

Affix label with Candidate Code  
Number here.  
If no label, enter candidate  
Number if known

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No. 9197



Plumbers,  
Gasfitters and  
Drainlayers Board

## REGISTRATION EXAMINATION, JUNE 2010

### LICENSED DRAINLAYER

QUESTION AND ANSWER BOOKLET

Time allowed THREE hours

#### INSTRUCTIONS

Check that the Candidate Code Number on your admission slip is the same as the number on the label at the top of this page.

Do not start writing until you are told to do so by the Supervisor.

Total marks for this examination: 100.

Write your answers and draw your sketches in this booklet. If you need more paper, use pages 20–21 at the back of this booklet. Clearly write the question number(s) if any of these pages are used.

All working in calculations must be shown.

**Candidates are permitted to use the following in this examination:**

Drawing instruments, approved calculators

**The following are NOT permitted in the examination room:**

Any publications, Acts, Regulations, Codes of Practice, or Standards

Check that this booklet has all of 21 pages in the correct order and that none of these pages is blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION**



## QUESTION 1

- (a) Poor ventilation in confined spaces may create hazardous situations. One result of this could be asphyxiation.

(i) Explain how asphyxiation occurs.

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(ii) State TWO symptoms of asphyxiation.

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(iii) State TWO possible effects of asphyxiation.

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(6 marks)

- (b) A drainlayer has been asked to inspect a branch drain down a 3 metre deep access chamber.

List THREE primary safety precautions the drainlayer should take before entering the access chamber.

1 

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2 

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3 

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(3 marks)

- (c) State the meaning of the following symbol on a portable electrical drill.



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(1 mark)

**Total 10 marks**

## QUESTION 2

(a) Using your knowledge of AS/NZS 3500 Part 2: Sanitary plumbing and drainage, state the MINIMUM size of the following.

(i) The upstream vent on any main drain.

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(ii) The upstream vent on any branch drain.

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(iii) The section of drain acting as a vent.

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(3 marks)

(b) Answer the following questions using your knowledge of New Zealand Building Code Clause G14 Industrial Liquid Waste.

(i) Give the meaning of the term industrial liquid waste (trade waste).

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(1 mark)

(ii) Industrial liquid wastes (trade wastes) that are prohibited from entering a sewage system fall under THREE categories. State these categories.

1 

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2 

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3 

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(1 mark)

## QUESTION 2 (cont'd)

- (iii) In controlling the discharge of trade waste, state what and who are being protected.

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(1 mark)

- (iv) The owner of a property is having problems with drain surcharge.

One solution is to use a mechanical type valve (reflux valve).

Fully describe an alternative solution.

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(2 marks)

**Total 8 marks**

**QUESTION 3**

A trench has the following dimensions:  
130 m long x 0.600 m wide with a depth of 0.820 m at the top end of the trench and 1.650 m at the bottom end.

Calculate the amount of material required to fill the trench.  
Your answer is to include an allowance of 25% for compaction.  
Show all working.

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Total 5 marks

#### QUESTION 4

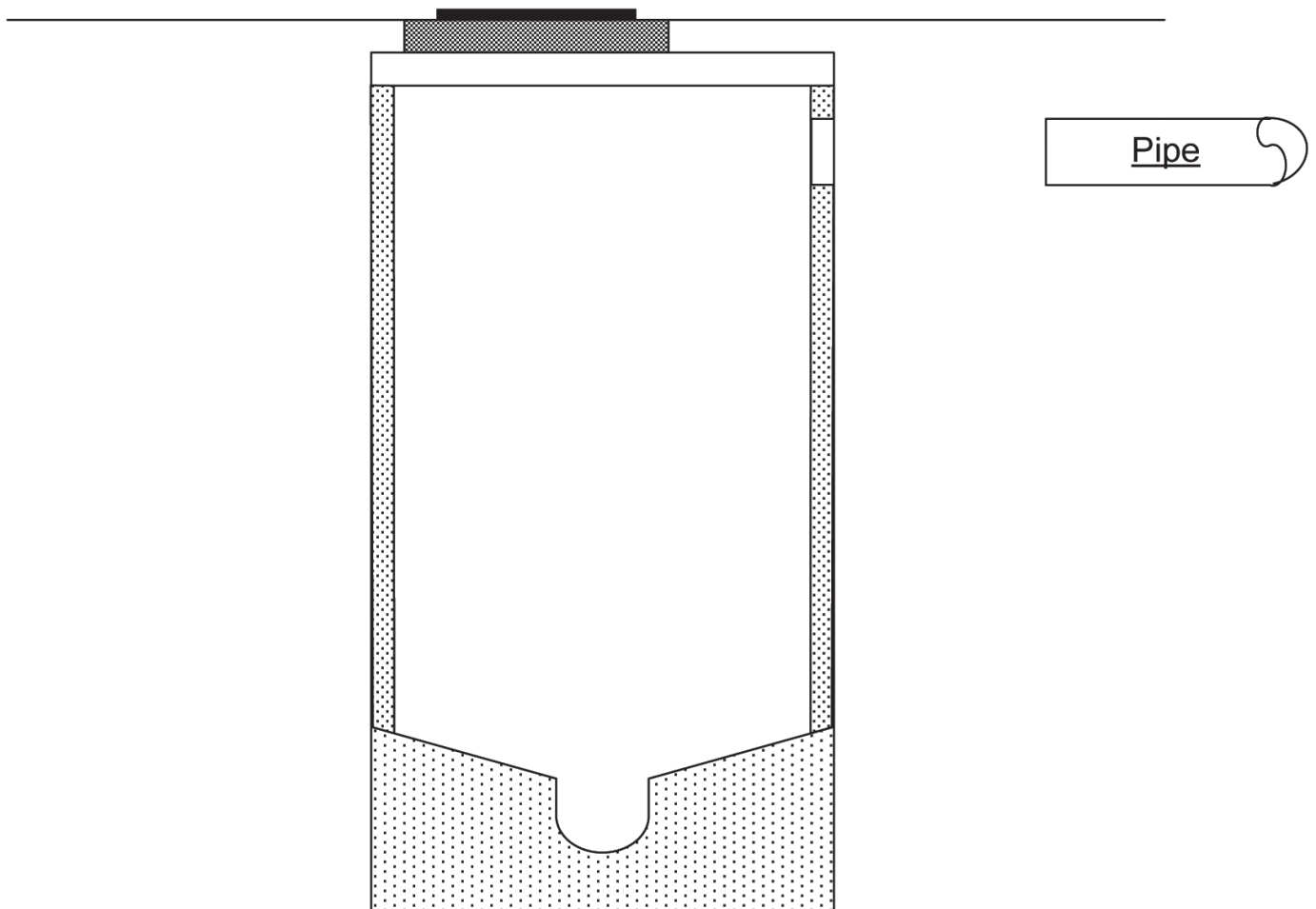
The starter drawing below shows a chamber.

A jump up is to be installed inside the chamber.

The jump up is to discharge to the open channel within the chamber.

Complete the drawing so that the chamber and jump up complies with AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

Include and label all fittings and components, both adjacent to and within the chamber.



Total 5 marks

## QUESTION 5

The drawing opposite shows the plan of a house on a building site.

The foul water drainage is to connect to the council sewer on the south boundary.

Ground level at the northwest corner of the building is 12.000 m.

Ground level at the northeast corner of the building is 12.500 m.

Ground level at the southeast corner of the building is 11.500 m.

The invert level at the sewer connection is 13.500 m.

All levels are taken from the given Datum (15.000 m).

Foul water drainage is to be installed exterior to the building.


Sanitary fixtures are to be connected individually to the drainage system.


The drainage system is to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

Draw and label a complete foul water drainage system. Include all bends, junctions, inspections, chambers, ventilation, access points and any other relevant components.

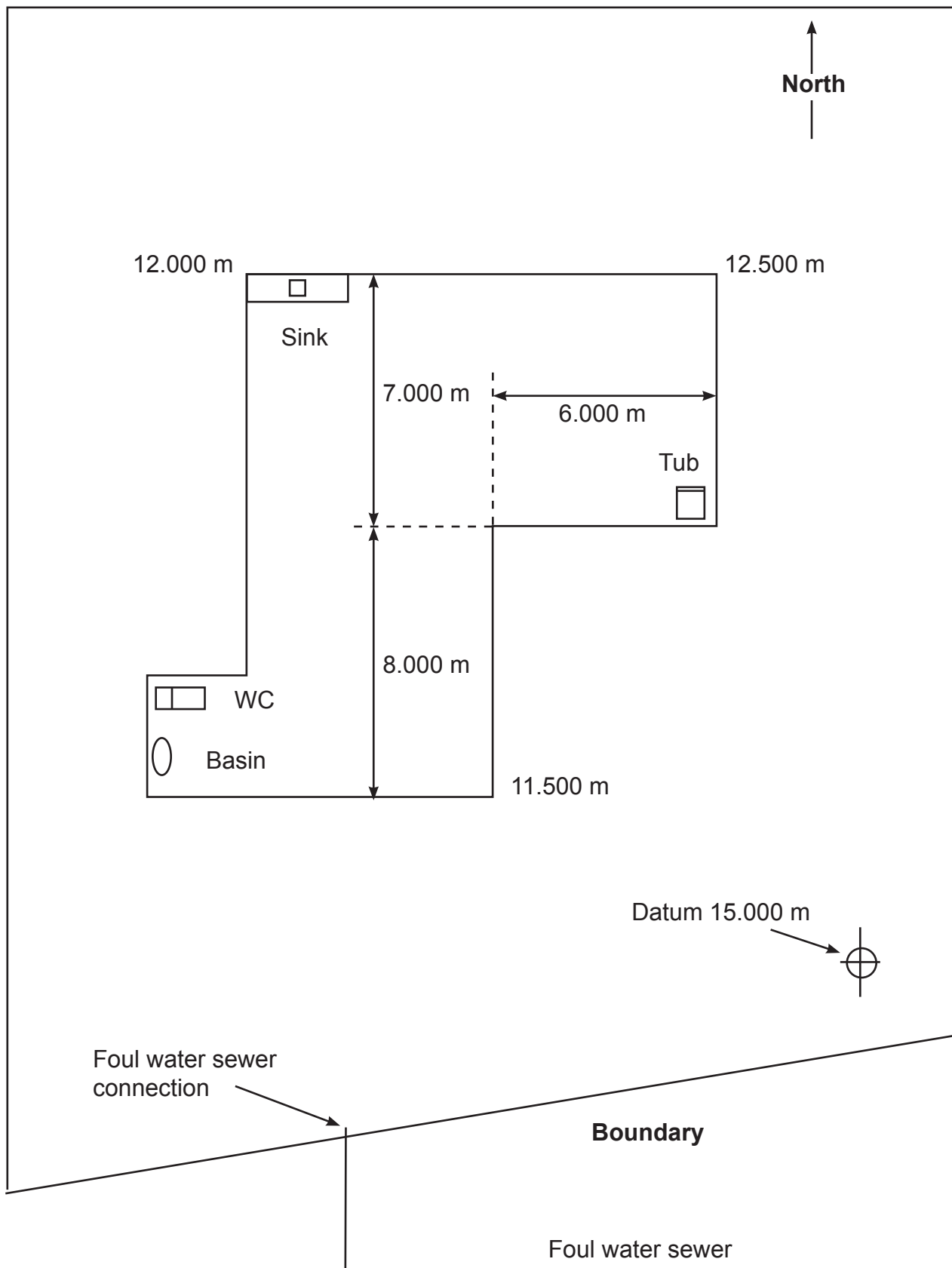
### LEGEND

 Basin

 Water closet

 Sink bench

**QUESTION 5 (cont'd)**



**Total 5 marks**

## QUESTION 6

- (a) When a drain passes through a below-ground external wall, it must comply with certain criteria.

Using your knowledge of AS/NZS 3500 Part 2: Sanitary plumbing and drainage, answer the following questions.

- (i) State what TWO fittings must be fitted to the drain within 800 mm of the external face of the wall, and state the distance apart they must be.

Fittings: \_\_\_\_\_

Distance: \_\_\_\_\_

(2 marks)

- (ii) State the requirement that must be met between the drain and the penetration of the wall.

\_\_\_\_\_  
\_\_\_\_\_

(1 mark)

- (b) During the course of any work, extraneous matter must be prevented from entering a sewer.

List THREE different types of extraneous matter.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(3 marks)

### QUESTION 6 (cont'd)

(c) When drains are being laid in other than stable ground or where soil movement may affect the performance of the drain, the Territorial Authority requires specific information to be supplied.

(i) List THREE documents that the Territorial Authority will require prior to the commencement of the laying of drains in these situations.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_

(3 marks) ☐

(ii) State who must verify the information prior to submission of this information to the Territorial Authority.

\_\_\_\_\_

(1 mark) ☐

**Total 10 marks** ☐

## QUESTION 7

The drawing opposite shows a plan of a group of three shops and a restaurant.

The car parking area at the rear of the buildings has a sealed surface.

There is a paved public walk way from the parking area to the front of the buildings.

Foul water drainage is to connect to the appropriate sewer connection.

All components of the foul water system are to be external to the building.

Surface water from the car park area and storm water drainage are to combine and discharge at the storm water sewer connection.

Drainage systems are to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

On the plan, draw and label the drainage systems. Include foul water and storm water systems, all pipe work, bends, junctions, fittings, traps, inspections, chambers and ventilation points.

### LEGEND

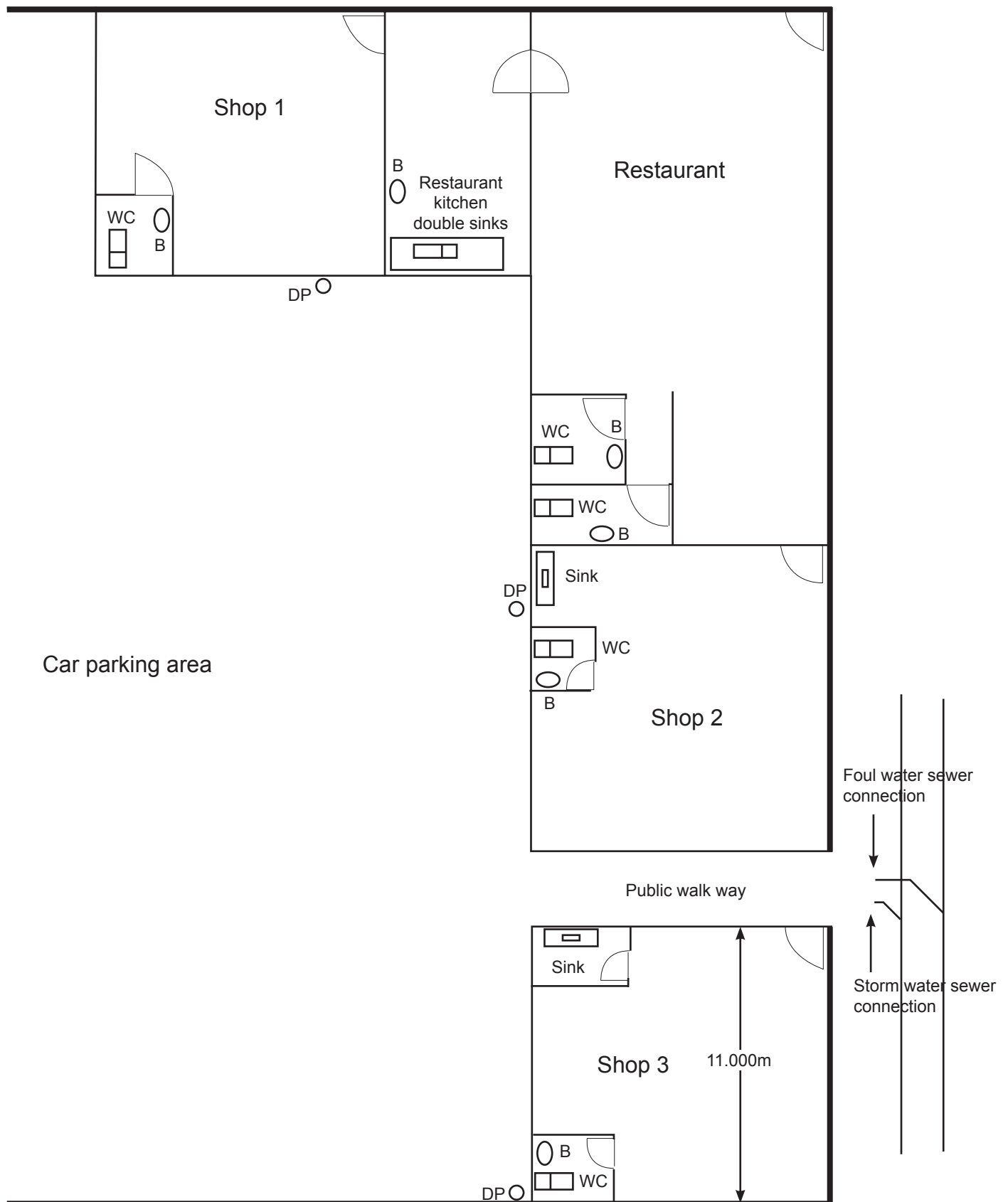
○ Basin

□ Water closet

□ Sink bench

○ Downpipe

**QUESTION 7 (cont'd)**



**Total 15 marks**

## QUESTION 8

- (a) When a drain or part of a drain is no longer required, it must be disconnected from the foul water drainage system.

(i) State the position at which the drain must be disconnected.

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(1 mark)

☐

(ii) State what the drainlayer must use to seal the disconnection.

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(1 mark)

☐

(iii) State TWO effects that the unsatisfactory disconnection of old branch drains from live drains may have on the drainage system.

1 

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2 

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(2 marks)

☐

(b) (i) State the maximum height for the riser of a gully trap.

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(1 mark)

☐

(ii) State the TWO points from where the gully trap riser measurements are taken.

1 

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2 

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(1 mark)

☐

### QUESTION 8 (cont'd)

- (c) Using your knowledge of AS/NZS 3500 Part 2: Sanitary plumbing and drainage, list FOUR requirements that must be met in locating an overflow relief gully.

1 \_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_

3 \_\_\_\_\_  
\_\_\_\_\_

4 \_\_\_\_\_  
\_\_\_\_\_

(4 marks)

**Total 10 marks**

## QUESTION 9

- (a) Give the differences between a wet inspection chamber and a dry inspection chamber.

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(2 marks)

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- (b) Define the following terms as they relate to drainlaying.

- (i) Main drain

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(2 marks)

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- (ii) Sullage

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(1 mark)

☐

- (iii) Infiltration

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(1 mark)

☐

**QUESTION 9 (cont'd)**

(iv) Outfall

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(1 mark) ☐

(v) Surcharge (sanitary)

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(1 mark) ☐

(vi) Access chamber

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(1 mark) ☐

(c) Give TWO purposes of a sewer gas interceptor trap.

1 

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2 

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(2 marks) ☐

(d) State where measurements are taken to find the developed length of a drainage system, and state what these measurements include.

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(1 mark) ☐

**Total 12 marks** ☐

## QUESTION 10

The diagram opposite shows a building site.

Foul water drainage from Warehouse 1 is to discharge into Access Chamber 1.

Foul water drainage from Warehouse 2 is to discharge into Access Chamber 2.

Foul water drainage from the restaurant is to discharge into Access Chamber 3.

Drainage from Access Chamber 2 is to combine into Access Chamber 1 and then into Access Chamber 3.

Foul water drainage from Access Chamber 3 is to terminate at the foul water sewer connection at the roadway.

Each access chamber is 10.000 m from the side boundary and 10.000 m from the building it serves.

The stormwater drainage system is to incorporate all downpipe connections and terminate at the roadside storm water sewer connection.

The drainage systems are to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

On the plan, draw and label all foul water and stormwater drainage systems for each of the three buildings. Include all bends, junctions, inspections, pipe runs, ventilation points, interceptor traps and any other relevant components.

## LEGEND

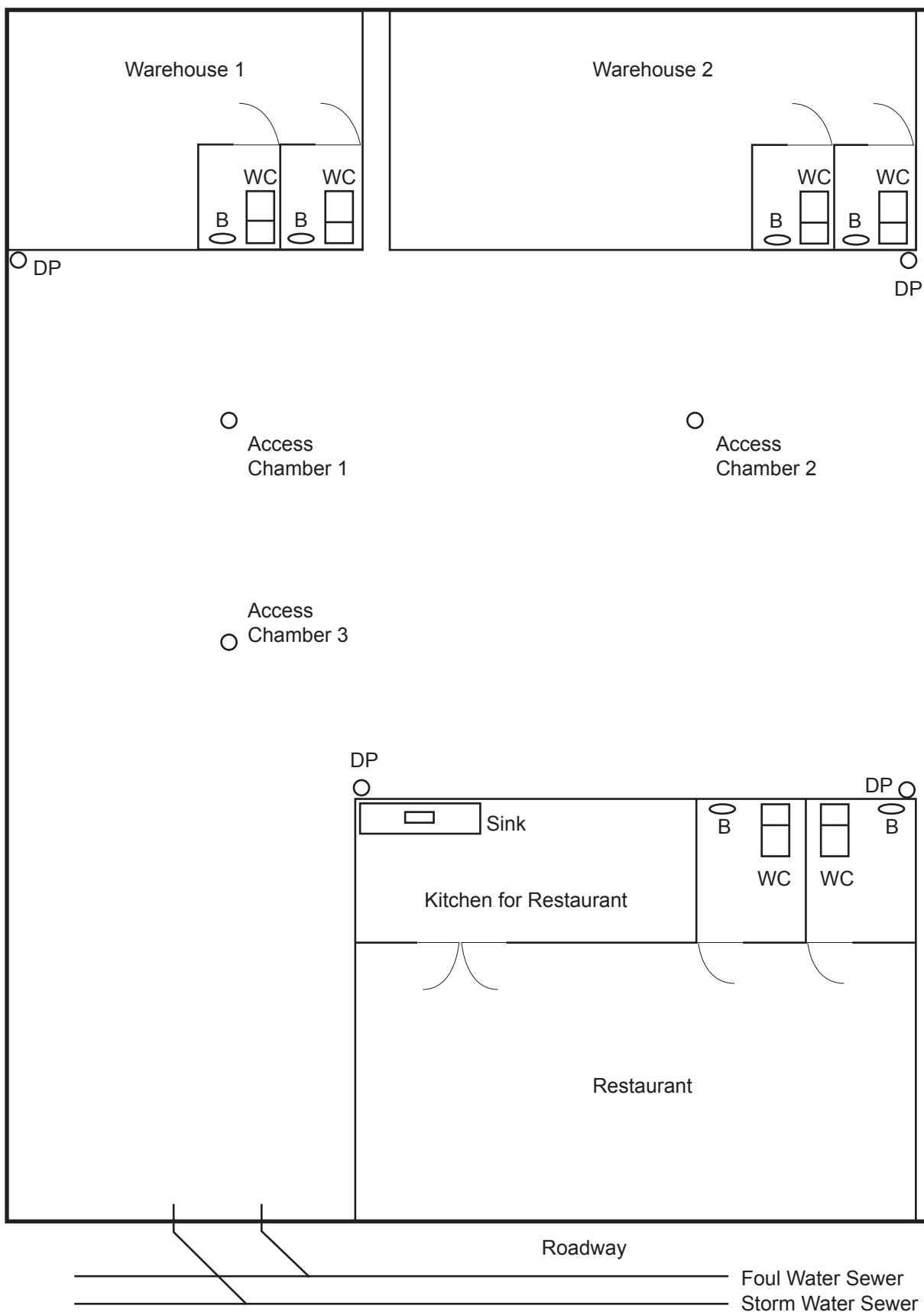
○ Basin

□ Water closet

○ Downpipe

□ Sink bench

# QUESTION 10 (cont'd)



Drawing not to scale

Total 10 marks



## QUESTION 11

- (a) List FOUR details, apart from name and address, that must be recorded in an employment agreement.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

(4 marks)

- (b) When a drainlayer employs a trainee, a limited certificate for the trainee must be uplifted from the Plumbers, Gasfitters and Drainlayers Board.

- (i) State what the Plumbers, Gasfitters and Drainlayers Board must receive from the trainee drainlayer before the Board will issue a limited certificate.

\_\_\_\_\_

- (ii) State TWO undertakings that are given by the registered drainlayer who endorses the certificate.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

- (c) The New Zealand Building Code has clause numbers and titles that relate to drainlaying.

One of these is G13 Foul Water.

List TWO other relevant clause numbers and their titles from this Code.

	Number	Title
1		
2		

(2 marks)

**QUESTION 11 (cont'd)**

(d) State who is allowed to lay drains under the Plumbers, Gasfitters and Drainlayers Act.

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(2 marks)

**Total 10 marks**

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Question number \_\_\_\_\_

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Question number \_\_\_\_\_

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For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
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6		
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11		
Total		