Civil Engineering

This section deals with the elements of the streetscape that interface between the carriageway and footpath. They are:

- Kerbs
- Water-tables
- Driveway crossovers
- Kerb ramps
- Tactile tiling and surfacing within ramps
- Drainage elements - formed or precast
- Inspection pits - formed or precast
- Grating
- Pit covers

Locational principles are determined by each application and guided by considerations of public convenience and safety, visual appearance, and efficiency.

Ramps with tactile tiles should be installed to assist the crossing of roads and laneways at all intersections involving a change of grade and the potential for pedestrians and vehicles to conflict.

Covers and gratings should be adjusted to the precise level of the surrounding footpath immediately following installation.

The Council does not have formalised policies that relate to the urban or visual design of kerbs, water-tables, driveway cross overs, formed or precast drainage elements, or drain and inspection pit covers. The choice of those elements is governed by the technical requirements of the specific application, the past and current practice of Council in stalling those elements in the City, and technical standards and specifications that are in general use, including Australian Standards that apply.

Standards and policies that relate most particularly are:

- Australian Standards (various)
- Standards with regard to the safety and convenience of people with a disability
- The Council’s Paving Policy
  (in Draft form only at the time of preparation of this section of the Manual)
Case 1:
200mm thick watertables are constructed when the carriageway adjacent the kerbline is used by minor traffic.

Standard kerb height varies:
- 100mm
- 140mm
- 200mm

Case 2:
300mm thick watertables are constructed when the carriageway adjacent the kerbline is used by industrial/heavy traffic or is on a bus route.

Standard kerb height varies:
- 100mm
- 140mm
- 200mm
- 300mm

Construction:
The Corporation of the City of Adelaide and Contractors

Materials:
Reinforced Brighton Lite Concrete or equivalent.
Note: to be used when full length of kerbing is constructed.

Finish:
Steel trowel

Maintenance:
Cracks or chips in surface to be made good to avoid trip hazards.

Standard kerb heights
- CITY 100mm, 140mm
- PARK LANDS 200mm

Vertical concrete kerbs are used throughout the City. Insitu concrete kerbs are preferred, although extruded kerb and gutter may be used.

Generally used to contain traffic within the roadway and to delineate between areas for pedestrian usage and vehicle usage.
Kerb & Watertable Selection In Relation To Street Type

<table>
<thead>
<tr>
<th>Kerb Height</th>
<th>watertable thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>200  Low traffic flows Minor Streets</td>
</tr>
<tr>
<td>140</td>
<td>200  Low traffic flows Minor Streets</td>
</tr>
<tr>
<td>200</td>
<td>200  Carriageway through Park Lands</td>
</tr>
</tbody>
</table>

The above is a guideline only. Please consult Corporation staff for approval.

KERB AND WATERTABLE TYPES

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**Construction:**
The Corporation of the City of Adelaide and Contractors

**Materials:**
Insitu Reinforced Brighton Lite Concrete or equivalent to be used where full length of kerbing is constructed.

**Finish:**
Steel trowel

**Maintenance:**
Cracks or chips in surface to be made good to avoid trip hazards.

Reinforced concrete kerbs are constructed for areas where stormwater flows away from the kerb.

200mm kerbs are constructed where the carriageway is adjacent the park lands to prevent unauthorised vehicles entering the park lands.

− *(Park lands)*
Footpath

− Carriageway

− 100mm or 140mm Kerb *(200)*

− To match adjacent watertable depth 200mm or 300mm *(300)*

**Note:** Bracketed information refers to the kerb type used for carriageways through the Park Lands. Information shown without brackets is for kerbs used for carriageways through City streets.

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LOCATION OF KERB
Construction:
The Corporation of the City of Adelaide and Contractors

Materials:
Extruded concrete

Finish:
Steel trowel

Maintenance:
Cracks or chips in surface to be made good to avoid trip hazards.

Median barrier kerbs are used throughout the city to contain traffic within the roadway and to provide a safe refuge for pedestrians at the centre of the road.
When space is available, planting can be introduced into the median of a streetscape to beautify the street and break up the wide pavement area of the road.

**MINIMUM MEDIAN WIDTH FOR TREE PLANTING**

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Kerb ramps are constructed at points where pedestrians cross roads, i.e. at intersections and along pedestrian routes.

Kerb ramps must be aligned in the direction of travel across the road with the ramp on the far side. Where the paving abuts the edge of the kerb ramp, the two surfaces must be flush.

Tactiles must be set into the ramp surface to warn pedestrians that the edge of a road has been reached.
NOTES:
1. The ramp and sloping sides should be slip resistant.
2. Kerb ramp should be aligned in the direction of travel across the road and with the kerb ramp on the far side.
3. It is desirable that the kerb ramp and sloping sides be kept free of penetrations (ie service covers). If unavoidable, the covers must be slip resistant.
4. The length of ramp is determined by the ramp gradient (1:8 maximum). Intersecting with the footpath crossfall (existing or proposed) and must lie between the 900mm minimum and 1520mm maximum.
5. Footpaths with high pedestrian traffic width to be determined to suit pedestrian volume.
Kerb ramps are constructed at points where pedestrians cross roads, i.e. at intersections and other major pedestrian routes. This kerb ramp variant is only used in special cases where the kerb and watertable is 100mm high and when service covers do not permit the use of the standard kerb ramp. Kerb ramps must be aligned in the direction of travel across the road with the ramp on the far side. Where the paving abuts the edge of the kerb ramp, the two surfaces must be flush. Introducing this type of kerb ramp creates a low point.

Consideration shall be taken to avoid stormwater ponding at low point with catchpit (existing or new). Tactiles must be set into the footpath surface to warn pedestrians that the edge of a road has been reached.
NOTES:
1 Kerb ramp should be aligned in the direction of travel across the road and with the kerb ramp on the opposite side.
2 This ramp should only be used where obstructions to the ramp cannot be moved or modified.
*Note: must have Corporation approval.

DESIGN INFORMATION FOR CONSTRUCTION DRAWINGS
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Kerb ramps are constructed at points where pedestrians cross roads, i.e. at intersections and along major pedestrian routes.

Kerb ramps must be aligned in the direction of travel across the road with the ramp on the other side. Where the paving abuts the edge of the kerb ramp, the two surfaces must be flush.

Tactiles must be set into the ramp surface to warn pedestrians that the edge of a road has been reached.
NOTES

1. The ramp and sloping sides should be slip resistant.
2. Kerb ramp should be aligned in the direction of travel across the road and with the kerb ramp on the far side.
3. It is desirable that the kerb ramp and sloping sides be kept free of penetrations (ie service covers). If unavoidable, the covers must be slip resistant.

PLAN

Desirable 500mm minimum clearance to next ramp

Landing 1330mm minimum from top of ramp to any obstruction

Tactile Type B indicator
Colour Grey
Refer to AS 1428.4-1992

Realigned kerb & watertable

Direction of travel
see note 2

Traffic signal pedestrian push button

Footpath

Carriageway

SECTION A-A

Change of grade
160° minimum

Sharp transition with no lip at watertable

1:8 Gradient

190mm

1520mm Ramp

1330mm Landing

Sharp transition at meet point with footpath

+1:24 (max)
+1:48 (min)

Proposed footpath level

DESIGN INFORMATION FOR CONSTRUCTION DRAWINGS

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Driveway crossovers are always associated with an entrance, either to a private property or public area.

Driveway crossovers can be built completely new or by modification of an existing kerb and watertable.

* Vehicle access must be checked in accordance with Australian Standards 2890.1-1993 to ensure that vehicles will not scrape the undersides when negotiating them.

**Crossover width**

- Single residence: 2750mm
- All other uses: (to match existing or approved length)
  - 3000mm minimum
  - 7600mm maximum

**Construction:**
The Corporation of the City of Adelaide and Contractors

**Materials:**
Insitu reinforced Concrete or bitumen or paved

**Finish:**
Concrete to be steel trowelled with tooled flagstones

**Maintenance:**
Cracks or chips in surface to be made good to avoid trip hazards.
DRIVEWAY ENTRANCE CLEARANCE

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**Construction:**
The Corporation of the City of Adelaide and Contractors

**Materials:**
Insitu reinforced Concrete, bitumen and concrete tactile pavers. (Tactile type B indicator, AS1428.4 1992)
Colour - Grey

**Finish:**
Concrete to be steel trowelled.
Bitumen to be smooth

**Maintenance:**
Cracks or chips in surface to be made good to avoid trip hazards. Damaged parts to be replaced.

Tactiled crossovers are associated with an entrance, either to a minor public road or car park with high vehicular traffic volumes.
Design Objectives:

- Any drainage and access must be resolved as part of the design.
- Crossover at the back of footpath to accommodate 1:100 surface flow plus 30mm freeboard from all doorways floor level and damp course.
- All drainage across the crossover to be piped underground.
- Concrete margin to match existing kerbing in the minor road or carpark entrance provided it is 900mm from the building line to allow for site distance and pedestrian safety.
- Footpaths less than 2200mm wide, grade cross over full width.
- Tactiles are used for all public road crossovers and high vehicular traffic flow carpark entrances, (to be approved by Corporation staff).
- Surface finish of crossovers to be bitumen unless otherwise approved by the Corporation.

Note:
Vehicle access must be checked in accordance with Australian Standards 2890.1-1993 or appropriate to ensure that a vehicle will not scrape their underside when negotiating the crossover.
Catchpits are constructed at points where stormwater is taken from the road surface to the underground stormwater network system.

Construction:
Catchpits are constructed with cast iron and are always associated with an underground chamber, depths vary.

Materials:
Cast iron frame grate and lintel, supplied by ACC. Insitu reinforced concrete chamber.

Finish:
Frame, grate and lintel - Natural

Maintenance:
Regular clean out chamber. Replace damaged parts.

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DESIGN CRITERIA
Catchpit capacity, separation lengths and spreads of stormwater flows to be approved by Corporation staff.

TYPICAL LOCATION OF CATCHPIT AND CHAMBER

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Catchpits are constructed at points where stormwater is taken from the road surface to the underground stormwater network system.

They are used in areas such as roads and laneways without footpaths where stormwater is directed towards the centre of the road.

Stormwater from roads/laneways must be collected rather than flow over a pedestrian footpath.

**Construction:**
Catchpits are constructed with cast iron grate and frame and are always associated with an underground chamber, depths vary.

**Materials:**
Cast iron frame and grate, supplied by ACC. In situ concrete chamber.

**Finish:**
Frame and grate - Natural

**Maintenance:**
Regularly clean out chamber. Replace damaged parts.
*DESIGN CRITERIA*

The location of the catchpit is determined by the following conditions:

- Back of footpath to accommodate 1:100 surface flow plus 30mm minimum free board from all doorways floor level and damp course.
- Achieve as close as possible a straight grade between the adjacent properties along the back of footpath.

**TYPICAL LOCATION OF CATCHPIT INVERT DRAIN**
Case 1:
200mm thick invert drains are constructed when the carriageway is used by minor traffic.

Case 2:
300mm thick invert drains are constructed when the carriageway is used by industrial/heavy traffic.

Construction:
The Corporation of the City of Adelaide and Contractors

Materials:
Insitu reinforced Brighton Lite concrete or equivalent.
Note: to be used when full length of drain is constructed.

Finish:
Steel trowel

Maintenance:
Cracks or chips in surface to be made good to avoid trip hazards.

Reinforced concrete invert drains are constructed at carriageways where stormwater is directed towards the centre of the road where the catchpit invert drain is located.
INVERT DRAIN SELECTION IN RELATION TO STREET TYPE

<table>
<thead>
<tr>
<th>Street Type</th>
<th>Low traffic flows</th>
<th>Industrial/heavy vehicle traffic flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watertable Thickness</td>
<td>200</td>
<td>300</td>
</tr>
</tbody>
</table>

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INVERT WATERTABLE TYPES
Checker plate drain allows the discharge of stormwater from private property to the kerb and watertable without disturbance to pedestrians.

Checker plate drains are installed perpendicular to the street property boundary and a minimum of one metre clear of any crossing place.

**Manufacturer:**
Steel fabricator

**Construction:**
The Corporation of the City of Adelaide or Contractors

**Material:**
Steelplate and checker plate steel

**Finish:**
Galvanised

**Maintenance:**
Regular inspections to avoid trip hazard to pedestrians. Replace when damaged.

**Case 1:**
Checker plate

**Case 2:**
Use L-Shaped Checker plate drain to avoid service covers, posts and driveways. It must be in the footpath within the property boundary alignment draining that property.
**PROPERTY CONNECTION - CHECKER PLATE DRAIN**

**TYPE 1**

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Checker plate drain allows the discharge of stormwater from private property structure such as a verandah to the kerb and watertable without disturbance to pedestrians.

Checker plate drains are installed perpendicular to the street property boundary.
ENLARGEMENT 'A'

PROPERTY CONNECTION
CHECKER PLATE DRAIN TYPE 2
Top of kerb start of hydraulic grade line

200 min cover for the length of RCP

250 Sq pipe

Reinforced concrete pipe, minimum size 150 diameter. **UPVC AND OTHER MATERIALS NOT PERMITTED**

Outlet pipe invert must be equal to sump invert level

Possible existing wet sump type catchpit

**SECTION**

**Construction:**
The Corporation of the City of Adelaide or Contractors

**Material:**
Reinforced concrete pipe, insitu concrete or brick sump.
Checker plate steel

**Finish:**
Existing paving surface to be reinstated.

**Maintenance:**
Regular cleaning. Replace when damaged.

Underground stormwater pipe connection allows the discharge of stormwater from private property to the Corporation’s catchpit and underground stormwater system.
Underground connections are to be used where discharge flows are in excess of 15 Litres/second based on a recurrence interval of 20 years.

The invert level of the proposed pipe connection at the Corporation’s existing catchpit must be above the invert level of the catchpit outlet pipe. (Note: Some of the Corporation’s catchpits are wet pits, that is the invert level of the outlet pipe is above the invert level of the pit).

The pipework external to the property boundary shall be reinforced concrete, laid perpendicular to the boundary and incorporate a dry sump in the footpath adjacent the property boundary.

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Case 1:
Pipe to be connected into top half of the stormwater pipe and flush with internal wall.

Case 2:
Install Junction Chamber if the diameter of the proposed connection pipe is equal to or greater than half the diameter of the Corporation's stormwater pipe.

**Construction:**
The Corporation of the City of Adelaide or Contractors

**Material:**
Reinforced concrete pipe, insitu concrete or brick.
Checker plate steel

**Finish:**
Existing paving surface to be reinstated.

**Maintenance:**
Regular cleaning.
Replace when damaged.

Underground stormwater pipe connection allows the discharge of stormwater from private property to the Corporation's underground stormwater system.

Reinforced concrete pipe, minimum size 150 diameter. UPVC AND OTHER MATERIALS NOT PERMITTED.
Underground connections are to be used where discharge flows are in excess of 15 Litres/second based on a recurrence interval of 20 years.

The pipework external to the property boundary shall be reinforced concrete, laid perpendicular to the boundary and incorporate a dry sump in the footpath adjacent the property boundary.

**SUMP DETAIL AND STORMWATER DRAINAGE DESIGN NOTES**