

Salandra Group

Corner Days & Regency Roads, Croydon Park DPA

Stormwater Assessment



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Stormwater Assessment

Our Ref.: 17026-2B

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Document Status

Revision	Date	Approved	Details
A	29 Apr 2019	DJ	Client Issue
B	23 Sep 2020	DJ	Client Issue

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Appendix A Existing Infrastructure Plans, supplied by City of Port Adelaide Enfield

1 Introduction

1.1 Background

A Development Plan Amendment (DPA) is proposed to be undertaken for a group of land parcels in Croydon Park. The affected area is shown in Figure 1.1.



Figure 1.1 Subject Land

The *Statement of Intent for Corner Days & Regency Roads Development Plan Amendment* (City of Port Adelaide Enfield, 2016), amongst other things, details the nature of the investigations required to be carried out in preparing the DPA. Section 4.1.2 of the *Statement of Intent* calls for the following investigation to be performed:

- Stormwater assessment of the potential impacts brought about by the proposed change of use of the subject land

This report responds to this item.

1.2 Scope

The scope of this investigation has been limited to the following:

- Collation of available base data and reports
- Consideration of supplied comments prepared by City of Port Adelaide Enfield infrastructure team staff
- High level assessment of pre / post development stormwater discharge(s) from the site
- Identification (at a conceptual level) of stormwater management strategies to be considered in the future development of the land
- Preparation of this report

2 Existing Features, Council Requirements

2.1 Site Features, Catchment Context

The subject land is located near the upstream (southern) end of what is known as the South Road (North Arm West) stormwater catchment (refer Figure 2.1). This drainage system feeds into a main drain within the South Road (North South Motorway) corridor, which discharges into the Barker Inlet wetlands north of the Port River Expressway. The catchment is located predominantly within the City of Port Adelaide Enfield, with some area within the City of Charles Sturt also contributing to the system.

The site is relatively flat, with a very slight (uneven) overall gradient from south to north. The southern boundary has a maximum ground level of approximately 10.25mAHD, and the north-eastern corner has the lowest level on the land of approximately 8.75mAHD.

The subject land has access to three Council drains, as follows:

- A drain in Laurel Avenue which passes through the subject land to Days Road. This drain is understood to be a 1050 mm diameter pipe, with a number of direction connections within the subject land to this drain
- A drain in Days Road, increasing in size from a 525mm diameter pipe (south) to a 900 mm diameter pipe (north).
- A drain in Regency Road, increasing in size from a 825mm diameter pipe (west) to a 900 mm diameter pipe (east).

Council have nominated the respective portions of the subject land to be apportioned to each drainage system, as shown on the Infrastructure Layout Plan presented in Appendix A.

These systems all converge to a combined main drain at the intersection of Regency Road and Days Road. Preparation of a Stormwater Management Plan for the broader catchment, referred to as the *Barker Inlet Central Stormwater Management Plan*, is currently in progress by the catchment Councils.

2.2 Council Requirements

Port Adelaide Enfield Council engineering staff have made the following 11 comments regarding stormwater requirements for the subject land:

- 1 *Council stormwater drains currently pass through the land and are contained within a 4.0 metre wide drainage easement. From an infrastructure maintenance/replacement perspective, Council's preference would be for the existing stormwater pipes to be located within road reserve (which would require new roads to be created directly over existing pipes). Consideration would also need to be given to any traffic/access requirements to ensure that the layout of roads also satisfy any traffic engineering requirements. Alternatively, 6.0 metre wide long form drainage easements would need to be created which is Council's current easement width requirement for stormwater pipes of this size. Any costs associated with the creation of new easements will be at the expense of the developer. Any works within the easement would need to be in strict accordance with Council requirements.*

- 2 *If roads are constructed over the two existing 1050mm dia class X stormwater drains, a structural assessment of the pipes should be undertaken to confirm they can withstand long term vehicle loads above. The pipes should also be assessed to confirm the pipes will not be damaged due to heavy loads during earthworks and construction. CCTV inspections of the pipes should be completed to Council satisfaction before and after earthworks are completed to confirm no damage has been caused to the pipes.*
- 3 *An existing 375mm dia stormwater drain is contained within an easement running north-south along the western boundary of the development. The engineer should investigate if this drain needs to be retained however it is understood that the drain was installed to drain lot 112 into Council 2 x 1050mm dia pipes. If the land is re-developed and a new allotment layout created, there may be potential to remove the drain as it is not believed to manage any Council stormwater.*
- 4 *Stormwater should be directed into either:*
 - *the 2 x 1050mm dia pipes running east-west contained within the easement*
 - *the 1 x 900mm dia pipe running north-south on the western side of Days Rd, and/or*
 - *the 1 x 900mm dia pipe running east-west on the south side of Regency Rd.*

Limits apply regarding the allowable discharge rates that are permitted to discharge to each of these systems. Stormwater detention will be required to ensure that the peak flow rates generated from the site do not exceed pre-development levels. Calculations should analyse minor (5 year ARI) and major (100 year ARI) storm events and confirm the critical storm events and maximum detention storage volumes.
- 5 *Stormwater detention systems should be provided within the public drainage network (e.g. Council reserve stormwater basin or on-street ponding) and not rely on the use of on-site detention systems.*
- 6 *Rear of allotment drains and easements for newly created allotments should be avoided.*
- 7 *The design of stormwater drainage systems should have consideration for operating water levels in Council's piped drainage systems (e.g. apply tailwater levels when modelling stormwater system).*
- 8 *The design and construction of all civil infrastructure that is proposed to be handed to Council shall be undertaken in accordance with Council's "Statement of Engineering Requirements".*
- 9 *All surface runoff from car parking and hardstand areas should be directed through bio-filtration systems, on-site pollutant treatment devices or other system to improve stormwater quality before discharging into the public stormwater drainage system. Final details of water quality improvement systems should be agreed to in consultation with Council's Technical Services Department.*
- 10 *Developments should be designed to incorporate Water Sensitive Urban Design (WSUD) techniques and contain evidence of bio-filtration trenches, drainage swales, slotted kerbs, permeable pavement, and/or retention systems, consistent with the requirements outlined within the Water Sensitive Urban Design Technical Manuals for the Greater Adelaide Region.*

- 11 *A Soil Erosion and Drainage Management Plan (SEDMP) should be developed and implemented where a site exceeds 0.5 hectare or there is a high risk of sediment pollution to adjoining land or receiving waters. Such plan shall be developed in accordance with the EPA Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry (March 1999).*

Council also provided:

- Summary details of existing Council drainage infrastructure, and an assessment of portions of the subject land draining to respective drainage systems; and
- Construction drawings of existing stormwater infrastructure located within and adjacent to the site.

These plans are presented in Appendix A.



Figure 2.1 South Road (North Arm West) Catchment, Drainage Network



Figure 2.2 Local Stormwater Network, Ground Levels

3 Assessment

3.1 Existing Main Drain through site

Council have made some comments (Items 1, 2 refer Section 2.2) in relation to the 2 x 1050 mm diameter stormwater drain that traverses the site from Laurel Avenue through to Days Road.

These comments must be noted in planning of development surrounding this drain, particularly to consider whether to align an internal public road over the drain, and/or set aside an easement over the drain alignment. Future development planning of the site must be informed by structural assessment of the existing stormwater drain to confirm that the existing stormwater asset will not be adversely affected by the proposed land use, such as an internal road.

3.2 Existing 375mm dia drain on western boundary

Council have made some comments (Item 3, refer Section 2.2) in relation to the 375 mm diameter stormwater drain that runs north-south along the western boundary of the development.

This drain is located within the 'green' site catchment area. An inspection of existing surface levels of this catchment area suggests that lowest point within this site catchment area (approximately 9.0 mAHD) coincides with the connection point of this lateral drain in to the Laurel Avenue main drain. Hence, the existing 375 mm diameter drain is assessed to potentially provide a role in the future drainage of the site, subject to further design consideration.

3.3 Discharge to Council drainage systems

3.3.1 Site Hydrology

A DRAINS stormwater model has been established to assess pre-development and post-development peak flow rates, and preliminary detention basin size requirements. Design rainfall data and associated loss parameters specific to the subject land have been obtained from the ARR Data Hub (<http://data.arr-software.org/>).

Pre-development peak discharges were estimated for each of the three site drainage catchment areas. These areas were assessed to have the impervious site coverage values as summarised in Table 3.1 below. 75% of the total hardstand area has been assumed to be 'directly connected' (DC), with the remaining 25% 'indirectly connected' (IDC).

Table 3.1 Site Drainage Catchment Characteristics

Catchment	Roof Area (ha)	Hardstand Area (ha)	Total Area (ha)	DC Impervious	IDC Impervious	Pervious
Red	0.94	1.30	3.46	55.3%	9.4%	35.3%
Green	0.10	1.02	3.92	22.1%	6.5%	71.4%
Yellow	1.41	1.64	4.59	57.5%	8.9%	33.6%
Total	2.45	3.96	11.97	45.3%	8.3%	46.4%



Figure 3.1 Existing Impervious Site Coverage

Post-development peak discharges were estimated with an 80% impervious site coverage. The resulting peak flow estimates are summarised in Table 3.2.

Table 3.2 Pre, Post Development Peak Discharge

Catchment	Pre-development 5yr ARI (m ³ /s)	Post- development 5yr ARI (m ³ /s)	Pre-development 1% AEP (m ³ /s)	Post- development 1% AEP (m ³ /s)
Red	0.24	0.34	0.53	0.77
Green	0.11	0.39	0.40	0.87
Yellow	0.33	0.45	0.73	1.02

3.3.2 Stormwater Detention

In accordance with council requirements (No 4 as listed in Section 2.2), detention storage is required to ensure the post-development peak flow rate does not exceed the pre-development peak flow, for both the 5 year ARI and 1% AEP level. This has been evaluated at an initial conceptual level for each of the three site catchment areas. Summary results are reported in Table 3.3 below.

Table 3.3 Preliminary Detention Storage Assessment, 5 year ARI

Catchment	Peak storage volume (m ³)	Mitigated 5yr ARI flow (m ³ /s)	Critical Duration
Red	274	0.16	45 min
Green	436	0.10	1 hour
Yellow	323	0.23	45 min

Table 3.4 Preliminary Detention Storage Assessment, 1% AEP

Catchment	Peak storage volume (m ³)	Mitigated 1%AEP flow (m ³ /s)	Critical Duration	Detention Footprint ¹ (m ²)
Red	539	0.32	30 min	750
Green	787	0.39	1 hour	1000
Yellow	640	0.47	30 min	800

¹ Initial estimate only, refer comments below

An initial estimate has been made of the detention storage footprint. This is based on the following preliminary analysis:

- the Council drain inverts are approximately 2m below the adjoining site ground level at each of the three drainage connection points
- the HGL (where shown on the supplied drawings) is approximately 1m below the adjoining site ground level
- the detention storages would be provided by open basins with a depth of 1m (i.e. above the typical operating range of water levels in the Council drain system).

These storages and footprints are indicative and suitable for planning purposes only. It is expected that refinement of these values will occur as part of future design development. The following Council comments should also be noted Council in the future design of site drainage and detention systems:

- Stormwater detention systems should be provided within the public drainage network (e.g. Council reserve stormwater basin or on-street ponding)
- Rear of allotment drains and easements for newly created allotments should be avoided
- The design of site stormwater drainage systems should have consideration for operating water levels (tailwater levels) in Council's piped drainage systems
- The design and construction of all civil infrastructure that is proposed to be handed to Council shall be undertaken in accordance with Council's "Statement of Engineering Requirements"

3.4 Water Quality Improvement

Water quality improvement measures are required to be incorporated into site drainage systems, in accordance with requirements listed in Section 2.2 (Nos 9, 10). These devices should be deployed primarily to treat runoff in surface drainage systems, and be selected to suit the pollutant generation that can be reasonably expected from the proposed land use.

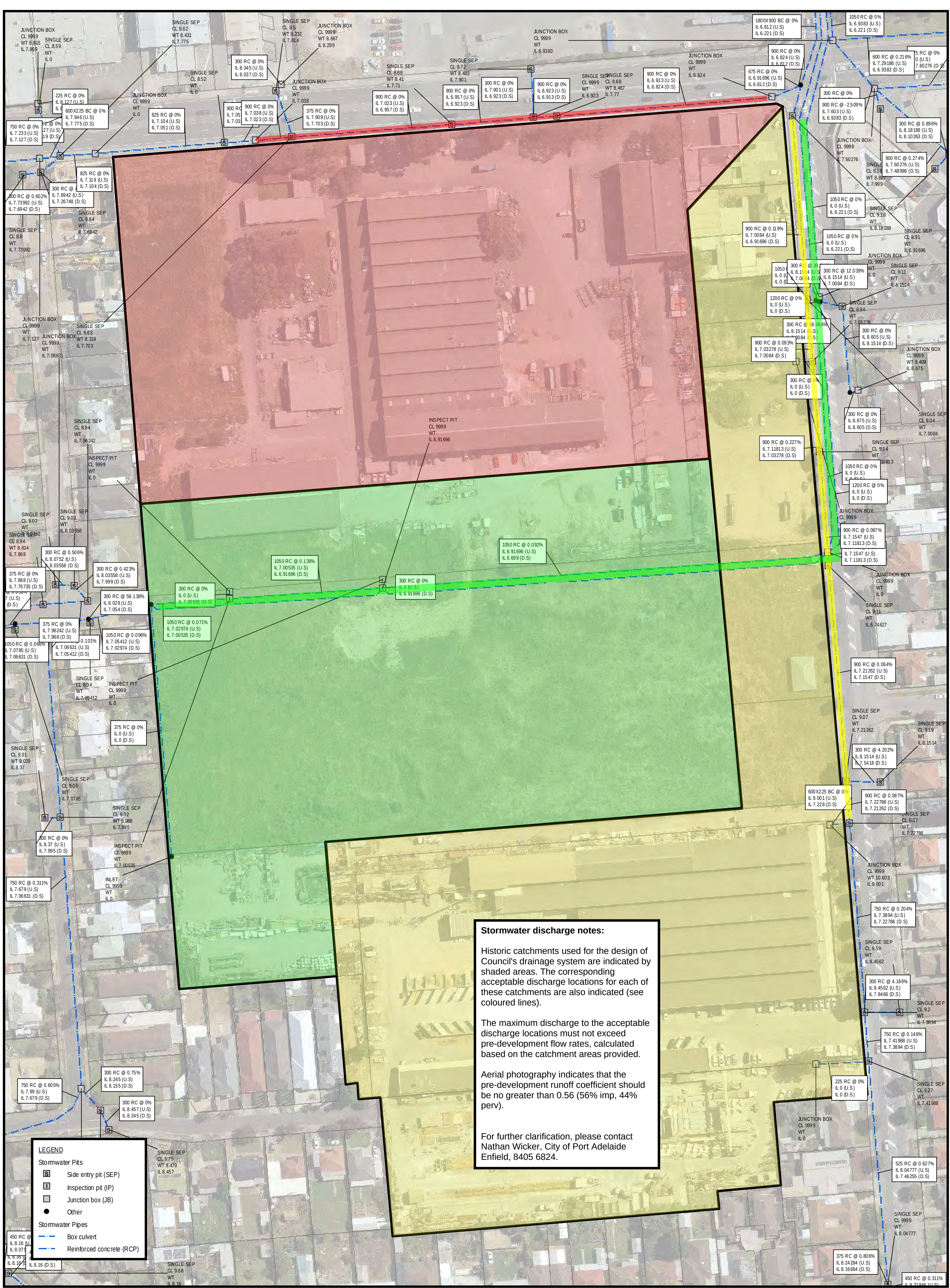
Roof drainage systems should not be combined with untreated surface drainage stormwater, to optimise the performance of these treatment measures.

A Soil Erosion and Drainage Management Plan (SEDMP) is to be developed and implemented where a site exceeds 0.5 hectare or there is a high risk of sediment pollution to adjoining land or receiving waters. Such plan shall be developed in accordance with the *EPA Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry* (March 1999).

Appendix A

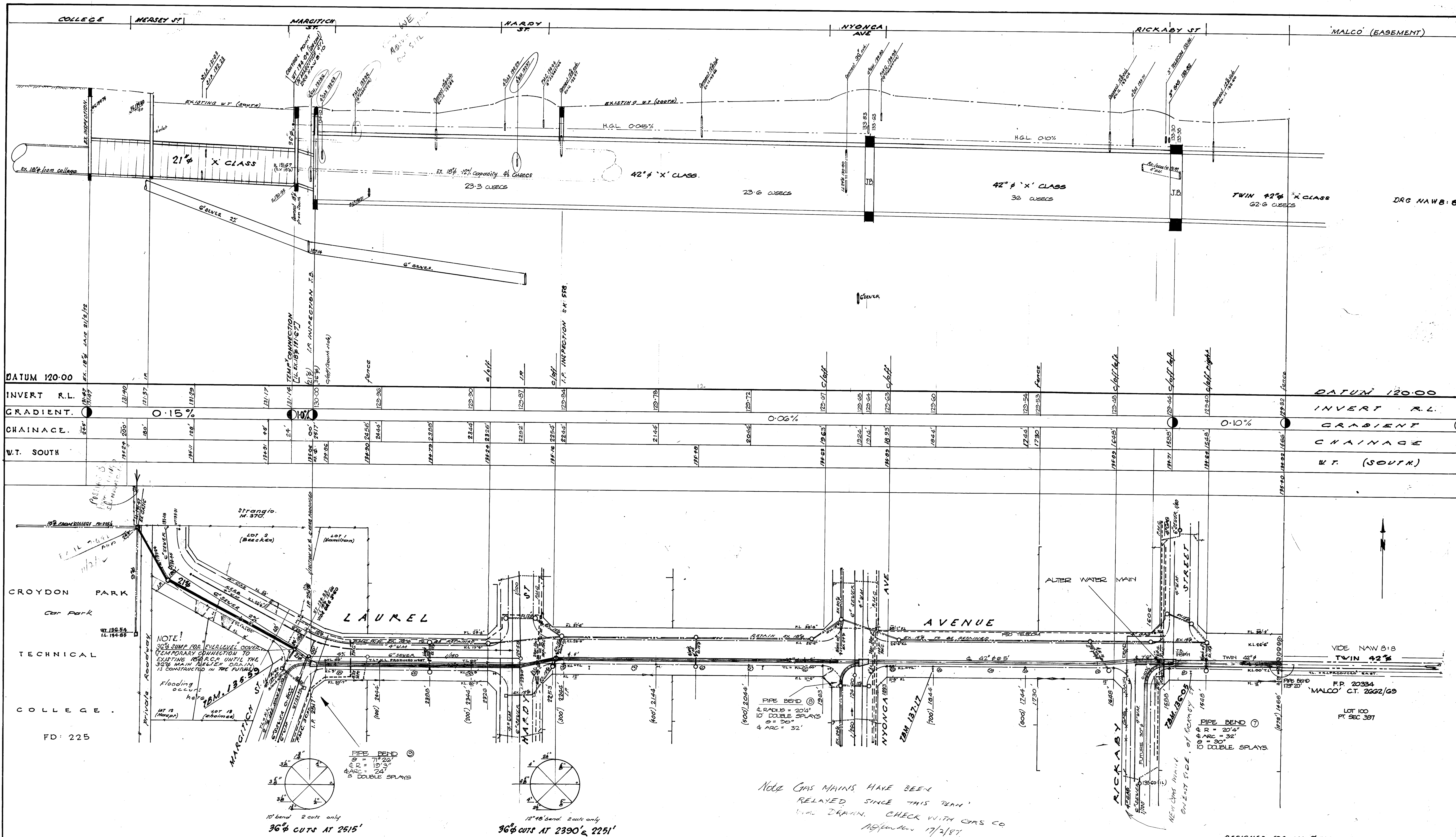
Existing Infrastructure Plans,
supplied by City of Port
Adelaide Enfield





INFRASTRUCTURE LAYOUT (A2)

Notes:
1. All levels are relative to Australian Height Datum (A.H.D.).
2. All information is to be taken as indicative only and to be confirmed on site.
3. The advice and/or information given is for private use only. The accuracy of the advice and/or information is not guaranteed and no responsibility is accepted by the City of Port Adelaide Enfield or their officers, agents or servants for any loss or damage caused by reliance upon this advice and/or information as a result of any error, omission, misdescription or misstatement therein whether caused by negligence or otherwise.



PIPES REQUIRED SEE 77. % 35938.

28 Lengths of 21" X CLASS (224 FT) REQUIRED
(TO PROVIDE TEMPORARY CONNECTION TO EXISTING 18" X CLASS)
FROM CROYDON PARK TECHNICAL COLLEGE

CITY OF ENFIELD.

CROYDON PARK TECHNICAL COLLEGE.

CONNECTION TO MARGITICH ST.

1" = 40 FT & 1" = 2 FT. **PT DRD. NAWB: 9**

City Engineer Date: Nov/77

NOTE GAS MAINS HAVE BEEN REPAIRED SINCE THIS YEAR

17/2/87

PIPE ORDER

1800LA 16540

PIPE LIST

PIPE CLASS	UNITS	(8' UNITS)	(4' UNITS)
42" X CLASS	474 UNITS	19 SPLAYS	(4' UNITS)
30" X CLASS	8 SPLAYS	(4' UNITS)	(4' UNITS)
24" X CLASS	8 SPLAYS	(4' UNITS)	(4' UNITS)
42" X CLASS	114 UNITS	(8' UNITS)	(4' UNITS)

CITY OF ENFIELD.

DRAINAGE.

LAUREL AVE.

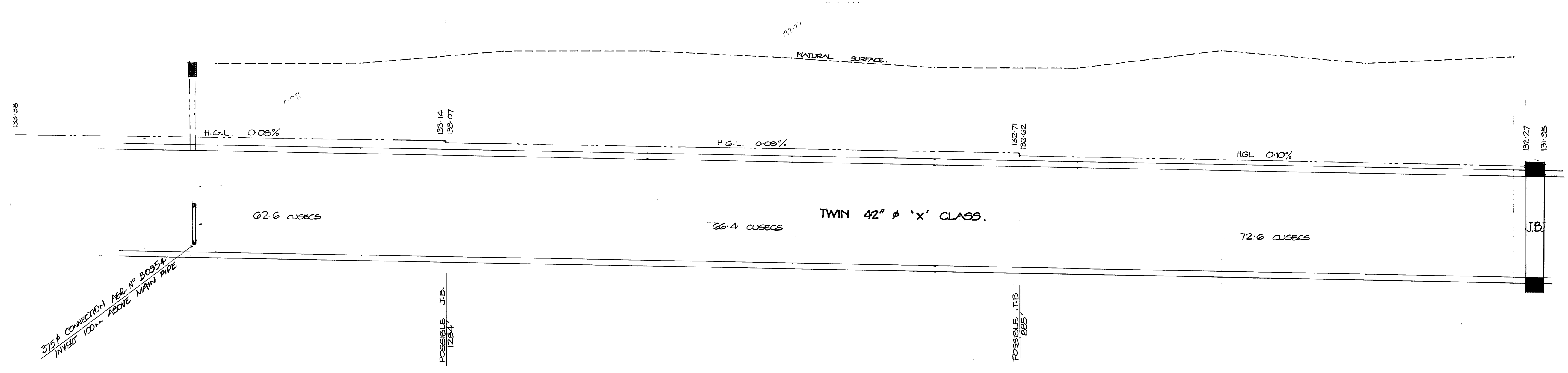
CROYDON PARK.

SCALE 1" = 40' & 1" = 2'

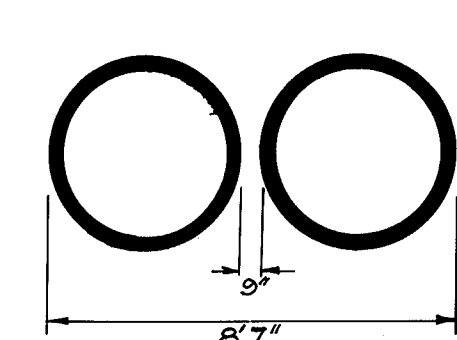
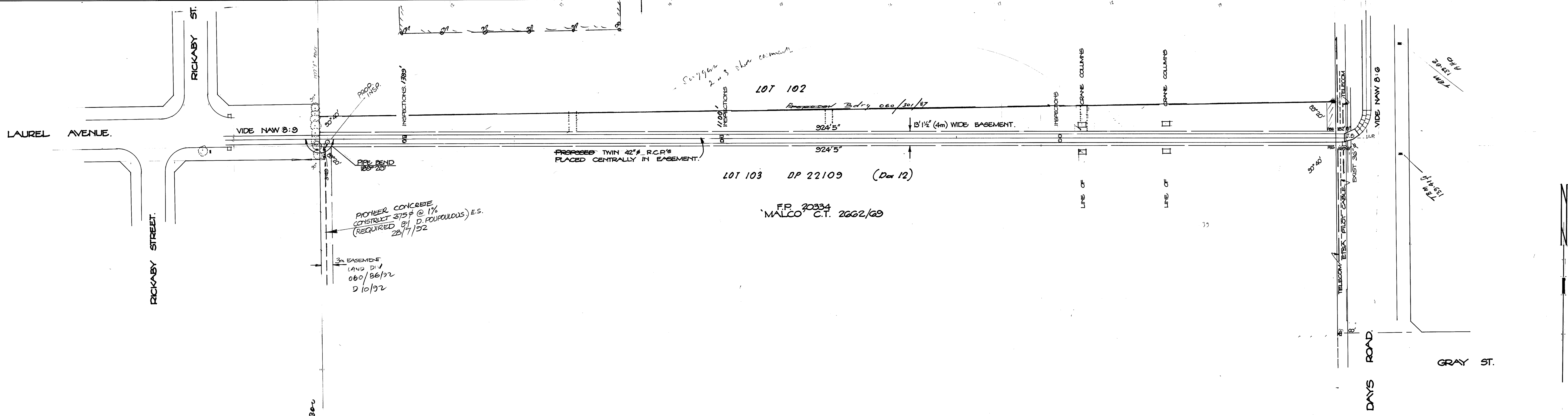
JOBS NO. 044103

NAWB: 9

DATE: 11/77 CHECKED: C.E.O. 239



129+32	129+30	129+20	129+10	129+00	128+90	128+80	128+70	128+60	128+50	128+40	128+30	DATUM 124-00
1444'	1444'	1344'	1244'	1144'	1044'	944'	844'	744'	644'	544'	444'	INVERT R.L.
107.95	107.95	107.95	107.95	107.95	107.95	107.95	107.95	107.95	107.95	107.95	107.95	GRADIENT
107.95	107.95	107.95	107.95	107.95	107.95	107.95	107.95	107.95	107.95	107.95	107.95	N.S. R.L.
1444'	1444'	1344'	1244'	1144'	1044'	944'	844'	744'	644'	544'	444'	CHAINAGE (PIPE)



CITY OF ENFIELD			
Drawn	L.D.	Job No. 1421506	
Date	NOV. 85	Other Refs.	
Checked			
Passed			
C.E.O. Dkt.		Plan No.	
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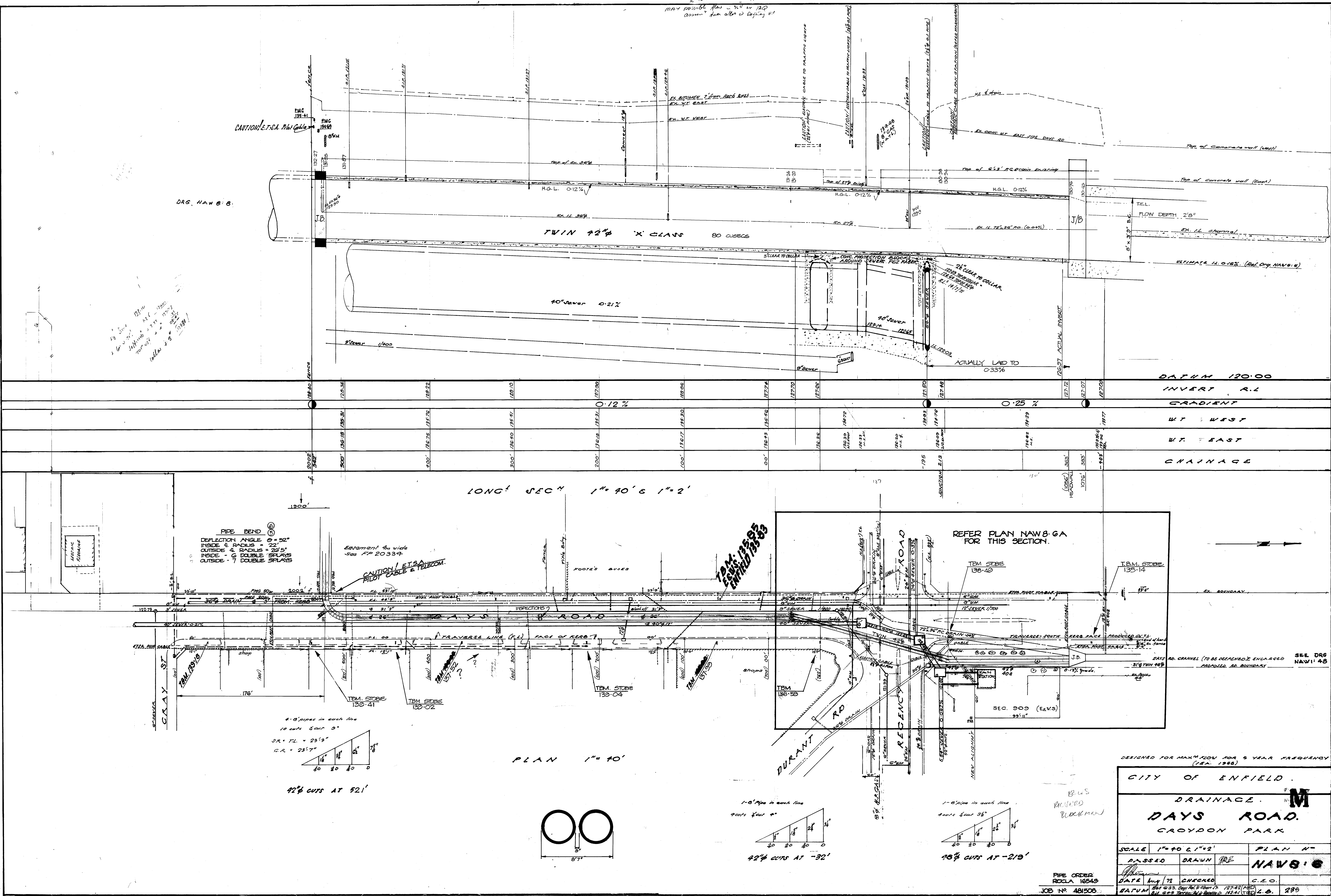
DRAINAGE
'MALCO' EASEMENT
LAUREL AVE. - TO - DAYS RD.
CRUYDON PARK.

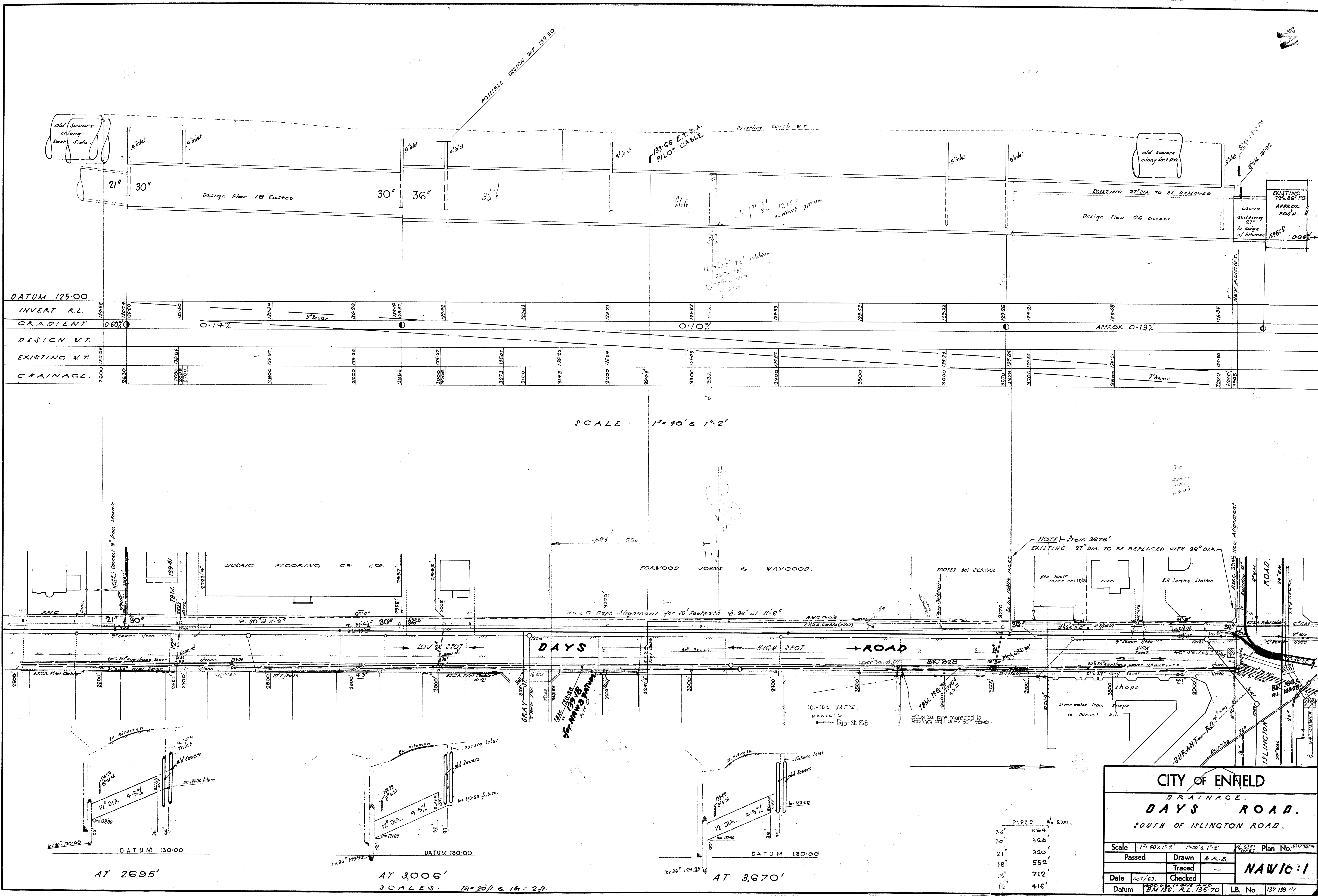
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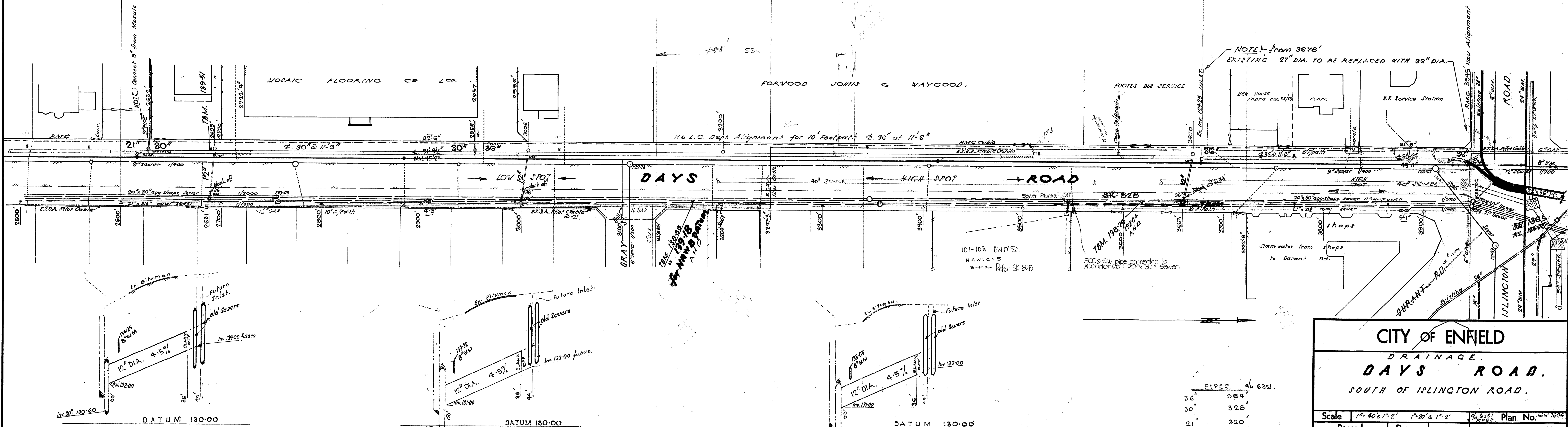
PIPE ORDER
 RECLAS 12042

M





SCALE: 1" = 40' & 1" = 2'



CITY OF ENFIELD

DRAINAGE

DAYS ROAD.

SOUTH OF INLINGTON ROAD.

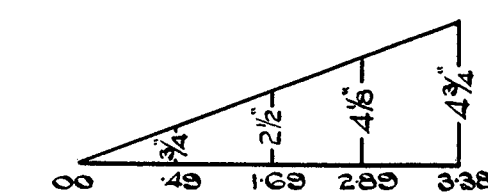
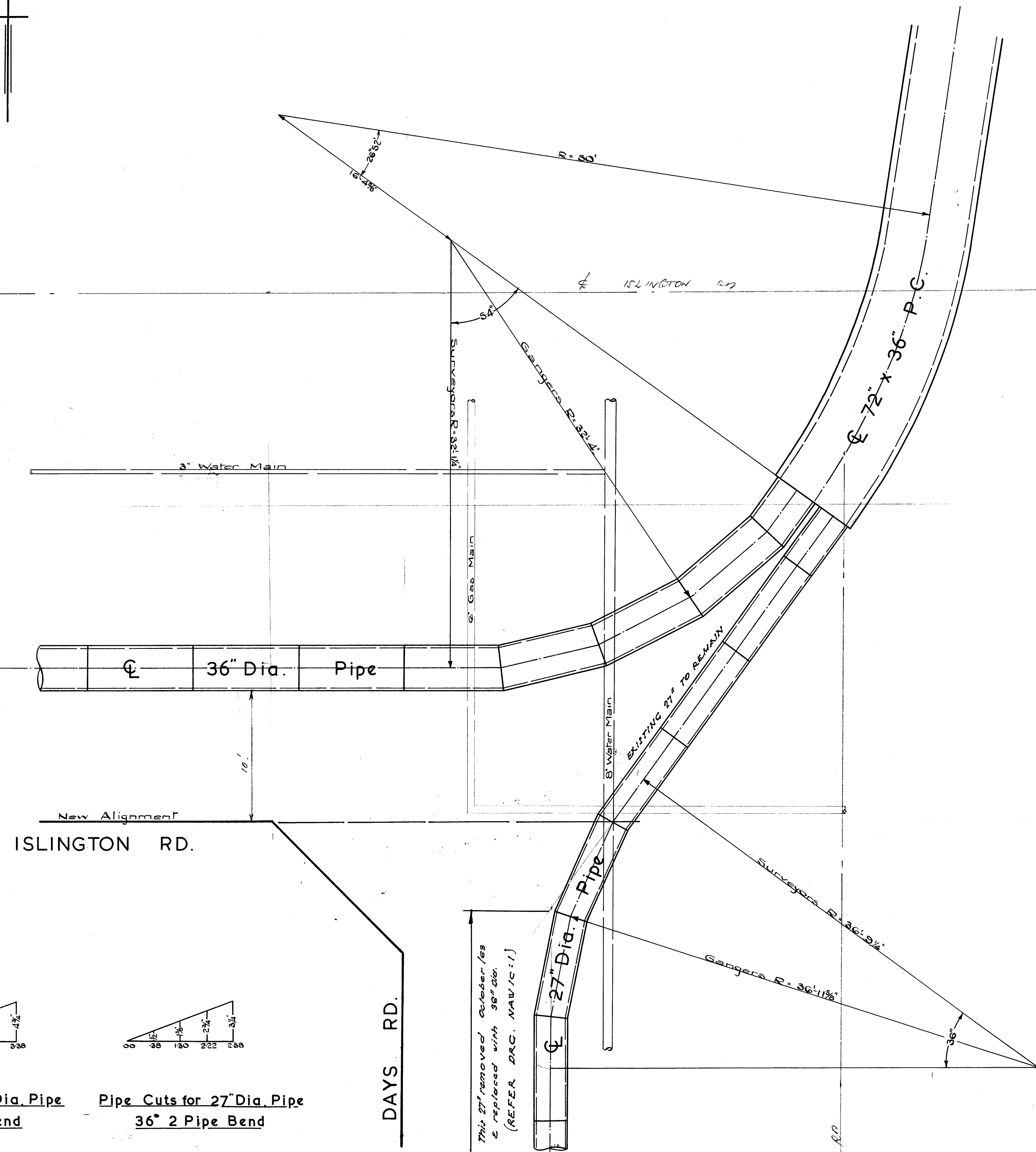
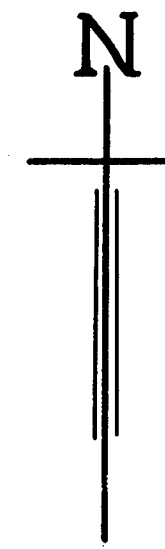
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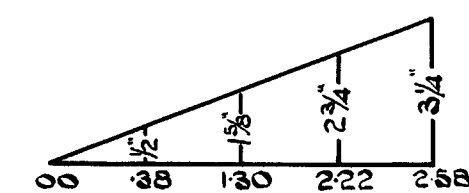
LB. No. 137 139 14

PIPER 4" 6351.

36"	984'
30"	326'
21"	320'
18"	552'
15"	712'
12"	416'



Pipe Cuts for 36" Dia. Pipe
54° 3 Pipe Bend



Pipe Cuts for 27" Dia. Pipe
36° 2 Pipe Bend

This 27" removed October 1988
& replaced with 36" dia.
(REFER DRC. NAWI:11)

M

CITY OF ENFIELD			
27" DIA, 36" DIA & 72"x36" P.C. INTERSECTION DAYS RD. ISLINGTON RD.			
Scale	4" = 1'		
Passed	Drawn	WJT DAB	
	Traced	DAB	NAWI: 5
Date	Checked		