

## *4. Project need, objectives and design principles*

This section outlines the RTA's Pacific Highway project objectives and provides an overview of the design guidelines were used in the development of the project.

## 4.1 Need for the project

The need to upgrade the Pacific Highway between Iluka Road and Woodburn has been evaluated in the context of the overall Pacific Highway. The highway is a major inter-state transport infrastructure facility that not only forms the primary Sydney-Brisbane transport link, but also serves a significant and growing coastal residential and recreational population.

The project is required to meet the NSW and Commonwealth Governments' overall objective of fully upgrading the Pacific Highway to a four-lane divided highway standard. It will provide additional capacity in an area with continued traffic growth, and will join other completed and planned projects to form a continuous high-standard road, better able to meet the demands placed on it.

The project is also an essential component of the wider regional network, and the need for it is based on a number of issues, including:

- Road safety including the need to reduce the number and severity of road traffic accidents through safer design.
- Population growth, urban expansion, commercial development, tourism and employment growth on the NSW north coast and in southern Queensland.
- Freight transport demand and service patterns.

It is expected that traffic volumes on the Pacific Highway will continue to increase due to:

- Population increases in the North Coast region.
- Traffic diverted from other routes as the Pacific Highway is improved.
- Traffic generated by improved travel times and reduced travel costs.

## 4.1.1 Pacific Highway Upgrade Program objectives

The RTA's overall objectives for the Pacific Highway Upgrade Program are to:

- Significantly reduce road accidents and injuries.
- Reduce travel times.
- Reduce freight transport costs.
- Develop a route that involves the community and considers their interests.
- Provide a route that supports economic development.
- Manage the upgrading of the route in accordance with ESD principles.
- Provide the best value for money.

## 4.1.2 Highway design standards

The design of the Iluka Road to Woodburn upgrade of the Pacific Highway is being carried out according to Upgrading the Pacific Highway – Upgrading Program Beyond 2006: Design Guidelines (2006), prepared by the RTA's Pacific Highway Office. The project also seeks to comply with Austroads standards (various dates) and the RTA's Road Design Guide (1989). Key standards applying to this project are summarised below in **Table 4.1**.



| Feature     Class A dual carriageway     Intersecting and other roads       Design speed     Horizontal 110 km/h.<br>Vertical 100-110 km/h.     80 and 60 km/h dependent on<br>function.       Cross section     Dual carriageway.     Two lane single carriageway with<br>typically 3.5 m lanes and shoulder<br>width dependent on road function.       Shoulder: typical 2.5 m.     Traffic lanes: minimum 0.5 m.     Traffic lanes: minimum 0.5 m.       Offside shoulder: minimum 0.5 m.     Central median reserve minimum<br>11m.     Offside shoulder: typical 2.5 m.       Verge: typical 10 m.     Verge: typical 10 m.     No change to existing conditions.       Flood immunity     One carriageway positioned above<br>the 1 in 100 year flood level<br>(desirable) or the 1 in 20 year flood<br>level (minimum) across the flood<br>plain.     No change to existing conditions.       Intersections     At-grade 'seagull' type T-intersections<br>at key local roads.     At grade T-intersections with some<br>turning lanes.       Access     Grade separated 'dumbbell'<br>interchange at key location.     Unrestricted.       Access     Left-in, left out for most existing<br>access roads and private properties<br>not serviced by 'seagul' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.     Varies dependent on function.<br>Typically 5.3m       Flit/batter     1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal     1 vertical : 2 horizontal<br>1 vertical : | Table 4.1 Pacific Highway Upgrade Standards Class A |  |                                    |
|---|---|--|------------------------------------|
| Vertical 100-110 km/h.function.Cross sectionDual carriageway.Two lane single carriageway with<br>typically 3.5 m lanes and shoulder<br>width dependent on road function.Shoulder: typical 2.5 m.Traffic lanes: minimum 2 x 3.5 m.<br>Offside shoulder: minimum 0.5 m.<br>Central median reserve minimum<br>11m.Traffic lanes.<br>Shoulder: typical 2.5 m.Flood immunityOne carriageway positioned above<br>the 1 in 100 year flood<br>level (minimum) across the flood<br>plain.No change to existing conditions.IntersectionsAt grade 'seagul' type T-intersections<br>at key location.At grade T-intersections with some<br>turning lanes.<br>Connecting to dumbbell interchange<br>interchange at key location.At grade T-intersections with some<br>turning lanes.<br>Connecting to dumbbell interchange<br>intersection (Class A). Some<br>access roads and private properties<br>not serviced by 'seagul' type T-<br>intersection (Class A). Some<br>access may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mVaries dependent on function.<br>Typically 3.3 mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal   | Feature   | Class A dual carriageway   | Intersecting and other roads       |
| Verge: typical 10 m.<br>Shoulder: typical 2.5 m.typically 3.5 m lanes and shoulder<br>width dependent on road function.Shoulder: typical 2.5 m.<br>Traffic lanes: minimum 2 x 3.5 m.<br>Offside shoulder: minimum 0.5 m.<br>Central median reserve minimum<br>11m.<br>Offside shoulder: minimum 0.5 m.<br>Kentral median reserve minimum<br>11m.<br>Offside shoulder: minimum 0.5 m.<br>Ninimum: 2 x 3.5 m traffic lanes.<br>Shoulder: typical 2.5 m.<br>Verge: typical 10 m.No change to existing conditions.Flood immunityOne carriageway positioned above<br>the 1 in 100 year flood<br>level<br>(desirable) or the 1 in 20 year flood<br>level (minimum) across the flood<br>plain.No change to existing conditions.IntersectionsAl-grade 'seagull' type T-intersections<br>at key local roads.<br>Grade separated "dumbbell"<br>intersection (Class A). Some<br>access roads and private properties<br>not serviced by 'seagull' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mVaries dependent on function.<br>Typically 5.3 m.Fill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal  |   |  | •                                  |
| Verge: typical 10 m.width dependent on road function.Shoulder: typical 2.5 m.Traffic lanes: minimum 2 x 3.5 m.Offside shoulder: minimum 0.5 m.Central median reserve minimum<br>11m.Offside shoulder: minimum 0.5 m.Minimum: 2 x 3.5 m traffic lanes.Shoulder: typical 2.5 m.Verge: typical 10 m.Flood immunityOne carriageway positioned above<br>the 1 in 100 year flood level<br>(desirable) or the 1 in 20 year flood<br>level (minimum) across the flood<br>plain.No change to existing conditions.IntersectionsAt-grade 'seagull' type T-intersections<br>at key local roads.<br>Grade separated 'dumbbell"<br>interchange at key location.At grade T-intersections with some<br>turning lanes.<br>Connecting to dumbbell interchange<br>interchange at key location.AccessLeft-in, left out for most existing<br>access roads and private properties<br>not serviced by 'seagull' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mVaries dependent on function.<br>Typically 5.3mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal  | Cross section                                       | Dual carriageway.  | typically 3.5 m lanes and shoulder |
| Traffic lanes: minimum 2 x 3.5 m.<br>Offside shoulder: minimum 0.5 m.<br>Central median reserve minimum<br>11m.<br>Central median reserve minimum<br>11m.Offside shoulder: minimum 0.5 m.<br>Minimum: 2 x 3.5 m traffic lanes.<br>Shoulder: typical 2.5 m.<br>Verge: typical 10 m.No change to existing conditions.Flood immunityOne carriageway positioned above<br>the 1 in 100 year flood level<br>(desirable) or the 1 in 20 year flood<br>level (minimum) across the flood<br>plain.No change to existing conditions.IntersectionsAt-grade 'seagull' type T-intersections<br>at key local roads.<br>Grade separated 'dumbbell'<br>interchange at key location.At grade T-intersections with some<br>turning lanes.<br>Connecting to dumbbell interchangeAccessLeft-in, left out for most existing<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mVaries dependent on function.<br>Typically 5.3m.Fill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal  |   | Verge: typical 10 m.   |                                    |
| Offside shoulder: minimum 0.5 m.<br>Central median reserve minimum<br>11m.Offside shoulder: minimum 0.5 m.<br>Minimum: 2 x 3.5 m traffic lanes.<br>Shoulder: typical 2.5 m.<br>Verge: typical 10 m.No change to existing conditions.Flood immunityOne carriageway positioned above<br>the 1 in 100 year flood level<br>(desirable) or the 1 in 20 year flood<br>level (minimum) across the flood<br>plain.No change to existing conditions.IntersectionsAt-grade 'seagull' type T-intersections<br>at key local roads.<br>Grade separated 'dumbbell'<br>intersection.At grade T-intersections with some<br>turning lanes.<br>Connecting to dumbbell interchange<br>access roads and private properties<br>not serviced by 'seagull' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mVaries dependent on function.<br>Typically 5.3mVaries dependent on function.<br>Typically 5.3mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal   |   | Shoulder: typical 2.5 m.   |                                    |
| Central median reserve minimum<br>11m.Central median reserve minimum<br>11m.Offside shoulder: minimum 0.5 m.<br>Minimum: 2 x 3.5 m traffic lanes.<br>Shoulder: typical 2.5 m.<br>Verge: typical 10 m.No change to existing conditions.Flood immunityOne carriageway positioned above<br>the 1 in 100 year flood level<br>(desirable) or the 1 in 20 year flood<br>level (minimum) across the flood<br>plain.No change to existing conditions.IntersectionsAt-grade 'seagull' type T-intersections<br>at key local roads.<br>Grade separated "dumbbell"<br>interchange at key location.At grade T-intersections with some<br>turning lanes.<br>Connecting to dumbbell interchange<br>interchange at key location.AccessLeft-in, left out for most existing<br>access roads and private properties<br>not serviced by 'seagul' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mVaries dependent on function.<br>Typically 5.3mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal   |   | Traffic lanes: minimum 2 x 3.5 m.  |                                    |
| 11m.Offside shoulder: minimum 0.5 m.Minimum: 2 x 3.5 m traffic lanes.Shoulder: typical 2.5 m.Verge: typical 10 m.Flood immunityOne carriageway positioned above<br>the 1 in 100 year flood level<br>(desirable) or the 1 in 20 year flood<br>level (minimum) across the flood<br>plain.No change to existing conditions.IntersectionsAt-grade 'seagul' type T-intersections<br>at key local roads.<br>Grade separated "dumbbell"<br>interchange at key location.At grade T-intersections with some<br>turning lanes.AccessLeft-in, left out for most existing<br>access roads and private properties<br>not serviced by 'seagul' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mVaries dependent on function.<br>Typically 5.3mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal   |   | Offside shoulder: minimum 0.5 m.   |                                    |
| Minimum: 2 x 3.5 m traffic lanes.<br>Shoulder: typical 2.5 m.<br>Verge: typical 10 m.No change to existing conditions.Flood immunityOne carriageway positioned above<br>the 1 in 100 year flood level<br>(desirable) or the 1 in 20 year flood<br>level (minimum) across the flood<br>plain.No change to existing conditions.IntersectionsAt-grade 'seagull' type T-intersections<br>at key local roads.<br>Grade separated "dumbbell"<br>interchange at key location.At grade T-intersections with some<br>turning lanes.<br>Connecting to dumbbell interchange<br>interchange at key location.AccessLeft-in, left out for most existing<br>access roads and private properties<br>not serviced by 'seagull' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mVaries dependent on function.<br>Typically 5.3mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal  |   |  |                                    |
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| Verge: typical 10 m.Flood immunityOne carriageway positioned above<br>the 1 in 100 year flood level<br>(desirable) or the 1 in 20 year flood<br>level (minimum) across the flood<br>plain.No change to existing conditions.IntersectionsAt-grade 'seagull' type T-intersections<br>at key local roads.<br>Grade separated "dumbbell"<br>interchange at key location.At grade T-intersections with some<br>turning lanes.<br>Connecting to dumbbell interchangeAccessLeft-in, left out for most existing<br>access roads and private properties<br>not serviced by 'seagull' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mVaries dependent on function.<br>Typically 5.3mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal  |   | Minimum: 2 x 3.5 m traffic lanes.  |                                    |
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| at key local roads.turning lanes.Grade separated "dumbbell"<br>interchange at key location.Connecting to dumbbell interchangeAccessLeft-in, left out for most existing<br>access roads and private properties<br>not serviced by 'seagull' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mOverhead clearances5.3 m.Varies dependent on function.<br>Typically 5.3mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal  | Flood immunity                                      | the 1 in 100 year flood level<br>(desirable) or the 1 in 20 year flood<br>level (minimum) across the flood   | No change to existing conditions.  |
| interchange at key location.Unrestricted.AccessLeft-in, left out for most existing<br>access roads and private properties<br>not serviced by 'seagull' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mOverhead clearances5.3 m.Varies dependent on function.<br>Typically 5.3mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal  | Intersections                                       |  |                                    |
| AccessLeft-in, left out for most existing<br>access roads and private properties<br>not serviced by 'seagull' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right<br>hand-in layouts.Unrestricted.Minimum radius1000mVaries dependent on function.<br>Typically 5.3mOverhead clearances5.3 m.Varies dependent on function.<br>Typically 5.3mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 2 horizontal  |   |  | Connecting to dumbbell interchange |
| Minimum radius1000mOverhead clearances5.3 m.Varies dependent on function.<br>Typically 5.3mFill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal  | Access  | Left-in, left out for most existing<br>access roads and private properties<br>not serviced by 'seagull' type T-<br>intersection (Class A). Some<br>accesses may have u-turns and right | Unrestricted.                      |
| Fill/batter 1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal Typically 5.3m   1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal 1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal  | Minimum radius                                      |  |                                    |
| Fill/batter1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal1 vertical : 3 horizontal to<br>1 vertical : 2 horizontal   | Overhead clearances                                 | 5.3 m.   |                                    |
| Cuttings 1 vertical : 2 horizontal 1 vertical : 2 horizontal  | Fill/batter   |  |                                    |
|   | Cuttings  | 1 vertical : 2 horizontal  | 1 vertical : 2 horizontal          |

Table 4.1 Pacific Highway Ungrade Standards Class A

Source: RTA, various publications.