will be staged over a number of years to align with available funds and ramp traffic demands.

Improvements to the northbound off-ramp have been identified as a high priority and will be done in the first stage.

Progress of construction is planned to align with 2025/2034 financial years.

Construction of the interchange improvements will be planned around maintaining normal traffic, pedestrian and cyclist requirements as much as possible.

Some delays will be unavoidable during the construction period.

Hinkler Drive (North)

Main Roads has requested by:
- Maintaining the northbound on-ramp to the M1
- Undergoing a stage-by-stage alignment and refinement requirements
- Estimate traffic noise

Spencer Road

Community feedback included:
- Maintain a southbound on-ramp from the M1
- Make the intersection safer and more efficient from the M1
- Minimise property impacts

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Hinkler Drive (North)

Community feedback included:
- Maintain a southbound on-ramp from the M1
- Make the intersection safer and more efficient from the M1
- Minimise property impacts
- Minimise noise impacts
- Avoid the use of roundabouts
- Extend Hinkler Drive south to Elysium Road

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- Minimise noise impacts
- Avoid the use of roundabouts
- Extend Hinkler Drive south to Elysium Road

Main Roads has responded by:
- Extending the off-ramp to cater for extra vehicles and upgrading it to modern design standards
- Positioning the off-ramp as far away from residential properties as practicable
- Keeping M1 off-ramp traffic separate from Hinkler Drive
- Determining requirements and options to minimise traffic noise
- Re-aligning Hinkler Drive to minimise property impacts
- No roundabouts are proposed in the upgrade

The long term planning layout allows for the future extension of Hinkler Drive south to Elysium Road

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- Determining requirements and options to minimise traffic noise
- Re-aligning Hinkler Drive to minimise property impacts
- No roundabouts are proposed in the upgrade

The long term planning layout allows for the future extension of Hinkler Drive south to Elysium Road
Figure 4.4(l) - Community consultation/newsletter/public display – example 2
5 Report style drawings and sketches

There are numerous other drawings and sketches which accompany specialist reports and can be as diverse as glossy planning reports and complete job documentation for construction. These reports are often appended to option analysis, business case or design development reports.

Often the product is a direct output from a specialist technical software package.

Specialist reports may include:

- bridge design options
- environmental and cultural heritage studies
- geotechnical investigations
- hydraulic analysis
- land tenure
- noise studies
- traffic analysis.

Following are examples of these types of drawings.
5.1 Bridge design options

Figure 5.1(a) - Bridge design options – example 1
Figure 5.1(b) - Bridge design options – example 2
Figure 5.1(c) - Bridge design options – example 3
Figure 5.1(d) - Bridge design options – example 4
Figure 5.1(e) - Bridge design options – example 5
5.2 Environmental and cultural heritage studies

*Figure 5.2(a) - Environmental and cultural heritage studies – example 1*
Figure 5.2(b) - Environmental and cultural heritage studies – example 2
Figure 5.2(c) - Environmental and cultural heritage studies – example 3
5.3 Geotechnical investigations

Figure 5.3(a) - Geotechnical investigations – example 1
Figure 5.3(b) - Geotechnical investigations – example 2
Figure 5.3(c) - Geotechnical investigations – example 3
5.4 **Hydraulic analysis**

*Figure 5.4(a) - Hydraulic analysis – example 1*
Figure 5.4(b) - Hydraulic analysis – example 2
Figure 5.4(c) - Hydraulic analysis – example 3
5.5 Land tenure

Figure 5.5(a) - Land tenure – example 1
Figure 5.5(b) - Land tenure – example 2
5.6 Noise studies

Figure 5.6(a) - Noise studies – example 1
Figure 5.6(b) - Noise studies – example 2
### Figure 5.6(c) - Noise studies – example 3

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#### Comments

- LA10(16hr): 66.8 dB(A)
- LA50(16hr): 68.4 dB(A)
- LA90(16hr): 68.4 dB(A)
- LMax: 65.8 dB(A)
- LMax(24hr): 41.0 dB(A)
- LMax(16hr): 45.7 dB(A)
- LMax(16hr): 66.1 dB(A)

#### Description

Noise monitoring carried out 1m from façade of residence at 2002 Cunningham Highway.

#### Observations

- LA10 (dBA): 66.8 dB(A)
- LA50 (dBA): 68.4 dB(A)
- LA90 (dBA): 68.4 dB(A)

#### Site Photos

- Site Diagram

#### End Time

- L10 (dBA): 69.3 RTN from Hwy dominant: birds sometimes
- 10:41 RTN from Hwy dominant: birds sometimes
- 12:07 68.8 RTN from Hwy dominant: birds sometimes, insects
- 19:39 69.9 RTN from Hwy dominant: aircraft
5.7 Traffic analysis

Figure 5.7(a) - Traffic analysis – example 1
Figure 5.7(b) - Traffic analysis – example 2