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DRAINAGE STATEMENT

McDonald's, Crescent Road Tesco, Wrexham (ST2543)



Prepared for: McDonald's Restaurants Ltd

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Document History

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1.0 Introduction

Purpose

1.1 This Drainage Statement (DS) has been prepared by Glanville Consultants Ltd on behalf of McDonald's Restaurants Limited to support a planning application for the redevelopment of part of a Tesco car park to create a new restaurant. This report will be included in the SAB application for the proposed development.

1.2 The proposed layouts for the new restaurant shown in this report are outline ones, but accurately reflect the proposal from a drainage impact assessment point of view. The outline drawings exclude signage.

Site Location & Description

1.3 The site is located 700m northeast of the centre of Wrexham, within the Tesco overflow car park, as shown in Figure 1. The site is surrounded by retail premises to the north, residential development to the east, Tesco overflow parking to the south and a verge with Tesco parking beyond to the west.

Data Sources

1.4 Data used for this report is as follows:

- Topographical survey, Google Earth observations & historical mapping.
- On-line Flood Maps -. NRW
- Sewer record plans for the surrounding area.
- Geotechnical & Geo-environmental data
- TAN 15 – Development Flooding and Coastal Erosion
- Flood Consequences Assessments: Climate Change
- Sustainable Drainage (SuDS) Statutory Guidance
- Revised Draft Water Resources management Plan 2024 – Strategic Environmental Assessment - Welsh Water

1.5 All the level information quoted in this report refers to the Ordnance Datum, defined as the mean sea level recorded at Newlyn in Cornwall.

2.0 Flood Risk & SuDS Planning Policy

The EU Flood Directive

2.1 The Flood Directive (2007/60/EC) came into force in the EU in November 2007 to assess and manage flood risks in Europe. As part of the Directive, which applies to both inland and coastal waters, Member States are required to draw up a series of documents to identify flood hazards and flood risks and flood risk management plans by the end of 2015.

2.2 The Water Framework Directive (200/60/EC) has been UK law since 2003. This Directive promotes water management via river basin planning and is the basis for water environment changes made in Wales.

Natural Resources Wales

2.3 The Environment Agency is the principal flood risk management operating authority in England and Wales and receives funding from Welsh Government and DEFRA. It was established by the Environment Act 1995, taking over the flood risk management responsibilities of the then National Rivers Authority. The Environment Agency has the responsibility of increasing flood risk awareness, forecasting and warning prior to flooding events, building and maintaining flood defences and controlling capital project grants.

2.4 Natural Resources Wales (NRW) oversees the management of the natural resources of Wales. It was formed from a merger of the Countryside Council for Wales, Environment Agency Wales, and the Forestry Commission Wales, and reports back to the Welsh Government.

Welsh National Flooding Policy & Guidance

2.5 Technical Advice Note (TAN) 15: Development and Flood Risk (2004) provides the technical guidance to national planning policy set out in Planning Policy Wales (PPW) with reference to development and flooding. PPW outlines a precautionary framework for the guidance of planning decisions and aims to advise caution for the creation of new developments in areas where the risk of flooding is high.

2.6 New development is directed away from high-risk areas to locations where the risk of flooding is lower. TAN 15 includes Development Advice Maps that define three development advice zones as follows:

- Zone A: Considered to be at little or no risk of fluvial or tidal/coastal flooding.
- Zone B: Areas known to have been flooded in the past evidenced by sedimentary deposits.
- Zone C: Based on the NRW extreme flood outline, equal to or greater than 0.1% from river, tidal or coastal flood (i.e.: greater than 1 in 1,000 chance of flooding in any one year).

2.7 Zone C is subdivided into C1 and C2: -

- C1 includes areas of the floodplain which are developed and served by significant infrastructure, including flood defences.
- C2 includes areas of the floodplain without significant flood defence infrastructure.

2.8 Development proposals in Zone A do not require any further assessment of flood risk. For development proposals in Zone B flood risk should usually be considered further. For development proposals in Zone C, a flood consequences assessment is required. In Zone C1 development can take place subject to a satisfactory assessment. In Zone C2 only less vulnerable forms of development should be considered.

2.9 The precautionary framework identifies the vulnerability of different land uses to flooding, and for this purpose, development has been subdivided into the three categories below: -

- Emergency services: hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood;
- Highly vulnerable: hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood;
- Less vulnerable: General industrial, employment, **commercial and retail development**, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, excluding waste disposal sites.

2.10 The proposed development lies in Zone A (Development Advice Map), and Zone 1 (Flood Map for Planning) as shown in Image 1, and is classified as Less Vulnerable. As such a Flood Consequence Assessment is not required.

Welsh National SuDS Policy & Guidance

2.11 Schedule 3 of the Flood and Water Management Act provides a framework for approval and adoption of surface water systems serving new developments. Under the Act, all new developments of more than 1 dwelling house or where construction is 100m^2 or more, will require SuDS. The SuDS must be designed and built in accordance with the Statutory SuDS standards and approved by the SuDS Approving Body (SAB) before construction begins.

2.12 Under Schedule 3 of the Act, local authorities as the SAB have a duty to approve SuDS which follow national statutory standards for SuDS. With the exception of single curtilage sites, the SAB also has a duty to adopt the system.

2.13 Paragraph 2 of Schedule 3 to the 2010 Act defines sustainable drainage as managing rainwater with the aim of: -

- Reducing damage from flooding,
- Improving water quality,
- Protecting and improving the environment,
- Protecting health and safety, and
- Ensuring the stability and durability of drainage systems

2.14 The Sustainable Drainage (SUDS) Statutory Guidance document includes the following key points of relevance to this development:-

- Designers should consider the CIRIA SuDS Manual for the range of available solutions.
- Early engagement with SAB's and other stakeholders is encouraged.
- An application for SAB approval can be made separately or alongside a planning application.
- SAB application should be accompanied by a Maintenance Plan.

2.15 The Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems includes standards and guidance for the following: -

- S1. Surface water runoff destination
- S2. Surface water runoff hydraulic control
- S3. Water Quality
- S4. Amenity
- S5. Biodiversity
- S6. Design of drainage for construction, operation and maintenance

SAB for Wrexham

2.16 The SAB authority have been consulted separately via an application for for SuDS approval and pre application services.

3.0 Existing Conditions and Sources of Flooding

Topography

3.1 The site has levels ranging from 79.2m in the southeast to 80.1m in the northwest. There is a banked verge along the western site boundary, with levels reaching approximately 1m above the adjacent site levels, with small trees growing from near to the top of the bank.

3.2 There are also small trees on the northern and eastern boundaries.

Geology & Ground Conditions

3.3 The British Geological Survey (BGS) mapping indicates Glaciofluvial Sheet deposits (Superficial) over Salop Formation (Bedrock). The site-specific Geo-Environment Assessment is summarised in Table 1 with further details in Appendix A.

Table 1: Summary of on-site 2024 Geo-Environmental Investigation

Geotechnical Summary: (m = metres below ground level)) - ***BGS Boreholes nearby***		
Strata top	Strata base	Description of Strata
0.0	0.5-2.2	MADE GROUND – Sandy TOPSOIL or blacktop over Type 1 with geogrid over silty, gravelly CLAY with concrete and wood fragments or sandy gravelly CLAY with brick ash, coal, clinker.
0.5-2.2	5.0+	SAND – medium dense, fine SAND with a base of loose very clayey SAND. Underlaying cohesive pockets have negligeable volume change potential.
Desk Study Geotechnical Summary:		
Highest water level		Groundwater not found to a depth of 5m. Mapping suggest 50m deep.
Soakaway Test		3.72×10^{-5} (not full BRE test). BRE result = 1.08×10^{-5}.
Aquifer Designation/SPZ		Superficial – Secondary A, Bedrock – Secondary A. Not within an SPZ. Soils of high leaching potential.
Nearest Watercourses		River Gwenfro 550m SW

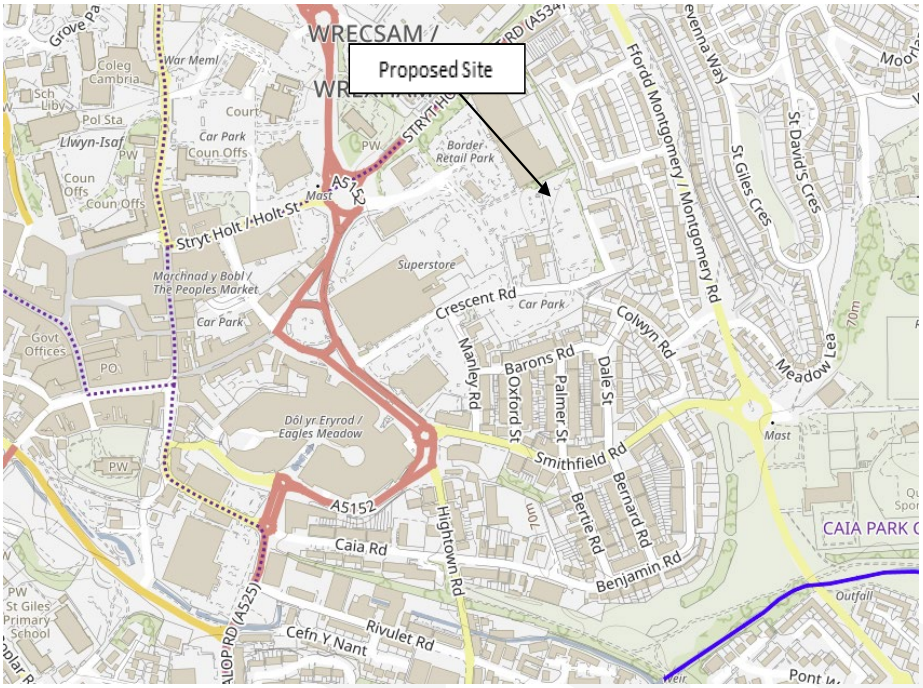
Fluvial Flooding

3.4 The nearest main river is located 550m SW, see Image 1. Ordinary watercourses are shown discharging into the River Gwenfro from the west, but no ordinary watercourses are shown any closer to the site than the River Gwenfro

3.5 Flood Zone definitions are set out in TAN 15 as follows: -

- Flood Zone 1 - land assessed as having a less than 1 in 1,000 annual probabilities of river or sea flooding (<0.1%)
- Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year
- Flood Zone 3 - land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year
- TAN 15 Defended Zones – Areas where flood risk management structure provides a minimum standard of protection against flooding from rivers of 1:100 (+climate change and freeboard).

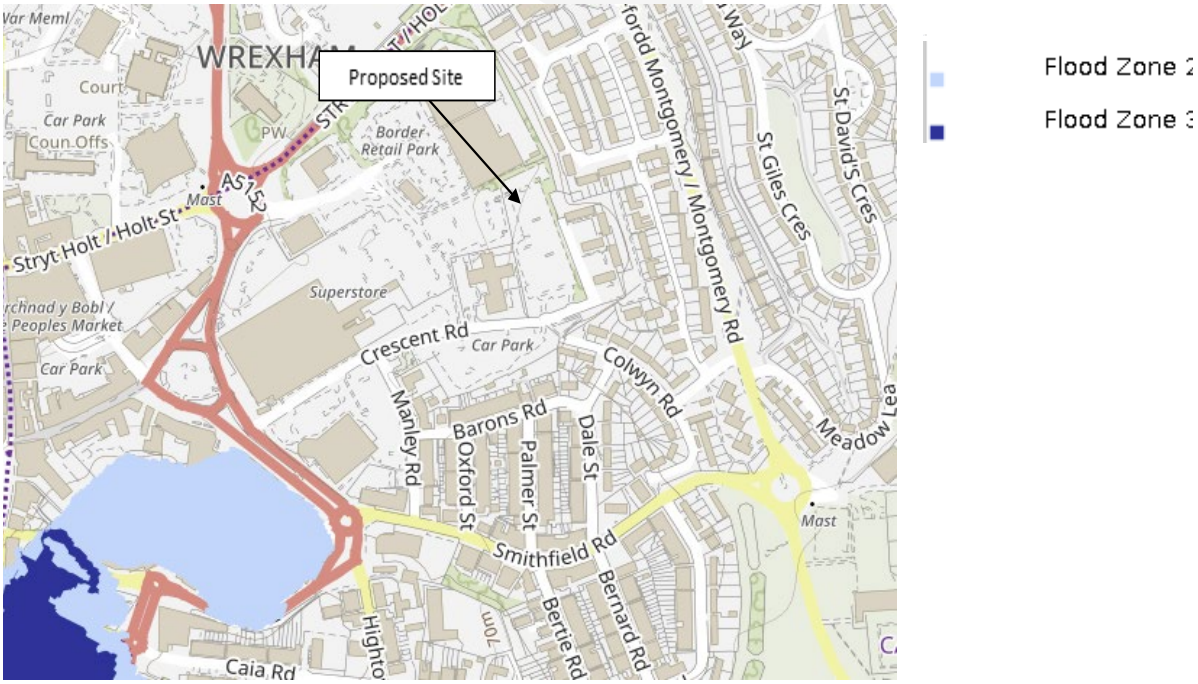
Image 1: NRW – Main River Map



3.6 Image 2 indicates the site to be located within Zone 1. Paragraph 7.10 of the TAN 15 Development, flooding and coastal erosion guidance (December 2021) states that planning authorities should prioritise development in Zone 1, but sites may also be allocated for any types of development on brownfield land in the TAN 15 Defended Zones.

3.7 The NRW website also indicates the site is not within an area recorded by NRW as having flooded previously.

Image 2: NRW – Rivers & Sea Flood Risk Map for Planning



3.8 The NRW – Developer Advice Map, as shown in Image 3, indicates the site is within Zone A, which is considered to be at little to no risk of fluvial or tidal/coastal flooding

Image 3: NRW - Development Advice Map



Groundwater Flooding

3.9 Groundwater is believed to be circa 50m at the site, none was found during the Geo-Environmental investigation to a depth of 5m. A very low risk of flooding is therefore concluded, however contrary to this date the BGS mapping indicates potential for flooding at the surface.

Overland (Pluvial) Flooding

3.10 The Natural Resources Wales, Flood Map for Planning website, see Image 4, indicates the site to have no risk of surface water flooding. The topographic survey, refer to Figure 2, shows the site levels and exceedance routes.

Image 4: NRW - Surface Water & Small Watercourses Flood Risk Map



Flooding from Reservoirs, Canals and other Artificial Sources

3.11 The NRW website, see Image 5, indicates the site to be outside the area at risk of reservoir flooding.

Image 5: NRW - Reservoir Flood Breach Extent Map



Existing Public Sewer Flooding

3.12 The public sewer records, see Image 6, do not show any public sewers currently within or adjacent to the site. However, the sub scan, see Image 7, reveals a surface water in the eastern part of the site, picking up gullies and draining south beyond the site boundary. The head of this run is within the site and it appears to pick up only the parking area.

Image 6: Public Sewer Records Extract

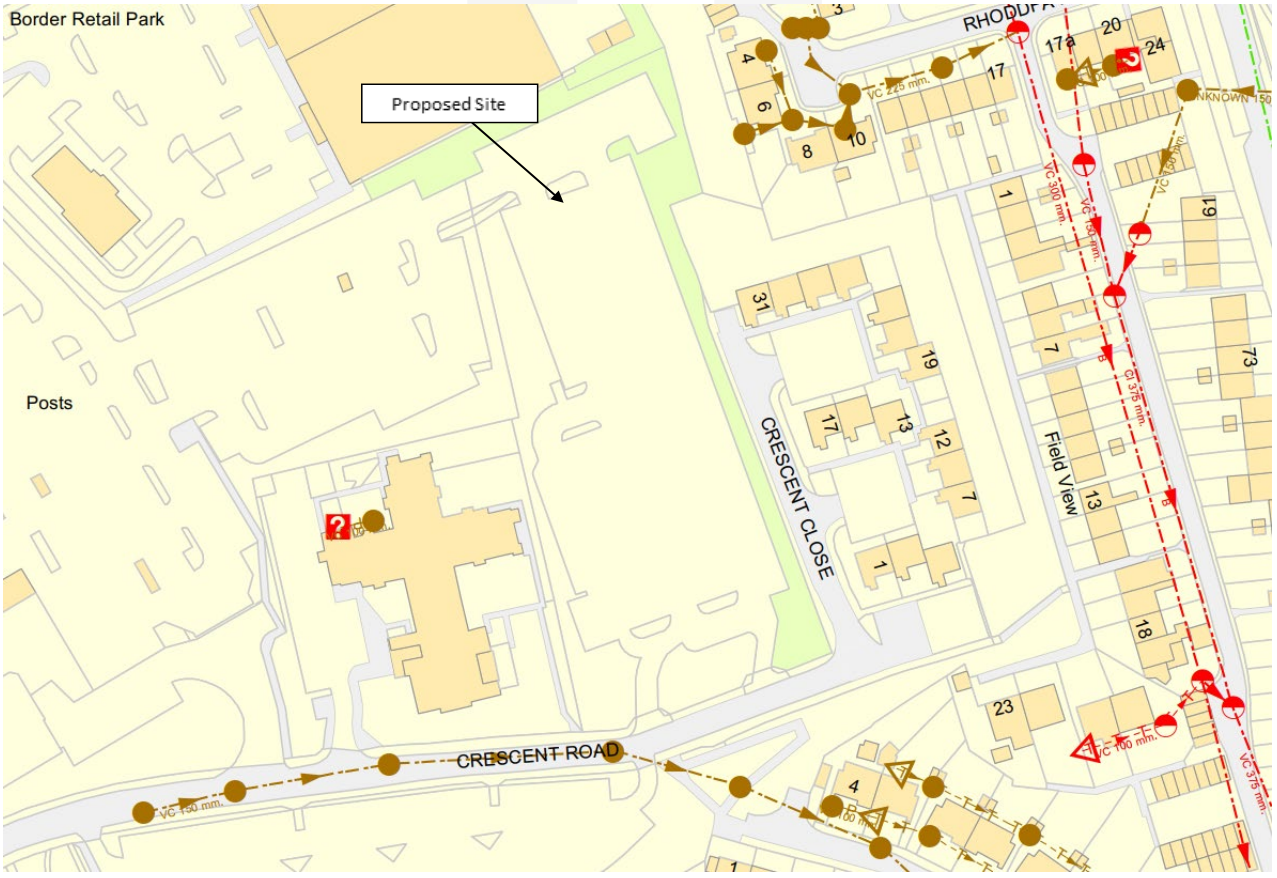


Image 7: Site Sub Scan Extract



4.0 Development Flood Risk

Development Proposals

4.1 The proposed development consists of a McDonald's Restaurant with associated drive-through lane and car park. The development layout can be seen in Figure 3.

Flood Risk Management

4.2 The development design includes flood risk reducing features which are listed in Table 2. The following sub sections of this chapter describe in more detail each of the potential sources of flooding and how the development design features will reduce these risks.

Table 2: Flood Risk Reducing Design Features

Possible Design Features	In this Design	Description of Feature	Flood Risk Reduction
Surface levels & FFL	Yes	Surfaces drained into the SuDS. Exceedance flow routes are checked to ensure they do not create a new flood risk.	Pluvial flooding
SuDS Drainage	Yes	1:100 + climate change allowance included within drainage system.	Pluvial flooding
Flood Resilience Measures	No	Building is not expected to flood from any source, so resilience is not required.	N/A
Flood Compensation	No	Building is not expected to flood from river sources, so flood compensation is not required.	N/A
Flow Control Devices	No	Infiltration is possible and therefore no positive discharge from the site is proposed.	Fluvial
Safe Pedestrian Escape Route	Yes	Site not expected to flood from any source.	N/A
Safe Vehicular Escape Route	Yes	Site not expected to flood from any source.	N/A
Dry parking area	Yes	Site not expected to flood from any source.	N/A
Flood Emergency Plan	No	Site not expected to flood from any source.	N/A

Tidal & Fluvial Flooding

4.3 The development is outside the floodplain; therefore, no design features are required to address fluvial flood risks to the development. Hence, the risk of fluvial flooding will remain very low.

Overland Surface Water Flooding (Pluvial) On Site

4.4 The proposed overland flow paths and levels are shown in Figure 6 with the existing flow path shown in Figure 2. In addition, the improved on-site drainage and raised building FFL, the site level design will ensure that any pluvial flooding is routed to avoid a risk to the development and to match existing flow routes through the site.

Overland Surface Water Flooding from the Site onto Surrounding Land

4.5 The proposed drainage system is designed to accommodate a 1 in 100 plus climate change rainfall event, without creating a flood hazard. If an exceedance event occurs (greater magnitude than 1:100 +CC storm event) then the existing overland flood routes on and off the site will not be changed by the development, so there will be no adverse impact on surrounding land, see Figures 2 & 6.

Groundwater Flooding

4.6 The site level design will ensure that in the unlikely event that any groundwater does flood at surface level, the proposed overland flow routes do not create a risk to the development (see Figure 5).

Flooding from Reservoirs, Canals and other Artificial Sources

4.7 No artificial sources of flooding have been identified.

Sewer Flooding

4.8 The proposed development surface and foul water drainage layouts are shown in Figure 5. The new foul drainage infrastructure on the site will be designed in accordance with Building Regulations and therefore no significant flood risk is expected from the proposed on-site foul water drainage.

4.9 The new on-site surface water drainage is going to be designed to accommodate a 1 in 100 year plus climate change event without creating a flood hazard and therefore the risk of flooding is low.

4.10 Any flooding from existing sewers will be routed through design of exceedance flow routes to avoid creating a flood risk to the development. Any exceedance flows leaving the site will follow the existing exceedance routes, so no new flood risks will be created downstream, as shown in Figure 6.

Flood Impacts, Mitigation and Residual Effects

4.11 Table 3 rates the different flood risks to the development, considering the development design proposals as described in this report. Design proposals are not considered to be mitigation, but any action required in addition to the current design proposals is considered mitigation and listed in the table. We have rated the risks as none, low, medium and high based on our assessment of the facts relating to each source of flooding and the potential hazards.

Table 3: Residual Flood Risk

Type of Flood Risk	Flood Risk Rating None Low Med High	Mitigation required	Mitigation Measure
Fluvial Flooding	Low	No	None
Overland SW flooding from adjacent land	Low	No	None
Overland SW flooding onto adjacent land	Low	No	None
Groundwater flooding	Low	No	None
Flooding from reservoirs	Low	No	None
Flooding from sewers	Low	Yes	Normal drainage maintenance

5.0 Proposed Sustainable Drainage

Statutory Standards for SuDS

5.1 The Statutory Standards for SuDS are refenced in this section, with a description of the SuDS proposed and how they comply with the standards.

S1 – Surface water runoff destination

S1 Surface water runoff destination

Priority Level 1: Surface water runoff is collected for use;

Priority Level 2: Surface water runoff is infiltrated to ground;

Priority Level 3: Surface water runoff is discharged to a surface water body;

Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;

Priority Level 5: Surface water runoff is discharged to a combined sewer.

5.2 The site is located within Hafren Dyfrdwy's water management area. The Draft Water Resource Management Plan 2024 (WRMP) for this area confirms that there is no deficit of water resources and therefore there is no foreseeable need to harvest water at the site. The WRMP targets a 50% reduction in leakage from the piped network by 2050, compared to 2019/20 levels.

5.3 Level 2 – Discharge of surface water into the ground. The investigation completed to date, refer to section 3.0 and extracts in Appendix A, indicates made ground over SAND. BRE permeability tests have been completed and these indicate that infiltration is possible within the sand. It is therefore proposed to use infiltration SuDS.

5.4 Level 3 – Discharge to a Surface Water body. There is no existing watercourse located nearby.

S2 – Surface water runoff hydraulic control

S2 Surface water runoff hydraulic control

1) Surface water should be managed to prevent, so far as possible, any discharge from the site for the majority of rainfall events of less than 5mm.
2) The surface water runoff rate for the 1 in 1 year return period event (or agreed equivalent) should be controlled to help mitigate the negative impacts of the development runoff on the morphology and associated ecology of the receiving surface water bodies.
3) The surface water runoff (rate and volume) for the 1% (1 in 100 year) return period event (or agreed equivalent) should be controlled to help mitigate negative impacts of the development on flood risk in the receiving water body.
4) The surface water runoff for events up to the 1% (1 in 100 year) return period (or agreed equivalent) should be managed to protect people and property on and adjacent to the site from flooding from the drainage system.
5) The risks (both on site and off site) associated with the surface water runoff for events greater than the 1% (1 in 100 year) return period should be considered. Where the consequences are excessive in terms of social disruption, damage or risk to life, mitigating proposals should be developed to reduce these impacts.
6) Drainage design proposals should be examined for the likelihood and consequences of any potential failure scenarios (e.g. structural failure or blockage), and the associated flood risks managed where possible.

5.5 Point 1 – Interception of runoff. The proposed soakaway will provide interception and disposal of run-off during all rainfall events, including the first 5mm of rainfall.

5.6 Point 2 – Morphological protection of receiving surface water bodies. The site will not discharge to a watercourse.

5.7 Point 3 – Flood risk mitigation for receiving surface water bodies. Runoff will be disposed of via ground infiltration and will not discharge to a watercourse.

5.8 Point 4 – Flood protection for the site. The drainage system will be designed to contain all events up to the 1:100 year event, allowing for climate change. The maximum water level in the drainage system will never exceed a level 300mm (freeboard) below the finished flood level of the restaurant. Refer to the drainage calculations in Appendix B.

5.9 Point 5 – Extreme exceedance management of surface water runoff. An exceedance 1:1000 event has been modelled, with results shown in Appendix F. The site is not expected to flood due to the failure of the onsite drainage system, as the proposed storage would contain the resulting runoff volume.

5.10 Point 6 – Evaluation of impact of potential failure of the drainage system. Pipe blockage in certain location could prevent effective conveyance of the drainage run-off creating greater flooding on site. To mitigate against this risk, sumped catchpit manholes are used to capture sediment which might enter the drainage system. The separate Drainage Maintenance Plan includes procedures for regular maintenance and inspections to reduce the risk of blockage.

S3 – Surface water quality management

> **S3 Surface water quality management**
>
> Treatment for surface water runoff should be provided to prevent negative impacts on the receiving water quality and/or protect downstream drainage systems, including sewers.

5.11 Interception is provided by sumped channels and gullies which capture run-off from paved areas. This will reduce contaminant loadings.

5.12 Ciria pollution treatment measures have been applied to ensure treatment of the surface water. The pollution control measures are designed to minimise the transmittal of any pollutants, collected by runoff flowing over hard paved areas, to the public sewers and to ground. Pre-treatment is provided with gulleys, catchpit manholes and filter drains to remove silt and prolong the life of the pollution control treatment media. Pollution control measures for this site include a proprietary SPEL coalescer ESR30/C1 petrol interceptor prior to discharge to ground. Additionally permeable paving is provided in the central car parking to treat run off that flows into or on the bays in question.

5.13 The suitability of the pollution control measures is quantified in accordance with CIRIA 753, pollution hazard indices. Comparing the pollution hazard indices in Table 4, for each catchment type, with the total pollution mitigation indices in Table 5, it can be seen that the suggested drainage system will be sufficient to mitigate the expected pollution from roofs and paved areas. See mitigation formula below and Appendix G for the product details. Permeable paving in the central parking bays as well as filterdrains also provide treatment.

Total SuDS Mitigation Index must be ≥ Each Catchment's Pollution Hazards Index
(For each contaminant type)
Total SuDS Mitigation Index = 1st Stage Mitigation Index + 0.5 (2nd Stage Mitigation Index)

Table 4: Pollution Hazard Indices

Catchment Type	Pollution Hazard Level	Requirements for Discharge to Groundwater	Pollution Hazard Indices		
			Suspended solids	Metals	Hydrocarbons
Restaurant Roof	Low	Simple index approach	0.3	0.4	0.05
Restaurant parking	Medium	Simple index approach	0.7	0.6	0.7

Table 5: Total Pollution Mitigation Indices

Type of Pollution Mitigation (SuDS)	Pollution Mitigation Indices		
	Suspended solids	Metals	Hydrocarbons
SPEL Petrol interceptor with coalescer ESR 10/C1	0.8	0.6	0.9
Permeable Paving to central parking bays	0.7	0.6	0.7
Total lowest treatment indices	0.7	0.6	0.7

S4 – Amenity

S4 - Amenity

The design of the surface water management system should maximise amenity benefits.

5.14 The site is relatively small and near fully utilised due to the drive thru and parking requirements. Green spaces are created wherever possible and used for planting to create an amenity benefit. See Figure 5 and Figure 8 accordingly.

S5 – Biodiversity

S5 - Biodiversity

The design of the surface water management system should maximise biodiversity benefits.

5.15 The site occupies an area of approximately 2,790sqm, currently entirely impermeable (roofs and tarmac finishes). The proposed site layout maximises the land for use as drive thru and parking requirements. However green spaces are created wherever possible and used for planting to create amenity benefit.

5.16 The proposed landscape plan details the proposed planting and maintenance action to be taken throughout the life of the development. This is shown in Figure 8. The existing and proposed impermeable and permeable areas are shown in Figure 4 and summarised in Table 6.

Table 6: Impermeable and permeable areas

Scenario	Uses/finishes		
	Impermeable (sqm)	Permeable	Total
Existing site	1900	892	2,792
Proposed site	2,270 + 30*	492	2,792
Gain/Loss (+/-)	-370	-400	2,792

** Note: the corral occupies 30sqm which contribute to foul water discharge from this development*

S6 – Design of drainage for Construction, Operation and Maintenance and Structural Integrity

> **S6 – Design of drainage for Construction, Operation and Maintenance**
>
> 1) All elements of the surface water drainage system should be designed so that they can be constructed easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).
> 2) All elements of the surface water drainage system should be designed to ensure maintenance and operation can be undertaken (by the relevant responsible body) easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).
> 3) The surface water drainage system should be designed to ensure structural integrity of all elements under anticipated loading conditions over the design life of the development site, taking into account the requirement for reasonable levels of maintenance.

5.17 The Drainage layout incorporates the proposed SuDS measures is shown in Figure 5. Product details are provided in Appendix G. A separate Maintenance Plan details the maintenance regime required for the proposed SuDS system. The design life of all materials is at least as long as the design life for the development which is 50 -75 years.

Selected Sustainable Drainage Measures

5.18 The selection of SuDS techniques for this site has followed the SuDS management train concept explained in the SuDS Manual. The concept is to use drainage techniques in series to incrementally reduce pollution, flow rates and volumes. The hierarchy of techniques to be used are as follows: -

- Prevention - prevent runoff & pollution e.g., rainwater re-cycling and road sweeping.
- Source Control - control runoff at or near its source e.g., local infiltration methods.
- Site Control - routing water to site controls e.g., pipes to a large detention basin.
- Regional Control - routing water from several sites to regional controls e.g., pipes to a balancing pond or wetland.

5.19 The proposed surface water drainage layout is shown in Figure 5 and includes the following features: -

- Rainfall will be collected from roofs & the main car park /patio by rainwater pipes, gullies, channels and is then conveyed to cellular soakaway. Before reaching the cellular soakaway, any inflow passes through a treatment unit to achieve the required level of cleanliness before ground infiltration.
- The cellular soakaway is used primarily to facilitate the infiltration of runoff into the ground. In addition, the cellular soakaway provides attenuation of run-off.

5.20 These sustainable drainage measures have been selected for the site conditions and are suitable for the constant use and daily maintenance required for a McDonald's site. These systems are tried and tested on similar sites where permeability is poor, and the site area cannot accommodate larger open drainage features.

Climate Change

5.21 Climate Change allowances were updated in September 2021. The new climate change allowances are 20% and 40% for the central and upper estimate respectively. This is for the period from 2070-2115 which is consistent with a design life of 75 years. Advice states 'As a minimum, development proposals should be assessed against the central estimate to inform design levels'.

Flow Rates & Attenuation

5.22 Existing and proposed impermeable areas have been calculated and are shown in Figure 4. These areas have been used to calculate the existing and proposed discharge from the site for a range of storm events.

5.23 Table 7 shows the existing discharge rates from the drainage system as well as the maximum water level and attenuation within the proposed SuDS for a range of storm events up to a 1 in 100 year storm event plus 40% climate change. The full calculation results are shown in Appendix F.

Table 7: Existing & Proposed Flows & Attenuation

Storm Event (Annual Exceedance Probability)	Existing - Run Off Rate / Brownfield (l/s)	Proposed - Max water level in SuDS (m below FFL)	Attenuation Provided (m^3)
1 in 2	22		
1 in 30 (3.3% AEP)	49		
1 in 100 (1% AEP) plus 40%	72		

Foul Water (FW) Drainage Strategy

5.24 The development will generate foul water flows which will flow via gravity to the proposed foul sewer under Crescent Road, as shown in Figure 5. A pre-development enquiry has been submitted to Welsh Water and their response is awaited.

5.25 The restaurant drainage includes an alarmed grease trap for all the kitchen waste pipework to ensure drains do not lose capacity due to grease build up and to prevent grease entering the public sewers.

6.0 Further Investigations & Approvals

6.1 The information in this report is sufficient to demonstrate the suitability of the proposed development in respect of Flood Risk and Sustainable Drainage. This information will be part of the SAB Application for SuDS approval and to the planning authority. The drainage proposals shall be implemented in accordance with the SAB approval, inspected during construction as required, and as built records produced to the SAB authority at completion of the works.

6.2 The detailed drainage design must comply with the Welsh Building Regulations and approval will be required from a qualified Building Inspector.

6.3 Surface water must be carefully managed on site during construction to safeguard the works and neighbouring land from flooding and to ensure protection of natural water resources and ecology.

7.0 Conclusion

7.1 The development proposals have been designed after consideration of national and local planning policy and best practice guidance, in the context of the proposed use and site conditions.

7.2 Flood risks within the site have been assessed and minimal. The proposed design ensures that flood risks are reduced further by raising the restaurant floor level and provision of improved on-site drainage.

7.3 The development's surface water drainage strategy follows the Statutory Standards for sustainable drainage systems. Infiltration is suitable at this site and therefore runoff is discharged into the ground via on site SuDS. The sustainable surface water drainage system is designed to accommodate a 1:100-year event plus the appropriate climate change allowance for this site, without flooding.

7.4 A SuDS maintenance schedule has been provided to demonstrate adoption and maintenance proposals in a separate Glanville report entitled 'Drainage Maintenance Plan'.

7.5 The development's foul water drainage strategy utilises gravity to take effluent to the existing foul sewer within the site. The design includes many access points for maintenance and an alarmed grease trap to ensure downstream sewers are protected from cooking waste / grease.

7.6 In summary, the development proposals comply with relevant standards for flood risk and sustainable drainage.

Figures



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS, DOCUMENTS AND SPECIFICATIONS. ANY DISCREPANCIES BETWEEN INFORMATION SHOWN ON THIS AND ANY OTHER DRAWING SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY.
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KEY:

SITE BOUNDARY

FIGURE 1

FOR INFORMATION ONLY

Rev.	Description	Date	By	Chkd
I1	FIRST ISSUE	11/09/24	LF	HBG

Glanville
Survey > Plan > Engineer

Civil Engineering | Structural Engineering | Transport Planning | Highways Engineering | Building Surveying | Geomatics

Hertfordshire | Oxfordshire | Cambridgeshire | Bristol

Client : McDonald's RESTAURANT

Project : McDONALD'S RESTAURANT
CRESCENT ROAD, WREXHAM
CLWYD, WALES, LL13 8HF

Title : SITE LOCATION PLAN

Engineer : HBG	Date : SEPT '24
Director : HBG	Scale : 1:200 @A3
Status :	INFORMATION

Drawing No.	Rev
4240121-SK06	I1

N

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KEY

- SITE BOUNDARY
- TOPOGRAPHICAL SURVEY (80.45)
- OVERLAND FLOW ARROW
- EXISTING MINOR CONTOUR (0.1m INTERVALS)
- EXISTING MAJOR CONTOUR (0.5m INTERVALS)

FIGURE 2

McDonald's ™

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Glanville
Survey > Plan > Engineer

Civil Engineering | Highways Engineering | Structural Engineering | Building Surveying | Transport Planning | Geomatics

Hertfordshire | Oxfordshire | Cambridgeshire | Bristol

Client : McDonald's RESTAURANT

Project : McDONALD'S RESTAURANT
CRESCENT ROAD, WREXHAM
CLWYD, WALES, LL13 8HF

Title : EXISTING SITE SURVEY
AND OVERLAND FLOW ROUTE

Engineer : HBG | Date : AUG '24

Director : HBG | Scale : 1:250 @ A3

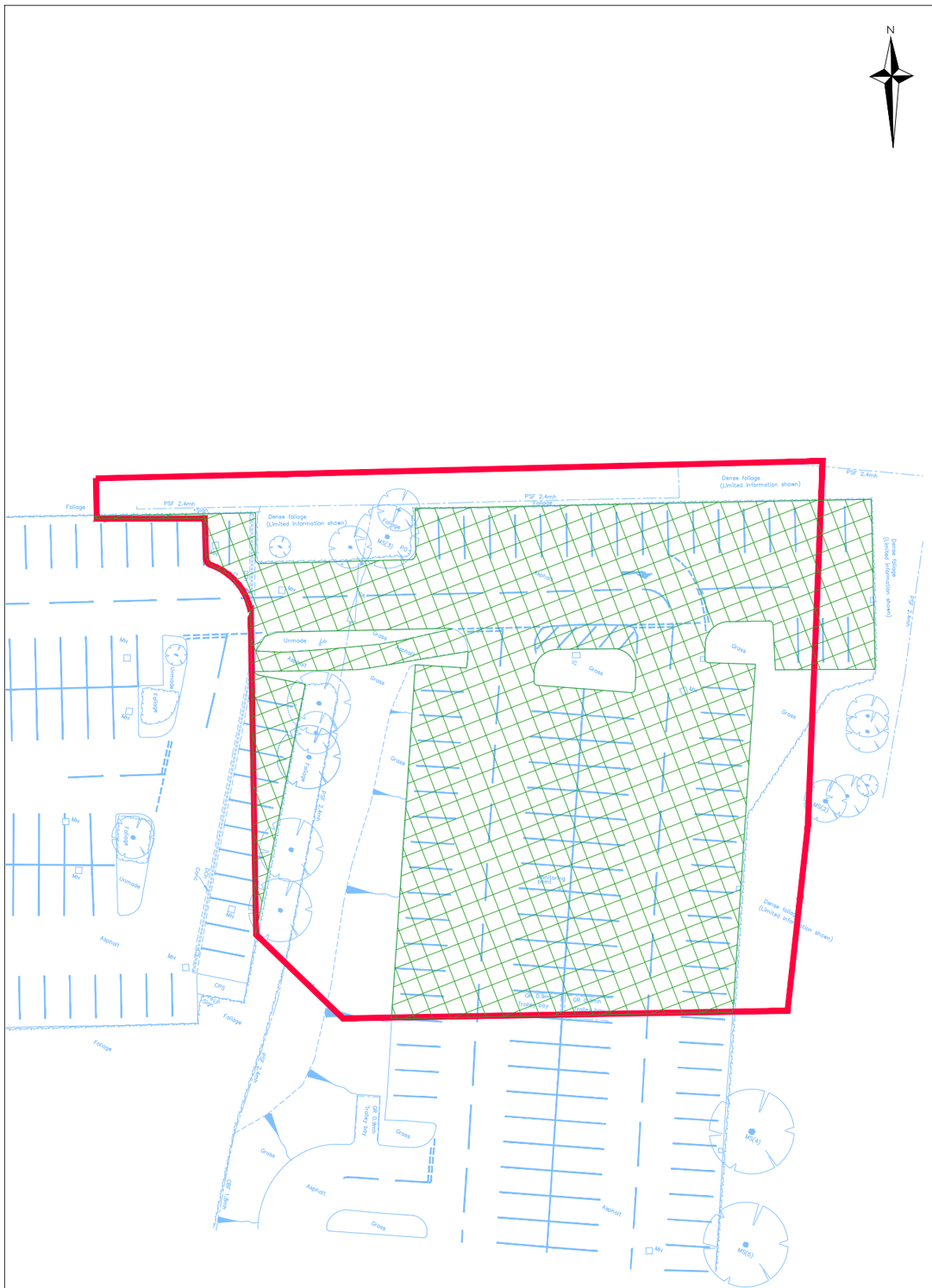
Status : INFORMATION

Drawing No. 4240121-SK07 | Rev I1

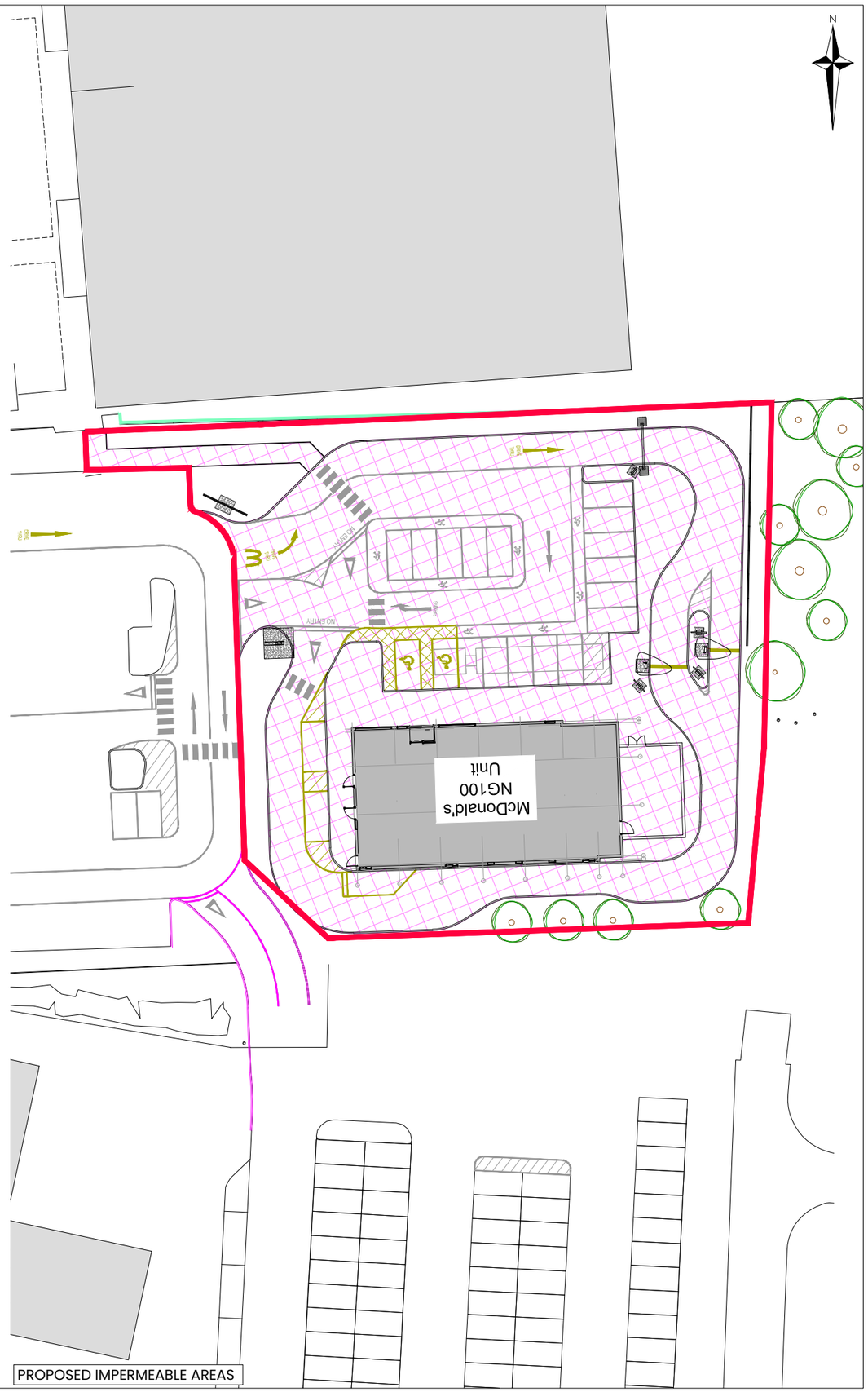
VIEWPORT 2 - PLAN VIEW

VIEWPORT 1 - PLAN VIEW

FOR CONTINUATION SEE VIEWPORT 2



EXISTING IMPERMEABLE AREAS



PROPOSED IMPERMEABLE AREAS

NOTES

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KEY:

- SITE BOUNDARY
- EXTENT OF EXISTING IMPERMEABLE AREAS: 0,19 ha
- EXTENT OF PROPOSED IMPERMEABLE AREA WITHIN MCDONALDS DEMISE: 0,23 ha

FIGURE 3

FOR INFORMATION ONLY

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Glanville
Survey > Plan > Engineer
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Hertfordshire | Oxfordshire | Cambridgeshire | Bristol

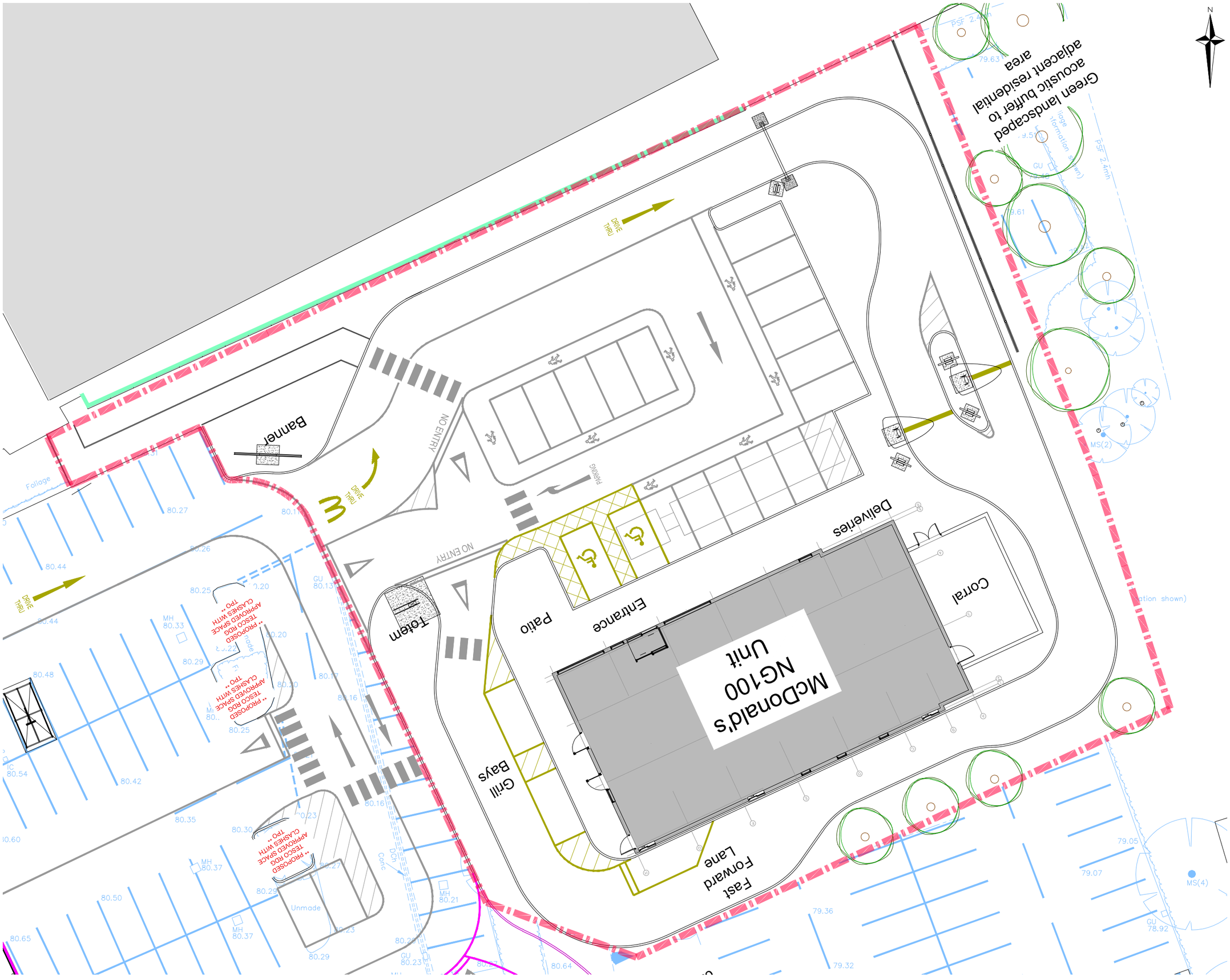
Client : McDonald's Restaurant

Project : McDONALD'S RESTAURANT, CRESCENT ROAD, WREXHAM CLWYD, WALES, LL13 8HF

Title : EXISTING AND PROPOSED IMPEREABLE AREAS

Engineer : HBG	Date : SEPT '24
Director : HBG	Scale : 1:500 @A3
Status :	INFORMATION

Drawing No.	Rev
4240121-SK08	I1



N

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KEY

- SITE BOUNDARY
- TOPOGRAPHICAL SURVEY
- OS MAP
- PROPOSED SITE LAYOUT

FIGURE 4

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Hertfordshire | Oxfordshire | Cambridgeshire | Bristol

Client : McDonald's RESTAURANT

Project : McDONALD'S RESTAURANT
CRESCENT ROAD, WREXHAM
CLWYD, WALES, LL13 8HF

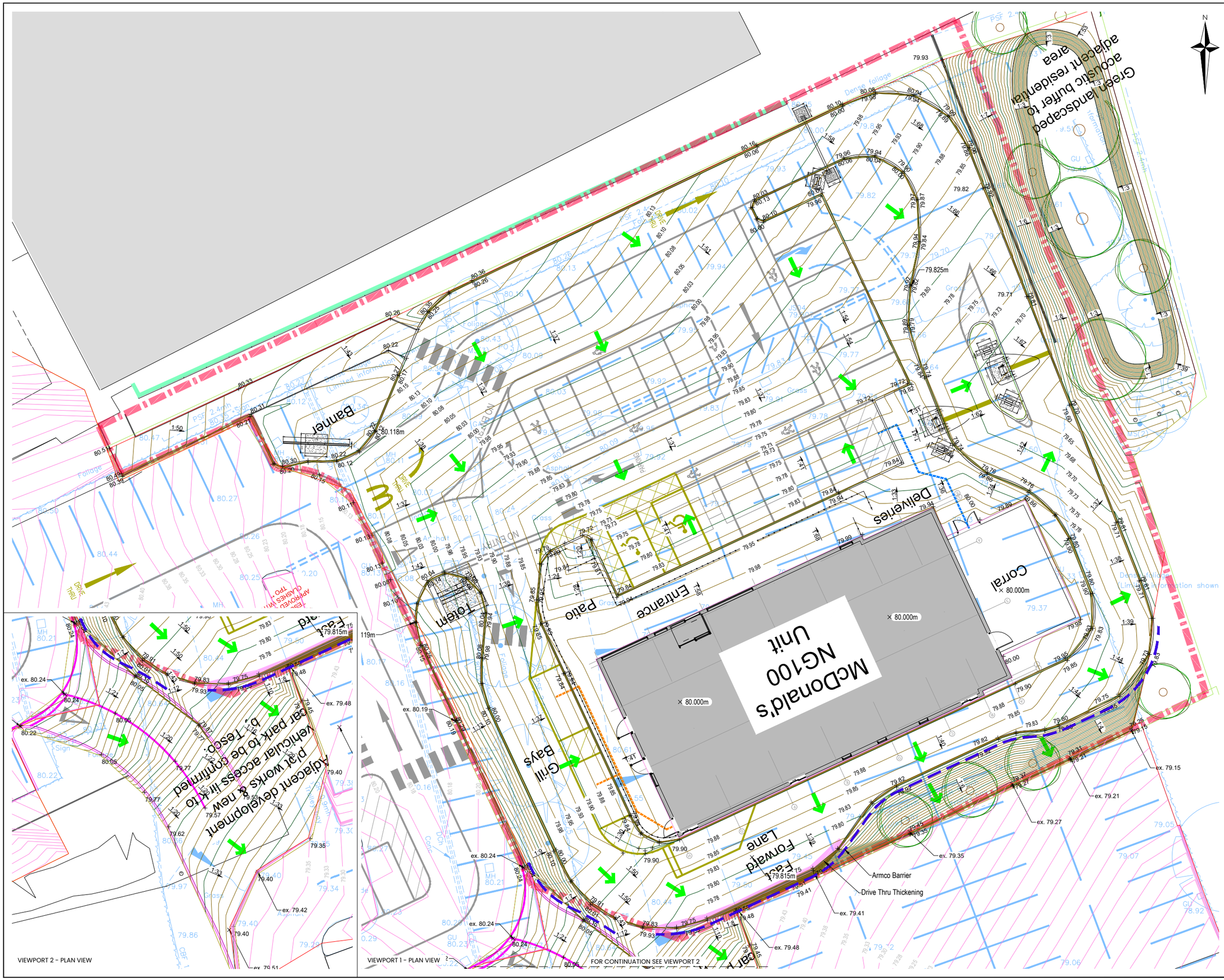
Title : PROPOSED SITE LAYOUT

Engineer : HBG | Date : SEPT '24

Director : HBG | Scale : 1:250 @ A3

Status : INFORMATION

Drawing No. 4240121-SK09 | Rev I1



NOTES

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KEY

- SITE BOUNDARY
- TOPOGRAPHICAL SURVEY
- PROPOSED SITE LAYOUT
- EXISTING 0.025m CONTOURS
- PROPOSED 0.025m CONTOURS
- + ex.84.95 EXISTING LEVELS
- + 84 .95 PROPOSED LEVELS
- 1:30 SLOPE
- ARMCO BARRIER
- DRIVE-THRU THICKENING

FIGURE 5

McDonald's ™

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I1	ISSUE FOR INFORMATION	16/09/24	LF	HBG

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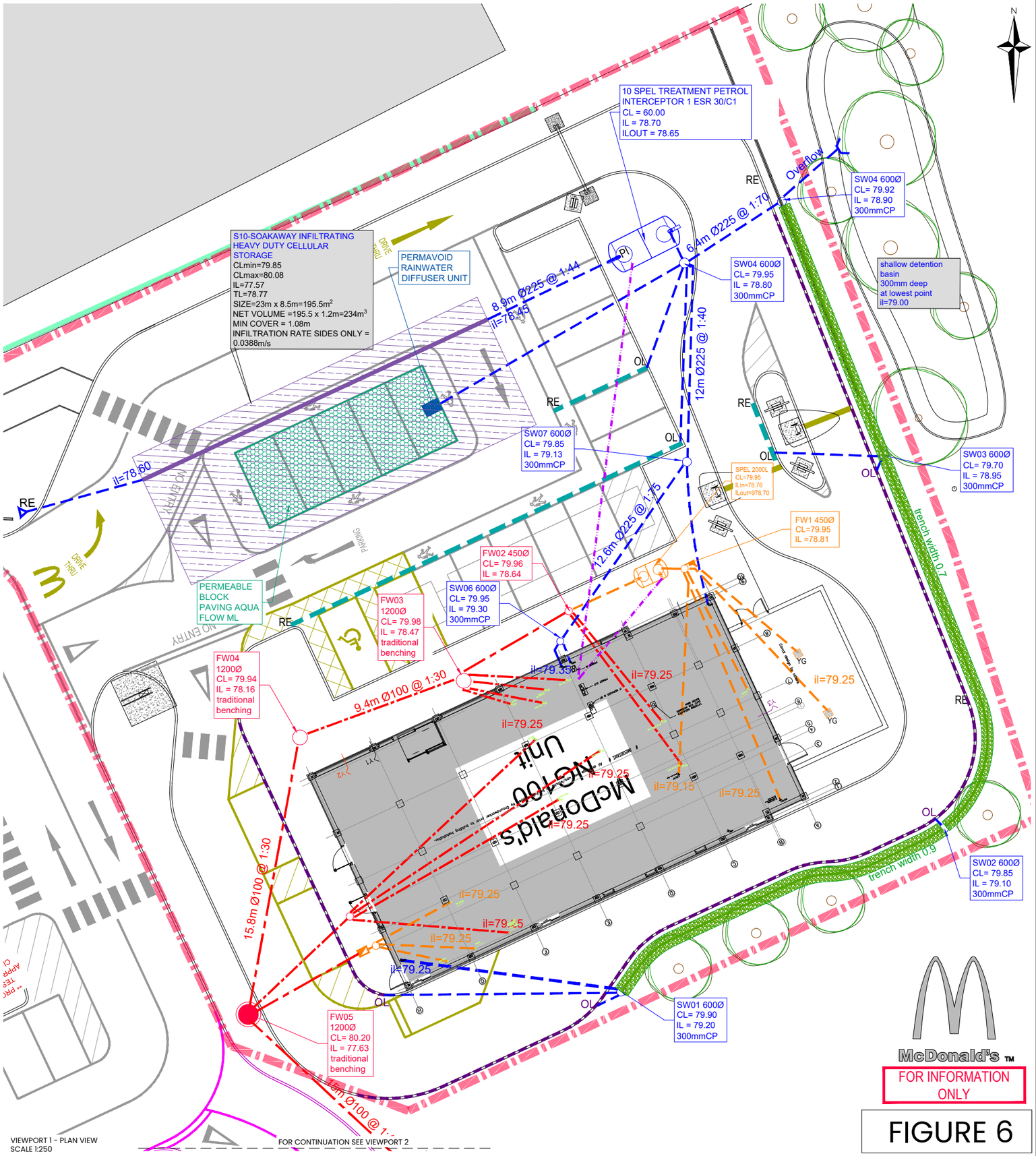
Client : McDonald's RESTAURANT

Project : McDONALD'S RESTAURANT
CRESCENT ROAD, WREXHAM
CLWYD, WALES, LL13 8HF

Title : PROPOSED OVERLAND FLOW EXCEEDANCE ROUTES AND LEVELS

Engineer : HBG	Date : SEP '24
Director : HBG	Scale : 1:250 @ A3
Status :	INFORMATION

Drawing No.	Rev
4240121-SK10	I1



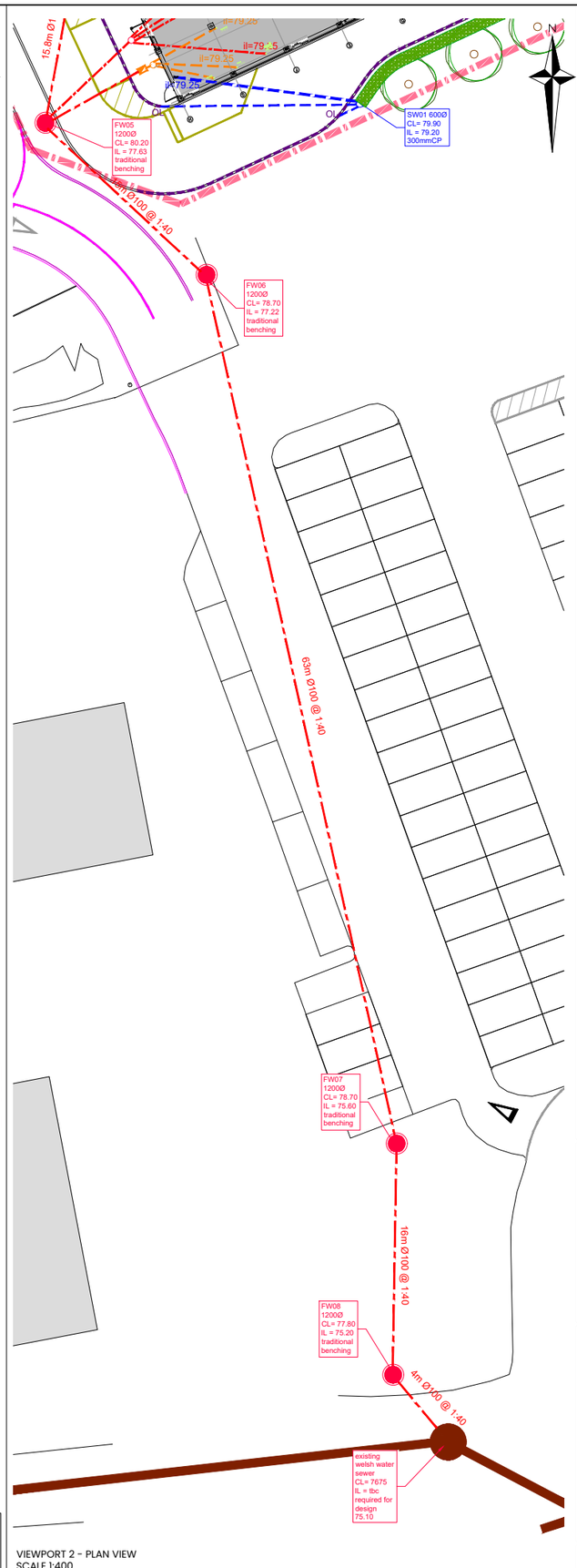
VIEWPORT 1 - PLAN VIEW
SCALE 1:250

FOR CONTINUATION SEE VIEWPORT 2

McDonald's ™

FOR INFORMATION ONLY

FIGURE 6



VIEWPORT 2 - PLAN VIEW
SCALE 1:400

NOTES

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KEY

- SITE BOUNDARY
- EXISTING SITE PLAN
- PROPOSED SITE LAYOUT
- SW Ø1200 CL=106.57 IL=104.70 300mmCP — DRAINAGE LABEL CP=CATCHPIT
- PROPOSED GULLEY WITH 150Ø PIPE
- 9.3m-100Ø 1:80 — PROPOSED SURFACE WATER DRAINAGE PIPEWORK SHOWING LENGTH, PIPE DIAMETER AND GRADE
- PROPOSED BUILDING SURFACE WATER PPIC CATCHPIT MANHOLE WITH 300mm SUMP
- RWP — PROPOSED RAINWATER DOWN PIPE INVERT 500mm BELOW PROPOSED EXTERNAL LEVEL (ALL OUTLETS 100Ø & TO HAVE RODDING ACCESS UNLESS OTHERWISE INDICATED)
- ACO MONO DRAIN PD100D U.N.O 0.0 DRAINAGE CHANNEL (BLACK)
- 9.3m-100Ø 1:80 — PROPOSED FOUL WATER DRAINAGE PIPEWORK SHOWING LENGTH, PIPE DIAMETER AND GRADE
- PROPOSED BUILDING FOUL WATER DRAINAGE INSPECTION CHAMBER
- 9.3m-100Ø 1:80 — PROPOSED GREASE WATER DRAINAGE PIPEWORK SHOWING LENGTH, PIPE DIAMETER AND GRADE
- PROPOSED BUILDING GREASE WATER DRAINAGE INSPECTION CHAMBER
- ALARMED 2000l SPEL GREASE TRAP WITH HARD WIRE TO MANAGERS OFFICE
- CLEARFLOW GT150 GREASE TRAP
- 110Ø DUCTS FOR GREASE TRAP/ CABLES TO INCOMING ELECTRICS CUPBOARD (MUST BE INSTALLED, CONNECTED AND COMMISSIONED BY THE GROUNDWORK CONTRACTOR PRIOR TO PRACTICAL HANDOVER)
- KERBDRAIN 305 TO ALLOW SURFACE WATER TO DRAIN INTO FILTER DRAIN FILTER DRAIN
- SOAKAWAY INFILTRATING HEAVY DUTY CELLULAR STORAGE
- CONTROL CHAMBER - Q-BRAKE FLOW CONTROL
- SPEL TREATMENT PETROL INTERCEPTOR ESR
- PERMEABLE BLOCK PAVING AQUA FLOW ML
- PERMAVOID RAINWATER DIFFUSER UNIT
- PROPOSED ADOPTED WELSH WATER FOUL SEWER
- EXISTING ADOPTED WELSH WATER FWS

Rev.	Description	Date	By	Chkd
I1	ISSUE FOR INFORMATION	11/09/24	LF	HBG

Glanville
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Civil Engineering | Structural Engineering | Transport Planning | Highways Engineering | Building Surveying | Geomatics
Hertfordshire | Oxfordshire | Cambridgeshire | Bristol

Client : McDonald's RESTAURANT

Project : McDONALD'S RESTAURANT
CRESCENT ROAD, WREXHAM
CLWYD, WALES, LL13 8HF

Title : PROPOSED DRAINAGE LAYOUT

Engineer : HBG | Date : AUG '24
Director : HBG | Scale : AS SHOWN @ A3
Status : INFORMATION

Drawing No. 4240121-SK11 | Rev I1