

# City of Ryde

## GUIDE FOR STORMWATER DRAINAGE FROM LOW LEVEL PROPERTIES



## General

### The problem at hand:

Traditionally much of the City of Ryde has consisted of small (generally 2-3 bedroom) houses built on large blocks of land (typically 750 m<sup>2</sup>). At present this area is undergoing much change as a result of property development. This is largely a result of increased property values and members of the community seeking a different type of housing to that already constructed in the area. Most recent applications for single new dwellings have been for much larger houses (5-6 bedrooms, large garages, recreational areas, paved courtyards and large driveways).

These new dwellings and their associated structures have a significantly greater amount of roofs and other hard surfaces. These surfaces result in a far greater rate of stormwater runoff and greatly reduces opportunities for interception storage (trees, rockpools and grass) and natural infiltration. There are four further issues compounding this problem:

1. A significant number of Development Applications received by Council for these dwellings are on lowside properties. Up until now most houses built on these properties have either had direct access to a drainage easement, or have drained to a rubble pit, or to a dispersion trench. These dispersion structures have often proved ineffective, with pits being placed in clay (highly impermeable) or cut into solid rock in order to meet Council's drainage requirements, or are under the required size to disperse the expected loading. This means that stormwater fills the trench and then surcharges, flowing overland through downstream properties. As houses and related hardened areas have become larger, increasing the amount of runoff and decreasing the amount of landscaped area, these systems have become increasingly ineffective.
2. Many of these newer houses are situated such that there is only a metre between the house and the side boundaries, leaving only 2 metres for sheet flow to pass between the dwellings. This results in increased depth and velocity of sheet flows, further increasing scour, erosion, and nuisance flooding.
3. The construction of large "slab-on-ground" houses on sloping land generally involves significant cutting and filling of land and the construction of retaining walls. Cutting into the ground often creates problems with the interception of groundwater, which then has to be dealt with. This groundwater often contains high contaminant loading due to the presence of dispersive soils that are predominant in the Ryde area. This type of polluted water is difficult to treat (normal filtering is not effective) and is a hazard to aquatic life.

Thus the development of properties on the low side of the street that do not have the benefit of a drainage easement is very limited due to the potential impact of the stormwater runoff from the increase in the impervious area on adjoining properties.

There are several options for property owners in this situation however Council will generally not approve stormwater systems which drain against the natural grade of the land.

**The first course a property owner wishing to undertake any redevelopment of their property must take is to approach the adjoining down-slope owners to request that an easement be granted for the purpose of draining stormwater to Council's drainage system. See sample letter on page 12**

Where a drainage easement is refused and this must be documented by means of a signed letter other alternatives may then be explored.

# 1 Alternative Drainage Systems

The following details are extracts from the City of Ryde Development Control Plan 2010 Part 8.2. Please refer to this document for full details.

## 1.1 On-site Absorption Systems

Single dwelling-houses and duplexes on properties that cannot pipe runoff to the street or do not have access to a suitable interallotment or Council drainage pipeline, may under certain conditions be permitted to discharge stormwater runoff into an on-site absorption system. It is to be noted that this is the least preferred allowable option for stormwater disposal for the following reasons:

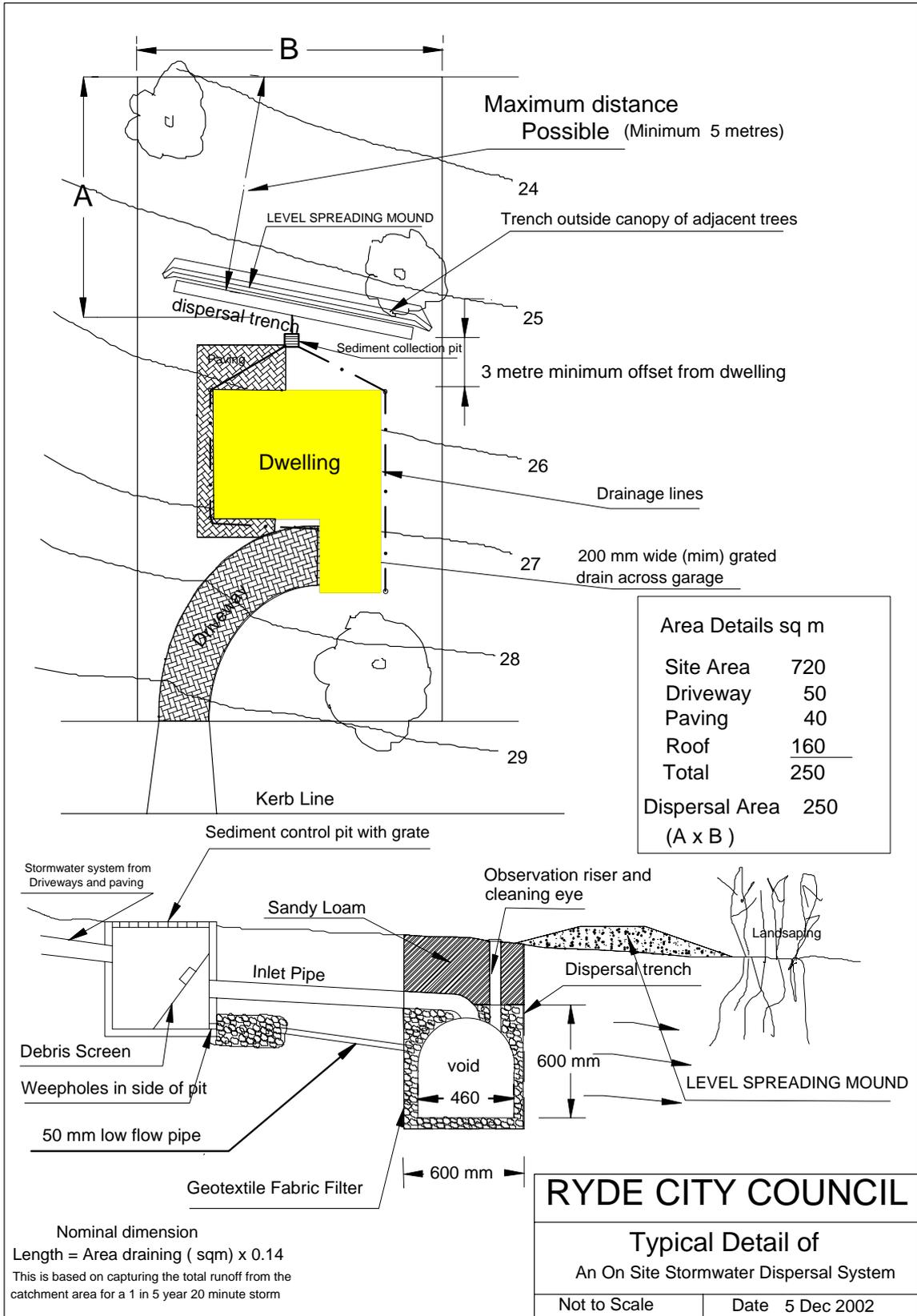
- It severely restricts any opportunity to further develop the site without redesigning and reconstructing the system
- It generally involves substantial earthworks
- It is difficult to predict changes to the water-table resulting from the installation of such systems
- Infiltration systems generally require maintenance if they are to continue to work effectively
- Often there is a high capital cost of installation.

If it is proposed to use on-site stormwater absorption then the following requirements must be complied with:

- The property must not be located within any areas identified by Council as containing soil types that are predominantly not conducive to the dispersion of stormwater, likely to induce landslip or have an identified salinity problem. The applicant should liaise with Council as to whether their property is so affected before further proceeding with any detailed drainage design.
- Evidence must be supplied by the applicant that all relevant downstream property owners have been approached and are unwilling to grant a private drainage easement that will allow the piping of stormwater to a Council street or suitable pipeline.
- **The total plan area of all impervious areas such as roofs, driveways, paths and paved courtyards on the property do not exceed 35% of the total site area and there is an area downslope of the dwelling at least equal to the impervious area draining to it in which to construct the absorption trench.**

NOTE this applies to the site cover for existing lots only. New land subdivisions will not be permitted to dispose to absorption systems.

- The site cover may be increased where an extension to an existing dwelling is proposed to have a site cover between 35% and 40% if a rainwater tank is installed as follows:  
The storage tank must have the capacity to store at least 200 litres for every 1 m<sup>2</sup> of impervious area in excess of the 35% site cover allowance. The tank must be connected to an internal reuse system to ensure that the water level in the tank is drawn down on a regular basis. The area for dispersal must still be equal to or greater than 35% of the site area.
- The extent of driveways and other paving is to be kept to a minimum.
- A design and supporting calculations, prepared by a suitably qualified and experienced engineer, of a stormwater management system that will handle runoff from any storm up to the 100-year Average Return Interval events must be supplied by the applicant in conjunction with the development application. This is to include any necessary geotechnical information required to support the design, an assessment of the infiltration of the soil profile, consideration of antecedent moisture conditions and performance over a variety of rainfall events. The design is to be accompanied with a report by a geotechnical engineer attesting to the absorption capacity of the system and demonstrating that the proposal will not have an adverse impact upon adjoining and/or downstream properties by the direction or concentration of stormwater on those properties.
- Any on-site absorption structures are to be located as far as practicable from the downstream property boundaries (minimum 5.0 metres) and a minimum of 3.0 metres from buildings. If the system is being constructed in conjunction with any new structure (including residential dwellings), the foundations of the structure are to consist of pier and beam, and the piers are to be to a solid stratum. The system should not be placed under any paved surfaces and must be at least 1.0 metres from pavements subject to vehicular traffic.
- A debris/silt collection pit shall be constructed immediately upstream of the underground system, a capped observation riser installed over the underground system and the area downstream is to be landscaped in a manner that will ensure a reduction of sub-soil flows into the adjoining property.
- When an on-site stormwater management system has been approved, no further development will be permitted on the site without a further stormwater management study demonstrating that the system is able to handle the additional runoff. A positive covenant is to be placed on the Property Title to ensure that the system is adequately maintained according to the approved maintenance schedule. A Restriction as to User is to be placed on the Property Title to ensure that no additional impervious areas are created on the property. The authority to vary the Restriction is to be Ryde City Council.



## **1.2 New Minor Structures**

### **(including Sheds and Swimming Pools)**

When constructing structures in the rear yards of existing dwellings that already discharge runoff into an on-site absorption system the applicant must demonstrate one of the following:

The structure will not have an adverse impact upon the operation of the absorption system; or

- The modifications to the existing system required to ensure there are no adverse stormwater impacts upon adjacent or downstream properties.

This will generally require a report prepared by a suitably qualified and experienced engineer, of the existing stormwater management system and its capacity to handle the total (existing and proposed development) runoff from any storm up to the 100-year Average Return Interval events. This is to include any necessary geotechnical information required to support the design, an assessment of the infiltration of the soil profile, consideration of antecedent moisture conditions and performance over a variety of rainfall events. The design is to be accompanied with a report by a geotechnical engineer attesting to the absorption capacity of the system and demonstrating that the proposal will not have an adverse impact upon adjoining and/or downstream properties by the direction or concentration of stormwater on those properties

In some instances it may not be possible to modify the existing system due to soil conditions, amount of runoff etc. In these instances no development approval is to be granted until it can be demonstrated that a suitable interallotment easement will be granted by the downstream owners.

The location of the existing dispersion trench/system must be shown on the drainage plan to be submitted in conjunction with the application for Construction Certificate.

If there is no point of connection to Council's drainage system shown on the concept drainage plan, then it will be assumed that any existing house lower than the adjacent public road drains to an on-site stormwater dispersion system.

## **1.3 Use of Pumps**

Pumps may only be used to drain seepage and a minor amount of direct runoff from a basement car parking area. The area directing runoff to the pumped system shall not be greater than 10% of the total basement area.

Wet wells shall be designed and constructed in accordance with section 7.3 of AS 3500.3.

The pumps shall be dual submersible pumps and shall be sized and constructed in accordance with section 7.4 of AS 3500.3.

Direct connection of a pump's rising main directly to the kerb will not be permitted. Where connection to the kerb is proposed, the pumped water must be treated prior to discharge to remove any pollutants before piped across the public footway by gravity flow.

## **1.4 Use of Charged Lines**

Charged lines will be permitted under some circumstances for single occupancy residential developments only and will be subject to the following criteria:

- Only permitted for single occupancy residential developments where an application is made to Council. i.e. they are not accepted for "Complying Developments"
- Documentary evidence must be submitted with the application indicating that an easement cannot be obtained at a reasonable cost from the downstream property owner(s)
- Will only be permitted if there are no drainage problems downstream in the catchment where the drainage is being directed.
- A full hydraulic analysis of the system including a hydraulic grade line and calculations must be submitted with the application.
- All gutters and pipes in the system must be designed for a 1 in 100 year ARI storm event.
- There must be a minimum difference in height between the roof gutter and the discharge pit at the property boundary of 1.8 metres.
- There must be a gravity flow across the footpath from an isolating pit within the property.
- All services within the footpath must be located prior to submitting the plans and all details must be shown on the plans
- All pipes must be a minimum of 100 mm with all joints must be solvent welded.
- A cleaning eye must be provided at the low point in the system within a pit that can be drained to an on site dispersal system.
- Gutter guards must be installed on all gutters to minimise debris entering the system.
- **Normal On-site Stormwater Detention requirements will still apply.**

- Full details of the system must be submitted with the Development Application.
- A Positive Covenant will be required to be placed on the title of the property to inform owners of their responsibility in maintaining the system. See City of Ryde Development Control Plan 2010, Section 8.4, Title Encumbrances for details

## **1.5 Piping Against the Natural Grade**

The drainage layout should, where possible, follow the natural fall of the land. Council will only approve systems that drain against the natural grade of the land where:

- Council has assessed that the receiving drainage system can accept the additional runoff from the new catchment area without having an adverse impact upon downstream property and/or public infrastructure (this will generally require a drainage study by a suitably qualified engineer to be submitted in conjunction with the application); and
- Downstream property owners have indicated their unwillingness to grant easements that would permit the property drainage system to follow the natural fall of the land.
- The roof gutters, downpipes and drainage system must be designed to cater for a 1 in 100 year ARI storm event.

## **2 Application under Section 88K**

If the proposed redevelopment cannot comply with any of the preceding drainage options an application under Section 88K of the *Conveyancing Act 1919* may be the only option. This may permit the Court to make an order imposing an easement over land if the easement is reasonably necessary for the effective use or development of other land that will have the benefit of the easement.

There are a number of criteria outlined in the Act that must first be satisfied.

1. That the easement is reasonably necessary for the effective use or development of the land that will have the benefit of the easement.
2. That the use of the land in accordance with the easement is not inconsistent with the public interest.
3. That the owner burdened by the easement can be adequately compensated for any loss or disadvantage as a consequence of the easement.
4. That all reasonable attempts have been made to obtain the easement otherwise than by approaching the court.

### 3 Developments Adjacent to Bushland or Undeveloped Public Reserves

On site absorption systems may be used to distribute stormwater runoff from properties that adjoin bushland where no connection is available to a drainage system. In these cases the absorption trench may be constructed no closer than 2 metres from the boundary adjoining the bushland and run parallel with the contours.

## 4 Creation of Drainage Easements

### 4.1 Rights and Obligations

Common law obligations require that nothing be done on one property that would cause nuisance on another. Changing the natural pattern of stormwater runoff by increasing the amount or rate of runoff, or redirecting the runoff, has the potential to create this nuisance. Practically all property improvements will affect stormwater runoff to some extent and therefore provision must be made to ensure these site modifications do not adversely affect surrounding properties.

Minimum standards regarding the treatment of stormwater runoff from properties improvements are outlined elsewhere in this document

Where it is necessary to convey collected stormwater runoff from one lot through another, an easement must exist on the downstream lot that confers rights to the upstream lot to drain water through it.

The standard easement used for this purpose is an ***Easement for drainage of water***. The rights and obligations associated with an easement of this type are outlined below.

- 1 The body having the benefit of this easement may:
  - (a) drain water from any natural source through each lot burdened, but only within the site of this easement,
  - (b) do anything reasonably necessary for that purpose, including:
    - entering the lot burdened, and
    - taking anything on to the lot burdened, and
    - using any existing line of pipes, and
    - carrying out work, such as constructing, placing, repairing or maintaining pipes, channels, ditches and equipment.

- 2 In exercising those powers, the body having the benefit of this easement must:
- (a) ensure all work is done properly, and
  - (b) cause as little inconvenience as is practicable to the owner and any occupier of the lot burdened,
  - (c) cause as little damage as is practicable to the lot burdened and any improvement on it, and
  - (d) restore the lot burdened as nearly as is practicable to its former condition, and
  - (e) make good any collateral damage.

Interallotment drainage easements should be described as an ***Easement for drainage of water***. Describing an easement in this way on the instrument has the same affect as inserting the words given above.

Interallotment drainage easements shall benefit individual lots only and not list Council as a beneficiary.

Where an interallotment drainage easement must be created to facilitate a development, it is the responsibility of the applicant to negotiate with affected property owners to secure an easement.

Property owners are under no legal obligation to burden their lots with an easement for interallotment drainage unless they have been required to do so by the Supreme Court exercising the powers available to it under section 88K of the *Conveyancing Act 1919*, as amended, or required to do so by way of a condition of development consent. See Section 2

Where an easement is required to allow suitable disposal of collected stormwater runoff from the property, a letter of agreement from the affected property owner(s) shall support the Local Development Application to demonstrate to Council that a suitable easement can be obtained. The Construction Certificate cannot be issued until the easement has been prepared by a registered surveyor and has been lodged with the Land Titles Office for registration.

## **4.2 Design of the Drainage System**

The design of the drainage system within the easement shall be such that the total runoff from the site for a 1 in 20 year ARI storm event can be contained within the pipe and the additional flow from up to a 1 in 100 year ARI storm event can flow overland generally within the easement. If no overland flow path is available, the pipeline shall be designed to carry the full 1 in 100 year event and sufficient inlet capacity shall be provide to capture this flow.

### 4.3 Width of Drainage Easements

Width of interallotment easements should be as according to the following table:

Nominal Pipe Diameter	Easement Width
150 mm up to 300 mm 375 mm to 900 mm >900 mm	1.0 metre 1.2 metres 2.5 metres Width required for maintenance, but not less than width of conduit + 1 metre and not less than 2.5 metres.

### 4.4 Using an Existing Private Drainage Easement

Where it is proposed to discharge collected runoff to an existing pipeline that passes through an adjoining lot or to lay a new pipe within an existing easement interallotment drainage easement, the applicant shall submit to Council information from the Land Titles Office to indicate the subject property enjoys rights to use the interallotment drainage system.

Where an existing pipeline is to be used the applicant must submit a hydraulic analysis of the system to indicate that the pipeline is capable of accepting the additional flow. If the pipeline is undercapacity, a design for the upgrading of the system must be submitted.

This information must be received before Council will issue a Local Development Consent on the lot

