

Project No. 410.66138.00001

Date: 1 August 2024

Maelor Foods, Pickhill Lane, Cross Lanes, Wrexham

Variation of Condition 07 of Planning Permission APP/H6955/A/18/3216187 to Permit the Processing of 2 million Birds per Week

Introduction

SLR have been appointed by Maelor Foods to provide additional transport services in support of development proposals to expand existing poultry processing capabilities at the Maelor Foods site off Pickhill Lane in Wrexham.

As part of the submission to vary Condition 7, in 2022 SLR prepared a Transport Assessment (TA), followed by a Transport Addendum in 2023 to address the Council's initial comments on the submitted TA. Following submission of the Transport Addendum, the Council have now provided further comments, to which this document responds to (comments were received on 2nd July 2024). Wrexham County Borough Council's (WCBC) latest response has been provided as **Appendix A**.

For ease of reference the response to the comments is in the general order in which they were presented by WCBC in their response.

Visibility Splays & Site Access Arrangements

The full 2022 ATC data for Pickhill Lane is provided as **Appendix B**, attached to the rear of this report.

Since the most recent 2023 transport document, the access arrangements at the site have changed. Staff and visitors now access the site slightly east of the historic entry point. The photos below illustrate this new arrangement.

Visibility splays of 110m to the southwest and 121m to the northeast are provided as **Drawing 410.66138.00001_D100** and presented on the latest layout. The visibility splays conform to the distances specified in the previous highway response report.

The visibility splays will fall within land under the applicants control and all fencing etc. will not impede the required visibility splays, with the proposed acoustic barrier shown in green on **Drawing D100**.





Trip Generation

It is encouraging to see from the transport comments that highways have no concerns with the trip generation figures. To clarify, there could be *up to* 29 HGV vehicle movements in an hour during the peak or busiest hour, this figure representing a worst-case scenario hour only. It is not 29 movements every hour of the day and for large parts of the day, movements will be around 14 movements per hour and during nighttime hours there will be an average of 4 – 6 movements per hour.

Service Management Plan

It is encouraging to see from the transport comments that highways have no comments relating to the submitted Service Management Plan. The existing Service Management Plan has been reviewed and updated where necessary with the updated Service Management Plan found as **Appendix C**, attached to the rear of this report.

It is confirmed that the Service Management Plan will be implemented day-to-day and reviewed on a regular basis. Maelor Foods are committed to minimising potential adverse impacts associated with the operation of the site and have mechanisms already in place to allow for issue to be identified, reported and mitigated in a swift and efficient manner.

Sustainable Travel

As discussed, a 2.0m wide surface-level marked pedestrian route from Pickhill Lane will be implemented. This designated route will connect with the existing internal footway in the site. **Drawing 410.66138.00001_D101** illustrates the complete pedestrian route from Pickhill Lane to the pedestrian entrance of the building.

In addition to the above, as part of the reorganisation of the existing parking hardstanding at the site to optimise parking and increase efficiency across the site, the following sustainable travel infrastructure and initiatives are proposed:

- Secure long-stay and short stay cycle parking;
- Secure motorcycle parking;
- Car share spaces;
- Electric vehicle charging spaces (cars); and
- Electric charging points (bikes).



The proposed layout of this arrangement is presented in **Drawing 410.66138.00001_D101** and will be implemented as part of the proposals.

In addition to the above, a car sharing database and guaranteed lift home system will be set up to support the car sharing spaces, and existing shower and changing facilities within the site will be retained for use by staff members etc. who are walking and cycling.

Car Parking, Cycle Parking and Motorcycle Parking

As has been discussed above, **Drawing 410.66138.00001_D101** shows the updated site layout plan and proposed car parking layout. This layout broadly follows that of Figure 3 within the Transport Addendum. The proposed modifications of the car park bring the total on-site car parking provision to circa. 215 spaces.

For clarity, the parking accumulation exercise has been conducted using the 2022 site access turning count data (inbound and outbound movements) only, which was then factored to include the uplift of 125 members of staff. The robustness of this approach is comparable to that of a traditional parking beat survey and the results obtained from this methodology are equivalent to those that would be produced by conducting a parking beat survey, and therefore the conclusions deduced from the parking accumulation exercise remain valid.

The level of on-site parking for the development is suitable for the needs of the site whilst also avoiding the overprovision of parking spaces to still support key objectives related to sustainability and encouraging the use of alternative modes of travel over the private car.

The Junction of Pickhill Lane and the A525

The proposed junction amendments are contained within the adopted highway. The adopted highway extents are shown in plan **VN222301-D102** as per the red dashed line.

Both horizontal and vertical visibility sightlines at the Pickhill Lane / A525 junction are presented on **Drawing VD190095/SK004** attached to the rear of this report. As is shown, suitable visibility can be achieved both in the vertical and horizontal plane and is consistent with existing visibility provided at the junction. As demonstrated by the vertical splay assessment, considering the existing road level / profile to the north, drivers have a clear and unobstructed 120m sightline from an eye height of 1.05m to an object height of 0.6m above the carriageway, ensuring no safety concerns. This height complies with the Manual for Streets (MfS) guidance.

As request the full modelling data of the Pickhill Lane / A525 junction are provided as **Appendix D** attached to the rear of this report.

Travel Plan

The adopted Travel Plan will continue to be implemented as part of the proposals. The Travel Plan Action Plan submitted in the Addendum note has been updated with additional measures that will be implemented within the next 12-month period.

The Council's comments have been taken on board and the measures identified below are considered proportionate to that of the scale of the development proposals.



Table 1 – Travel Plan Measures (to be implemented within the next 12 months)

Number	Action	Objective	Responsibility
1	Update and redistribute the staff travel information document / pack to be sent to all existing and any new staff members	To increase staff awareness on alternate travel modes around the site	TPC
2	Update all communal noticeboards with up-to-date travel information	To increase staff awareness on alternate travel modes around the site	TPC
3	Undertaken an updated Staff Travel Survey	To establish up-to-date staff modal shift data	TPC
4	Undertake one travel plan promotion day	To increase staff awareness on alternate travel modes around the site	TPC
5	Install cycle parking provision and an electric bike charging point in a new cycle shelter	To help encourage cycling to / from the site	TPC
6	Provide a puncture repair station in the proposed new cycle shelter	To help encourage cycling to / from the site	TPC
7	Promote national cycle to work week to all employees	To help encourage cycling to / from the site	TPC
8	Offer a bike loan scheme via salary sacrifice offered and promoted to all employees	To help encourage cycling to / from the site	TPC
9	Assess the requirement for a bicycle user group and if demand dictates establish a BUG	To help encourage cycling to / from the site	TPC
10	Set up a Car Share Database and guaranteed lift home scheme	To help encourage car sharing amongst staff members	TPC
11	Convert ten existing car parking spaces to marked car sharing bays	To help encourage car sharing amongst staff members	TPC / Owner
12	Provide a number of Electric Vehicle Charging Bays	To help encourage travel via electric vehicles	TPC / Owner

Conclusion

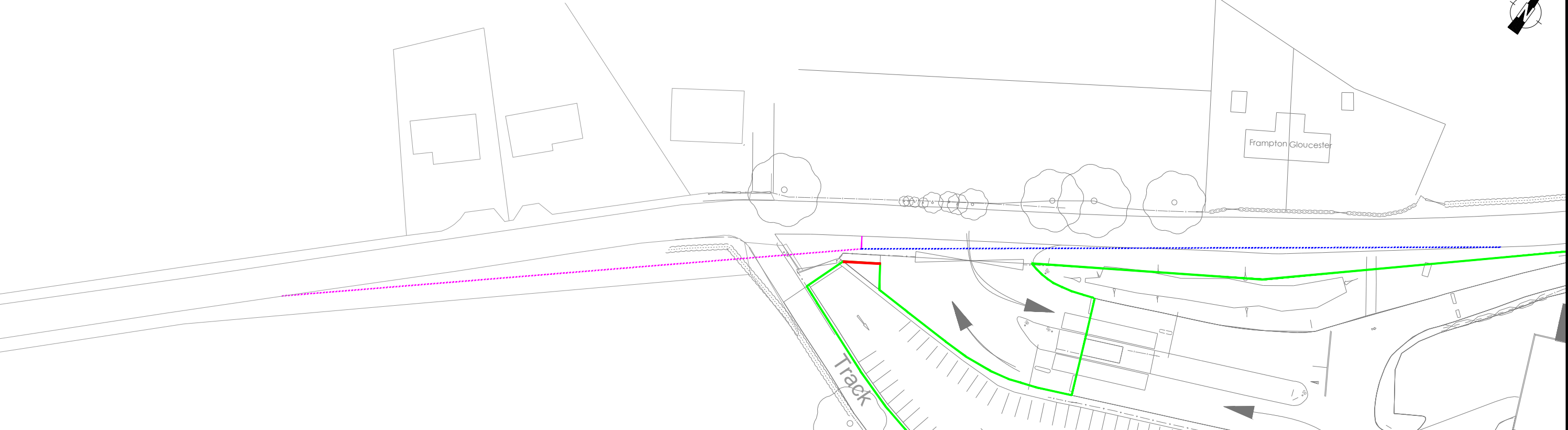
This report is considered to provided the clarifications requested by the Local Highway Authority and should allow Highways to support the application to vary Condition 07 to permit the processing of 2 million birds per week (APP/H6955/A/18/3216187).



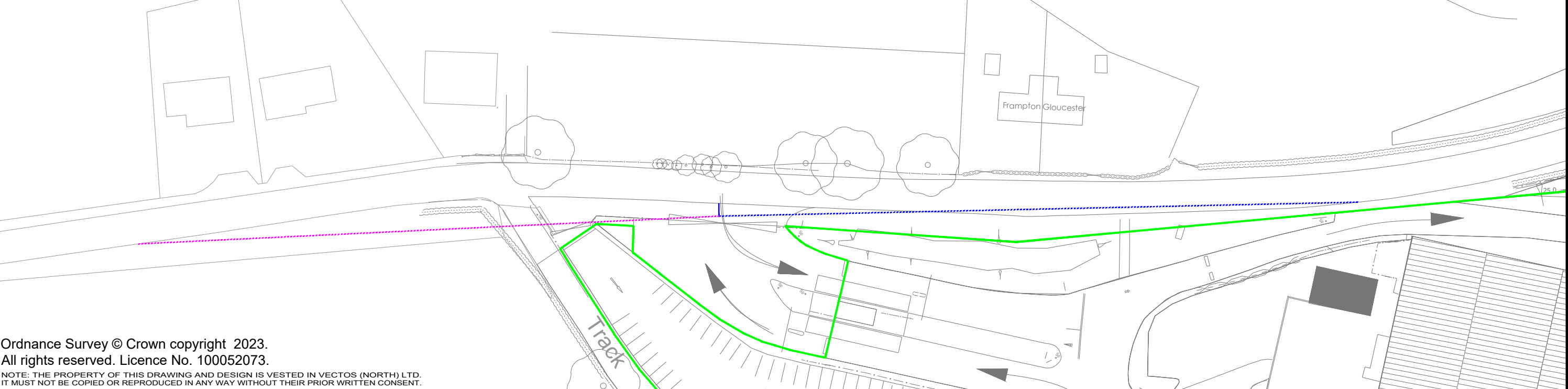
Drawings



General Access Point (ie. Staff & Visitors)



Service Access Point



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REV.	DETAILS	DRAWN	CHECKED	DATE

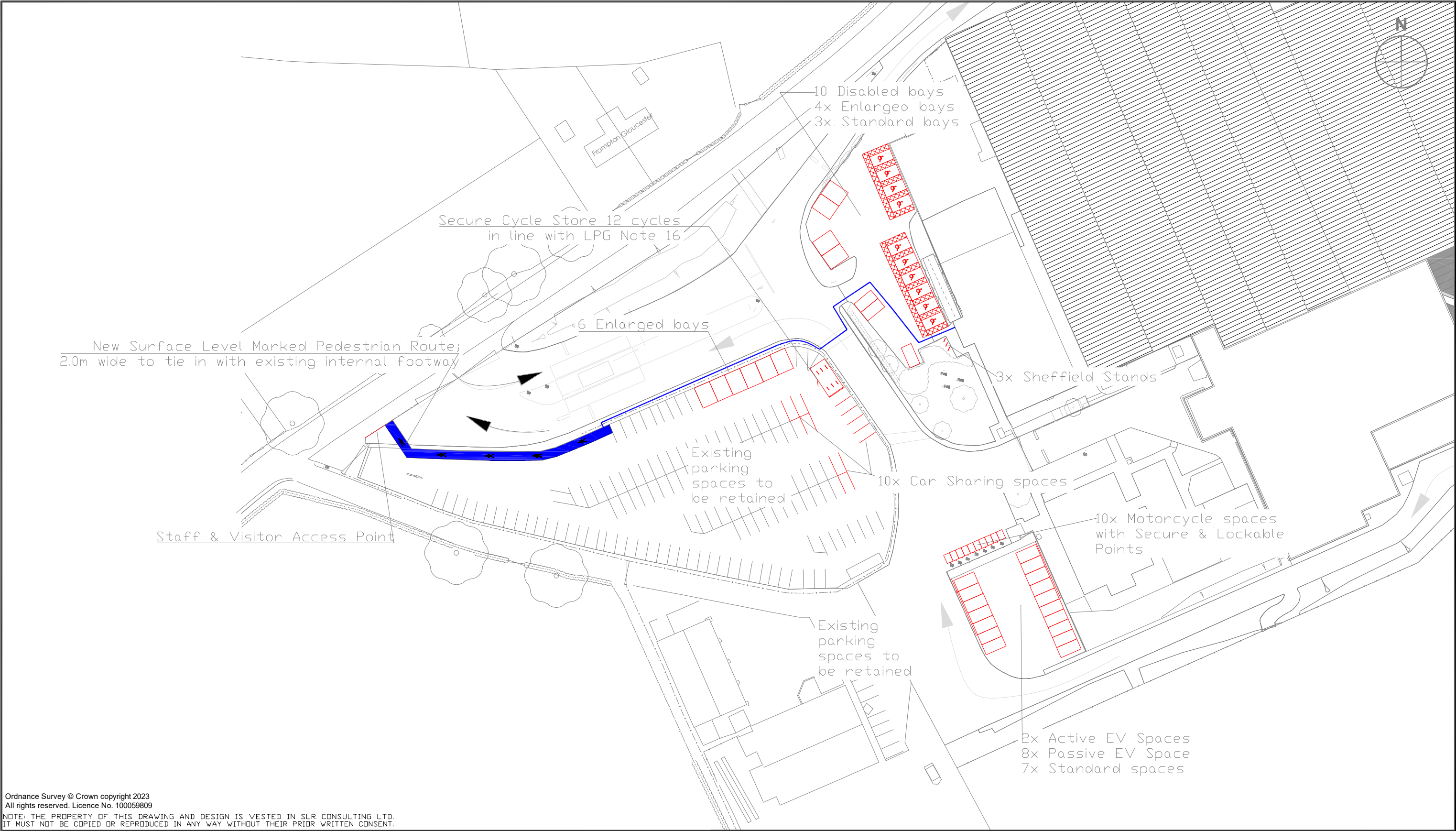
Notes:

- 1. This is not a construction drawing and is intended for illustrative purposes only.
- 2. White lining is indicative only.

--- 2.4m x 110m
--- 2.4m 121m
— Access Point as of 2024
— Proposed Acoustic Fence /
Gates / Barrier

Note: Land to West of site access where Splay overflys is within the applicants control

Maelor Foods Further Development				Maelor Foods Ltd	
Site Access Visibility Splay Assessment					
DRAWN: EG	CHECKED: PW	DATE: 01.08.24	SCALES: 1:750 at A3	DRAWING NUMBER: D100	REVISION: .



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REV.	DETAILS	DRAWN	CHECKED	DATE
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Notes:

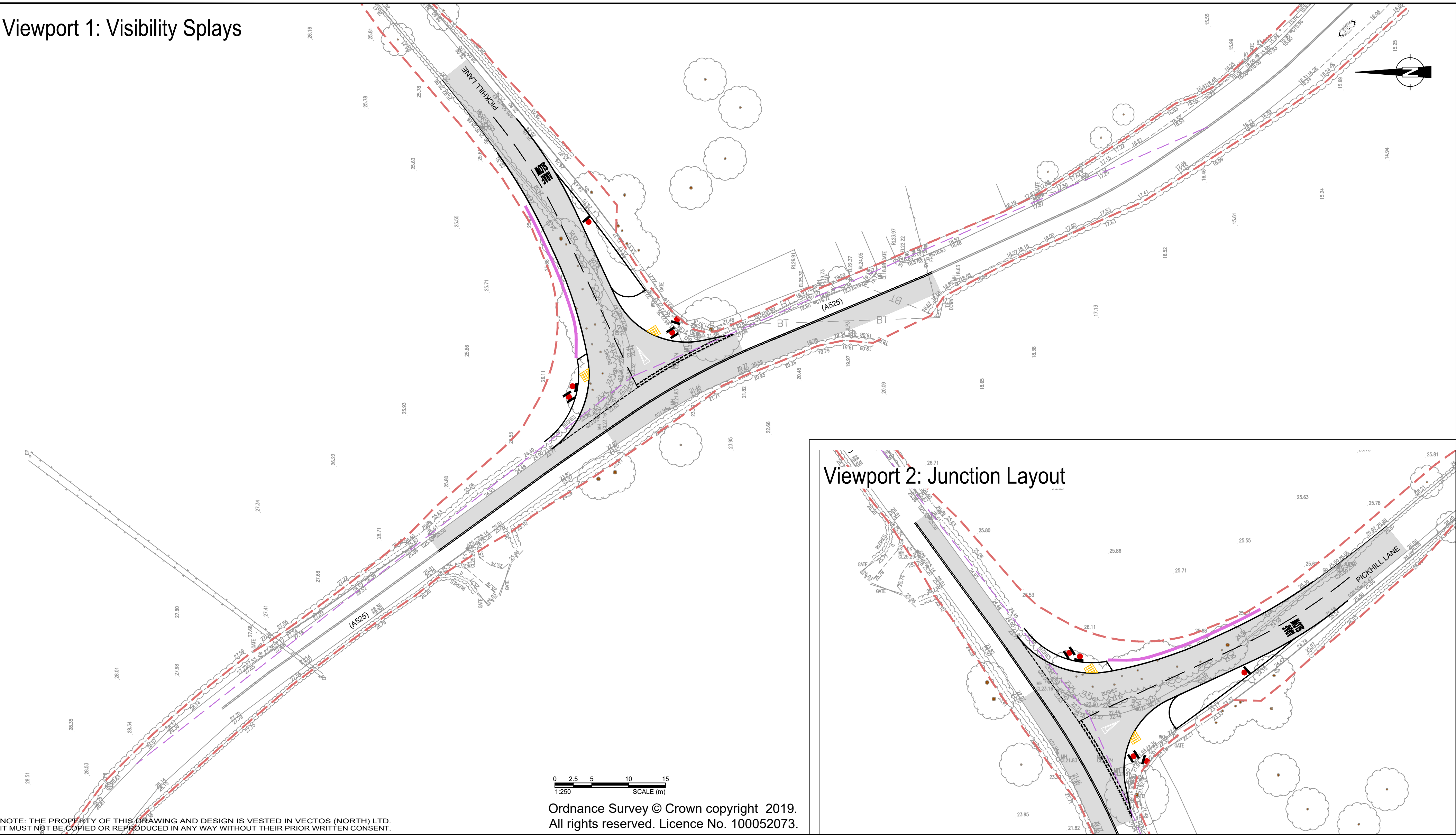
1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.

Standard Space = 2.4m x 4.8m
Enlarged Space = 3.6m x 4.8m
Disabled Space = 2.4m x 4.8m (+ 1.2m hatched area)
Electric Vehicle Space = 2.6m x 4.8m
Motorcycle Space = 1.4m x 2.0m

 Pedestrian Route to Main Entrance

Pickhill Lane, Wrexham				Maelor Foods Ltd	
Proposed Car Park Layout					
DRAWN:	CHECKED:	DATE:	SCALE:	DRAWING NUMBER:	REVISION:
YF	PW	17.07.2024	NTS	410.066138.00001-DR101	

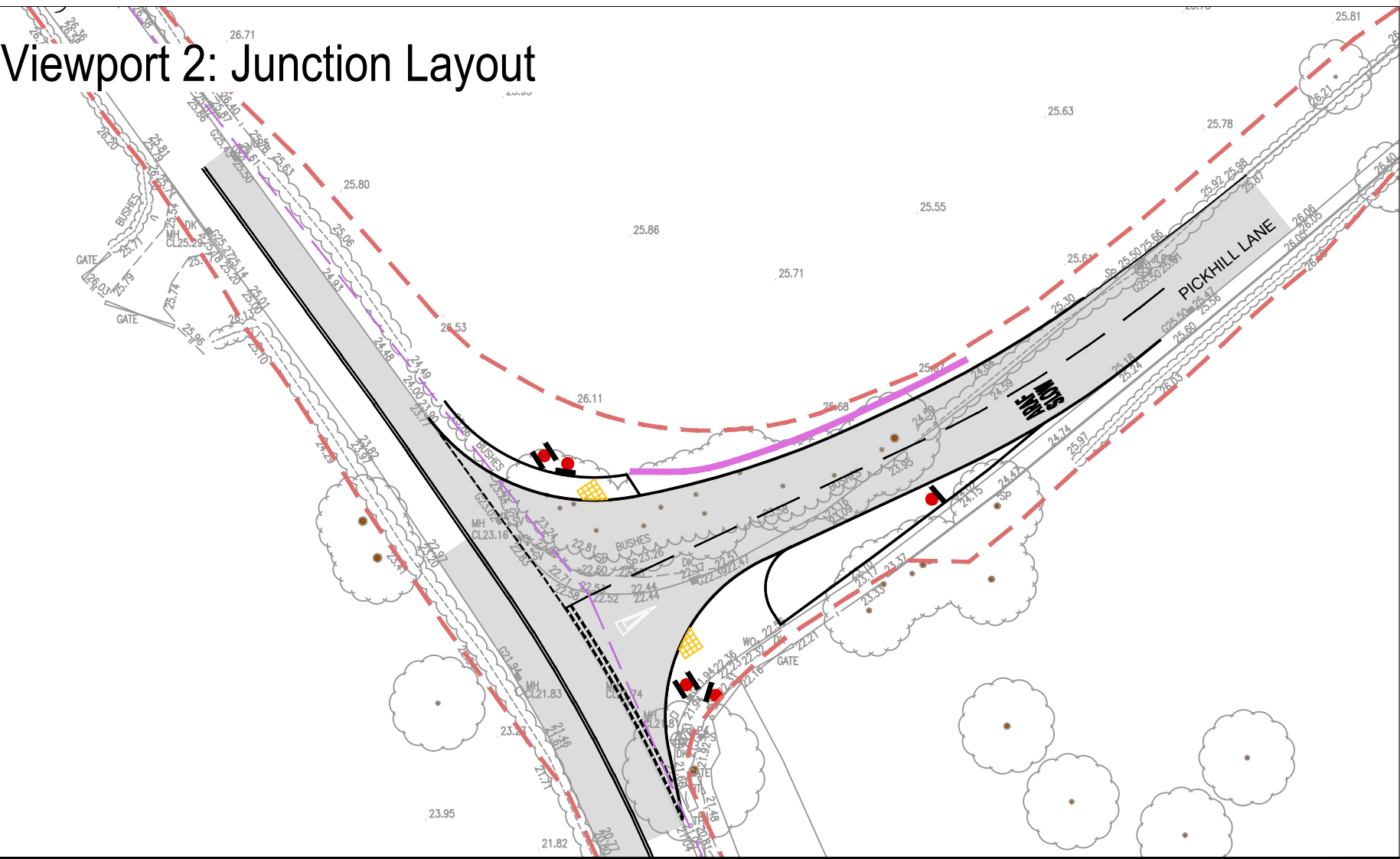
Viewport 1: Visibility Splays



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Viewport 2: Junction Layout



REV.	DETAILS	DRAWN	CHECKED	DATE
1				

Notes:

- 1. This is not a construction drawing and is intended for illustrative purposes only.
- 2. White lining is indicative only.

--- 2.4m x 120m Visibility Splay

--- Extent of Adopted Highway

--- Retaining Wall Structure

Maelor Foods Further Development

A525/Pickhill Lane General Arrangement

DRAWN: JC

CHECKED: MR

DATE: 07.07.22

SCALES: 1:500 at A2

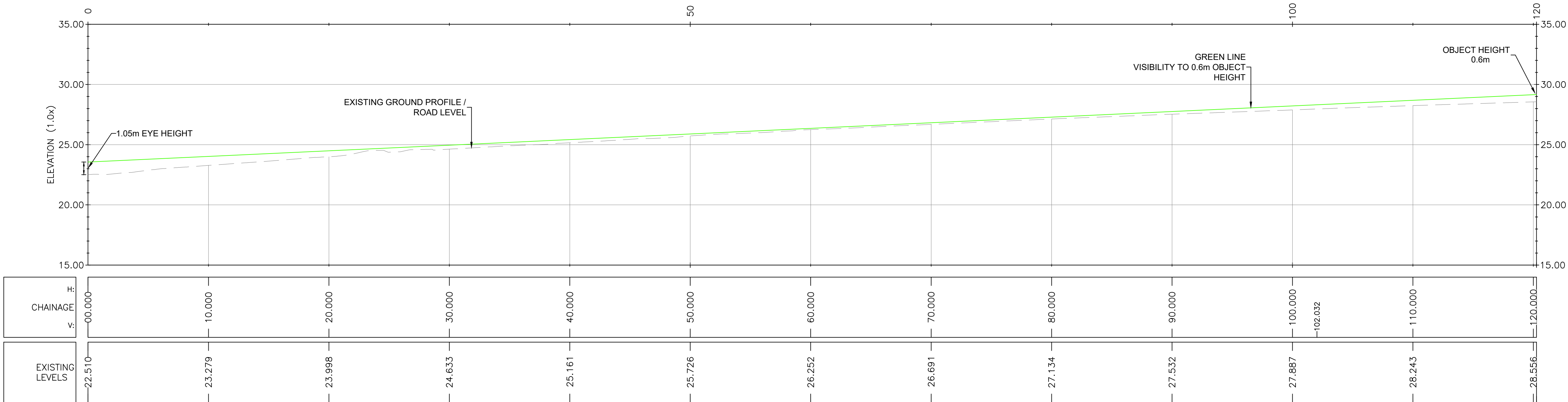
Maelor Foods

vectos.

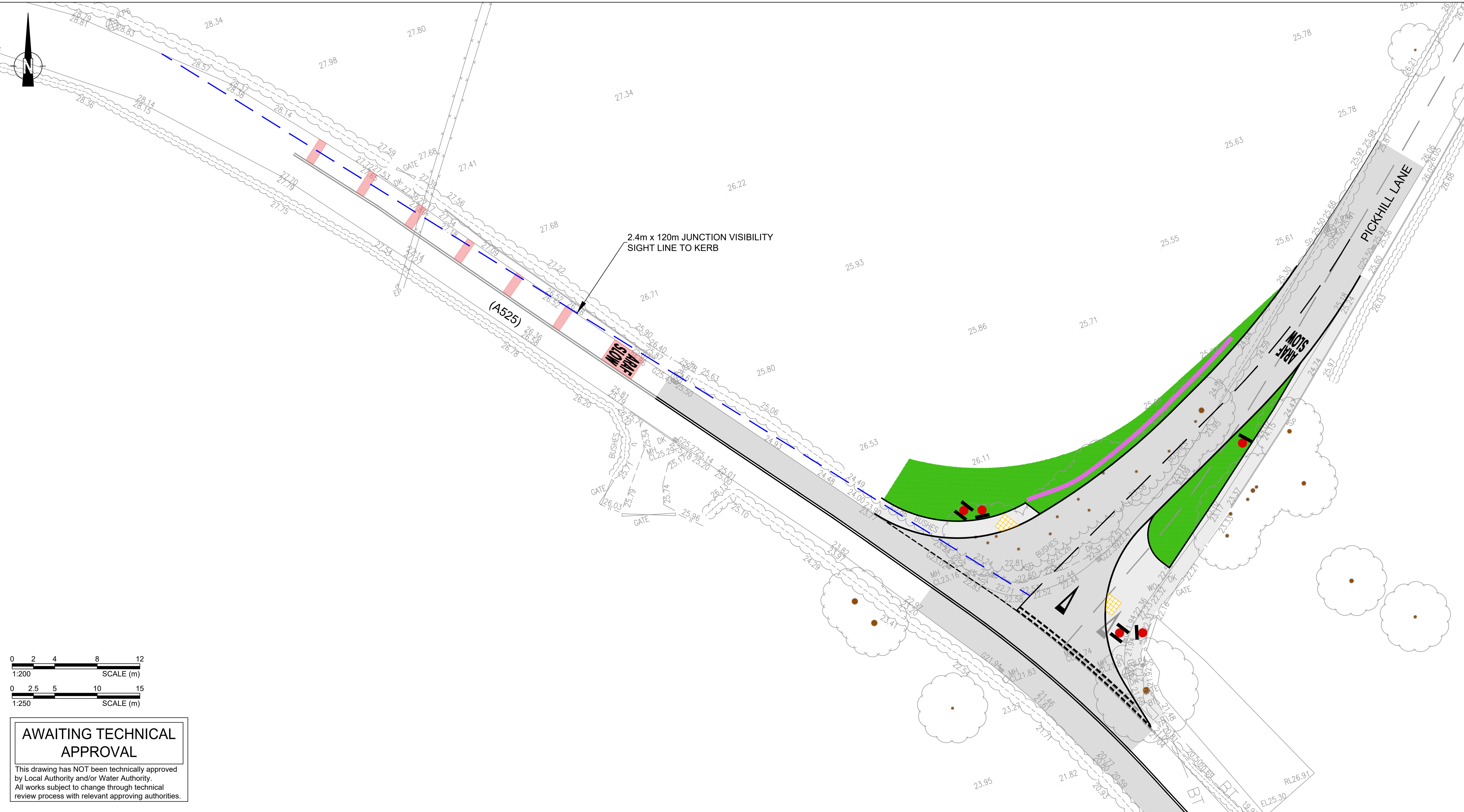
4th Floor Oxford Place, 61 Oxford Street, Manchester, M1 6EQ
0161 228 1008 e: manchester@vectos.co.uk

DRAWING NUMBER: VN222301 D102

REVISION: .



LONG SECTION ALONG VISIBILITY SIGHT LINE TO KERB
SCALE: H 1:200, V 1:200



REV	DETAILS		DRAWN	CHECKED	DATE
INFORMATION					
CLIENT:					
MAELOR FOODS					
PROJECT:					
PICKHILL LANE					
DRAWING TITLE:					
VISIBILITY LONGSECTION SHEET 2					
SCALE:					
1:200, 1:250 @ A1					
DRAWN:		CHECKED:		DATE:	
JC		PW		25.07.2024	
vectos. 4th Floor Oxford Place, 61 Oxford Street, Manchester, M1 6EQ 0161 228 1008 e: manchester@vectos.co.uk CfA ISO 9001 UKAS MANAGEMENT					
VD190095/SK005					-

Appendix A – Highway Response



MEMORANDUM

From:	Chief Officer, Environment & Technical	To:	Chief Officer Planning & Regulatory
Our Ref:	ET/DC/MZ/P/2022/0820	Your Ref:	P/2022/0820 Res(1)
Date:	02/07/2024		

TOWN AND COUNTRY PLANNING ACT 1990

AMRYWIO AMOD 07 O CANIATAD CYNLLUNIO APP/H6955/A/18/3216187 (P/2017/1032) I CANIATAU PROSESU 2,000,000 O ADAR YR WYTHNOS / VARIATION OF CONDITION 07 OF PLANNING PERMISSION APP/H6955/A/18/3216187 (P/2017/1032) TO PERMIT THE PROCESSING OF 2,000,000 BIRDS PER WEEK

MAELOR FOODS PICKHILL LANE CROSS LANES WREXHAM
Grid Ref: E 338510.4N 346705.93

I refer to your consultation / email dated 28/09/2022 in respect of the above and write to follow up the LHA comments previously made on 18/04/2023. Since these comments were submitted, the applicant has provided additional information in response to the comments made.

The main notes raised within the LHA's previous comments were:

- the increase in the number of staff by 125 from 253 to 3 and an increase in corresponding staff travel to work trips, in addition to an increase in the number of HGV trips by 29 per hour (an additional 618 HGV movements) from 588 HGV movements over 6 days to 1206 over 6 days.
- No amendments were proposed to the site access arrangements.
- There is a lack of access routes for pedestrians to the site to encourage active travel
- Clarification was requested around staff shift times and vehicle movement times in a service management plan.
- That there is high levels of car dependence noted on site. A survey of 100 staff from the site (factored up) showed that 92% of the existing 253 staff travel by car / motorbike and therefore 98 of the new 125 staff are likely to travel by car / motorbike.
- Clarification was requested in relation to car parking numbers and a plan of the car park to show car parking, cycle and motorcycle parking areas.
- The junction assessment at the A525/Pickhill Lane showed that there was spare capacity in the junction according the submitted information, however, the modelling details / runs have not been provided and are requested.
- A survey was undertaken in May 2022 at Pickhill Lane & The A525 which demonstrated that there was spare capacity within the junction, but the LHA requested access to the model.
- The proposals look to realign the Pickhill Lane approach to the A525 and increase the kerb radii to 16m to improve HGV's turning left onto Pickhill Lane towards the site. Furthermore, the junction redesign ensures that large vehicles exiting Pickhill Lane turning left and heading south along the A525 will no longer be required to cross the centerline of the carriageway. Swept paths were requested alongside a Stage 1 Road Safety Audit.

- As part of the A525 / Pickhill Lane junction redesign it is proposed to use some of the existing grass verge, and it was flagged to check the adopted highway extents. It also requires a retaining wall which would require checking by the WCBC structures department.
- Details were provided in regards to the Active Travel in regards to the limited footways and the lack of street lighting on Pickhill Lane and the need to make more from single occupancy car users, providing incentives for car sharing etc.

The applicant has since provided additional information including a response to the LHA's comments which incorporates the following relevant information:

Visibility Splays and site access arrangements

Speed surveys have been undertaken on Pickhill Lane in 2017, which demonstrated an 85th Percentile speed between 41 and 44mph and a further survey was undertaken in 2022 which recorded a 85th percentile speed of 37-38mph. The corresponding visibility splay requirements for 37mph in Manual For Streets is 59m, which should be taken from 2.4m back into the site from the kerbline or back of highway. The LHA notes that the survey data for the 2022 data has not been provided and requests that this is submitted for review prior to the acceptance of the reduced visibility splays.

Whilst a visibility splay has been submitted which indicates 2.4m x 121m to the east and 2.4m x 110m to the west, it is not clear which vehicular access this is taken from. There are two different site accesses, one for HGV's and one for general traffic. Therefore the LHA requests swept paths for both different access points and an indication that all areas within the visibility splays are on land within the applicants control or within the public highway. There is concern that a site access immediately to the west of the general traffic exit is not under the ownership of the applicant and that any gates or amendment to this access could impede the visibility, can the applicant confirm this status.

The access arrangements /gates for the general car park are also asked to be clarified as the plans do not show the operations clearly and a site visit by the LHA confirmed a different arrangement to what was previously described.

Trip generation

As stated above the proposals look to result in an increase in the number of HGV trips by 29 per hour (an additional 618 HGV movements) from 588 HGV movements over 6 days to 1206 over 6 days. The submitted information shows a daily profile of HGV's but its quite difficult to ascertain as many of the colours are very similar. The narrative states that there will be a maximum of 14 arrivals in a single hour as a worst case which equates to 1 movement every 4 minutes and that the majority of the arrivals will occur in the interpeak period. Clarification has been provided that all HGV movements are currently co-ordinated and arrivals pre-booked in advance (where possible) and that a booking system will operate to allocate arrival times to each HGV which will be staged across each hour so no more than one HGV will arrive at one time. The applicant states there is space for 3 max length HGV's to be stored off highway upto the entry barrier and the contingency scenario is to direct HGV's through the main access to the second weigh bridge and security check point at the rear of the main building. All of these details should be included within a Service Management Plan.

Within the Transportation Statement the additional cars expected on the network in the peak hours were set out as 15 Two-way trips in the AM peak and 16 in the PM Peak. For HGV's the increase in the AM Peak was stated to be 8 two-way trips and 9 in the PM Peak.

Service Management Plan

A draft service management plan has been supplied in the further highways response that details the objectives of the document, the site operation, vehicle routing and vehicle movement times. It states that the majority of movements are coordinated during the inter-peak period (0900-1500

hours) when traffic flows are generally lower on the network but that there are some vehicle movements that occur out of hours (2000 – 0600). The plan indicates that a working group will be established and that this service management plan will be monitored regularly.

Sustainable Travel

There is an existing footway along the south side of Pickhill Lane which is narrow in nature and there is no street lighting along Pickhill Lane which makes walking to the site less attractive in the winter months. The pedestrian access into the site from the site access is limited and would benefit in improvements. The submitted report shows an indicative pedestrian route to and from Pickhill Lane along the general traffic exit route, with an informal zebra crossing path and then a continuation of a pedestrian route marked out to link with the existing pedestrian route and internal footway in Figure 2 of the further transport submission. The LHA requests that a full route through to the entrance of the building is clearly indicated within the plans to detail the complete route from the sites vehicular entrance to the building entrance for staff.

A staff travel survey was undertaken with 100 staff and factored up which indicated heavy reliance on single occupancy car journeys, therefore it is the LHA's view that further works should be undertaken to improve access for more sustainable methods of travel. Measures such as the installation of secure long stay cycle parking, secure motorcycle parking, car share spaces (and the setting up of a car share database and policy with features such as a guaranteed lift home when sick if car sharing) and electric vehicle charging points for both cars and bikes alongside a high standard of showers and changing facilities would work to encourage staff to travel by more sustainable modes.

Whilst there is no increase in the floorspace of the site proposed, there is a proposed uplift of an additional 125 staff and it is considered that a representative proportion of sustainable travel measures should be put into place.

Car Parking, Cycle Parking and Motorcycle Parking

The submitted information details that there are approximately 240 car parking spaces at the site comprising the main car parking area with 160 marked out bays and an additional overflow area with approximately 32 spaces located immediately to the south. There are approximately 28 spaces on the unmarked parking area in front of the main building entrance and approximately 20 vehicles can park around the unit to the southeast of the main parking area. Not all car parking spaces are marked out formally and there is less efficiency where car parking bays are not marked out.

There are currently no formally marked bays for disabled users, motorcycles or cycles but the available space is stated to be used informally within the site. It is the LHA's view that site would benefit from the provision of secure (well overlooked and covered) cycle parking and motorcycle parking spaces and the provision of disabled spaces for visitors to the site. As the car park currently operates on a first come first serve basis and shift working is undertaken, it would be difficult to ensure that disabled drivers can park in close proximity of the building entrance within the current arrangements.

A car parking accumulation survey was undertaken based on traffic surveys at the site access recorded in May 2022. The surveys indicated that a total of 175 cars accessed and 181 egressed the premises. The maximum demand for parking was 81 vehicles within the 1pm to 2pm hour. The LHA visited the site within this time of maximum car parking demand and saw a significant number of vehicles accessing the site and therefore further clarification is required to this end.

The car park accumulation has been factored up for the predicted uplift of staff and indicates the maximum car park occupancy is likely to be 121 vehicles between 1pm and 2pm based on 378 staff working at the site.

The car parking survey data and staff travel to work survey was based on the survey of 100 staff. A parking beat survey during a neutral month out of school holiday times would have been more robust.

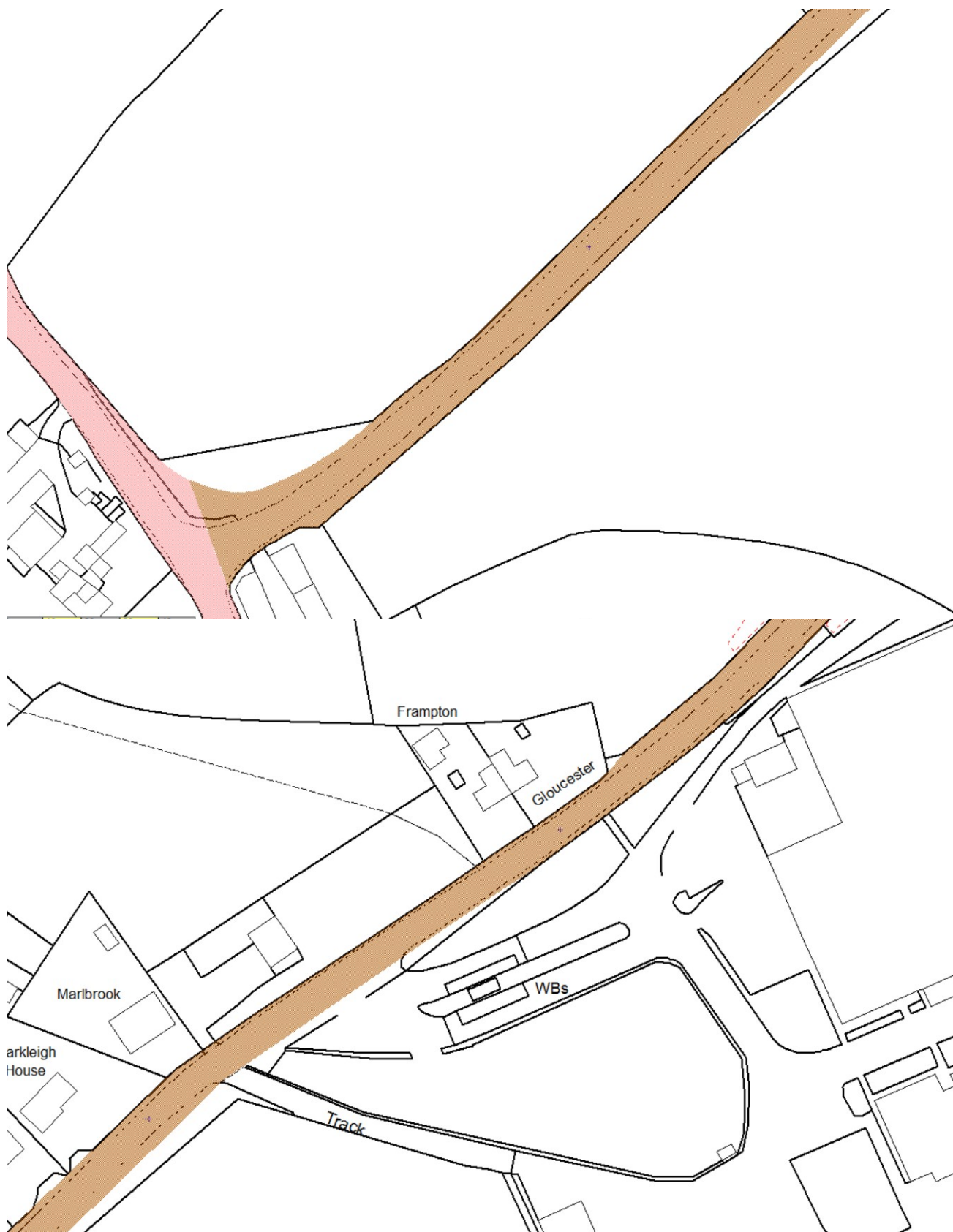
The submitted Vectos report suggests that space within the car parking areas could be more formally defined and modifications to the car park have been shown in figure 3 of the submitted further response which outlines:

- The removal of several bays to accommodate a pedestrian footpath through the site
- The conversion of 10 existing bays into marked car sharing bays with scope to convert additional spaces subject to travel plan monitoring
- New markings to provide 15 standard mobility bays. LPG Note 16 states there is a requirement for 10% of the bays to be mobility bays, and it is considered that the enlarged 1.2m extra width could be shared between two bays to enable an increased number of spaces to be provided.
- The removal of 3 car parking spaces to provide a cycle shelter with 12 stands. The provision of 10 stands. Further detail would be required as the proposed shelter should be secure and well overlooked and the provision of cycle spaces should be provided at a rate of 1 cycle parking space per 1000 sq m of gross floorspace. The required design of cycle parking spaces is set out in LPG Note 16.
- The removal of 6 car parking spaces to provide 10 motorcycle parking spaces 1.4m wide. These should be provided with secure lockable points.
- The unmarked parking areas to be retained but potentially the installation of electric vehicle charging points. The LHA would recommend that the installation of some electric vehicle charging points and the provision of car share bays in a location of higher accessibility to the building to make them attractive to use.
- The proposals set out a total of 215 car parking spaces including 15 disabled bays, 14 cycle parking spaces and 10 motorcycle parking spaces.

The applicant is requested to submit an updated site layout plan to detail the proposed car park layout and provide details of cycle parking, motorcycle parking, car share spaces, pedestrian access path, showers and changing facilities. The LHA cannot advise on the levels required as no floorspace has been provided within the application submission.

The Junction of Pickhill Lane and the A525

The applicant has proposed an amended layout to the junction of Pickhill Lane and the A525. It is proposed to widen the junction on the northern side to provide an 18m radius kerb on the approach to the site from the A525. Swept paths are shown for the proposed access and egress by a standard articulated vehicle. The revised junction arrangement ensures that the vehicle can turn and stay within the extents of its lane within access and egress. Dropped kerbs and tactile paving are proposed to create a level crossing point across the mouth of the junction which is an improvement and the footway is proposed to be built out on the south side of the junction. Whilst there are no objections in principle to this, the dropped kerb to access the existing farm on the south side of the junction will need to be reinstated. The existing street name sign and speed limit signs and other street furniture located at the junction will need to be re-sited, and all works to be delivered as part of a Section 278 Agreement. A Stage 1 Road Safety Audit has been provided within the further submission which has raised 9 issues that need to be addressed fully as part of the junction improvement scheme delivery, these include the resiting of a gulley and ensuring the surfacing has adequate skid resistance. Further Road Safety Audits will be required during and beyond scheme delivery. The proposed amendments to the highway have the potential to encroach beyond the public highway and therefore the applicant should ensure that the required permissions are in place. The public highway extents are shown below:



The proposals detail a retaining wall that will be required to be installed to support the realignment of the junction, the Councils structures team will need to provide their approval for such an arrangement.

Furthermore an updated drawing with the visibility splays at the junction should be submitted.

Junction modelling for the junction was undertaken using PICADY software within the Junctions 10 modelling package which indicated that the Ratio Of Flow To Capacity of each arm of the junction works well within capacity at the present time and in the future with the extra increase in traffic flows as a result of the proposed development. The full modelling data has however not been provided to review, therefore this should be submitted for review.

Travel Plan

A refined travel plan action list has been devised and has been included within the further information submitted. The measures listed seem reasonable but more far reaching actions and incentives could be undertaken to encourage sustainable travel to work, a bike loan scheme via salary sacrifice could be offered and also puncture repair station or electric bike charging point could be beneficial too.

Conclusion

Whilst there is a substantial increase in HGV's that will result from the proposals and an increase in staff and corresponding trips to work, it is considered that the existing highway network will be able to cater for this increase especially with the proposed junction mitigation measures which include the widening of the A525/Pickhill Lane junction which will ensure that all large vehicles approaching the site are able to negotiate the junction and remain in their lane without swinging onto the opposite side of the carriageway. The improvements should be secured through a Section 278 agreement and appropriate follow up Road Safety Audits should be undertaken by the developer.

It is requested that further clarification of the site access arrangements and an updated site layout plan are submitted detailing the proposed car parking, disabled parking spaces, cycle parking, motorcycle parking, car share spaces, electric vehicle charging points and pedestrian path proposed within the site.

The submitted Travel Plan needs to be updated with more extensive measures to incentivise more sustainable travel and should be retained by condition. The submitted Service Management Plan should be updated and should be retained by condition.

Further clarification is required about the visibility splay at the site access junction and the junction of A525/Pickhill Lane which should consider the vertical and horizontal visibility.

A handwritten signature in black ink, appearing to be 'J. J. J.', written in a cursive style.

Chief Officer, Environment & Technical

Appendix B – 2022 ATC Survey Data



Table 1: Data for 100 rows									
Row ID	Category A	Category B	Category C	Category D	Category E	Category F	Category G	Category H	Category I
1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
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Appendix C – Updated Service Management Plan (2024)



Maelor Foods Ltd

Pickhill Lane, Cross Lanes. LL13 0UE

Service Management Plan (Updated July 2024)

Specification

This Service Management Plan outlines the ways in which Maelor Foods will coordinate and manage all deliveries to and from the site, including those which occur out of hours. It applies to vehicles and drivers which are the direct responsibility of Maelor Foods, but also their primary suppliers and service partners.

By actively influencing and monitoring all delivery vehicle movements, it will be possible to reduce round trip journey times, maximise fleet utilisation, reduce fuel consumption, increase road safety and improve the quality of life for residents and the local community.

It is important that the plan provides an outline structure whilst retaining flexibility to respond positively to changes in market demand or other circumstances outside of the control of Maelor Foods.

Aims and Objectives

The main aim of the Service Management Plan is to manage the movement of delivery vehicles to and from the site in order to maximise operational efficiency and be a good neighbour to residents and the local community.

Key objectives include:

- Minimise the noise associated with all delivery vehicle movements;
- Manage out of hours delivery movements so as to minimise potential impacts on residents and the local community;
- Appoint a key member of staff to be responsible for the management of the plan, monitoring and ongoing assessment;
- Maintain communications with WCBC, local residents on Pickhill Lane and other interests;
- Prepare a 'Driver Charter' built around the principles of a quiet delivery scheme; and
- Monitor site operations and establish a feedback structure for dealing with complaints (if any).

This plan is a working document and has updated (July 2024) to consider the processing of 2 million birds per week (APP/H6955/A/18/3216187). A number of additions have been added to this plan since its last review, to improve and better mitigate any impacts from delivery and servicing at the site and improve business operations.

Site Operation

Maelor Foods currently operates daily with the majority of movements coordinated between the site and their parent company Salisbury Poultry in Bilston, Wolverhampton. Key routes between Maelor Foods and Salisbury Poultry are to and from the south along the A41 and M54, as shown in **Figure 1**.

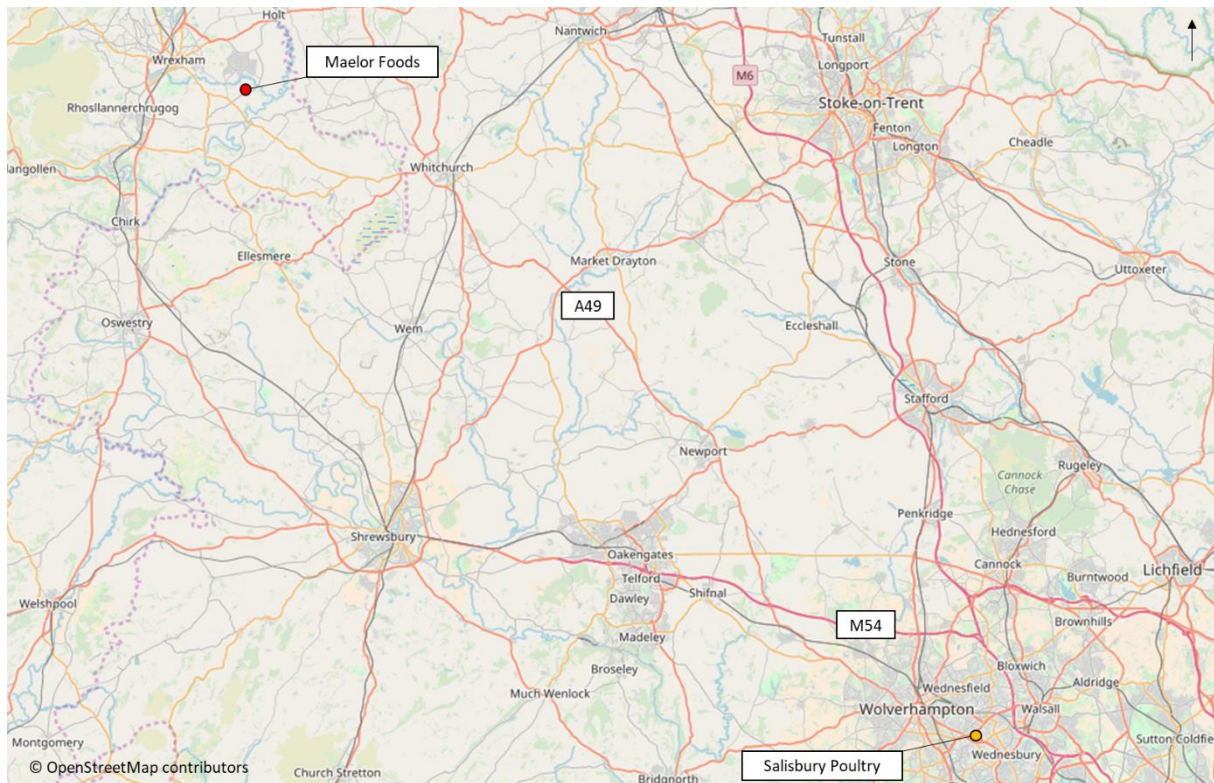


Figure 1: Maelor Foods and Salisbury Poultry Site Locations

There are also a number of other daily movements associated with deliveries from local farms, as well as other supplies required for day to day operations.

Vehicle movements are coordinated from the main site access on Pickhill Lane which is wide and avoids the need for vehicles to wait before entering the site. All vehicles are recorded at the security desk and then proceed to the main loading/unloading area to the east of the main building, away from Pickhill Lane. To further assist, a secondary weighbridge is provided within the site to avoid vehicles having to wait at the site access for longer than is necessary.

Vehicle movements currently occur throughout the day, with the majority coordinated during the inter-peak period (i.e. 0900-1500hrs) when traffic flows are generally lower on the network. There are some vehicle movements that occur out of hours (i.e. 2000-0600hrs).

Site Access Arrangements

The delivery/service access point is separate from the staff/visitor access points, although located adjacent to each other. These access points are clearly signed, as shown in the photos overleaf.

Photo 1 & 2 – Delivery Access Point & Signage



Service Management Plan Coordinator

The key contact responsible for the implementation of the plan is the Transport Manager who should be the first point of contact for all delivery-related enquiries.

Initiatives

A number of initiatives are implemented at the Maelor Foods site to ensure that it can continue to operate efficiently and considerately. This includes:

- Coordination of deliveries with Salisbury Poultry and other key suppliers through the use of a vehicle booking system with managed arrivals and departures;
- New drivers at Maelor Foods to be sent on an 'eco-driving' course to positively influence driver behaviour;
- New staff at Maelor Foods involved in loading/unloading activity to be briefed and trained with techniques to minimise noise, in accordance with the code of practice;
- Arrange for noise monitoring equipment to be installed on site annually to record baseline noise;
- Consideration to be given to using newer and quieter delivery vehicles and equipment (where possible);
- Ensure all equipment, both on vehicle and at the delivery point, is in a good working order and maintained/modernised to minimise noise when in operation;
- Liaise with WCBC and residents to explain the plans to manage delivery vehicle movements throughout the day and out of hours;
- Liaise with clients, suppliers and other local businesses to minimise the likelihood of unscheduled vehicles arriving at the site; and
- Consideration to be given to the storage of vehicles off-site to minimise out of hours movements (if required).

Noise Mitigation

The site operates under a new noise management plan, attached as **Appendix A** to this document, which will be strictly followed as part of this service management plan.

An ultrasound barrier/acoustic fence with a barrier rating of A5: B3 is to be installed around the site, with this fence designed to mitigate the noise impact on any residential receptors.

Working Group

Consideration will be given to establishing a more formal working group comprising management from Maelor Foods, WCBC, residents on Pickhill Lane and Sesswick Community Council. The working group will be engaged so that changes to activity at the site can be communicated to key stakeholders whilst also providing a feedback mechanism to record views, opinions and complaints (if any). Annual updates will be provided.

Engagement has already been made with these parties; however further engagement will continue and provide an updates to key stakeholders.

Monitoring

The Service Management Plan will be monitored regularly to ensure drivers and staff are performing their duties in line with the Driver Charter. Updates will be provided as part of regular working group sessions (as discussed above).

More formal monitoring (i.e. noise emissions) can be coordinated annually by management at Maelor Foods, with an up to date delivery schedule maintained each week for vehicle movements into and out of the site. This will assist in making sure all drivers to and from the site operate in accordance with the code of practice.

Management Support

The management at Maelor Foods are fully supportive of the Service Management Plan for their own staff and vehicles, as well as partners and suppliers staff and vehicles.

Maelor foods are committed to minimising potential adverse impacts associated with the operation of the site and have mechanisms already in place to allow for issues to be identified, reported and mitigated swiftly and efficiently.



Appendix A – Noise Management Plan



PHASE 2 NOISE MANAGEMENT PLAN

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Version Control

Version	Date	Changes	Issued By	Approval
1	01 Sept 2022	1st issue of operational NMP	S. Hutchinson	J.Colley
2	17 Feb 2023	Minor change to update based on Feb NIA report including WWTP blowers for MBR plant and revised recommendations for HGV noise & chiller plant.	S. Hutchinson	J.Colley
3	27 Oct 2023	Revised after noise impact assessment in Sept – Oct 2023.	J Rogers	J.Colley
DRAFT	26 Jan 2024	Revised after Noise Impact Assessment resubmission to NRW	J Colley	R Mehta

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1 Introduction

Maelor Foods Ltd are updating our Noise Management Plan (NMP) for Phase 2 operations at our poultry processing facility at Pickhill Lane, Wrexham, LL13 OUE.

Our environmental permit for the site (EPR/AB3591ZQ) is regulated by Natural Resources Wales (NRW) under The Environmental Permitting (England & Wales) Amendment Regulations 2018.

A NMP was prepared to support our environmental permit application and condition 3.4.1 allows us to use an approved NMP to control noise from the permitted installation.

“Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.”

Noise Management Plans (NMP) are required for installations permitted under the Environmental Permitting (England and Wales) Regulations 2018 (as amended) (EPR) if the activities undertaken at the installation have significant potential to cause noise nuisance.

We have determined that the activities at our installation have an inherent noise nuisance potential and some operations could be noisy.

This NMP is designed to ensure that all reasonable measures are taken to control noise emissions, and if an adverse impact is caused then prompt action will be taken to identify the source and apply corrective measures. It provides a schedule of actions that will be taken to help minimise noise impact and sets out site management procedures for the management of noise.

2 Objectives & content

The objectives of this NMP are to identify all significant sources of noise present at the facility and then provide information on management practices and the infrastructure in place to abate or minimise noise emissions from the facility to low impact.

The effects of emergency and abnormal circumstances on noise emissions are also considered. Monitoring procedures are described to help validate the effectiveness of measures taken to control noise emissions. The plan also outlines measures taken in the event of the detection of excessive noise during monitoring, with a view to reducing this to an acceptable level as soon as possible.

Response procedures are described in case noise related complaints are received from a neighbour of the plant, with procedures for recording all relevant information and investigating the potential cause of the noise.

3 Guidance & review

This NMP has been produced with reference to [Noise and vibration management: environmental permits](#), Updated 31 January 2022.

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Our NMP is to be reviewed on a regular basis (at least annually) or more frequently if there are any changes to the activities and/or if any specific issues in respect of noise have become apparent.

Any amendments stemming from these reviews may need to be agreed with and approved by NRW and / or the Planning Authority to meet the terms of our Planning Consents.

NRW and the Planning Authority should be consulted at an early stage to ensure that the NMP can be amended in future, with the prior written agreement of the authorities, to ensure that any necessary and beneficial changes to noise management practices can be implemented without breaching the terms of our Planning Consents and to allow compliance with the EPR permit.

Such changes may need to be made in the light of operating experience, complaint episodes or if new developments or technologies become available in future so that facilities or practices can be adapted and optimised to further reduce noise impacts.

For the management of deliveries and noise, reference should be made to Department for Transport's Guidance on [Reducing noise to make deliveries outside normal delivery hours](#)

3.1 Updates

An initial noise management plan for the installation was developed by Environoise as part of the initial noise impact assessment for the installation when permitted in 2017 and it was adapted into the EMS.

Version 1

Maelor Foods prepared a Noise Management Plan for the environmental permit variation application for Phase 2 in September 2022. The current Operational Noise Management Plan has been based on this and amended accordingly with the later versions of this NMP.

Version 2

The variation application was withdrawn and resubmitted in February 2023 to revise the wastewater treatment plant design and a revised noise impact assessment was included.

Version 3

The NMP was reviewed in October 2023 following a noise survey and impact assessment undertaken by Acoustics Environment. This was to address NRW's requirements in a Schedule 5 Notice associated with their determination of the variation application for Phase 2 of the site.

Version 4

The NMP was further reviewed in January 2024 following a noise survey and impact assessment undertaken by Acoustics Environment with support from Jacobs Bond Pascoe. This was to address NRW's requirements in a second Schedule 5 Notice associated with their determination of the variation application for Phase 2 of the site.

3.2 Improvements / Actions

During the site surveys / visits for the noise impact assessment in September / October / December 2023 a series of observations were made which could further reduce noise levels from some parts of the installation. These are summarised in the Table below along with details of actions taken and proposed:

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Recommendations for Reducing Noise Levels to ensure Low Impact

Aspect	Improvement Action	Status / Timescale
People practices – driving onto site with radios at high volume, beeping horns, high speed on approach road	Re-enforce training & disciplinary policy for employees entering and exiting site without regard for neighbours	Complete & ongoing
Speed bumps causing impact noises / braking noise from vehicles at site entrance	Assess safety aspects & remove bumps / add safety signage / alternative measures	Removed bump at main site entrance. Removed bump at staff car park entrance
Onsite transport noise – some audible FLT, HGV reversing alarms	Reassess site and contractor vehicles & replace reversing alarms with 'white noise' reversing alarms	Complete and ongoing
Weighbridges – minimise gatehouse weighbridge use to reduce vehicle movement noise at site entrance	Investigate using the main weighbridge for all HGV vehicles and restrict gatehouse weighbridge for back up.	6 months to implement any changes
Acoustic Barriers or containment	Progress the noise mitigation measures proposed in the revised Acoustics Noise Impact Assessment to design and install various acoustic screening • A noise barrier will be installed to limit site noise at Receptor A. • A noise barrier will be installed to limit the noise at Receptor B and C • Ultrasound reduction housing will be installed for the scrubber	12 months for all barriers and containment proposed
Onsite transport / vehicle loading – noise from refrigerated trailers	• Add more electrical hookups for loading produce & overnight storage • Review the addition of Sound reducing technology on the fridge units - Auto switching from Electric to diesel	Extra electrical hookups installed in Dec 2023 12 months for all investigations/review of available technology

	- Low noise condensers - Mobile acoustic hoods - Multi Temperature T-1200R Whisper Pro Models - Acoustic jackets around compressors - PIEK Certification approval - Use of PZ units	
Door control – plant rooms, roof space, lairage – internal noise breakout	Re-enforce training & enforce disciplinary policy for employees breaching door control practices	Complete & ongoing
WWTP aeration blowers	Reassess existing and new blowers at WWTP with a view to upgrading & enhancing the noise mitigation around them to achieve low impact - Bespoke acoustically attenuated enclosures to be designed	12 months to implement any changes
Main chiller plant	Reassess existing chiller plant and ancillary plant area with a view to upgrading & enhancing the noise mitigation to achieve low impact, to include: - Acoustic cladding/shielding of chiller plant - Acoustic silencing to existing fans	12 months to implement any changes
Inlet and Outlet vents from the Factory – around the roof and high level areas	Install splitter type attenuators to all HVAC inlets and outlets Install splitter type attenuators to all forced air inlet and outlets	12 months to implement any changes

4 Site Location and Plant Description

4.1 Site Location

The poultry processing facility is located on the site of the former Maelor Creamery, Pickhill Lane, approximately 1 km to the north-north-west of the village of Bangor-on-Dee and approximately 700m to the south-east of the residential area of Cross Lanes. Appendix 1 shows the locations of potentially sensitive noise receptors around the plant.

The proximity of these sensitive receptors is such that there are risks of off-site noise nuisance being caused and therefore high standards of noise management are required.

5.24.2 Plant Description & Risk Assessment

The plant undertakes the slaughter and processing of up to 2 million broiler chickens per week under Phase 2 operations. The following paragraphs describe the key activities in each area of the plant, the noise risks in each area and the key control measures which will be used to reduce noise emissions and/or disrupt the pathways for noise to potential receptors. The noise risk of each area has been assessed against experience gained to date and from knowledge of other UK poultry processing plants.

Appendix 2 shows the locations of noise sources around the site under Phase 1 and lists the Phase 2 noise sources. The location plan will be updated with the Phase 2 noise sources listed when final layout is confirmed.

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5.2.14.2.1 Delivery & Lairage / Intake

Live chickens from broiler production farms arrive at the plant in modules on HGV trailers. The HGV trailers enter a lairage area, before moving to the intake area where the modules are unloaded. All doors remain closed when not in use. Birds are transferred from the intake area to the preliminary processing area.

The Lairage / Intake area has a low level of noise from the birds and a recirculated air conditioning system maintains good working conditions and a comfortable environment for the birds held in this area prior to slaughter.

The lairage is cleaned daily with the manure manually scraped into collection bins and floors washed using trigger operated spray lances.

The live bird holding area is large enough to accommodate the temporary holding of live bird delivery vehicles pending unloading if there are processing delays and deliveries of live birds are pushed back until the plant is operational again. As a further contingency, under permit Variation 2 Maelor Foods acquired the former transport depot adjacent to the installation and have scope to convert this into an additional live bird holding area for emergency use. This could allow up to seven live bird vehicles to be parked inside so the live birds can be cooled by air fans in a non-stressful manner. The live bird vehicles would be moved from here into the lairage as soon as the lairage was available to receive them.

Until this is implemented the noise potential is unsubstantiated but it is expected to be a low noise source and no worse than the lairage.

HGV delivery Best Practice and Site Management recommendations are incorporated into this Noise Management Plan.

A combination of traffic management and maintenance of road surfaces will minimise traffic noise. Broadband type reversing vehicles warning alarms are used on the majority of vehicles used on or visiting the site or they are deactivated otherwise. The traffic flow design is such that vehicles do not have to reverse into or out of the lairage. These factors minimise noise from reversing alarms on HGV vehicles.

This is a Medium noise risk area of the plant.

5.2.24.2.2 Stunning and bleeding

Birds are transferred from the intake area via a Linco module handling system to the preliminary processing area. Here the modules are loaded onto the intake line and the birds are gas stunned, then removed from the modules and hung-on to the “shackles” of an overhead conveyor line and transferred to a bleeding area. Here the birds are decapitated and blood is drained into the blood trough and pumped away at frequent intervals during the day to the blood storage tank in the ABP storage building.

The empty modules are transferred to the “module wash” and then transferred to the “box return” service area where they are loaded onto empty HGV trailers for subsequent re-use in the collection of birds from farms.

The internal workplace is air conditioned on a recirculated air system while the module wash area is extracted and dispersed through the roof exhaust point.

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The area is washed down and sanitised during night shifts and at weekends. The live bird handling systems area is cleaned every night and briefly in between kills.

All operations are conducted inside with doors closed so noise escape will be minimal.

This is a LOW noise risk area of the plant.

5.2.34.2.3 AeroScalder

After bleeding the birds are conveyed into the de-feather room where they are scalded by a saturated hot air system. The birds are conveyed through the scalding unit to loosen their feathers to facilitate mechanical plucking in the de-feather area.

The AeroScalder system is entirely enclosed and consists of two chambers; an air conditioning chamber where the moisturised hot air is prepared and, next to it, the scalding chamber itself through which birds are conveyed and into which the scalding air is blown. Moisturised hot air is blown forcefully onto the most critical parts of the broiler, preventing over scalding of fragile parts.

As a precautionary measure we extract air from this area of the plant at high rates directly to our chemical scrubber odour abatement system before dispersion to atmosphere through a tall stack.

There are also fresh air inlets to provide “cooling” air, which is also extracted to the chemical scrubbing abatement system.

All operations are conducted inside with doors closed so noise escape will be minimal.

This is a LOW noise risk area of the plant.

5.2.44.2.4 De-feathering

After scalding the birds are conveyed to the de-feather area where mechanical defeathering is undertaken in defeathering machines.

Feathers are rinsed from the machines with re-circulated water fed via nozzles and transported via a recirculating water flume into the ABP storage building. The flume water is drained down to the effluent treatment plant at the end of each day. The feathers are pressed to remove excess water before collection in a vehicle trailer in an ABP collection bay.

Wall and ceiling mounted fans introduce cooling air into the building. The headspace air in the de-feather area is potentially odorous so is extracted directly to a chemical scrubber odour abatement system.

All operations are conducted inside with doors closed so noise escape will be minimal.

This is a LOW noise risk area of the plant.

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5.2.54.2.5 Evisceration

The birds are mechanically eviscerated to remove the intestines and other internal organs (heart, lungs, gizzards, livers etc.). Edible offal is separated, dry chilled and packed for retail markets and transferred to the cold store awaiting distribution.

Inedible offal is transferred by vacuum lines to the animal by-products trailer in the ABP collection bay where it is collected daily for off-site processing.

Carcasses are rinsed during evisceration. Spills of meat scraps onto floors are quickly dealt with and collected into bins for transfer to ABP trailer.

An enclosed air system is in place with cooling to moderate the working environment and a small amount of input air is provided to maintain fresh air.

All operations are conducted inside with doors closed so noise escape will be minimal.

This is a LOW noise risk area of the plant.

5.2.64.2.6 Treating & processing

Under Phase 2 we will be applying flavouring rubs to some whole bird products but will not undertake cooking of whole birds. Ingredients will be mixed onsite and flavours such as, but not limited to sage and onion, garlic and herb will be injected into the whole birds. Up to 30,000 birds per week will be flavoured (approx. 50T per week) which will utilise around 6-8T of marinade per week.

At the moment there is no portioning or cutting operations undertaken.

All operations are conducted inside with doors closed so noise escape will be minimal.

This is a LOW noise risk area of the plant.

5.2.74.2.7 Chilling & packing

Following evisceration, the birds are transferred to the chiller where they pass through on a shackle carousel system, spending sufficient dwell time in the enclosure to ensure they leave at the correct temperature (<4°C). Air in the chiller enclosure is continuously recirculated via the refrigeration system to maintain the correct temperature in the enclosure.

Offal material which is fit for human consumption is transferred to chillers and cold storage areas, where it is stored before transport off-site. The cold storage buildings are kept refrigerated to prevent decay and are largely “sealed” by means of a cold-store type door.

The chiller plant room equipment / compressors are all located inside so there is no noisy external equipment. The building is constructed of insulated cladding panels which helps maintain desired temperatures within the inside in an energy efficient way and provides sound insulation. Vents are installed to discharge potential leaks of ammonia externally and these present a potential escape route for noise. The air cooled condenser and some ancillary plant are located within an enclosure adjacent to the chiller plant room.

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The chiller and associated plant were assessed in our noise impact survey in July 2020 and the remaining non-louvred ammonia vent was found to be a potential source of offsite noise nuisance. Following this study this vent has been fitted with the recommended louvre. This was the only remaining ammonia vent which was not louvred; already louvred extracts were not audible at the noise measurement position.

The initial noise impact assessment for Phase 2 found that night-time noise levels at Site A receptor may be inadvertently affected by the chiller plant noise. To address this, the second, new chiller plant condenser for Phase 2 is being sourced and will be water cooled to ensure it can achieve the low noise specification recommended, so as not to increase the noise level at this receptor. This also has the benefit of providing recovered heat for hot water heating.

The latest noise impact assessment highlighted that the noise levels from within the chiller enclosure can be further mitigated and this is added to the improvements section of the NMP. This will include addition of cladding panels to the same height as the office block which will be specified to achieve noise attenuation.

This is a MEDIUM noise risk area of the plant.

5.2.84.2.8 Animal By-Products Storage and Handling

The animal by-products (ABP) comprise of inedible offal, feathers, blood, inedible material, meat scraps, dead on arrival birds and WWTP screenings. These are all held in the ABP storage building which accommodates sufficient trailers to ensure ABP are always stored inside and collected in a timely manner.

Empty Animal By Product (ABP) trailers arrive on site and are weighed before being parked in the ABP storage building which accommodates sufficient trailers to ensure ABP are always stored inside and collected in a timely manner. Inedible offal and other ABP are transferred by vacuum lines into the ABP trailers. Feathers are transferred in a water flume, separated and pressed before being loaded into bulk trailers inside the building awaiting collection for further processing off-site. The ABP and feather trailers are collected daily and are replaced by empty trailers. Dolavs and other small containers used for collecting ABP around the process are emptied into the ABP trailer and then washed out. All factory doors remain closed when not in use and diesel engines are turned off whenever the vehicle is stationary. The number of ABP collections varies with the production rate and the operating hours on different days of the working week.

The blood tank is emptied daily and is regularly cleaned using an integrated Clean In Place (CIP) system. Blood tanker drivers connect to the external blood offloading point and link the outlet/exhaust of their tanker vacuum pumps to a flexible hose which is directly connected to the chemical scrubber abatement system extraction ducting. This operation takes around 20 minutes once per day.

The ABP building is fully enclosed and doors are kept closed except for immediate vehicle access and egress and closed at all other times. The building headspace air undergoes at least 3 air changes per hour to the chemical scrubber(s) for odour abatement to prevent fugitive escape of internal air.

Noise breakout from the internal vacuum system is a potential source of noise and was assessed in our noise impact survey in July 2020 and found not to be a likely source of offsite noise nuisance. The vacuum systems are operational between 05.00 - 22.00hrs.

This is a MEDIUM noise risk area of the plant.

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5.2.94.2.9 Module Washing

Empty live bird modules are washed in the “module wash”. The building air from this area of the plant is extracted for high level dispersion above the lairage building.

All operations are conducted inside with doors closed so noise escape will be minimal.

This is a LOW noise risk area of the plant.

5.2.104.2.10 Trailer Washing

Unloaded HGV trailers are moved from the intake area to the “trailer washing” area where they are completely washed down before moving to the “box return” area for reloading with clean empty modules. The building air from this area of the plant is extracted for high level dispersion above the lairage building.

All operations are conducted inside with doors closed so noise escape will be minimal.

This is a LOW noise risk area of the plant.

5.2.114.2.11 Module Return Area

Washed and sanitised modules are returned to the “box return” area where they are loaded onto clean HGV trailers. The building air from this area of the plant is extracted for high level dispersion above the lairage building.

All operations are conducted inside with doors closed so noise escape will be minimal.

This is a LOW noise risk area of the plant.

5.2.124.2.12 Waste-Water Treatment Plant (WWTP)

Waste-water (effluent) comprises of contaminated wash water from the abattoir and specifically from the de-feather areas and the feather flume system.

The WWTP is located downhill beyond the factory buildings, well away from the Pickhill Lane residencies.

Raw effluent drains to an enclosed/housed raw effluent pump sump. From the sump the raw effluent is pumped through an enclosed rotary drum screen on top of the balance tank to screen out larger solids from the effluent before treatment. The primary screenings fall into a skip which is enclosed on three sides with strip curtains on the fourth to minimise odours. The screenings are transferred into a trailer in the ABPs storage building. The screen and associated elements are cleaned daily.

The balance (and diversion tank on the occasions when it is used) are agitated by venturi mixers to mix and aerate the contents and to maintain aerobic conditions and prevent them from going septic and becoming odorous. The Phase 2 balance and diversion tank are enclosed tanks and the other balance tank is fitted with a cover, which helps contains noise from the venturi mixers. An air extraction unit pulls tank headspace air into the scrubber serving the WWTP area to reduce odour emissions.

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From the balance tank, effluent is transferred to a Dissolved Air Flotation (DAF) system to flocculate and separate/remove suspended solids, fats, oils and greases, from where the separated solids are pumped to a covered sludge storage tank. The DAF plant is housed inside a new building and a new sludge dewatering plant will also be inside its own building so noise from these areas will be contained inside.

The separated liquid from the DAF plant is transferred to an activated sludge system tank for aerobic (activated sludge) treatment before final treatment in the membrane bioreactor and discharge to river.

Our activated sludge plant consists of anoxic treatment followed by an aeration tank where the conditioned mixed liquor is injected with air via fine bubble air diffusion manifolds. The membrane bioreactor plant removes the remaining suspended solids from the effluent to guarantee the final effluent quality.

The primary noise sources at the WWTP area are pumps and blowers. The aeration tank is served by two noise enclosures, one housing 2 x Aerzen D52S blowers and the other housing a Landia DK-6940 blower. These were assessed in our noise impact survey in July 2020 and found not to be a likely source of offsite noise nuisance. However, with new blowers to be installed for the MBR plant the noise enclosures around the existing blowers will be reviewed and updated accordingly.

The new MBR plant will also have 2 x Aerzen D52S blowers and will be provided with noise enclosure(s). In total there are 3 duty blowers and 2 standby.

This is a MEDIUM noise risk area of the plant.

5.2.134.2.13 WWTP Sludge treatment, storage and handling

Under Phase 2 the combined DAF and waste or surplus activated sludge is dewatered before transfer off-site by contractors for land deployment or other waste recovery method. The dewatering plant is located inside a building at the WWTP and HGV's enter the building to collect sludge cake.

As a contingency, the Phase 1 sludge storage tank is retained for back up use and is covered. A mixer is in place to keep the sludge mixed if operational. The off gas from the tank headspace is vented into the WWTP area scrubber. Displaced air from the road tanker during sludge transfers is fed into the chemical scrubber. Sludge tanker drivers collecting non dewatered sludge connect to the external sludge offloading point and connect the outlet/exhaust of their tank or tanker vacuum pumps to a flexible hose which is directly connected to the for treatment before release to atmosphere. This operation takes around 20 minutes twice per day with the vehicle's engine left idling to operate the extraction pump. Under Phase 2 the sludge de-watering will reduce sludge collections by 60%.

This is a LOW noise risk area of the plant.

5.2.144.2.14 Chemical Scrubber Odour Control & Mitigation Systems

The Phase 1 chemical scrubbers were assessed in our noise impact survey in July 2020 and found not to be a likely source of offsite noise nuisance but as a contingency the process area scrubbers are only operational at design duty between 05:00 – 21:00hrs, with a timer set to reduce fan speed between 21:00 – 06:00hrs. For the Phase 2 noise impact assessment the additional scrubbers were found to not have a significant offsite noise potential. The WWTP area scrubber is required to operate continuously.

This is a Medium noise risk area of the plant.

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5.2.154.2.15 Air Handling Systems in Process Areas

The process buildings are served by a recirculated air conditioning system and there are no emissions externally. All these operations are conducted inside with doors closed so noise escape will be minimal.

This is a LOW noise risk area of the plant.

5.2.164.2.16 Utilities

Hot water for the activities is provided by 3 modular boilers comprising 9 modules in total. Two further boilers serve the aeroscalders.

All the boilers are located in the utilities building which is fully enclosed and ventilation points are fitted with louvres. The boilers operate during processing and cleaning and ramp down overnight to meet the base load only.

Water softening plant serving the boilers runs continuously and is located outside the utilities building and was not identified as a significant noise source during the 2020 noise impact survey.

Air Separation Unit (ASU) for nitrogen gas generation for use in our packaging applications. This minimises liquid or bottled nitrogen delivery and noise associated with deliveries.

This is a LOW noise risk area of the plant.

5.2.174.2.17 Vehicle Loading and Unloading Operations

Pre-loaded HGV trailers with clean modules are weighed on an external weighbridge on the yard at the start of each shift (driver shifts are staggered throughout the day; start times vary and can start at any time depending on the Transport Plan). The vehicle then departs to a broiler production farm where the modules are loaded with live broiler chickens.

On return to site, the vehicle is re-fuelled at the on-site fuelling station before being re-weighed on the weighbridge. The tractor unit is de-coupled on the yard and the HGV trailer is then taken by a shunter vehicle in to the internal lairage area, before moving to the internal intake area where modules are unloaded by forklift truck which transfers live broiler chickens from the preliminary processing area. The empty vehicle is sanitised on the yard before being re-loaded with empty modules and drawers and the process is repeated. This process takes approximately 1.5 hours from when a vehicle enters the site to when it departs. All factory doors remain closed when not in use and tractor unit diesel engines are turned off whenever a vehicle is stationary.

Empty refrigerated trailers arrive on site and the vehicle is re-fuelled and AD-Blue topped up before being re-weighed. The refrigerated trailer is then positioned on the yard where empty Dolavs are taken off by a Forklift Truck via a ramp that is secured to the trailer by chains. Once the trailer is empty it is taken to a loading bay and connected to an electrical hookup point which provides the refrigeration system with an electrical power supply for approximately 1 hour while the vehicle is loaded by a ride-on pedestrian truck. The diesel 'donkey' engine is only turned on to fuel the trailers refrigeration system when the trailer is fully loaded and ready to leave the loading bay and exit site. Any refrigerated trailer that has been loaded, but needs to stay on site overnight, will be connected to one of the electrical hookup points located on

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the yard to minimise noise. The number of produce dispatched in refrigerated trailers varies with the production rate and the operating hours on different days of the working week.

Empty Animal By Product (ABP) trailers arrive on site and are weighed before being parked in the ABP storage building which accommodates sufficient trailers to ensure ABP are always stored inside and collected in a timely manner. Inedible offal and other ABP are transferred by vacuum lines into the ABP trailers. Feathers are transferred in a water flume, separated and pressed before being loaded into bulk trailers inside the building awaiting collection for further processing off-site. The ABP and feather trailers are collected daily and are replaced by empty trailers. Dolavs and other small containers used for collecting ABP around the process are emptied into the ABP trailer and then washed out. All factory doors remain closed when not in use and diesel engines are turned off whenever the vehicle is stationary. The number of ABP collections varies with the production rate and the operating hours on different days of the working week.

The blood tank is emptied daily and is regularly cleaned using an integrated Clean In Place (CIP) system. Blood tanker drivers connect to the external blood offloading point and link the outlet/exhaust of their tanker vacuum pumps to a flexible hose which is directly connected to the chemical scrubber abatement system extraction ducting. This operation takes around 20 minutes once per day.

The sludge tank on the Wastewater Treatment Plant (WWTP) is emptied twice per day by road tankers to remove wet sludge left over from the effluent treatment process. Sludge tanker drivers connect to the external sludge tank point to extract sludge from the WWTP into the vehicle's bulk liquid tank. This operation takes around 20 minutes twice per day with the vehicle's engine left idling to operate the extraction pump. Under Phase 2 WWTP sludge will be de-watered which will reduce sludge collections by 60%.

See the vehicle loading and unloading locations plan in Appendix 5.

This is a Medium noise risk area of the plant.

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65 Source Identification & Review

6.15.1 Physical characteristics

The key plant and equipment (or operations) with the potential to give rise to noise is listed in Table 1 below:

Table 1 - Noise sources

Operation	Description
Site vehicle movements	HGVs bringing in live birds, ABP & waste collections, forklift trucks, HGVs of outgoing produce, reversing alarms, loading & unloading
Chillers	Condensers / fans, compressors, refrigerated trailers
Boilers	Modular and aeroscalder boilers for hot water supply
General plant & equipment	Fans, pumps, vacuum pumps, compressors, blowers, air extraction systems, abatement plant, stacks for emissions to air
General	Cleaning of plant, modules & vehicles, waste collections

Noise sources from our activities will have different and distinctive characteristics and the duration and frequency of noise will vary. These features are listed in Table 2 below:

Table 2 - Noise type by source

Type of noise	Potential source	Frequency/ duration*
Clatter or rattle	HGV & fork truck movements Equipment and belts Module offloading Module wash	Frequent & intermittent Periodic
Buzzing or beeping	Reversing vehicles warning alarms and other audible warning alarms if not using authorised white noise alarms	Frequent & intermittent
Whine or hum	Fans, compressors, condensers	Periodic or continuous
Roaring / rushing	Revvng of HGV engines, , high pressure air lines, air brakes	Occasional, brief
Screech	Fan belts Vehicle brakes	Periodic or continuous Occasional, brief
Clangs, bangs, grinds and thumps	Maintenance workshop, vehicles, movement of containers by fork truck, unloading of materials	Frequent & intermittent
Tonal elements	Fans, blowers, condensers, vacuum pumps, stack gas efflux noise	Continuous & intermittent

* Overnight periods, limited vehicle movements, production lines and air extraction equipment switched off / ramped down

6.25.2 Key Noise Control Measures

The following advisory measures are recommended to reduce noise impacts:

General Management

- It is important to reduce noise impact that an open dialogue is kept with nearby residents and any concerns they have in relation to noise are dealt with and followed up.
- Employees should be made aware and instructed to minimise noise break-out from all warehouse, factory and utility areas and keep doors closed.
- Management of the loading bays should introduce procedures to reduce the possibility of shutter doors and plant room doors being left open, drivers slamming doors, leaving engines idling, having radios on loud and causing unnecessary noise.
- Reduce the time spent for HGV's waiting at entrance gates by opening prior to HGV arrival or immediately upon arrival to minimise the impact of noise generated by engine idling.
- Ensure items of plant are regularly maintained so that noise is not unduly generated.

Plant & Utilities Management

- The chiller plant has acoustic louvres fitted on all external ventilation points and the condensers are specified to meet the sound pressure levels recommended by our noise consultants.
- Further noise attenuation measures are to be considered for the chiller enclosure for Phase 2.
- The fans on the process area chemical scrubbers are operated on a timer to ramp down overnight and are to be enclosed in acoustic enclosures for Phase 2.
- The blowers at the WWTP are housed in acoustic enclosures.
- The utilities building housing the boilers is fitted with louvered doors and is fully enclosed.
- WWTP building houses DAF and sludge dewatering plant under Phase 2.

HGV & Vehicle Movements

- For the management of deliveries and noise, refer to the Dept. of Transport's - Quiet Deliveries Good Practice Guidance – Key Principles and Processes for Community and Resident Groups, Feb 2015. <https://www.gov.uk/government/publications/quiet-deliveries-demonstration-scheme>
- HGV movements are minimised overnight.
- Traffic routes designed to minimise reversing of vehicles.
- Main weighbridge on yard used primarily with gatehouse weighbridge mostly as back up.
- Low volume broadband white noise reversing alarms should be used or reversing alarms are to be deactivated on site and a banksman used.
- The site speed limit is 5mph to avoid excessive bumping and jolting.
- The hardstanding and vehicle movement routes are maintained in good condition, inspected regularly and repaired as required to minimise potholes and other defects.
- Loading bay shutter doors gates should be closed once HGV have manoeuvred into the loading bay and engine switched off.
- When departing, HGV engines should be switched on before opening loading bay shutter doors.
- HGV engines should not be left to idle unless needed to power ancillary loading equipment
- Vacuum tankers collecting blood and sludge are scheduled between operational hours.
- Surfaces on which fork lift trucks operate are free from bumps and steps so that shocks to the fork suspension do not cause excessive impulsive noises and clatter.
- Where practicable (i.e. between trailers and delivery points) clearly mark work-site routes for the fork lift trucks so that rough or uneven surfaces are avoided.

Table 3 summarises the potential sources of noise at the installation and the factors which may influence noise levels and the potential for variations in noise.

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Table 3 - Potential Noise Sources

Area / Source of Noise		Control measures	Factors that may influence emissions
1.	Lairage / Intake	Control of HGV movements within approved operating hours. Main weighbridge used – gatehouse weighbridge used as backup Lairage capacity allows live bird trailers to be unloaded & empty modules & trailers to be cleaned & reloaded inside Good condition of hardstanding and adherence of drivers to speed limits and reversing procedures. One way system for HGV vehicles reduces vehicle reversing warning beepers noise. Vehicles use broadband type reversing alarms Closure of doors at all times except immediate access / egress. Maintenance of air conditioning systems to prevent abnormal noise from wear and tear of fans / vibration etc. Sound insulation of buildings Holes and openings closed off Enclosed operations within buildings	Out of hours vehicle movements, unauthorised use of horns, non broadband reverse alarms, revving of engines, squeaking brakes, speeding, potholes & bumps, unaffixed loads. Poor maintenance, open doors , damaged building fabric
2.	Hang-on and bleeding, scalding & de-feather & Evisceration	Closure of doors at all times except immediate access / egress. Maintenance of aeroscalder, air conditioning systems to prevent abnormal noise from wear and tear of fans / vibration etc. Sound insulation of buildings Holes and openings closed off Enclosed operations within buildings	Poor maintenance, open doors, damaged building fabric
3.	Treating, processing and packing – flavouring of whole birds	Closure of doors at all times except immediate access / egress.	Poor maintenance, open doors , damaged building fabric
4.	Chilling & Packing	Continuous operation, invertors on condenser fans to minimise operation, located in plant room, insulated building fabric Attenuation of ammonia vents Noise attenuation of chiller enclosure for Phase 2 under assessment Low noise specification for condensers (1 water cooled, 1 air cooled)	Poor maintenance, open doors , damaged building fabric. Intermittent failure of solenoid switches (located inside chiller enclosure) Refrigerated trailers powered by diesel units being used instead of electric hook up points during loading / overnight

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Area / Source of Noise		Control measures	Factors that may influence emissions
		Maintenance of refrigeration plant to prevent abnormal noise from wear and tear / vibration etc. Closure of doors at all times except immediate access / egress. Refrigerated trailer loading done in covered docks Refrigerated trailers use electric hook up points during loading & if held overnight	
5.	ABP handling and storage	Control of ABP HGV movements within approved operating hours. Availability of processing line / space in lairage to move live bird vehicles inside. Good condition of hardstanding and adherence of drivers to speed limits and reversing procedures. Closure of doors at all times except immediate access / egress. Maintenance of air extraction systems to prevent abnormal noise from wear and tear of fans / vibration etc. Adherence to procedures for collection of ABP & emptying blood tank Maintenance of vacuum pumps to minimise noise breakout.	Out of hours vehicle movements, unauthorised use of horns, non broadband reverse alarms, revving of engines, squeaking brakes, speeding, potholes & bumps, unaffixed loads Poor maintenance of vacuum pumps and extraction equipment, open doors , damaged building fabric
6.	Module washing, trailer washing & module return area	Closure of doors at all times except immediate access / egress. Maintenance of equipment and air extraction systems to prevent abnormal noise from wear & tear of moving parts, fans / vibration etc. Sound insulation of buildings Holes and openings closed off Enclosed operations within buildings	Poor maintenance, open doors , damaged building fabric
7.	WWTP	Maintenance of blowers and pumps to prevent abnormal noise from wear and tear / vibration etc. Noise enclosures around blowers	Poor maintenance of pumps and blowers Effectiveness of noise enclosures around blowers.
8.	WWTP sludge storage & handling	Enclosure of primary and divert tanks, DAF and dewatering plant inside buildings. Minimal sludge tanker movements & within approved operating hours, adherence to procedures for collection of sludge Maintenance of pumps to prevent noise form wear & tear / vibration	Poor maintenance, doors left open, damaged building fabric Out of hours vehicle movements, unauthorised use of horns, non broadband reverse alarms, revving of engines, squeaking brakes, speeding, potholes & bumps, unaffixed loads Poor maintenance of pumps

Area / Source of Noise		Control measures	Factors that may influence emissions
9.	Main extraction and air treatment system	Timer on process area scrubbers to ramp down fans overnight Maintenance of scrubbers and extraction systems to prevent abnormal noise from wear and tear / vibration etc.	Poor maintenance, ID fan belt noise, vibration in stacks, doors left open, damaged building fabric, extraction units / process area scrubbers left on full power overnight
10.	Utilities	Closure of doors on utilities building at all times except immediate access / egress. Maintenance of equipment to prevent abnormal noise from wear and tear of moving parts, fans / vibration etc. Timers on boilers to shut down / ramp down overnight	Poor maintenance, ID fan belt noise, vibration in stack, doors left open, damaged building fabric
11.	Vehicle Loading and Unloading Operations	Control of HGV movements within approved operating hours. Gatehouse weighbridge mostly used as back up - main weighbridge onsite is not in direct line of sight to closest noise receptor A Good condition of hardstanding and adherence of drivers to speed limits and reversing procedures. One way system for HGV vehicles reduces vehicle reversing warning alarms noise and broadband alarms used Closure of doors at all times except immediate access / egress. Refrigerated trailers connected to electric hook up points during loading – on board diesel units only turned on when trailer is loaded & ready for departure Loaded refrigerated trailers held overnight hooked up to electric points	Out of hours vehicle movements, unauthorised use of horns, revving of engines, non broadband reverse alarms, squeaking brakes, speeding, potholes & bumps, unaffixed loads. Open doors Refrigerated trailers powered by diesel units being used instead of electric hook up points Contractor vehicles with non-broadband reversing beepers Correct driver behaviours are enforced via training and use of company disciplinary policy i.e. no unauthorised use of horns, revving of engines, radios in cabs will not be operated at excessive levels, speeding is prohibited. Vehicles are well maintained under service contract to prevent squeaking of brakes, Door control is enforced via training and use of company disciplinary policy, i.e. all external doors are closed when not in use. Compliance with use of electrical hookups is enforced via training and use of company disciplinary policy, i.e. use of diesel prohibited. All company vehicles have non-broadband reverse alarms.

Area / Source of Noise		Control measures	Factors that may influence emissions
			Contractors are requested to only use vehicles with non-broadband reverse alarms when on site. Yard is maintained in good order to prevent rumble and vehicle slap noise from poorly maintained surfaces.

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76 Noise Risk Assessment

Our original Planning Consent required that the rating level of any noise generated due to this installation shall not exceed the pre-existing background level by more than 5dB(A) at any time. Our Phase 1 noise impact assessment supported our original planning application.

During Phase 1 we undertook a noise survey in July 2020 to investigate noise complaints from a residence in Pickhill Lane. This noise survey proved that under Phase 1, the installation increases the background levels at the closest residential receptors by less than 5dB(A). The survey recommendation to add attenuation to the one remaining ammonia vent on the chiller plant without attenuation has been completed.

This condition has since been retired and the more appropriate condition of 'not exceeding the background level at any time' is now the objective. This is to prevent 'background creep' a situation where the background noise level increases incrementally by developments over time, with the end result being a louder environment.

It is with this new condition in mind that we undertook a further assessment for Phase 2. The key noise sources for Phase 2 are shown on the installation plan in Appendix 2 of this NMP. We revised the noise impact assessment for Phase 2 alongside our resubmitted permit variation application in February 2023 to include the amended WWTP design. This noise impact assessment has been reviewed and updated again in September – October 2023 to address NRW's Schedule 5 Notice and has been considered alongside updating the NMP.

The key findings of the noise impact assessments for Phase 2 are:

For Sites B-D to the north, north-east and north-west, set against the existing operations it is determined the combined noise impacts of plant and heavy goods vehicle movements for daytime and night-time periods are indicated as likely to be low, depending on context. This is to be expected given observations made during surveys, whereby subjectively there were no adverse impacts on account of plant noise with the installation site fully operational.

To the west at Site A, for daytime the impact is predicted as likely to have an adverse impact, depending on context, and for night-time likely to be an indication of significant impact, again depending on context. Such adverse numerical impacts are based on previous modelling work for plant. This, however, leads to considerations on uncertainty, as during surveys when the installation site has been fully operational, when no untoward plant noise was evident and no adverse impacts were subjectively determined, either during the daytime or the night-time. It is considered noise ratings in this regard, allowing for a two-fold proposed increase in production, are not representative and as such cannot be sustained. Fixed plant is subject to the Noise Management Plan which is now being revised to improve noise control and in-turn noise emissions from the installation.

Concerning impacts to the west that are associated with heavy goods vehicles, these are predicted as low for daytime, and between low and less than adverse impact for night-time.

With on-going improvements at the installation, however, for noise-sensitive receptors to the north, north-east and north-west, recognised strategic criteria for acoustic amenity are not unduly compromised. For noise-sensitive receptors to the west, the main focus rests with plant noise which, under the revised Noise Management Plan seeks to sustain or provide betterment of in terms of installation noise impacts.

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The recommendations from the noise impact assessment are to be addressed to ensure that noise levels should have a low impact at the receptors.

This will be achieved by:

- Amendments to the Noise Management Plan
- Improvement areas identified in Section 3.2 of this Noise Management Plan

7.16.1 Potential impact of releases

We have also undertaken a qualitative assessment of the potential noise impact from the sources described above, which have been informed by the latest noise surveys and assessment

7.1.16.1.1 Qualitative assessment of risks of potential impacts

The likelihood and frequency of exposure to any noise arising from the facility is determined by the magnitude of release, duration, time of day and the distance and direction of receptors in relation to the facility.

A qualitative risk assessment methodology has been used where a judgement of risk of an impact is assigned based on the 'Source-Pathway-Receptor' Model.

A subjective risk score has been calculated for each identified odour or noise source based on a potential Impact score "I" (scored from 1 to 5), which is a subjective measure of intensity/emission rates, multiplied by a Likelihood "L" score (also from 1 to 5). T

The overall risk score assumes that specified suitable control measures are in place, however, the bracketed scores with asterisks provide an assessment of the potential risk if controls are not effective or not effectively used/monitored.

The risk assessment has been based on the following risk matrix scoring system that is used widely in this and other sectors.

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Risk Matrix		Likelihood				
		1 Rare	2 Unlikely	3 Possible	4 Likely	5 Almost certain
Impact Severity	1 Negligible	1	2	3	4	5
	2 Minor	2	4	6	8	10
	3 Moderate	3	6	9	12	15
	4 Major	4	8	12	16	20
	5 Catastrophic	5	10	15	20	25

For grading risk, the scores obtained from the risk matrix are assigned grades, as follows;

	1 – 4	Low risk	Broadly acceptable level of Risk
	5 – 9	Low - Medium risk	ALARP Risk is tolerable if risk reduction is impractical disproportionate to cost
	10 – 14	Medium - High risk	ALARP Risk is tolerable if is disproportionate to cost
	15 – 19	High risk	Unacceptable risk, cannot be justified except in extreme circumstances
	20 - 25	Extreme risk	Risk cannot be justified

ALARP – as low as reasonably practicable

The risk assessment is presented in Table 4 below:

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Table 4 - Noise Risk Assessment & Key Noise Controls to Minimise Risk

Inventory			What can harm/ be harmed?			Managing the risk		Assessing the risk	
Source		Process (Location)	Hazard	Receptor ^{see} Receptor map in App 1	Potential Impact 'I'	Risk Management	Likelihood of exposure 'L'	Magnitude of Risk 'I' x 'L'	Overall Risk
1.	Lairage / Intake	North-east section of factory	Noise from HGVs and from lairage / intake buildings	Receptors A - D	2 - Minor	Control of HGV movements within approved operating hours. Availability of processing line / space in lairage to move live bird trailers inside. Good condition of hardstanding, speed bumps removed at site entrance and adherence of drivers to speed limits and reversing procedures / broadband alarms.	3 - Possible	6 – Low-Medium	Low - Medium if well managed.
					(4 – Major*)	One way system for HGV vehicles reduces vehicle reversing warning alarms noise Closure of doors at all times except immediate access / egress. Maintenance of air conditioning systems to prevent abnormal noise from wear and tear of fans / vibration etc. Attenuation installed on all outlets/inlets. Sound insulation of buildings Holes and openings closed off Enclosed operations within buildings	3 - Possible	6 – Low-Medium	
2.	Hang-on and bleeding, scalding & de-feather & Evisceration	Central section of factory	Noise from internal process operations	Receptors B - D	1 - Negligible	Closure of doors at all times except immediate access / egress. Maintenance of aeroscalder, air conditioning systems to prevent abnormal noise from wear and tear of fans / vibration etc. Sound insulation of buildings Holes and openings closed off Fully enclosed operations within buildings	1 - Rare	2 - Low	Low

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Inventory			What can harm/ be harmed?			Managing the risk		Assessing the risk	
Source		Process (Location)	Hazard	Receptor ^{see} Receptor map in App 1	Potential Impact ‘I’	Risk Management	Likelihood of exposure ‘L’	Magnitude of Risk ‘I’ x ‘L’	Overall Risk
3.	Treating, processing and packing – flavouring of whole birds	South of the main building opposite side close to Pickhill Lane	Noise from internal process operations	Receptors B - D	1 - Negligible	Fully enclosed operations within buildings Closure of doors at all times except immediate access / egress.	1 - Rare	2 - Low	Low
4.	Chilling & Packing	North-west corner close to Pickhill Lane	Noise from condensers / breakout from vents	Receptor A – main chiller. Receptor B – chilled dispatch	2 - Minor	Continuous operation, invertors on condenser fans to minimise operation, located in plant room, insulated building fabric. Attenuation of ammonia vents Review of attenuation of chiller plant / enclosure for Phase 2	3 - Possible	6 – Low-Medium	Low - Medium if well managed.
					4 - Major*)	Low noise specification for condensers Maintenance of refrigeration plant to prevent abnormal noise from wear & tear / vibration etc. Closure of doors at all times except immediate access / egress. Refrigerated trailer loading done in covered docks and electric hook up points.	3 - Possible	6 – Low-Medium	
5.	ABP handling and storage	Northern section of factory	Noise from HGVs, tanker vacuum pumps and from inside	Receptors A – D	2 - Minor	Control of ABP HGV movements within approved operating hours. Good condition of hardstanding and adherence of drivers to speed limits and reversing procedures / broadband alarms. Closure of doors at all times except immediate access / egress. Maintenance of air extraction	3 - Possible	6 – Low - Medium	Low - Medium if well managed.

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Inventory			What can harm/ be harmed?			Managing the risk		Assessing the risk	
Source		Process (Location)	Hazard	Receptor ^{see} Receptor map in App 1	Potential Impact 'I'	Risk Management	Likelihood of exposure 'L'	Magnitude of Risk 'I' x 'L'	Overall Risk
			storage buildings		(4 - Major*)	systems to prevent abnormal noise from wear and tear of fans / vibration etc. Adherence to procedures for collection of ABP and for emptying blood tank Maintenance of vacuum pumps to minimise potential for noise breakout.	3 - Possible	6 – Low - Medium	
6.	Module washing, truck wash & module return area	Southern section of factory	Noise from inside building	Receptors C & D	2 - Minor	Closure of doors at all times except immediate access / egress. Maintenance of equipment and air extraction systems to prevent abnormal noise from wear and tear of moving parts, fans / vibration etc. Sound insulation of buildings Holes and openings closed off Enclosed operations within buildings	2 – Unlikely	4 - Low	Low
7.	WWTP	Eastern edge of site activities	Noise from WWTP equipment	Receptors B – D	2 - Minor	Maintenance of blowers and pumps to prevent abnormal noise from wear and tear / vibration etc. Effectiveness of noise enclosures around blowers. Primary and divert tanks enclosed. DAF and sludge dewatering plant inside buildings.	2 – Unlikely	4 - Low	Low if well managed. *Night time disturbance possible if controls fail

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Inventory			What can harm/ be harmed?			Managing the risk		Assessing the risk	
Source		Process (Location)	Hazard	Receptor ^{see} Receptor map in App 1	Potential Impact 'I'	Risk Management	Likelihood of exposure 'L'	Magnitude of Risk 'I' x 'L'	Overall Risk
					(3 – Moderate*)		(3 – Possible*)	(9 – Low-Medium*)	
8.	WWTP sludge storage & handling	Eastern edge of site activities	Noise from HGVs and tanker vac pump	Receptors B – D	2 – Minor	Standby use only under Phase 2 with new sludge dewatering plant inside building. Control of sludge tanker movements within approved operating hours. Adherence to procedures for collection of sludge Maintenance of pumps to prevent noise from wear and tear / vibration	2 – Unlikely	4 – Low	Occasional use as back up. Low if well managed. *Short duration night time disturbance possible if controls fail
					(3 – Moderate*)		(3 – Possible*)	(9 – Low - medium*)	
9.	Main extraction and air treatment system	To east of main factory building	Noise from scrubber fan / efflux noise from stack	Receptors B – D	2 – Minor	Timer operation of scrubbers to ramp down fans overnight Maintenance of scrubbers and extraction systems to prevent abnormal noise from wear and tear / vibration etc. Acoustic attenuation for all input/output vents	2 – Unlikely	6 – Low - Medium	Low
					3 – Moderate		(3 – Possible*)	6 – Low - Medium	

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Inventory			What can harm/ be harmed?			Managing the risk		Assessing the risk	
Source		Process (Location)	Hazard	Receptor ^{see} Receptor map in App 1	Potential Impact 'I'	Risk Management	Likelihood of exposure 'L'	Magnitude of Risk 'I' x 'L'	Overall Risk
10.	Utilities	Eastern edge of site activities	Noise from inside building / stacks	Receptors B – D	2 – Minor	Closure of doors on utilities building at all times except immediate access / egress. Maintenance of equipment to prevent abnormal noise from wear and tear of moving parts, fans / vibration etc. Timers on boilers to shut down / ramp down overnight	2 – Unlikely	4 – Low	Low if well managed. *Night time disturbance possible if controls fail
					3 – Moderate		(3 – Possible*)	(9 – Low - medium*)	
11.	Vehicle Loading and Unloading Operations	Entire installation	Noise from vehicle movements & loading / unloading	Receptors A-D	2 – Minor	HGV movements in approved operating hours. Gatehouse weighbridge mostly used as back up - primary weighbridge onsite is not in direct line of sight to closest noise receptor A Good condition of hardstanding, speed bumps removed at site entrance and adherence of drivers to speed limits and reversing procedures. One way system for HGV vehicles reduces vehicle reversing warning alarms noise and broadband alarms used Closure of doors at all times except immediate access / egress. Refrigerated trailers connected to electric hook up points during loading. On board diesel units only turned on when trailer is loaded & ready for departure Loaded refrigerated trailers held overnight hooked up to electric points	2 – Unlikely	4 – Low	Low if well managed. *Night time disturbance likely if controls fail
					4 – Major		(4 - Likely*)	16 - High	

(*)risk of abnormal events, e.g., failure of noise control systems and / or non-adherence to procedures

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87 Management of noise

This NMP is a working document, intended to be used as a reference document for operational staff on a daily basis. It provides a schedule of actions that must be taken to minimise noise impact and details site management procedures for the management of noise.

The NMP is available on-site to all relevant site personnel and any visiting officers from Wrexham County Council or NRW.

Our environmental management system (EMS) addresses noise and we will use and review the NMP to ensure we minimise noise from the installation. The management systems include:

- Staff roles and responsibilities
- Training of staff
- Operating procedures
- Auditing and inspections
- Preventative and breakdown maintenance
- Housekeeping standards
- Incidents and emergency response
- Complaint handling and investigation
- Community liaison

The remainder of this document is structured according to aspects of the operation and management of the site.

All measures, contained in this NMP are to be implemented in the routine operation of the site. Additional measures that may be adopted in response to incidents or one-off events are detailed in the contingency procedures section.

98 Roles & Responsibilities

9.18.1 Site Management

The overall implementation of this NMP is the responsibility of the General Manager, supported as required by other Maelor Foods staff with specific roles relating to noise control. The roles and responsibilities of staff are documented under the EMS.

The General Manager can delegate certain tasks as required, although ultimate responsibility will remain with him / her.

A nominated deputy can be appointed for all times when the General Manager is not on site. In such circumstances, it will be the nominated deputy's responsibility to ensure that the requirements of the NMP are adhered to.

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9.28.2 Staff Training

Staff training is a key aspect of ensuring that noise is controlled through effective management during daily operations. All key site operatives involved in “noise” related areas of the plants and particularly maintenance personnel must be trained on induction with “tool-box talks” to deal with noise management issues in the areas in which they will work. They must also be made aware of the existence of this NMP and its requirements through environmental training tailored to staff responsibility levels.

Training needs are reviewed for all staff on an annual basis and refresher training scheduled at set intervals. General noise management forms part of the site induction process to all new members of staff or contractors working in potentially noisy areas of the plant.

Where investigation of an incident identifies a gap in training or a need for refresher training this will be carried out as soon as possible.

9.38.3 Operating Procedures

All departments have a set of operating procedures that cover specific and generic tasks. These procedures identify areas where noise could be released and specify the measures that must be taken to ensure that noise is minimised. The procedures cover the measures to be taken if abnormal events occur such as plant failures and spell out the reporting and recording criteria if abnormal events occur.

Plant whose failure could cause a noise event is covered by operational procedures.

9.48.4 Maintenance

Any plant item whose failure could cause a noise event is covered on the preventative maintenance (PM) system which schedules a series of maintenance tasks at set frequencies. The PM system includes regular checks and maintenance of doors, extraction systems, building fabric, odour abatement plant, WWTP and process plant to minimise failure events and keep noise control optimised. The tasks and their frequency are based on plant manufacturer’s guidance or site experience of operating the plant.

We hold stocks of essential spare parts, so plant can be repaired as soon as possible, and we have same day call out contracts for the main elements of the plant if specialist help is required.

Breakdown maintenance is prioritised if there is potential for or an increase in noise. We will undertake a bespoke environmental risk assessment if we need to undertake maintenance tasks that could create an elevated noise risk and will identify precautions and additional measures that we must take to control noise during the work. This could include work on building doors or roof if they need to be opened for prolonged periods. Wherever possible, we will schedule such work for non-production days to minimise the potential for noise events to disturb site neighbours. We may also issue neighbourhood bulletins to advise neighbours in advance of such work.

There is a clear structure of responsibility which allows operational staff to call in specialist contractors to deal with emergencies and unplanned events which may lead to a noise impact, such as damages to extraction ducts etc.

Such events, and appropriate remedial measures are normally the responsibility of the Site Manager, but lines of responsibility and delegation will be clarified in case the manager is off site when an unplanned

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event occurs. A list of approved contractors who can be called out to deal with incidents is maintained by the Engineering Manager and all staff with delegated responsibility are aware of this list.

9.58.5 Sub-Contractors

Any sub-contractors working at the site must adhere to the requirements of the NMP. Failure to comply with noise control measures will result in a formal warning to the operative and his or her employer. Failure to comply with the warning will result in the operative being banned from the site.

9.68.6 Measures for Reducing Noise Levels On-site – Auditing and Inspections

Maelor Foods will address all reasonable opportunities to reduce noise levels from the site. Measures for reducing the risk have been detailed throughout the document. Audits and inspections are carried out across departments covering housekeeping and adherence to procedures where they address noise. Departmental Managers will also undertake their own checks, inspections and audits as part of the shift handover process.

The specific noise management and noise related checks and tasks are listed in Table 5 below. This list must be reviewed as experience of the plant is collected and if incident investigations identify any areas for improvement:

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Table 5 – Routine Noise Management & Monitoring Tasks / Checks

No.	Tasks	Who?	Targets/Action Levels	Record form
1	Inspect the site for excessive noise levels at least daily during the hours of production (including during the night) and record the findings to determine trends. Frequency to be increased in event of complaints	Environmental Manager/ Hygiene Manager and Security	Checks to include: 1. Not >1 live bird delivery waiting to get into the lairage 2. Doors closed on lairage & ABP storage building when not in use for vehicle movements 3. Doors closed on other process buildings 4. Chiller plant building – no abnormal parameters or noise 5. WWTP area – No abnormal parameters or noise 6. Chemical scrubber area – no abnormal parameters or noise 7. Utilities building – no abnormal parameters or noise 8. External hard standings / vehicle pathways are free of any bumps, holes, obstructions 9. Drivers observe site speed limit and consider neighbours when entering site 10. Reversing beepers disengaged on vehicles / broadband noise alarms used 11. External fork trucks use broadband reversing alarms	Combined Noise / Sniff survey record form EMS9.3.1.1.4 – Appendix 3
2	Site perimeter noise assessments at different times of day. To be conducted alongside odour SNIFF assessments	Environmental Manager/ Hygiene Manager and Security	Detectable/recognisable noise. Back track if elevated or abnormal noise is detected and carry out site checks as set out at 1 above.	Combined Noise / Sniff survey record form EMS9.3.1.1.4 – Appendix 3

109 Abnormal Events and Emergency Operation

We have contingency measures to deal with the foreseeable abnormal events that could influence noise levels from the installation. Table 6 describes several abnormal events or emergencies which may take place at the site and lead to elevated noise levels and lists the response measures.

Table 6 - Abnormal Events and Emergency Operation

Scenario / Event	Location on Site	Likely effect on emissions inventory	Response Measures
Failure of noise control measures, e.g. doors not closing or building fabric / attenuation damage, excessive wear on plant	Site	The control measures proposed are all simple and low tech so the risk of failure is low. If failures do occur, then the potential effect would be an increased risk of off-site effects	All maintenance staff to be trained in identifying problems with control equipment or systems and applying simple fixes. For mechanical plant, such as fans and scrubber dosing and liquor circulation pumps, a supply of essential spares will be kept on site. Refrigeration & WWTP plant engineers available on call
Unavailability of site staff	Site	Incidents occurring outside of site hours may be exacerbated by lack of staff available to attend.	Emergency contact details to be agreed such that someone is available on call to address issues which may arise.

Our Emergency Response Plan covers the generic aspects of how to respond and who to notify. We also have more specific procedures such as a spillage procedure to cover types of incidents. Other events are covered in our standard operating procedures such as how to address effluent treatment plant faults.

We treat door faults, extraction or abatement plant failures and any other incidents that cause or could lead to a noise increase as an environmental incident. Such incidents are handled in accordance with our Incidents & Non-conformances Procedure and we will ensure they are fully investigated and recorded once resolved, with preventative and corrective actions.

We will report incidents to NRW in accordance with our Environmental Licence Reporting Procedure of and Schedule 5 of our environmental permit. These notifications comprise of an initial report to notify NRW of a potentially significant incident as soon as possible followed by a report covering the incident investigations and conclusions.

110 Record keeping

Throughout the whole of the NMP, accurate and thorough record keeping are essential to ensure noise is controlled and will allow us to review and analyse performance. We keep records of maintenance of plant, production, waste management, monitoring, audits and inspections, communication, incidents, complaints and training.

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Our Production Managers are responsible for keeping records of vehicle arrivals, departures, load details, materials processed and records of any incidents or issues that occur. They also maintain a shift log of processing stages which detail any abnormal events or faults requiring maintenance.

1211 Noise Complaints Procedure

The measures outlined in this NMP are aimed at preventing excessive noise occurring to the extent where complaints may be made by neighbours of the site. Nevertheless, it is recognised that having an established complaints procedure is a necessary part of the NMP and we have a generic Environmental Complaint Procedure which we use for this purpose.

The primary purpose of this complaint procedure is to ascertain whether any complaints are linked to the site and associated operations and, if so, to identify the cause(s) and what action may be taken to remedy any on-going complaint episode and to prevent or minimise the probability of a recurrence. All complaints and investigations into them are recorded on an Environmental Complaints Record Form.

1312 Noise Monitoring

There is no routine quantitative noise monitoring undertaken on or around the site. Should noise complaints be verified and Maelor Foods' operations substantiated or suspected as the source, we will use our noise consultant to investigate. This may include qualitative and / or quantitative noise monitoring to identify the extent of any nuisance and to investigate any on site sources and advise on any noise mitigation measures.

1413 Community Liaison

It is important to reduce noise impact that an open dialogue is kept with nearby residents and any concerns they have in relation to noise are dealt with and followed up.

We appreciate how important it is that our neighbours who could potentially be affected by noise from the plant are made aware that we take noise control very seriously and take all reasonable measures to reduce our environmental impact on the local community. Our neighbours will be kept informed of new developments and if requested, we will issue contact details for them to notify the company or to complain in the event of unacceptable noise being experienced.

Our neighbours are encouraged to report any nuisance noise at the time they are experienced so that timely investigations can be carried out.

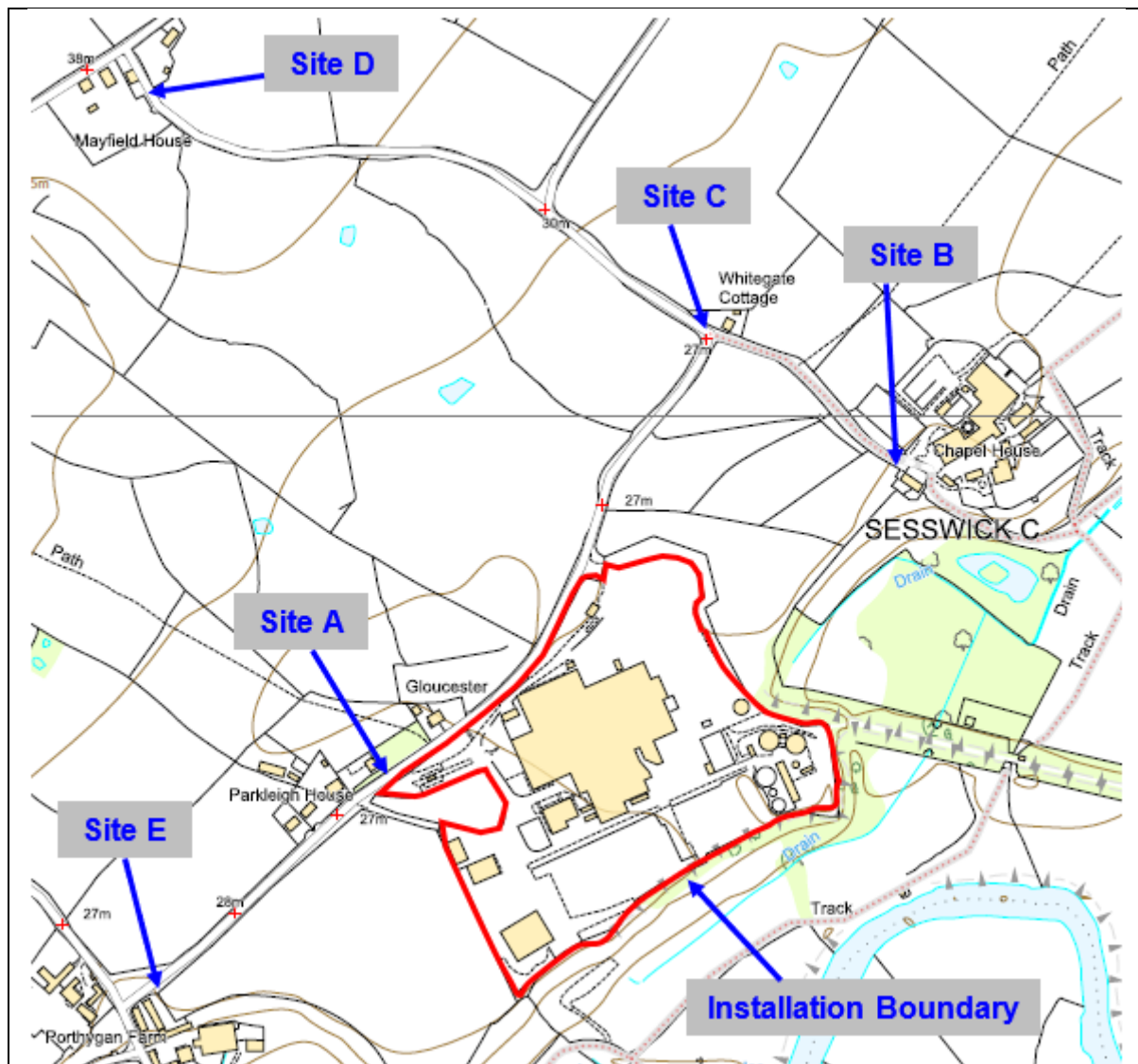
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1514 Appendices

Appendix 1 – Potential Noise Sensitive Receptors

The site location and potential residential noise receptors are shown in Figure 1.

Figure 1: Site location and potential residential noise receptors



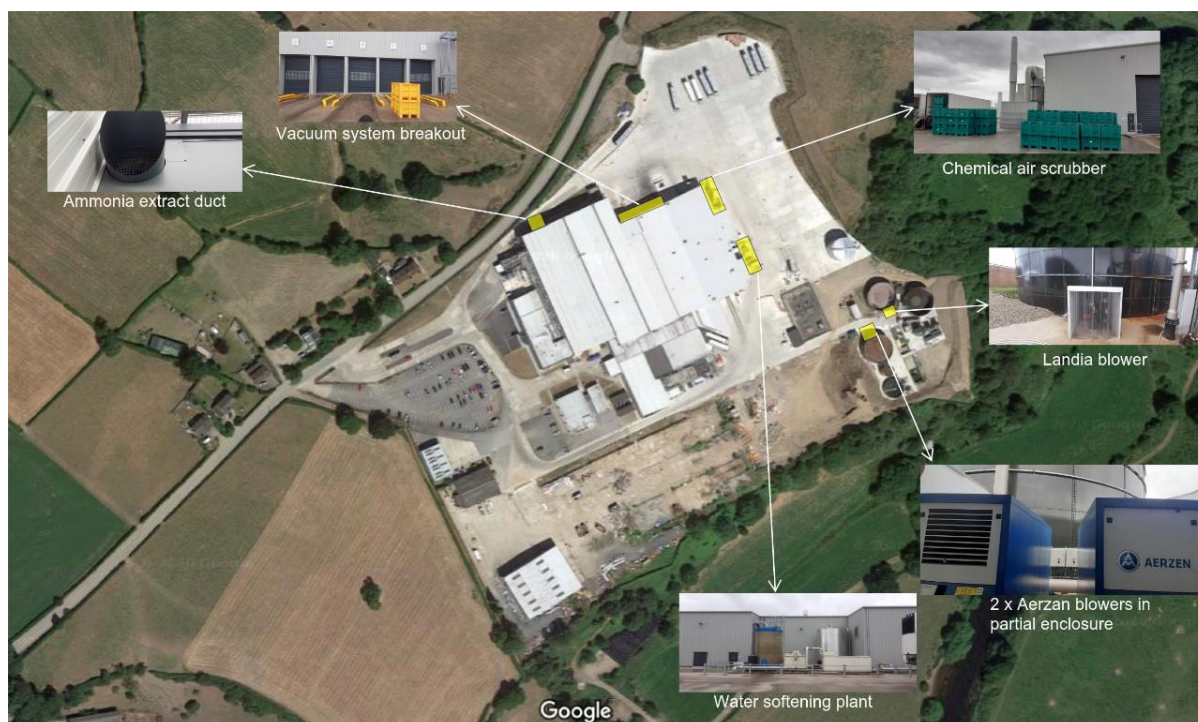
- A. Marlbrook House, Pickhill Lane (opposite to Maelor Foods site entrance)
- B. Pickhill Old Farm complex / Pickhill Equestrian Centre, off Pickhill Lane
- C. White Gate Cottage, Pickhill Lane
- D. Mayfield House, Talwrn Lane
- E. Porthygan Farm, A525 Wrexham Road

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Appendix 2 – Site Noise Source Locations – Phase 2

The site source locations are shown in Figure 2.

Figure 2: Maelor Foods site and plant noise sources (Phase 1) – to be updated with Phase 2 sources above to reflect final layout.



Main chiller plant

- **ammonia refrigeration plant and condensers enclosure:** 1 air cooled and 1 water cooled condenser added for Phase 2. Inverter reduces / increases load with production demands - switched off when no duty required.
- **ammonia plant duct:** Extract ventilation duct

Vacuum System: Noise breakout from the internal vacuum system operational 05.00 - 22.00hrs.

Chemical Air Scrubbers: Operational at design duty 05.00 – 21.00hrs with a timer set to reduce fan speed 21.00 – 06.00hrs. 2nd unit added for Phase 2.

Water Softening Plant: Continuously in operation.

Aeration Tank: Two enclosures, one with 2 x Aerzen D52S blowers and the other with 1 x Landia DK-6940 blower. (2 duty, 1 standby)

MBR Tank: Enclosure(s), 2 x Aerzen D52S blowers (1 duty, 1 standby) added for Phase 2

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Appendix 3 – Daily Environmental Check Sheet

Daily Environmental Check Sheet



General Information

Inspection Date	Inspection Time	Weather Conditions	Temperature	Wind Direction	Wind Strength

Odour Survey

Location	Time	Nature of Odour	Odour Severity	Extent/ Persistence	Noise Level (dB)
1					
2					
3					
4					
5					
6					

Scoring Guide			
	Nature	Severity	Persistence
0	No Odour	No Odour	No Odour
1	Lairage/ Chicken	Very Weak	Localised, not off site
2	Defeather/ Aero scald	Weak	Offsite for brief period
3	Offal	Distinct	Persistent but localised
4	Effluent	Obvious	Persistent over narrow range
5	Sludge	Strong	Persistent over wider range
6	Blood Tanks	Very Strong	
7	Other (Describe)	Extremely Offensive	



ETP Alarm Y/N		Cyclone Alarm Y/N		Cyclone Redox:		Cyclone pH	
Main Scrubber Alarm (Y/N)				Scrubber Redox		Scrubber pH	

General Site Management

Odour Management

Question	Yes/ No	Question	Yes/ No
Are vehicles observing speed limits?		Is there more than 1 vehicle waiting	
Are FLT's driving safely and loads secure?		Are all offal/ lairage doors closed?	
Are external yard areas clean and free of spills?		Is lairage area clean	
Are spill kits sealed and contents full/ unused?		Are all other process doors closed?	
Are correct containers being used/ labelled?		Is offal bay clean and in good condition?	
Are noise controls working around the site?		Is blood tank area clean?	
Are all chemicals banded/ stored correctly?		Is ETP area clean?	
Are bunds in good condition/ no leaks?		Are all carbon filters working?	
Is site drainage colour coded?		Are all Dolavs covered?	
Are handstanding areas in good condition?		Is sludge tank back venting (where applicable)?	
Cleaning activities in correct area?		Other Comments/ Actions:	
W2 and W3 free of visible oil/ grease?			
Borehole secure and free from obstruction?			
Completed By			
Signature			

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Issued By: Suzanne Gray	Approved By: James Colley	

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Appendix 4 – Environmental Complaint Record Forms

Date of Complaint	Time of Complaint	Date Noticed	Time Noticed																								
Name and Address of Complainant																											
Description of Odour (what does it smell like?)																											
Odour Severity	1 Very Weak Faintly noticeable when odour present	2 Weak Odour character barely recognizable	3 Distinct Odour character is recognizable																								
	4 Obvious Odour character is easily recognizable	5 Strong Odour may be offensive if persistent	6 Very Strong Odour is of become exposure considered undesirable																								
7 Extremely Strong Odour is of become and action needed to avoid further exposure																											
Constant or Intermittent	Duration																										
Does the complainant have any other comments about the odour?																											
Are there any other complaints relating to the installation, or to that location?		If yes please give details (dates etc.)																									
Location of complaint Please mark on map location of complaint. ✗ Wind Direction Log <table border="1"> <thead> <tr> <th></th><th>Time</th><th>Direction</th></tr> </thead> <tbody> <tr> <td>30 minutes before complaint</td><td>15.00</td><td>30</td></tr> <tr> <td>20 Minutes before complaint</td><td>15.10</td><td>30</td></tr> <tr> <td>10 Minutes before complaint</td><td>15.20</td><td>3</td></tr> <tr> <td>Time of Complaint</td><td>15.30</td><td>303</td></tr> <tr> <td>10 minutes after complaint</td><td>15.40</td><td>304</td></tr> <tr> <td>20 minutes after complaint</td><td>15.50</td><td>252</td></tr> <tr> <td>30 minutes after complaint</td><td>16.00</td><td>174</td></tr> </tbody> </table> Plot the above direction data onto the wind chart below			Time	Direction	30 minutes before complaint	15.00	30	20 Minutes before complaint	15.10	30	10 Minutes before complaint	15.20	3	Time of Complaint	15.30	303	10 minutes after complaint	15.40	304	20 minutes after complaint	15.50	252	30 minutes after complaint	16.00	174		
	Time	Direction																									
30 minutes before complaint	15.00	30																									
20 Minutes before complaint	15.10	30																									
10 Minutes before complaint	15.20	3																									
Time of Complaint	15.30	303																									
10 minutes after complaint	15.40	304																									
20 minutes after complaint	15.50	252																									
30 minutes after complaint	16.00	174																									
Weather Information (Please attach screenshot of weather station data log)																											
Weather Conditions	Average Wind Speed	Average Wind Direction	Average Temperature																								
Operating Conditions at time of complaint																											
Describe what was happening on site at the time? Any abnormal events, weather conditions or maintenance issues at the time or ongoing? E.g. power cut, abnormal weather (very hot or cold), chemical scrubber or ETP fault?																											
ABP and sludge collection times																											

Complaint Report Form	
Time and date of complaint:	Name and address of complainant:
Telephone number of complainant:	

Date noticed:	
Time noticed:	
Location, if not at above address:	
Weather conditions (i.e., dry, rain, fog, snow):	
Temperature (very warm, warm, mild, cold or degrees if known):	
Wind strength (none, light, steady, strong, gusting):	
Wind direction (e.g. from SW):	
Complainant's description of odour or noise or other nuisance:	
o What does it smell or sound or look like?	
o Severity (see below):	
o Duration (time):	
o Constant or intermittent in this period:	
o Does the complainant have any other comments about the odour or noise or other nuisance?	
Are there any other complaints relating to the installation, or to that location? (either previously or relating to the same exposure):	
Any other relevant information:	
Do you accept that odour or noise or other nuisance is likely to be from our activities?	
What was happening on site at the time?	
Operating conditions at time of occurrence (e.g. odour abatement plant parameters, ABP's collections etc.):	
Actions taken:	
Form completed by:	Date Signed
<u>ODOUR SEVERITY KEY</u> 0 - No Odour Present - no odour perceived 1 - Very Weak - probably some doubt whether odour present 2 - Weak - odour character is barely recognisable 3 - Distinct - odour character is recognisable 4 - Obvious - odour character is easily recognisable 5 - Strong - odour may be offensive if persistent 6 - Very Strong - odour is offensive, exposure to this level considered undesirable 7 - Extremely Strong - odour is offensive, instinctive reaction to avoid further exposure <u>NOISE SEVERITY GUIDE</u> 0 - No Noise Present - no noise perceived 1 - Very faint - probably some doubt whether noise present 2 - Faint - noise character is barely recognisable 3 - Distinct - noise character is recognisable 4 - Obvious - noise character is easily recognisable 5 - Loud - noise may cause minor annoyance - disruption of tranquillity 6 - Very Loud - moderate annoyance – must talk louder 7 - Extremely Loud - serious annoyance – forced to go inside	

Appendix 5 – Plan of Vehicle Loading & Unloading Activities

The site source locations are shown in Figure 3.

Figure 3: Maelor Foods site showing locations of vehicle loading & unloading activities



	WWTP Sludge Collections
	Main HGV Trailer Weigh Bridge
	Vehicle Fuelling Station / Ad Blue
	ABPs Bays
	Lairage
	Vehicle Sanitisation
	Refrigerated Vehicle Unloading
	Refrigerated Vehicle Loading
	Gate House Weigh Bridge
	Intake

Appendix D – Full Modelling Results



Junctions 10									
PICADY 10 - Priority Intersection Module									
Version: 10.0.3.1598 © Copyright TRL Software Limited, 2021									
For sales and distribution information, program advice and maintenance, contact TRL Software: +44 (0)1344 379777 software@trl.co.uk trlsoftware.com									
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution									

Filename: VN222301_A525-Pickhill Road_Priority T-Junction.j10

Path: N:\Vectos Job Data\2022\VN222301 Maelor Foods Further Development\Picady

Report generation date: 30/06/2022 16:12:44

- »2022 Baseline, AM
- »2022 Baseline, PM
- »2027 Baseline, AM
- »2027 Baseline, PM
- »2027 with Dev, AM
- »2027 with Dev, PM

Summary of junction performance

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2022 Baseline									
Stream B-AC	D1	0.1	8.12	0.04	A	D2	0.2	8.13	0.13	A
Stream C-AB		0.2	5.44	0.09	A		0.0	6.12	0.03	A
	2027 Baseline									
Stream B-AC	D3	0.1	8.19	0.05	A	D4	0.2	8.33	0.14	A
Stream C-AB		0.2	5.40	0.10	A		0.1	6.11	0.03	A
	2027 with Dev									
Stream B-AC	D5	0.1	9.48	0.08	A	D6	0.3	9.56	0.20	A
Stream C-AB		0.3	5.69	0.14	A		0.1	6.74	0.05	A

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	
Location	
Site number	
Date	22/06/2022
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	VECTOSNORTH\manchester.modelling
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2022 Baseline	AM	ONE HOUR	07:45	09:15	15
D2	2022 Baseline	PM	ONE HOUR	16:15	17:45	15
D3	2027 Baseline	AM	ONE HOUR	07:45	09:15	15
D4	2027 Baseline	PM	ONE HOUR	16:15	17:45	15
D5	2027 with Dev	AM	ONE HOUR	07:45	09:15	15
D6	2027 with Dev	PM	ONE HOUR	16:15	17:45	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2022 Baseline, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	Two-way	Two-way		0.85	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.85	A

Arms

Arms

Arm	Name	Description	Arm type
A	untitled		Major
B	untitled		Minor
C	untitled		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right-turn storage	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	7.00			120.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	4.30	21	32

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	565	0.098	0.249	0.157	0.356
B-C	728	0.107	0.270	-	-
C-B	643	0.238	0.238	-	-

The slopes and intercepts shown above include custom intercept adjustments only.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2022 Baseline	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	229	100.000
B		✓	24	100.000
C		✓	389	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A	B	C
	A	0	18	211
	B	4	0	20
	C	351	38	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
	A	0	6	10
	B	0	0	40
	C	4	15	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.04	8.12	0.1	A
C-AB	0.09	5.44	0.2	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	18	636	0.028	18	0.0	7.638	A
C-AB	43	778	0.056	43	0.1	5.435	A
C-A	250			250			
A-B	14			14			
A-C	159			159			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	625	0.035	22	0.0	7.835	A
C-AB	56	806	0.070	56	0.1	5.316	A
C-A	293			293			
A-B	16			16			
A-C	190			190			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	26	608	0.043	26	0.1	8.122	A
C-AB	77	845	0.092	77	0.2	5.162	A
C-A	351			351			
A-B	20			20			
A-C	232			232			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	26	608	0.043	26	0.1	8.122	A
C-AB	78	845	0.092	78	0.2	5.151	A
C-A	351			351			
A-B	20			20			
A-C	232			232			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	625	0.035	22	0.0	7.838	A
C-AB	56	806	0.070	57	0.1	5.286	A
C-A	293			293			
A-B	16			16			
A-C	190			190			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	18	636	0.028	18	0.0	7.645	A
C-AB	43	778	0.056	44	0.1	5.425	A
C-A	249			249			
A-B	14			14			
A-C	159			159			

2022 Baseline, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	Two-way	Two-way		0.93	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.93	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2022 Baseline	PM	ONE HOUR	16:15	17:45	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	395	100.000
B		✓	65	100.000
C		✓	230	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
	A	B	C	
From	A	0	13	382
	B	18	0	47
	C	217	13	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	27	4
	B	0	0	9
	C	6	17	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.13	8.13	0.2	A
C-AB	0.03	6.12	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	49	584	0.084	49	0.1	7.139	A
C-AB	13	684	0.019	13	0.0	6.123	A
C-A	160			160			
A-B	10			10			
A-C	288			288			

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	58	567	0.103	58	0.1	7.527	A
C-AB	16	693	0.024	16	0.0	6.055	A
C-A	190			190			
A-B	12			12			
A-C	343			343			

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	72	542	0.132	71	0.2	8.130	A
C-AB	22	707	0.031	22	0.0	5.950	A
C-A	232			232			
A-B	14			14			
A-C	421			421			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	72	542	0.132	72	0.2	8.135	A
C-AB	22	707	0.031	22	0.0	5.938	A
C-A	232			232			
A-B	14			14			
A-C	421			421			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	58	567	0.103	59	0.1	7.538	A
C-AB	16	693	0.024	16	0.0	6.024	A
C-A	190			190			
A-B	12			12			
A-C	343			343			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	49	584	0.084	49	0.1	7.154	A
C-AB	13	684	0.019	13	0.0	6.110	A
C-A	160			160			
A-B	10			10			
A-C	288			288			

2027 Baseline, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	Two-way	Two-way		0.86	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.86	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2027 Baseline	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	241	100.000
B		✓	25	100.000
C		✓	408	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A	B	C
From	A	0	19	222
	B	4	0	21
	C	368	40	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
From	A	0	6	10
	B	0	0	40
	C	4	15	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.05	8.19	0.1	A
C-AB	0.10	5.40	0.2	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	19	635	0.030	19	0.0	7.683	A
C-AB	47	785	0.059	46	0.1	5.402	A
C-A	261			261			
A-B	14			14			
A-C	167			167			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	623	0.036	22	0.0	7.890	A
C-AB	61	814	0.075	61	0.1	5.283	A
C-A	306			306			
A-B	17			17			
A-C	200			200			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	28	606	0.045	27	0.1	8.194	A
C-AB	84	855	0.098	84	0.2	5.130	A
C-A	365			365			
A-B	21			21			
A-C	244			244			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	28	606	0.045	28	0.1	8.195	A
C-AB	84	855	0.098	84	0.2	5.117	A
C-A	365			365			
A-B	21			21			
A-C	244			244			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	623	0.036	23	0.0	7.894	A
C-AB	61	814	0.075	61	0.2	5.254	A
C-A	306			306			
A-B	17			17			
A-C	200			200			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	19	635	0.030	19	0.0	7.689	A
C-AB	47	785	0.060	47	0.1	5.390	A
C-A	260			260			
A-B	14			14			
A-C	167			167			

2027 Baseline, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	Two-way	Two-way		0.96	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	0.96	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2027 Baseline	PM	ONE HOUR	16:15	17:45	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	415	100.000
B		✓	69	100.000
C		✓	242	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
	A	B	C	
From	A	0	14	401
	B	19	0	50
	C	228	14	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	27	4
	B	0	0	9
	C	6	17	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.14	8.33	0.2	A
C-AB	0.03	6.11	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	52	580	0.090	52	0.1	7.243	A
C-AB	14	686	0.020	14	0.0	6.105	A
C-A	168			168			
A-B	11			11			
A-C	302			302			

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	62	562	0.110	62	0.1	7.660	A
C-AB	18	696	0.026	18	0.0	6.035	A
C-A	200			200			
A-B	13			13			
A-C	360			360			

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	76	536	0.142	76	0.2	8.326	A
C-AB	24	711	0.034	24	0.1	5.927	A
C-A	243			243			
A-B	15			15			
A-C	442			442			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	76	536	0.142	76	0.2	8.329	A
C-AB	24	711	0.034	24	0.1	5.912	A
C-A	243			243			
A-B	15			15			
A-C	442			442			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	62	562	0.110	62	0.1	7.672	A
C-AB	18	696	0.026	18	0.0	6.005	A
C-A	200			200			
A-B	13			13			
A-C	360			360			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	52	580	0.090	52	0.1	7.251	A
C-AB	14	686	0.021	14	0.0	6.092	A
C-A	168			168			
A-B	11			11			
A-C	302			302			

2027 with Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	Two-way	Two-way		1.36	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	1.36	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2027 with Dev	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	252	100.000
B		✓	43	100.000
C		✓	433	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A	B	C
From	A	0	26	226
	B	5	0	38
	C	375	58	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
From	A	0	8	10
	B	0	0	60
	C	4	20	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.08	9.48	0.1	A
C-AB	0.14	5.69	0.3	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	644	0.050	32	0.1	8.788	A
C-AB	68	787	0.087	67	0.2	5.689	A
C-A	258			258			
A-B	20			20			
A-C	170			170			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	39	632	0.061	39	0.1	9.068	A
C-AB	89	816	0.109	89	0.2	5.610	A
C-A	300			300			
A-B	23			23			
A-C	203			203			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	47	615	0.077	47	0.1	9.479	A
C-AB	124	858	0.144	123	0.3	5.503	A
C-A	353			353			
A-B	29			29			
A-C	249			249			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	47	615	0.077	47	0.1	9.480	A
C-AB	124	858	0.144	124	0.3	5.485	A
C-A	353			353			
A-B	29			29			
A-C	249			249			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	39	632	0.061	39	0.1	9.075	A
C-AB	89	817	0.109	90	0.2	5.560	A
C-A	300			300			
A-B	23			23			
A-C	203			203			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	644	0.050	32	0.1	8.800	A
C-AB	68	787	0.087	69	0.2	5.677	A
C-A	258			258			
A-B	20			20			
A-C	170			170			

2027 with Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	Two-way	Two-way		1.49	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	1.49	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2027 with Dev	PM	ONE HOUR	16:15	17:45	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	425	100.000
B		✓	99	100.000
C		✓	249	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
		A	B	C
From	A	0	24	401
	B	23	0	76
	C	228	21	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
From	A	0	47	4
	B	0	0	21
	C	6	32	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.20	9.56	0.3	A
C-AB	0.05	6.74	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	75	588	0.127	74	0.2	8.068	A
C-AB	21	685	0.031	21	0.0	6.742	A
C-A	166			166			
A-B	18			18			
A-C	302			302			

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	89	569	0.156	89	0.2	8.637	A
C-AB	27	694	0.039	27	0.1	6.666	A
C-A	197			197			
A-B	22			22			
A-C	360			360			

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	109	543	0.201	109	0.3	9.547	A
C-AB	36	709	0.051	36	0.1	6.533	A
C-A	238			238			
A-B	26			26			
A-C	442			442			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	109	543	0.201	109	0.3	9.561	A
C-AB	36	709	0.051	36	0.1	6.498	A
C-A	238			238			
A-B	26			26			
A-C	442			442			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	89	569	0.156	89	0.2	8.657	A
C-AB	27	695	0.039	27	0.1	6.583	A
C-A	197			197			
A-B	22			22			
A-C	360			360			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	75	588	0.127	75	0.2	8.095	A
C-AB	21	685	0.031	21	0.1	6.703	A
C-A	166			166			
A-B	18			18			
A-C	302			302			