Engineering Services Report

Shared Educational Campus for Gaelscoil Na Camóige, Gaelscoil Chluain Dolcáin and Coláiste Chillian, Old Nangor Road, Clondalkin, Dublin 22

February 2017

Revision A

TOBIN CONSULTING ENGINEERS

TOBIN

Patrick J. Tobin & Co. Ltd.

TOBIN
Patrick J. Tobin & Co. Ltd.

REPORT

PROJECT:

Shared Educational Campus
Old Nangor Road
Clondalkin
Dublin 22
Planning Engineering Services Report

CLIENT:

Department of Education and Skills

COMPANY:

TOBIN Consulting Engineers
Block 10-4,
Blanchardstown Corporate Park,
Blanchardstown,
Dublin 15,

www.tobin.ie

Template rep 003
DCO 0084

DOCUMENT AMENDMENT RECORD

Client:	Department of Education and Skills
Project:	Shared Educational Campus, Old Nangor Road, Clondalkin, Dublin 22
Title:	Planning Engineering Services Report

PROJECT NUMBER: 8064				**DOCUMENT REF: 8064–Planning Engineering Services Report-Clondalkin**			
A	Planning	CS	09.02.17	AM	09.02.17	AM	09.02.17
Revision	**Description & Rationale**	**Originated**	**Date**	**Checked**	**Date**	**Authorised**	**Date**
TOBIN Consulting Engineers							

TABLE OF CONTENTS

APPENDICES

1 INTRODUCTION

This report has been prepared to detail the engineering solutions to roads, drainage and water supply as part of a planning submission for a proposed schools development located on a brownfield site on Old Nangor Road, Clondalkin, Dublin 22. It should be read in conjunction with the watermain, roads, foul and storm design drawings (refer to **Appendix 1** for drawings) as outlined and noted herein. The schools are proposed by The Department of Education and Skills (DoES).

This report details the foul and storm drainage design and the water mains for said schools. The site encompasses approximately 4.87Ha of land, is a brown field site and has a boundary on all sides. It is proposed to provide direct access to the site from the existing Old Nangor Road along the southern boundary of the site. A separate entry and exit point will be designed to assist with traffic flow and increase safety.

It is proposed to discharge the foul effluent generated by the proposed campus to the existing 900mm public foul sewer which runs along New Nangor Road to the north of the site. Details of the foul drainage are outlined in detail in Section 4 below and drawing 8064-2501.

It is proposed to discharge the storm water generated by the proposed campus to the existing 300mm public storm sewer which runs along New Nangor Road to the north of the site. The controlled discharge flow rate will be set at the allowable Greenfield run off rate of 10.49l/s (Qbar) or 3.46l/s/Ha as detailed in Section 3 below and drawing 8064-2501.

It is proposed that the watermain for the development will connect to the existing 300mm public watermain located along New Nangor Road.

2 WATER SUPPLY

2.1 POTABLE WATER SUPPLY

It is proposed to connect a new 100mm diameter uPVC watermain to the existing 300mm diameter watermain on the north boundary of the site along R134 as shown on Drawing No. 8064-2502. This new watermain is to include boundary boxes with integral stopcocks at the connections. Provision is also to be made for the installation of flow meter chambers.

Staff/Student estimated water usage of 60l/day/person utilised is according to Table 3 of the EPA Design Manual – Treatment Systems for Small Communities Business, Leisure Centres and Hotels. A pre-connection enquiry was issued to Mr. Michael McAdam in South Dublin County

Council on 09/08/16. Mr McAdam concluded that "*The site is adequately serviced for peak potable water demand as a 300mm main lies to the north of the site*". A copy of correspondence between TOBIN and South Dublin County Council is included **Appendix 3**.

Fire hydrants will be located around the schools within a minimum distance of 46m from any part of the schools footprint and within a minimum distance of 30m to a vehicle access roadway or hard-standing area for fire appliances according to Part B of the building regulations.

Refer to **Appendix 1** for Watermain layout.

3 SURFACE WATER

3.1 GENERAL

South Dublin County Council records indicate a 300mm diameter surface water (SW) pipe north of the site. A new on site surface water drainage system has been designed in accordance with the Greater Dublin Strategic Drainage Strategy (GDSDS). It will ensure surface water discharge from the site is limited to QBAR (3.46 l/s/ha), in accordance with GDSDS, through a combination of attenuation storage tanks and permeable paving. This will ensure the current surface water discharge rate from the Shared Educational Campus will be reduced from its current discharge rates, thus reducing the loadings to the 300mm diameter public surface water network located to the north of the site. All surface water from the attenuation system will connect to the existing surface water drain via a petrol interceptor and hydrobrake.

The storm drainage for the entire development has been designed using the Micro Drainage's Windes Drainage design Software in accordance with the Recommendations for Site Development Works for Housing Areas and also the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). The details of the Micro Drainage outputs for the pipe designs and associated long sections are outlined at **Appendix 6** of this report. The storm water drainage has been designed to cater for surface water from public hard surfaces in the proposed development including roadways, footpaths, and the proposed building.

The drainage network has been designed so that the network pipelines and manholes will not be surcharged as a result of the critical 2-year critical rainfall and will not overflow as a result of the critical rainfall with a 30-year and 100-year storm return period intensity.

The most up-to-date rainfall intensities for the site area have been derived from Met Eireann. 10% climate change has been implemented in the attenuation capacity design, as per South Dublin County Council requirements.

Refer to **Appendix 1** for drainage drawings and **Appendix 4** for attenuation calculations.

3.2 SUDS (SUSTAINABLE URBAN DRAINAGE SYSTEMS)

The general principal behind SUDs is to reduce the quantity of water leaving a site and increase the quality of water leaving the site. In practice a calculation for the site runoff is carried out using the Institute of Hydrology report No. 124. This gives the limit for discharge from the site.

In accordance with the GDSDS (Greater Dublin Strategic Drainage Study), underground storage is provided for the 1 in 30 year storm with on site attenuation provided for the 1 in 100 yr storm, to ensure that there is no flooding of the buildings. A flood risk assessment is carried out to ensure that there is no risk of damage to property or people and to mitigate against flood risks, flood routing is designed into the site layout. A flood risk assessment was carried out. A synopsis has been provided below in Section 4.4 with full details included in the planning documents.

Typical types of SUDs which may be used are Infiltration systems (Infiltration trenches, Soakaways and Permeable paving), Attenuation systems (Attenuation tanks and Proprietary systems), Attenuation Ponds, Detention Basins, Rainwater harvesting and Green Roofs.

Types of SUDs devices, which may be applicable to the campus;

Given the development is to be constrcuted on a brownfield site, the following SUDs approach have been reviewed and found to be suitable for the site, subject to detail design.

Permeable paving

It is proposed to use permeable block paving in a section of the staff car park bays. This will consist of a layer stone of gravel with a voids ratio of 40% approximately 0.5m in depth with a impermable geotextile lining under our typical surface courses.

Attenuation

The combined attenuation systems of permeable paving and Aquacell units (or similar approved) have been designed for storm periods with rainfall intensities taken for up to the 100 years return period. The proposed stormwater drainage system will be restricted by a hydrobrake to QBAR (10.49l/s) to the existing surface water pipe to the east of the site.

Bypass Separator

It is proposed to install a Bypass Separator under the proposed basketball courts where the storm drainage system discharges to the existing storm sewer. The stormwater from the external paved areas will include run-off from the car park and therefore may have hydrocarbons within their flow. These hydrocarbons pollutants require removal so they are not discharged back into the environment. The separator has been sized to cater for the total external paved area. The location of the separator is shown in the civils layout in **Appendix 1** with details included in **Appendix 7** of this report.

From the selection tables in the Separator Product Brochure in **Appendix 7**, a NSBE 040 or similar interceptor is required to cater for the hydrocarbons which may be present in the stormwater collected from this site. This separator is designed to cater for an approximate area of 22,222m^2. However, the paved area of the site is 16,693m^2, therefore, the separator is designed to cater for an area in excess of the required capacity.

3.3 RAINWATER HARVESTING

Storm water from the roof of the proposed building will discharge to a rainwater harvesting system (RWHT) located to the north west of the proposed building. Stored water will be distributed by pump to a static water storage tank that will feed the toilets and general landscaping taps when required. Overflow will be provided to the proposed storm sewer complete with a non-return valve. The total volume of the system will be 15,000 litres (Kingspan or similar underground commercial rainwater harvesting tanks). The location of the proposed tanks are shown on the civils layout drawing in **Appendix 1** of this report while details of the rainwater harvesting tanks are included in **Appendix 8**.

3.4 FLOOD RISK ASSESSMENT

This Flood Risk Assessment (FRA) presents a review of:

- OPW Flood Maps;
- OPW Preliminary Flood Risk Assessment Maps;
- South Dublin County Development Plan (2015-2021);
- The Planning System & Flood Risk Management (PSFRM) Guidelines; and
- Eastern CFRAM Study.

Due to the proximity of the site to the Camac River, fluvial flooding was initially identified as the primary potential risk to the proposed development.

The PSFRM guidance document recommends that "Highly Vulnerable" developments, such as the proposed schools, be constructed in flood zone C, i.e. that there is less than a 0.1% probability of the site flooding.

Based on the extrapolation of water levels predicted as part of the Eastern CFRAM study the 100 and 1000 year MRFS flood levels in the River Camac adjacent to the site have been estimated as 58.02mOD and 59.24mOD respectively. This includes an allowance for climate change.

The lowest recorded existing ground elevation at the site (63.05mOD) is 3.81m above the predicted 1-in-1000-year MRFS flood level.

Based on flood analysis carried out as part of the Eastern CFRAM study and recorded elevations at the proposed site, it is estimated that the proposed development at Old Nangor Road is located in Flood Zone C and therefore will not be inundated by flooding during the 1 in 1000 year mid-range-future-scenario.

4 FOUL WATER

4.1 GENERAL

South Dublin County council records indicate the presence of an existing 750/900mm diameter combined sewer pipe running along New Nangor Road.. It is proposed that the foul drainage from the proposed campus will discharge to this existing 750/900MMmm diameter sewer. A wayleave will be provided over this existing 750/900mm diameter pipe, to be taken in charge by the council. Following discussions with South Dublin County Council it was determined that there are "no problems with foul capacity". Full details of feedback from South Dublin County Council are included in **Appendix 3**.

4.2 OCCUPANCY FIGURES & WASTEWATER FLOW RATES

The occupancy figures and associated hydraulic loadings of the proposed schools are in accordance with The Environmental Protection Agency Wastewater Treatment Manual "Treatment Systems for Small Communities, Business, Leisure Centres and Hotels". A wastewater flow rate, for students and staff, of 60 litres/person/day and 30 BOD5 grams/person/day is assumed from Table 3 of the above manual. A wastewater flow rate, for visitors, of 10 litres/person/day and 15 BOD5 grams/person/day is also assumed. A summary of the total Hydraulic and Organic loadings based on the figures in Table 3 of the above Manual is outlined below:

Source		Hydraulic Loading (Litres/Day)		BOD_5 Load (Grams/Day)		P.E.
Description	Total Occupancy	Per Occupancy	Total	Per Occupancy	Total	
Total Staff/students	1000 staff/students 10 visitors	60 10	60100	30 15	30,300	505

Table 4.2.1 – Summary of Hydraulic and Organic Loadings

Therefore, the total Hydraulic load for the proposed development is 60,100 litres per day and the proposed PE is 505. Calculations have been provided in **Appendix 5.**

NOTE: A co-ordination exercise was carried out taking into account existing services ensuring no clashes will be encountered between new and existing services.

Please refer to **Appendix 1** for drainage drawings.

5 SITE INVESTIGATIONS

Site Investigations were carried out by Techsol Ltd. Location of site investigations is shown on drawing 8064-2000 in **Appendix 1**. A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:

- Topsoil: The exploratory holes generally encountered topsoil to a depth of 200-300mm.
- Made Ground (fill): Reworked clay fill was encountered at locations TP04-TP06, BH02-BH08 to a maximum observed depth of 2.0m (BH08).
- Glacial Till: Firm to stiff brown sandy gravelly clay, frequently with low cobble content, was encountered at all locations to a maximum observed depth of 3.2m at BH08 overlying stiff to very stiff grey brown sandy gravelly clay to a maximum observed depth of 5.4m at BH06.
- Bedrock (limestone): Rotary drilling was not undertaken to prove the depth or integrity of the bedrock.

Infiltration tests were undertaken at three locations, IT01 to IT03. The absence of significant outflow from the pits precluded the measurement of any actual infiltration rates. The low permeability fine-grained soils are considered to be poor infiltration media, and would be deemed unsuitable for the implementation of infiltration drainage systems. All storm drains and attenuations tanks have been designed should to allow for minimal infiltration to ground in accordance with the recommendations of BRE Digest 365 and CIRIA 697 (SUDS).

6 ROADS AND TRAFFIC

6.1 GENERAL

The design and layout of access road and parking areas have been developed with reference to the following:

- *Design Manual for Roads and Streets (March 2013)*
- *RA Design Manual for Roads and Bridges*
- *Traffic Signs Manual published by the DOE*
- *DTO Traffic Management Guidelines*

Access to the site will be from Old Nangor Road along the southern boundary of the site. A separate entry and exit point will be designed to assist with traffic flow and increase safety. The proposed campus is within a 50km/hr speed limit zone. The visibility splay of 2.4m x 45m is in accordance with Design Manual for Urban Roads and Streets. This visibility splay at the junctions is achievable in both directions. The existing access road to the existing secondary school will be maintained, however it will be changed from a dual purpose entry and exit road to a single purpose entry. The existing secondary school will merge with traffic from the new primary schools on exit.

Dedicated pedestrian and cyclist access points will be provided, ensuring separation from the vehicle access point. A Swept Path Analysis has been carried out and concluded no issues with the proposed road layout. Please refer to auto-track drawings in **Appendix 1** of this report.

A Traffic and Transport Assessment, Mobility Management Plan and a Road Safety Audit were requested. Conclusions of the above are outlined below with full details included in the planning documents.

6.2 TRAFFIC AND TRANSPORT ASSESSMENT

This Traffic and Transport Assessment has been prepared to assess the proposal by The Department of Education and Skills to construct a shared educational campus consisting of 2 no. schools within the site of an existing primary and post primary school off the Old Nangor Road in Clondalkin, Co. Dublin.

- ORS have undertaken detailed traffic analysis and investigation into the likely traffic impact the development may have. Current and future traffic flows were established on the surrounding road network.

- The site access arrangements and the key junctions identified on the wider road network were subjected to capacity analysis to examine the potential traffic levels generated from the site and the existing road network. These junctions were tested for AM and PM peak conditions for baseline, potential year of opening, and future design years. While the tests demonstrate that the proposed development will marginally impact on the existing road network it must be noted that there are pre-existing capacity issues on the junctions which were tested as part of this assessment during morning and evening peak times. All tests have shown that the development proposal will not significantly reduce the capacity levels of the junctions reviewed in this assessment. The existing capacity issues on the junctions analysed during this assessment are as a result of the traffic volume in the area at peak times as the road network in the area is an arterial route which links north and south Dublin.

- The proposed access arrangements will operate efficiently and within capacity limits for all design scenarios and future design years. The proposed access arrangements will also result in a much improved scenario in terms of vehicular permeability to the school as all parking and drop offs will be accommodated within the site as opposed to the public road which is currently the case. All traffic will be able to enter and leave the site in forward gear safely and within the prescribed guidelines.

- The internal site layout has been designed to provide a safe and efficient circulatory system that reduces the potential for conflicting movements at the site accesses and within the site. All signage and safety measures possible will be implemented to ensure maximum safety within the site.

- In transportation engineering terms, the proposal put forward will not be a significant factor to the future operation and capacity of the junctions identified in this report. The development proposal is being put forward as a result of demand in the area for additional educational facilities and the location of the proposal is ideal given its proximity to the post primary school.

- The proposal put forward is designed to cause the least possible disruption to the existing public road network. While it is acknowledged that there are capacity issues in the area during morning and evening peak traffic periods, the proposal put forward by The Department of Education & Skills has incorporated every available means to ensure that the development can be incorporated in the area with the least possible disruption to the existing

road network. ORS would recommend that the capacity of the road network in the area of the campus is reviewed by the Local Authority with a view to providing capacity improvement measures in the future.

6.3 MOBILITY MANAGEMENT PLAN

Mobility management is a process that is intended to be ongoing over a number of years with the end target being reduced vehicle numbers arriving and departing at peak times. Sustainable transportation should be embraced by the campus and not be seen as a chore and an anti-car approach. This report assists in providing alternative modes of transport and incentives to help promote the uptake in such forms of transport. It should be noted however that the actual monitoring and review of the initiatives proposed in this plan will be a far greater part of the mobility management plan itself.

Essential to the success of the plan is the appointment of a mobility management plan coordinator. The mobility management plan coordinator for will be Thomas O'Dróna. Thomas will be responsible for implementing the measures discussed in the plan and should be granted sufficient time and resources to help ensure the plan is a success.

The mobility management plan mainly focuses on the travel attitudes of pupils, parents, and staff and it is essential to the success of the plan that these groups are consulted from the outset. Successful coordination of tasks and communication could also be transferred to these groups if they are consulted from the onset of the implementation of the plan.

Pupils, parents and staff will play a pivotal role in the implementation of the plan as; they after all are the target audience to take an active role in the plan. The plan will evolve and develop with the campus as the culture of the campus changes, taking into account new student's needs, changing staff, and changing patterns in travel.

In order to ensure that the plan is effective and up to date it is encouraged that the stakeholder survey attached in Appendix A of this report is issued annually to establish changing travel patterns and targets. It should be noted that failing to meet targets should not be viewed as a failure, particularly in the first year to year and a half following implementation of the plan. This period should be used to recognise achievable targets and put forward long term goals.

The propensity for the teaching staff and users of the proposed campus site to use alternatives to single-occupancy car travel for their work trips will inevitably depend on the convenience and availability of those alternative networks and facilities. The campus has limited influence in

influencing the travel choices other than to ensure that facilities are in place locally and to promote their use through education and regular initiatives for the pupils.

What can, and will, make the greatest difference to modal choice and future modal shift, will be the availability of transport connections between the site and the catchment areas. The onset of the development will do nothing to prevent the advancement of those necessary and any future programmed improvements to public transport and pedestrian network infrastructure. Indeed, the further development of the campus at its current location can in fact be instrumental in bringing forward these measures since it will provide the means for public transport services to generate revenue and become increasingly viable and sustainable into the future.

6.4 ROAD SAFETY AUDIT

A Road Safety Audit was carried out by ORS Ltd, a copy of which has been provided as part of this planning application. The terms of reference / procedure for the Audit were as per the relevant sections of the ***National Roads Authority (NRA) Design Manual for Road and Bridges (DMRB) HD 19/15***.

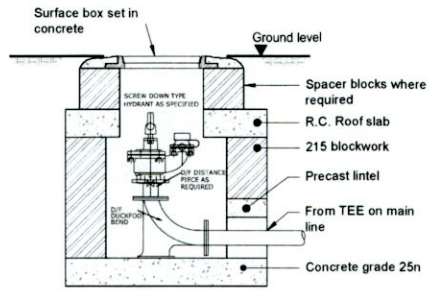
Ten items were raised by the Audit Team during the audit process. A copy of the Road Safety Audit report has been included as part of this planning application. All ten items have been resolved and reflected on in the design to the complete satisfaction of the Audit Team Leader. A copy of the Audit Feedback form signed by the Audit Team Leader has been provided in Appendix 9 of this report.

APPENDIX 1

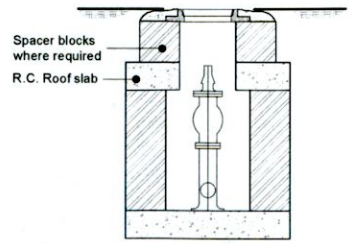
Civil Drawings

Civil Drawings

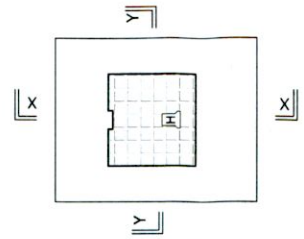
DWG. No:	DRAWING TITLE
2500	BH and TP Locations
2501	Drainage Layout
2502	Watermain Layout
2503	Roads Layout
2504	Reinstatement Details
2505	Typical Manhole Details
2506	Road Details/Sections
2507	Attenuation Details
2508	Watermain Details
2509	Pedestrian Crossing Details
2510	Autotrack 1 of 3
2511	Autotrack 2 of 3
2512	Autotrack 3 of 3



SECTION X-X



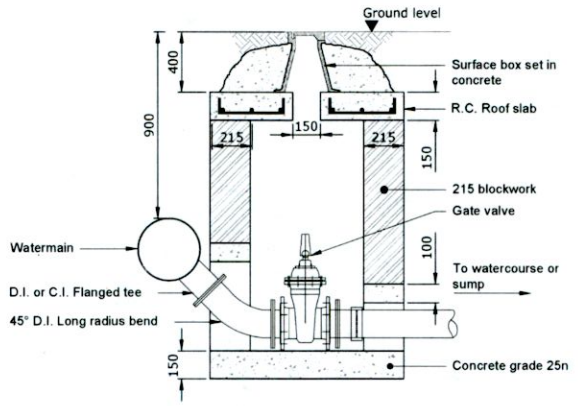
SECTION Y-Y



PLAN ON COVER SLAB

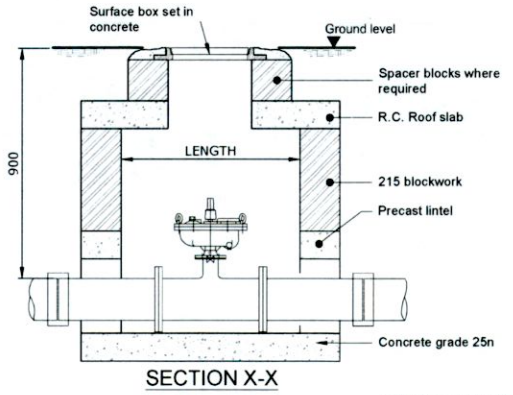
HYDRANT CHAMBER

HYDRANT CHAMBER DIMENSIONS				
VALVE DIA. (mm)	CHAMBER WIDTH (W)	CHAMBER LENGTH (L)	DEPTH OF COVER TO PIPE (H)	CLEAR OPE. SURFACE BOX (mm)
50	390	720	900	375x225
80	460	960	900	575x300
100	460	960	900	575x300
150	920	1500	900	900x600

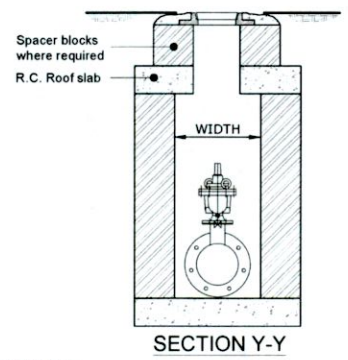


TYPE 1 SCOUR CHAMBER

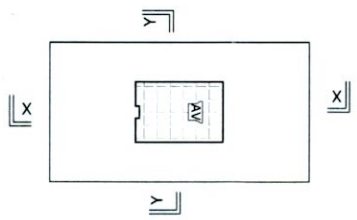
SCOUR SIZES	
MAIN PIPE DIA (mm)	SCOUR PIPE DIA. (mm)
80 100 150	80
200	100
250 300 350	150
400 450 500	200
600	REFER TO SPEC.



SECTION X-X



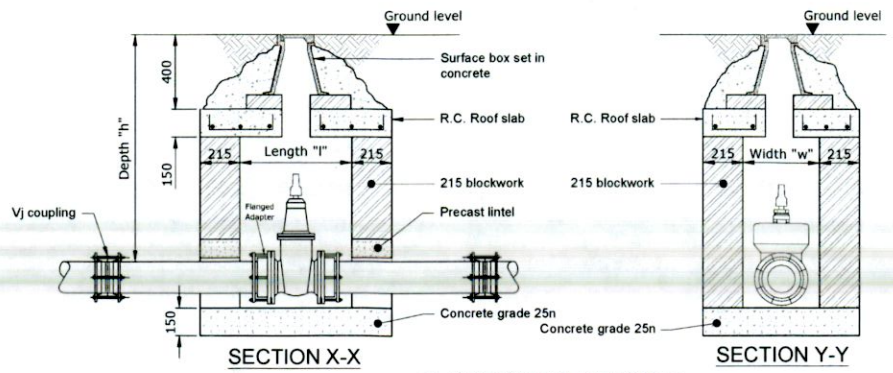
SECTION Y-Y



PLAN ON COVER SLAB

AIR VALVE CHAMBER

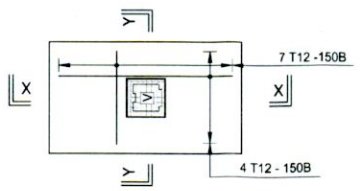
AIR VALVE CHAMBER DIMENSIONS			
PIPE DIA (mm)	CHAMBER WIDTH (W)	CHAMBER LENGTH (L)	DEPTH OF COVER TO PIPE (H)
150	510	690	900
250	510	690	900
300	600	720	1050
400	800	800	1050
450	800	800	1050
500	1000	1000	1050
600	1200	1200	1300



SECTION X-X

SECTION Y-Y

SLUICE VALVE CHAMBER



PLAN ON COVER SLAB

Note
Concrete floor to chamber not to be provided when Class 1 watermains are used.

SLUICE VALVE CHAMBER DIMENSIONS			
VALVE DIA. (mm)	CHAMBER WIDTH (W)	CHAMBER LENGTH (L)	DEPTH OF COVER TO PIPE (H)
80	280	560	900
100	310	560	900
150	410	610	900
200	460	610	900
250	510	690	900
300	600	720	1060
400	800	800	1060

NOTES
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd
A	07.02.17	PLANNING	CS	AM

Client: Department of Education and Skills

Project: 6.1 Clondalkin Old Nangor Road Clondalkin Dublin 22

Title: TYPICAL WATERMAIN DETAILS

Scale @ A1: 1:20

Prepared by: CS | Checked: AM | FEB 2017

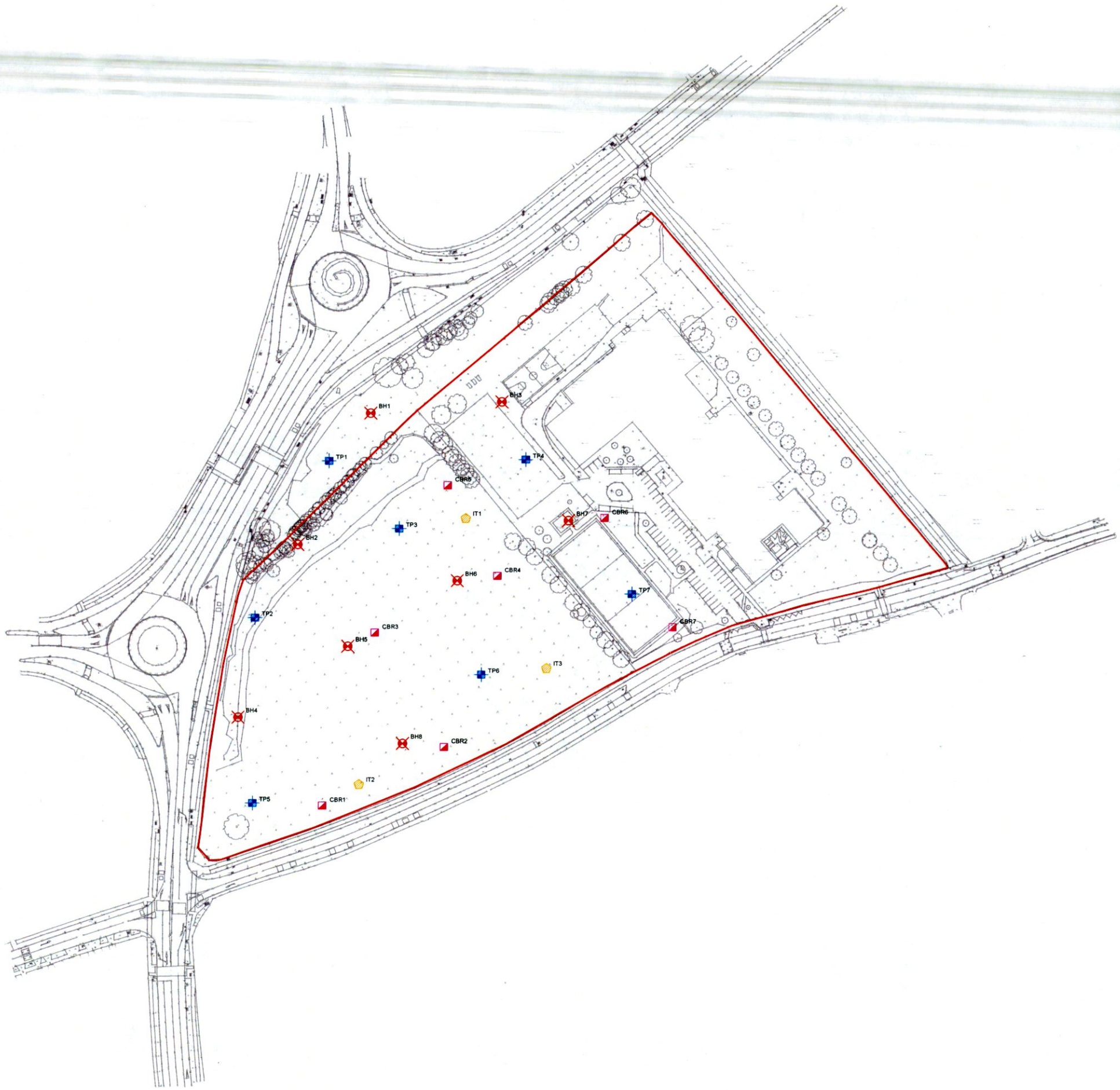
Project Director: MICHAEL MCDONNELL

Drawing Status: PLANNING

TOBIN
Patrick J. Tobin & Co. Ltd
TOBIN Consulting Engineers,
Block 10-4, Blanchardstown Corporate Park,
Dublin 15, Ireland.
tel: +353-(0)1-8030406
fax:+353-(0)1-8030409
e-mail: dublin@tobin.ie
www.tobin.ie

Drawing No.: 8064-2508

Revision: A



BH BOREHOLE LOCATION (8No.)

TP TRIALPIT LOCATION (7No.)

IT INFILTRATION TEST LOCATION (3No.)

CBR CALIFORNIAN BEARING RATIO TEST LOCATION (7No.)

Rev	Date	Description	By	Chkd
A	03.02.17	PLANING	CS	AM

Client:
DEPARTMENT OF EDUCATION AND SKILLS

Project:
SHARED EDUCATIONAL CAMPUS
OLD NANGOR ROAD
CLONDALKIN

Title:
Existing Survey
BOREHOLES & TRIALPITS

Scale @ A1: 1:500

Prepared by:	Checked:	Date:
CS	AM	FEB 2017

Project Director: CIARAN MCGOVERN

Drawing Status: PLANNING

TOBIN
Patrick J. Tobin & Co. Ltd.
TOBIN Consulting Engineers,
2nd Floor, Elgee Building, Market Square,
Dundalk, Co. Louth, Ireland.
tel: +353-(0)42-9335107
fax:+353-(0)42-9331715
e-mail: dundalk@tobin.ie
www.tobin.ie

Drawing No.: 8064-2500

Revision: A

THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

LEGEND

- Proposed Storm Line
- Proposed Foul Line
- Proposed Road Gully Line
- Proposed ACO Drain
- Existing Foul Line
- Existing Surface Water Sewer
- Road Gully
- Attenuation
- Permeable Paving
- Rainwater Harvesting Tank
- Hardstanding Area
- Planting Area

SUDS SOLUTIONS

-PERMEABLE PAVING TO CAR PARK

-PETROL INTERCEPTOR

-RAIN WATER HAVESTING TANK

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWNG.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	13.02.17	PLANNING	CS	AM

Client: Department of Education and Skills

Project: 6.1 Clondalkin
Old Nangor Road
Clondalkin
Dublin 22

Title: PROPOSED DRAINAGE LAYOUT

Scale @ A1:	1:500	
Prepared by: CS	Checked: AM	Date: FEB 2017
Project Director:	Ciaran McGovern	
Drawing Status:	PLANNING	

TOBIN
Patrick J. Tobin & Co. Ltd.
TOBIN Consulting Engineers,
2nd Floor, Elgee Building, Market Square,
Dundalk, Co. Louth, Ireland.
tel: +353-(0)42-9335107
fax:+353-(0)42-9331715
e-mail: dundalk@tobin.ie
www.tobin.ie

Drawing No.: 8064-2501 Revision: A

THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

LEGEND

- OUTLINE OF PROPOSED SITE WORKS
- EXISTING 300mm WATERMAIN FROM SDCC RECORDS
- PROPOSED100mm uPVC POTABLE WATERMAIN
- H — PROPOSED FIRE HYDRANT
- SV — PROPOSED SLUICE VALVE
- SCV — PROPOSED SCOUR VALVE
- M — PROPOSED METER
- AV — PROPOSED AIR VALVE

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev.	Date	Description	By	Chkd.
A	13.02.2017	PLANNING	CS	AM

Client: Department of Education and Skills

Project: 6.1 Clondalkin
Old Nangor Road
Clondalkin
Dublin 22

Title: PROPOSED WATERMAIN LAYOUT

Scale @ A1: 1:500

Prepared by:	Checked:	Date:
CS	AM	FEB 2017

Project Director: CIARAN MCGOVERN

Drawing Status: PLANNING

TOBIN
Patrick J. Tobin & Co. Ltd
TOBIN Consulting Engineers,
2nd Floor, Elgee Building, Market Square,
Dundalk, Co. Louth, Ireland.
tel: +353-(0)42-9335107
fax:+353-(0)42-9331715
e-mail: dundalk@tobin.ie
www.tobin.ie

Drawing No.: 8064-2502

Revision: A

THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

LEGEND

- Outline of Proposed Site Works
- PEDESTRIAN ROUTES & PLAY AREAS
- ROADS
- CARPARKING (PERMEABLE PAVING)
- PLANTING AREA
- G — ROAD GULLY
- 1:100 — GRADIENT MAGNITUDE AND DIRECTION
- DK DK — DROPPED KERBS

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd
A	13.02.2017	PLANNING	CS	AM

Client: Department of Education and Skills

Project: 6.1 Clondalkin
Old Nangor Road
Clondalkin
Dublin 22

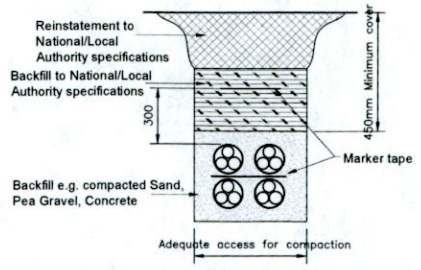
Title: PROPOSED ROADS LAYOUT

Scale @ A1:	1:500	
Prepared by: CS	Checked: AM	Date: FEB 2017
Project Director:	CIARAN MCGOVERN	
Drawing Status:	PLANNING	

TOBIN
Patrick J. Tobin & Co. Ltd.
TOBIN Consulting Engineers,
2nd Floor, Elgee Building, Market Square,
Dundalk, Co. Louth, Ireland.
tel: +353-(0)42-9335107
fax:+353-(0)42-9331715
e-mail: dundalk@tobin.ie
www.tobin.ie

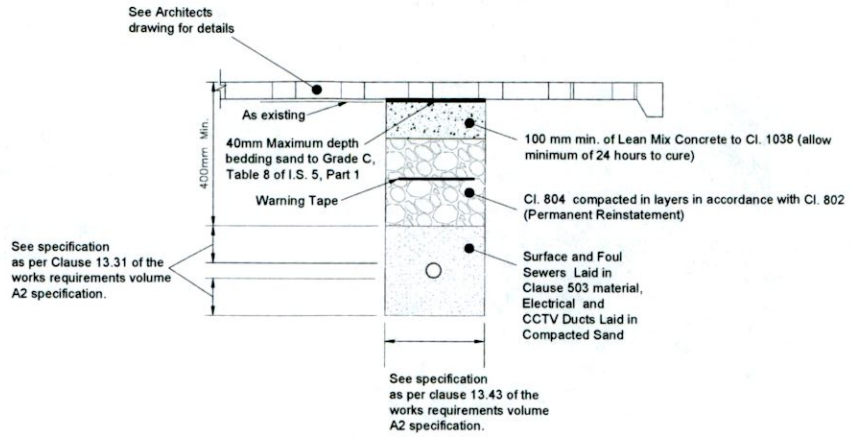
Drawing No.: 8064-2503 | Revision: A

NOTE A:
CONFIGURATION TO BE 3 FULL ROWS DEEP, AT NARROWEST POINT, OF 6 NUMBER WIDE (OR CROSSING WIDTH), 400mm sq. TACTILE TILES ON BOTH SIDES OF THE ROAD. THE TACTILE DOMES ON THE TILES MUST BE LINED UP TO GIVE THE DIRECTION OF TRAVEL IN ORDER TO CROSS THE ROAD STRAIGHT.



TRENCH IN FOOTWAYS, PAVEMENTS, VERGES

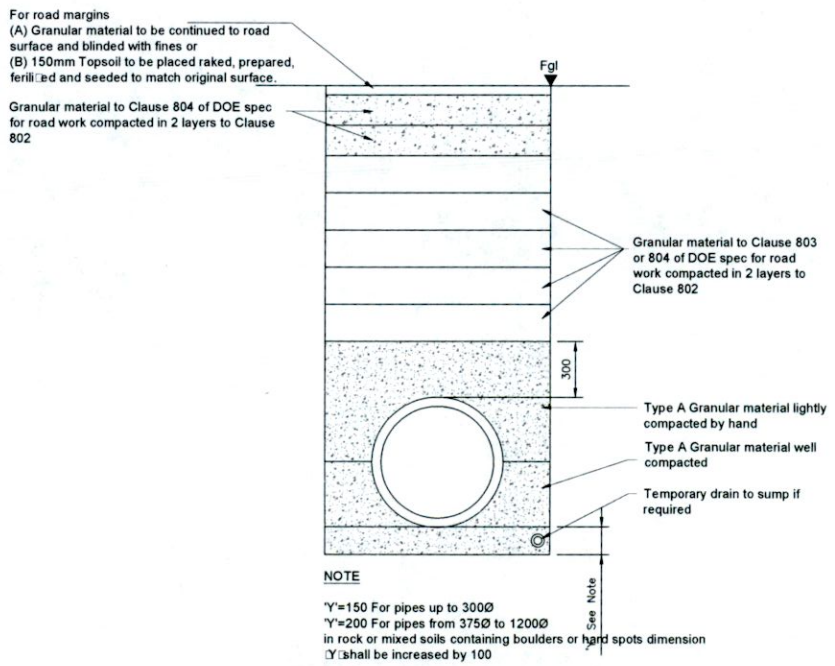
SCALE 1:10



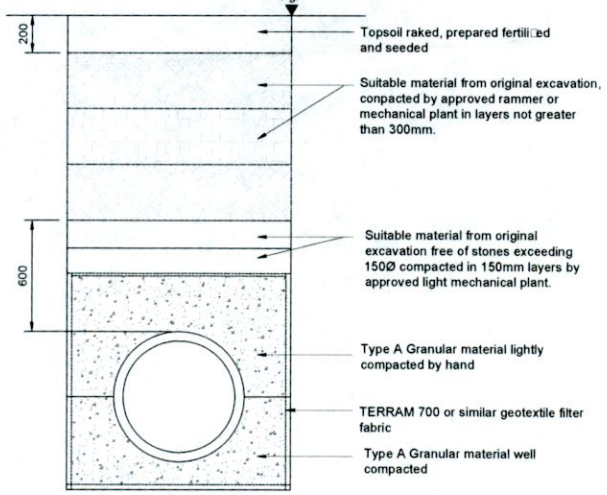
NOTES:-

1. Add fresh sand and compact with a plate compactor. Additional sand is spread to stand proud of adjacent sand.
2. Use a slightly cambered profile over width of trench to counter any tendancy to settle under traffic/load.
3. Relay blocks as tightly as possible.
4. One pass of plate compactor, then sand and compact with two or three passes to ensure full interlock.
5. 2 to 5mm joints between blocks to be filled with sand to Grade F of I.S. 5 Part 1.
6. The difference in level between adjacent blocks should not exceed 3mm.

S.W & FOUL PIPE /DUCT TRENCH DETAIL IN PRECAST BLOCK PAVING FOOTHWAYS

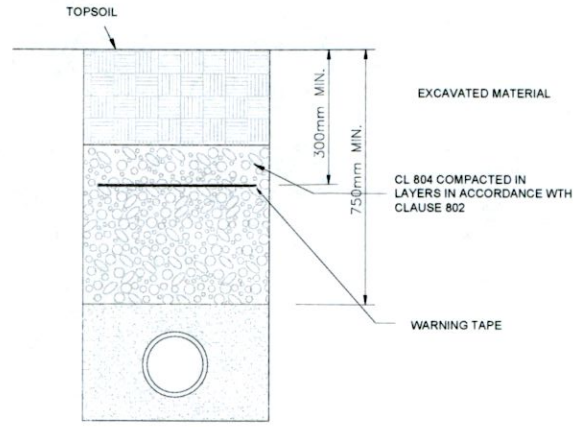


TRENCH IN ROAD AND ROAD MARGINS



FIELDS

(where required by poor ground conditions)



PERMANENT REINSTATEMENT

GRASS VERGES, MEDIANS, FIELDS AND LAWNS

NOTES:

1. Prior to excavation , all grass areas are to be cut into turves which are to be carefully stacked and re-used within one week of cutting during the period 1st april to 31st august or within two weeks of cutting during the remainder of the year. Turves not used within these periods shall be regarded as topsoil.

2. Prior to seeding or turfing, an approved fertiliser shall be evenly distributed on the topsoil of not less than 100g per sq.metre.

3. The areas to be grassed shall be covered with topsoil to a minimum depth of 100mm which shall be reduced to a fine tilth, free from stones and debris with any dimension greater than 35mm. The topsoil shall be graded and lightly compacted to 100mm thickness - whichever is greater. Any upstanding debris or stones exceeding 25mm dimension shall be removed.

4. Pay due regard to the season and weather condition before sowing grass seed. Imeediately prior to sowing the grass seed, topsoil shall be reduced toa fine tilth. Sowing the grass seed shall be carried out by an even distribution, using a blend of (per hectare)170kg manhattaan rye grass and 13kg dwarf clover or other mix as specified by the road authority. For slopes in excess of ten degrees, these quantities shall be increased by 50%. The seed shall be covered by lightly raking into the surface of the topsoil.

5. All drainage channels shall be marked on the carriageway, mapped and shall be restored in conjunction with verge reinstatement to ensure that surface water runoff is discharged from the road surface.

6. All temporary reinstatement as detailed above shall be carried out immediately after backing the trench. When all settlement has taken place or after a three month period, whichever is the greater, the trench shall be topped up with topsoil to its original level.

TYPICAL TRENCH WIDTHS

NOMINAL PIPE DIA (mm)	MIN. TRENCH WIDTH (mm)	MAX. TRENCH WIDTH (mm)
100	430	630
150	490	690
225	580	780
300	680	880
375	950	1150
450	1030	1230
525	1120	1320
600	1240	1440
675	1330	1530
750	1400	1600
900	1920	2120
1050	2100	2300

Rev	Date	Description	By	Chkd.
A	06.02.17	PLANNING	CS	AM

Client: Department of Education and Skills

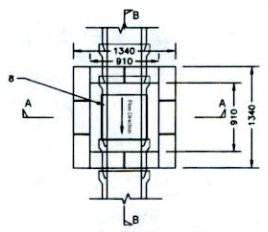
Project: 6.1 Clondalkin
Old Nangor Road
Clondalkin
Dublin 22

Title: TYPICAL DETAILS FOR ROAD REINSTATEMENT AND TRENCHES

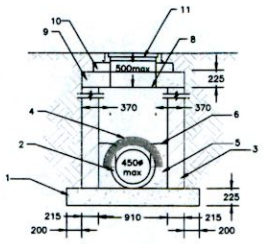
Scale @ A1:	AS SHOWN		
Prepared by: CS	Checked: AM	Date: FEB 2017	
Project Director:	CIARAN MCGOVERN		
Drawing Status:	PLANNING		

TOBIN
Patrick J. Tobin & Co. Ltd.
TOBIN Consulting Engineers,
2nd Floor, Elgee Building, Market Square,
Dundalk, Co. Louth, Ireland.
tel: +353-(0)42-9335107
fax:+353-(0)42-9331715
e-mail: dundalk@tobin.ie
www.tobin.ie

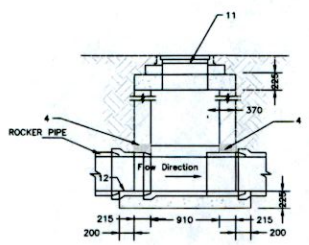
Drawing No.: 8064-2504 Revision: A



PLAN BELOW ROOF SLAB



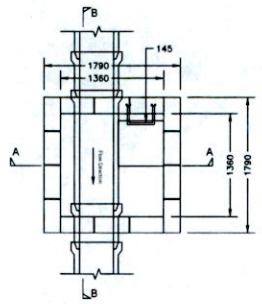
SECTION A-A



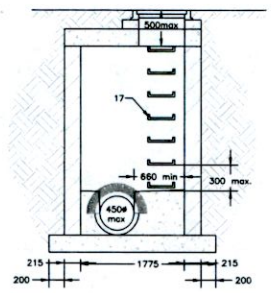
SECTION B-B

TYPE A MANHOLE

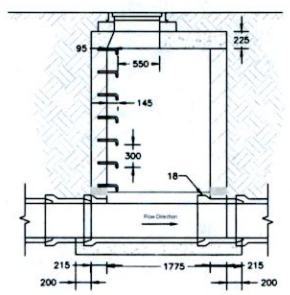
MANHOLE DETAILS FOR PIPE Ø 150,225,300,375,450. DEPTH TO INVERT □m.



PLAN



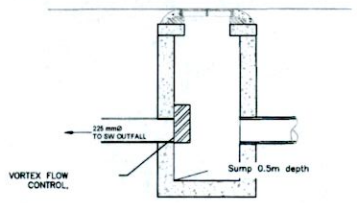
SECTION A-A



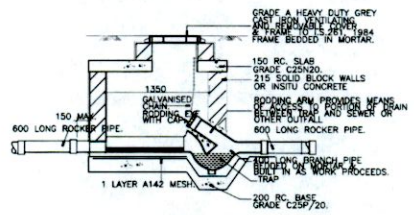
SECTION B-B

TYPE B MANHOLE

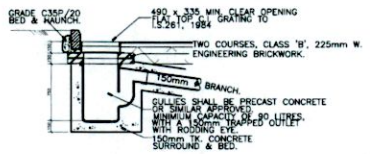
MANHOLE DETAILS FOR PIPE Ø 225,300,375,450. DEPTH TO INVERT 1m - 3m.



SURFACE WATER FLOW CONTROL CHAMBER
SCALE 1:25



TYPICAL SECTION THRO□
MANHOLE INCORPORATING
INTERCEPTOR. SCALE 1:20.
FOR TIEING INTO COMBINED DRAIN.



ROAD GULLY DETAIL.
SCALE 1:20.

I.I. Drawing Notes:
1) 225mm thick Cl. 20N/20mm Mass Concrete Foundations.
2) Preformed half circle channel pipes. The pipeline may, where practicable, be laid through the manhole and the crown cut out to half diameter, provided flexible joints are situated on each side no further than 600mm from the inner face of manhole wall.
3) Manhole construction.
• For Surface Water Manholes high-density blocks to Cl.S10 of IS.20 Part 1:1987 or Cl. 30N/20mm insitu concrete.
• Block work shall be bedded and jointed using mortar to IS406. Beds and vertical joints shall be completely filled with mortar as the blocks are laid.
• Joints shall be flush pointed as the work proceeds.
• All Foul Manholes must be faced in solid Engineering Brick (min. class A or B), or insitu concrete for 1 metre above Benching Level.
• Brick to be bonded to block work using English Garden Wall Bond.
4) Relieving arch formed by 215x103x65 solid engineering brick Class A or B as per drawing.
Relieving arches used in brick or block work manholes extend over full thickness of wall.
A Double Arch is to be formed for pipe diameters greater than 600mm.
5) Benching and pipe channel pipe surround - Cl. 20/20 concrete.
6) Benching finished in 2:1 sand-cement mortar with a smooth trowel finish, at 1 in 30 slope towards channel.
7) Standard rungs at 300c/c vertically and galvanized to the latest version ofB.S. 729 or equivalent. Note: Steps Irons are not acceptable.
8) 600mm square ope in roof slab.
9) Precast R.C. Roof Slab shall be 200mm thick in Class 30N/20mm, with 40mm cover to steel.
10) 1 to 2 courses of solid engineering bricks Cl.B to I.S.91:1983 set in 1:3 (cement and mortar).
11) Class D400 or E600 manhole cover and frame to IS/EN 124. 150mm deep frame for roads and 100mm deep for footpaths and green areas. Non-rock design, closed keyways, manufactured from spheroidal graphite cast iron (ductile cast iron), 600 x 600 (600diam.) clear opening, cover and frame coated in bitumen or other approved material, cover to have a minimum mass of 140kg/m2, frame bearing area shall be 80,000mm2 min, frames shall be designed to prevent covers falling into manhole. Frames shall be bedded on approved mortar to manufactures instructions.
12) Short length pipe and pipe joint external to manhole shall not exceed 600mm from the inner face of manhole wall.
13) Toe holes of 230mm minimum depth and galvanized steel safety railings to be provided in benching of sewers greater than 525mm diameter and depth to invert >3m for access to invert.
14) A safety chain is to be provided on pipes that exceed 450mm in diameter. Mild safety chain shall be 10mm nominal size grade M(H) non-calibrated chain, type 1, complying with B.S.4942 Part 2 or equivalent.
15) When depth of manholes to invert is greater than 3.0m ladders shall be used instead of rungs to B.S.4211 or equivalent except that stringers should be not less than 65 x 12mm in section and rungs 25mm in diameter.
Fixed ladders should meet the dimensional requirements of B.S.4211 or equivalent.
16) Ladder stringers should be adequately supported from the manhole wall at intervals of not more than 2.0m stringers should be bolted to cleats to facilitate renewal.
17) All ladders, rungs, handrails, safety chains etc shall be hot dip galvanized to B.S.729 or equivalent.
18) Pipe should be cut flush with the inside surface of the manhole wall so that the channel extends the full length of the manhole (except for precast manholes).
19) Position of 910 square ope in intermediate roof slab.
• All manholes shall be watertight to the satisfaction of the Engineer.
• Formwork to Reinforced Concrete and Mass Concrete shall comply with Class 2, Section 6.2.7, B.S.8110: Part 1: 1997.
• Finish to the top of slabs shall comply with Type A, Section 6.2.7,B.S.8110: Part 1:1997.
• Plan dimensions of manholes are based on block work having a coordinating size of 450 x 225 x 100.
• Manholes are designed to B.S.8005 and wall thickness to LS.325 block work design code taking granular fill pressure and H.B. surcharge.
• Reinforcement to slabs to Engineers details.
20) For manholes >3m depth to invert use 30N/20mm insitu concrete. Reinforcing mesh ref. A393 @ 6.16kg/m to be fixed at mid point of wall. Additional reinforcement to be supplied over pipe crown.
21) For Pre cast Manholes, Chamber walls and cover slab to be constructed to IS EN 1917 and IS 420 2004
22) Manhole Openings to be situated furthest from the nearest Carriageway. Manhole steps / access to be positioned to allow viewing of oncoming traffic.
23) For bedding and sealing of Chamber rings, the top ring (to Pre cast cover slab) and bottom ring to be bedded with cement mortar. For intermediate rings, joints to be sealed with approved pre-formed jointing strip.

24) Pre cast Manholes to be surrounded with a minimum of 150mm thick Grade C20/40 concrete
General Notes
i) All brick to be Solid Engineering Brick Class A or B.
ii) For pipe diameter >750mm use manhole with internal diameter size = pipe size + 1metre + 300mm.
iii) Distance from the top rung of the ladder to ground level must be a maximum of 500mm.

Rev	Date	Description	By	Chkd.
A	08.02.17	PLANNING	CS	AM

Client: Department of Education and Skills

Project: 6.1 Clondalkin
Old Nangor Road
Clondalkin
Dublin 22

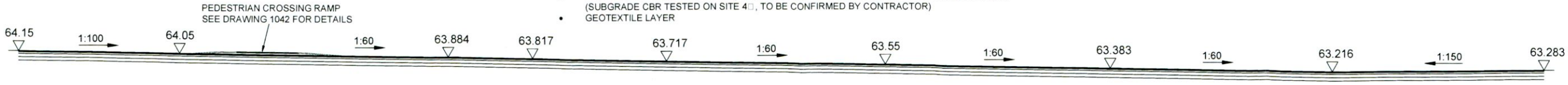
Title: TYPICAL DRAINAGE MANHOLE DETAILS

Scale @ A1:	1:15	
Prepared by: CS	Checked: AM	FEB 2017
Project Director:	CIARAN MCGOVERN	
Drawing Status:	PLANNING	

TOBIN
Patrick J. Tobin & Co. Ltd.
TOBIN Consulting Engineers,
Block 10-4, Blanchardstown Corporate Park,
Dublin 15, Ireland.
tel: +353-(0)1-8030406
fax:+353-(0)1-8030409
e-mail: dublin@tobin.ie
www.tobin.ie

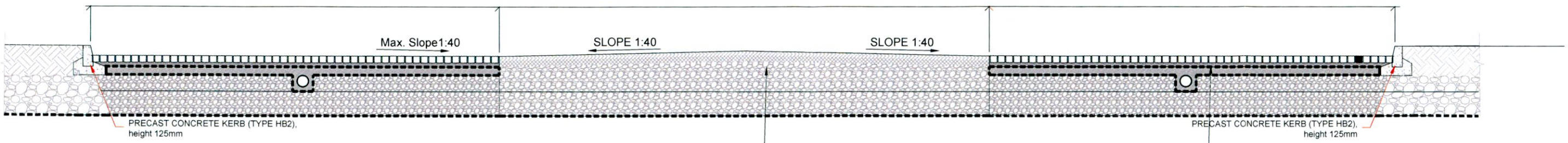
Drawing No.: 8064-2505
Revision: A

ROAD CONSTRUCTION
- 45mm SURFACE COURSE: SMA 10 SURF PMB 65/105-60 DES, GRADE 40/60 TO CLAUSE 942 ON,
- 60mm BINDER COURSE: DENSE ASPHALT CONCRETE AC20, GRADE 40/60. ON
- 145mm BASE COURSE: DENSE ASPHALT CONCRETE AC32, GRADE 40/60. ON
- 300mm SUB-BASE LAYER: TYPE B, TO CLAUSE 804 ON MIN. 300mm CAPPING LAYER: TYPE 6F2. (SUBGRADE CBR TESTED ON SITE 4□, TO BE CONFIRMED BY CONTRACTOR)
- GEOTEXTILE LAYER



NOTE:
SEE ROAD LAYOUT DRAWING 8064-1006
FOR LOCATION OF LONG-SECTION

TYPICAL ROAD SECTION 3-3
SCALE 1:100



TYPICAL CAR PARK SECTION 1-1
SCALE 1:25

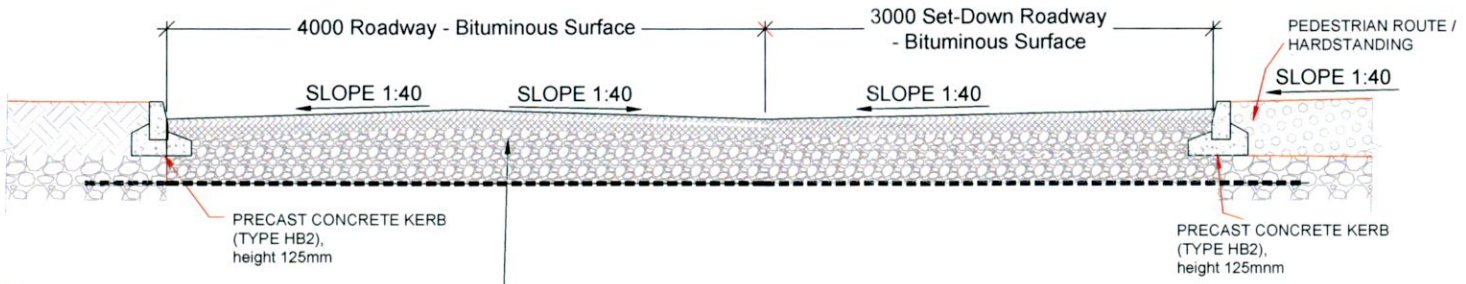
ROAD CONSTRUCTION
- 45mm SURFACE COURSE: SMA 10 SURF PMB 65/105-60 DES, GRADE 40/60 TO CLAUSE 942 ON,
- 60mm BINDER COURSE: DENSE ASPHALT CONCRETE AC20, GRADE 40/60. ON
- 145mm BASE COURSE: DENSE ASPHALT CONCRETE AC32, GRADE 40/60. ON
- 300mm SUB-BASE LAYER: TYPE B, TO CLAUSE 804 ON MIN. 300mm CAPPING LAYER: TYPE 6F2. (SUBGRADE CBR TESTED ON SITE □2□ IN CAR PARK TO NORTH OF SITE, TO BE CONFIRMED BY CONTRACTOR)
- GEOTEXTILE LAYER

CAR PARKING SPACE CONSTRUCTION
- PERMEABLE PAVING BLOCKS MANUFACTURED IN ACCORDANCE WITH BSEN 1338:2003 TO ARCHITECTS DETAILS. GAPS BETWEEN PERMEABLE PAVING BLOCKS TO BE FILLED WITH LAYING COURSE/JOINT MATERIAL.
- LAYING COURSE - MIN. 50mm OF 2mm TO 6.3mm AGGREGATE (TYPE 2/6.3 $\frac{80}{20}$ ACCORDING TO BSEN 13242:2002)
- GEOTEXTILE WITH MIN. 300mm LAPS
- 100mm COURSE GRADED AGGREGATE $\frac{4}{20}$ SUB-BASE.
- GEOTEXTILE WITH MIN. 300mm LAPS.
- COURSE GRADED AGGREGATE - 100mm OF 4mm TO 20mm AGGREGATE WITH MIN. 30□ VOIDS RATIO, LAID IN 100-150mm LAYERS.

NOTES

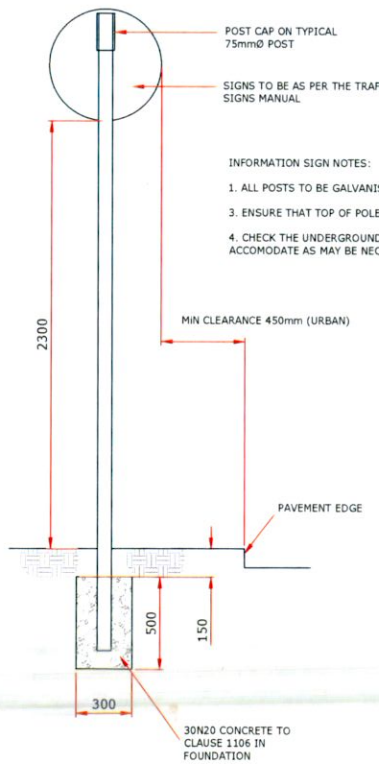
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

NOTE:
SEE ROAD LAYOUT DRAWING 8064-2503
FOR LOCATION OF CROSS SECTIONS

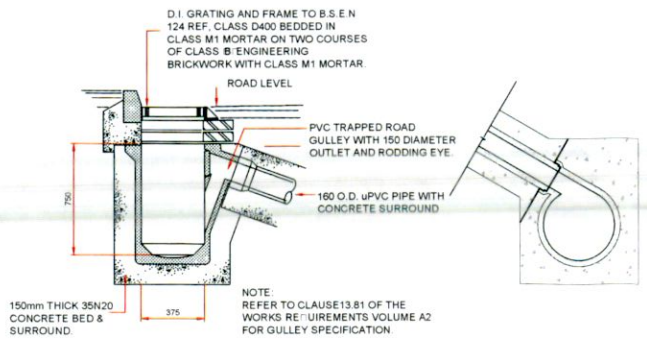


ROAD CONSTRUCTION
- 45mm SURFACE COURSE: SMA 10 SURF PMB 65/105-60 DES, GRADE 40/60 TO CLAUSE 942 ON,
- 60mm BINDER COURSE: DENSE ASPHALT CONCRETE AC20, GRADE 40/60. ON
- 145mm BASE COURSE: DENSE ASPHALT CONCRETE AC32, GRADE 40/60. ON
- 300mm SUB-BASE LAYER: TYPE B, TO CLAUSE 804 ON MIN. 300mm CAPPING LAYER: TYPE 6F2. (SUBGRADE CBR TESTED ON SITE 4□, TO BE CONFIRMED BY CONTRACTOR)
- GEOTEXTILE LAYER

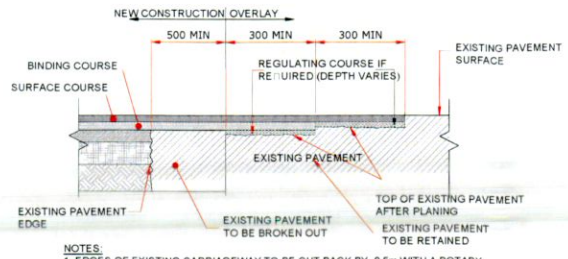
TYPICAL ROAD SECTION 2-2
SCALE 1:25



TYPICAL ROAD SIGN
SCALE 1:20



TYPICAL ROAD GULLEY DETAIL
SCALE 1:25



NOTES:
1. EDGES OF EXISTING CARRIAGEWAY TO BE CUT BACK BY 0.5m WITH A ROTARY SAW TO FORM A VERTICAL FACE AND PRIMED IN ACCORDANCE WITH CLAUSE 920.

2. WHERE THE ROADBASE IS TO BE LAID IN TWO LAYERS, THE UPPER LAYER OF ROADBASE SHOULD BE STEPPED INTO THE EXISTING PAVEMENT BY 300 MIN. WITH THE BASECOURSE AND WEARING COURSE TO BE EACH STEPPED IN A FURTHER 300mm MIN. RESPECTIVELY.

LONGITUDINAL JOINT BETWEEN NEW CONSTRUCTION & EXISTING ROAD
SCALE 1:25

Rev	Date	Description	By	Chkd
A	08.02.17	PLANNING	CS	AM

Client: Department of Education and Skills

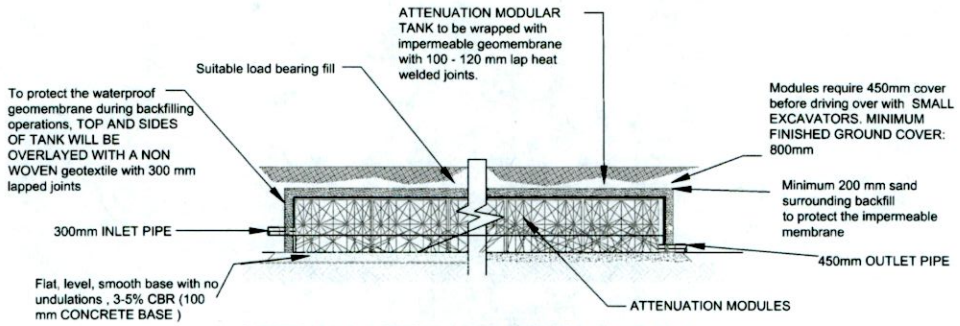
Project: 6.1 Clondalkin Old Nangor Road Clondalkin Dublin 22

Title: PROPOSED ROAD DETAILS

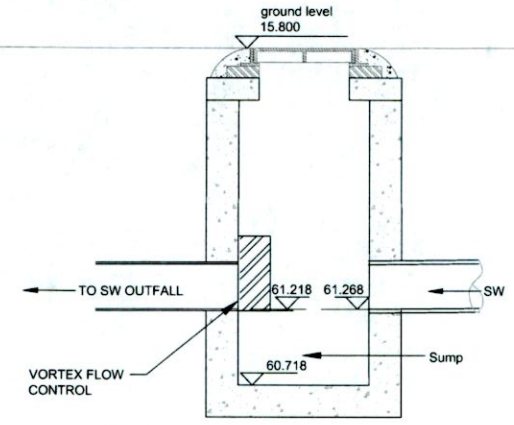
Scale @ A1:	As Shown		
Prepared by:	CS	Checked: AM	FEB 2017
Project Director:	CIARAN MCGOVERN		
Drawing Status:	PLANNING		

TOBIN
Patrick J. Tobin & Co. Ltd
TOBIN Consulting Engineers,
Block 10-4, Blanchardstown Corporate Park,
Dublin 15, Ireland.
tel: +353-(0)1-8030406
fax:+353-(0)1-8030409
e-mail: dublin@tobin.ie
www.tobin.ie

Drawing No.: 8064-2506 | Revision: A



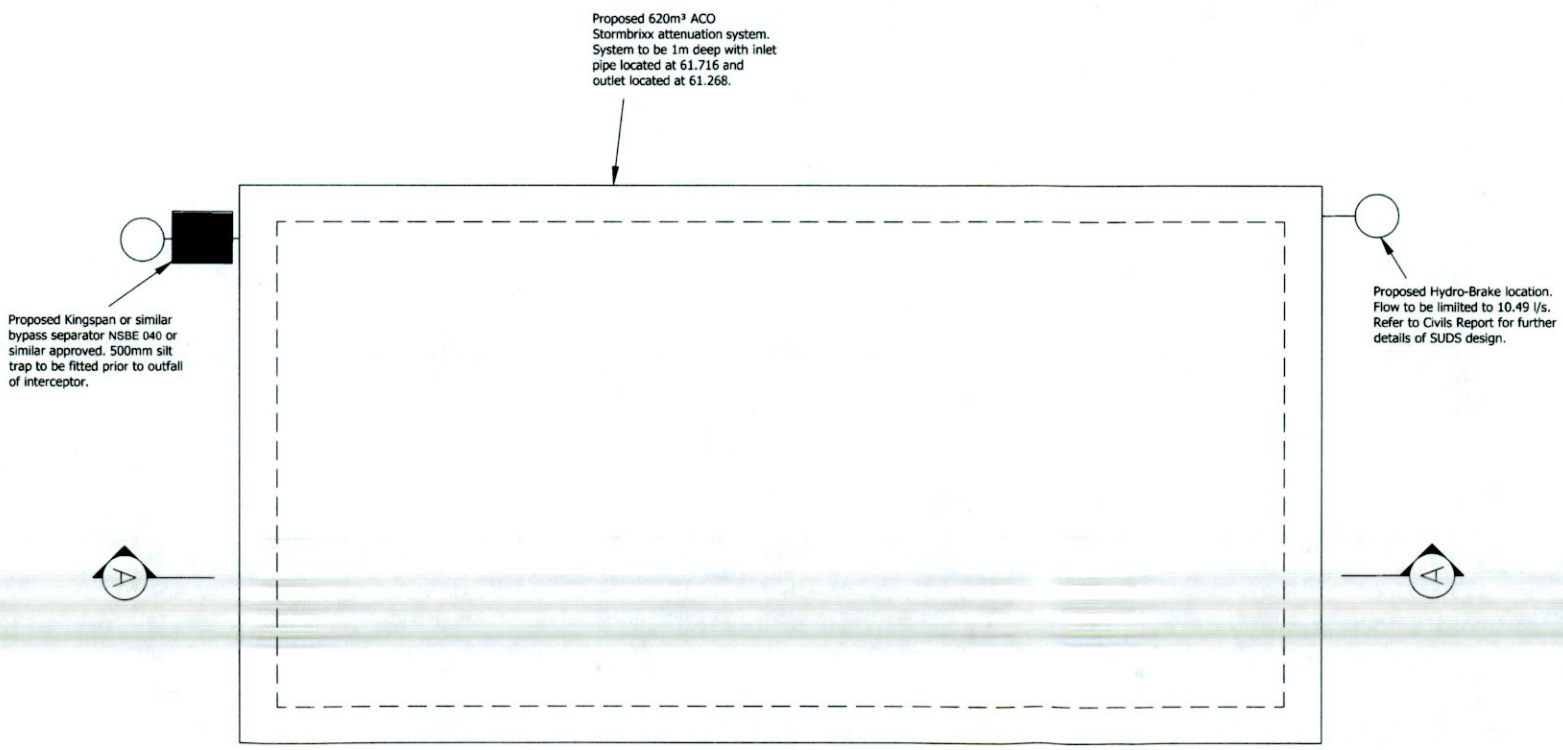
SECTION A-A: LONGITUDINAL SECTION THROUGH MODULAR ATTENUATION TANK
SCALE 1:100



SURFACE WATER FLOW CONTROL CHAMBER
SCALE 1:25

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD



PLAN OF ATTENUATION SYSTEM - STORM NETWORK
SCALE 1:100

Rev	Date	Description	By	Chkd.
A	07.02.17	PLANNING	CS	AM

Client: Department of Education and Skills

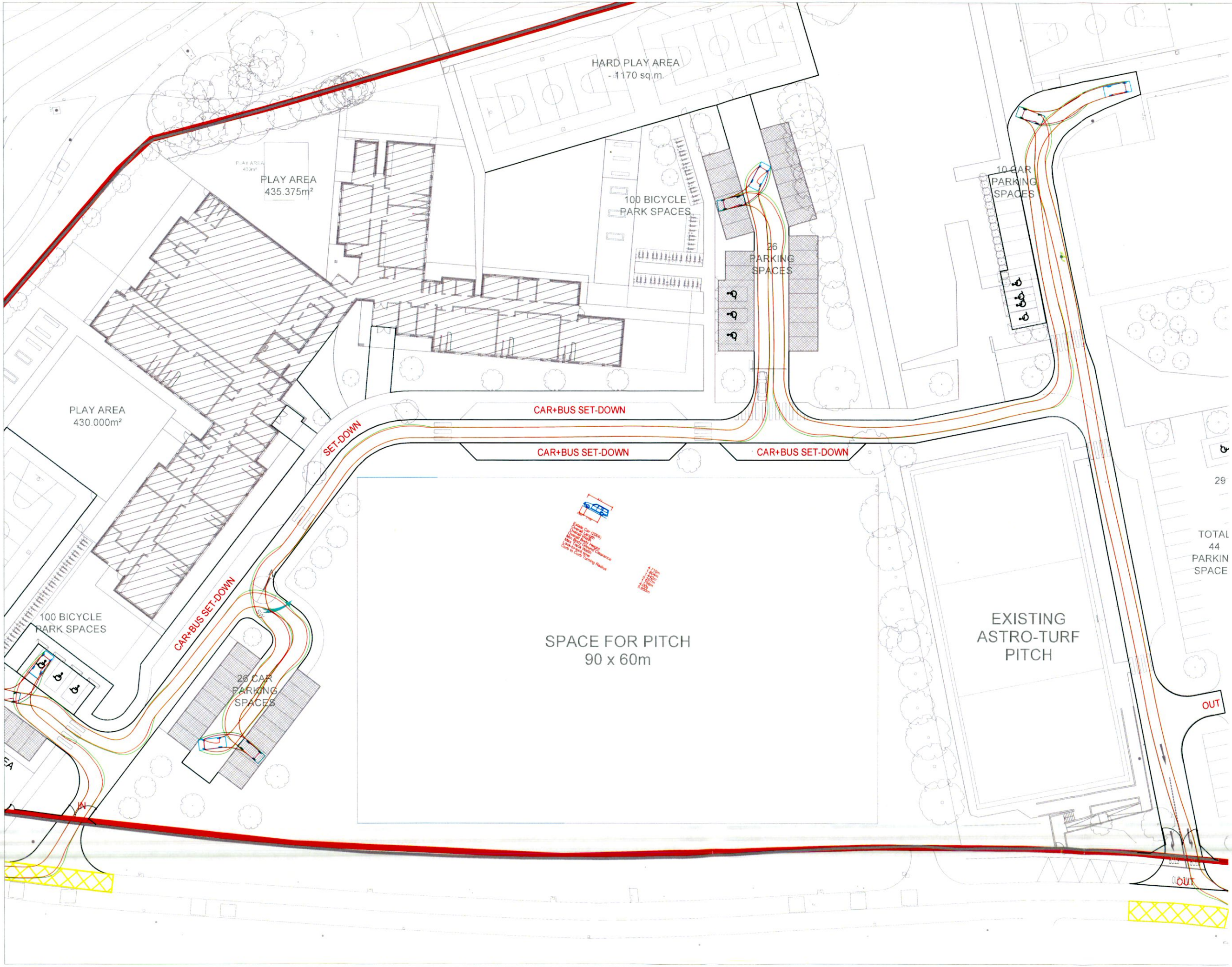
Project: 6.1 Clondalkin
Old Nangor Road
Clondalkin
Dublin 22

Title: DETAILS OF ATTENUATION STORM NETWORK

Scale @ A1:	As Shown	
Prepared by: CS	Checked: AM	Date: FEB 2017
Project Director:	Ciaran McGovern	
Drawing Status:	PLANNING	

TOBIN
Patrick J. Tobin & Co. Ltd.
TOBIN Consulting Engineers,
Block 10-4, Blanchardstown Corporate Park,
Dublin 15, Ireland.
tel: +353-(0)1-8030406
fax:+353-(0)1-8030409
e-mail: dublin@tobin.ie
www.tobin.ie

Drawing No.: 8064-2507 | Revision: A



THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

VEHICLE CHASSIS ENVELOPE

VEHICLE BODY ENVELOPE

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd
A	08.02.17	PLANNING	CS	AM

Client: Department of Education and Skills

Project: 6.1 Clondalkin
Old Nangor Road
Clondalkin
Dublin 22

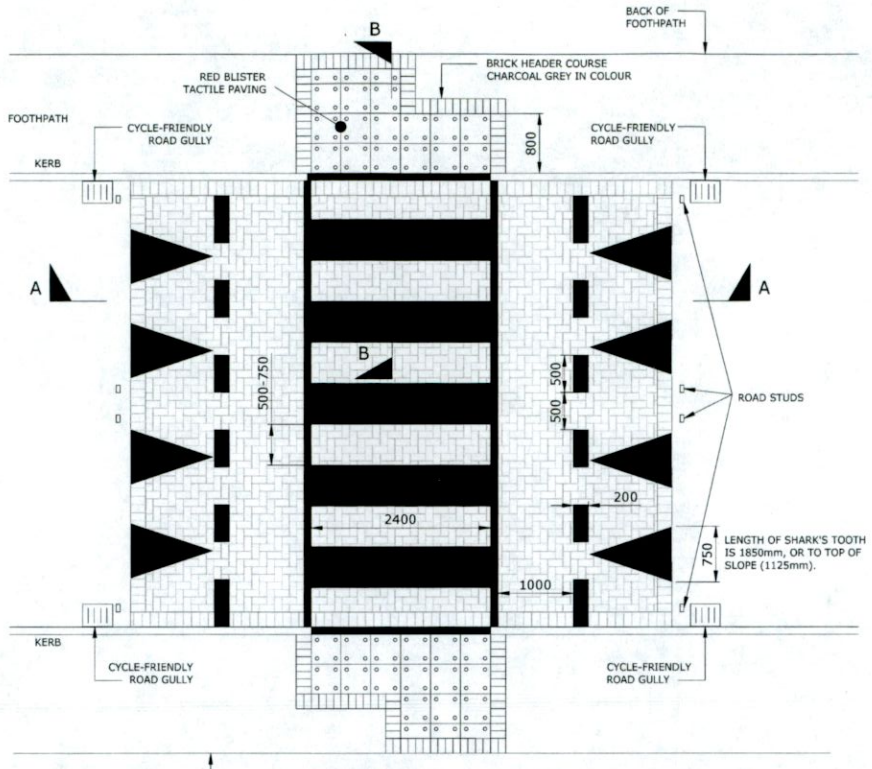
Title: AUTOTRACK
LAYOUT 03

Scale @ A1:	1:500	
Prepared by: CS	Checked: AM	Date: FEB 2017
Project Director:	CIARAN MCGOVERN	
Drawing Status:	PLANNING	

TOBIN
Patrick J. Tobin & Co. Ltd
TOBIN Consulting Engineers,
2nd Floor, Elgee Building, Market Square,
Dundalk, Co. Louth, Ireland.
tel: +353-(0)42-9335107
fax:+353-(0)42-9331715
e-mail: dundalk@tobin.ie
www.tobin.ie

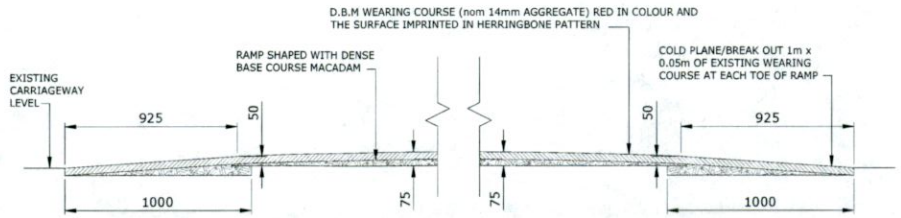
Drawing No.: 8064-2512

Revision: A



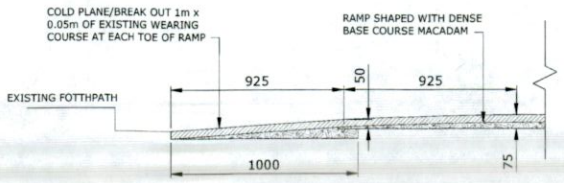
TYPICAL RAISED RAMP PLAN & ZEBRA CROSSING PLAN

SCALE 1:50



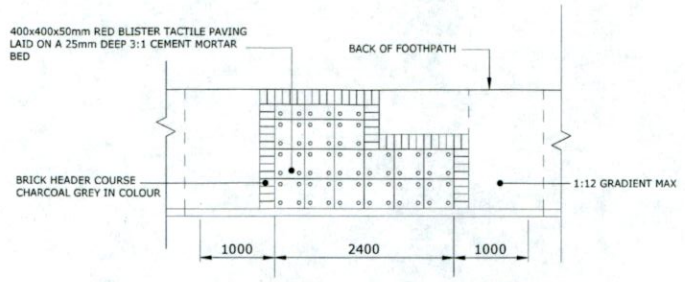
TYPICAL RAISED RAMP DETAIL SECTION A-A

SCALE 1:20



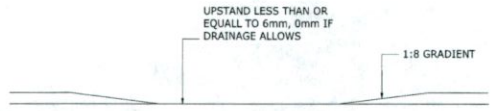
TYPICAL RAISED RAMP CHANNEL DETAIL SECTION B-B

SCALE 1:20



TYPICAL TACTILE PAVING AT ZEBRA CROSSING PLAN

SCALE 1:50



TACTILE PAVING ELEVATION

SCALE 1:50

NOTE:

1. TACTILE PAVING SLABS 400x400mm RED IN COLOUR.

2.L SHAPED CONFIGURATION OF TACTILE SLABS ON BOTH SIDES OF THE ROAD.

3.LEG OF L TO BE THREE SLABS WIDE TO ENSURE A VISUALLY IMPAIRED PERSON LOCATES THE CROSSING WHEN WALKING ALONG THE PAVEMENT, TOP OF L TO BE TWO SLABS WIDE.

4. THE TACTILE DOMES ON THE TILES MUST BE LINED UP TO GIVE THE DIRECTION OF TRAVEL IN ORDER TO CROSS THE ROAD STRAIGHT

5. UTILITY/SERVICE BOXES SHOULD NOT BE LOCATED IN THE TACTILE PAVED AREAS WHERE POSSIBLE.

6. BRICK HEADER COURSE OUTLINING TACTILE PAVED AREA TO BE 215x100x65mm CHARCOAL GREY IN COLOUR.

7.TRAFFIC BOXES AND DUCTING (INCLUDING DUCTING TO ILLUMINATED BOLLARDS AND SCATS LOOPS) TO SUIT SITE ARRANGEMENTS.

8.ALL CLAUSE REFERENCES RELATE TO VOLUME 1 SPECIFICATION FOR ROAD WORKS (NRA).

Rev	Date	Description	By	Chkd.
A	07.02.17	PLANNING	CS	AM

Client: Department of Education and Skills

Project: 6.1 Clondalkin Old Nangor Road Clondalkin Dublin 22

Title: Pedestrian Crossing Details

Scale @ A1: AS SHOWN

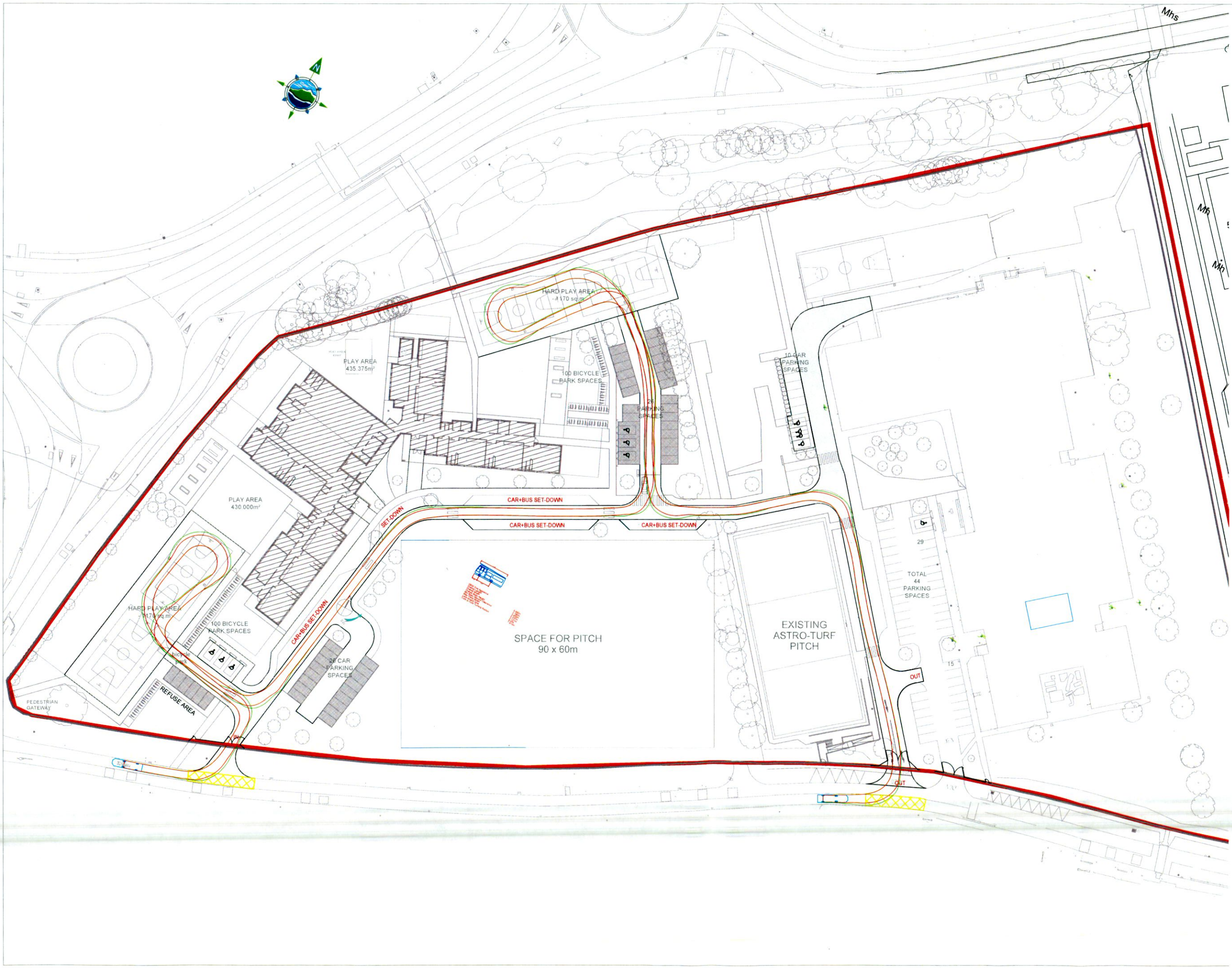
Prepared by:	Checked:	Date:
CS	AM	FEB 2017

Project Director: MICHAEL MCDONNELL

TOBIN
Patrick J. Tobin & Co. Ltd.
TOBIN Consulting Engineers,
Block 10-4, Blanchardstown Corporate Park,
Dublin 15, Ireland.
tel: +353-(0)1-8030406
fax:+353-(0)1-8030409
e-mail: dublin@tobin.ie
www.tobin.ie

Drawing No.: 8064-2509

Revision: A



THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

VEHICLE CHASSIS ENVELOPE

VEHICLE BODY ENVELOPE

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd
A	13.02.17	PLANNING	CS	AM

Client: Department of Education and Skills

Project: 6.1 Clondalkin
Old Nangor Road
Clondalkin
Dublin 22

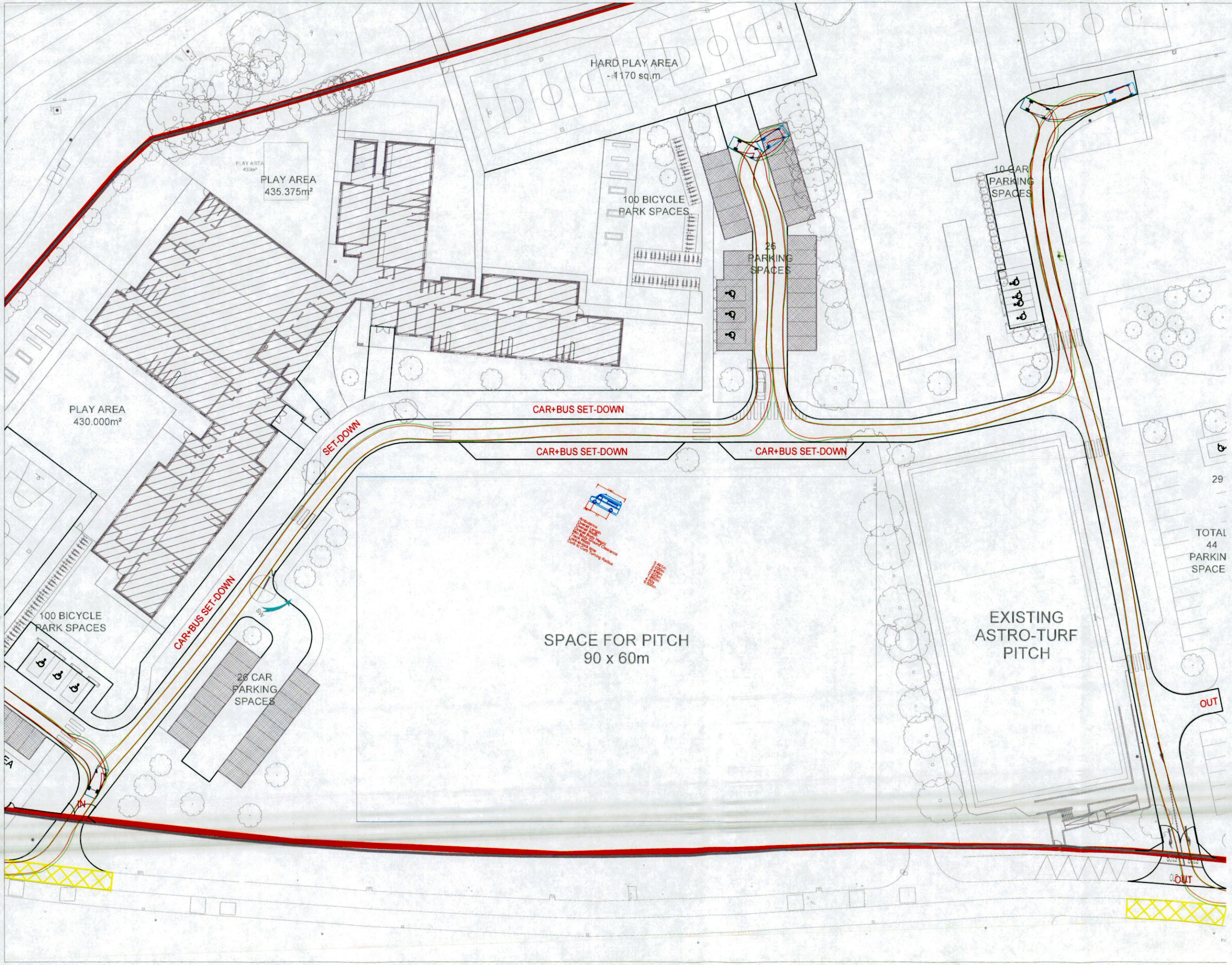
Title: AUTOTRACK
LAYOUT 01

Scale @ A1:	1:500	
Prepared by: CS	Checked: AM	Date: FEB 2017
Project Director:	CIARAN MCGOVERN	
Drawing Status:	PLANNING	

TOBIN
Patrick J. Tobin & Co. Ltd
TOBIN Consulting Engineers,
2nd Floor, Elgee Building, Market Square,
Dundalk, Co. Louth, Ireland.
tel: +353-(0)42-9335107
fax:+353-(0)42-9331715
e-mail: dundalk@tobin.ie
www.tobin.ie

Drawing No.: 8064-2510

Revision: A



THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

VEHICLE CHASSIS ENVELOPE

VEHICLE BODY ENVELOPE

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

29

Rev	Date	Description	By	Chkd.
A	08.02.17	PLANNING	CS	AM

Client: Department of Education and Skills

Project: 6.1 Clondalkin
Old Nangor Road
Clondalkin
Dublin 22

Title: AUTOTRACK
LAYOUT 02

Scale @ A1:	1:500	
Prepared by: CS	Checked: AM	Date: FEB 2017
Project Director:	CIARAN MCGOVERN	
Drawing Status:	PLANNING	

TOBIN
Patrick J. Tobin & Co. Ltd
TOBIN Consulting Engineers,
2nd Floor, Elgee Building, Market Square,
Dundalk, Co. Louth, Ireland.
tel: +353-(0)42-9335107
fax:+353-(0)42-9331715
e-mail: dundalk@tobin.ie
www.tobin.ie

Drawing No.: 8064-2511 | Revision: A

APPENDIX 2

Water Demand Calculations

TOBIN
Patrick J. Tobin & Co. Ltd.

CALCULATION SHEET		Ref No:	8064
PROJECT:	ADAP Lot 6 Clondalkin	Sheet No:	1
		Designer:	CS
ELEMENT:	Potable Water Demand	Date:	04/08/2016

File Location: \\FSERVER4-DUB\Tobin\Projects\8064 - ADAP Lot 6 - Drumcondra & Clondalkin Schools\05-
This Element: Potable Water Demand

Potable Supply for Domestic Use

Design Population

Site	Max. No. Staff & Students	Max. No. Visitors	Total
AD Plant	1000.0 persons	10.0 persons	1010.0 persons

Staff & Students Water Usage Rate	60.0 l/day/person	(See Note 2)
Visitor Water Usage Rate	10.0 l/day/person	(See Note 2)

Demand

	EPA Design Guidelines
Avg. Daily Demand	0.123 l/sec
Peak Demand	0.307 l/sec

3866.88 m3/annum

Potable Supply for Firewater

Demand

Peak Demand	37.500 l/sec	(See Note 3)

Pipe Sizing

ø	velocity
100	4.81 m/s
150	2.14 m/s
200	1.20 m/s
250	0.77 m/s

Therefore, use 150 mm diameter watermains

Notes:

1. Pipe sizing uses an average velocity of v = 1.2 m/s
2. The Flow rates are obtained from Table 3 Wastewater Treatment Manuals (pg.8).
3. Guidelines on flow requirements for developments served by Dublin Fire Brigade - Class II
4. Wavin Polyethylene Water Systems Technical Guide - max. velocity = 5.0 m/s

APPENDIX 3

South Dublin County Council Correspondence

Craig Scully

From: Michael McAdam [mmcadam@SDUBLINCOCO.ie]
Sent: 10 August 2016 12:53
To: Craig Scully
Cc: Aongus Bates
Subject: FW: Pre-connection Enquiry Form
Attachments: School Old Nangor Road.jpg

Craig,

In relation to queries 1 and 2, please note John's comments, as follows;

A 300mm main runs to the north of the site, this is connected to a 600mm trunk main.
There's plenty of capacity in terms of peak demand flow.
The only way to ascertain if fire flow is adequate (35 l/s at any single hydrant for a community school) is to conduct a flow test on a hydrant.
We will carry out a test and let you know.

Please note the comments from Gabrielle, as per her email earlier in relation to point 3;

The school can connect into a manhole on the existing 750mm/900mm sewer at the NE corner of the existing school (see map attached).
The sewer is approximately 8m below ground at this location.
If you decide to connect through the existing school grounds and written permission will be required if this property is not in the same ownership as proposed development.
There are no problems with foul capacity.

Regards,
Michael

From: Craig Scully [mailto:Craig.Scully@tobin.ie]
Sent: 09 August 2016 11:35
To: Michael McAdam <mmcadam@SDUBLINCOCO.ie>
Cc: Aongus Bates <Aongus.Bates@tobin.ie>
Subject: Pre-connection Enquiry Form

Dear Michael

I am writing to you to issue a pre-connection enquiry form for the Shared Educational Campus (Gaelscoil na Camoige, Gaelscoil Chluain Dolcain and Colaiste Chillian) Clondalkin, Dublin 22. We spoke with Oliver Fogarty in Irish Water who directed us to South Dublin County Council.

Just to provide you with a bit of background on this project, two new schools with a combined capacity of 1000 students and staff are to be constructed adjacent to the existing Coliaste Chillian school.

Our main queries are to clarify the following:

1. The flow and pressure for potable water is adequate
2. The flow and pressure for fire fighting is adequate
3. The capacity of the existing public sewer is adequate

We would appreciate if you could confirm the above. If there are any queries or clarifications required, please do not hesitate to contact us.

Kind Regards

APPENDIX 4

Attenuation Calculations and Specification

Stormwater Storage and Control Calculations

INPUT
OUTPUT

Institute of Hydrology Report No. 124 for Sites Up To 24 Ha
Greater Dublin Strategic Drainage Study

SITE DETAILS:

Location	Clondalkin	Old Nangor Road		
Site Area	7.50 Acre	3.04 Ha		30,352 m^2
Impervious Area Draining To Piped Network		55%	16,693	m^2
Impervious Area Draining to Infiltration		0%	-	m^2
Pervious Area		45%	13,658	m^2
Allowance for Impervious Green Area		0%	-	m^3

RIVER REGIME PROTECTION

Allowable Discharge From Site: $QBAR = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$

Q_{BAR}:	Mean Annual Peak Flow From Site	m^3/s			
AREA:	Area of Site	km^2			
SAAR:	Standard Annual Average Rainfall	820		mm	
SOIL:	Soil Index	SOIL TYPE	4	SOIL	0.370

1	0.1	Very Low	Sandy, well drained
2	0.3	Low	Intermediate Soil (silty)
3	0.37	Moderate	Intermediate Soil (sandy)
4	0.47	High	Clayey, poorly drained
5	0.53	Very High	Steep, rocky area

Rainfall Intensities
Climate Change F 10%

If site is <50Ha, calculate Q-Bar for 50Ha and linearly interpolate for Site Area

QT estimated from old data where not specified by

QBAR 50 Ha - STANDARD				Return Period	QT Factor	Q_{ALL}	Q_{ALL}	V
AREA	Ha/Km2	50	0.5	Yrs	-	l/s	l/s/ha	m^3
Q_{BAR}	=	0.1728	m^3/s	1	0.85	8.92	2.94	182
Q_{BAR}	=	172.85	l/s	2	1	10.49	3.46	200
Q_{BAR}	=	3.46	l/s/Ha	5	1.3	13.64	4.49	285
QBAR Development - RESTRICTED				10	1.7	17.84	5.88	312
AREA	Ha/Km^2	3.035	0.0303515	20	1.9	19.94	6.57	402
Q_{BAR}	=	0.0105	m^3/s	30	2.1	22.03	7.26	444
Q_{BAR}	=	10.49	l/s	50	2.31	24.24	7.99	487
Q_{BAR}	=	3.46	l/s/Ha	100	2.6	27.28	8.99	610

Interceptor Designed YES

Flow Control Designed at Outlet Manhole with overflow YES

ACO StormBrixx

Stormwater attenuation and infiltration system

Interactive digital brochure

This brochure has been specifically prepared to be viewed digitally.
Please consider the environment and do not print this brochure unless you really need to.

ACO

www.stormbrixx.co.uk

Introduction to ACO StormBrixx

ACO StormBrixx is a unique and patented plastic geocellular stormwater management system. Designed for surface water infiltration and storage, its versatility allows it to be used in applications across all construction environments as a standalone solution or as part of an integrated sustainable urban drainage (SuDS) scheme.

What is ACO StormBrixx?

Plastic geocellular systems are a widely accepted method of creating infiltration and attenuation systems throughout the UK. They have been installed in a variety of applications for a number of years.

One drawback of these types of systems is an overall lack of accessibility for maintenance. Improving accessibility would enable Local Authorities and Water Companies to adopt them.

ACO StormBrixx has been developed to satisfy these adoption needs and the ongoing maintenance requirements of private drainage installations.

The Flood and Water Management Act 2010 now gives overall ownership responsibilities for SuDS systems to Local Authorities in England and Wales. As part of the National Standards within the Act, adopting authorities are required to maintain and ensure on going operation of all sustainable drainage systems - requirements which cannot be met by most current geocellular systems.

Specifiers for projects in Scotland should refer to Sewers for Scotland 2nd Edition and SEPA for guidance on the specification of Sustainable Drainage Systems.

ACO StormBrixx addresses the primary adoption needs of the Local Authorities by providing true 3D access for inspection and maintenance, whilst retaining the structural integrity of the installation.

The system can form part of the design of any integrated drainage scheme, such as open parking areas, commercial premises, retail or residential developments.

Designed and manufactured in accordance with CIRIA C680, in 2014 ACO StormBrixx was awarded BBA certification.

The ACO StormBrixx system

The ACO StormBrixx system consists of a single recycled polypropylene body that can be assembled in a variety of ways to form an open bonded structure.

ACO StormBrixx's unique pillar configuration gives a high void ratio of 95%. This minimises the excavation required to achieve a specified storage capacity, reduces the aggregate needed for backfilling, and improves the flow characteristics of runoff through the installed tank.

Side panels are added to the perimeter of the system for lateral support and top covers are added to ensure consistent vertical support for the cover fill material.

ACO StormBrixx benefits from a patented cell brick and cross bonding feature which provides unparalleled stability in the construction of the tank. Where brickbonding is not used or for multilayered tank structures, connectors are available to support the integrity of the structure.

Additional accessories available include inspection point and pipe connectors, geotextiles and geo-membranes, as well as a 600 x 600mm access chamber for full inspection and maintenance.

ACO StormBrixx can be configured to minimise silt accumulation and has the added feature of a low flow and drain down facility ensuring that the system can be properly maintained throughout its life.

System benefits explained

- Brick bonded and cross bonding stacking for optimum stability
- Low flow, draindown and silt management facility
- 3D inspection access to tank interior
- Environmentally efficient solution, minimising carbon emissions in manufacture, transportation and on-site assembly
- High void ratio minimises excavation volume
- Fully certified performance
- BBA certified in accordance with CIRIA C680
- Manufactured from recycled and recyclable polypropylene
- Suitable for all industrial, commercial and residential applications including highways

Structural integrity

The ACO StormBrixx system has been independently tested to certify the structural integrity and the long term life expectancy of the system.

The patented brickbonding and cross bonding feature provides a strong, long term installation and also helps to improve the construction speed of the tank.

Click here for a short demonstration.

Access and maintenance

ACO StormBrixx addresses the fundamental requirement of access and maintenance for SuDS Approval Boards (SABS) and water companies. The open cell structure permits completely free access for CCTV and jetting equipment which allows the whole system, including all the extremities, to be inspected and maintained from just a few access points.

Click here for a short demonstration.

Simplified handling and logistics

ACO StormBrixx simplifies delivery, site logistics and installation as a result of its stackable design. Each single injection moulded body nestles, optimising logistical and installation cost significantly, thus helping to reduce the carbon footprint of the system.

Click here for a short demonstration.

Visit www.stormbrixx.co.uk for further information on ACO StormBrixx including a full system demonstration, installation movies and much more. Help with specification, design or installation can also be found here.

ACO StormBrixx attenuation and infiltration system layout

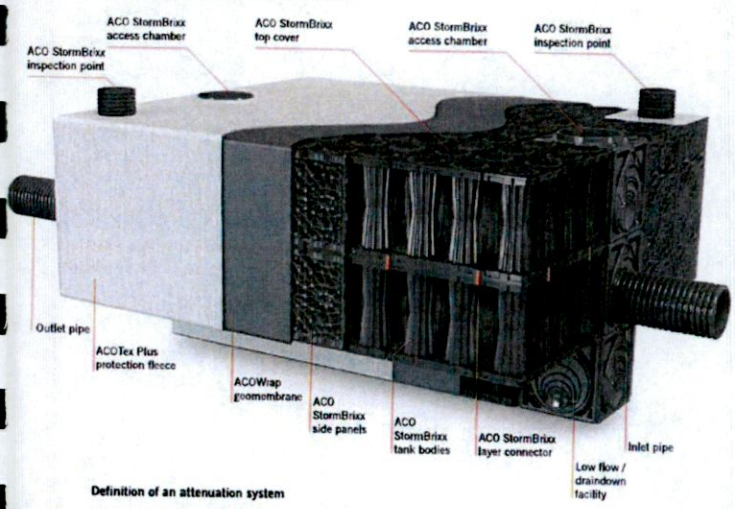
ACO StormBrixx has a range of key features which are common to both attenuation and infiltration systems and are listed below. ACO StormBrixx attenuation and infiltration systems also have a set of features specific to their configuration. These features are highlighted on the product images below.

- ACO StormBrixx can be assembled in a variety of different tank configurations to satisfy installation and site requirements
- The patented brickbonding and crossbonding feature delivers a strong and robust tank installation
- Silt management and control achievable through tank configuration layout
- The open cell structure provides simple access for remote CCTV and maintenance equipment to inspect all levels and areas of the system
- The system has a unique 'draindown' facility – a simple access and clean feature of the tank (Attenuation only)
- Access chamber provides access for cleaning, large pipe diameter inlets and silt management
- Delivery, site logistics and installation are all dramatically simplified, as a result of the system's stackable design
- A clip-in 3-way connector improves the structural integrity of multilayered tank structures and where brickbonding is not used
- Inspection point for camera or jetting equipment
- Clear column 'pathways' simplify cleaning
- Smooth surfaces prevent silt build-up
- Top covers support infill material
- Clip-in 3-way connector and the crossbonding feature permits off site construction of the system

The stackable design reduces transportation costs and improves the carbon footprint of the product
Click here for a short demonstration

Example:
280m³ storage volume is required for project A. Using ACO StormBrixx the project requirement can be transported on a single vehicle whereas up to four vehicles may be required for other comparable systems.

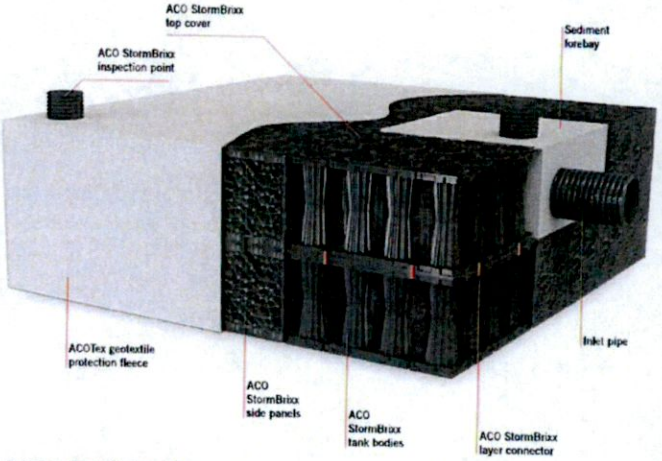
ACO StormBrixx attenuation system features



Definition of an attenuation system

Attenuation is the process of spreading the peak flow of a storm event over a longer period of time, releasing the water slowly, and mitigating the surge effect downstream.

ACO StormBrixx infiltration system features



Definition of an infiltration system

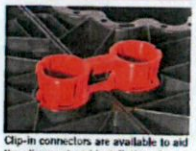
Infiltration is the passage of water through a myriad of voids in the receiving ground strata. The process includes sedimentation and biodegradation, freeing the water from impurities.

ACO STORMBRIXX MAIN COMPONENTS

Side panels

Recycled polypropylene side panels are added to the perimeter of the system to give lateral support against surrounding soils.

Layer connectors



Clip-in connectors are available to aid the alignment and installation of single and double layer ACO StormBrixx configurations.

Units can be cut in half to accommodate tank configurations

Top covers

Recycled polypropylene top covers are added to the top layer of the system to ensure consistent vertical support for the cover fill material.

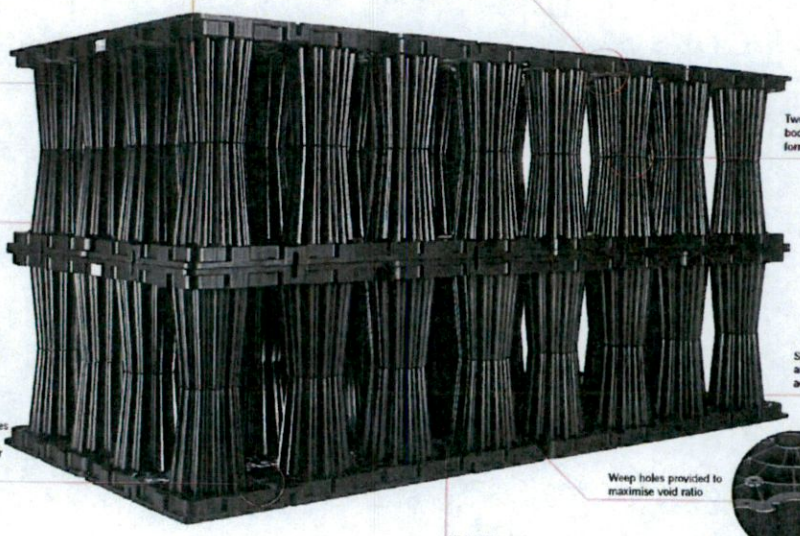
Inspection points

An Ø225mm inspection point connector provides access for remote CCTV and jetting equipment from the surface of the system to different levels and areas of the tank installation.

High strength ribbed columns

Recycled polypropylene construction provides tough, highly corrosion resistant structure

Lightweight design for easy manual handling and fast installation



Two injection moulded bodies clip together to form one single tank unit

Side walls create debris and silt traps and provide additional lateral support

Access groove provides a clear path for inspection cameras or jetting equipment

Weep holes provided to maximise void ratio

High void ratio – 95%

ACO StormBrixx access chamber

The access chamber is designed to provide complete 3D access to any ACO StormBrixx system for simple inspection and maintenance. The modular stackable chamber is designed to be incorporated into any ACO StormBrixx attenuation or infiltration system, and forms an integral part of the system's overall volume, removing the need for expensive upstream catch pit manholes.

Each ACO StormBrixx access chamber module provides 150mm, 225mm, 300mm and 375mm inlet and outlet pipe connections, reducing the need for expensive and time-consuming manifold connections.

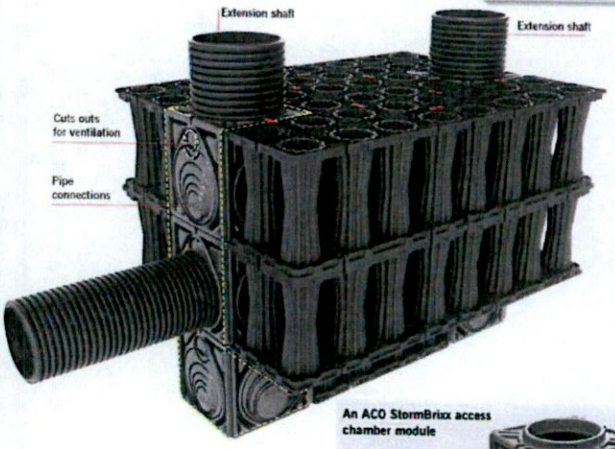
A 375mm cut can be made in the ACO StormBrixx access chamber module to enable complete inspection of all levels and areas of the system. A 100mm or 150mm vent can be created by removing the cut outs provided in the top half of the access chamber.

Cover and frame

A Load Class D 400 Ø450mm solid ductile iron cover and frame is available to complete the ACO StormBrixx access chamber installation.

Low flow and drain down feature

The ACO StormBrixx access chamber provides the ability to create a low flow and drain down facility (as below and on page 18). This function enables the system to be drained and sediment and debris removed as part of the maintenance program.



An ACO StormBrixx access chamber module

Unit and pipes are shown for illustration purposes only. ACO StormBrixx tank units and pipes are sold separately from the access chamber modules.

Cutting the unit for pipe connections

Inlet and outlet pipe connections are provided on each side of the access chamber module. Depending on the pipework requirements, cut and remove the appropriate panel. Recessed cutting lines are provided for guidance. Secondly remove 375mm panels from each side of the unit requiring access.

Making pipe connections

Push up to 65mm of the pipework into the access chamber module.

Cutting the base for a multi layered access chamber

If using more than one access chamber module in a stack, it will be necessary to remove the base from all modules except the base unit. Cut along the recessed cutting line provided and remove base.

Building the access chamber

Once the bases of the upper module(s) have been removed, simply stack the units on top of each other ensuring that each module is clipped to the main structure using the ACO StormBrixx layer connectors.

Layer connectors should be incorporated before the next module is added to the access chamber stack.

Adding a raising piece

Once the main access chamber has been constructed it will be necessary to add a 450mm ID raising piece cut to length and placed over the top of the access chamber unit.

MAINTENANCE AND INSPECTION

The access chamber enables all levels and areas of the ACO StormBrixx structure to be inspected by either tracked or push rod CCTV inspection equipment. Where required, the ACO StormBrixx system can be jetted using standard equipment.

When the ACO StormBrixx access chamber has been configured to create a low flow drawdown channel (see opposite) or a silt trap (see page 19), the unit allows for the removal of silt and debris.