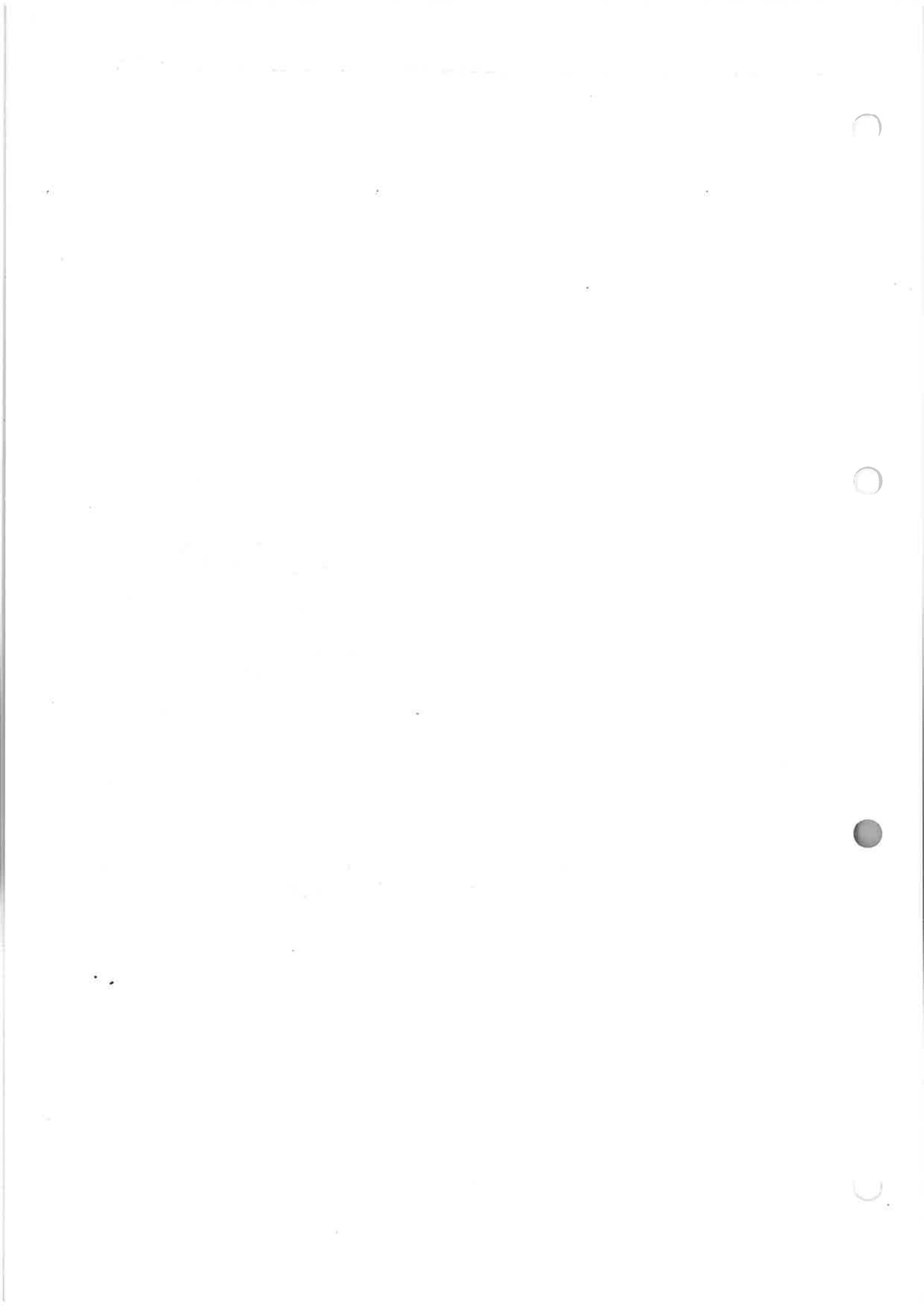


DEVELOPMENT
CONSTRUCTION
SPECIFICATION

C220

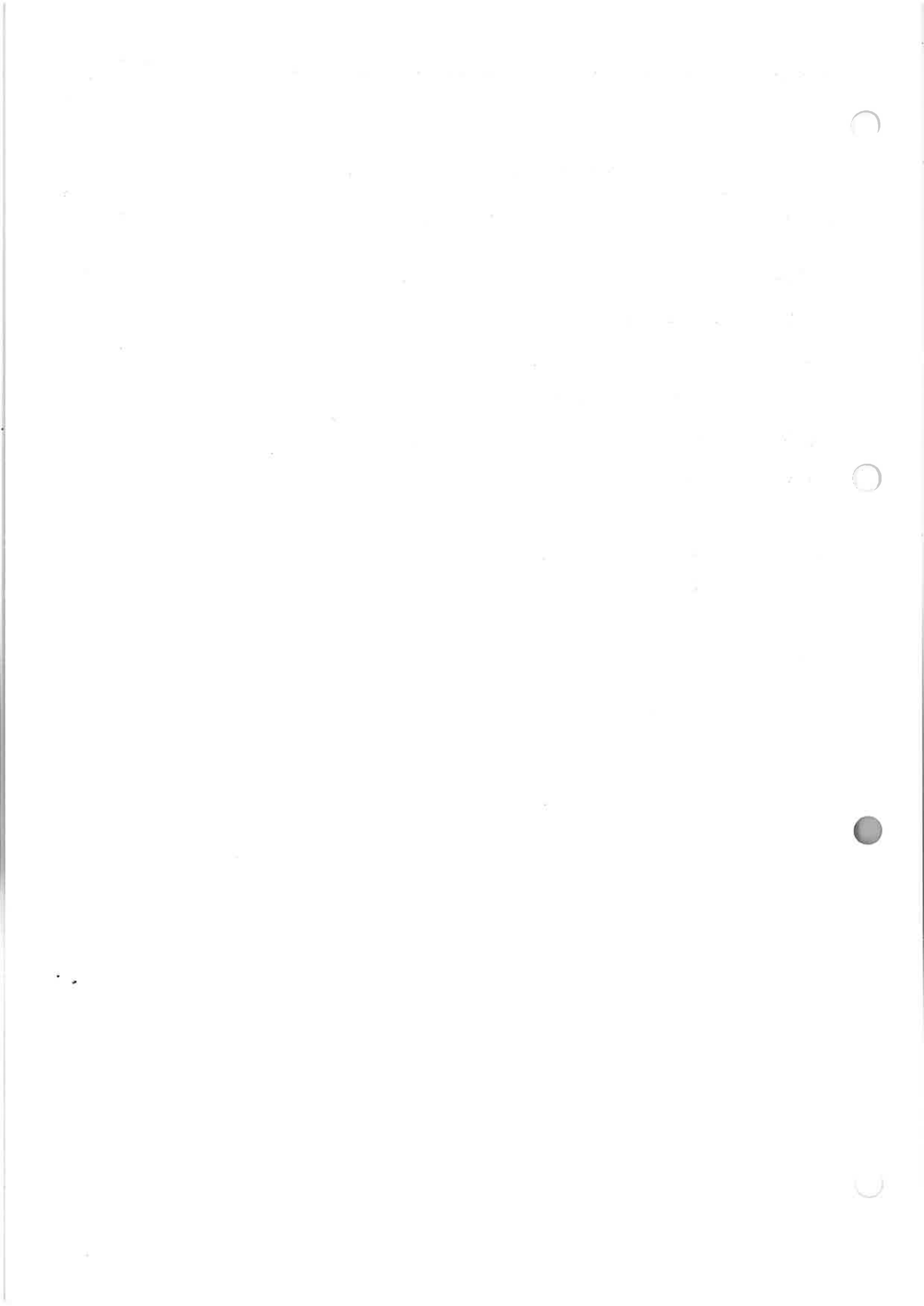
STORMWATER DRAINAGE
GENERAL



SPECIFICATION C220

STORMWATER DRAINAGE - GENERAL

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SPECIFICATION C220 : STORMWATER DRAINAGE - GENERAL

GENERAL

C220.01 INTRODUCTION

1. Drainage works shall form a complete system carrying water through and away from the Works. **Purpose**
2. This is the general Specification common and applicable to all types of drainage lines, open drains, kerb and gutter, and drainage structures and shall be read in conjunction with the following drainage Specifications:

C221	-	Pipe Drainage
C222	-	Precast Box Culverts
C223	-	Drainage Structures
C224	-	Open Drains, including Kerb and Gutter

as applicable.

C220.02 SCOPE

1. The work consists of: **Scope**
- (a) Preparation for stormwater drainage construction,
 - (b) Temporary drainage during construction,
 - (c) Siting of pipes, pipe arches and box culverts.
 - (d) All activities and quality requirements associated with excavation, bedding and backfilling,
 - (e) All concrete work associated with stormwater drainage.

C220.03 REFERENCE DOCUMENTS

1. Documents referenced in this specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated. **Documents
Standards Test
Methods**

(a) Other Council Specifications

C211	-	Control of Erosion and Sedimentation
C213	-	Earthworks
C271	-	Minor Concrete Works
C221		Pipe Drainage
C222		Precast Box Culverts
C223		Drainage Structures

(b) Australian Standards

AS 1289.5.7.1	-	Compaction Control Test (Rapid Method)
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(c) RTA Test Methods

T 166	-	Determination of Relative Compaction
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DRAINAGE

(d) NSW Government Legislation

Occupational Health and Safety Act, 2000

C220.04 TEMPORARY DRAINAGE DURING CONSTRUCTION

1. All drainage works carried out by the Contractor shall comply with Specification C211 CONTROL OF EROSION AND SEDIMENTATION. **Control**
2. Adequate provision for runoff flows at drainage works under construction to avoid damage or nuisance due to scour, sedimentation, soil erosion, flooding, diversion of flow, damming, undermining, seepage, slumping or other adverse effects to the Works or surrounding areas and structures shall be made. **Developer's Responsibility**
3. No proposal to dam up or divert existing watercourses (either temporarily or permanently) is permitted without the prior approval of Council by way of approved Drawings or written instruction. **Limitations**
4. Material and equipment shall be located clear of watercourses or secured so that they will not cause danger or damage in the event of large runoff flows. **Location of Equipment**

C220.05 SITING OF CULVERTS

1. Before commencing construction of any culvert, the culvert inlet and outlet positions shall be setout to the location and levels shown on the Drawings. **Set-out**
2. Council's Development Engineer may amend the inlet or outlet locations, designed levels or the culvert length to suit actual site conditions. Any activity resulting from such amendments by Council's Development Engineer shall be included as part of the works. **Amendments to planned work**
3. Should the Developer propose changes to the culvert location, length, designed levels, culvert strength, conditions of installation or cover to suit his construction procedures, amended designs and site setout are to be submitted for consideration by Council's Development Engineer. No changes shall be made unless the prior written approval of Council's Development Engineer is obtained. **Proposed Changes by Developer**

C220.06 EXCAVATION

1. Before undertaking stormwater drainage excavation, topsoil shall be removed in accordance with Specification C213 EARTHWORKS. **Topsoil**
2. Excavation shall be undertaken in compliance with the Occupational Health and Safety Act 2000. The Developer shall provide any shoring, sheet piling or other stabilisation of the sides necessary to comply with these Acts. **Safety**
3. Where public utilities exist in the vicinity of stormwater drainage works the Contractor shall obtain the approval of the relevant authority to the method of excavation before commencing excavation. **Approval by Public Utility Authorities**
4. Excavation by blasting, if permitted by Council, shall be carried out to ensure that the peak particle velocity measured on the ground adjacent to any previously installed culvert of drainage structure does not exceed 25 millimetres per second. The Developer shall comply with other requirements concerning blasting operations in Specification C213 EARTHWORKS. **Blasting Operation**
5. Trench or foundation excavations for stormwater drainage works shall be undertaken to the planned level for the bottom of the specified bedding or foundation level. All loose material shall be removed. **Excavation Level**
6. Any material at the bottom of the trench or at foundation level which Council's Development Engineer deems to be unsuitable shall be removed and disposed in accordance with Specification C213 EARTHWORKS and replaced with backfill material in accordance with the requirements of this Specification and the Specifications for particular culvert types. The bottom of the excavated trench or foundation, after any unsuitable material has been removed and replaced, shall be parallel with the specified level and slope of the culvert. **Unsuitable Material**
7. The excavated material may be used in the construction of embankments backfilling or spoiled in accordance with Specification C213 EARTHWORKS. **Spoil**

C220.07 BACKFILLING

1. Backfilling shall be carried out in accordance with the requirements of the relevant culverts or drainage structures Specifications and to the compaction requirements specified below.

C220.08 COMPACTION

1. Foundations, bedding and backfilling shall be compacted to the following requirements when tested in accordance with Test Method T166. **Standard**

	Relative Compaction
Foundations or trench base to a depth of 150mm below foundation levels	95%
Material replacing unsuitable material	95%
Bedding material	95%
Selected backfill and ordinary backfill material	
• Below 1.5m of finished surface	95%
• Within 1.5m of finished surface	100%
Backfill material within the selected Material zone	100%

DRAINAGE

2. All material shall be compacted in layers not exceeding 150mm compacted thickness. Each layer shall be compacted to the relative compaction specified before the next layer is commenced. **Layers**

3. At the time of compaction, the moisture content of the material shall be adjusted so as to permit the specified compaction to be attained at a moisture content which, unless otherwise approved by Council's Development Engineer, is neither less than 60 per cent nor more than 90 per cent of the apparent optimum moisture content, as determined by AS 1289.5.7.1. **Moisture Content**

4. When compacting adjacent to culverts or drainage structures, compaction methods that will not cause damage to any culvert or drainage structure are to be adopted. Any damage caused shall be rectified. **Precautions**

C220.9 CONCRETE WORK

1. All concrete work is to comply with Specification C217 - MINOR CONCRETE WORKS in relation to the supply and placement of normal class concrete and steel reinforcement, formwork, tolerances, construction joints, curing and protection. **Specification**

C220.10 SPRAYED CONCRETE

1. If sprayed concrete has been specified, shown on the Drawings or directed by Council's Development Engineer, it shall comply with requirements in Specification C217 - MINOR CONCRETE WORKS. **Standard**

LIMITS AND TOLERANCES

C220.12 SUMMARY OF LIMITS AND TOLERANCES

1. The limits and tolerances applicable to the various clauses in this specification are summarised in Table C220.1 below:

Item	Activity	Limits/Tolerances	Spec Clause
1.	Excavation by blasting		
	Peak particle velocity	≤ 25 mm/sec	C220.06
2.	Relative Compaction (Standard)		
	(a) Foundations or trench base to a depth of 150mm below foundation levels	95%	C220.08
	(b) Select material replacing unsuitable material	95%	C220.08
	(c) Bedding Material	95%	C220.08
	(d) Selected backfill and ordinary backfill material.		C220.08
	• below 1.5m of finished surface	95%	
	• within 1.5m of finished surface	100%	
	(e) Backfill material within the selected material zone	100%	C220.08
3.	Backfill		
	(a) Layers	≤ 150 mm	C220.08
	(b) Moisture Content	> 60%, < 95%	C220.08

Table C220.1 - Summary of Limits and Tolerances

