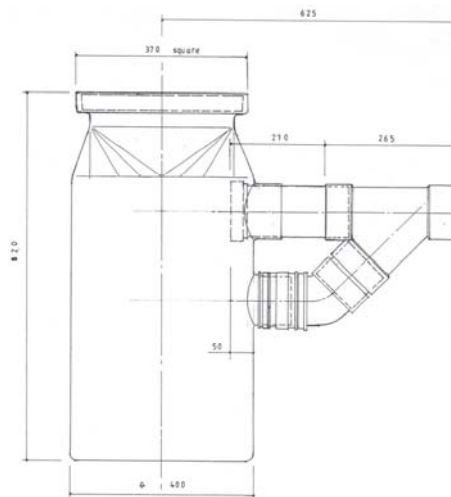


## Determination 2009/96

### The code-compliance of a polyethylene surface water sump at 745 Rosebank Road, Avondale, Auckland



**Figure 1: Elevation of the sump**

#### 1. The matter to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004<sup>1</sup> (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of the Department. The parties are:

- the building owner, Clark Pipes Ltd (“the applicant”) acting through a consultant (“the applicant’s consultant”)
- the Auckland City Council (“the authority”) carrying out its duties and functions as a territorial authority or building consent authority.

1.2 The determination arises from the decision of the authority to refuse to issue a building consent for the installation of a polyethylene surface water sump and its associated drainage.

---

<sup>1</sup> The Building Act, Building Code, Compliance documents, past determinations and guidance documents issued by the Department are all available at [www.dbh.govt.nz](http://www.dbh.govt.nz) or by contacting the Department on 0800 242 243

- 1.3 I take the view that the matters for determination, in terms of sections 177(a) and 177(b)(i)<sup>2</sup>, are:
- whether the surface water sump at this particular location complies with Clauses E1 ‘Surface water’, and B1 ‘Structure’ of the Building Code (Schedule 1, Building Regulations 1992)
  - whether the surface water sump complies with Clauses B2 ‘Durability’, and F2 ‘Hazardous building materials’ of the Building Code
  - whether the decision of the authority to refuse to issue a building consent was correct.
- 1.4 In making my decision, I have considered the submissions of the parties, the report of an independent expert commissioned by the Department to advise on this dispute (“the expert”), and the other evidence in this matter. In making my decision, I have not considered any other aspects of the Act or the Building Code.

## **2. The building work**

- 2.1 The building work is the installation of a polyethylene surface water sump (“the sump”) and associated drainage pipework in the owner’s demonstration yard area. The sump in question is made from rotationally moulded low density polyethylene (“LDPE”), and is 400mm diameter x 820mm deep with a wall thickness of 5mm, and a base thickness of 10mm. I note that some of the drawings describe the material as ‘linear medium density polyethylene’ and this should be corrected. The sump is shown in elevation in figure 1 above.
- 2.2 The sump is fitted with one 100mm O/D and one 120mm O/D spigot outlet and a removable cast iron cover grating. The driveway slab is thickened to give a total 120mm depth of reinforced 20Mpa concrete for an overall area of 1m<sup>2</sup> surrounding the sump grating. The sump is to be fed by a U250 strip drain with a concrete surround and is via a 100mm diameter uPVC surface water drain to the adjacent surface water system.

## **3. Background**

- 3.1 The applicant’s consultants applied for a building consent covering the sump, the strip drain, and the associated surface water drainage.
- 3.2 In a letter to the consultants dated 11 July 2007, the authority stated that the consent application was on hold. The authority required a plan clearly defining the catchment area associated with the system and details confirming the code-compliance of the sump.
- 3.3 The application for a determination was received by the Department on 25 July 2007.

---

<sup>2</sup> In this determination unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

## 4. The submissions

### General

- 4.1 In a submission dated 17 July 2007, the applicant's consultants described the background to the disputed matter. The consultants noted that other authorities had accepted the sump as manufactured.
- 4.2 The applicant forwarded copies of:
- the sump details
  - details of the physical properties of the LDPE used (Rotathene 11UV)
  - a test certificate relating to a compression test carried out on the grating lid
  - the relevant correspondence.
- 4.3 In an undated letter that was received by the Department on 26 July 2007, the authority noted that it had not received the information requested in its letter to the applicant's consultants dated 11 July 2007 (refer paragraph 3.2).
- 4.4 Following a request from the Department for further information, the applicant's consultants wrote to the Department on 22 August 2007. The consultants stated that the sump in question was sold as a stock item throughout New Zealand. It was noted that the minimum load that the sumps have to withstand was a 1 tonne point load. During a test carried out by a testing laboratory the cast iron grating failed at 1.6 tonnes with no deformation to the supporting surrounds.
- 4.5 Following a meeting between the applicant's consultants and the Department's expert, the consultants wrote to the expert on 17 March 2008. The consultants noted that they had calculated the minimum slope for 100mm pipe to be laid to service the contributory area of 540m<sup>2</sup>. The consultants attached a copy of their calculations to their letter.
- 4.6 In answer to a request for information, the applicant's consultants wrote to the Department on 23 May 2008. The consultants noted that:
- the sump's position was now located on a plan
  - the intended use for the sumps is ' "light vehicle traffic" for [surface water] control in a residential application'
  - provided that the sump is installed following the installation instructions the concrete supporting apron will carry the expected traffic loads.
  - there was no know failure arising from the use of the sumps, it had been decided to continue manufacturing them from LDPE material.
- 4.7 The applicant's consultants wrote to the Department on 16 April 2009, noting that the sump had been redesigned so that its capacity exceeded the requirements for Figure 8 of the Approved Document E1/AS1. A design had also been prepared for the driveway in question. The applicant's consultant provided details for four variants of the sump as follows:

- Either a square or round cast iron grating (with the sump moulded to suit)
- A sump having a top “clean-out” outlet with a screwed cap fitting.
- A sump having a normal outlet, with the top outlet sealed.
- A sump having both outlets sealed and these can be trimmed to suit installation requirements.

4.8 The calculations relating to the concrete surround were forwarded to the Department on 20 April 2009.

4.9 On 20 July 2009, the applicant’s consultants forwarded to the Department a revised set of calculations relating to the concrete surround.

### **The draft determination**

4.10 Copies of a draft determination were forwarded to the parties on 29 September 2009 and the applicant accepted the draft without further comment.

4.11 The authority also accepted the draft, but in a letter to the Department dated 6 October 2009 noted that the sump referred to in figure 1 differed from the model referred to in the consent documentation (I discuss this in paragraph 7.4). While the authority had no issues with the sump described in figure 1, it had concerns regarding the pipe connections to the sump in the consent documentation.

## **5. The legislation and the compliance document**

5.1 Relevant provisions of the Building Code include:

### **Clause E1 Surface Water**

**E1.3.3** Drainage systems for the disposal of surface water shall be constructed to:

- (a) Convey surface water to an appropriate outfall using gravity flow where possible

5.2 The relevant provisions of Compliance Document E1/AS1 include:

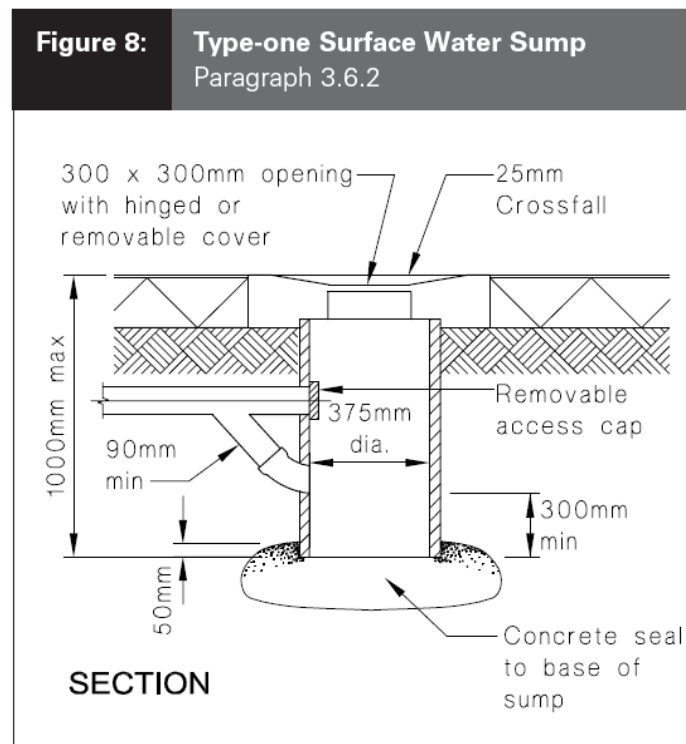
### **3.6 Surface water inlets to drains**

**3.6.1** All surface water, except that collected directly from a roof, shall enter the drain via a sump which has;

- a) A grating, hinged or removable for maintenance access. The grating shall comprise at least 35% openings. The smaller dimension of any individual opening shall not exceed 35 mm,
- b) Capacity at the bottom for settlement of silt and debris, and
- c) A submerged (or trapped) outlet which prevents floatable solids entering the drain.

**3.6.2** Two different sumps are shown in Figures 8 and 9. The sump shown in Figure 8 is suitable for an area of up to  $4500/I \text{ m}^2$  ...where I is the rainfall intensity for a storm with a 10% probability of occurring annually.

The relevant figure in this case is figure 8 as shown below.



## 6. The expert's report

6.1 As described in paragraph 1.4, I engaged an independent expert, who is a hydraulics services consultant, to provide me with an assessment of the sump and its associated drainage. Upon obtaining sufficient data from the applicant's consultants, the expert furnished me with a memorandum dated 31 March 2008. The memorandum answered the queries raised by the authority regarding the sump and its drainage, and I summarise the answers as follows:

- Based on the consultant's data, the expert believed that the outlet of the sump would be of adequate size for the attributed catchment.
- In the expert's opinion, based on the performance history over the past 10 years, the sump grating would be capable of carrying the load compatible with "light vehicular traffic".
- As the grating was removable, it met the requirements of paragraph 3.6.1 of E1/AS1 and the associated Figures 8 and 9. In addition, the grating had enough free space to dispose of the projected surface water adjoining it. In the expert's opinion, the grating satisfied the requirements pertaining to inlet capacity and ponding demands.

6.2 In another memorandum to the Department dated 11 June 2008 the expert concluded:

Considering the sump is not being exposed to ultra violet light, not being subject to excessive surface loading, not subjected to any lateral loads from being buried too deep, is only acting as a transfer box for water under pressure, we believe that the material [the LDPE used in the sumps manufacture] will offer acceptable life and be fit-for-purpose.

- 6.3 In order to ascertain the capacity of the concrete slab adjoining the sump, an officer of the Department checked the calculations forwarded by the applicant's consultants. The officer was of the opinion that provided the D12 reinforcing bars were placed in the middle of the slab, the slab as designed would have adequate capacity to resist a point load of 13kN in accordance with AS/NZS 1170.

## **7. Discussion**

- 7.1 Based on the expert's report and the opinion of the Department's officer as set out in paragraph 6, I am prepared to accept that the sump meets the requirements of Clause E1. I note that as the matter has not been raised by the authority, I have not determined the adequacy of the surface water drains leading from the sump to the adjacent surface water system.
- 7.2 The material the sump is manufactured from, LDPE, is a well established material used in the building industry with proven history of use spanning in excess of 30 years. The material is used to store and transport potable water. Surface water running through the LDPE sump would be able to be safely discharged into a watercourse. In my opinion the material would comply with Building Code Clauses B2 Durability, and F2 Hazardous building materials.
- 7.3 I emphasise that my decision relates to the particular sump as described in this determination and at this location with these loads. A similar sump in different circumstances may not necessarily be code-compliant. In particular, I refer to the expert's comments in paragraph 6.2 regarding the specific reasons why it was considered that the sump in question was code-compliant, and which could vary if the sump is part of a surface water system at other locations. Likewise the particular catchment areas discharging into the sump will also vary at other locations.
- 7.4 While I have found that this particular sump is code-compliant, I accept that the sump shown on the consent documents may not be. Accordingly, I am of the opinion that the authority was justified in refusing to issue the consent. The applicant should therefore withdraw its original consent application and make a new application based on the sump shown in Figure 1.

## **8. The decision**

8.1 In accordance with section 188, I hereby determine that:

- the surface water sump, as described in this determination and in this particular location, complies with Building Code Clauses B1 and E1
- the surface water sump as described in this determination complies with Building Code Clauses B2, and F2
- the decision of the authority to refuse to issue a building consent for the sump shown on the consented documentation is confirmed.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 30 October 2009.

John Gardiner  
**Manager Determinations**