

# **VOLUME 3**

## **SECTION 1**

### **Roads, Infrastructure, Drainage and Traffic Management**

**The Responsibility of the  
National Works Agency  
140 Maxfield Avenue  
Kingston 10**



## TABLE OF CONTENT

<b>CHAPTER 1</b> .....	<b>1</b>
BACKGROUND	
<b>CHAPTER 2</b> .....	<b>3</b>
ROADS	
<b>CHAPTER 3</b> .....	<b>17</b>
FUNCTION OF ROADS	
<b>CHAPTER 4</b> .....	<b>24</b>
PARKING AND LOADING	
<b>CHAPTER 5</b> .....	<b>39</b>
ACCESS LAYOUT	
<b>CHAPTER 6</b> .....	<b>47</b>
ROAD MARKING	
<b>CHAPTER 7</b> .....	<b>54</b>
NAMING OF ROADS	
<b>CHAPTER 8</b> .....	<b>56</b>
PETROL FILLING STATIONS	
<b>CHAPTER 9</b> .....	<b>59</b>
UTILITY SERVICES	
<b>CHAPTER 10</b> .....	<b>62</b>
DRAINAGE	

**CHAPTER 11** .....95

HYRAULIC REPORTS ON DRAINAGE SYSTEMS FOR PROPOSED SUBDIVISIONS

**CHAPTER 12**.....97

DOCUMENTS REQUIRED FOR SUBDIVISION APPLICATIONS

**CHAPTER 13**.....99

INFORMATION REQUIREMENT FOR SUBDIVISION APPLICATIONS

**CHAPTER 14**.....105

STREET FURNITURE

# CHAPTER I

## BACKGROUND

### I.0 OVERVIEW

The National Works Agency (NWA) became an Executive Agency on April 1, 2001 and assumed the responsibilities of the defunct Public Works Department (PWD). An agency under the Ministry of Transport & Works (MTW) it is mandated to plan, build and maintain a reliable, safe and efficient main road network and flood control system which:

- i Protects life and property
- ii Supports the movement of people, goods and services
- iii Reduces the cost of transport
- iv Promotes economic growth and improves the quality of life
- v Protects the environment

#### I.0.1 NWA's Mandate

The agency is committed, through its mandate, to:

- i Facilitate the construction and maintenance of roadways to world class standards
- ii Ensure that all new roads are constructed satisfactorily, meet the agency's minimum standard and complement the national road network.
- iii Safeguard the integrity of the main road network to facilitate the movement of people, goods and service.
- iv Improve access to towns and communities, thereby facilitating economic development throughout the country.
- v Dedicate resources to improve road building and flood control systems that will reduce negative impacts on the environment.

## **I.1 LEGAL FRAMEWORK**

The operation and involvement of the NWA in the approval process is guided by the following Acts and Regulations:

- i The Town & Country Planning Act
- ii The Local Improvement Act
- iii The Main Roads Act
- iv The Road Traffic Act
- v The Executive Agency Act
- vi The Roads Protection Act
- vii The Advertisement Regulation
- viii The Flood Control Act

## **I.2 ROLE OF THE NATIONAL WORKS AGENCY IN THE APPROVAL PROCESS**

NWA is a stakeholder and facilitator in national development, and its input into the development and approval process is fundamental. It complements the actions of all agencies involved in decision-making at the national, regional and local levels. NWA as the responsible agency for the island's main road network, flood control system and other support structures such as bridges, traffic signals, road signs etc, offers guidelines on the following:

- i Design and location of ingress/egress points to allow safe entry and exit of vehicles from properties onto roadways.
- ii Setback of buildings from road property boundaries, to ensure the proper establishment of building lines, uniformity in the streetscape, attenuation of noise and emission from vehicles, provision for future road widening, geometric improvement of road ways and provision of adequate space for underground/overhead utilities and other civil works.
- iii Adequate provision of on and/or off-street parking.
- iv Traffic management through the requisition of Traffic Impact Analysis (TIA), which assesses and reduces the negative impact of land development on the island's road network.
- v On and off-site drainage to eliminate or reduce the incidences of road and property damage.
- vi Drainage, River Training, Flood Control and Sea Defence Systems.

## CHAPTER 2

### ROADS

#### 2.0 ROAD SYSTEMS

Development is best served by roads which are designed with regard to topography, function, proper geometry and optimum street length. The proposed system should therefore be integrated into the existing system and natural features are to be preserved to enhance the development.

#### 2.1 CLASSIFICATION

Roads are classified in categories according to the authority (National Works Agency, KSAC/Parish Council, and the Ministry of Agriculture) that maintains them. Other factors that are used include: Average Daily Traffic (ADT) and regional importance (national, regional and local)

Expressways/Motorways and Toll Roads are maintained by the National Works Agency or by a road authority appointed by the Minister. Minimum Reservations width are given, see classification matrix at table I.

##### 2.1.1 Main Roads

Main Roads - built and maintained by the National Works Agency fall into three basic sub-categories:

- A – Arterial Road
- B – Secondary Road
- C - Tertiary Road

##### 2.1.2 Parochial/ Parish Council Roads

Parochial/Parish Council Roads are usually built by developers of subdivision and transferred to the KSAC/Parish Councils or built by or for the KSAC or Parish Councils by other road authorities. They are maintained by the KSAC/Parish Councils.

##### 2.1.3 Farm Roads

Farm Roads are built and maintained by the Ministry of Agriculture

### **2.1.4 Expressways/Motorways, Toll and Main Roads**

Expressways/Motorways, Toll and Main Roads are those roads of national importance which carry average daily traffic volumes in excess of 1500 vehicles (see road classification matrix for details) and link one or more major areas of the island with other major national regions.

### **2.1.5 Road Classification System**

A road classification system designates roads into different groups according to the type of service each is intended to provide and is a fundamental tool for road management. Grouping roads can improve transportation planning, road infrastructure design, maintenance, traffic and road operation. A road classification system is also integral to the management of urban development. The classification is as follows:

- i 'A' Roads are those roads of national importance which carry daily traffic volumes in excess of 1,000 vehicles, and link one or more major area/town of the island with other major national regions.
- ii 'B' Roads are those secondary roads of regional importance, which connects with arterial roads and normally carry average daily traffic volumes of 500 to 2000 vehicles.
- iii 'C' Roads are roads which are normally only of local importance and have the function of allowing communications and contact within or between districts. C roads normally serve traffic volumes less than 1000 vehicles per day.
- iv 'PC' Roads are roads which provide the same service as 'C' roads.

## **2.2 ACCESS MANAGEMENT AND MINIMUM ROAD RESERVATION REQUIRED**

Expressway/motorway should have no direct property access; a minimum of 30.5m (100ft) reservation is required. The reservations are as follows:

### **2.2.1 'A' Roads**

Highways and Major Arterial - these are the main roads normally linking towns; a minimum of 23m /75.5ft reservation is required.

## **2.2.2 Arterial/Main Estate Roads**

Arterial/Main Estate Roads (Spine or Collector Roads)- these are main roads which include main residential roads, and would normally be used as bus routes or as heavily used traffic routes through residential areas; a minimum of 15.24m /50ft reservation is required.

## **2.2.4 'B' Roads**

Estate Roads (Local Roads) - these are intermediate collector roads for traffic generated by the service roads; a minimum of 12.2m/40 ft reservation is required.

## **2.2.5 'C' Roads**

Service Roads (Local Roads) - these are used for direct access to individual lots within a residential area or for access to commercial premises and should comply with local bylaws, unless other-wise specified in special area developments. Where these cannot be applied a minimum of 9.14m/30 ft reservation should be used.



**Road Classification Matrix (Criteria)****Table I**

Characteristic	Local (C & PC Roads)	Collector/ (B Roads)	Arterial (A & B Roads)	Major Arterial By-pass/Highways (A Roads)	Expressways/ Motorways
Importance	Roads of local importance	Roads of regional importance	Roads of national importance	Roads of national importance	Roads of national importance
Traffic Movement versus property access	Property access primary function	Traffic movement and property access of equal importance	Traffic movement primary consideration; some property access control	Traffic movement primary consideration; subject to property access control	Traffic movement primary consideration; no property access or control
Average daily traffic (both directions)	< or = 1000	500 - 2000	> or = 1000	> or = 1000	> or = 5000
Desirable connection	Local, collector	Collector, local, arterial	Collector, arterial	Collector, arterial, highways/by-pass	Major arterial, Expressways, highways
Flow characteristics	Interrupted flow (at grade)	Interrupted flow (at grade)	Interrupted flow (at grade)	Limited interruption (at grade)	Very limited interruption (grade separation)
Legal speed limit (km/h)	=50	> = 50	> = 50	= 80	> 80
Accommodation of pedestrian	Side walk on one or both sides	Side walk on both sides	Side walk on both sides	Side walk on both sides	Pedestrians prohibited
Public transportation	Recommended	Permitted (bus stop)	Preferred (bus stop)	Permitted (bus Stop)	Not applicable (bus stop)
Typical right of way width, m	9.14	>=12.2	>= 15.24	> = 23	> = 30

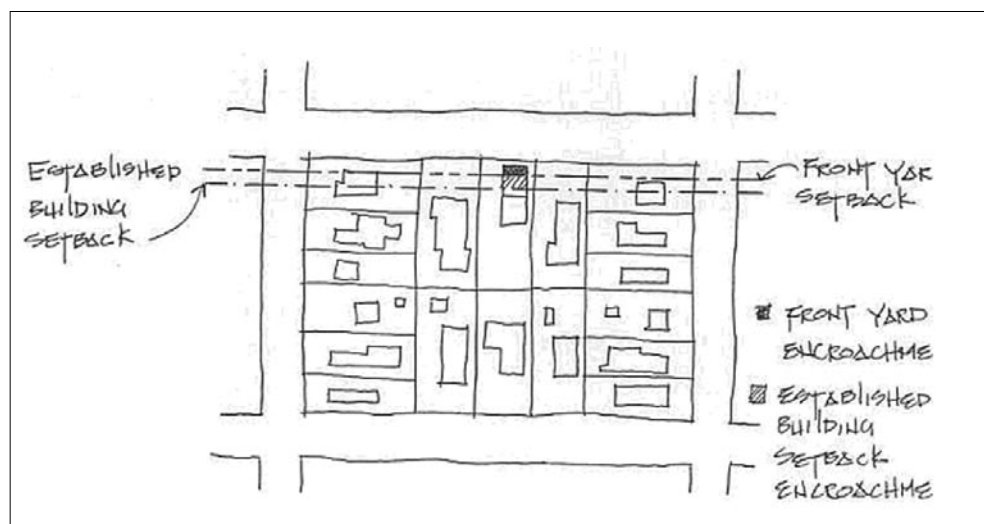
## 2.3 BUILDING SETBACK

Building line/setback is the prescribed distance which a building facing a road shall be setback from the centre line of the street, or the minimum distance of all buildings or permanent structures that shall be setback from the centre of the street.

Building setback maintains the character and aesthetic of the neighbourhood, while ensuring the building or structure is accessible. It forms a barrier to noise pollution and emissions from vehicles, reduces the intrusion of towering buildings along the road and facilitates future improvements of roads, utilities and other civil works.

New or proposed buildings/structures should follow the requirement of the relevant authority. If this cannot be achieved the existing building setback may be allowed.

Type of Road	Road Reservation (Metres)	Building Setback from Road Centre Line (metres)
1) Arterial Primary Roads due for dualization.	30.48 – 36.58	25.91
2) Secondary Main Road.	15.24 – 22.86	19.20
3) Parochial Roads.	10.06 – 12.19	12.12



## 2.4 ROAD DETAILS

The material classes for use with typical road designs are set out at table 2.

Table 2: Material classes for use with typical road designs.

CODE	MATERIAL	SPECIFICATIONS
G4	Crushed and natural gravel Eg: Marl Limestone, Alluvium (River Shingle)	Minimum CBR = 80 % @ 98 % Mod. AASHTO, Maximum size 37.5 mm; CBR = 98 @ 100 % Mod. AASHTO; PI < 6; Max. swell = 0.2 % @ 100 % Mod. AASHTO. For calcrete PI < 8
G5	Natural gravels	Minimum CBR = 45 % @ 95 % Mod. AASHTO, Maximum size 63 mm or 2/3 of layer thickness; Density as per prescribed layer usage; PI < 10; Max. swell = 0.5 % @ 100 % Mod. AASHTO
G6	Natural gravels	Minimum CBR = 25 % @ 95 % Mod. AASHTO, Maximum size 63 mm or 2/3 of layer thickness; Density as per prescribed layer usage; PI < 12; Max. swell 1.0 % @ 100 % Mod. AASHTO
G7	Gravel / soil	Minimum CBR = 15 % @ 93 % Mod. AASHTO, Maximum size 2/3 of layer thickness; Density as per prescribed layer usage; PI < 12 or 3GM + 10; Max. swell 1.5 % @ 100 % Mod. AASHTO.
G8	Gravel / soil	Minimum CBR = 10 % @ 93 % Mod. AASHTO, Maximum size 2/3 of layer thickness; Density as per prescribed layer usage; PI < 12 or 3GM + 10; Max. swell 1.5 % @ 100 % Mod. AASHTO.
G9	Gravel / soil	Minimum CBR = 7 % @ 93 % Mod. AASHTO, Maximum size 2/3 of layer thickness; Density as per prescribed layer usage; PI < 12 or 3GM + 10; Max. swell 1.5 % @ 100 % Mod. AASHTO.
G10	Gravel / soil	Minimum CBR = 3 % @ 93 % Mod. AASHTO, Maximum size 2/3 of layer thickness; Density as per prescribed layer usage or 90 % Mod. AASHTO.

## 2.5 BASE SPECIFICATIONS FOR ROADS

### 2.5.1 Granular Base-course

The Base-course layer shall be made of graded crushed aggregate. The crushed stone of 0 -37.5 mm /0 -1.5" size shall be made of Marley Limestone.

The grading shall conform to the requirements given in the following table and the fraction passing the 0.075 mm sieve shall not exceed two thirds of the fraction passing the 0.6 sieve:

Table 3

Sieve Size		Percentage by Weight Passing
Metric	Imperial (BS)	
37.5mm	1 1/2	100
20mm	3/4	80 – 100
10mm	3/8	55 – 80
5mm	3/16 (No. 4)	40 – 60
2.36mm	No. 8	30 – 50
0.6mm	No. 25	15 – 30
0.075mm	No.200	5 – 15

The physical properties shall be:

Coefficient of Uniformity	10 - 40
Abrasion Test (Los Angeles)	max. 50%
Sodium Sulphate Soundness Test Loss on five cycles	not more than 12%
Liquid Limit	Max. 25%
Plasticity Index	Max. 6%
Linear Swell	Max. 0.3%
California Bearing Ratio (C.B.R)	Min. 80%

Alternate road design may be submitted for review and consideration.

## 2.5.2 Sub - Base Specifications

### Granular Sub-base

The sub-base material shall be crushed aggregate. The crushed stone of 0-75 mm / 0 -3" size shall be of Marley Limestone.

The grading shall conform to the requirements given in Table 4:

Table 4

Sieve Size		Percentage by Weight Passing
Metric	Imperial (BS)	
75mm	3	100
37.5mm	1 1/2	80-100
20mm	3/4	60 – 80
10mm	3/8	45 – 65
5mm	3/16 (No. 4)	30 – 50
0.6mm	No. 25	10 – 30
0.075mm	No.200	5 – 15

The physical properties shall be:

Abrasion Test (Los Angeles)      Max. 50%

CBR (4 days soaked)                  Min. 30%

Liquid Limit                              Max. 30%

Plasticity Index                          Max. 10%

Alternate grading may be submitted for consideration or approval.

## 2.6 ASPHALTIC CONCRETE SPECIFICATIONS

### 2.6.1 Materials for Asphalt Concrete

The bitumen shall be 80/100 or 60/70 penetration grade and conform to BS 3690, bitumen for road purposes. Aggregates for asphalt concrete shall be entirely crushed material and provided from approved source. The grading of the mixture of coarse and fine aggregate shall be within and approximately parallel to the grading envelope given in Table 5 below.

Table 5 Grading Envelope for Aggregates for Asphalt Concrete

Sieve Size		Percentage Weight Passing
Metric	Imperial (ASTM)	
20mm	3/4	100
14mm	1/2	90 – 100
10mm	3/8	70 – 90
6.3mm	1/4	55 – 75
4mm	3/16 (No.4)	45 – 63
2mm	No.10	33 - 48
1mm	No.16	23 – 38
0.425mm	No.40	14 – 25
0.300mm	No.50	12 – 22
0.150mm	No.100	8 – 16
0.075mm	No.200	5 - 10

### 2.6.2 Coarse Aggregates

Coarse aggregates shall consist of sound crushed rock coarser than 2 mm and shall not contain pieces coated with deleterious material, dust, dirt or other objectionable matter. It shall be as free as is practicable from soft or non-durable particles and in no case shall contain more than 2 % of such material.

Coarse aggregates shall have test results not exceeding the following maxima:

Los Angeles Abrasion	25 %
30 % and/or Aggregate Crushing Value	
Sodium Sulphate Soundness	12 %
Flakiness Index	20 %
Water Absorption	2 % (BS 812)

The bitumen affinity of the stone shall be good and the bitumen retention shall be at least 75 % when tested for stripping. If there is less than 75 % of bitumen retention, the aggregates shall be rejected, or an approved method of treatment shall be used to change the material from a hydrophilic to a hydrophobic state.

### **2.6.3 Fine Aggregates**

Fine aggregates shall consist of crushed rock material finer than 2 mm and coarser than 0.09mm and shall be free from clay, silt, organic and other deleterious matter and shall be non- plastic.

Fine aggregates shall have test results not exceeding the following maxima:

Los Angeles Abrasion	40 %
Sodium Sulphate Soundness	12 %

### **2.6.4 Mineral Filler**

Mineral filler shall consist of material finer than 0.09 mm and ordinary Portland cement or finely ground particles of lime stone shall be used. At least 75% (by weight) shall pass a 0.075 mm sieve and 100% shall pass a 0.425 mm sieve. Mineral filler shall have a bulk density in toluene measured in accordance with BS 812 of between 0.5 and 0.9 kg per litre.

## 2.6.5 Requirements for Asphalt Concrete

The bitumen/binder content (by weight) shall be between five (5) and seven (7) percent and shall be agreed with the Engineer following laboratory tests and site trials. The mixture of the asphalt concrete shall comply with the following requirements:

Marshal Stability (75 blows per face)	min.8000N
Flow Value	2-4 mm
Voids in total Mix	min. 3 %, max. 5 %
Voids filled with Bitumen	75-85%

## 2.6.6 Drawings

Drawings must show typical section of all road types with the appropriate details. These include:

Road Cross Sections  
Drainage Structures and Features  
Road Profiles

## 2.7 STANDARDS FOR ROAD DESIGNS FOR TYPICAL CLASSES

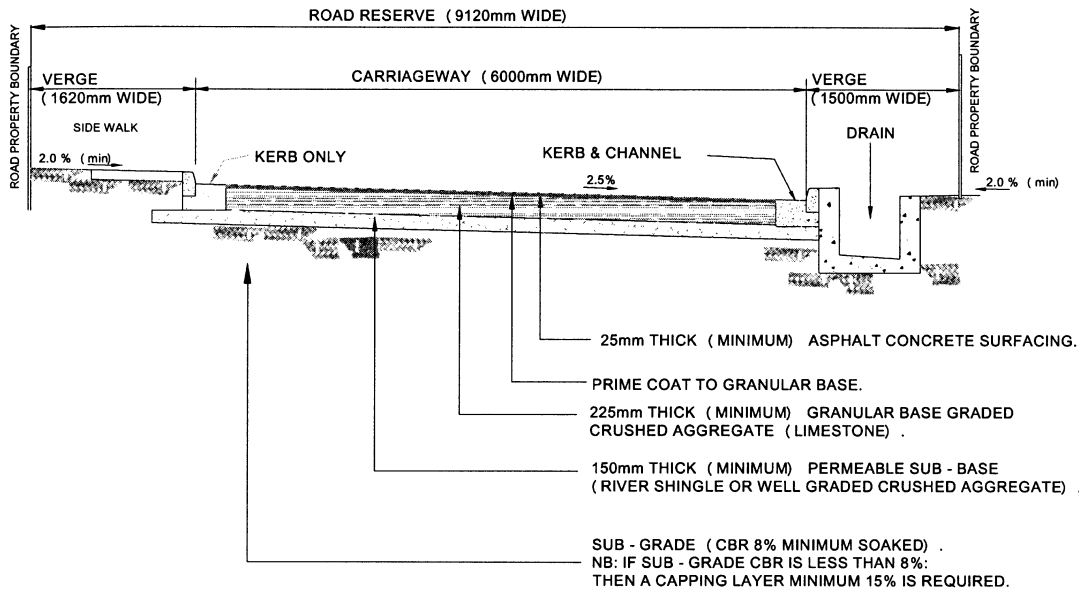
The standards for each classification are illustrated in the following diagrams. The compositions shown below are applicable to conditions where the sub grades have a minimum soaked C.B.R. 8%.

Where C.B.R. is less than 8% a design/treatment should be submitted for review and consideration by the NWA

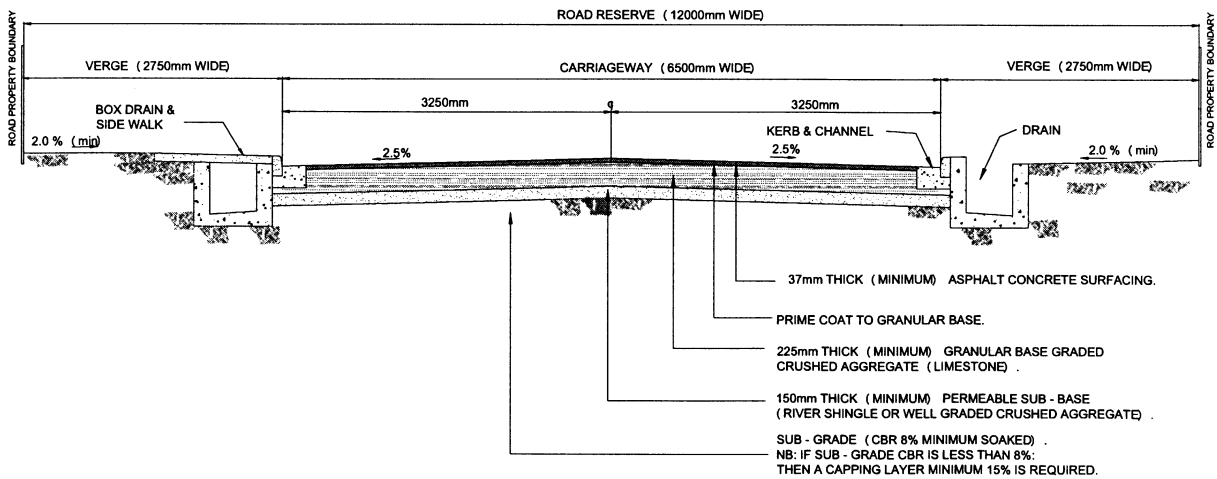


TYPICAL ROAD DESIGN

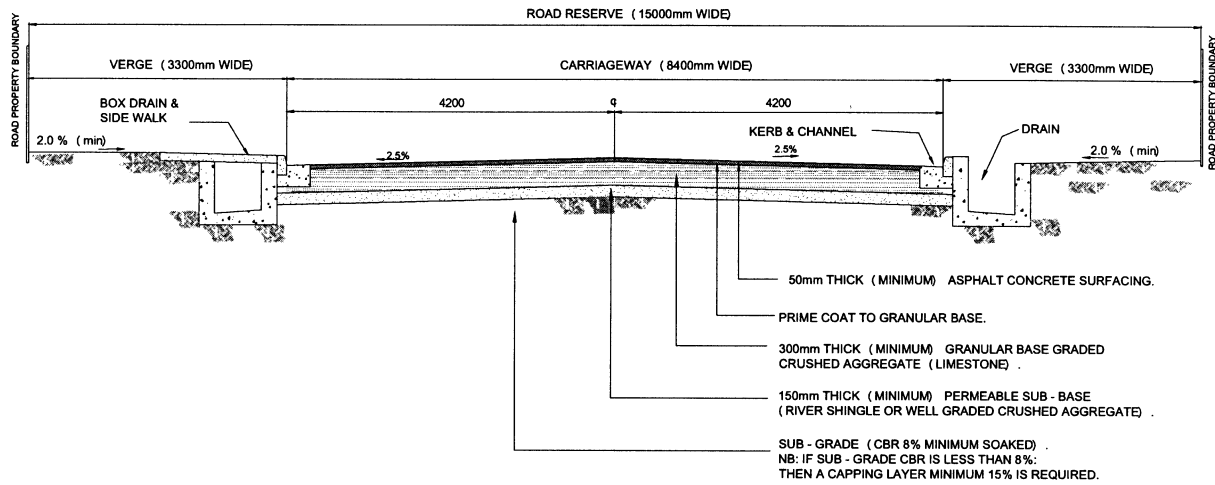
TYPICAL LOCAL / SERVICE ROAD



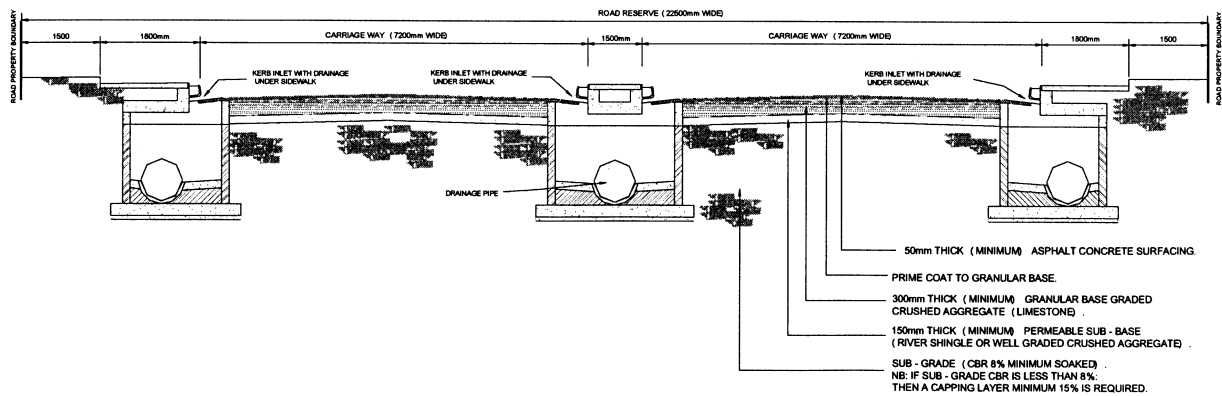
TYPICAL ESTATE & COLLECTOR ROAD

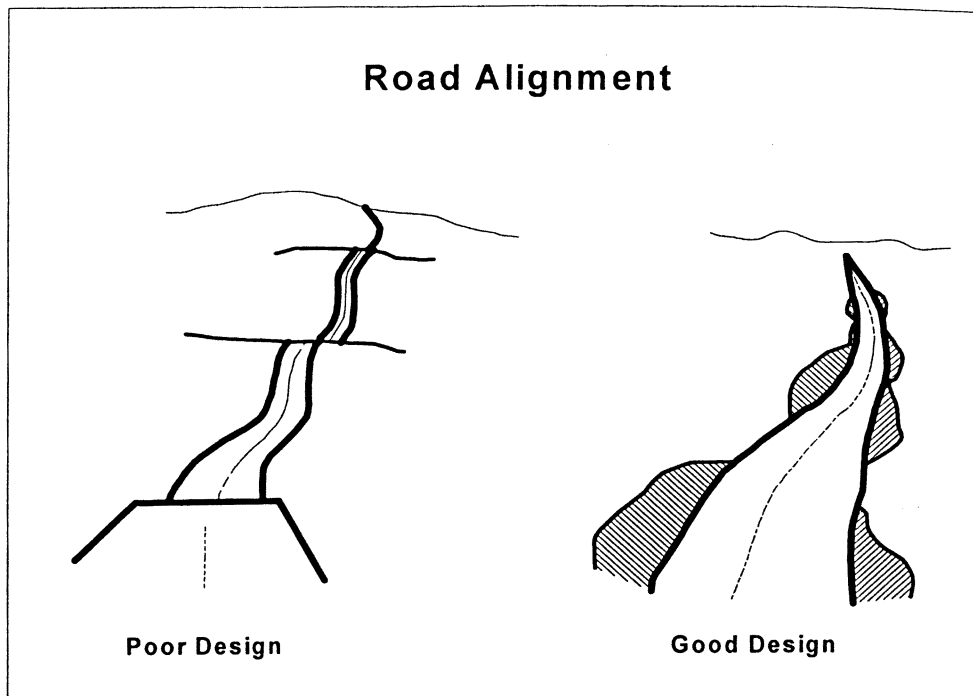


## TYPICAL ARTERIAL ROAD



## TYPICAL MAJOR ARTERIAL ROAD





## 2.8 Rise and Fall/ Curvature

The degree of curvature can reduce sight distance below the safe stopping distance at the design speed. Rise and fall exceeding 75m/km for a distance of 10km will result in an uncomfortable ride.

All designs will be checked to ensure that the vertical and horizontal curves have the minimum stopping and overtaking sight distances.

## **CHAPTER 3**

### **FUNCTION OF ROADS**

#### **3.0 ROAD FUNCTIONS**

The function of a main road is to carry vehicular traffic between towns. For that purpose intersections with access roads should be as few as possible as they reduce the speed of the traffic and the capacity and safety of the road. The standard for minimum distance between intersections will be regulated by the appropriate road authority. This distance depends on the classification of the main road.

#### **3.1 ACCESS AND EGRESS**

The design of access from lots to public roads and from a road of lower degree into one of higher degree in the hierarchy of roads according to classification should be obtained from the relevant road authority for the preparation of detailed plans. Service and collector roads shall be laid out in such manner as to discourage their use by through traffic. Service roads should be provided where necessary to avoid more than two entrances from the proposed developed area onto the main road and improve site distance.

#### **3.2 ROAD RESERVATION WIDTH**

The reservation width of roads shall be determined by the Planning Authorities on the recommendations of the Ministry of Transport and Works and the National Works Agency. This width should be the whole space dedicated to the public (between adjacent property boundaries) measured at right angles to the direction of the road. The width of the road should be indicated on the plan (or the distance from the centre line to the boundary).

#### **3.3 ROAD WIDTH**

Roads should be of sufficient width, (see Table 1) suitably graded and located, and adequately constructed to accommodate the traffic, afford adequate light and air, facilitate public transport, provide access for fire protection, and refuse collection vehicles and road maintenance equipment. These roads should be co-ordinated as to compose a convenient system properly related to the proposals shown on the development plan. The arrangements of roads should be such as to avoid undue hardship to adjoining property owners/occupiers and no property shall be rendered inaccessible from an existing public road or from a proposed road in a subdivision.

### **3.4 KERB DESIGN**

All carriageways are to be protected by kerbs running parallel on each side where the design permits. This recommended kerb design should be one which allows for a continuous visual line unbroken by driveways giving access to each dwelling unit along the length of the roadway.

### **3.5 ROADS IN SUBDIVISIONS**

The arrangement of roads in the subdivision may, if required, provide for the entrance and continuation of principal roads from adjoining subdivisions and for the extension of principal roads into adjoining land which has not yet been subdivided. Such arrangements may be required in order to facilitate fire fighting movement of vehicles, pedestrians, physically challenged and the construction or extension of necessary utilities and public services such as sewers, water supply and drainage.

### **3.6 INTERSECTIONS**

Intersection of streets should be approximately at right angles. Typical intersection designs may be obtained from the Ministry of Transport and Works (National Works Agency).

### **3.7 TYPES OF ROAD LAYOUT**

#### **3.7.1 Grid Plan**

This is the traditional road layout which was developed before the introduction of the automobile. Although this form of layout is still appropriate in some of the older urban areas, care must be taken to determine if it is suitable for new development where the scale and type of housing are different, where the topography of the site does not permit economic development in this manner and the traffic pattern must be designed to reduce potential hazards to the minimum.

Where a grid or modified grid plan is considered to be appropriate the following factors should be taken into consideration:

- i As few houses as possible should face the shorter linking roads normally about 61m/200ft in length
- ii Continuous road frontage should not exceed 366m /1,200ft. This distance can be increased to a maximum of 488m /1,600ft, if a

public pedestrian access way with a minimum width of 3m /9.84ft is provided near the mid point giving direct access to an adjacent road.

### **3.7.2 Other Road Plans**

Road systems may utilize other forms of layout including cul-de-sac, loop roads and P-loops. In the use of these service road forms, the following factors should be considered:

#### **i Cul de sacs**

When a cul-de-sac is used in residential development it should be provided with a paved, turning circle of sufficient width to facilitate easy access, and the turning of not only cars but trucks and other heavy vehicles like motor fire-engine etc. The recommended minimum radius is 10m /32.8ft.

The maximum length of a cul-de-sac should be 107m /350ft to the turning circle. This distance may, however, be increased to 183m /600ft if any emergency vehicular access and pedestrian walkway of a minimum width of 3m /9.84ft is provided from the turning circle of a cul-de-sac giving direct access to an adjacent road. Cul-de-sacs should not be located as a direct extension of estate roads. Types of cul-de-sacs or dead-end streets below are illustrated in Figure 1 of page 20.

#### **ii P-Loops**

P-loops which are defined as loop roads from a single access point should have an entrance leg not exceeding 213m /698.8ft and should have an emergency vehicular access way with a minimum width of 3m /9.84ft, from the loop giving direct access to an adjacent road. The loop should have a road length not exceeding 427m /1,400ft as illustrated in Figure 2 of page 20.

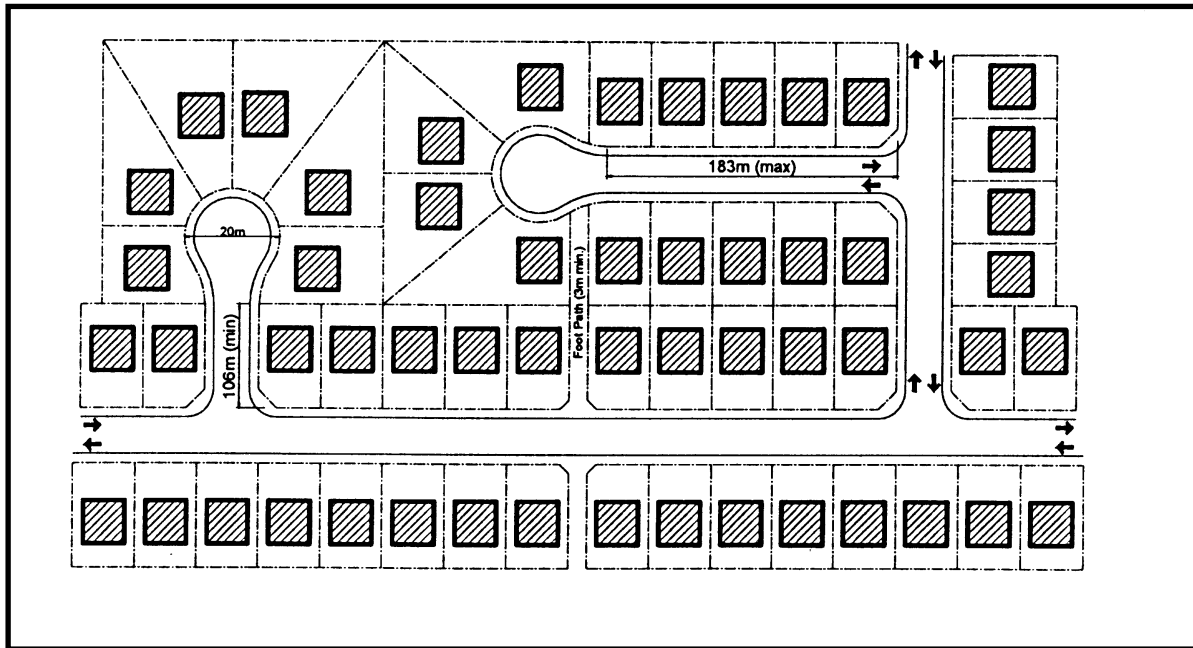


Figure 1: Cul-de-sacs

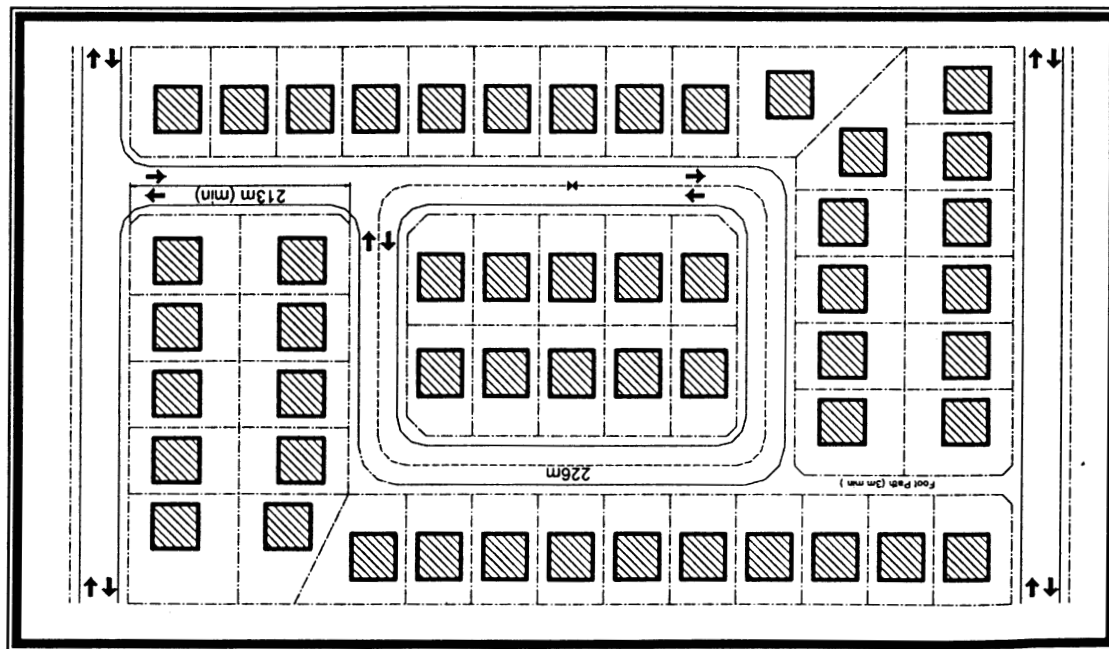
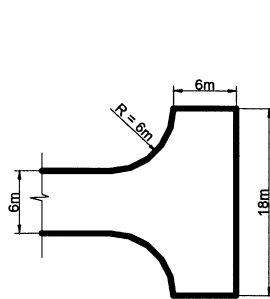


Figure 2: P-loops

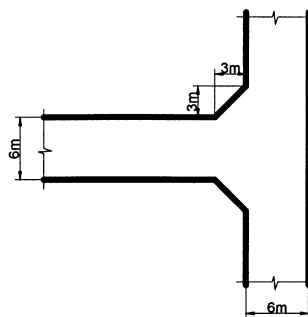
### 3.7.3 Cul-de-sacs or Dead End Streets

The following designs are suitable for cul-de-sacs or dead end streets:

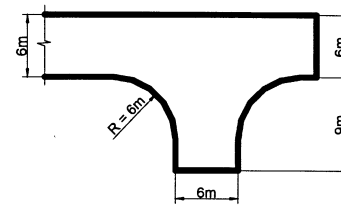
#### TYPES OF CUL-DE-SACS OR DEAD-END STREETS



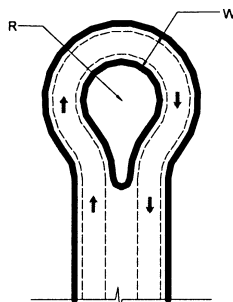
STANDARD TURNING AREA



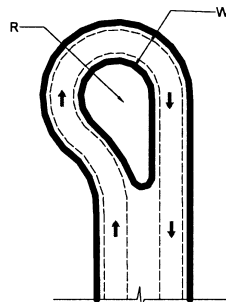
STANDARD CUT-CORNERS



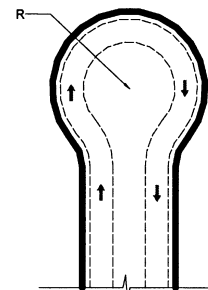
MINIMUM TURNING AREA



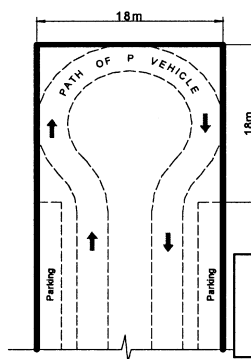
CIRCULAR



CIRCULAR

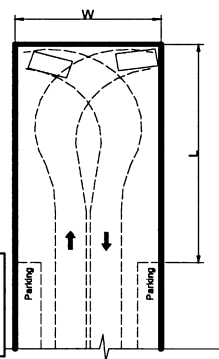


CIRCULAR - ALL PAVED



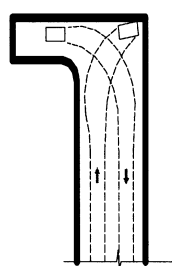
SQUARE END - TYPE 1

W	L
9.14m	18.3m
15.24m	30.5m

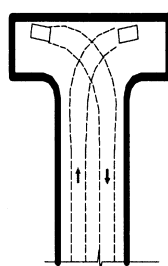


SQUARE END - TYPE 2

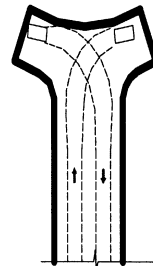
Vehicles	R	W
P	9.14m	5.49m
WB-40	12.80m	7.62m
SU&WB-50	14.33m	9.14m



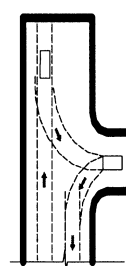
L-TYPE



T-TYPE



Y-TYPE



BRANCH



### 3.8 ROAD GRADIENTS

Steep gradients should be reduced to a minimum and avoided at road intersections. As a general rule no residential road should have a gradient in excess of 15%. For a distance of 50m / 164 ft) from a road junction, the gradient of a subdivision road shall not exceed 5%.

Combination vertical and horizontal curves should be avoided or minimised.

### 3.9 ROAD INTERSECTIONS/JUNCTIONS

Intersections of more than two roads should be avoided where possible as they represent potential collision points and unless clearly marked, the classifications of roads will not be apparent. Y-intersections can also be misleading unless one route is given obvious precedence over that adjoining it. T-intersections are generally preferred because vehicles entering the through roads are forced to stop or slow down, thus reducing the likelihood of collisions. T-intersections should be avoided on the inside curves of through roads where sight distance or stopping distance will be compromised.

Roads forming an intersection should meet one another at an angle of 90° plus or minus of 10°. This alignment should be maintained for a distance of 30.5m / 100 ft measured from the centre point of the intersection.

No residential road intersection on the same or opposite sides of a road should be closer than 61m / 196.8 ft between limits of road right-of-way unless warranted by exceptional site conditions.

Junctions should be avoided near changing vertical gradients and or horizontal curves or where a driver's vision is likely to be obstructed.

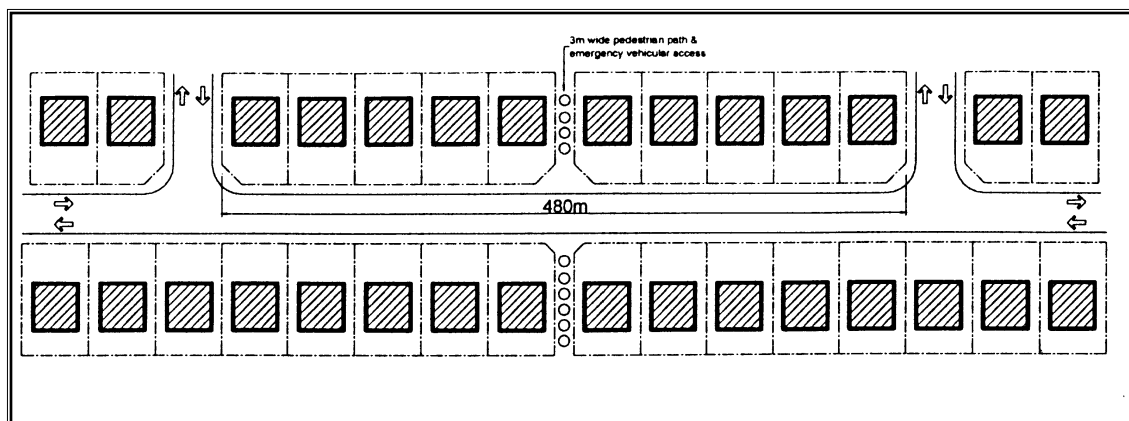


Figure 3 T-Junctions

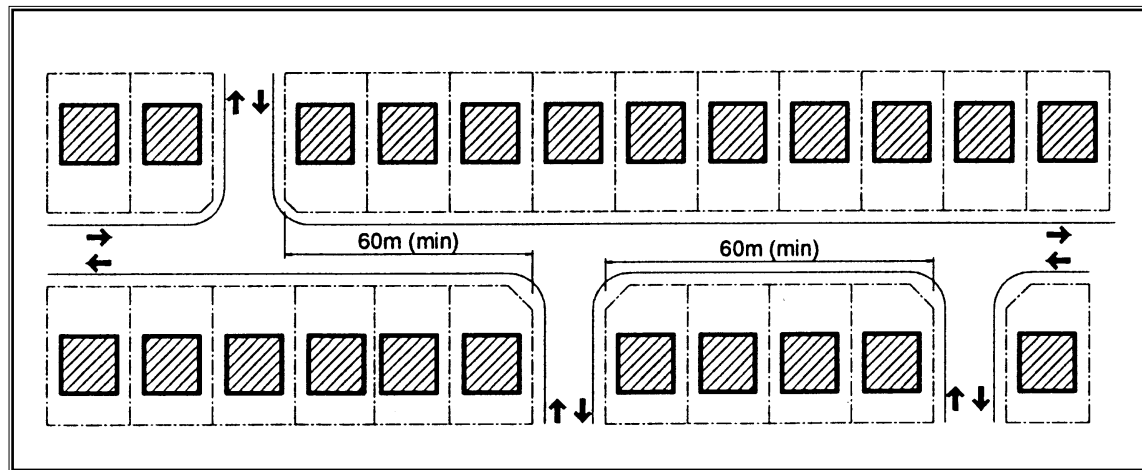


Figure 4. Staggered T-Junction

### 3.10 PEDESTRIAN ACCESS WAYS

The two major types of pedestrian access ways are footpaths and sidewalks.

### 3.11 DISABLED ACCESS WAY

The construction of roads and sidewalks must provide ramp for the disabled at strategic locations along the road. New sidewalks should be not less than 2m wide. Special consideration may be given for sidewalk less than 2m wide. No structure or obstacle should be placed within the area reserved for sidewalk and the sidewalk should be continuous across driveways (unbroken).

## CHAPTER 4

### PARKING AND LOADING

#### 4.0 GENERAL

Provision should be made within the boundaries of the site of all new and extended buildings for the parking of customers', employees' and visitors' vehicles in accordance with the standards, provided that:

- i Special consideration can be given to dual use of parking areas in mixed development where the uses alternate in terms of time scale.
- ii Where the use of any building is not specifically mentioned in the schedule or more than one use is involved, the planning authority shall determine the parking provision.
- iii For each car a standard allowance of approximately 28m<sup>2</sup> /301 ft<sup>2</sup> of parking site area inclusive of driveways should be made.
- iv Parking spaces should be provided in areas of practical shape which allows for the parking and manoeuvring of vehicles. Narrow and obstructed spaces, regardless of the number of spaces provided, are of no value for this purpose.
- v Provision should also be made within the site boundaries for loading of trucks and goods vehicles. The number of loading bays should be determined in accordance with the standards laid out in the Development Orders. The Planning Authority in consultation with the National Works Agency may waive this requirement when the building area is too small, the frontage of the site is short and service is not possible from the rear.
- vi Parking areas should be developed with paved driveways. The parking bays should be grasscrete constructed or prepared to allow percolation. The undeveloped areas are to be landscaped.

#### 4.1 SCHEDULES FOR PARKING, LOADING AND UNLOADING

Minimum parking requirements and loading/unloading bay requirements related to differing classes of land uses are set out in the following schedules seen in Tables 6 and 7.

**Table 6**  
**SCHEDULE OF OFF STREET PARKING REQUIREMENTS BY LAND USE**

Type of Development	Minimum Number of Vehicle Parking Spaces Required
Private Residence (up to two bedrooms)	1 for each individual unit
Private Residence (over two bedrooms)	2 for each individual unit.
Apartment Buildings and Town Houses	1.25 for each individual unit.
Elderly Persons Accommodation (self-contained dwellings)	2 per three units.
Elderly Persons Accommodation (grouped flatlets)	1 per three one bedroom units
Guest Houses	1 for each guest unit plus 1 for each 4.5 square metres of public dining room.
Motels and Hotels	1 for each guest unit plus 1 for each 4.5 square metres of public dining room. 1 coach parking space per 50 bed spaces in hotels.
Villas	1 per 2 bedroom villa 2 per 3 bedroom villa
Hostels for students	1 space for every 4 units plus 1 space per 2 full-time member of staff.
Civic Administration Buildings, Office Buildings, Libraries	1 for each 20 square metres of floor area inclusive of storerooms plus 1 space per unit for staff parking where the building is divided into smaller units.
Museums and Art Galleries	1 space per 30 square metres of public display space
Shops, Stores, Supermarkets	1 for each 20 square metres of gross floor area inclusive of store-rooms plus 1 space per unit for staff where the building is divided into smaller units
Markets	To be assessed individually
Restaurants	1 for each 4.5 square metres of public dining room
Take-away Fast Food Shops	6 spaces per unit, plus 1 for each 4.5 square metres of dining area or public dining room.
Hospitals Clinics/Health Centres	1 space for each 4 beds. 3 spaces for each practitioner.
Group medical, Veterinary or Dental Practices	2 spaces per practitioner
Creche, Day Nurseries or Day Care Centre	1 space per 3 staff members plus an area for setting down and picking up of children.

These are minimum requirements and the National Works Agency may raise the standard in relation to the present forecasted traffic volumes.

**Table 6**  
**SCHEDULE OF OFF STREET PARKING REQUIREMENTS BY LAND USE CONT'D**

Assembly Halls, Auditoriums, City and Town Halls Court House, Lecture Halls	1 for each 8 seats
Place of public worship or religious instruction	1 space per 7 seats or 1 space per 10 square metres if no permanent seat is provided.
Petrol Filling Station	5 car parking spaces per service bay plus a minimum of 3 car parking spaces up to a site area of 500 square metres and an additional space for each additional 250 square metres.
Golf Courses	4 spaces per hole
Tennis/Badminton	4 spaces per court.
Parking for Disabled	In all parking areas for developments open to the public consisting of 3 – 19 spaces – at least 1 space; 20 spaces or more – a minimum of 5% of the total number of spaces

**Table 7**

**LOADING/OFF LOADING BAY REQUIREMENTS**

<b>Types of Building</b>	<b>Number of Loading or Off-Loading Bays Required</b>
Shops, Showrooms, Stores, Markets, Hospitals	1 for each building up to 930 square metres plus 1 for each 1,850 square metres of floor area in excess of 930 square metres. 1 for each 930 square metres thereafter.
Industrial Buildings used for manufacturing or storage	1 for each building up to 460 square metres plus 1 for each 930 square metres of floor area in excess of 460 square metres to a total of 3. 1 for each 4,600 square metres thereafter.

## 4.2 CAR PARKING SPACE REQUIREMENTS

### 4.2.1 Space Requirements

For both enclosed and unenclosed parking an obstructed rectangular space 5.5m /18ft by 2.5m /8ft minimum shall be provided for each car except that:

- i Where parking is parallel to the kerb, the length of the car parking space shall be increased to 6.7m /22ft.
- ii Where circumstances allow a vehicle to overhang the kerb by 0.61m /2ft and such overhanging does not seriously limit the use of a sidewalk or other access, the length of the car parking space may be reduced to 4.9m /16 ft.
- iii Where the use of one car parking space is limited on both sides by a wall or column, the unobstructed width (face to face of obstruction) of the parking space shall be 3m /9.84ft or if a door opens into the parking space on its long side, 3.7m /12ft.
- iv Where the use of one parking space is limited on one side by a wall or column, the obstructed width (face to face of obstruction) of the parking space shall be 3m /9.84ft.

### 4.2.2 Width of Parking Aisle

The minimum width of a parking aisle shall be 5.5m /18ft except where parking is provided at a lesser angle to the aisle than 60 degrees and access is one way only, in which case the following aisle widths as set out at Table 8 shall apply:

**Table 8**

Angle of Parking	Aisle Width Minimum
30°	3.4m /11ft
45°	3.96m /13ft
60°	5.5m /18ft
90°	6.1m /20ft
Parallel	3.7m (12)

In the case of garages with columns, care must be taken to ensure proper moving of vehicles; in no case should a column project into a minimum parking space or aisle. See typical parking standards shown at paragraph 4.4 below.

### 4.3 GRADIENTS

Gradients of garages, and parking areas are as follows:

- i Maximum gradients for garages, car ports and parking areas shall be 1 in 20.
- ii Maximum cross slope for garages, car ports and parking areas shall be 1 in 20.

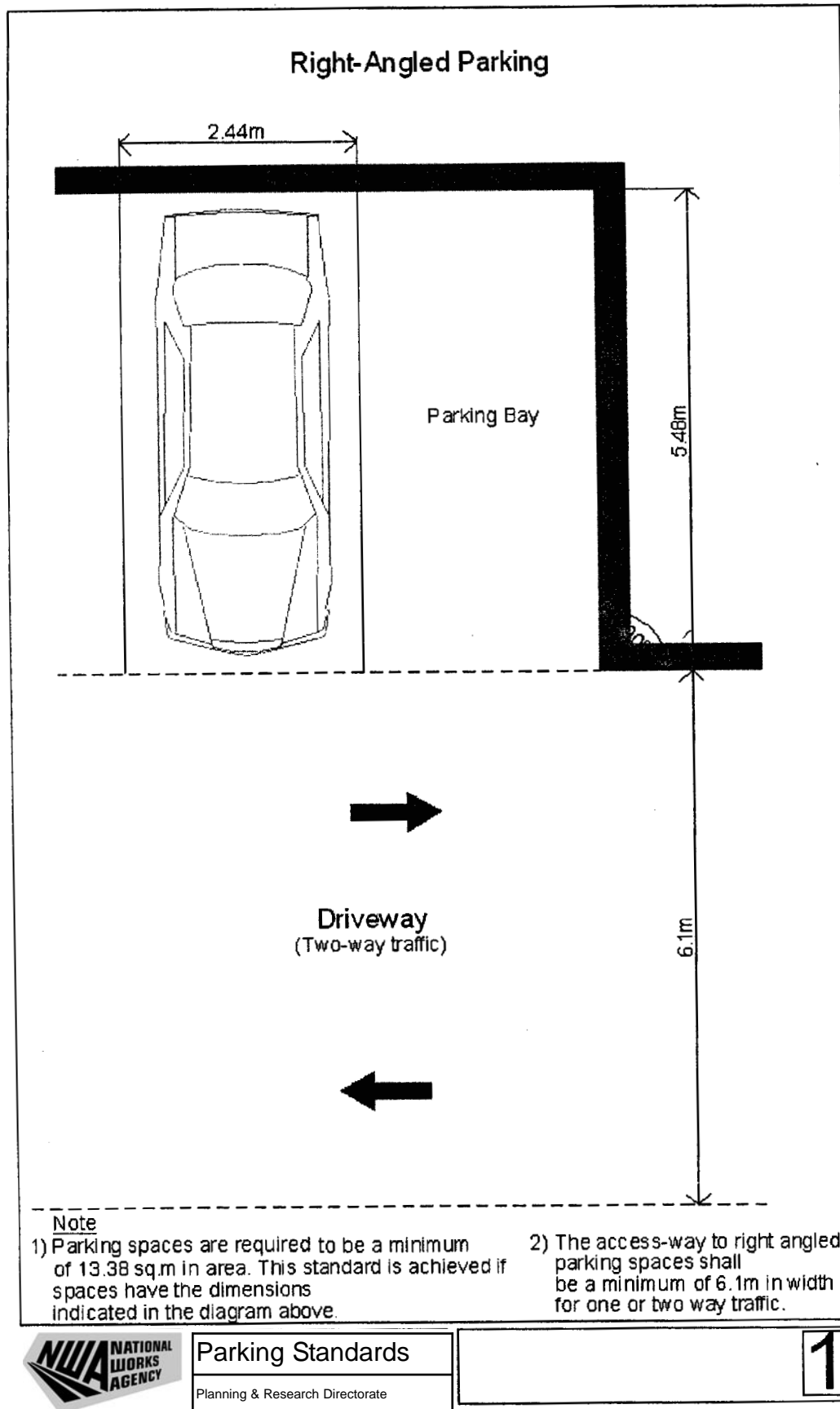
When the gradient is less than 1 in 40, the minimum cross slope shall be not less than 1 in 40.

*See illustration of parking standards 1 to 10, pages 25 to 34.*

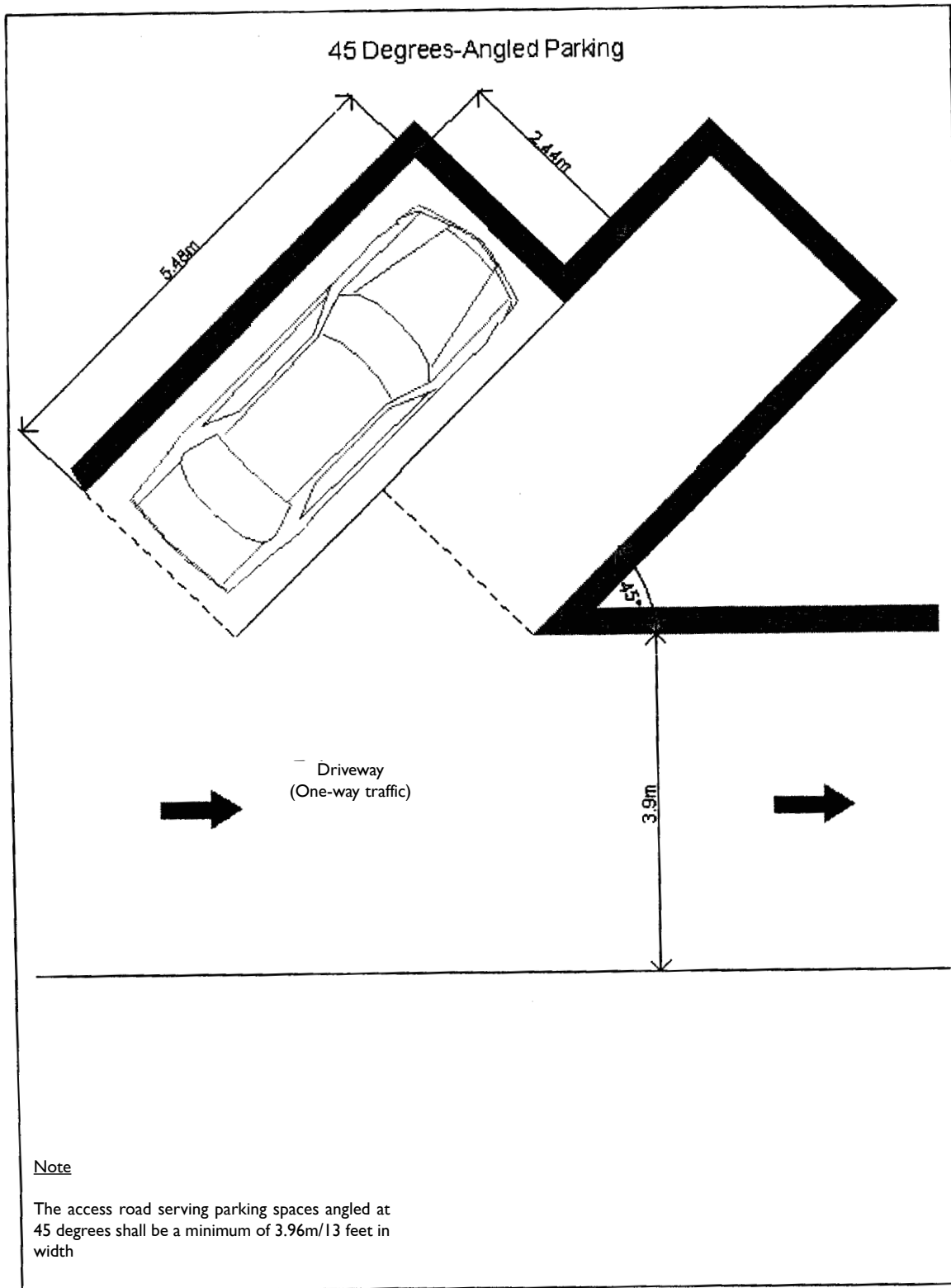
### 4.4 PARKING DESIGNS

The following designs illustrate parking standards and include:

- i Right angled parking
- ii 45 degree angled parking
- iii 60 degrees angled parking
- iv 30 degrees angled parking
- v Parallel parking
- vi Disabled parking bay
- vii 90 degrees angled parking design
- viii 30 degrees angled parking design
- ix 45 degrees angled parking design
- x 60 degrees angled parking design



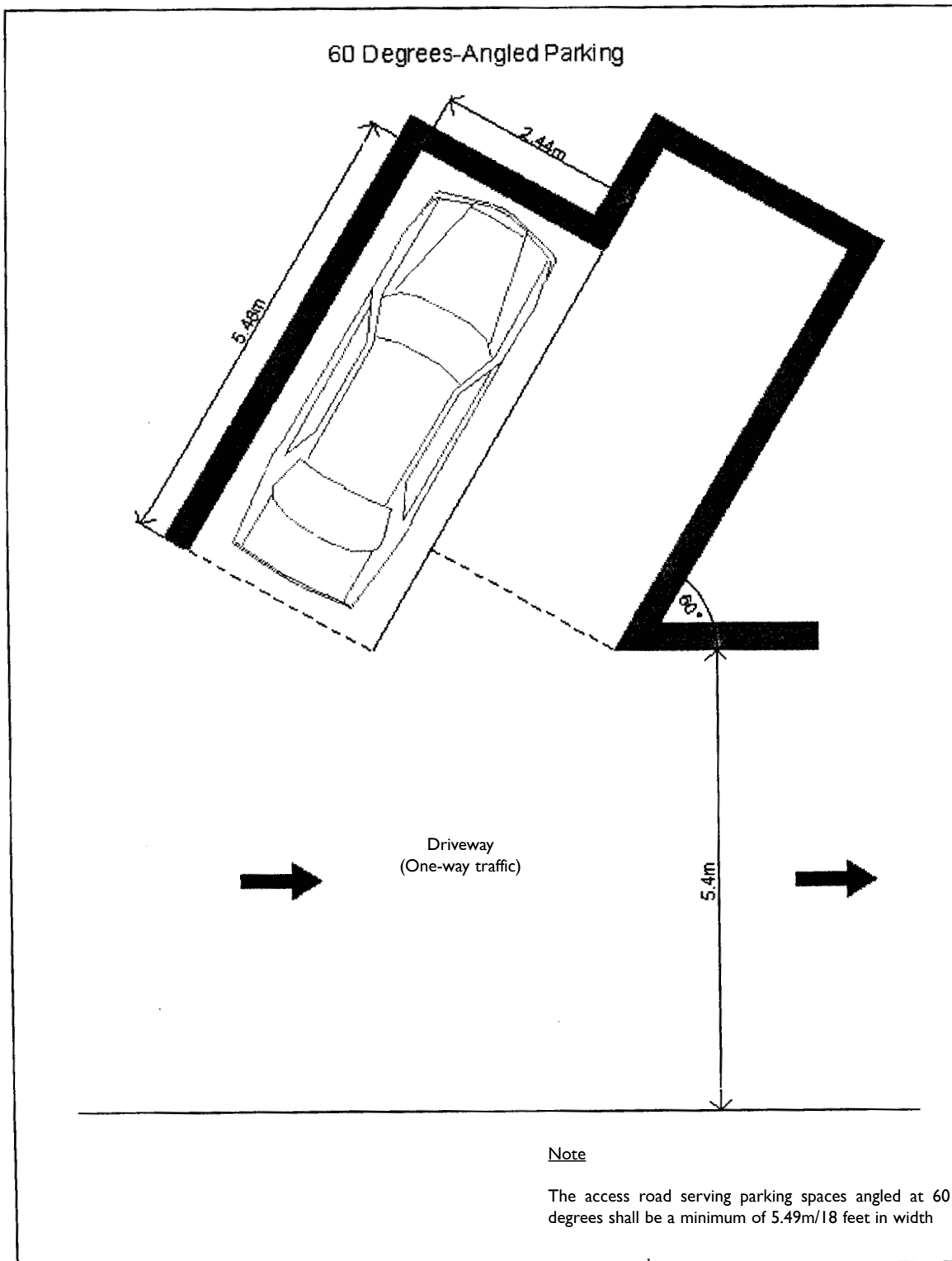




**Parking Standards**

Planning & Research Directorate

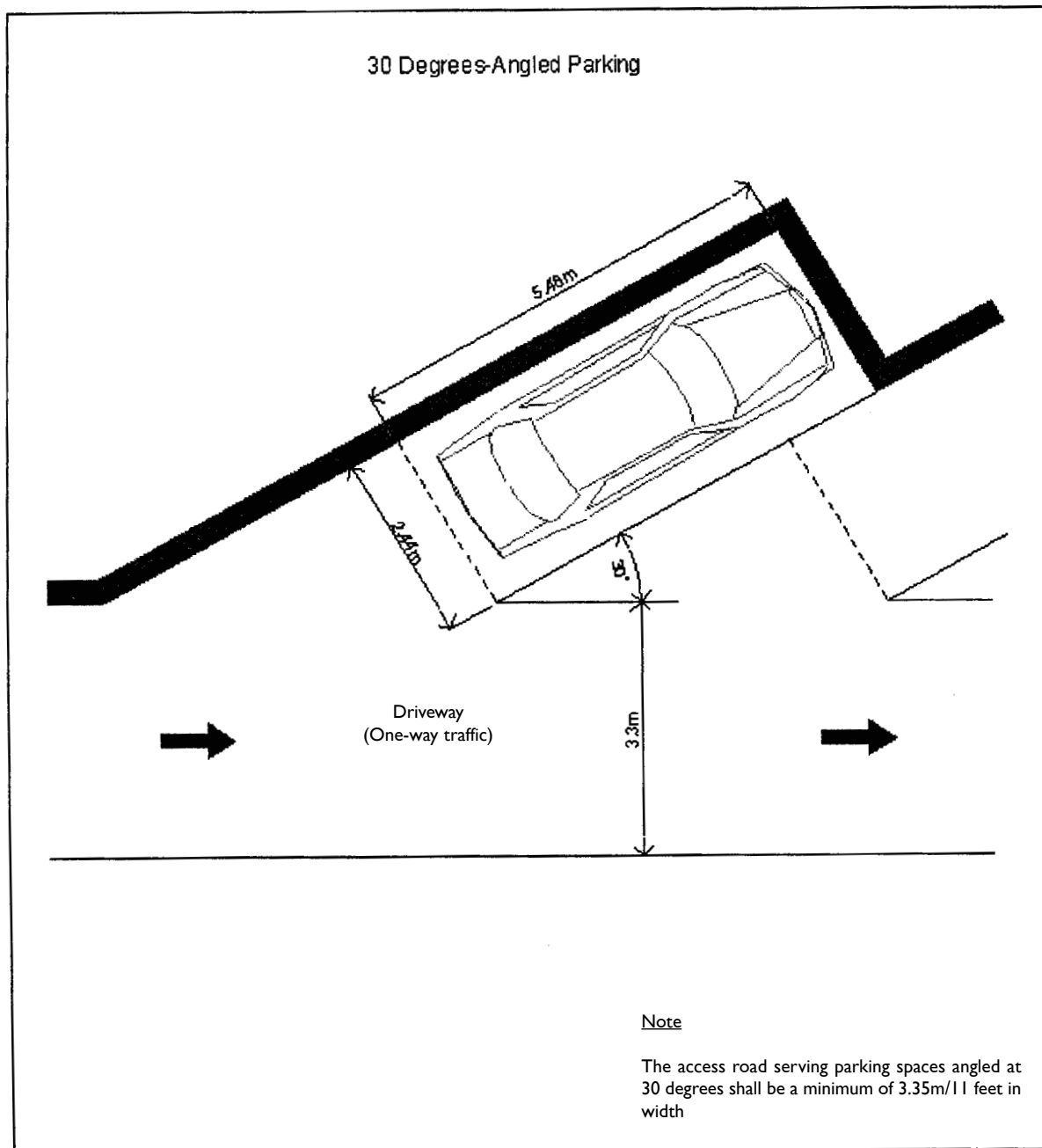
**2**



**Parking Standards**

Planning & Research Directorate

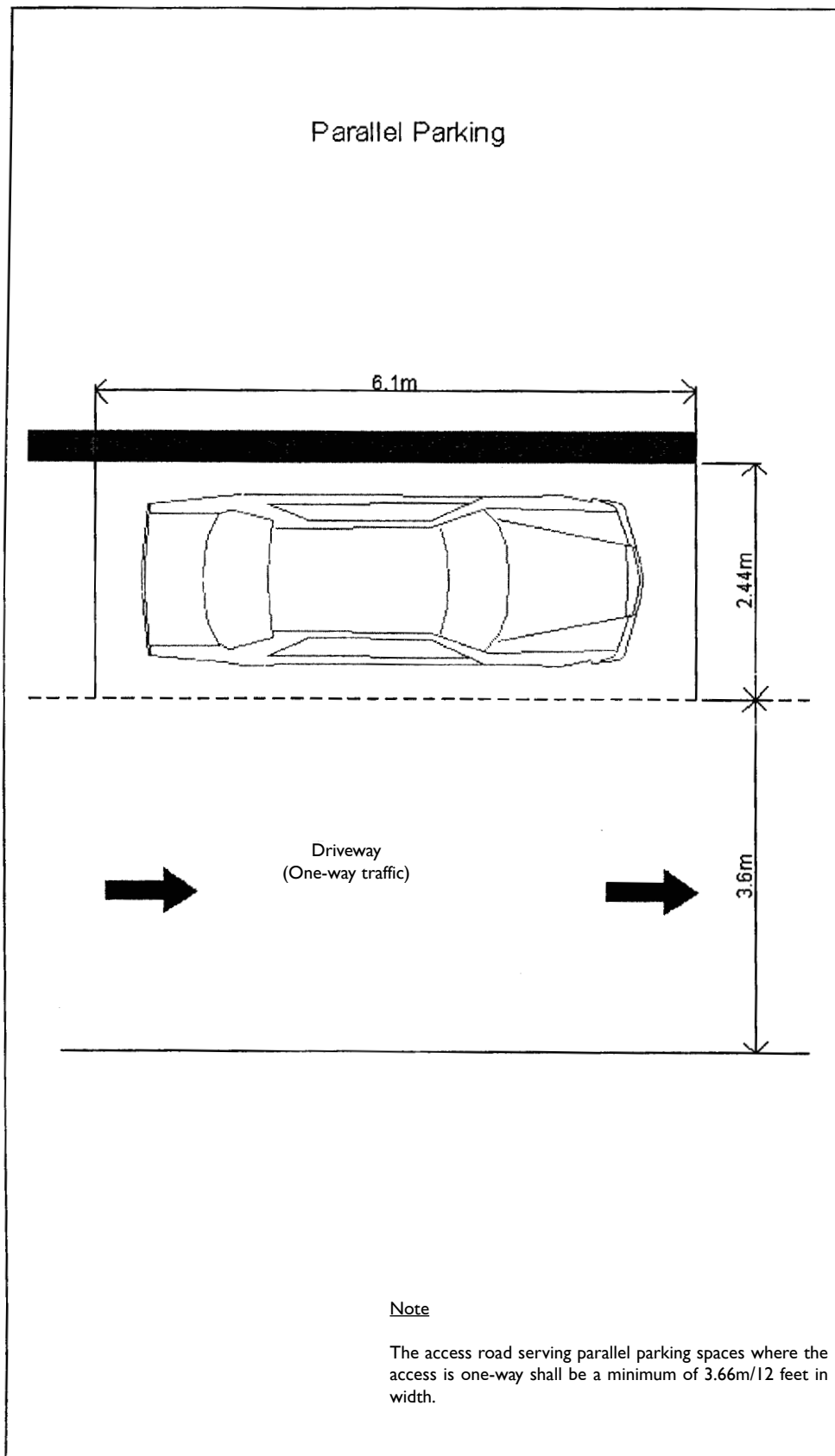
**3**



**Parking Standards**

Planning & Research Directorate

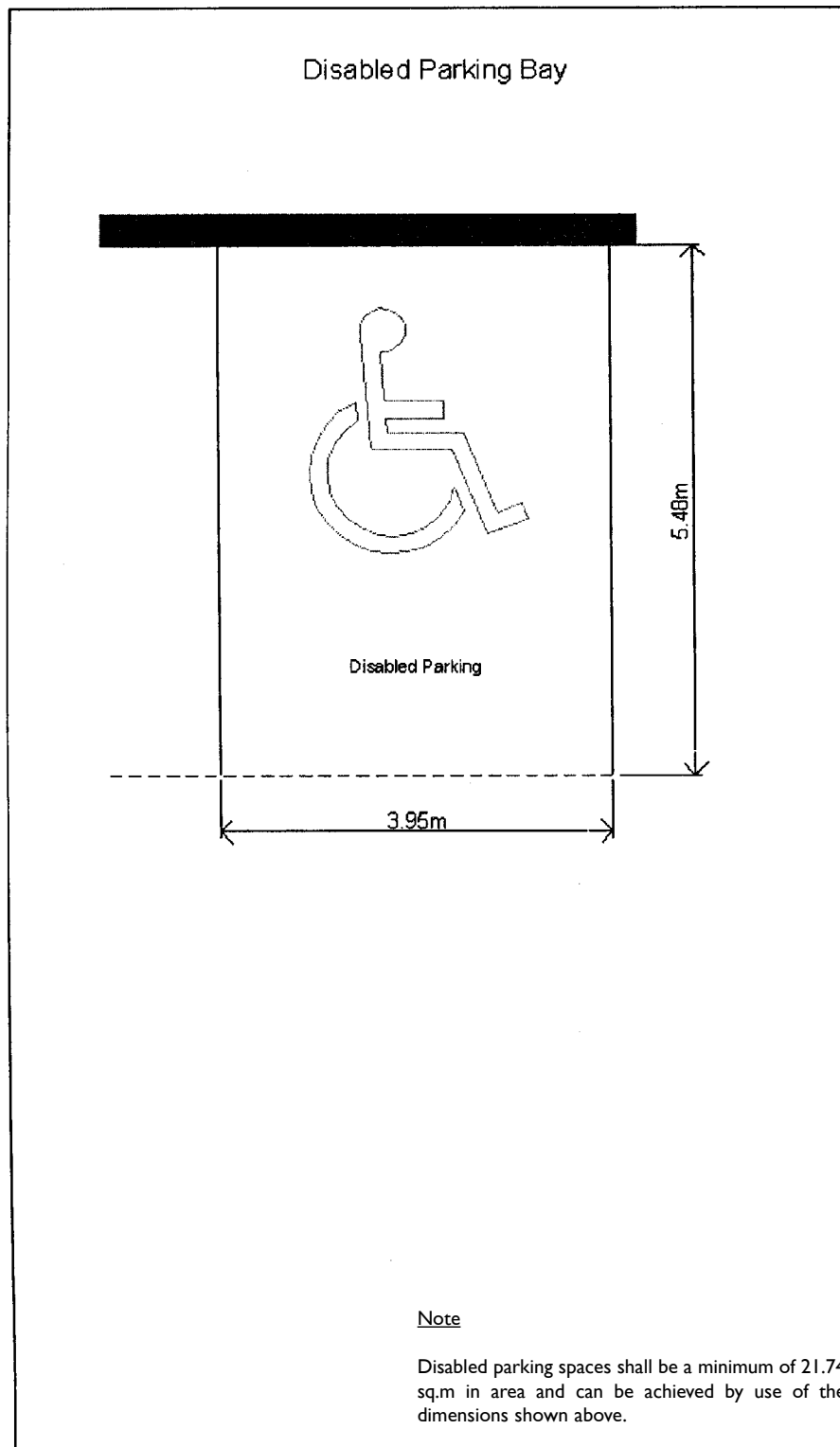
**4**



### Parking Standards

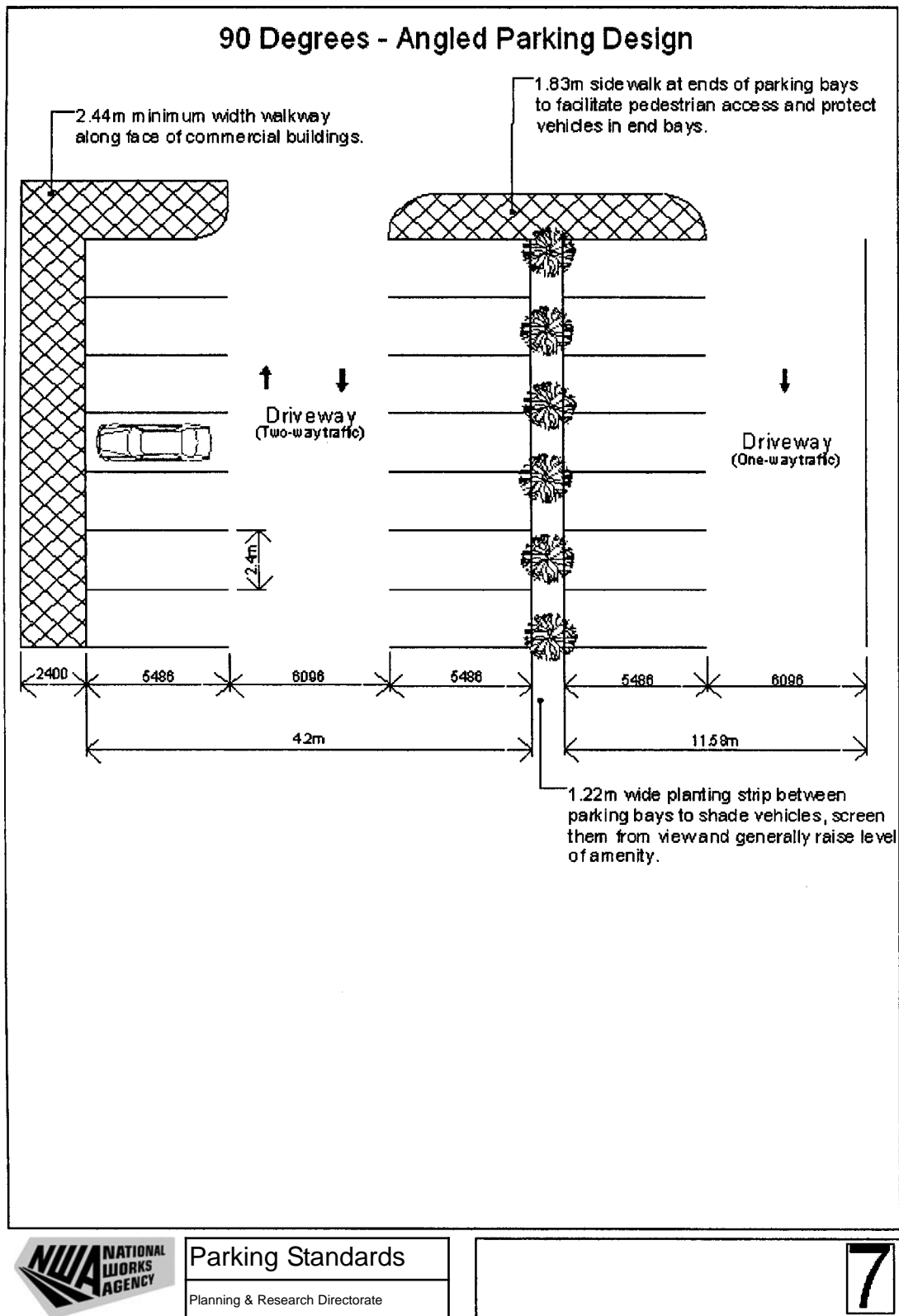
Planning & Research Directorate

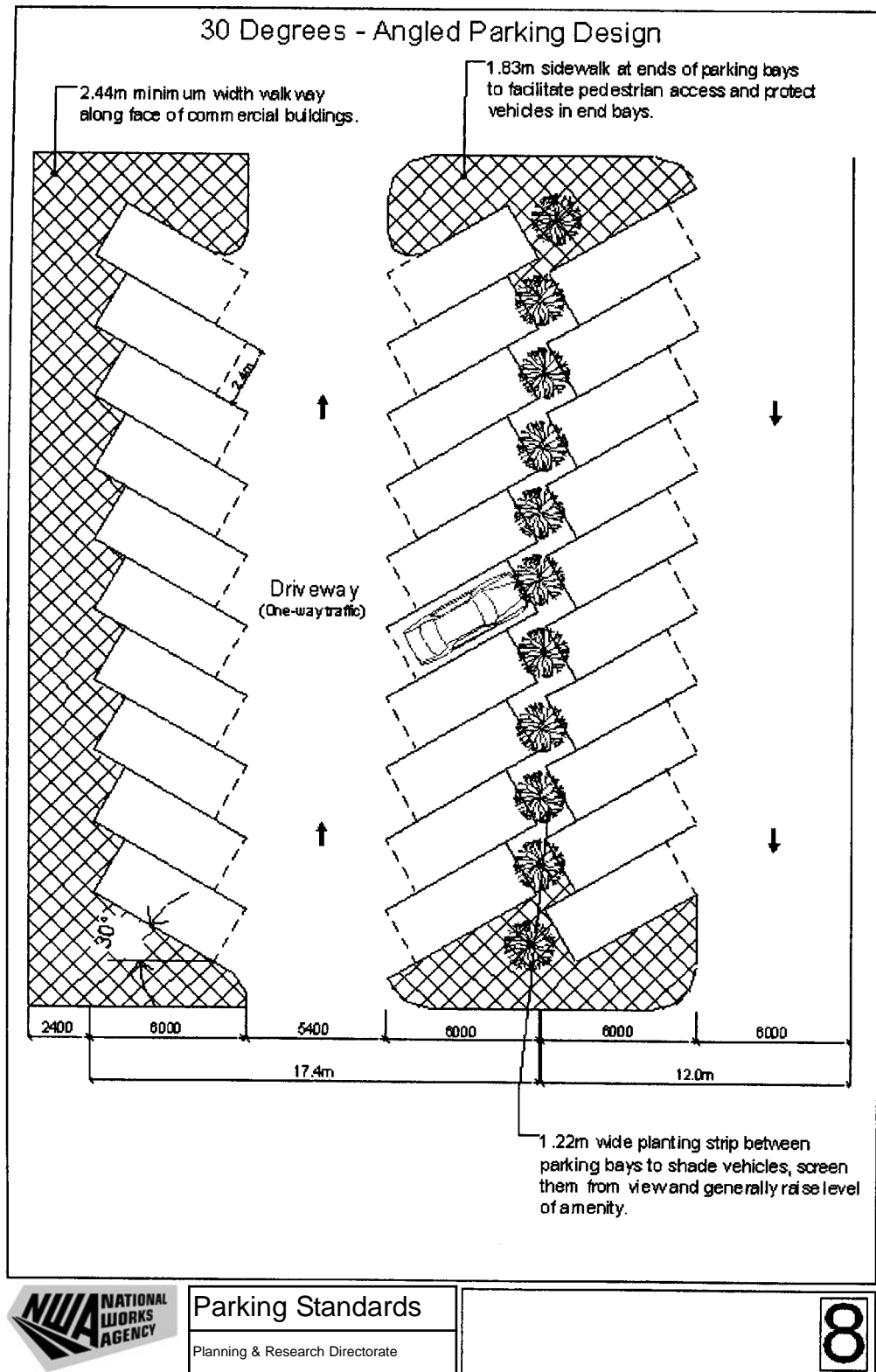
5



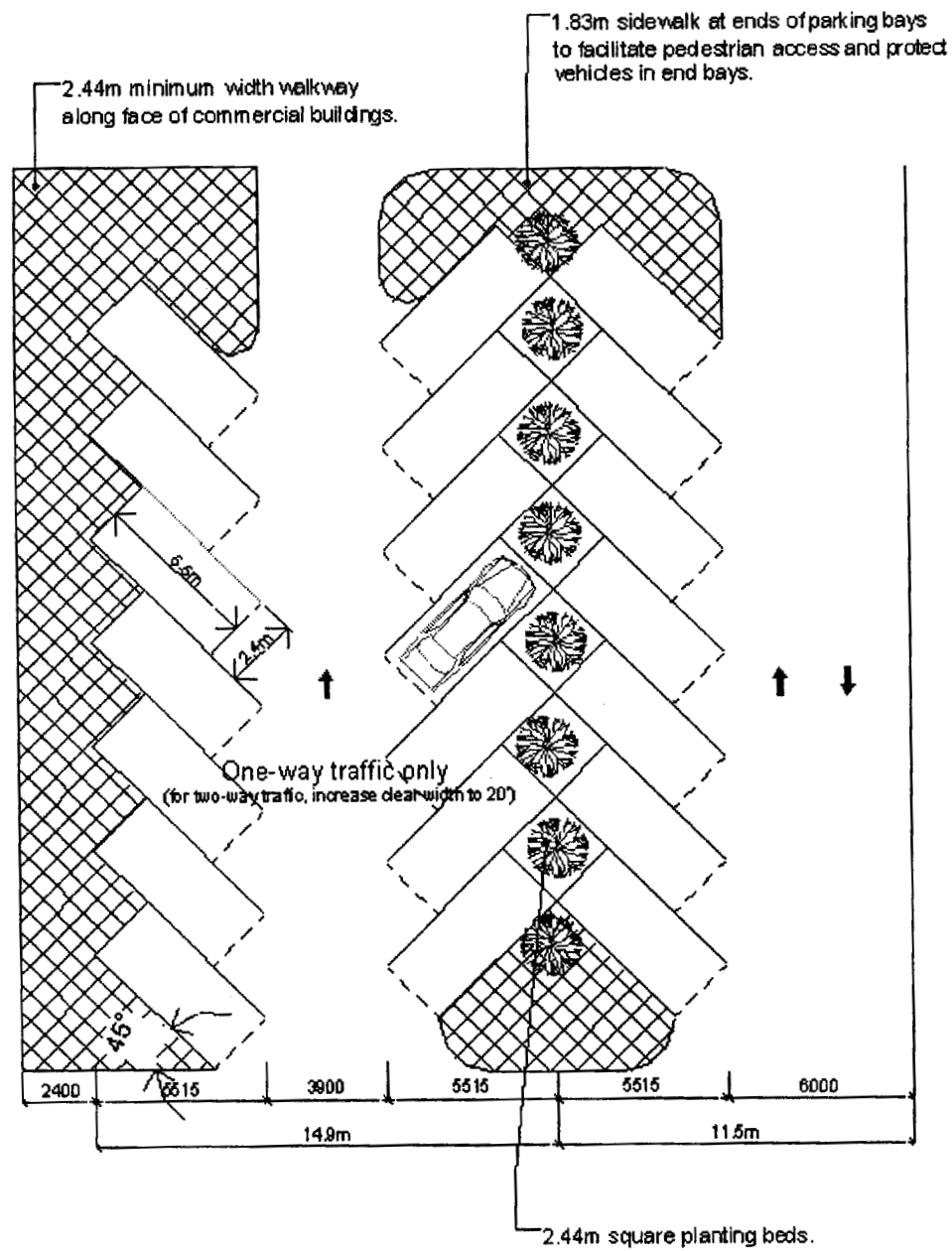
**Parking Standards**  
Planning & Research Directorate

**6**





### 45 Degrees - Angled Parking Design

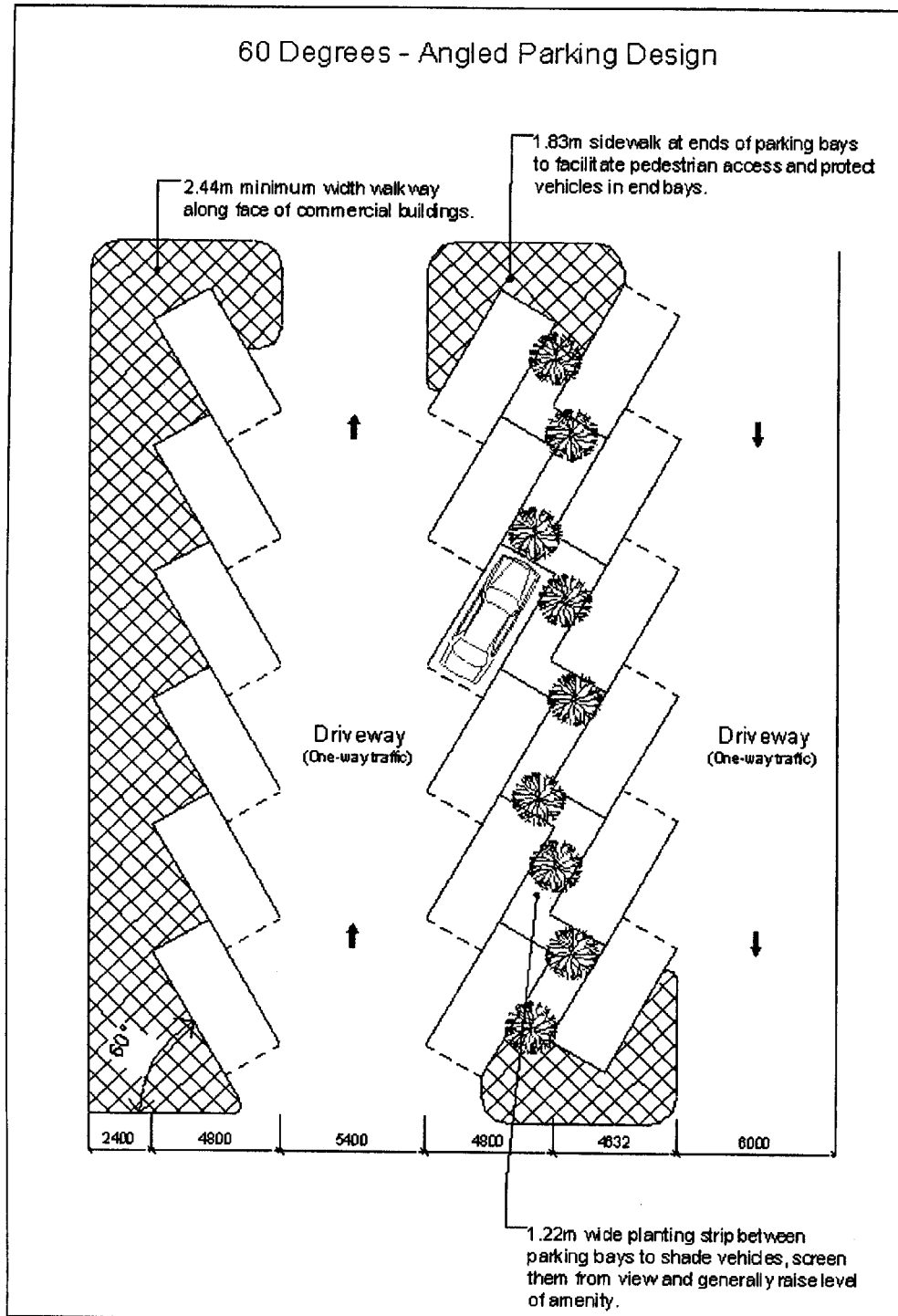


**Parking Standards**

Planning & Research Directorate

**9**





## Parking Standards

Planning & Research Directorate

**10**

## CHAPTER 5

### ACCESS LAYOUT

#### 5.0 ACCESS LAYOUT DESIGNS

This chapter provides a number of Tables and layout access designs. Table 9 provides information on the different types of access. Layout designs 1-9 are as follows:

- |      |           |   |
|------|-----------|---|
| i    | Layout 1: | Single dwelling   |
| ii   | Layout 2: | A simple T layout for urban and rural situations                                |
| iii  | Layout 3: | Left in/left out layout   |
| iv   | Layout 4: | T layout with Ghost Island  |
| v    | Layout 5: | Rural access where long vehicles are predicted                                  |
| vi   | Layout 6: | Rural access where long vehicles are predicted, no right turn from roadway      |
| vii  | Layout 7: | Typical gateway entry treatment   |
| viii | Layout 8: | Nearside diverge taper, as for example, entry to a Petrol Filling Station (PFS) |
| ix   | Layout 9: | Merge taper.  |

Layouts 2, 3, 4, 5, 6, allow for the provision of short merge tapers to enable Large Goods Vehicles (LGVs) to enter the roadway without having to encroach on the adjacent traffic lane. Where possible, these tapers should be provided, particularly if LGVs perform the turn regularly.

The maximum height of a solid wall at these layout points should not exceed 1m along major road ways. Where the sight distance is adequate the solid wall may be a maximum of 1.5m high.

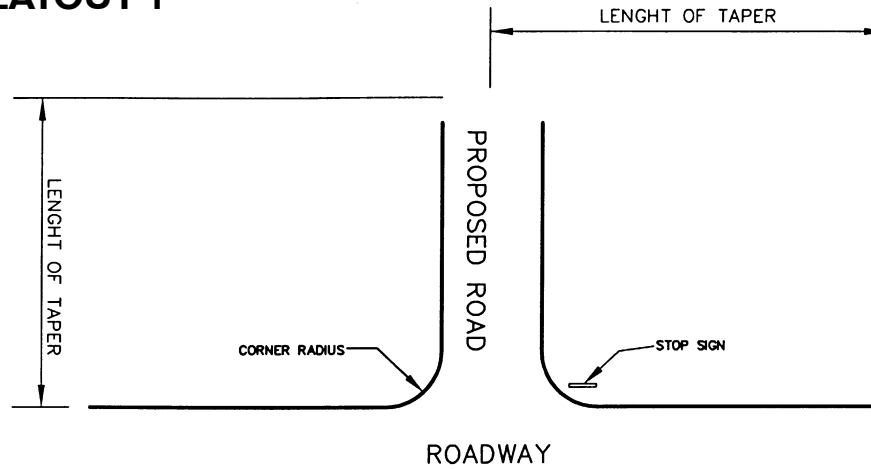
Table 9

	Field Access	Single Dwelling	Small Development eg. up to 30 dwellings	Medium Development eg. industrial estate	Larger sized Development eg. housing development	Where Larger Vehicles are likely to enter	Gateway Entry Holding bay	Diverge Lane	Merge Lane
<b>Direct Access Layout</b>	1	1	2	2,4	4	5,6	7	8	9
<b>Traffic using the access AADT</b>	Less than 20 movements a week	Less than 60 movements a week	0-300	Type 3: 0-300 Type 5: 300-500	300-500	Type 6: 0-300 Type 7: 300-500	0-300	See Notes 1	See Notes 1
<b>Layout suitable for carriageway Configuration</b>	Single Dual	Single Dual	Single	3- Single & Dual 5 – Single	Single	6 – Single 7 - Single	Single	Single Dual	Single Dual

## Notes

Traffic with any three criteria: Annual Average Daily Traffic (AADT) of over 450, speed limit of 50 km/h, dual carriageway, heavy vehicle percentage greater than 12% and/or an approach grade >5% or <5%. Where AADT exceeds 500 the access layout must be discussed with the National Works Agency.

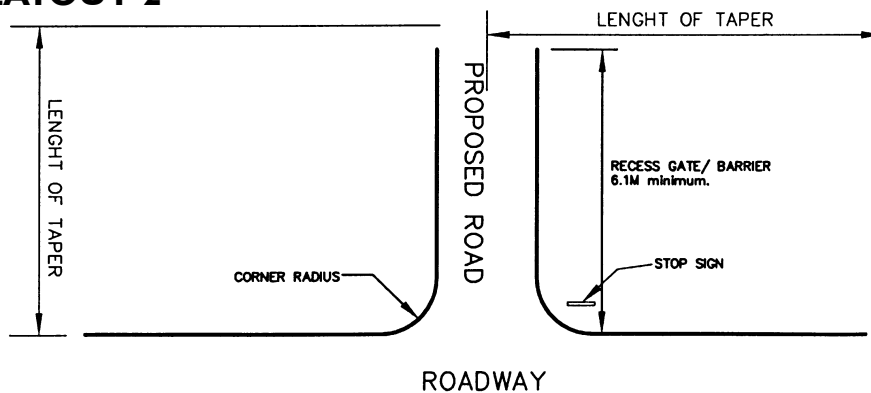
Any development except single family dwelling should consult the Guidelines for the Preparation of Traffic Impact Report (National Works Agency) before submitting their development for consideration by the Planning Authority.

**LAYOUT 1**

LAYOUT 1— INTERSECTION LAYOUT FOR SINGLE FAMILY  
RESIDENTIAL SUBDIVISION OF 25 LOTS & UNDER.

**NOTES:**

1. CORNER RADIUS WITH NO HEAVY VEHICLES  
MINIMUM RADIUS 6M FOR URBAN ROADS AND  
10M FOR RURAL ROADS.
2. FOR PROVISION OF HEAVY VEHICLES  
URBAN ROADS 10M (WITH TAPER OVER 30M OF 1:10 EXISTING LEFT TURN IN AND OUT)  
RURAL ROADS 15M (WITH TAPER 25M OF 1:10 EXISTING LEFT TURN IN AND OUT)  
THE MINIMUM WIDTH OF THE PROPOSED ROAD SHOULD BE 10.06M  
FOR SUBDIVISIONS OF 26 – 100 LOTS, THE MINIMUM WIDTH OF THE PROPOSED ROAD SHOULD BE 12.20M.

**LAYOUT 2**

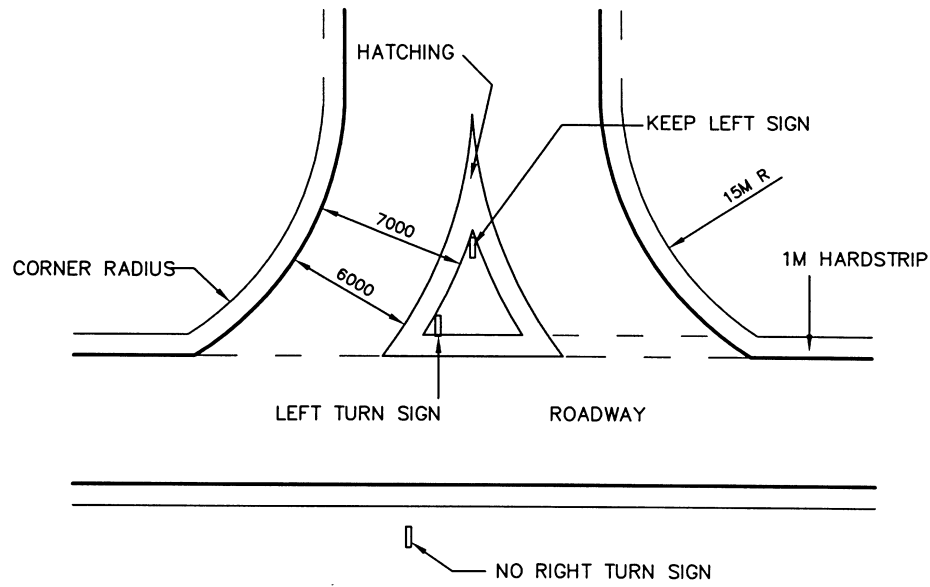
LAYOUT 2— INTERSECTION FOR MULTI FAMILY  
(TOWN HOUSE / APARTMENTS RESIDENTIAL SUBDIVISION)

**NOTES:**

1. CORNER RADIUS WITH NO HEAVY VEHICLES  
MINIMUM RADIUS 6M FOR URBAN ROADS AND  
10M FOR RURAL ROADS.
2. FOR PROVISION OF HEAVY  
URBAN ROADS 10M (WITH TAPER OVER 30M OF 1:10 EXISTING LEFT TURN IN AND OUT)  
RURAL ROADS 15M (WITH TAPER 25M OF 1:10 EXISTING LEFT TURN IN AND OUT)

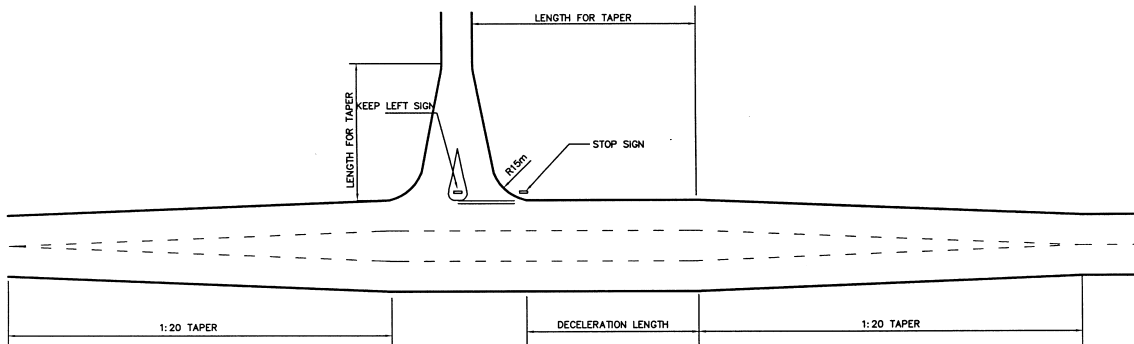
THE MAXIMUM WIDTH OF THE PROPOSED ENTRY/ EXIT SHOULD BE 9.14M

### LAYOUT 3



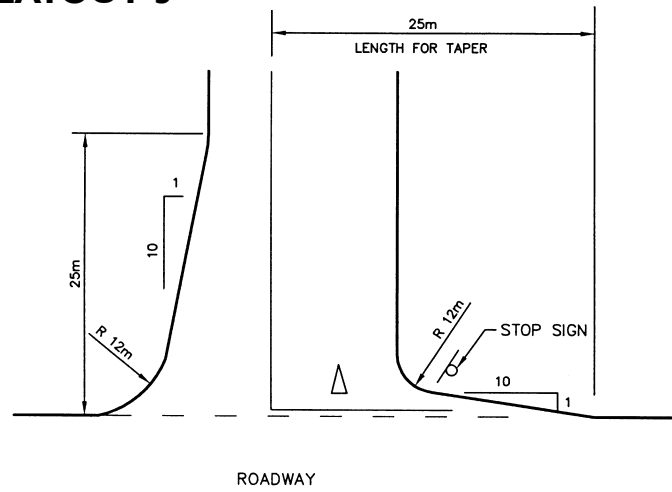
LAYOUT 3 – DIRECT ACCESS WITH LEFT IN / LEFT OUT

### LAYOUT 4



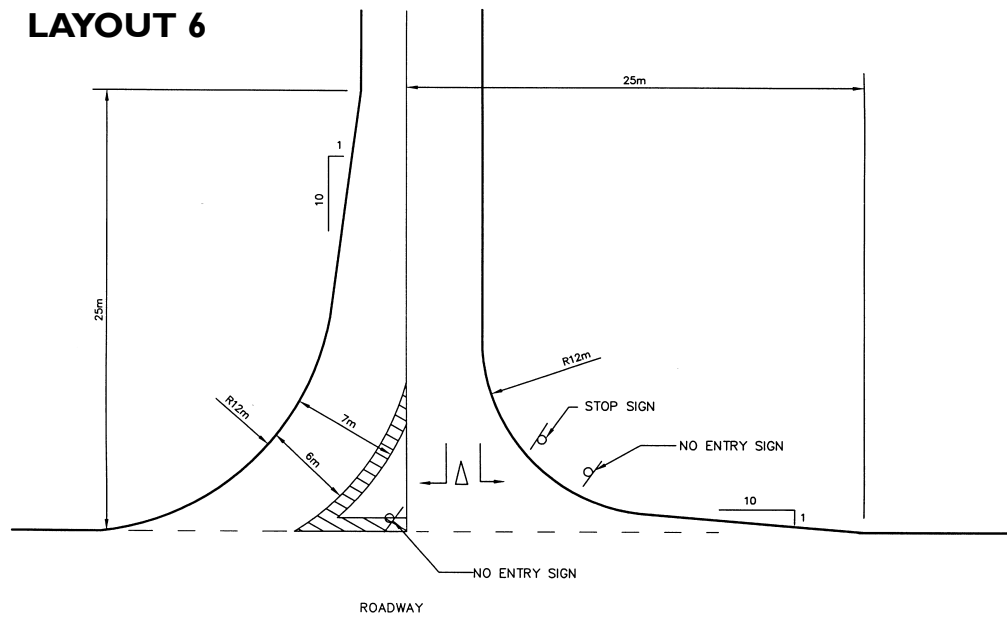
LAYOUT 4 – GHOST ISLAND TURNING LANE

## LAYOUT 5

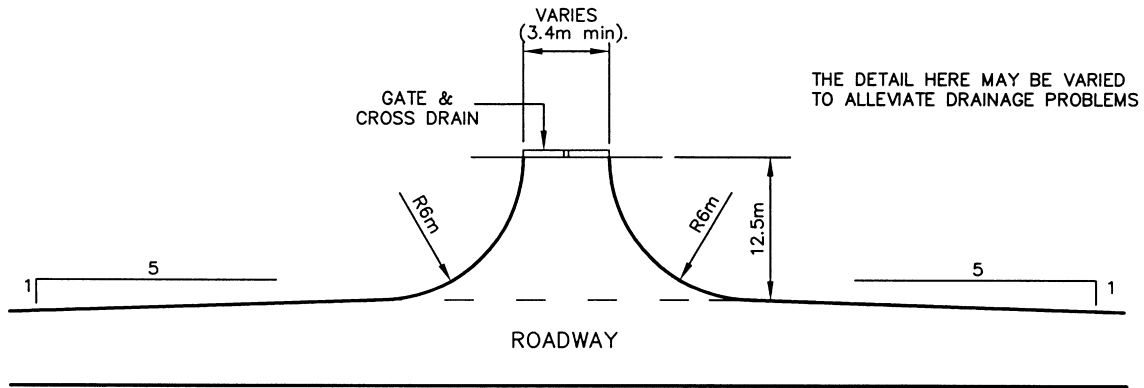


LAYOUT 5 – RURAL ACCESS WHERE LONG VEHICLES ARE PREDICTED

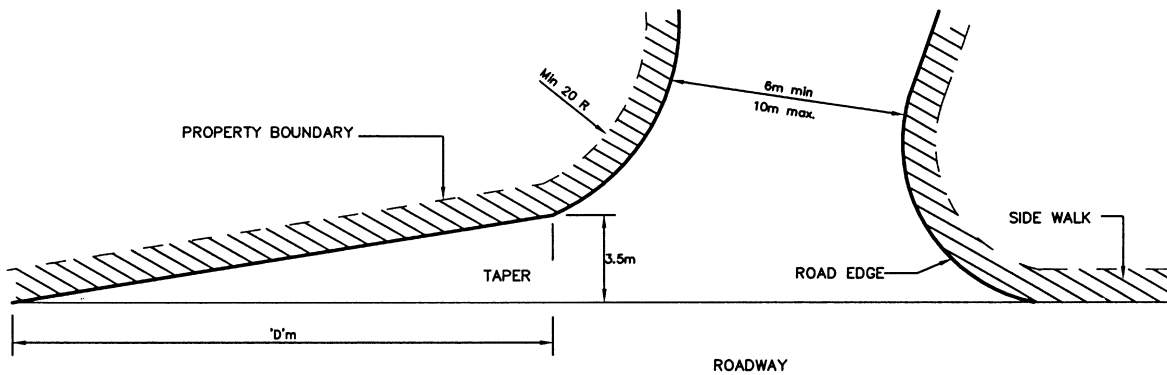
## LAYOUT 6



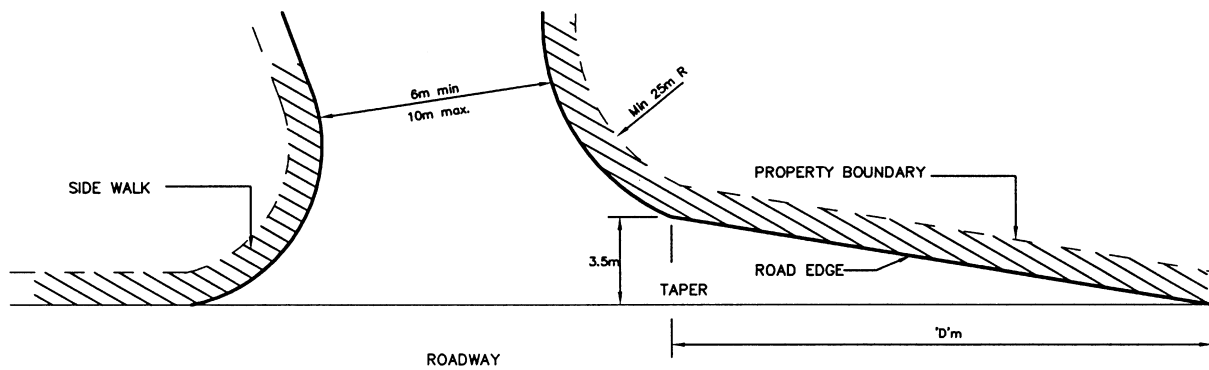
LAYOUT 6 – RURAL ACCESS WHERE LONG VEHICLES ARE PREDICTED



LAYOUT 7 – TYPICAL GATEWAY ENTRY



LAYOUT 8 – NEARSIDE DIVERGE TAPER



## LAYOUT 9 – MERGE TAPER

### 5.1 DIVERGE TAPER LENGTH 'D' METRES/ MERGE TAPER

Tables 10 and 11 provide details on Diverge Taper Length 'D' Metres and Merge Tapers

**Table 10**

Design Speed kph	D(m)			
	On up Gradient		On Down Gradient	
	0-4%	Over 4%	0-4%	Over 4%
120	110	80	110	150 (110)
100	80	55	80	110 (80)
85	55	40	55	80 (55)
70	40	25	40	55 (40)
60	25	25	25	40 (25)
50	25	25	25	25

Figures in brackets may be used where the all purpose roadway is a single carriageway

The length may be reduced as a relaxation by one design speed step where there are difficult site constraints.



**Layout 9 - Merge Taper****Table 11**

<b>Design Speed (kph)</b>	<b>Merge Taper Length M(m)</b>
120	110
100	90
85	70
[70]	50

Merge Tapers shall only be required on dual carriageway of two (2) lanes or wider where the design speed is 80kph or above the volume of left turning traffic exceeds 450 vehicles AADT and there is a large proportion of large or slow moving vehicles, either turning, or on the roadway (over 20%), or the gradient of the roadway is greater than 4%. Merge tapers may also be required where there is a high seasonal use by large or slow moving vehicles.

**5.2 VISUAL ROAD ASPECTS**

In the detailed design of roads, the visual aspects are important to create a pleasant living environment. Long, straight roads with repetitive units of houses lined up along a straight set back line give an impression of endless uniformity and monotony. Trees and other vegetation can be arranged to counter-balance this and also help to provide shade for pedestrians and to reduce the apparent width of roads. A slight bending of a long road and variation of set back or “stagger” of houses is also recommended for this purpose.

The overall clarity of vehicular movement within the development should be evident and the hierarchical status and function of all roads should be easily identified without comprehensive sign-posting.

# **CHAPTER 6**

## **ROAD MARKINGS**

### **6.0 COLOURS FOR ROAD MARKING**

Pavement markings shall be white in colour.

Curbs shall be painted in white (parking allowed) or yellow (no parking allowed).

### **6.1 MATERIALS**

Pavement markings may be in paint or thermoplastic material.

Generally, thermoplastic material should be used when the traffic volume is high or when there is a higher demand on the performance and service life of the markings.

Thus thermoplastic material should normally be used on primary roads and paint on secondary roads.

### **6.2 REFLECTORISATION**

In order to make the pavement markings visible both day and night they should always be reflectorised unless street lighting provides adequate visibility. Reflectorisation is achieved by adding glass beads to the paint or the thermoplastic material. Glass beads may be premixed into the paint or thermoplastic material or applied on the surface of the marking when it is freshly applied on the road. When the demand on reflectorisation is high, both methods may be used.

### **6.3 RAISED PAVEMENT MARKERS**


Raised pavement markers may be used to supplement longitudinal pavement markings. When used, raised pavement markers should be arranged in patterns to simulate continuous or broken lines. Raised pavement markings should be in the same colour as the road markings.

### **6.4 LONGITUDINAL MARKINGS**

#### **6.4.1 Centre Line and Lane Line**


The centre line separates traffic traveling in opposite directions. The lane

line separates lanes of traffic traveling in the same direction. The following provides standards and qualities for road markings:

Road marking	Directions and recommendations for use
<b>LM1-1. Broken centre line</b> 	<p>A broken line not less than 0.10 metres or more than 0.15 metres wide and 1.5 metres in length with a gap of 4.5 metres.</p> <p>Traffic shall keep to the left of such line and shall cross it only for the purpose of overtaking another vehicle or making a right turn into another roadway.</p>


Centre lines should be applied on all paved roads with a road width of 6.25 metres or more.

The broken centre line shall be applied on two-way road sections where the sight distances in both directions are long enough to allow overtaking. If not, continuous lines or combination of continuous lines and broken lines should be used.

<b>LM1-2. Broken lane line</b> 	<p>A broken line not less than 0.10 metres or more than 0.15 metres wide and 1.5 metres in length with a gap of 4.5 metres.</p> <p>Traffic shall keep within lane margins and shall only cross into another lane to comply with any other traffic sign or signal or when it is safe to do so having regard to prevailing traffic conditions.</p>
---	--

The broken lane line should be applied if the carriageway is divided into two or more lanes for travel in the same direction and traffic is allowed to change lanes.

The width of each lane should be not less than 2.9 metres and not greater than 4.0 metres.

<b>LM2-1. Continuous centre line</b> 	<p>A continuous line not less than 0.10 metres or more than 0.20 metres wide.</p> <p>The centre line separates traffic travelling in opposite directions.</p>
---	---

A continuous centre line shall mean that vehicles are not permitted to cross in order to overtake or straddle the line and that vehicles are not permitted to travel on the side of the line allocated for oncoming traffic.

Centre lines should be applied on all paved roads with a road width of 6.25 metres or more.

The continuous centre line shall be applied on two-way road sections where the sight distances in both directions are not long enough to allow overtaking. If overtaking can be allowed in one direction, a combination of continuous lines and broken lines should be used.

LM2-2. Continuous lane line



A continuous line not less than 0.10 metres or more than 0.20 metres wide.

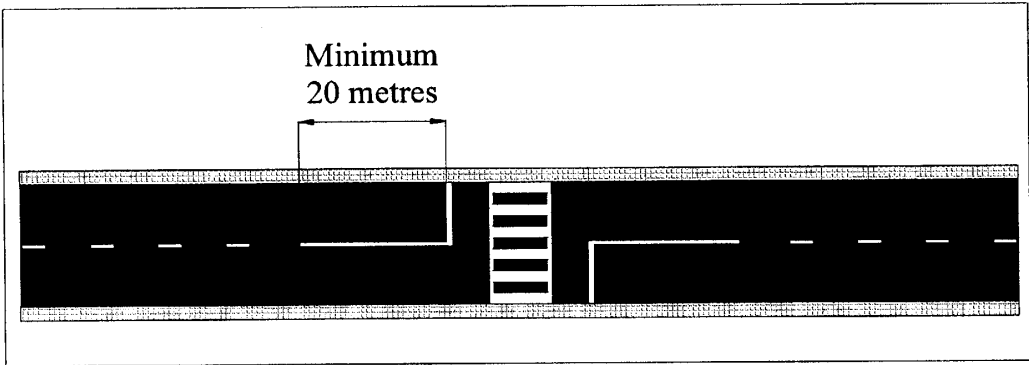
The lane line separates lanes of traffic travelling in the same direction.

A continuous lane line shall mean that vehicles are not permitted to cross in order to overtake or straddle the line.

The continuous lane line should be applied if the carriageway is divided into two or more lanes for travel in the same direction and traffic is not allowed to change lanes.

The width of each lane should be not less than 2.9 metres and not greater than 4.0 metres.

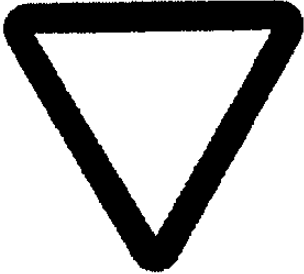
The continuous lane line should be used at approaches to intersections and pedestrian crossings. See examples below.



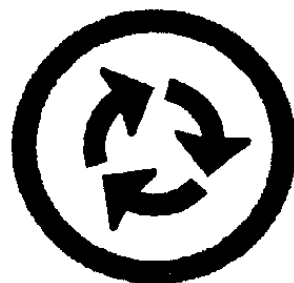
Continuous centre line at an approach to a pedestrian crossing.

## 6.5 REGULATORY SIGNS

The following pages provide a number of regulatory signs and descriptions that are to be used on roads

Sign	Directions and recommendations for use
<div>  <p>R1. Give way</p> </div>	<p>The sign shall be used to notify drivers that, at the intersection where the sign is placed, they must give way to vehicles on the road they are approaching.</p> <p>The sign shall normally be placed on the left-hand side of the road and not more than 25 metres from the intersection. If the approach comprises two or more lanes the sign shall be placed on both sides of the road or, when appropriate, on the left-hand side of a dividing island.</p> <p>The sign shall always be used at approaches to roundabouts. The Give way sign shall at approaches to roundabouts be combined with the mandatory sign R37 Compulsory roundabout. The Give way sign shall be placed above the Compulsory roundabout sign on the same post.</p> <p>The sign may be needed in the following cases:</p> <p>On minor roads at junctions where the general right-of-way rules would not work but stopping is not necessary if no other vehicles are approaching,</p> <p>On entrance ramps to motorways,</p> <p>On separate left turn lanes without adequate acceleration lanes,</p> <p>In any other case where engineering study indicates a need for a yield sign.</p> <p>The sign is not needed on paths or on earth-tracks leading to a road, since road users on such paths or tracks have an obligation to give way to vehicles on the main road.</p>

R37. Compulsory roundabout

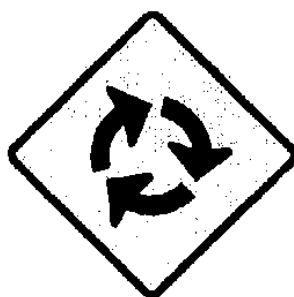


The sign shall be used to notify drivers of the prescribed direction of movement through a roundabout.

This sign should be used wherever there is a roundabout, inside as well as outside urban areas. Since the general right-of-way rules are not applicable at roundabouts, the Give Way sign should always be placed below the Compulsory roundabout sign on the same post.

See sign W26 about advance warning of roundabouts.

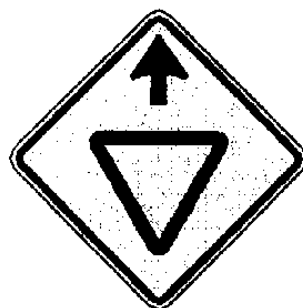
W26. Roundabout



The sign may be used to warn of roundabouts outside built up areas where the speed limit exceeds 60 km/h or if the visibility is poor.

The sign should normally not be used inside built up areas since roundabouts are common in such areas. However, if the visibility is poor or if the roundabout is hazardous for some other reasons, the sign should be used also inside built up areas.

W29. Give way ahead



This sign should be used on the approach to an intersection controlled by a Give way sign where the Give way sign is not visible from sufficient distance to enable the drivers to bring the vehicle to a stop at the intersection when needed.

“Sufficient distance” should be according to the following table.

<i>Speed limit (km/h)</i>	<i>90</i>	<i>80</i>	<i>70</i>	<i>60</i>	<i>50</i>
<i>Visibility less than (m)</i>	<i>145</i>	<i>120</i>	<i>95</i>	<i>75</i>	<i>55</i>

**R2. Stop**

The sign shall be used to notify drivers that, at the intersection where the sign is placed, they shall stop before entering the intersection and give way to vehicles on the road they are approaching.

The sign shall normally be placed on the left-hand side of the road and not more than 25 metres from the intersection. If the approach comprise two or more lanes the sign shall be placed on both sides of the road or, when appropriate, on the left-hand side and on a dividing island.

The STOP sign may be warranted at intersections where one or more of the following conditions exist:

- Intersection of a less important road with a main road where application of the general right-of-way rule is unduly hazardous
- Street entering a through highway or street
- Unsignalised intersection on a street having signals at other nearby intersections
- Other intersections where a combination of high speed, restricted view, and serious accident record indicate a need for control by the STOP sign

The STOP signs shall not be erected indiscriminately at intersections. Allowing STOP signs at such crossings tends to lessen compliance at locations where the signs are completely compatible with the condition they are covering.

In the following cases the sign should be erected at both sides of the road:

- when the carriageway has two or more lanes in the same direction
- when the design of the junction admits two or more vehicles to approach side by side
- when there are poor sight conditions at the junction and
- in other cases when the STOP signs need to be emphasized

If an advance warning is needed sign W27 shall be used.

W27. Stop ahead



This sign should be used on the approach to an intersection controlled by a STOP sign where the STOP sign is not visible from sufficient distance to enable the drivers to bring the vehicle to a stop at the intersection. “Sufficient distance” should be according to the following table:

<i>Speed limit (km/h)</i>	<i>90</i>	<i>80</i>	<i>70</i>	<i>60</i>	<i>50</i>
<i>Visibility less than (m)</i>	<i>145</i>	<i>120</i>	<i>95</i>	<i>75</i>	<i>55</i>

For additional details and type of road marking and sign see National Works Agency Manual on ROAD SIGNS AND MARKINGS



# CHAPTER 7

## NAMING OF ROADS

### 7.0 ROAD NAMES

The following guidelines must be observed when naming and renaming roads and streets. The main objective of roads and streets naming guidelines is to provide clear street names for citizens, for emergency dispatch and to optimize the possibility of emergency personnel to find the location of an emergency in a timely manner.

Generally road names should not contain abbreviations; however “St” may be used instead of “Saint”. Neither should apostrophe be used in naming a road or street. The use of hyphens should be avoided where possible.

The spelling of the road name must be in keeping with the common spelling of the word. There should be no duplication of road or street name within the same parish or Kingston and St. Andrew. All new road names should be submitted to the local authority for approval and the local authority may consult with the National Works Agency. Proposals for road names should include an appropriate road type suffix.

### 7.1 ROAD TYPE

Any proposals for a road name must have an appropriate road suffix. The following table of road suffixes and description is provided below for ease of reference:

<b>Standard Road and Street Suffix</b>	
Arcade	A covered road/passage way, especially with shops along the side
Avenue	A roadway or thoroughfare that is continuous and not limited to a single subdivision or development, usually planted on each side with trees. Generally has a North to South orientation.
Boulevard	A Street with a landscaped median dividing the roadway
Bypass	An alternative road constructed to facilitate through traffic to avoid congested areas or towns
Place	A dead-end street/street terminating in a cul-de-sac, or short through street having a maximum of 183m in length.
Circle	A roadway which makes a circle or part of a circle

<b>Standard Road and Street Suffix</b>	
Court /Close	A dead-end street or street terminating in a cul-de-sac, a maximum of 183m in length. If it is adjoining a street it shall the have same name, if not it shall be given a named.
Crescent	A semi-circular or Half-moon street that rejoin the road from which it starts.
Drive	A curvilinear street/curve horizontal alignment with few crossing streets
Edge	A road along the edge of a cliff, hill or ridge
Esplanade	A roadway usually found along river or seaside.
Fairway	A shot roadway between two roads
Garden(s)	A roadway planted with special flora and leading to a place for public entertainment.
Glade/Glen	A roadway in a valley of trees.
Grove	A roadway featuring a special cluster of trees.
Heights	A roadway which passes through high ground.
Highway	Used to designate a motor way/ Main Thoroughfare
Lane	Minor Street/ Narrow road usually between walls or buildings.
Loop	A road that diverts from and ends on the same road.
Mall/ Square/ Plaza	Quadrangle/ Open or Shopping area allowing restricted vehicular movement.
Mews	A road way with a group of houses at the end
Parade	A Roadway with adequate pedestrian facilities.
Parkway	Throughway/ Divided highway/ Expressway usually through parkland or open grass areas.
Promenade	Public walk/ Boardwalk/ Boulevard/ Path. Usually with good pedestrian facilities.
Quay	Along a Harbour/ Wharf
Ridge/Ridgeway/ Crest	A road running on top or along the top of a hill
Road	Designated thoroughfare for vehicles and pedestrians and/or for other use
Street	A roadway or thoroughfare that is continuous and not limited to a single subdivision or development. Generally has an East to West orientation.
Terrace	A raised road or walkway whether natural or artificial with houses on either side
Walkway	A foot path
Way	A Link road/access way between two streets.

## CHAPTER 8

### PETROL FILLING STATIONS

#### 8.0 PLANNING CRITERIA

The following are the required criteria for petrol filling stations:

- i The area of land to be developed should be sufficient to allow manoeuvring of vehicles within its curtilage but should not be less than 1,672 square metres with a minimum frontage of 91.44 metres on the primary street.
- ii Filling Stations will not be allowed in any area where the traffic situation is such that it will cause obstructions in entering or leaving a station or on tight curves where visibility is not adequate.
- iii Vehicular ingress/egress/crossover should be reasonably safe with adequate approach distances, especially where main roads and intersections are involved.
- iv Buildings are to be located a minimum of 12.19 metres from road property boundaries to provide adequate area for manoeuvring of vehicles in the service area.
- v Canopies and supports over pumps and service equipment when located less than 6.1 metres from interior residential lot lines or building or structure should be constructed of non-combustible material.
- vi No fuel pumps or other mechanical equipment shall be installed so as to permit servicing of motor vehicles standing in a public street or highway.
- vii A raised curb of at least 15.24cm in height should be erected along street property lines except for driveway openings so as to prevent operation of vehicles on sidewalks, and to define entrance/exit points.
- viii Signs should be in accordance with the Advertisement Regulations and should be located so as not to reflect the sun into the face of motorists and should be large enough so that they can be seen from a reasonable distance at a reasonable speed.

- ix All volatile flammable liquid storage tanks shall be installed below ground in compliance with the requirements of the National Works Agency (Ministry of Transport and Works).
- x No ingress to nor egress from a filling station shall be closer than 50 metres to any road intersection or 70 metres from the intersection of two main roads.

## 8.1 GUIDELINES TO APPLICANTS

The following are guidelines to applicants wishing to develop Petrol Filling Stations:

- i A filling Station is defined as any land, building or equipment used for the sale or dispensing of petrol or oils for motor vehicles or incidental thereto and includes the whole of the land, building or equipment whether or not the use as a petrol station is the predominant use or is only a part thereof.
- ii Any erection or alteration of building or equipment for the sale of petrol or oils for motor vehicles on any land or the change of use of land or buildings from any other use to that of a filling station shall be in accordance with the provisions of the Development Order for Petrol Fuel Stations and permission granted by the Town and Country Planning Authority thereunder.
- iii All applications for permission to erect a filling station should be made to the KSAC, the local planning authority/Parish Council or Municipal Council in which the proposal is to be located on a form issued and obtainable from that authority.
- iv Each application is to be accompanied by at least five (5) copies, or the number printed on the application forms of the plan of the development.
- v The Plan should be sufficient to identify the land to which the application for petrol filling station relates.
- vi Plans and drawings as are necessary to describe and illustrate the development in detail.
- vii The Planning Authority may request an applicant to produce evidence to verify any particulars of information given in an application.

- viii In dealing with applications, the Authority will afford the applicant, if he/she so desires, an opportunity of appearing before and being heard by a person appointed by the Authority for the purpose.
- ix The decision of the Authority can be appealed to the Minister responsible for Planning as set out in the Development Order.
- x Under the Law it is a requirement that permission for the erection of a petrol filling station anywhere in the island be obtained from the Town Planning Authority.

## CHAPTER 9

### UTILITY SERVICES

#### 9.0 GENERAL

Designs for utility services shall conform to all applicable Jamaican laws, codes, policies, standards and specifications.

The authority, company or organisation owning the facility shall be responsible for the design whether it is to be installed in the roadway, Right-of-Way or attached to a bridge structure.

Where apparatus belonging to a utility company is to be installed in a roadway, its design life should be no less than that of the road in question.

#### 9.1 INTEGRITY OF PUBLIC SPACE

In all cases, consideration shall be given to sound engineering principles and economic factors to preserve and protect the integrity of public space.

#### 9.2 Longitudinal Alignment

Services shall be located, as far as practical, on a uniform longitudinal alignment. Pipelines, ducts, manholes etc. shall be placed in sidewalks, verges and berms as far as practical except where traversing crossroads or accesses.

Where there are obstructions, or where the sidewalk is too narrow, alternatives are to be submitted for review and consideration.

#### 9.3 SUB-SURFACE FACILITIES

##### 9.3.1 Vertical Alignment

The depth to any facility shall be at least as indicated below:

- |     |   |         |
|-----|---|---------|
| i   | Electrical conduit  | 400 mm  |
| ii  | Telephony and Communication Cable                             | 600 mm  |
| iii | Potable/Sewage Distribution pipes not exceeding 50mm diameter | 900 mm  |
| iv  | Potable/Sewage Distribution pipes exceeding 50mm diameter     | 1200 mm |

Where pipes, ducts or cables are located within the road way, these shall be laid beneath the pavement structure or at the minimum depths given in i) above or whichever is deeper.

Approval shall be obtained from the National Works Agency for any departure from the requirements contained in (i) and (ii) above, prior to construction.

## **9.4 ROAD CROSSINGS**

Crossings of roadways shall be kept to an absolute minimum and shall be located, as far as practical, on a line perpendicular to the roadway alignment.

Deep excavation (greater than 1.2 m) shall be avoided near bridge foundations, across intersections and near stream beds, cross drains or other water courses.

## **9.5 SURFACE FACILITIES**

Generally all surface facilities shall be located in verges, berms or to the edge of a sidewalk away from the carriageway. They shall be located so as to cause the minimum of disruption to pedestrian and vehicular traffic flow, and to minimise relocation in areas where road widening within the existing Right-of-Way is likely in the future.

## **9.6 OVERHEAD FACILITIES**

### **9.6.1 Installation**

Installation of overhead lines in the public Right-of-Way shall be limited to single-pole type construction perpendicular to the direction of the carriageway. Double-pole type construction is only permissible parallel to the direction of the carriageway.

Joint use of single-pole construction shall be encouraged at locations where more than one utility facility is to be erected. This is particularly important at locations where the width of the right-of-way approaches the minimum required for safe operation or maintenance requirements, or where separate installations would require extensive removal of trees, etc.

## **9.6.2 Vertical Clearance**

The minimum vertical clearance for utility lines above the roadway shall be 7.3 m for electrical cables and 5.4 m - 6.3 m for telephony/communication cable or any similar utility lines on roads which are accessible to vehicular traffic.

Space or ways accessible to pedestrians only shall have a minimum vertical clearance for utility lines of 4.6 m.

Notwithstanding the provisions of i) and ii) at 9.3.1, requirements of the Government's Electrical Inspectorate shall be observed at all times.

## **9.6.3 Horizontal Clearance**

Poles and control boxes shall be located, where practicable, in verges and berms outside of sidewalks and away from the carriageway.

Where there is limited space available poles may be placed in the sidewalk, and control boxes elsewhere, but only after the position has been agreed with the National Works Agency. Generally the agreed position will be to the back of the sidewalk, leaving the main area free of obstructions.

Utility facilities shall have a minimum horizontal clearance from buildings and bridges of 1.5 m.

## **9.6.4 Additional Details on Placement of Utilities**

For additional Details on the placement of utilities along public right-of-way consult GUIDELINES AND SPECIFICATIONS FOR THE OPERATIONS OF UTILITY COMPANIES IN THE PUBLIC RIGHT OF WAY by GOVERNMENT OF JAMAICA MINISTRY OF TRANSPORT & WORKS - NATIONAL WORKS AGENCY



# CHAPTER 10

## DRAINAGE

### 10.0 SITE INVESTIGATIONS

Site investigations, are very critical in the review of development plans and the National Works Agency requires effective coordination in an effort to rationalize the number of site visits. Developers are, therefore advised to arrange site visits at the planning stage of development to involve various agencies and other interest parties. Site visits must be carried out by the National Works Agency for large developments and subdivisions for-the effective review of drainage plans.

### 10.1 IMPORTANT GUIDELINES

These guidelines relate mainly to subdivision of land, resort/residential, commercial, industrial and office developments

#### 10.1.1 Drainage

- i Drainage systems should be designed to convey only storm waters,
- ii The designing/construction of drainage schemes should be economical notwithstanding the fact that adequate drainage must be provided for any development.
- iii The drainage plan should correlate with the proposed ground level plan to minimize the passage of high storm flows on roadways and properties. Buildings should, therefore, be elevated or flood-proofed as required to avoid flooding.

#### 10.1.2 Lot Specifications

- i Residential lot coverage should not exceed 60% of the lot area, provided for residential uses.
- ii No site/lot will be recommended for development which is vulnerable to flooding, erosion, land slippage or might pose danger to property and/or life.
- iii No site/lot will be recommended for development, which is

proposed to be sited over a gully or other natural water channel, except for the provision of flood control measures for “probable maximum” storm events:

- iv Wherever feasible, landscaping should be encouraged to maximize vegetative cover.

### 10.1.3 Roads

- i All paved roadways are to be protected by kerb walls/ kerb and gutters, running parallel on each side of the road. Where design permits, well maintained grass verges are allowable in lieu of kerb walls.
- ii Maximum recommended road grade shall be 15% for distances not exceeding 50 metres.
- iii No proposed road or lot should drain storm water directly unto an existing road or property without the specific permission from the National Works Agency.

### 10.1.4 Collector Drains/Sewers

Regardless of the number of lots or gutter capacity, collector drains/sewers shall be constructed from any high point on the road for a distance not exceeding that as set out below.

Road Gradient (%)	Distance from high point (m)
<1.0	200.00
to 4.9	160.00
5.0 to 10.0	120.00
>10	60.00

### 10.1.5 Curb Heights

A minimum curb height of 150 mm is recommended, however, a height of 200 mm is recommended for gutters with transverse slopes greater than 4 % and road gradients flatter than 0.5 %.

### 10.1.6 Storm Drains/Sewers

- i Minimum allowable size of storm drains/sewers is 450 mm in width/diameter. For ease of maintenance, a minimum diameter of 600 mm is recommended for storm sewers.
- ii Minimum and maximum velocities in storm drains/sewers shall be 1.0m/s and 3.0 m/s respectively.
- iii Minimum gradient of storm sewers shall be as set out below:

Pipe Diameter (mm)	Minimum Gradient (%)
450	0.35
600	0.25
900	0.15
1200	0.1
1500	0.08

- iv Drop inlets, with a combination of grate and curb opening, are recommended to Intercept/collect gutter flow into storm sewers. The minimum length of inlets shall be 1.80m. Where inlets are located at a “low point”, a minimum length of 1.0m is recommended.
- v A minimum depression of 75 mm below the curb line (for all types of inlets) in a gutter with a width of 600mm is recommended.
- vi For storm sewer systems, manholes shall be provided with adequate access (457mm x 609mm) for the purposes of maintenance and inspection. Manholes shall be constructed at intervals not exceeding 80 metres.
- vii Junction chambers must be provided at the intersection of storm sewers.
- viii Maximum allowable length of storm sewer between inlets shall be 80 metres.

### **10.1.7 Drainage Schemes**

- i Where inadequate, existing drainage features/structures must be upgraded or improved to accommodate anticipated storm flows due to development. Approval of drainage schemes will, therefore, be subject to developer/agent/agency undertaking the necessary upgrading works.
- ii Easement for storm drains and other water channels shall be provided for easy maintenance and inspection. A minimum easement of 1.22m from each side of the design water way is recommended.
- iii Bridges and open channels shall be designed with a freeboard not less than 25 % of design flow depth.
- iv Where retaining areas are used as the main receiving bodies for run-off disposal, debris/sediment trap systems must be incorporated in the drainage plan.

### **10.1.8 Outfalls**

- i Storm water from any site should be safely disposed of in a manner so as to minimize backwater effects that may cause localized flooding. It is, therefore recommended to include invert elevations of major outfalls and normal water (flood) stages of receiving bodies such as rivers, holding areas, wetlands etc.

### **10.1.9 Drainage Plans**

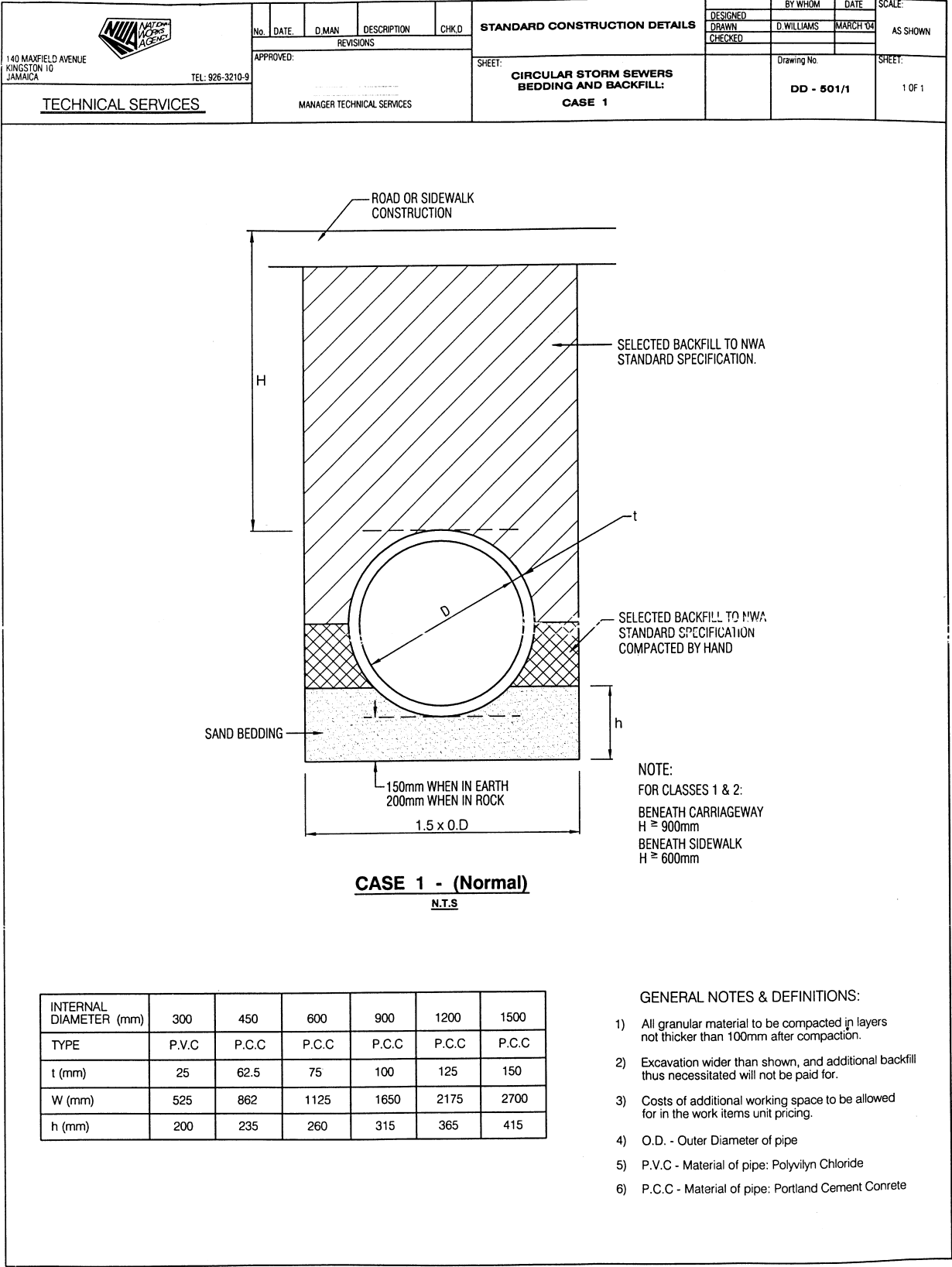
- i The maximum bank slope for earthen drains shall be 1 in 1.5.
- ii Detailed drawings of all proposed river and gully training and coastal works, must be included in proposed drainage plans.
- iii Proposed and existing culverts, outlets, inlets and earth drains should be shown on plan. These should be upgraded if they are not adequate to take the new development. Storm water and surface run off should be removed from the proposed roads at intervals not exceeding a specified distance by the National Works Agency/relevant road authorities.
- iv New roads intersecting any public road should be constructed so

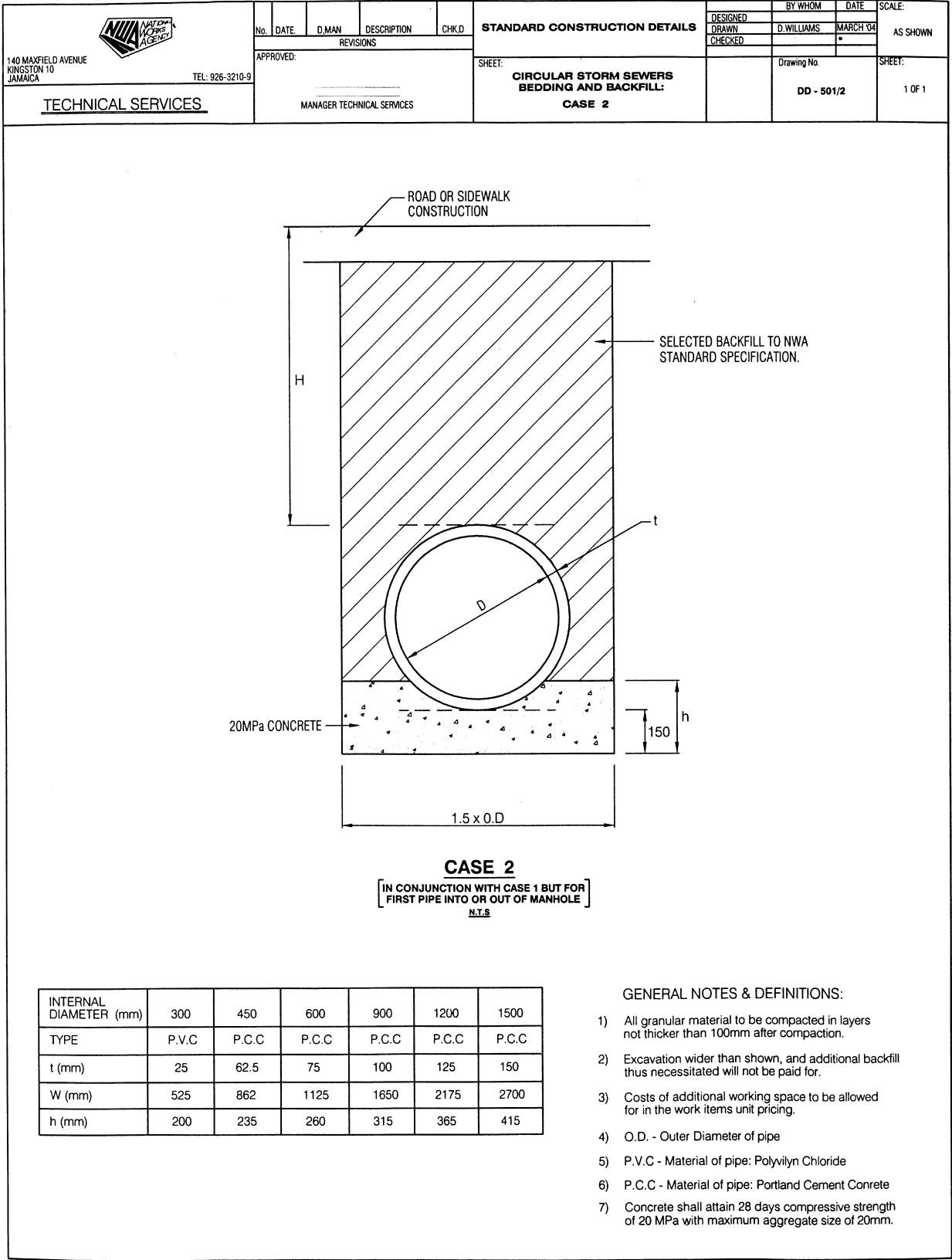
that surface and storm water runoff do not flow onto the said road.

- v Kerb and channel should be used where the road gradient is less than 4%. Where the gradient exceeds 4% a “U” or trapezoidal or any similar drain should be used along the road.
- vi Drainage plans and calculations should be developed and submitted for review and approval by the National Works Agency.
- vii Drainage plans for development and subdivision should show that there will be no adverse impact on roads and adjacent or down slope properties. Therefore, storm water/surface drainage should be effectively intercepted and disposed of within the site or into any existing off site drainage system. Final on or off site disposal of surface drainage/storm water runoff is a critical component of the approval process.

### **10.3 DETAILS OF HYDRAULIC STRUCTURES AND RETAINING WALLS**

Standard construction details of hydraulic structures, retaining walls and drainage infrastructure quality can be seen on the following 28 pages.

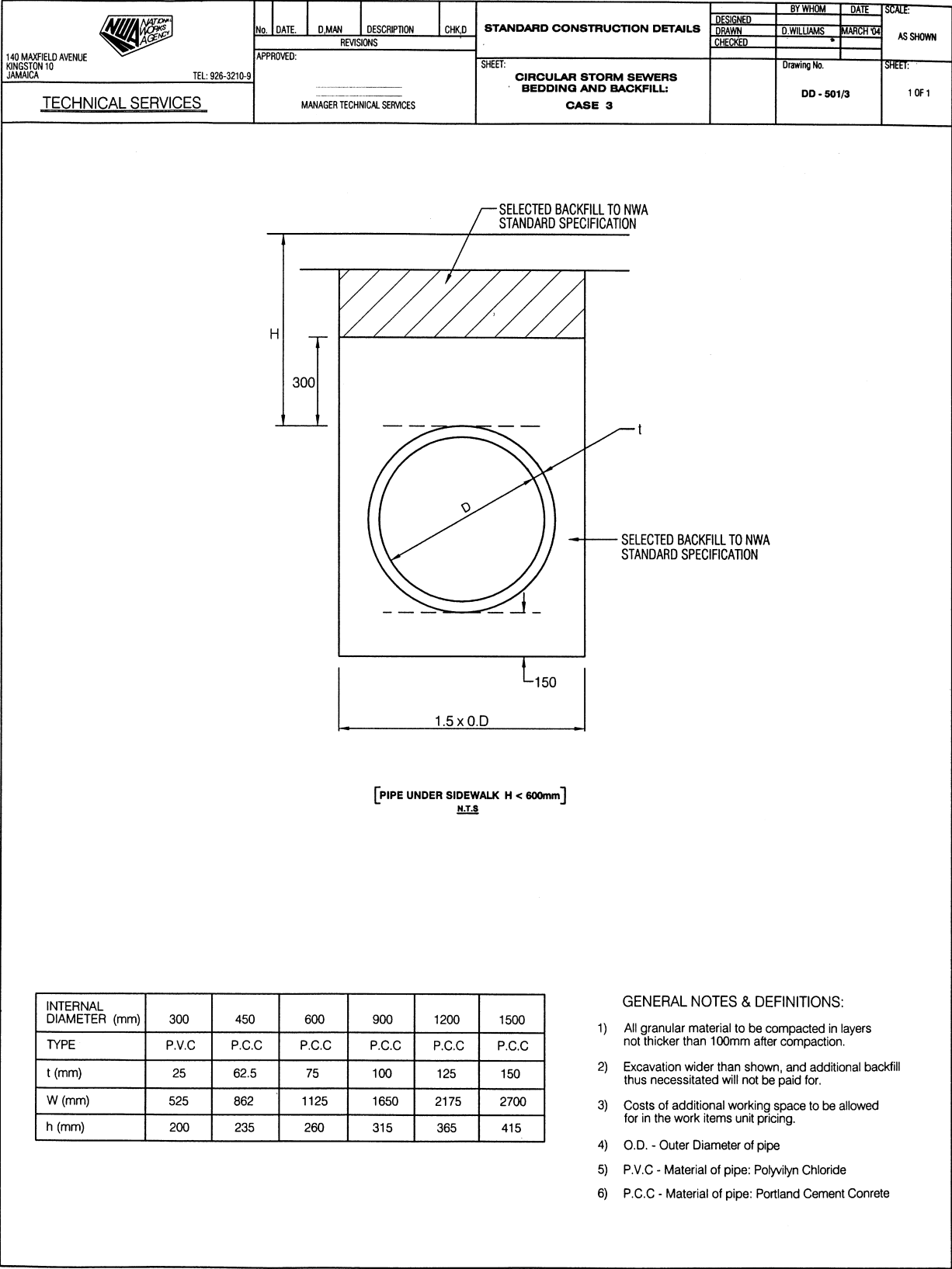




**CASE 2**  
[ IN CONJUNCTION WITH CASE 1 BUT FOR  
FIRST PIPE INTO OR OUT OF MANHOLE ]  
N.T.S

GENERAL NOTES & DEFINITIONS:

- 1) All granular material to be compacted in layers not thicker than 100mm after compaction.
- 2) Excavation wider than shown, and additional backfill thus necessitated will not be paid for.
- 3) Costs of additional working space to be allowed for in the work items unit pricing.
- 4) O.D. - Outer Diameter of pipe
- 5) P.V.C - Material of pipe: Polyvinyl Chloride
- 6) P.C.C - Material of pipe: Portland Cement Concrete
- 7) Concrete shall attain 28 days compressive strength of 20 MPa with maximum aggregate size of 20mm.



SELECTED BACKFILL TO NWA  
STANDARD SPECIFICATION

H

300

D

t

SELECTED BACKFILL TO NWA  
STANDARD SPECIFICATION

150

1.5 x 0.D

[ PIPE UNDER SIDEWALK H < 600mm ]  
N.T.S


INTERNAL DIAMETER (mm)	300	450	600	900	1200	1500
TYPE	P.V.C	P.C.C	P.C.C	P.C.C	P.C.C	P.C.C
t (mm)	25	62.5	75	100	125	150
W (mm)	525	862	1125	1650	2175	2700
h (mm)	200	235	260	315	365	415

GENERAL NOTES & DEFINITIONS:

- 1) All granular material to be compacted in layers not thicker than 100mm after compaction.
- 2) Excavation wider than shown, and additional backfill thus necessitated will not be paid for.
- 3) Costs of additional working space to be allowed for in the work items unit pricing.
- 4) O.D. - Outer Diameter of pipe
- 5) P.V.C - Material of pipe: Polyvinyl Chloride
- 6) P.C.C - Material of pipe: Portland Cement Concrete





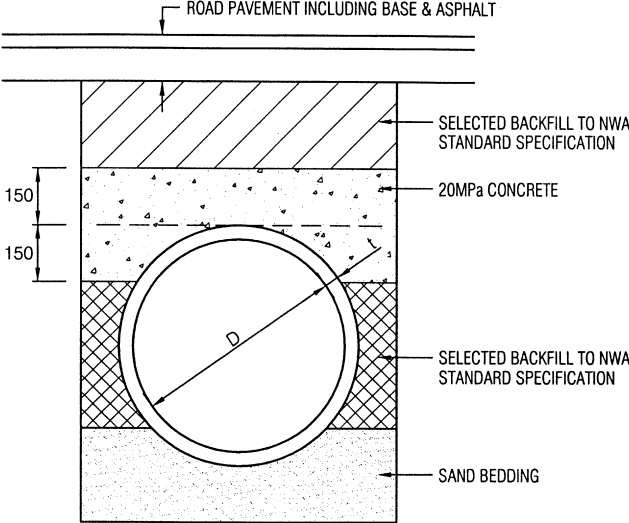


140 MAXFIELD AVENUE  
KINGSTON 10  
JAMAICA  
TEL: 926-3210-9

No.	DATE	D.MAN	DESCRIPTION	CHK.D
REVISIONS				
APPROVED:				
MANAGER TECHNICAL SERVICES				

TECHNICAL SERVICES

STANDARD CONSTRUCTION DETAILS					DESIGNED	BY WHOM	DATE	SCALE:
SHEET: CIRCULAR STORM SEWERS BEDDING AND BACKFILL: CASE 5					DRAWN	D. WILLIAMS	MARCH '04	AS SHOWN
					CHECKED			
					Drawing No. DD - 501/5			

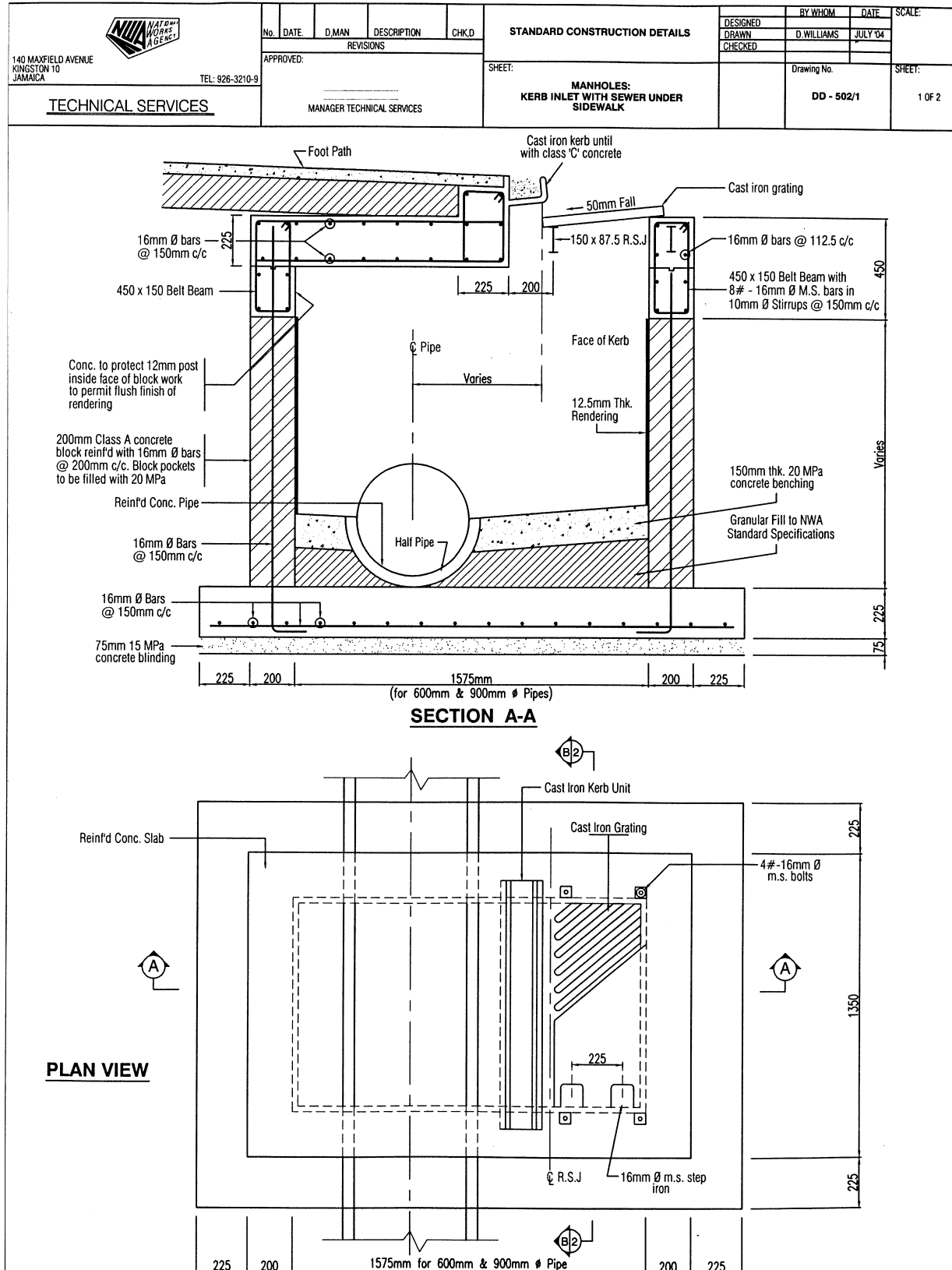


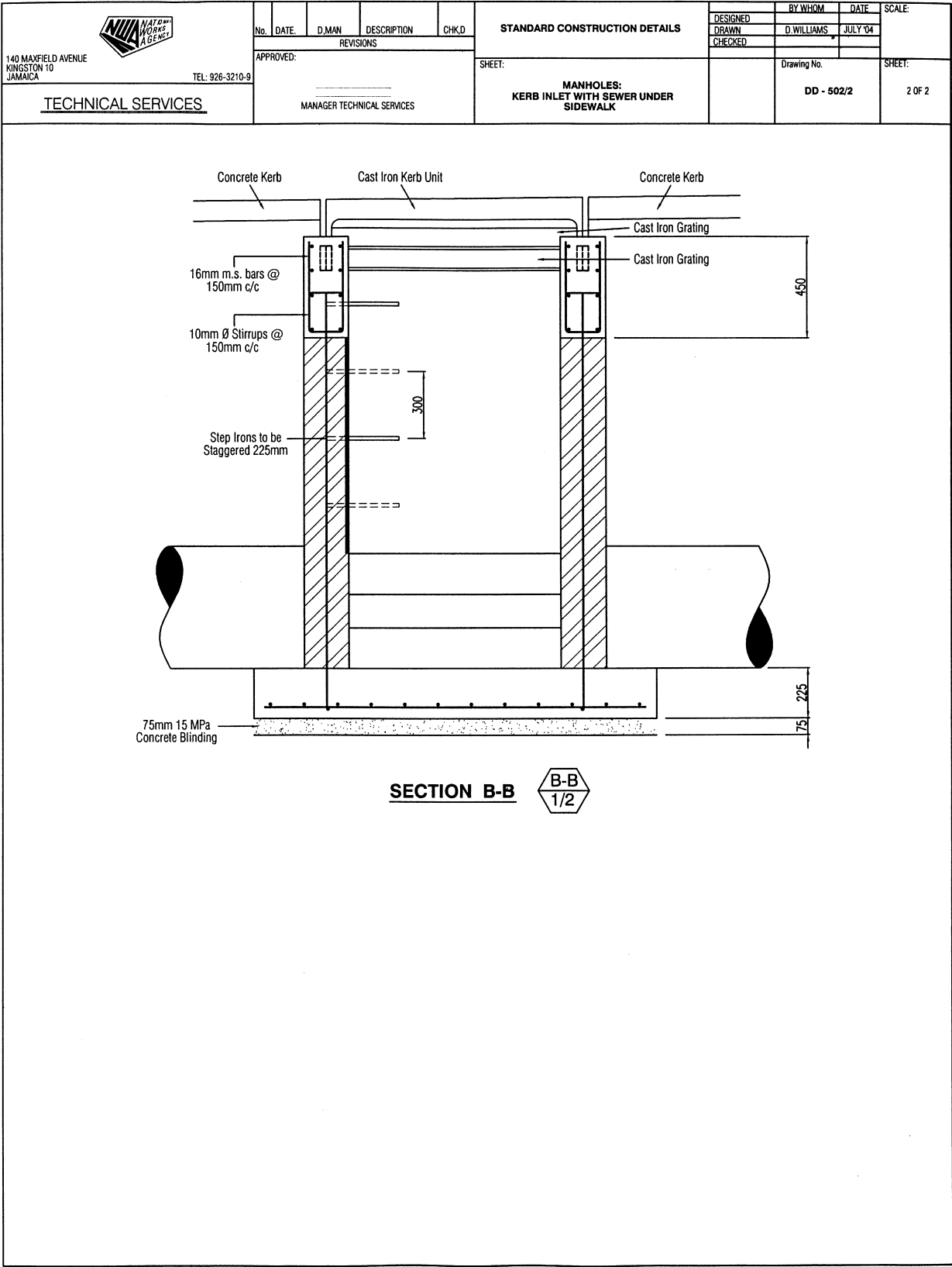
**CASE 5**  
N.T.S

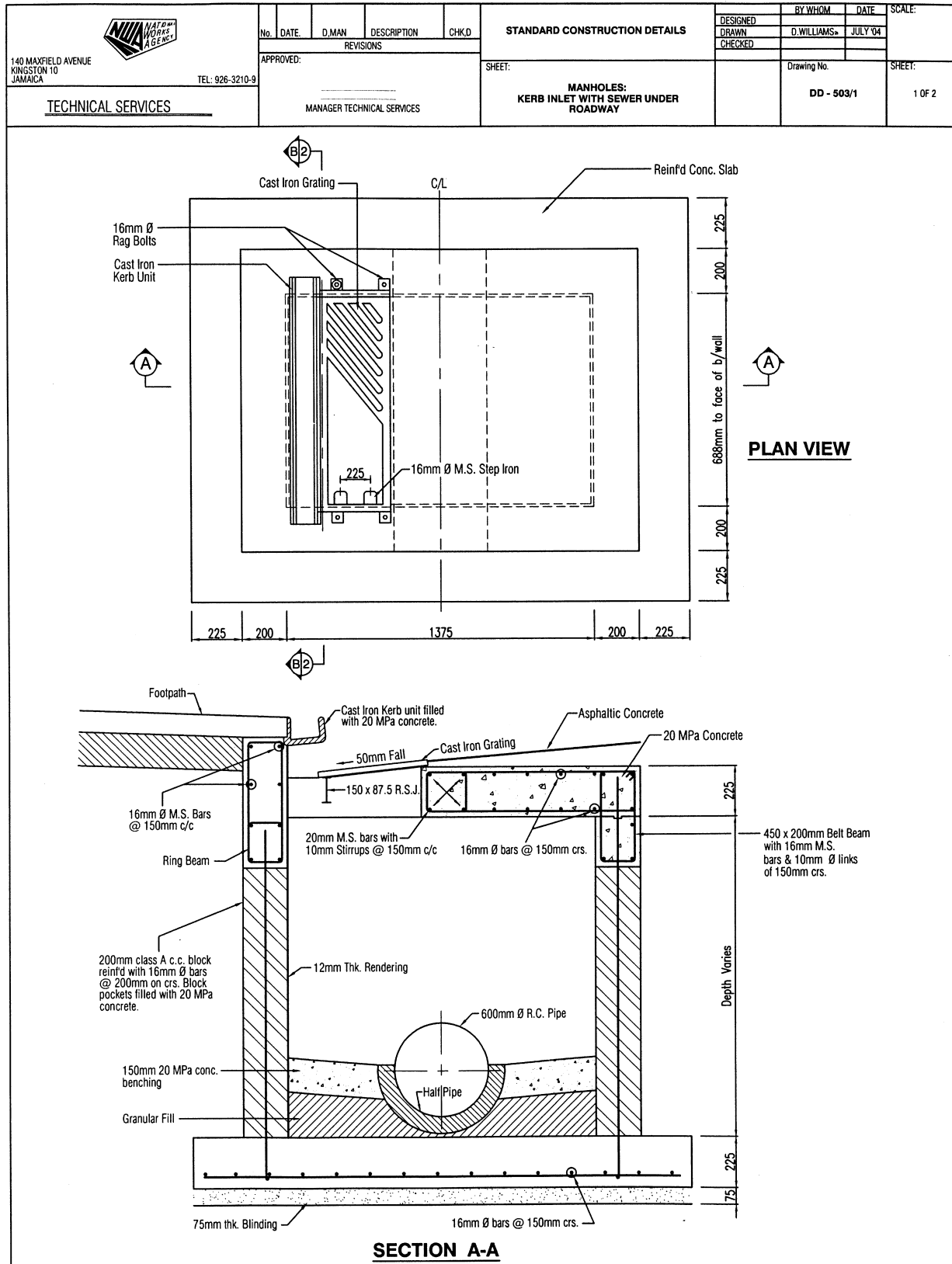
INTERNAL DIAMETER (mm)	300	450	600	900	1200	1500
TYPE	P.V.C	P.C.C	P.C.C	P.C.C	P.C.C	P.C.C
t (mm)	25	62.5	75	100	125	150
W (mm)	525	862	1125	1650	2175	2700
h (mm)	200	235	260	315	365	415

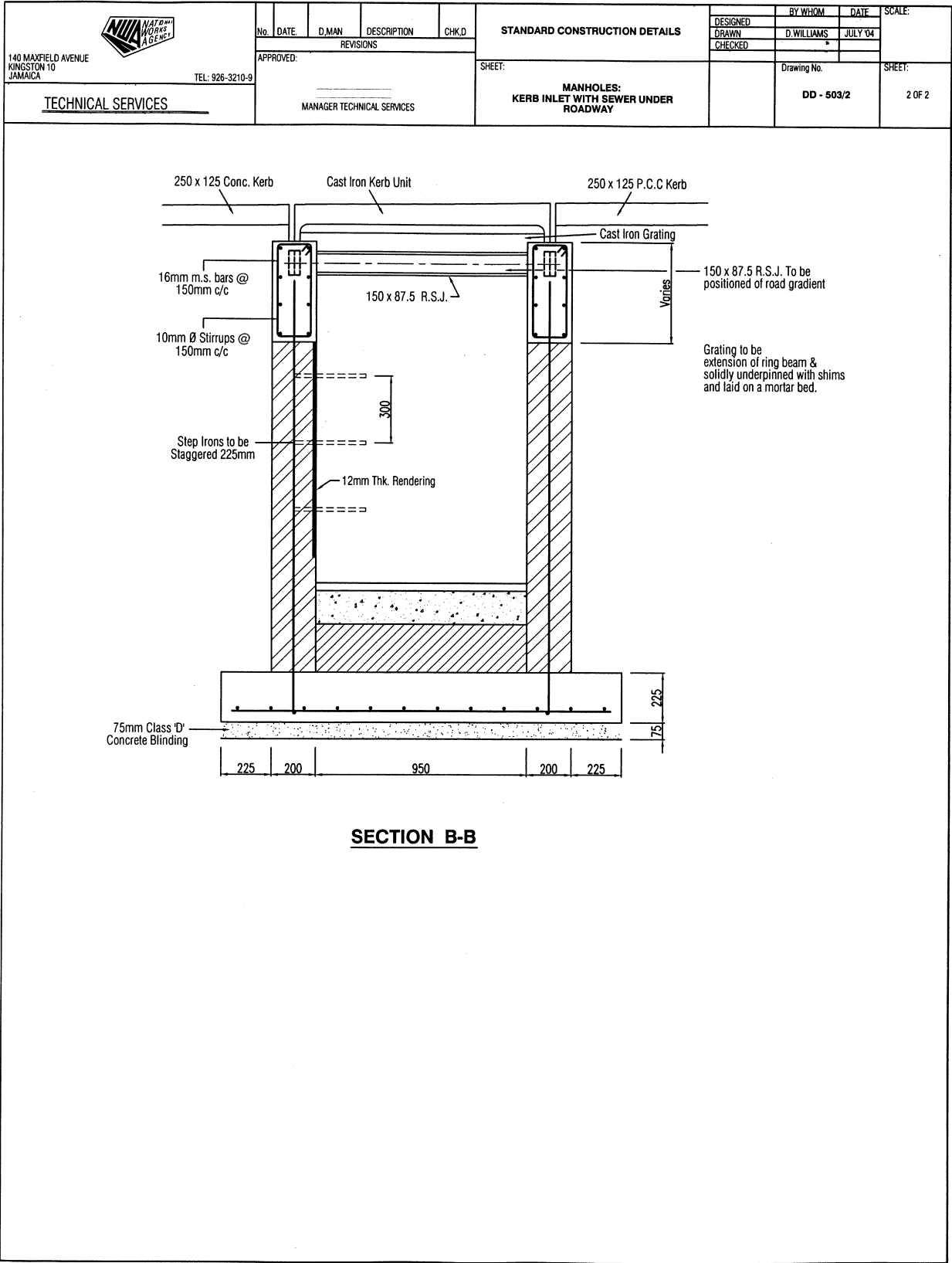
**GENERAL NOTES & DEFINITIONS:**

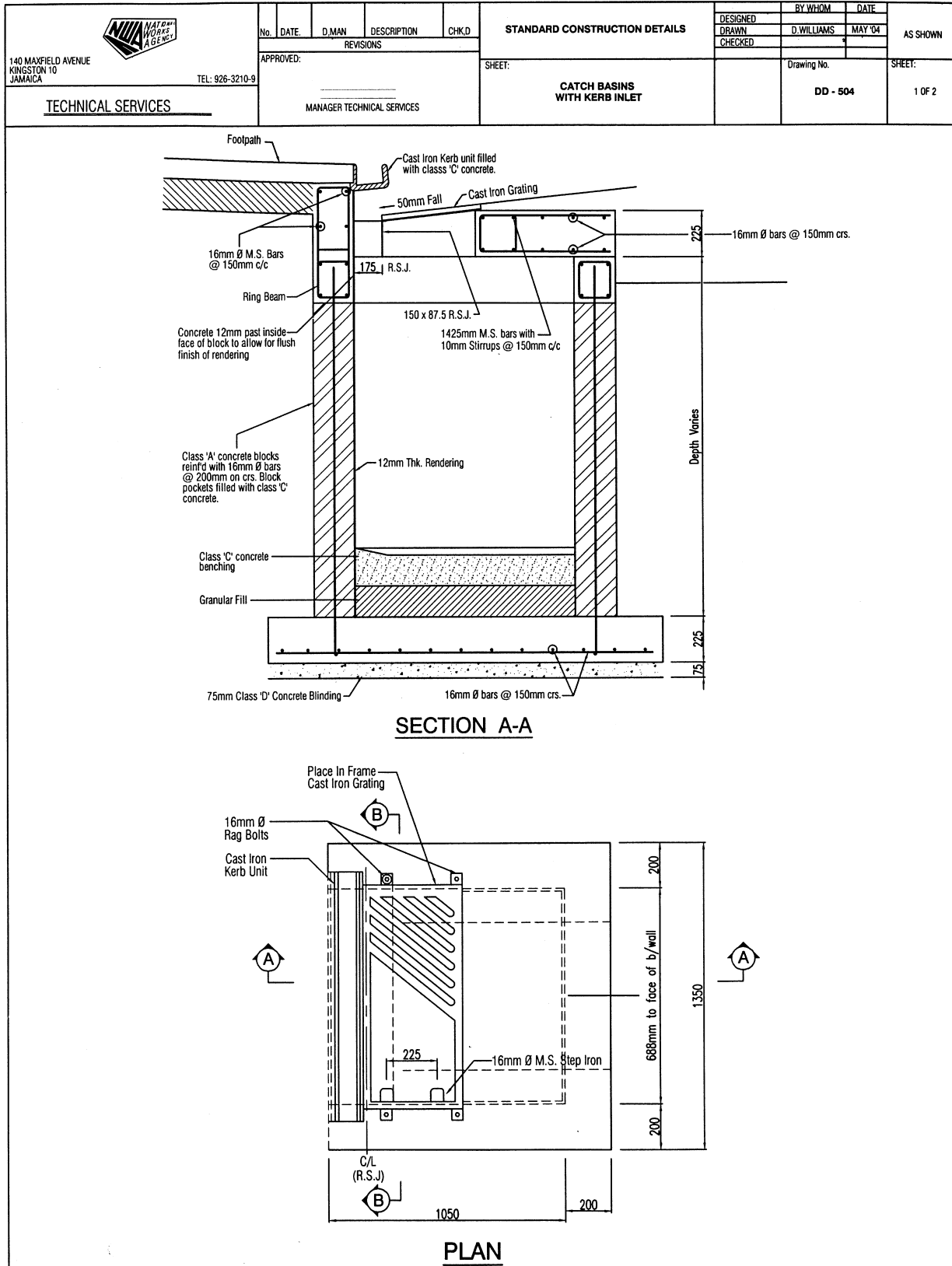
- 1) Special treatment at accesses and entrances as ordered by the Engineer
- 2) All granular material to be compacted in layers not thicker than 100mm after compaction.
- 3) Excavation wider than shown, and additional backfill thus necessitated will not be paid for.
- 4) Costs of additional working space to be allowed for in the work items unit pricing.
- 5) O.D. - Outer Diameter of pipe
- 6) P.V.C - Material of pipe: Polyvinyl Chloride
- 7) P.C.C - Material of pipe: Portland Cement Concrete
- 8) Concrete shall attain 28 days compressive strength of 20 MPa with maximum aggregate size of 20mm.





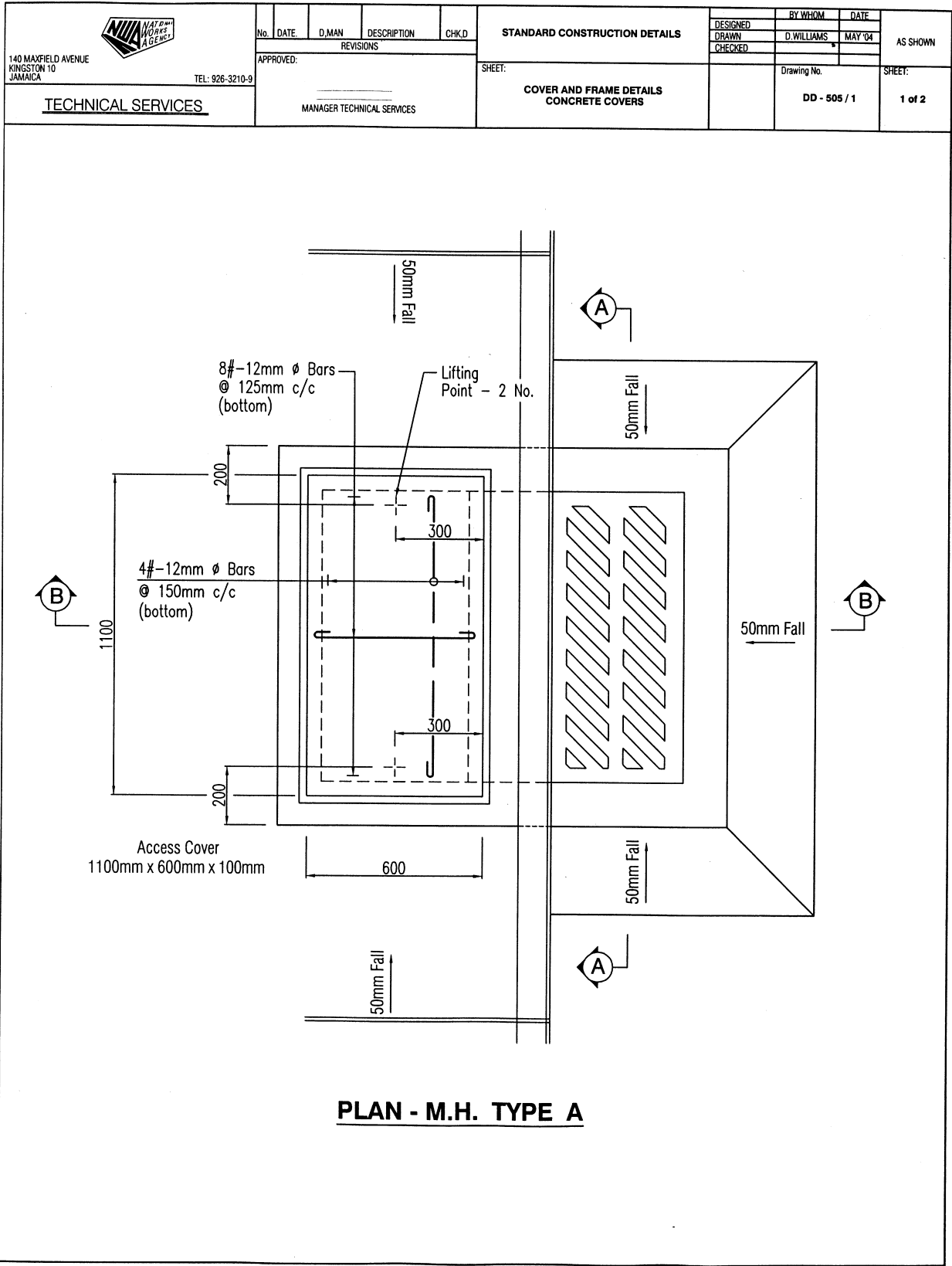


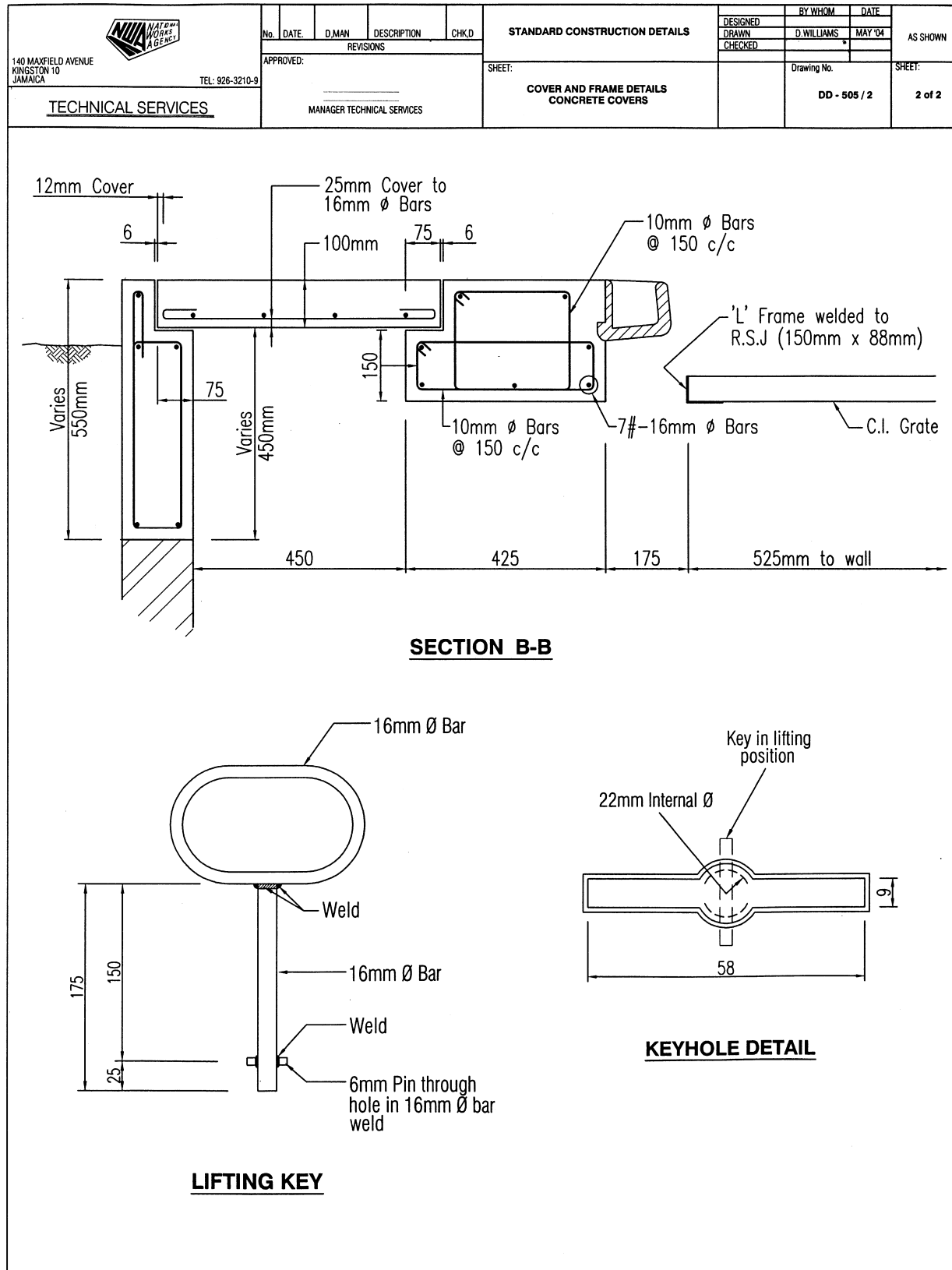


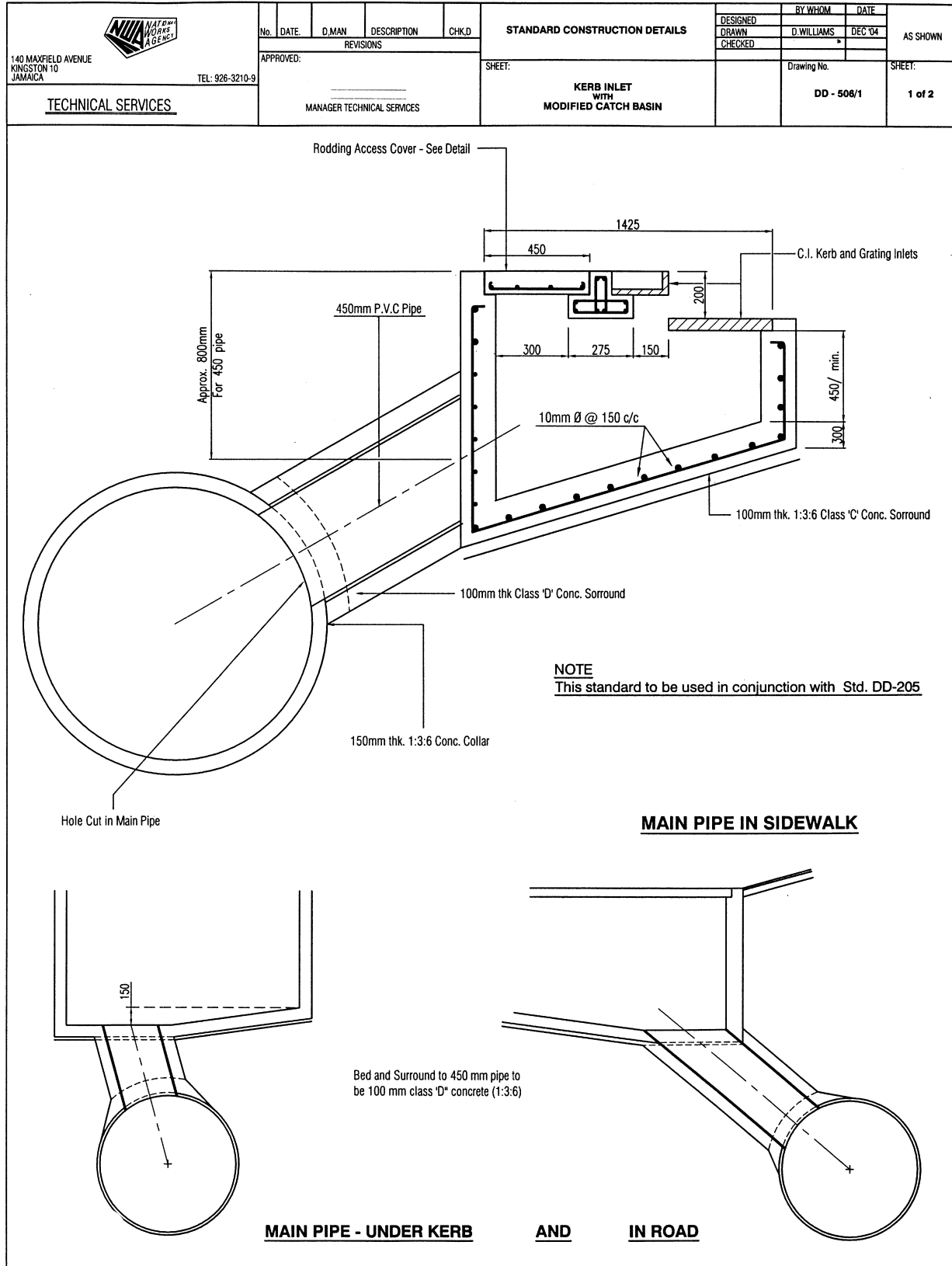


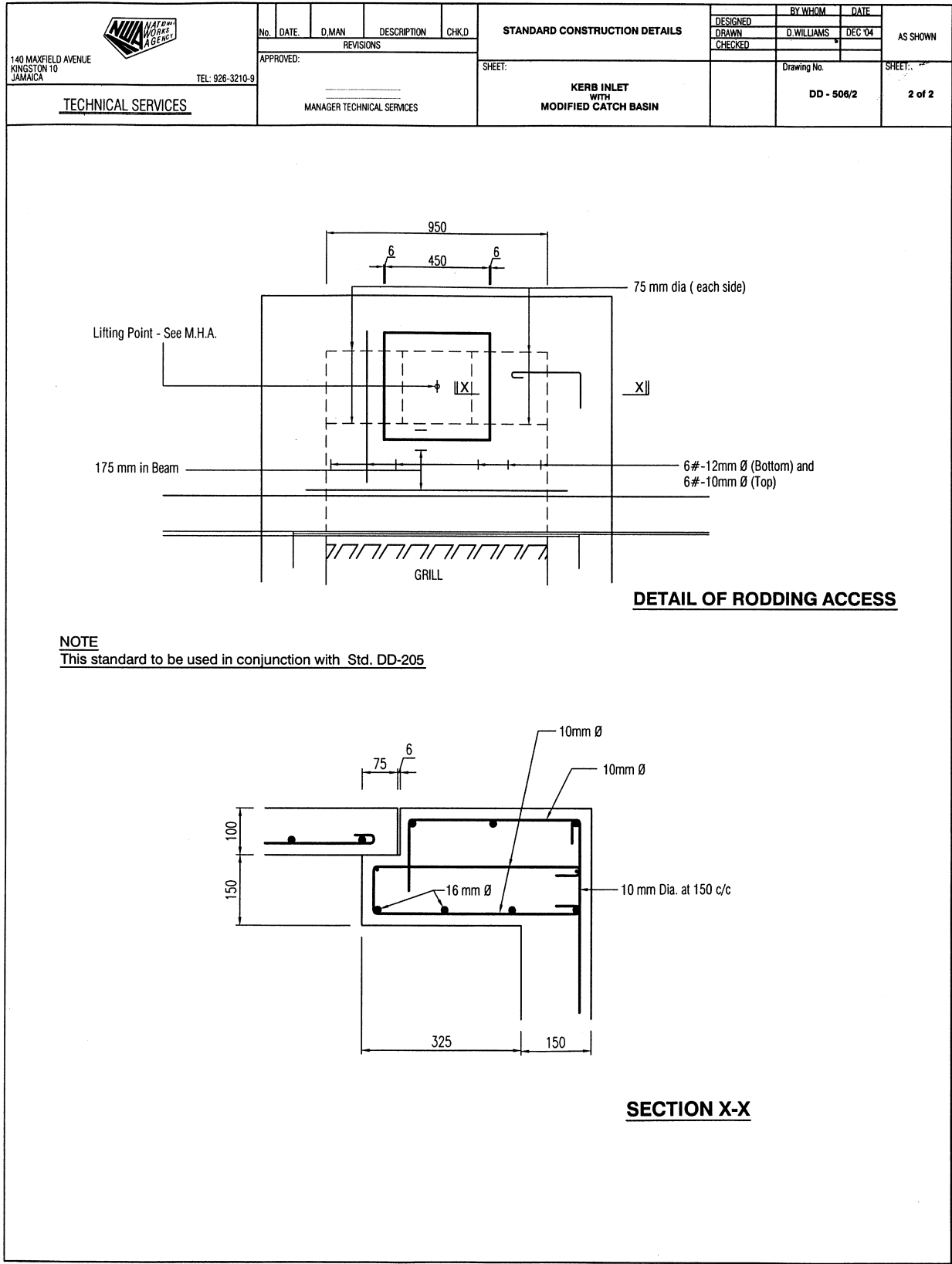


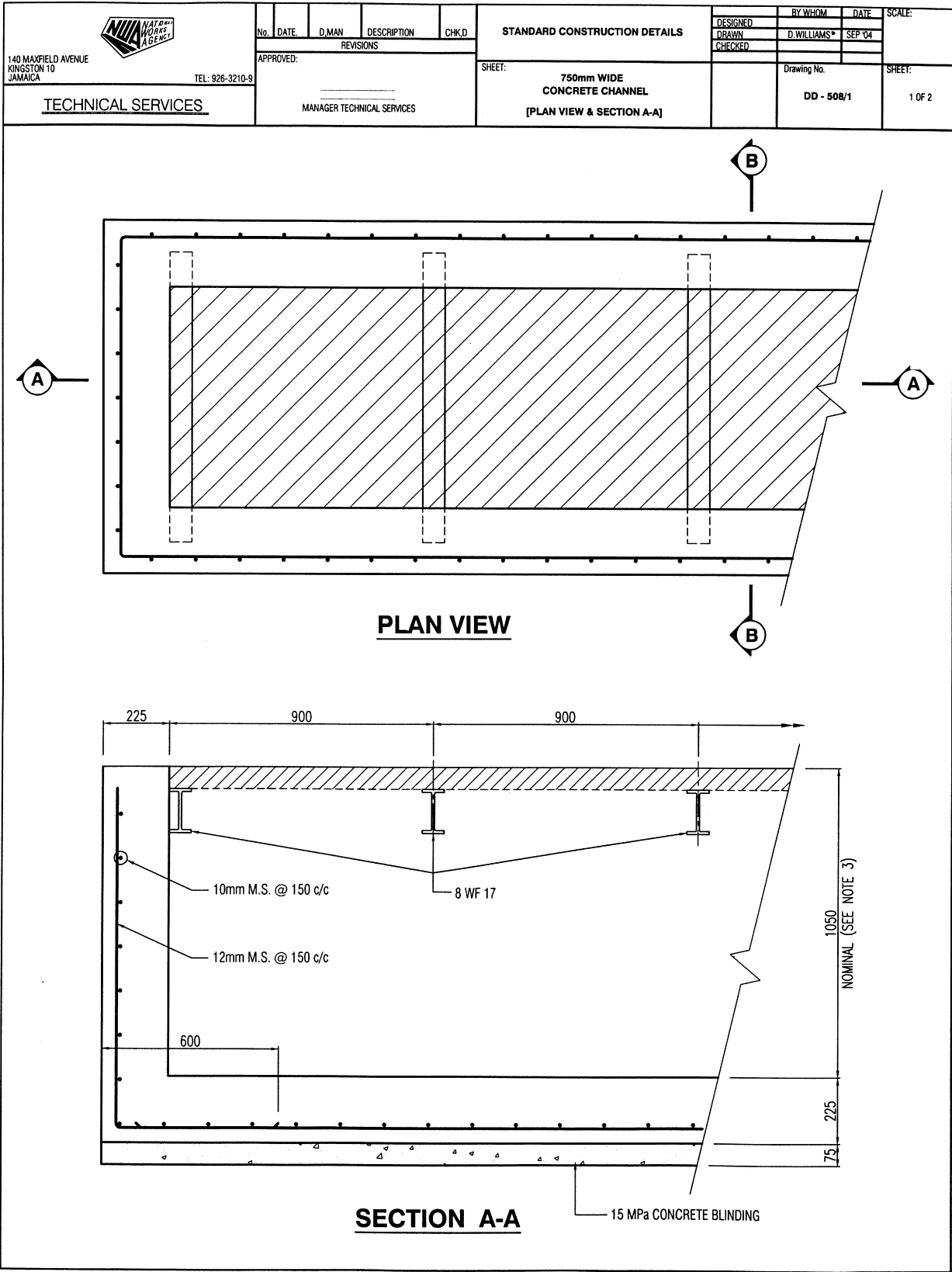


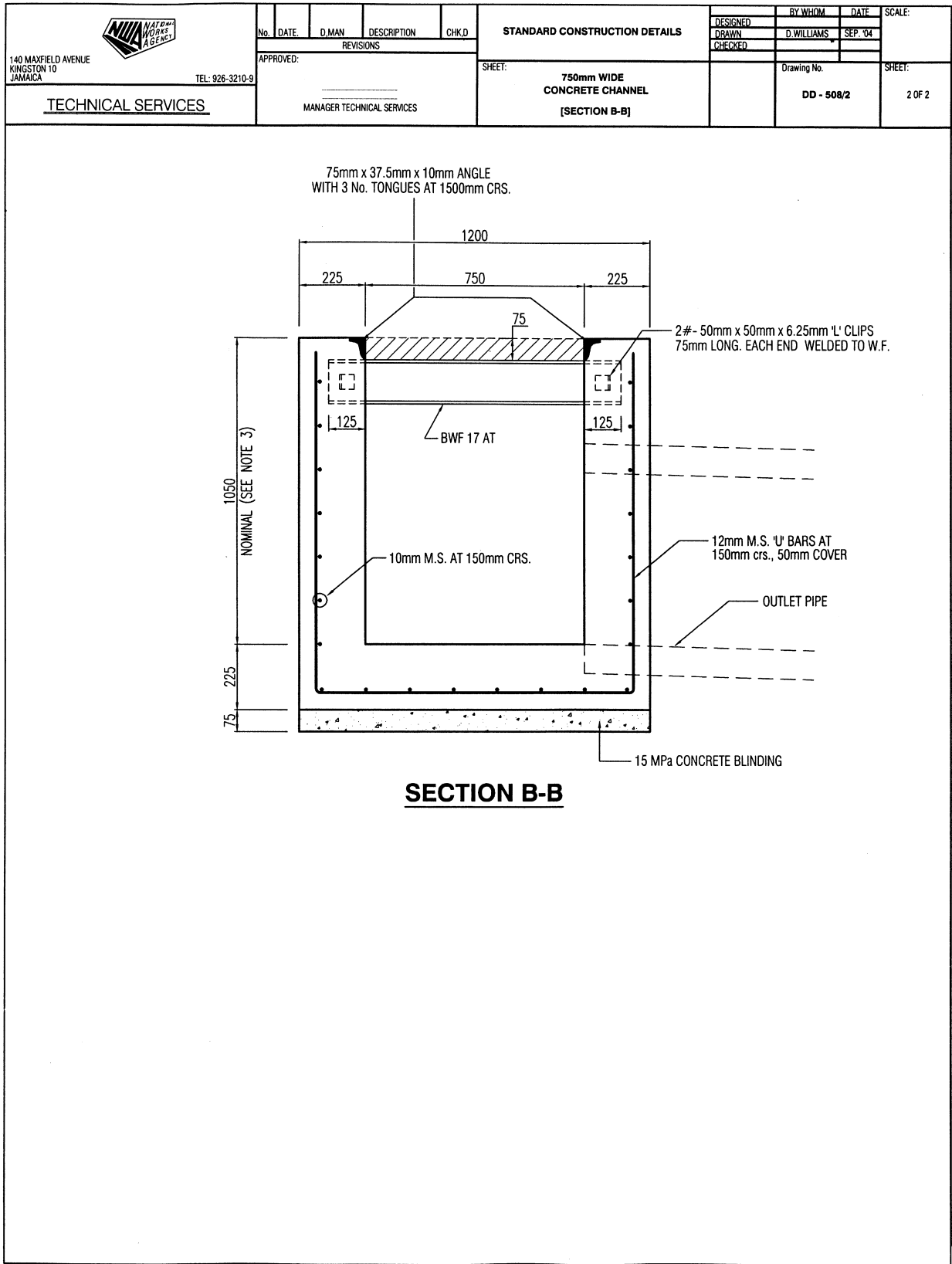


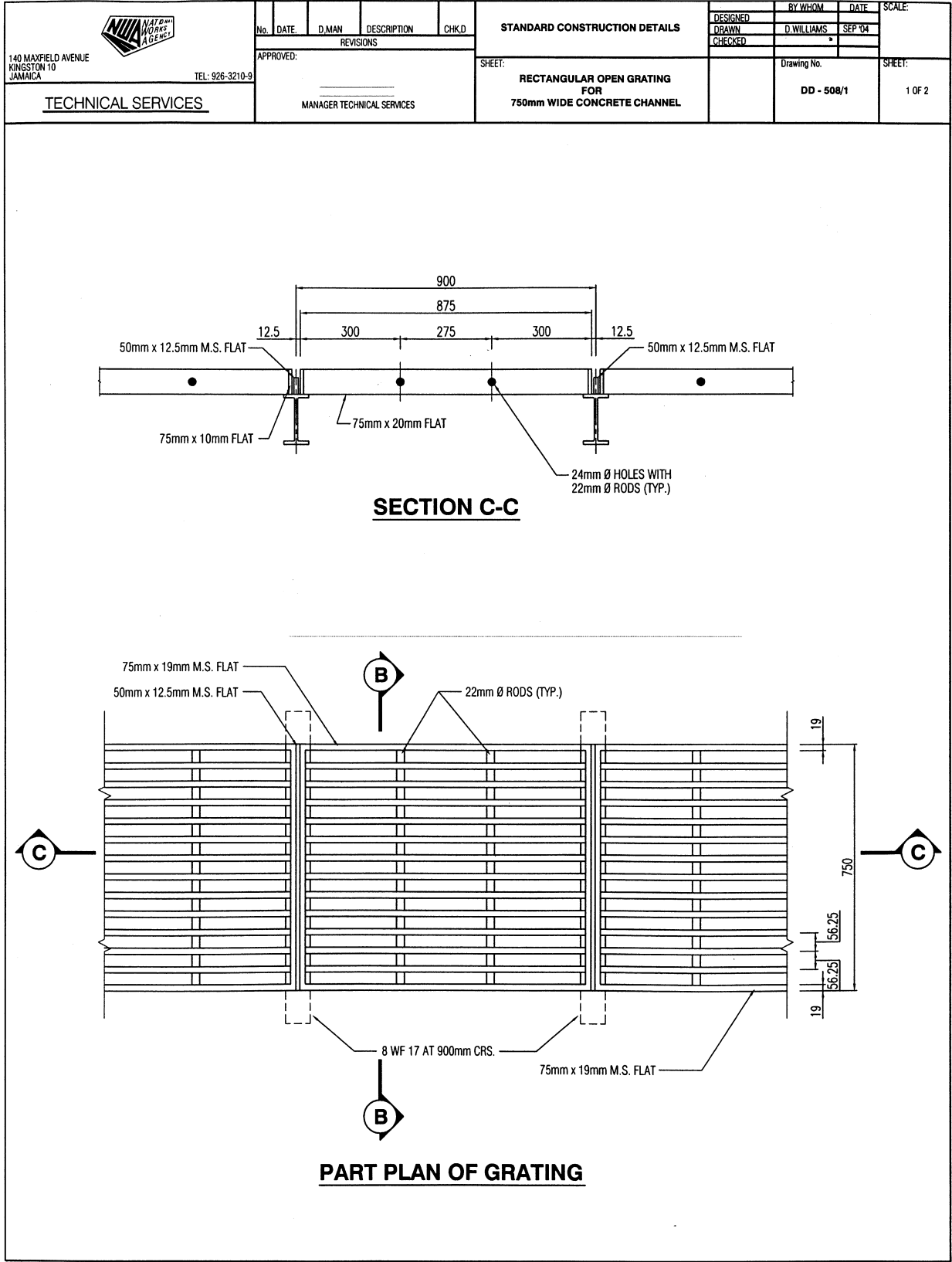


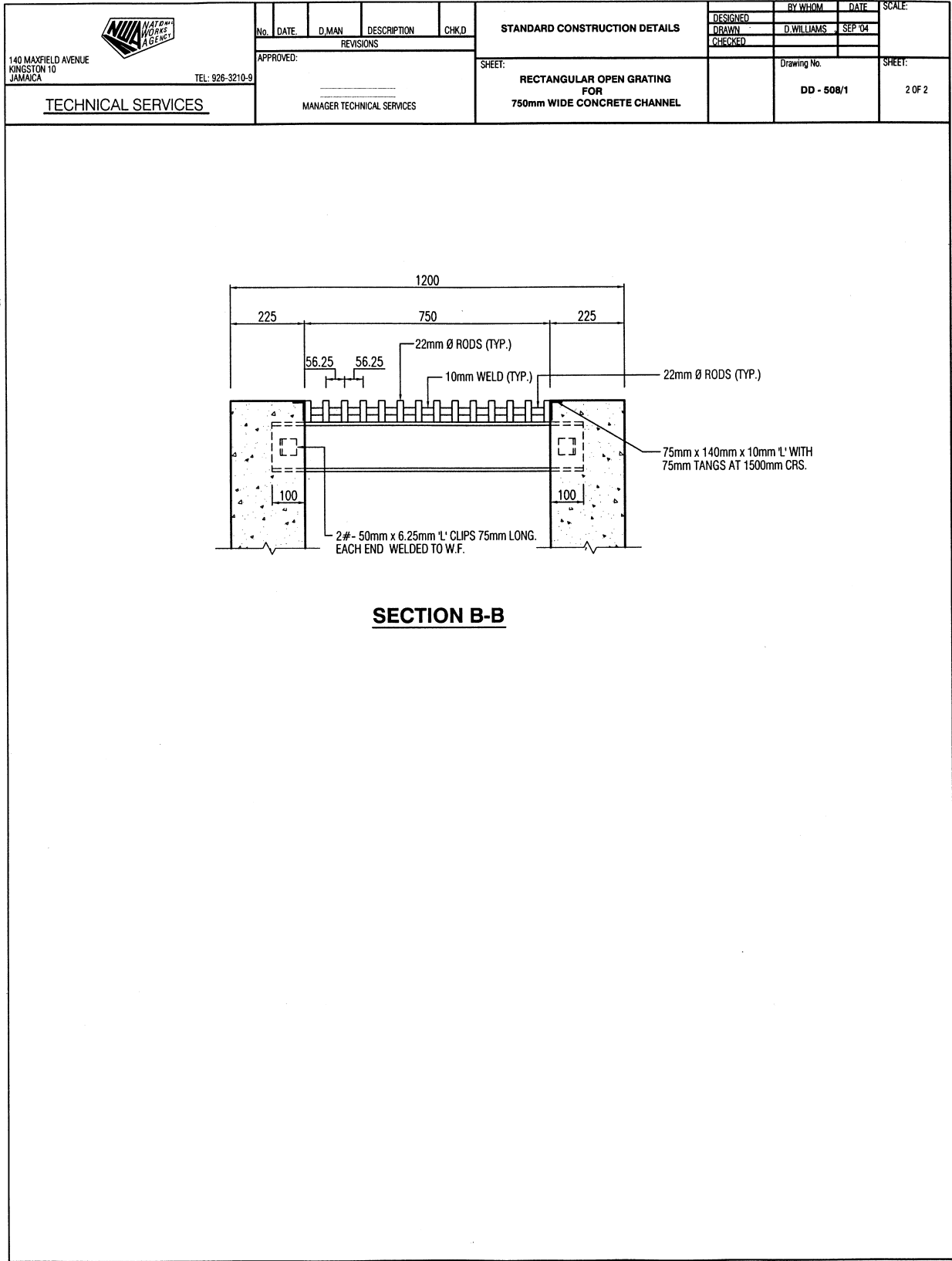




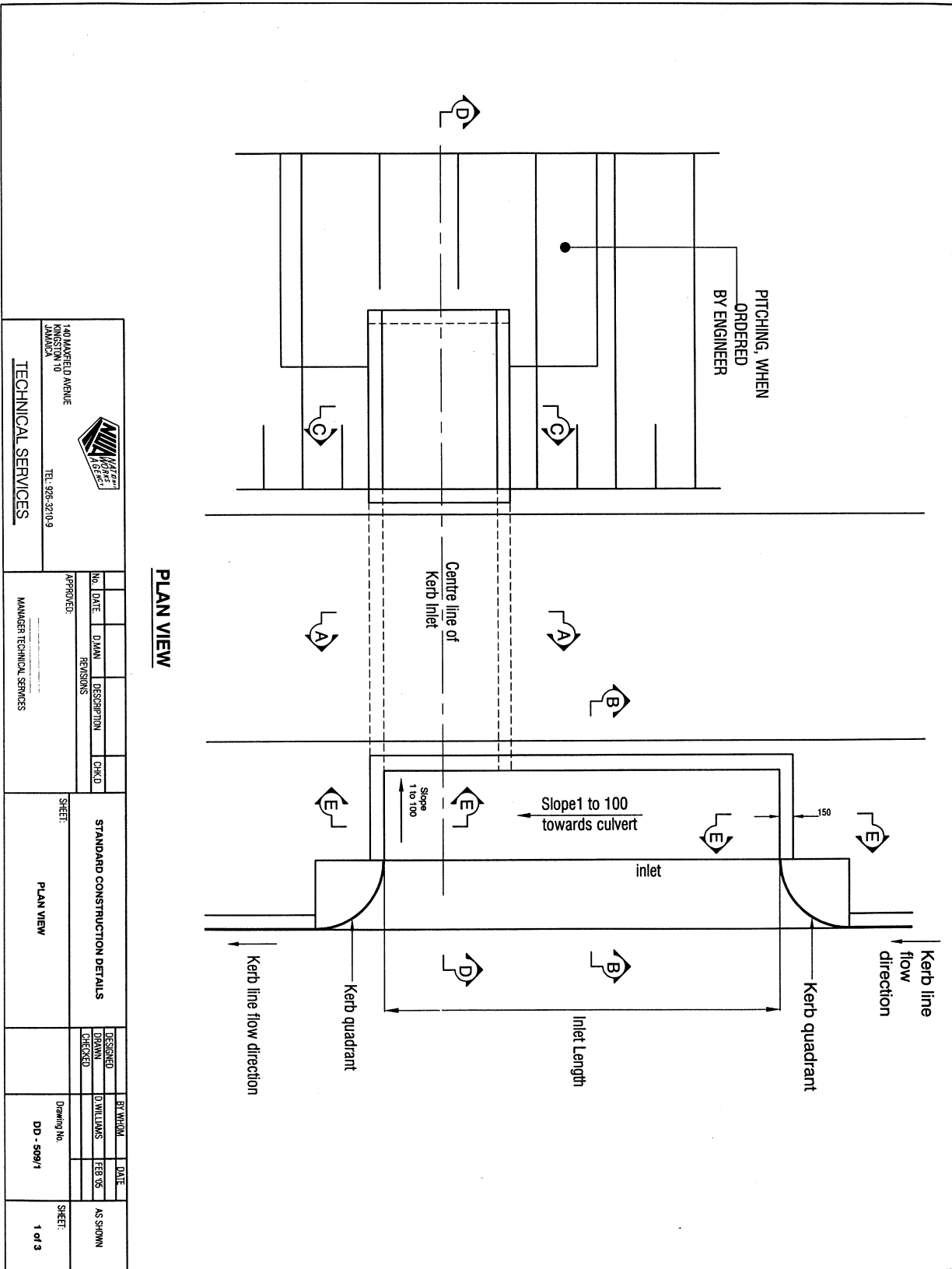


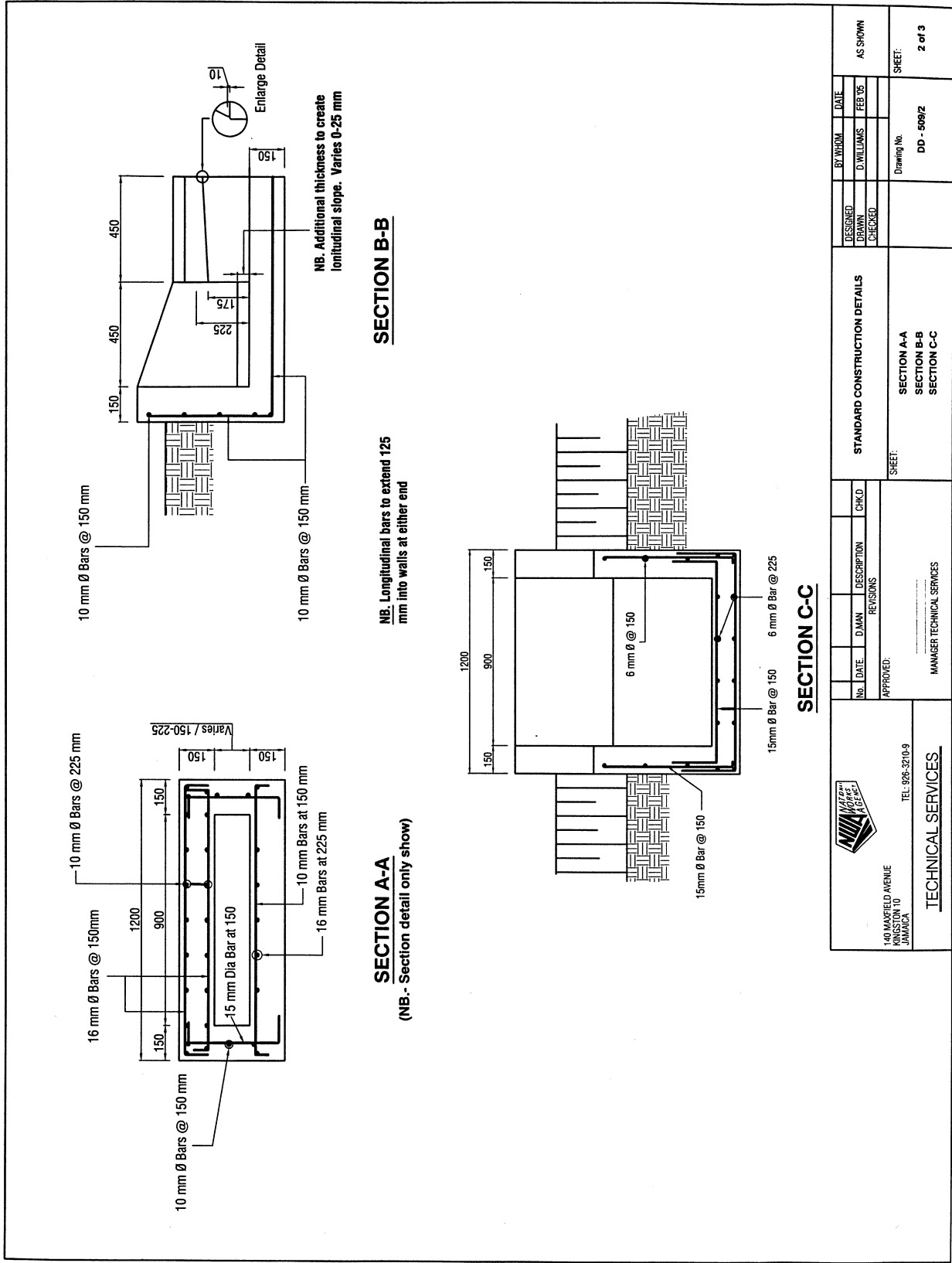












140 MAXFIELD AVENUE  
KINGSTON 110  
JAMAICA

TEL: 926-3210-9

TECHNICAL SERVICES

APPROVED:

MANAGER TECHNICAL SERVICES

No.	DATE	D.MAN	DESCRIPTION	CHKD
REVISIONS				

STANDARD CONSTRUCTION DETAILS

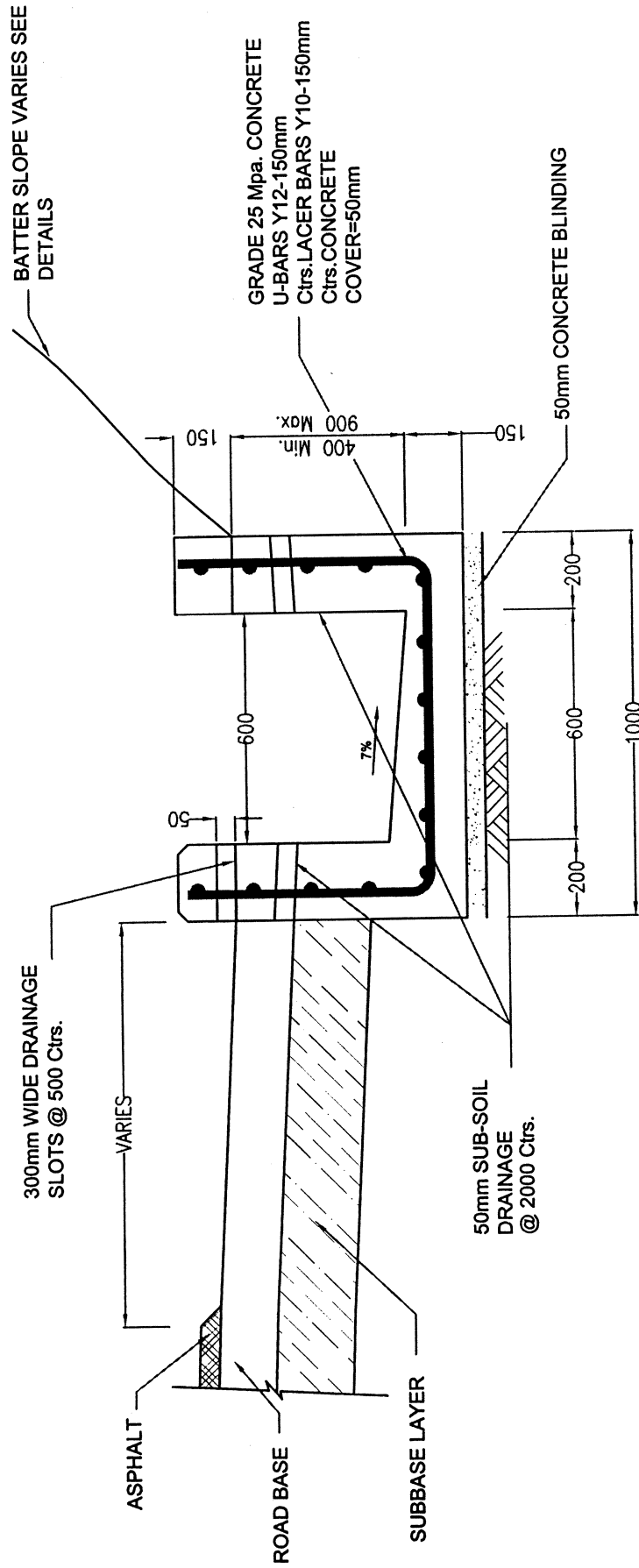
DESIGNED	BY WHOM	DATE
DRAWN	D. WILLIAMS	FEB '05
CHECKED		

SHEET:

Drawing No  
DD - 509/2

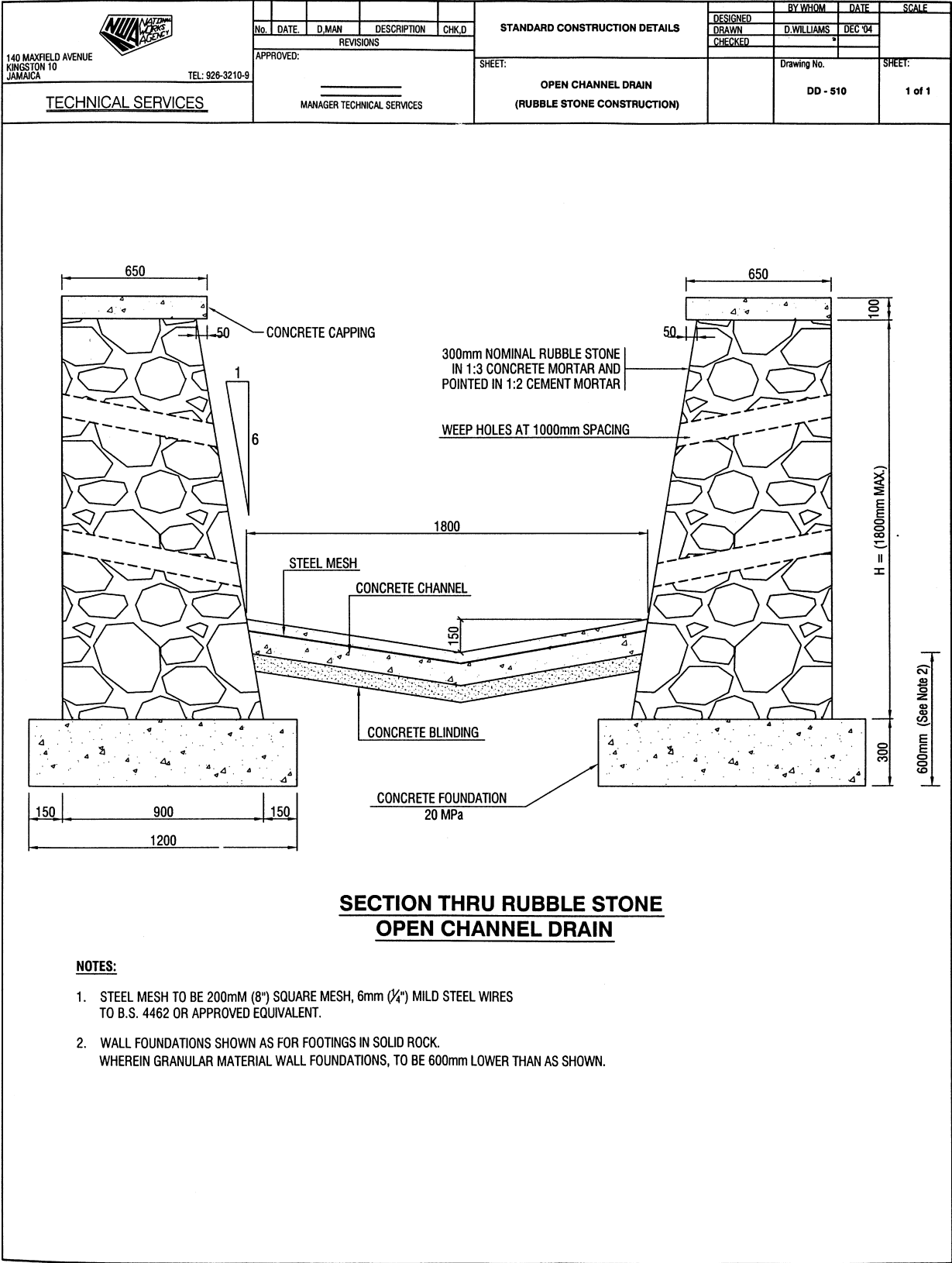
AS SHOWN

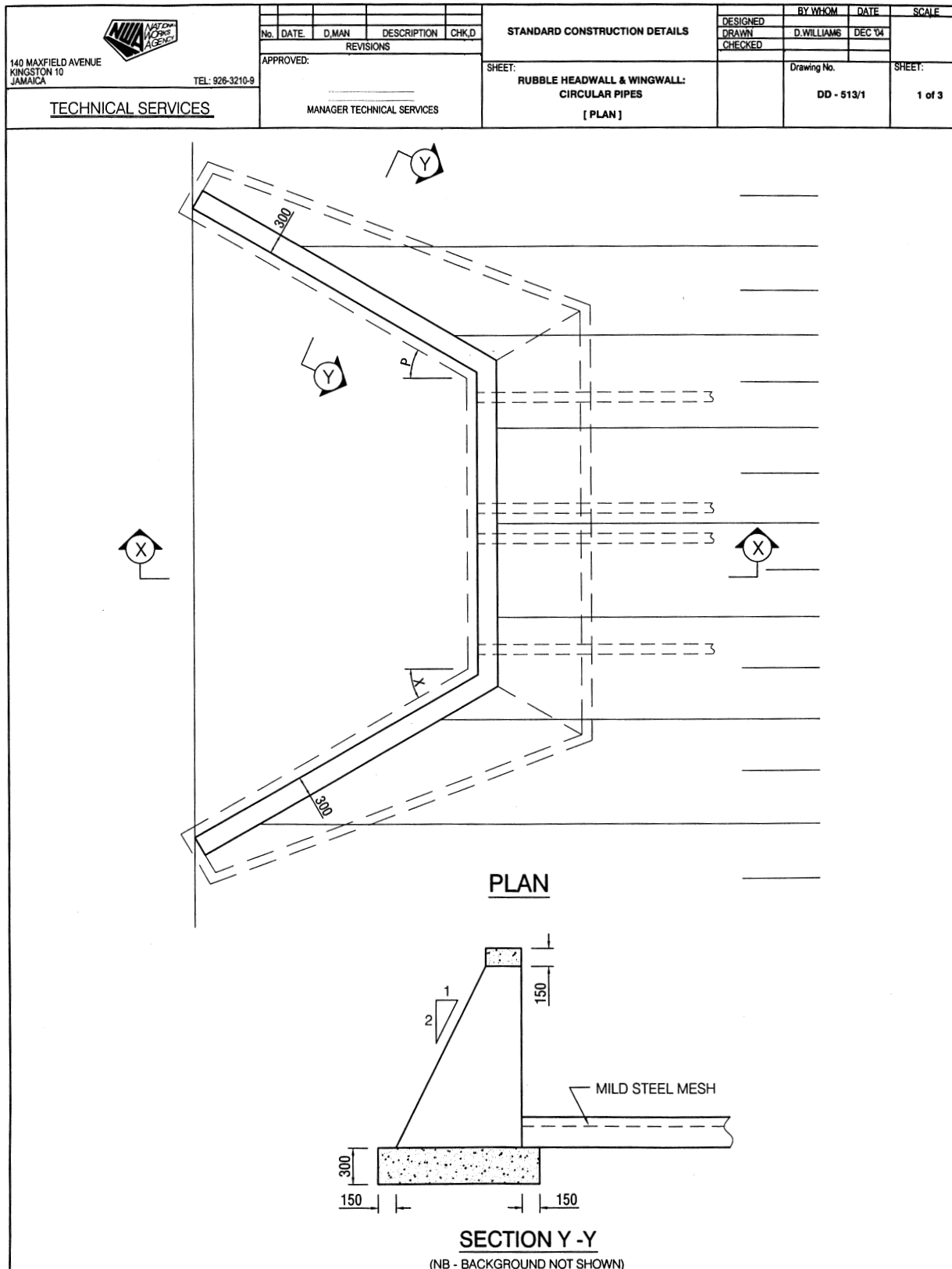
2 of 3



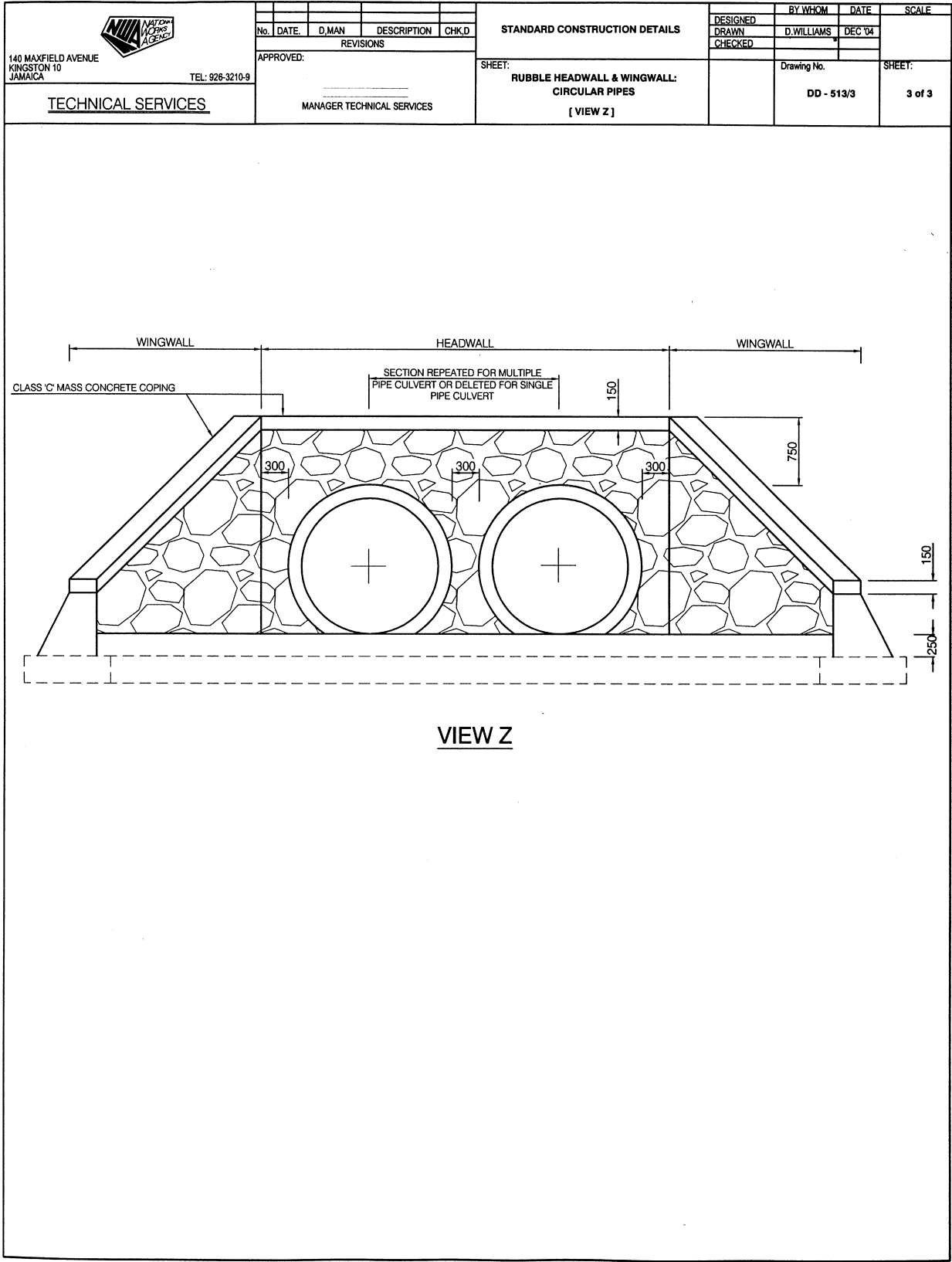
**U - DRAIN**  
**SCALE 1:25**



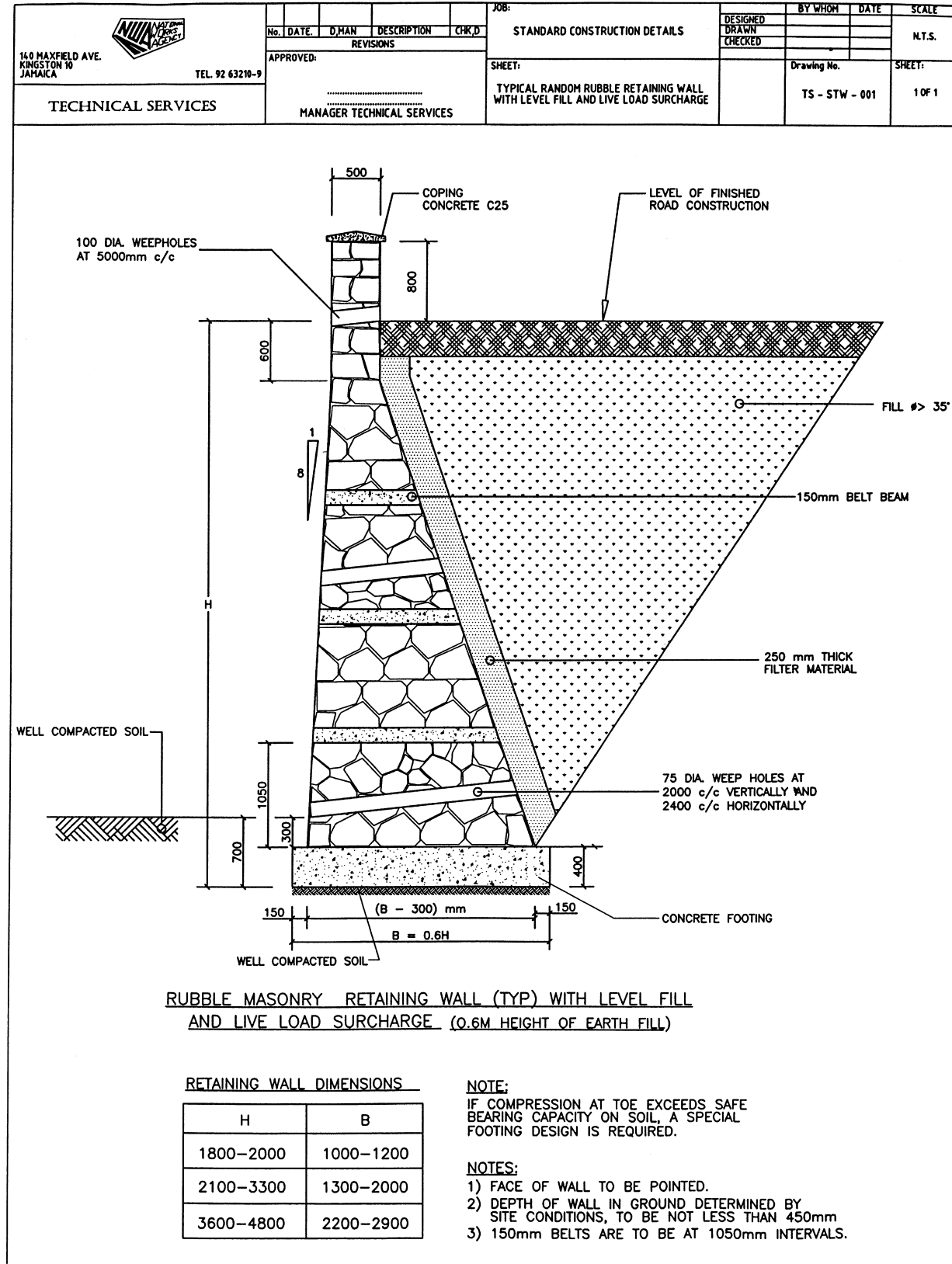












## CHAPTER 11

### GUIDELINES FOR PREPARING HYDRAULIC REPORTS ON DRAINAGE SYSTEMS FOR PROPOSED SUBDIVISIONS

#### 11.0 HYDRAULIC REPORTS

Each report produced, should give a good description of the site, existing drainage features and outline how the proposed drainage system works. Copies of maps and pictures should be included to augment points concerning location, catchment areas, drainage features etc. Each site is unique, therefore the report should include any other relevant information that is not outlined below.

The report does not necessarily have to follow the exact order as outlined but should include a proper description of all items identified below.

#### 11.1 GENERAL DESCRIPTION OF THE SITE

The general description of the site should state the following:

- i Location of the site
- ii Total area of proposed development
- iii Number of housing solutions/lots proposed
- iv Description of soil type
- v General topography of M (m) the site

#### 11.2 EXISTING DRAINAGE FEATURES / STRUCTURES

The existing drainage features/structures should:

##### 11.2.1 Identify the primary means of drainage of the site, which should include;

- i Significant drainage features/structures on site such as gullies rivers etc.
- ii Observation of the performance of these features/structures.
- iii Indication if the site shows signs of flooding or is flood prone, signs of scour in existing drainage features/structures, etc.
- iv Mapping of Local water shed - description of how the existing catchment, that the site is a part of, is drained.

### 11.3 PROPOSED DRAINAGE PLAN

The proposed drainage plan should include:

- i Method of determining surface flows -identify the method used for the analysis of flows and also the return period that each structure, which is part of the main drains, is designed for.
- ii Description of main drainage path through site- should indicate where storm water runoff outfalls from site.
- iii Main drain designs – indicate expected quantity of flows in that sub-catchment\* - and the required drainage structures to conduct it.

\* Flows from other developments upstream of proposed site, whether or not it is in the same natural catchment area, or from other sources, should be identified assessed and accounted for in the proposed design.

## CHAPTER 12

### DOCUMENTS REQUIRED FOR SUBDIVISION APPLICATIONS

#### 12.0 SUBDIVISION APPLICATIONS

An application to subdivide land shall be accompanied by the following documents:

##### 12.0.1 Layout Plans

The Applicant will be expected to present plans in a good state of preservation with all lines and writing legible. The plans shall indicate:

- i area of lots/dimension of lots
- ii field notes in respect of outer boundaries (requisition of the KSAC and Local Authority)
- iii name of roads (required by the KSAC and Local Authority)
- iv longitudinal and cross sections (new roads) and profiles indicating slope of the roadway
- v lot numbers in sequence
- vi proposed phasing if any
- vii use of each lot
- viii locations of existing buildings
- ix contour lines at 0.6m - 3m intervals, depending on the topography in respect of subdivision in excess of 20 lots
- x meridian to which the survey is referred
- xi scale to which the plan is drawn

##### 12.0.2 Map Scales

Recommended map scales are:

1:2,500  
1:1,250  
1:500

The choice of scale is dependent upon the area of land to be subdivided.

## 12.1 DETAIL SURFACE DRAINAGE/STORM WATER RUNOFF PLAN

Existing and proposed surface water drainage detailed plans should include:

- i Proposed bridges and culverts.
- ii All open drains, paved and unpaved.
- iii Storm water inlets, manholes and proposed invert levels.
- iv Outfalls to gullies, rivers and/or the sea.
- v Upgraded structures.
- vi Other features such as:
  - Retention/detention ponds
  - Soakaways/ absorption pits
  - Infiltration/ exfiltration trenches
- vii Dimensions of drainage structures
- viii Offsite drainage features as maybe affected by the subdivision
- ix Design Calculations:
  - For subdivisions located in flood prone areas
  - Calculations for developments over ten hectares
  - Minor drainage systems designed to accommodate 1 in 5 year flood event.
  - Major drainage systems to be designed to accommodate 1 in 25 year flood event.
- x Bridges designed for 1 in 50 year flood event.
- xi Name, signature, occupation and address of owner/agent.
- xii The nearest place/object of significance to and from which any road leads (e.g. milepost, post office, church, bridge etc.).
- xiii Information which will accurately identify any particular road.
- xiv Letters or numbers of main or parochial roads, where possible.
- xv Adjoining land ownerships, where possible.

## 12.2 REPORTS

The plans shall be accompanied by:

- i A site investigation report and a soil percolation test report (where the subdivision is in excess of 20 lots)
- ii Where small portions of a large area of land are being cut off, the developer should indicate where possible the use to which the remaining portion of the land will be put. This is intended to give the planning agency better control over ad hoc developments.

- iii The Commissioned Land Surveyor shall consult with a physical/urban planner and or a hydraulic engineer in the preparation of the design and layout of a subdivision in excess of 10 lots.

## **12.3 LOCATION DIAGRAM**

12.3.1 This is an essential part of the application as it facilitates:

- i Plotting on a map and the identification of the physical location.
- ii The officer processing the application to locate the site easily and so avoid delays.

12.3.2 The diagram shall show:

- i urban areas on planimetric sheets at a scale of 1:1,250
- ii rural areas at a scale of 1:12,500 (where maps at this scale are not available 1:50,000 may be used)
- iii where possible, definable and easily recognizable land marks, together with necessary data e.g. distance from nearest Km post, road intersection, bridge, church etc. (see illustrations of drainage structures at chapter 10).

## **12.4 DOCUMENTS TO BE SUBMITTED WITH BUILDING APPLICATIONS**

An application for the construction of a building shall be accompanied by the following documents:

12.4.1 Location plan at a (minimum) scale of 1:5000.

12.4.2 A site plan drawn at a minimum scale of 1:200 (metric) showing:

- i The boundary, dimensions and topography of the site.
- ii The road name and width of exiting road reservations.
- iii Layout of the parking areas.
- iv The undeveloped areas landscaped.
- v A defined vehicular ingress/egress from the site onto the roadway

with a minimum turning radii of 7m and 10m for residential and commercial development respectively.

- vi Location and setback of building(s) on the site from road property boundary(ies). A minimum of 6.1m and 7.62m is required from minor and major roads respectively.

**Note:** Where roads are earmarked for future improvement (widening) the setback requirement may be greater. The setback is to ensure conformity or establish building lines along roads.

- 12.4.3 A drainage plan illustrating effective interception and on-site disposal of surface drainage/storm water runoff on or off site. Final off site disposal should be into existing gullies, drain culvert or any other drainage system.

## 12.5 REQUIREMENTS FOR ADVERTISEMENT APPLICATION

The advertiser (i.e. the person/company) erecting the billboard must complete an application form paying particular attention to the following requirements:

- i The name of the applicant/agent.
- ii The correct address where the sign will be located.
- iii The duration for which the advertisement will be displayed.
- iv Proof of consent from the proprietor to erect a sign at the proposed location.
- v If the application is for a multi-tenanted property, such as a shopping centre or office complex, a suite number should be provided for each individual business (example shop no. 2 Hagley Park Plaza).
- vi For each sign/billboard two sets of drawings to scale should be submitted for each permit request.
- vii After making an application, a stake should be placed in the ground at the proposed location of the advertisement so that the site may be easily identified in regard to its suitability.

## **12.6 TRAFFIC IMPACT STUDY**

Traffic impact studies are vital to ensure that traffic continues to flow at an acceptable level of service. It is critical for the NWA to know how vehicular traffic generated by development will affect the road network.

### **12.6.1 Traffic Impact Report**

A traffic impact study must be conducted and a report submitted for:

- i Any project as may be deemed necessary by the National Works Agency
- ii Where the project size, traffic generated exceeds an Average Daily Traffic (ADT) of sixty (60)
- iii A residential development of twenty (20) units and over

### **12.6.2 Traffic Study**

The applicant must carryout a traffic study, prepared by a transport planner or engineer or any qualified professional within the field. To avoid undue delays or revisions, it is strongly recommended that the applicant or his/her agent contact the Traffic Management unit at the National Works Agency before beginning the study, to discuss traffic demand and capacity assumptions and other study requirements for the project.



### 12.6.3 Traffic Impact Threshold

#### ADT\* Impact Thresholds

This outlines the thresholds for impacts on any road or street by a subdivision/development (excluding surrounding growth) and the required traffic study:

ADT\* Growth along Road or Road Segment due to the Subdivision/development

ADT Growth along Road or Road Segment	Traffic Study Required
0.0-2.4% ADT Growth	Step 1 - Project review and Initial Study (Intersection Analysis of Traffic and Turning movement are sufficient)
2.5%-4.9% ADT Growth	Step 1 Examine Initial Study (Intersection Analysis of Traffic and Turning movement) Step 2 Access management Study (Detailed Report of a Focus Study within the immediate area of impact)
5.0%-7.4% ADT Growth	Step 1 Examine Initial Study (Intersection Analysis of Traffic and Turning movement) Step 2 Corridor Analysis Required (Detailed Report)
7.5% ADT Growth	Step 1 Examine Initial Study (Intersection Analysis of Traffic and Turning movement) Step 2 Network Analyses (Detailed Report)

**\*ADT - Average Daily Traffic**

# CHAPTER 13

## INFORMATION CHECKLIST FOR DRAINAGE REVIEW BY NWA

### 13.0 REQUIRED INFORMATION

The following information must be included in the subdivision application to enable timely review and recommendation of the project:

(Mark "y" for yes and "n" for no where appropriate)

### 13.1 APPLICATION FORM

- 1. Name of Project ( )
- 2. Date of receipt ( )
- 3. Name and address of developer/agent ( )
- 4. Name and address of Consultant (Commissioned Land/Surveyor/Planner/  
Hydraulic Engineer) ( )
- 5. Other contact such as telephone/fax/email ( )
- 6. Reference number ( )

#### Land use

- 1. Agricultural ( )
- 2. Residential ( )
- 3. Other ( )

### 13.2 LOCATION DIAGRAM

- 1. Geographical coordinates ( )
- 2. Site visit carried out by National Works Agency ( )

### 13.3 DRAINAGE LAYOUT PLAN

- 1. Set backs, layout of roads, lots, and other structures to the specification  
of the Chief Surveyor and drainage guidelines ( )
- 2. Layout plan shows proposed phasing of development area ( )

- 3. Plan shows labelled contour lines at intervals 0.6 to 3.0 metres ( )
- 4. Drainage easement 1.10 m (min) provided from each side of waterway ( )
- 5. Direction of storm water flow indicated for entire drainage system ( )
- 6. Exact location of hydraulic structures based on drainage plans and profiles ( )
- 7. Scour protection provided at outfalls ( )
- 8. River and gully training/cleaning (all upgrading) shown on plan ( )
- 9. All structures are properly labelled on plan ( )
- 10. Appropriate scale ( )

**13.4 OFFSITE DRAINAGE PLAN**

- 1. Drainage plan shows surrounding communities and adjoining properties ( )
- 2. All major water courses and receiving bodies are shown and labelled ( )
- 3. Existing roads and bridges etc. are indicated on plan ( )
- 4. Drainage plan shows boundaries of sub-catchment areas and properties ( )
- 5. Plan shows final safe disposal of run off into receiving drainage system ( )

**13.5 OTHER DESIGN PLANS ETC**

- 1. Subdivision layout ( )
- 2. Water Supply ( )
- 3. Sewerage ( )
- 4. Others where necessary ( )

**13.6 DETAILED DRAWINGS**

Detailed drawings (clearly labelled) for all existing and proposed hydraulic structures including;

- 1. Cross sections of proposed roads ( )
- 2. Proposed bridges and culverts ( )

- 5. Outfalls into gullies, rivers and sea etc. ( )
- 6. Upgraded structures ( )
- 7. Other features including
  - i) Retention ponds etc. ( )
  - ii) soak-aways / absorption pits
  - iii) Infiltration / exfiltration trenches ( )
- 8. Dimensions of drainage structures (features) ( )

**13.7 ENVIRONMENTAL IMPACT ASSESSMENT**

- 1. EIA required by the NRCA ( )
- 2. Project profile submitted ( )
- 3. EIA (excerpts) or EIA submitted including
- 4. Summary (overview) ( )
- 5. Description of hydrology ( )
- 6. Project area is prone to flooding ( )
- 7. EIA recommendations submitted ( )

**13.8 DRAINAGE CALCULATIONS**

- 1. Subdivision is located in a flood prone area ( )
- 2. Calculations submitted for developments over ten (10) hectares. ( )
- 3. Minor drainage system can accommodate 1 in 5 year flood events ( )
- 4. Major drainage systems based on 1 in 25 year storm event ( )
- 5. Bridges can carry 1 in 50 year flood events. ( )
- 6. River and flood control protection works based on 1 in 100 year events ( )
- 7. Calculations based on return period as specified. ( )

# CHAPTER 14

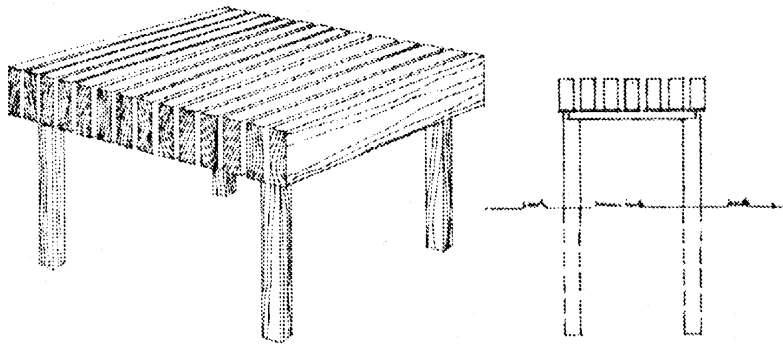
## STREET FURNITURE

### 14.0 TYPES OF STREET FURNITURE

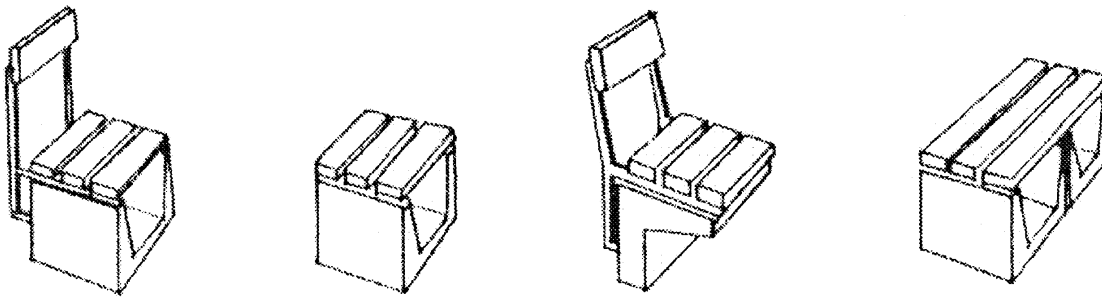
Street furniture is fittings and fixtures installed in streets such as lamp posts, fire hydrants, street signs, benches, etc.

Street furniture is an essential feature of the environment. Special consideration should therefore be given to their location, design and maintenance. They should be sensitively designed, sturdily constructed and functionally appropriate. Below are some examples of the more common types of street furniture.

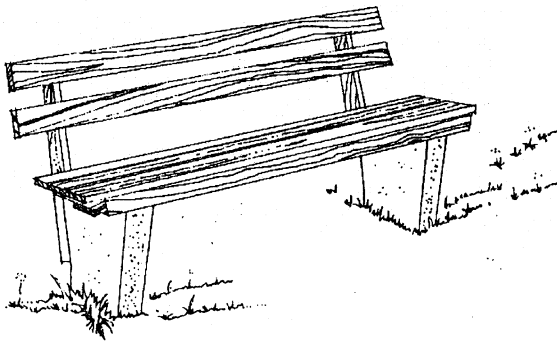
### 14.1 STREET FURNITURE



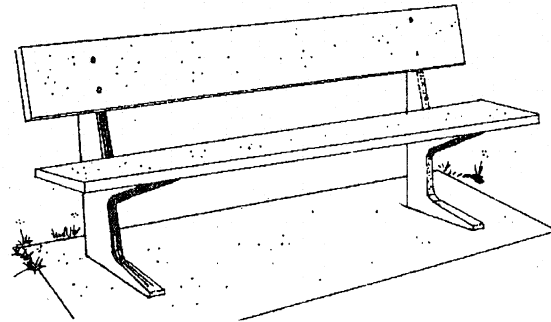
All purpose Table & Seater



Modular Seater: Pre-Cast Concrete and Wood

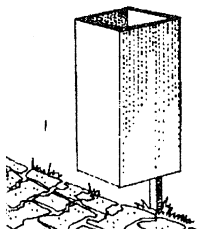


Benches: (i) Wood & Concrete

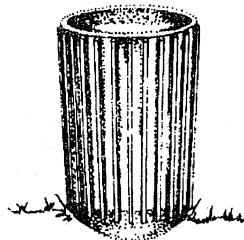


(ii) Concrete Plank & Aluminium

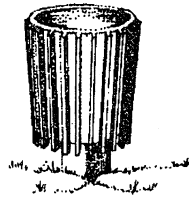
## 14.2 REFUSE BINS:



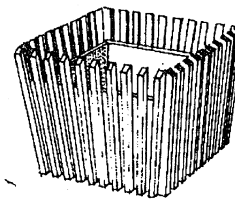
(i) wood or metal



(ii) wood or metal



(iii) wood or metal



(iv) wood



(v) pre-cast  
concrete or metal

## **CONTACT INFORMATION**

For further information please contact

The Chief Executive Officer  
The National Works Agency  
140 Maxfield Avenue  
Kingston 10

Customer Service Toll Free : 1-888-872-3342  
Tel (876) 926-3210/ 4804/ 4820  
Fax: (876) 926-2572  
Website: [www.nwa.gov.jm](http://www.nwa.gov.jm)