Operations and Maintenance
Stormwater Drainage Requirements – Guideline

Revision	Date	Approved By	Date Approved
1	30/10/15	Leon Berry	6/11/2015

Maribyrnong
CITY COUNCIL

www.maribyrnong.vic.gov.au

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1.0 Stormwater Drainage Requirements

1.1 Introduction

This Guideline is to be read in conjunction with the Council's Legal Point of Discharge Guideline and Build Over Easement Guideline. When a Legal Point of Stormwater Discharge Permit (Permit) is issued by the Council's Drainage Engineer, the Permit may contain specific conditions and/or requirements from Council, Melbourne Water and/or Vicroads that need to be included in the drainage design criteria. Such conditions and/or requirements will be confirmed during the stormwater drainage plan assessment in accordance with the specified requirements set out in the Permit.

All applications for drainage design assessments shall be submitted with a Drainage Plan Approval Application Form at the Council Offices for processing. The application will be accepted for processing when the application fee is paid. Detailed drainage plans must be approved by Council prior to the commencement of any drainage construction work, **except where specified in the Legal Point of Stormwater Discharge (LPD) Permit.**

The Council's process of approving an applicant's Drainage Design just confirms and verifies that the design is acceptable to Council at time of submission. Validating the outcome of the approved design will be necessary and must be in the form of a Compliance Statement from an appropriately experienced Civil Engineer with current qualifications recognised by Engineers Australia, accompanied by As Constructed Drawings and computations.

The applicant is held totally responsible for the delivery of the final Compliance Statement and As Constructed Drawings to the Council's Drainage Engineer. Failure to submit these documents may result in a final audit/inspection of the constructed drain(s) by the Drainage Engineer at a cost to the applicant.

A Road Opening Permit and/or Street Protection Permit are required for all works carried out within the road reserve. Inspections by our Reinstatement Officers will be conducted at the commencement and end of the works as required.

Our overall objective is to control the manner in which proposed developments discharge their stormwater runoff to the assigned legal point of discharge and to minimise uncontrolled surface flows which may result in adverse effects to downstream properties and existing infrastructure.

1.2 General Drainage Design Requirements

Drainage design shall be in accordance with relevant Standards, Regulations and Council policies, including:

- Australian Rainfall and Runoff (AR&R),
- Australian Standard AS 3500.3.2,
- Maribyrnong City Council Drainage Design Guidelines,
- Maribyrnong City Council Drainage Design Standards,
- Maribyrnong City Council Standard Drawings.

Stormwater drainage systems shall be designed to achieve the following outcomes:

- Minimise the inundation of private and public land and ensure that surface flow paths, where possible and practical, convey floodwaters within suitable velocity/depth limits;

- Minimise inconvenience to traffic and pedestrians as a result of storm events by applying control measures to flow where possible.
- Maximise incident rainfall retention within each catchment /sub catchment.
- Consider all ultimate upstream and downstream characteristics to achieve a total system which does not adversely affect existing systems or properties within the stream flow path and catchment.
- Minimise the impacts of erosion and sediment on the environment.
- Minimise maintenance requirements and enhance the urban landscape.
- Employ principles of Water Sensitive Urban Design.

Engineering drainage design plans and calculations prepared by a suitably qualified Civil Engineer shall be submitted to and assessed by Council if specifically required through a Legal Point of Discharge application, Planning Permit Conditions or otherwise. The Council's Drainage Engineer will assess drainage designs under the following circumstances:

- Internal drainage systems where an On-Site Detention, Pump or Pressurised System is required or where Council deems a development may pose a flood risk to an adjoining property,
- Where a development's Legal Point of Discharge Permit or Planning Permit Conditions requires the construction of a new Council asset,
- Where the fall of the land is to the rear of the property and a connection is sought to use an existing easement drain or Council pit within a Right of Way or Council reserve. These applications will need to have first considered all other available options. Approval in these situations is at the discretion of the Operations and Maintenance Manager.

The permissible site discharge (PSD) from a development shall be calculated for a 1 in 5 year ARI storm and is to be based on the site area, the impervious fraction of the site and sub catchment characteristics.

The stormwater runoff from the site is not to exceed the predevelopment flows at all points down stream of the site for a 1 in 5 year ARI.

For all developments, the applicant/developer shall make provision for overland flows through the subject site in the event of a blockage of the piped system or a storm exceeding the capacity of the piped system. The overland flow path is to be designed such that storm flows in excess of 1 in 10 years intensity can discharge from the site without causing property damage and/or soil erosion.

Stormwater surcharge across private property will only be allowed if the overland flow path is designed for the 100 year ARI flows and with a 50% blockage factor applied for pit entry capacities. The overland flow path should be located over or adjacent to the piped system.

Any floor levels within the property adjacent to an overland flow path are to be a minimum of 300mm above the highest calculated water level for a 1 in 100 year ARI design flow.

The use of permeable materials which partly mitigate the environmental impact of conventional impervious concrete or asphalt surfaces is to be considered and supported.

Requirements such as use of litter traps may be imposed in some developments, where deemed appropriate.
A Road Opening Permit shall be obtained prior to any drainage work commencing in road reservations in accordance with the Road Management Act, Regulations and Codes of Practices.

Council must be notified at least 48 hours prior to any drainage work commencing (phone Council's Drainage Engineer on 9032 4003 or 9032 4001).

Council's standard drawings shall be adopted unless specific approval is given otherwise. Details of our standard drawings are located in our website http://www.maribyrnong.vic.gov.au/standard drawings.

1.2.1 Residential Developments

Where the ***fall of the land is to the front*** of the allotment, the stormwater shall discharge into the Council barrel drain/drainage pit within the road reserve. Where a barrel drain/drainage pit does not extend past the frontage of the allotment, it is to discharge to the kerb and channel via Council's approved kerb adapter.

The minimum requirements include:

- The development is to have one outlet to the kerb and channel or barrel drain/drainage pit;
- Where two dwellings are proposed on separate titles, with individual street frontages (i.e. no common property), each of these dwellings are to discharge to the kerb and channel or barrel drain/drainage pit via individual outlets;
- Minimum size of a stormwater drainage outlet for a single dwelling is to be no less than 100mm diameter pipe;
- Minimum size of a common stormwater drainage pipe from a two-dwelling or multi-unit development is to be no less than 150mm diameter.
- Upgrade of existing drainage and/or On Site Detention (OSD) may be a condition of any permit. Up to 60m of outfall drainage may be required where no Council drain exists;
- Minimum size of a stormwater drainage pipe within a road reserve or right-of way is to be 300 mm diameter,
- If a new drain is to be constructed and adjoining property owners will be affected by the works, seven days written notification shall be provided by the developer to those affected. A copy of the notification letter shall be submitted to Council's Drainage Engineer prior to commencement of any works.
- House drains shall be located a minimum of six metres from the side boundary of a property to allow for construction of or alterations to vehicle crossings,
- A vehicle crossing shall be a minimum of one metre from drain pits and at least two metres from a pram crossing.

1.2.2 Commercial or Industrial Developments

Where the ***fall of the land is to the front*** of the allotment, the storm water shall discharge into the Council barrel drain/drainage pit within the road reserve. Where a barrel drain/drainage pit is situated within the frontage of the development and the capacity of the barrel drain within that catchment *is* less than Council's adopted standard of an ARI of 1 in 10, the development may discharge directly to the barrel drain/drainage pit.

Permission to discharge directly to the barrel drain/drainage pit is at the discretion of Council's Drainage Engineer and will be included in the issue of the Legal Point of Discharge Permit.

Where there are no existing council drains/drainage pits extending along the frontage of the development, the developer is to discharge to an existing council drain/drainage pit via the construction of a drain within the road reserve.

The size of a stormwater drainage outlet for commercial and industrial developments shall be determined by computations provided by the developer's registered civil engineering consultant and will depend on the size of the development.

1.2.3 On Site Detention System

All new single property developments requiring planning approval in residential zones which have an impervious fraction after development of 40% will be required to implement a stormwater management system for the site in the form of an On Site Detention System (OSD).

The purpose of an On Site Detention System is to limit the rate of stormwater discharge from the property to pre-development typical levels

Where a barrel drain extends past the frontage of the development, the developer may discharge to the barrel drain via the OSD.

Where a barrel drain does not extend past the frontage of the development, the developer may be required to discharge via an OSD to the nearest Council barrel drain/drainage pit via the construction of a drain within the road reserve.

Should the levels of the development site prevent discharge via gravity with an OSD, the developer may be required to construct a drain within the road reserve to the nearest Council drain.

Where outfall drainage is required in the road reserve or right-of-way, all new pits and pipes shall be designed for runoff from upstream catchments.

Where an existing dwelling is to remain, it must be connected to the OSD system.

Note that above ground OSD's will only be considered where the site has minimal grade.

Developers are encouraged to discuss the physical parameters prior to final design with the Council's Drainage Engineer on 9032 4003 or 9032 4001 so that the values specified in the MCC – Drainage System – Catchment Plans and Reports are confirmed.

1.2.4 Exceptions from Councils Stormwater Management System Requirements

The following exceptions are identified namely:

- Developments where the impervious area after development will be smaller and or equal to the fraction with existing conditions;

1.2.5 Pressurised System

kerb and channel or council barrel drain/drainage pit within the road reserve.

A rainwater tank is recommended in conjunction with the pressurised system, provided that the overflow from the tank is connected to an approved point of discharge.

Surface grates are not to be used in conjunction with a Pressurised System.

1.3 Council's Specific Requirements

Maribyrnong City Council drainage standards and requirements ensure that the quality of work carried out by developers does not leave a future financial obligation on our ratepayers.

Where the existing dwelling is to be retained as part of the unit development, the applicant/developer shall determine and indicate on the plan the location of the existing house drain and discharge point of the existing internal stormwater drainage system.

Where existing drainage easements are shown on the title, the applicant/developer shall indicate on plan the exact location of any available assets within the easement. This information is to be accompanied by pit/inspection opening locations, size of pipe with depths and offset.

All existing street features are to be accurately shown including driveways, pavements, drainage pits, electricity poles, Telstra pits, sewerage manholes, trees, etc.

All known Service Authority assets are to be shown on the plans from information obtained from a routine Dial Before You Dig or direct Service Authority enquiry. Where proposed drainage crosses or is likely to clash with an underground main or service, the developer shall provide evidence of the actual location and depth of the service on the plans and amend the design if necessary to avoid costly alterations.

Junction pit covers shall be as indicated on Council's standard drawings. Minimum Class 'C' medium-duty (e.g. 'gatic') covers are required unless otherwise noted. Class 'D' heavy-duty covers are required in roads with heavy vehicle loading.

Junction or side entry pit grates shall be of an approved 'bike safe' type pattern with load class specified as for junction pit covers.

No connections direct to a Council drain shall be permitted without the use of an appropriate connector as indicated MCC SD-D1. Council may consider a Flo-con "Conconect TM" connection flange as an alternative. All direct connections must be validated by the applicant's consultant or by inspection prior to backfilling by Council's Drainage Engineer (Phone (03) 9032 4003 or (03) 9032 4001 with at least 48 hours' notice).

Drainage trenches must be wide enough to achieve compaction of backfill material at the sides and over the pipe. In most cases, 200mm of trench width will be required either side of the pipe. If narrower trenches are adopted, the contractor will be required to prove that adequate compaction is achieved. All drainage pipes must be bedded on 75mm compacted depth 20mm Class 2 FCR.

Backfill material for drainage trenches under pavements or within 600mm of a kerb must be 20mm Class 2 FCR (wet-mix), compacted to 98% modified dry density.

Any proposed excavation beneath the canopy of a street tree must be in accordance with Council's Street Tree Policies and Protocols. For further information, contact Council's Senior Coordinator — Parks & Gardens on (03) 9032 4005.

Any assets within the road reservation affected by the works must be reinstated to Council's satisfaction, and at the contractor's cost.

Pipes within a drainage easement are to be no less than 150mm diameter in size.

Pipes within the road reserve or right-of-way are to be no less than 300mm diameter in size except where there is no provision for the collection of surface runoff via connection to side entry or grated inlet pits. In those cases, the minimum pipe size can be 225mm diameter.

The pipe material to be used shall be rubber ring jointed RCP or FRC.

In certain cases such as non-trafficable areas and easements, UPVC pipes may be considered.

The adjoining property owners who will be affected by the works are to be given 7 days written notification of the proposed works. A copy of the notification letter is to be submitted to Council prior to the commencement of works (see also construction requirements for easement drain).

A licence surveyor is to be engaged to verify that the alignment and level of the constructed drain has been constructed in accordance with approved development plans.

Council will not consent to more than three dwellings on an allotment discharging via a dual pump system. As far as is practical, discharge via gravity to an existing Council drainage asset must be achieved. All proposed dual pump systems are to be in accordance with AS3500.3.2 Section 9.

Where dual pump systems are installed due to a lack of infrastructure, the owner/s may still be required to contribute in any future Special Charge Scheme for the provision of drainage in the area.

1.3.1 Easement Drains

Some properties in Maribyrnong's older localities (Braybrook and Maidstone) contain easement drains. These are usually located within the rear or side boundary. Due to the difficulty of gaining access and maintaining easement drains, **new connections to these drains are generally not permitted unless approval is granted by the Manager Operations and Maintenance.**

Where a barrel drain/drainage pit is situated within an easement of the allotment or adjoining allotment and the capacity of the barrel drain within that catchment does not exceed Council's adopted standard of an ARI 1 in 10 (Commercial and Industrial) or ARI 1 in 5 (residential), the developer shall discharge directly to the barrel drain/drainage pit **if approval is granted by the Manager Operations and Maintenance.**

Where an easement drain is damaged due to works associated with the construction of the structure over the easement, Council's assets are to be reinstated by the developer to the satisfaction of Council's Reinstatement Officer at no cost to Council.

Where outfall drainage is required for any development, this may include the construction or upgrading of easement drainage through neighbouring properties. The developer must comply with all relevant conditions relating to permits, notices, Council and industry construction standards and Council inspections.

The pipe material to be used shall be rubber ring jointed RCP or FRC or UPVC.

The developer must obtain and submit to Council's Drainage Engineer evidence of written consent from affected property owners to enter their premises for the purpose of carrying out any works and of their satisfaction as to the proper reinstatement of the works areas in those properties.

1.3.2 Existing Site Condition

Where a Council drain is specified as the Legal Point of Discharge, it must be shown on the plans along with the actual location and invert level of the drain at the proposed point of connection.
In critical locations, a hydraulic grade line analysis may need to be undertaken to evaluate existing stormwater drainage controlled or maintained by Council within the road reserve or property to determine design levels of new pipes and pits.

Where the existing dwelling is to be retained as part of the unit development, the applicant/developer shall determine and indicate on the plan the location of the existing house drain and discharge point of the existing internal stormwater drainage system.

Where existing drainage and sewerage easements are shown on the title, the applicant/developer shall indicate on plan the exact location of any available assets within the easement. This information is to be accompanied by pit/inspection opening locations, size of pipe with depths and offset.

All existing street features are to be accurately shown including driveways, pavements, drainage pits, electricity poles, Telstra pits, sewerage manholes, trees etc.

All known Service Authority assets are to be shown on the plans from information obtained from a routine Dial Before You Dig or direct Service Authority enquiry.

1.4 Design Criteria

Property and outfall drainage shall be designed in accordance with Council's Drainage Design Guidelines and Drainage Design Standards available from Council's website.

1.4.1 Average Recurrence Intervals

In residential areas the drainage system shall be designed for a 5 year Average Recurrence Interval (ARI) or greater unless agreed otherwise.

In commercial and industrial areas the drainage system shall be designed for a 10 year ARI at least unless agreed otherwise.

For a main drain where the surcharge would seriously affect private property, the drainage system shall be designed for a 10 year ARI unless agreed otherwise.

For major commercial areas e.g. Defence Site, the drainage system and its outfall shall be designed for a 25 year ARI unless agreed otherwise.

1.4.2 Minimum Time of Concentration

Minimum times of concentration:

Commercial – 5 minutes
Residential - 7 minutes
Low density - 9 minutes

1.4.3 On Site Detention

Applicants/developers are to provide on-site detention systems where required in order to restrict the rates of flow from new developments to pre-development levels. This is the Permissible Site Discharge (PSD) and is based on a weighted coefficient of runoff (C) or to a figure acceptable to Council that will preserve the capacity of existing drainage infrastructure.

There should be no net increase in storm water runoff as a result of any redevelopment. Pre development discharge rate = post development discharge rate.

Design Criteria

Pre-development:

Average Recurrence Interval (ARI)	5 years
Coefficient of runoff (C)	0.4
Time of Concentration (tso)	6 minutes,
Time of Concentration (tc)	10 minutes

Post-development:

Average Recurrence Interval (ARI)	5 years
Coefficient of runoff (C)	0.75 (minimum)

Note: For post-development conditions, the coefficient of runoff shall be taken as the greater of the weighted value based on the total anticipated impervious area or C = 0.75.

Storage Volume

Storage Volume shall be calculated by considering the anticipated inflow and allowable outflow hydrographs applicable to the development site to be sufficient for a 10 year ARI.

For any stormwater detention system a suitable overflow arrangement must be provided to cater for higher intensity storms or in the event of an orifice blockage. The overflow facility should be designed to pass the runoff generated by a 20-year average recurrence interval storm for the particular development.

Flow Control Outlet

The flow control outlet is to be located between the storage system and the nominated Legal Point of Discharge.

The flow control outlet should be designed to minimise the risk of blockages. Orifice outlets must not be less than 40mm diameter and be fitted with an appropriate litter screen.

1.5 Minimum Information Required in the Drawings

Construction drawings, together with a set of drainage computations in accordance with the above design criteria, are to be submitted to Council for approval prior to commencement of any construction works.

Plans for detention systems shall include the following information as a minimum:

- Invert levels for all drains within the development site and outfall drainage external to the site.
- Design surface levels adjacent to the device.

- Floor levels of all buildings both existing and proposed.
- Cross section details of the detention device.
- Existing surface levels of the development site.
- Existing drainage levels.
- Design drainage levels (to A.H.D.).
- Downpipe locations and their connections to drainage system.
- Pipe sizes, types and gradients to be specified.
- Pit sizes and types to be specified.
- For industrial or commercial developments, the pavement drainage is to be via kerb and channel and side entry pits.
- Trench gratings in accordance with design loads.
- The drainage collection system for each unit on the site shall be independent of the others with a single connection point to the central or common system.
- Maximum distance between pits — 30 metres.

Where construction is proposed over an existing Council drain or easement, a Build Over Easement application must be made as soon as possible to the Building Surveyor, where structural building works are concerned.

Where outfall drainage is required refer to Council's Drainage Design Guidelines and Drainage Design Standards available from Council's website.

1.6 Vic Roads Requirements

The use of Vicroads assets for managing storm water discharge from properties shall be a last resort and if considered by the Drainage Design Engineer, compliance with the following requirements is mandatory:

- Vicroads assets should be nominated last for connection when all other options have been exhausted and only after discussing the matter with Vicroads. Evidence showing why all other options are not feasible (costs issues will not be considered.) must be supplied and in writing;

- Drainage Design will need to comply with Road Design Guideline - Drainage - Part 7 and Road Design Guideline - Standard Drawings - Part 9;

- The proposed drainage system will need to consider the effect on the entire network rather than an isolated pipe run. Therefore all excess flows from the proposal will need to be detained within the site;

- The following drawings and reports will need to be supplied for assessment :
  (a) Existing conditions & survey plan;
  (b) Contour plan of existing catchment;
  (c) Drainage Longitudinal Sections showing the Hydraulic Grade-line;
  (d) Alignment & Drainage Plans of the network and the proposed development;
  (e) Proposed catchment areas will need to be highlighted in colour on a separate plan;
  (f) Computations and an independent report verifying the drainage design.

The computations will be required to consider a 1 in 20 years ARI.

To ensure Vicroads agreement for a Legal Point of Discharge to their asset the Council Drainage Engineer shall contact Mr. Michael Kyrannis - Pavement Operations on (03) 9313 1143 or e mail: Michael.Kyrannis@roads.vic.gov.au.

If the applicant meets the Vicroads requirements, then the Council's Drainage Engineer can issue the permit and send a copy to Michael.Kyrannis@roads.vic.gov.au or other Vicroads nominated representative.

1.7 Melbourne Water Requirements – Storm Water Discharge

Maribyrnong City Council Drainage Engineer's approval is required before connecting to Council's stormwater system unless the nominated legal point of discharge is in a Melbourne Water drain or watercourse. In that case, you must apply to Melbourne Water for approval and include a copy of the advice from Council. The application to Melbourne Water can be made on line (refer to http://www.melbournewater.com.au) or contact Asset Services, Melbourne Water, Phone: (03) 9679 6614 Fax: (03) 9679 7399.

Melbourne Water must approve any new or modified stormwater connection into their drains, waterways or open drainage channels. Connections must meet their technical requirements, which vary depending on whether you are building a stormwater outlet or inlet.

Stormwater outlets are connections from a development to a Melbourne Water open waterway or drain. Outlet connections must be designed and constructed to their specifications. Melbourne Water requirements are indicated in the **creek enhancement work guidelines**, though these may vary by site. Melbourne Water will provide further details about the connection method once we have assessed your application.

Technical specifications can be found at http://www.melbournewater.com.au. These guidelines include:

- Pipe connections to existing pipelines ;
- Pipe connection to concrete channel ;
- Junction pit type 1 - 600mm and smaller ;
- Junction pit type 2 - 625mm to 825mm ;
- Junction pit type 3 - 825mm and larger.

The following information is provided as a guide only and applicants are directed to Melbourne Water's website for complete information.

Stormwater connection applications *to* Melbourne Water should include:

- a copy of your Certificate of Title;
- a copy of the legal point of discharge advice from council (for new connections that cannot connect to the council system) ;
- photographs of the area affected ;
- preliminary plans, including standard drawings.

Your preliminary plans need to show at least:

- size and alignment of the proposed connection, including Melbourne Water's asset ;
- size and alignment of any existing connection to Melbourne Water's asset ;
- the proposed connection angled at 45 degrees downstream to the flow in Melbourne Water's asset;
- relevant standard drawings;
- detailed plans of the development, including any driveways and landscaping ;
- a detailed cross section of the creek and the proposed drain indicating creek invert levels, width, depth top bank and surrounding topography ;

- if connecting to open waterways, indicate a pipe outlet velocity no greater than 1.5m/s and include long section indicating grades etc.

All specifications in your plans must meet the MW stormwater connection requirements:

- **MW Stormwater connection guidelines**