

THE RYLANDS BUILDING

STAGE 3+ NET ZERO CARBON AND
CIRCULAR ECONOMY STRATEGY
REPORT

02 March 2023

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ISSUE HISTORY		
Issue	Date	Description
1	01.03.23	For Planning – Requiring contribution from Russell WBHO
2	02.03.23	For Planning - Reporting update against the Planning conditions 19,20 & 21

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1.0 PLANNING CONDITIONS

This strategy report outlines how the proposed scheme is implementing the aspirations set out within the Rylands Building Environmental Standards Statement (Sustainability and Energy) for operational energy, net zero carbon and circular economy/waste management.

Condition 19

The development hereby approved shall be carried out in accordance with the The Rylands Building Environmental Standards Statement (Sustainability and Energy) for Planning Issue P3 05/09/2020 by Max Fordham
A post construction review certificate/statement shall be submitted for approval, within a timeframe that has been previously agreed in writing by the City Council as local planning authority.

This report has been specifically produced in response to the following conditions to provide a summary status of works carried out up to pre-commencement.

Condition 20

Prior to commencement of the development, an Embodied Carbon Strategy Report shall be submitted to and approved in writing by the City Council as Local Planning Authority. The report shall describe the strategy for the reduction and limiting of embodied carbon and how material circularity will be embedded within the process of design, material sourcing, construction and stewardship/ building management and how this will be monitored as part of the life cycle analysis. The development shall aim for a lifecycle embodied carbon target of 600kgCO₂e/m²(A1-C4) which is in accordance with The RIBA 2030 Climate Challenge interim date net zero carbon target metrics for the development.
Within 6 months of the completion of the development an Embodied Carbon Monitoring Report shall be submitted to the City Council. The report should include as-built embodied carbon life cycle analysis model results, assess the performance of the Embodied Carbon Strategy and include details of constraints, lessons learnt and guidance for future management of the building.

Condition 21

Prior to commencement of the development, an Operational Energy Strategy Report shall be submitted to and approved in writing by the City Council as Local Planning Authority. The report shall the strategy for the reduction and limiting of operational energy consumption and how this will be embedded within the process of design construction and stewardship/ building management and monitoring. The development shall aim for an energy use intensity of 206kWh/m²/yr or lower which is in accordance with The RIBA 2030 Climate Challenge interim date net zero carbon target metrics for the development.
Within 15 months of the completion of the development an Operational Energy Monitoring Report shall be submitted to the City Council. The report should include 12 months metered energy use data, assess the performance of the Operational Energy Strategy and include details of constraints, lessons learnt and guidance for on going improvement (reduction of energy use) for the building users/managers.

2.0 NET ZERO CARBON & CIRCULAR ECONOMY

The approach to NZC remains unchanged on the project since Stage 2. The Rylands Building Environmental Standards Statement (Sustainability and Energy) states that *in response to Manchester City Council's target for Manchester to be carbon neutral by 2038, it has been agreed that the redevelopment of the Rylands Building will aim to achieve Net Zero Carbon status. To accomplish this, a Net Zero Carbon design approach that follows the UK Green Building Council framework has been adopted from the early stages of the project.*

UKGBC Net zero carbon comprises two parts as illustrated in the figure below:

- Net zero carbon: Construction (Upfront construction carbon)
- Net zero carbon: Operational (In-use energy consumption)

The client brief is to achieve Net zero carbon Construction, on completion of the project as per the planning strategy.

The upfront embodied carbon emissions (referred as A1-A5) associated with new materials and the construction process, is over half of this lifecycle embodied carbon. These upfront carbon emissions need to be mitigated by purchasing approved carbon offsets. The previous Stage 3 was priced using the UKGBC Leadership Approach, which at that time was £70/t. Since then, this has risen to around £248/t (Source: HM treasury Green Book non-traded central scenario based on 2020 prices in pound per tonne of CO₂e). The Leadership Approach is not mandated and as such, the final offset price will depend on the approach and type of offsets purchased post completion.

The client brief is to achieve Net zero carbon Operational through NABERS 5 star rating.

It is proposed to use the approach set out in the UK Green Building Council Net Zero Carbon Building Framework as follows:

- 1) Limit the embodied carbon emissions to a target level;
- 2) Limit the operational energy demand to a target level via a combination of passive and then active measures;
- 3) Use an all-electric heating system to take advantage of the continuing decarbonisation of the national grid;
- 4) Incorporate renewable technologies to maximise on-site energy generation;
- 5) Offset any remaining operational and embodied carbon emissions using a Gold Standard offsetting scheme;
- 6) Report, disclose and achieve UKGBC verification.

2.1 Operational energy (Conditions 19 & 21)

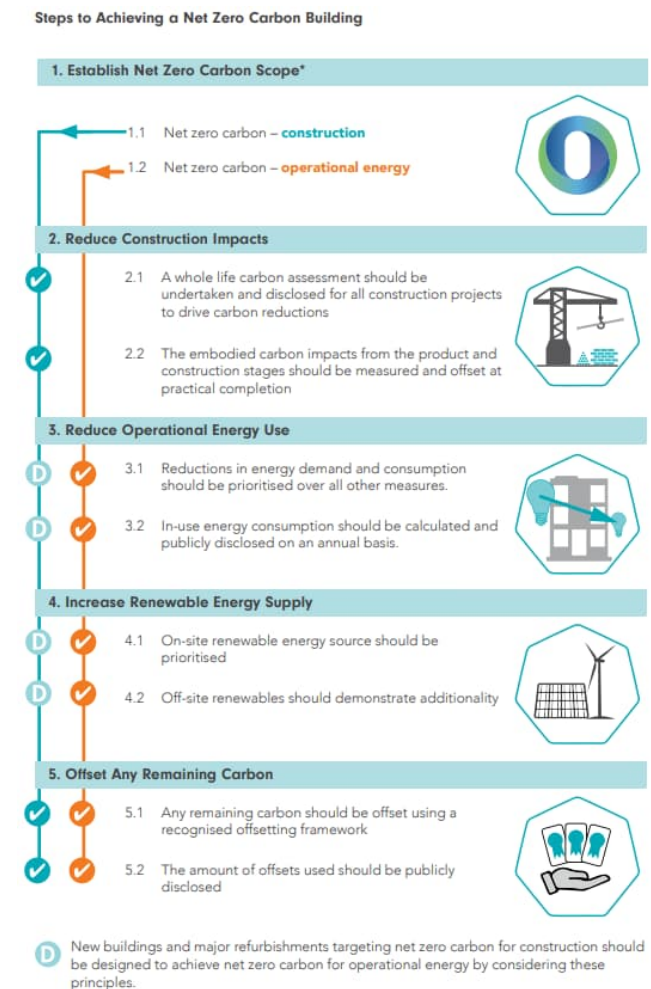
The operational energy demand target for the whole development of 206 kWh/m²/yr remains the same as set out in the planning application. This was arrived at by area-weighting TM46 energy use benchmarks for a variety of uses and applying a 25% reduction in line with the published RIBA 2020 target. Other indicators from UKGBC guidance were also taken into consideration.

NABERS certification will be pursued for the office areas of the Rylands Building once the redevelopment is complete, with the aim being to achieve a 5 star rating. To achieve this, the “base build energy” used to supply central services to the office areas will be logged for 12 months following building occupation and will need to be lower than 90 kWh/m²/yr.

The strategy for achieving these operational energy targets has been maintained from Stage 2 and developed in more detail during Stage 3:

- Enhance the thermal performance of the existing thermal elements by applying internal insulation;
- Replace the existing Crittall windows with superior double-glazed units;
- Improve the standard of airtightness;
- Minimise thermal bridging through design;
- Make use of the existing windows via a mixed mode ventilation strategy;
- Improve daylighting to minimise the use of electric lighting (which itself will be highly efficient LED);
- Utilise mechanical ventilation with heat recovery at times when natural ventilation would result in thermal discomfort or excessive heat loss;
- Provide space heating using highly-efficient reversible air source heat pumps that can provide heating and cooling simultaneously to different parts of the building;
- Utilise all available roof space for a photovoltaic array to maximise on-site renewable energy generation.

At this stage, an initial estimate has been made based on existing Stage 3 modelling, which was undertaken using passivhaus planning package (PHPP) software, as reported in the MF Stage 3 Report. The PHPP results are shown below, for typical refurbished-existing and new-build-extension office floors. Note the energy use intensity values relate to the GIA of the office building, not the NIA used in the NABERS rating. The energy use intensity values from the Stage 3 modelling have been applied to the whole office-building GIA, based on the accommodation schedule dated 11/11/2022. This results in an estimated Base Building energy of 1520 MWh/year. The Rated area (office NIA) based on the accommodation schedule is 28,011 m². The above results in an estimated Base Building energy of 1520,000/28,011= 54.3 kWh/m²(NIA)/year. This represents a 5.0 star NABERS rating, with a margin of ~30%.



Typically, a margin of >25% is required by the independent design reviewer, in order to confirm the target rating is achievable in practice. Note, it cannot be guaranteed that the Stage 4 Rated simulation results will match those given by the Stage 3 modelling used above. This is due to differences in the modelling methodology used, plus details of the design not known at Stage 3. Furthermore, computer simulation only provides an estimate of performance. The estimates are based on simplifications that do not and cannot fully represent all of the intricacies of performance once built. As a result, simulation results only represent an interpretation of the potential performance. No guarantee or warranty of performance in practice can be based on simulation results alone.

2.2 Embodied carbon (Conditions 19& 20)

Planning condition 19, states that the development hereby approved shall be carried out in accordance with The Rylands Building Environmental Standards Statement (Sustainability and Energy) for Planning Issue P3 05/09/2020 by Max Fordham. Planning condition 20, requires submission of an Embodied Carbon Strategy Report prior to commencement of the development. The development shall aim for a lifecycle embodied carbon target of 600kgCO₂e/m² (A1-C4) over 60 years. Within 6 months of the completion Embodied Carbon Monitoring Report shall be submitted to the City Council.

Embodied carbon comprises of two lifecycle assessment (LCA) components and Rylands project targets as described in the figures below :

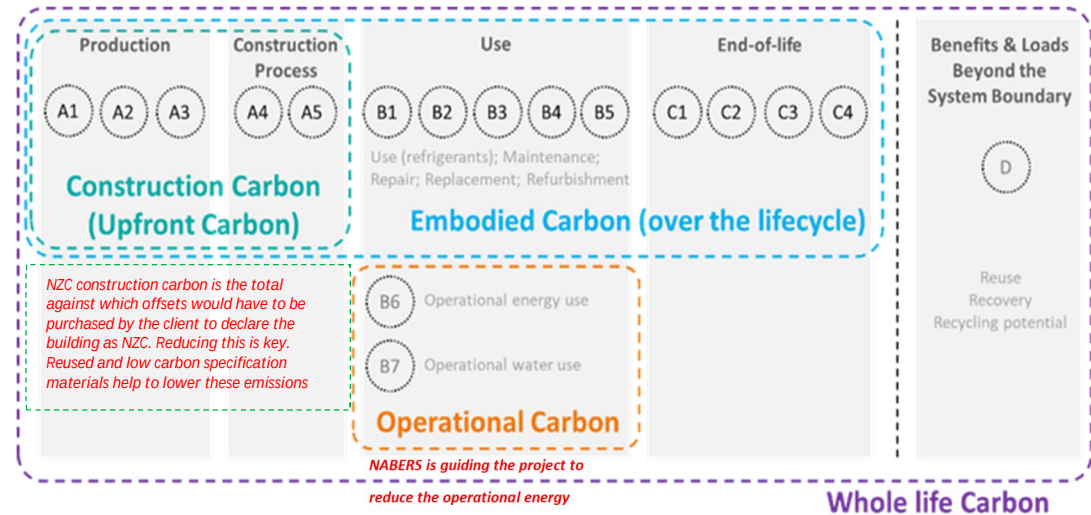


Figure 1 Illustration of Whole life carbon

Based on the current design strategy, the estimate of upfront and embodied carbon for the proposed development is as follows:

	Gross Internal area	Construction (Upfront) carbon	Embodied carbon
Refurbishment of existing building	41,137m ²	222-232kgCO ₂ e/m ²	437- 457 kgCO ₂ e/m ²
New build extension	5,380m ²	625-654 kgCO ₂ e/m ²	784-819 kgCO ₂ e/m ²
Total, for the whole development	46,517m ²	268-280 kgCO ₂ e/m ²	477- 499 kgCO ₂ e/m ²

Definitions	Embodied carbon components	LCA Stages	Description
EMBODIED CARBON	Construction (upfront) embodied carbon	A1 – A5	Includes the carbon emissions associated with production of the building materials and products, delivery to site and the construction processes.
	In use and end of life embodied carbon	B1 – C4 (excluding B6 & B7)	Includes the carbon emissions associated with repair and replacement of building components and the emissions associated with demolition and disposal.

Embodied carbon, A1-C4		Planning target 500- 600kgCO ₂ e/m ²	Upfront Carbon, A1-5	
Band	Office		Band	Office
A++	<150		A++	<100
A+	<345		A+	<225
A	<530		A	<350
B	<750		B	<475
C	<970		C	<600
D	<1180		D	<775
E	<1400		E	<950
F	<1625		F	<1100
G	<1900	G	<1300	

Figure 2 Rylands target

The design strategy will be reviewed as part of the supplier engagement undertaken by the main contractor. This exercise will identify targeted low carbon specification, for the following major carbon contributors:

- Steel frames for the extension
- Unitised curtain walling for the extension
- Raised access floor
- Floor finishes
- Wall finishes

Supplier information for the above will be scrutinised during procurement and construction. As per the Condition 20, Within 6months of completion, the project team will submit an as-built upfront and embodied carbon report for the scheme.

2.3 Circular Economy and Waste (Conditions 19 & 20)

Manchester City Council's Core Strategy (Policy EN19 Waste) sets out requirements relating to Circular Economy. The core circular economy design principles applied for the project as the design develops, to help minimise waste and contribute to reducing embodied carbon are:

- Maximise the residual value of the existing structure by cataloguing and analysing the existing materials and setting performance targets for diversion of landfill waste and reuse on site;
- Maximise the lifetime value of new build and fit-out via optimising the structural design, minimising the waste during construction and making use of recycled or reclaimed materials.

The core strategy Policy EN19 Waste requires the developers to:

- Demonstrate the application of the principles of the waste hierarchy (prevention, reduction, re-use, recycling/composting, energy recovery, final disposal)
- Submit a waste management plan to demonstrate how both construction and demolition waste will be minimised and recycled on site wherever possible and how the sustainable waste management needs of the end user will be met.
- Actively adopt innovation and technological advancement to achieve a closed-loop waste management system
- Provide accessible reuse and recycling facilities to encourage building users to take responsibility for the waste they create

The Rylands Building Environmental Standards Statement (Sustainability and Energy) for Planning Issue P3 05/09/2020 by Max Fordham, Section 5, Circular Economy, Pages 13, states that a pre-demolition audit of the existing building, internal finishes and building services will be carried out before strip-out. A two stage strip out and demolition process is being carried out. The first phase of the strip out was to remove the retail, some building service elements and remove the majority of hazardous waste. The second phase to undertake the strip out of the remainder of the elements, and demolish parts of the building, to enable the main construction to happen. The initial strip-out was encountered with numerous site constraints related to - asbestos and prolonged timescales. This meant that the project team were unable to quantify the initial retail strip-out waste, that was recycled and/or reused. The second phase of strip out will be carried out by the appointed main contractor. A pre-refurbishment/pre-demolition audit of the elements that will be stripped out and/or demolished has been carried out. This is included in the Appendix A.

Concrete is by far the largest contributor of demolition waste, accounting for approximately 61% of waste (20,861 tonnes). This is primarily from the demolition of floor slabs to form the new core. Steel is the second largest material waste stream at an estimate of 18% (6,209 tonnes), originating from the original steel framing. Additional metal waste arises from cable trays, sprinkler pipe work, lifts, escalators, windows etc.. Other waste streams include bitumen (roof covering). Brick is the third largest waste stream estimated to be around 18% (5,576 tonnes) of waste. See Appendix A for the full report including the quantities. Appendix B sets out the waste management procedures that would be implemented by the main contractor in terms of Site Waste Management Plan (SWMP), material removals, stewardship, monitoring and reporting. For the proposed strip-out, demolition and main build, a site waste management plan will be developed and implemented as per the procedures in Appendix B. On completion actual waste generation report will be submitted. The following table outlines the circular economy Key Performance Indicators set within the Sustainability and Energy statement (Section 5, Circular Economy, Pages 13 and 15), and the current strategy towards meeting those KPIs.

Key Performance Indicators	Current strategy
95% of strip-out waste diversion from landfill i.e. to be reused or recycled	The pre-refurbishment/ pre-demolition audit estimates that 96% of strip-out/demolition waste will be diverted from landfill. Due procedures will be implemented to enable reuse of feasible items and recycled most of other materials. See Appendices A and B.
At least 20% by volume, or 30% by weight of stripped out material to be reused	It is unknown how much of the amount of retail elements, that were stripped as part of Phase1, were reused off-site. Based on the pre-refurbishment audit (Appendix A) carried out by the main contractor, the project team are evaluating items that can be: - Incorporated within the base build - Retained on-site for future tenant fit-out - Stripped for reuse off-site The work is on-going. An update on the quantum of reused items on-site and off-site will be submitted on project completion.
50-60% of new materials installed to be demountable or removable at end of life	This primarily applies to the steel framing solution for the extension. Steelwork connections for the proposed extension are shown as bolted, details for column strengthening for the perimeter columns are also shown as bolted along with the inclusion of new steel beams for the trimming of any new apertures. It should also be noted that the steel frame is to have a new anodic/cathodic protection system integrated to aid with extending the design life even further. Details will be developed once the sub-contractors are appointed.
40-50% of removable materials to be recyclable.	This will be monitored and reported as part of the as-built upfront and embodied carbon report

APPENDIX A PRE-REFURBISHMENT AUDIT REPORT



PRE DEMOLITION AUDIT

Rylands Building

109-127 Market Street

Manchester

Projection Description:

The works consists of the conversion of the existing Grade II Listed former Debenhams building into retail space to ground and two basement levels, and CAT A office space to the seven floors above. This includes the construction of a four-storey extension to the top of the building and a glazed atrium running up the entire height of the building.

Demolition Timescales:

Start 27/02/23 and completion in TBC.

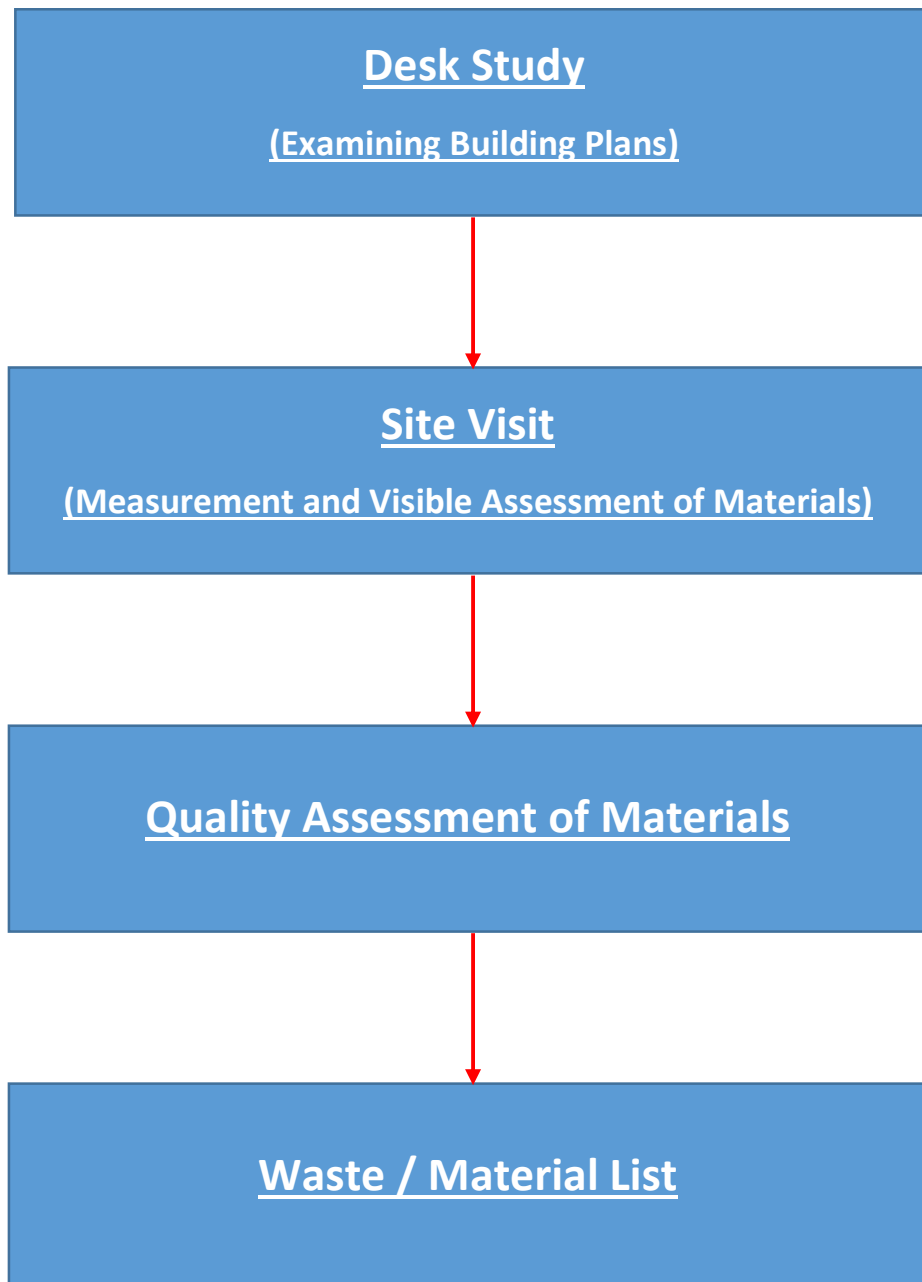
Report Produced by Leo Frechou – Head of Environmental & ISO

Date – 24/02/2023

I have been employed at Russell WBHO for 13 years managing Russell WBHO policies and procedures in compliance with environmental legislation and ISO standard requirements. I report and track the company and project's waste quantities and proactively looking at solutions to reduce waste and waste to landfill. I am a licenced BREEAM assessor for commercial, retail and leisure construction and completed numerous BREEAM projects with successful certification.

The following report was compiled with the information available at the time and as shown on the demolition drawings at Stage 4a by Jeffrey Bell Architects.

Pre Demolition Audit Flow Chart:



Desk Study & Site Visit:

Building Plans:

Building floors are as identified below and the plans shown in Appendix A:

- Sub Basement
- Basement
- Ground Floor, including mezzanine
- First Floor – Seventh Floor
- Roof

The major building materials found on the desk study is as follows:

- Floors – Concrete
- External Walls – Brick, cladding & glazing
- Roof – Concrete, Insulation & membrane
- Internal Walls – Stud Partition, plasterboard and block
- Glazing – Metal & Glass
- Mechanical – Metal chambers and fuel tanks
- Electrical – Lighting, Containment and Wiring

Contamination:

An Asbestos Demolition and Refurbishment Survey has been carried out and notifiable asbestos has been identified. This will be removed by a licenced asbestos removal contractor in accordance with the current regulations and a clean air certificate will be required prior to the main demolition start. The removal contractor will be required to notify the HSE.

Removal of Waste:

Waste shall be removed from site by dedicated skips. The waste carrier must be a licenced waste carrier in accordance with the Environmental Agency (EA) and the waste taken to the appropriate EA Licenced/Permitted recycling plant.

The demolition contractor shall ensure that when waste changes hands, a transfer note/ticket is completed and kept for a minimum of 2 years for Non-Hazardous waste and 3 years for Hazardous Waste with a Hazardous Waste Consignment Note (Section A to E completed in full).

All those who produce or handle wastes from demolition, earthworks and construction activities have legal responsibilities – Duty of Care – for its safe keeping, transport and subsequent recovery or disposal. Failure to comply can result in an unlimited fine.

Quality of Materials:

There may be potential for certain waste materials to be re-used, either on this scheme or elsewhere. A reuse items tracker has been established by Max Fordham with the following items identified:

POTENTIAL ITEMS FOR REUSE	Incorporate within base build	Retain future tenant fit-out	Reuse off-site	
Brick	√			20t (20no. 1t pallets) of existing brick target has been set by the project team to be recovered for use to repair areas of opening up works and damage repair.
Cast iron doors	√	√		2no. doors will be retained for either re-use or retained by future tenants for tenant fit-out
LED spot lights and track	√		√	Samples of LED spot lights will be sent to a re-manufacturer supplier to assess if the existing fittings are in good enough condition to be either re-used at Rylands or potentially elsewhere. 200no. fittings are currently targeted subject to re-manufactured depending on their condition.
Containment	√			Cable tray and containment may be re-used, subject to inspection, verification and suitability.
Escalators			√	The expected weights for re-use and scrappage of one escalator are as follow: (total 9no. escalators) Salvageable Parts targeted to be saved for re-use as spares are: • Step treads (60 x 15kg) = 900kg • Motor/Gearbox Unit = 1500kg • Ancillary parts (Re-useable spares) = 300kg • Total salvage = 2700kg Scrappage targeted for recycling: • Glass = 600kg • Handrails = 200kg • Truss (including step chains and all guides) 6,000kg.
Crittall Windows	√			All Crittall windows are to be removed, however spare parts are envisaged to be re-used in the refurb of the 7 th floor windows where practicable.
Heritage Items	√	√		Various elements will be either re-used on site or removed from site for storage or re-use elsewhere, i.e. stairs, column surrounds, timber panels in executive office.
Existing structural steel			√	Issue of warranting pre-1932 steel. Potential structural steel may be re-used offsite. Max Fordham are in consultation with Cleveland Steel to assess the potential for re-use off site of the structural steel to be demolished. This will then need to be agreed with AML and Russell WBHO.

Any material not being reused will be sent to a waste recycling facility for processing and recycling.

Waste / Material List – Soft Strip / Demolition Waste Breakdown

Component	ECW Code	Recovery Potential	In Situ Quantity (Tonnes)	Unit	Demolition Recovery Index (%)	Demolition Recovered Material Target
Concrete	17-01-01	Recycled Aggregates	20,861	Tonnes	97%	20,235
Bricks	17-01-02	Recycled Aggregates	5,576	Tonnes	97%	5,409
Tile / Ceramics	17-01-03	Recycled	580	Tonnes	99%	574
Flooring	17-01-03	Recycled	95	Tonnes	41%	39
Wood	17-02-01	Recycling	40	Tonnes	99%	39
Plastic	17-02-03	Shredding	12	Tonnes	41%	5
Metal	17-04-07	Recycled	6,209	Tonnes	99%	6,147
Insulation	17-06-04	Recycled	0.3	Tonnes	30%	0.1
Gypsum	17-08-02	Recycled	349	Tonnes	41%	104
Mixed Waste	17-09-04	Recycled	290	Tonnes	90%	261
Glass	20-01-02	Recycled	75	Tonnes	99%	74
Total			34,147		96%	32,922
Hazardous / Potential Contamination	All hazardous waste materials are proposed to be removed during the soft strip stage of the demolition.					
Note – Diversion from landfill recovery index are based on the current UK statistics available on the UK Government website. A more accurate recovery index % will be established once the waste transfer sites are known. The waste quantities identified above are targets and <u>not commitments</u> . Russell WBHO will monitor waste data monthly and review the actual waste data against the above figures.						

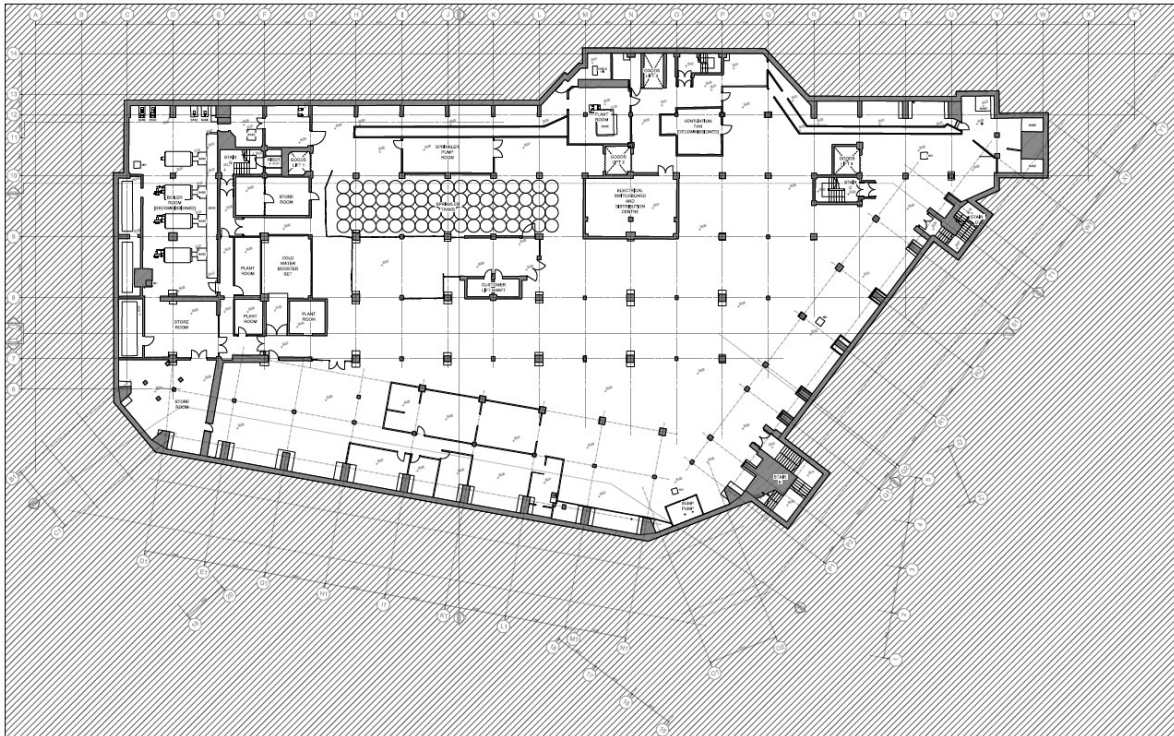
Waste Material:

Construction and Demolition waste material can be recycled and re-used in various other type of products if done correctly and effectively. Russell WBHO will liaise and work with the demolition contractor to establish the recycle activity of open/closed loop in more detail in consultation with their waste transfer stations and suppliers.

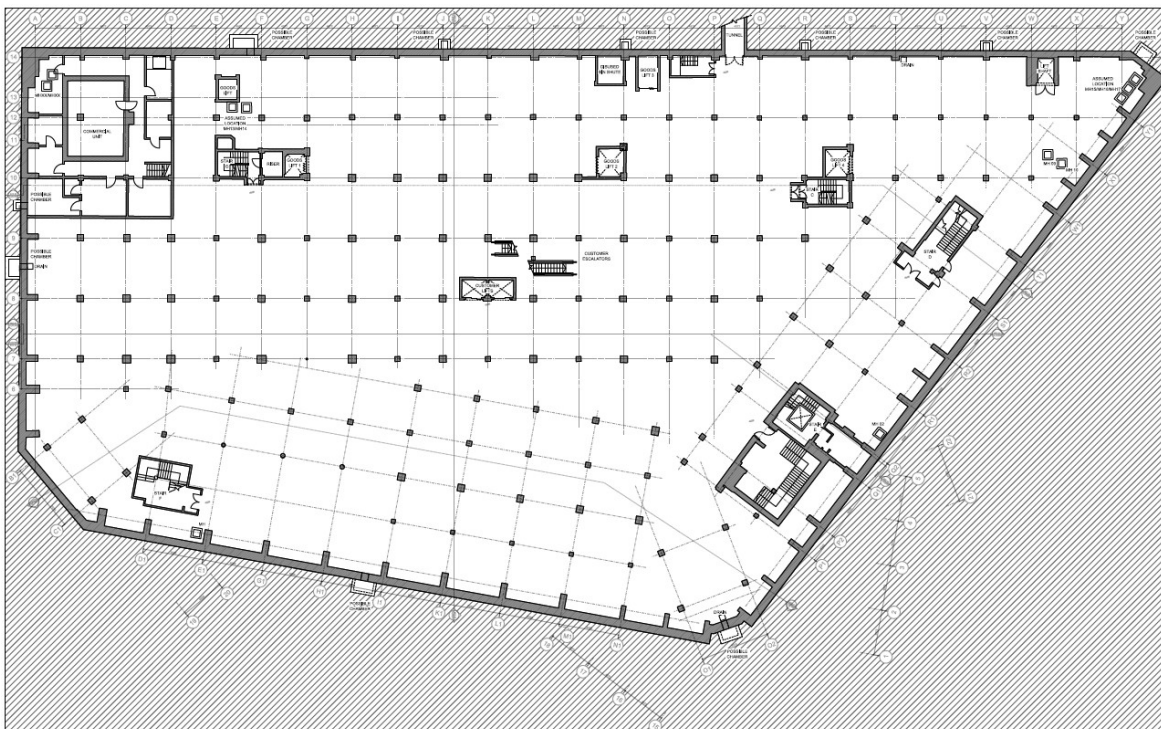
Waste Material	Can be recycled for	Open or Closed Loop
Concrete	Roads, pavements and aggregate for new concrete	Open and Closed
Brick / Masonry	Aggregate for gravel, broken down to make smaller bricks, sand	Open and Closed
Metal	A variety of new metal items (metal is 100% recyclable)	Closed
Glass	Sand, gravel, new building materials (glass is 100% recyclable)	Open
Wood	Landscaping mulch, bedding, fuel, composite board products and pallets	Open
WEEE Waste	They are sorted into plastics, ferrous and non-ferrous metals through a stringent recycling process.	Open

Appendix A

Sub-Basement



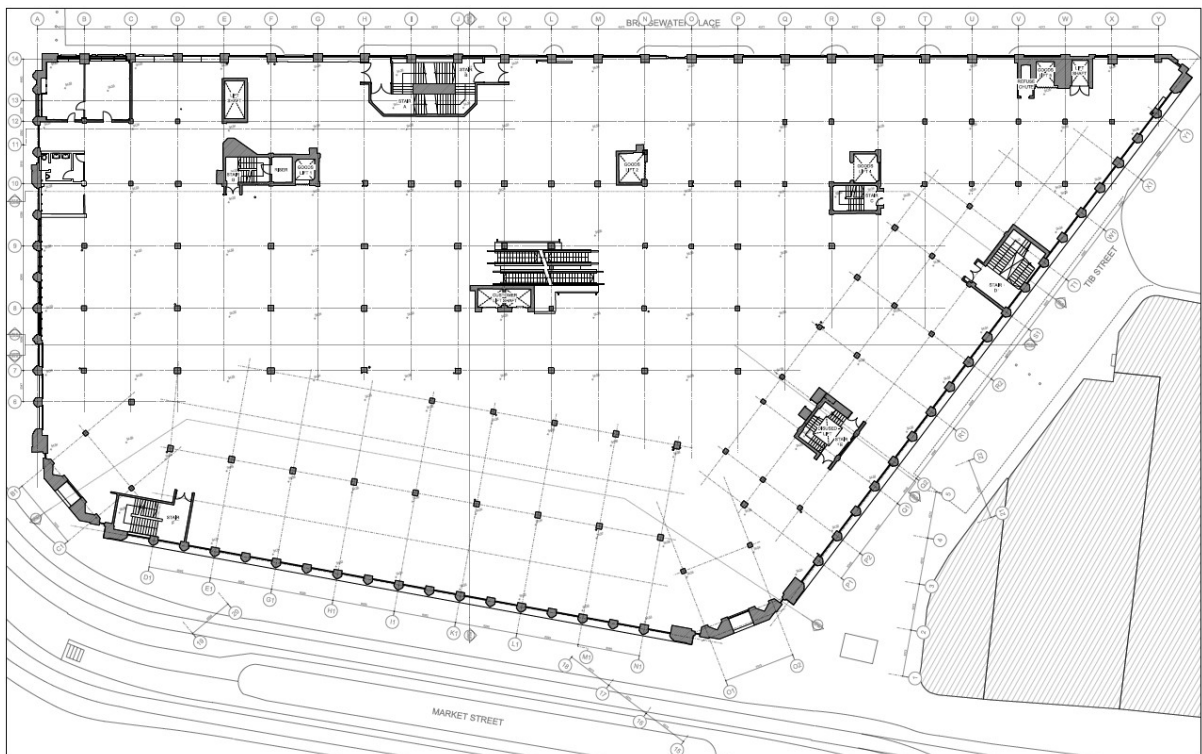
Basement



First Floor



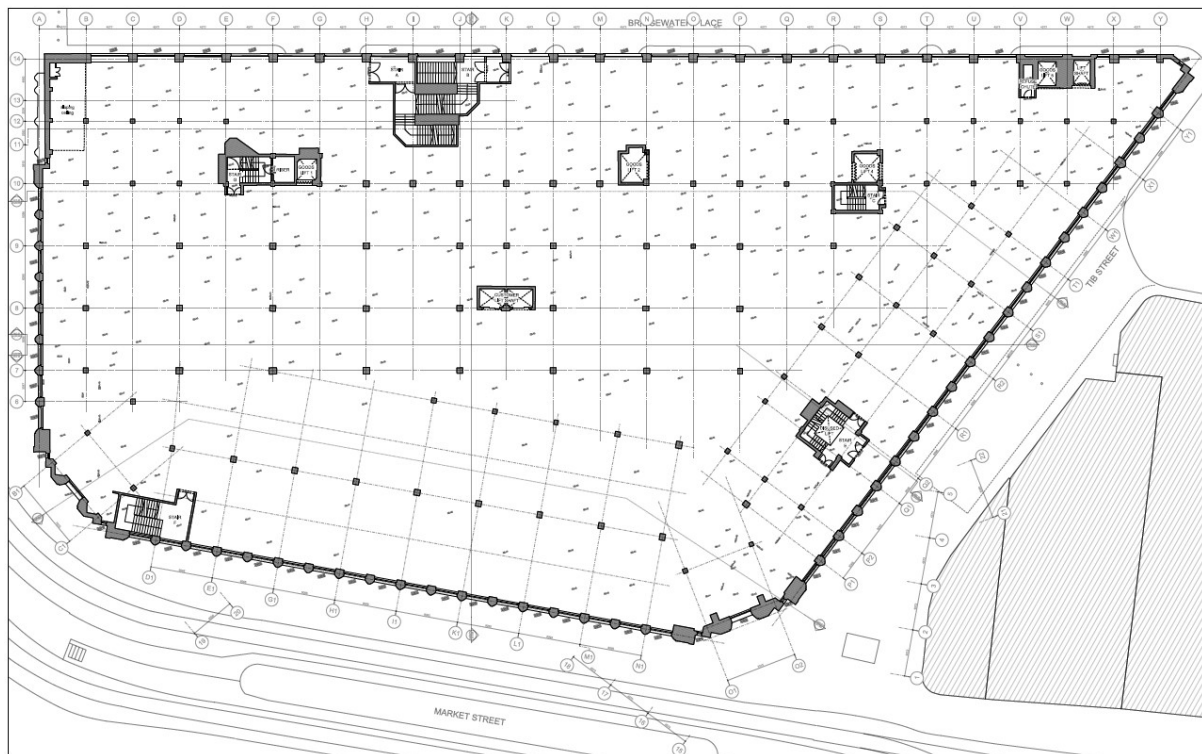
Second Floor



Third Floor



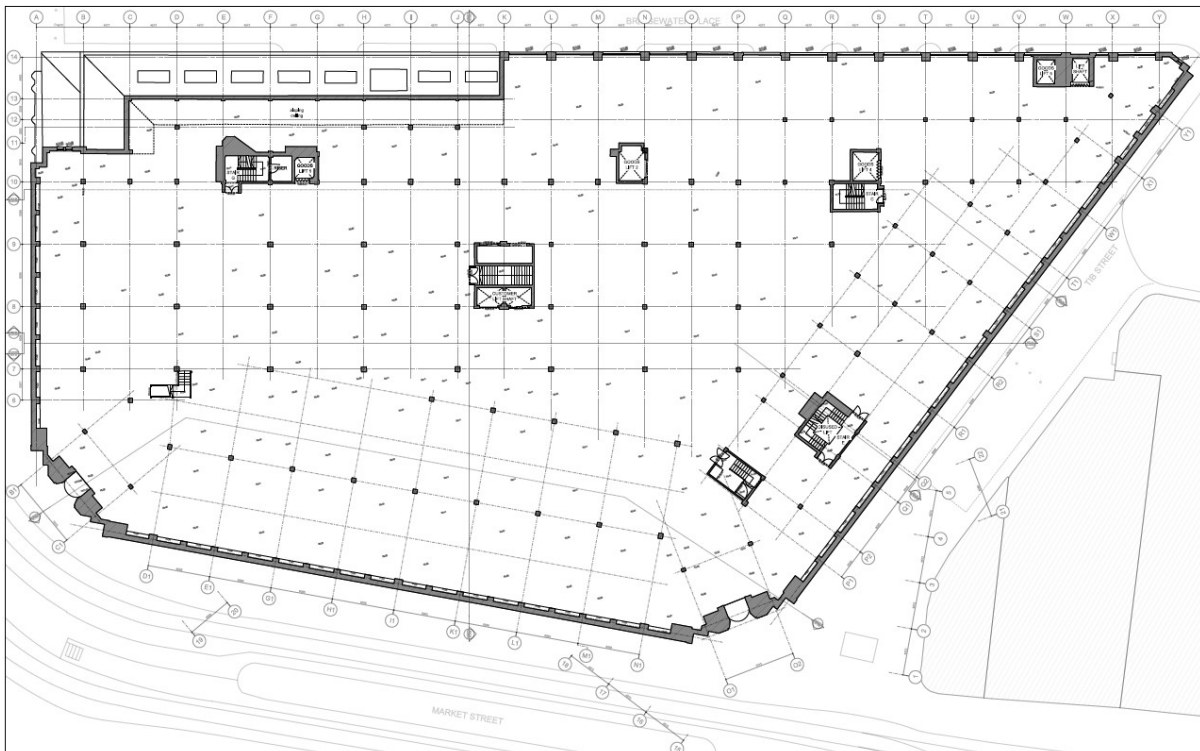
Fourth Floor



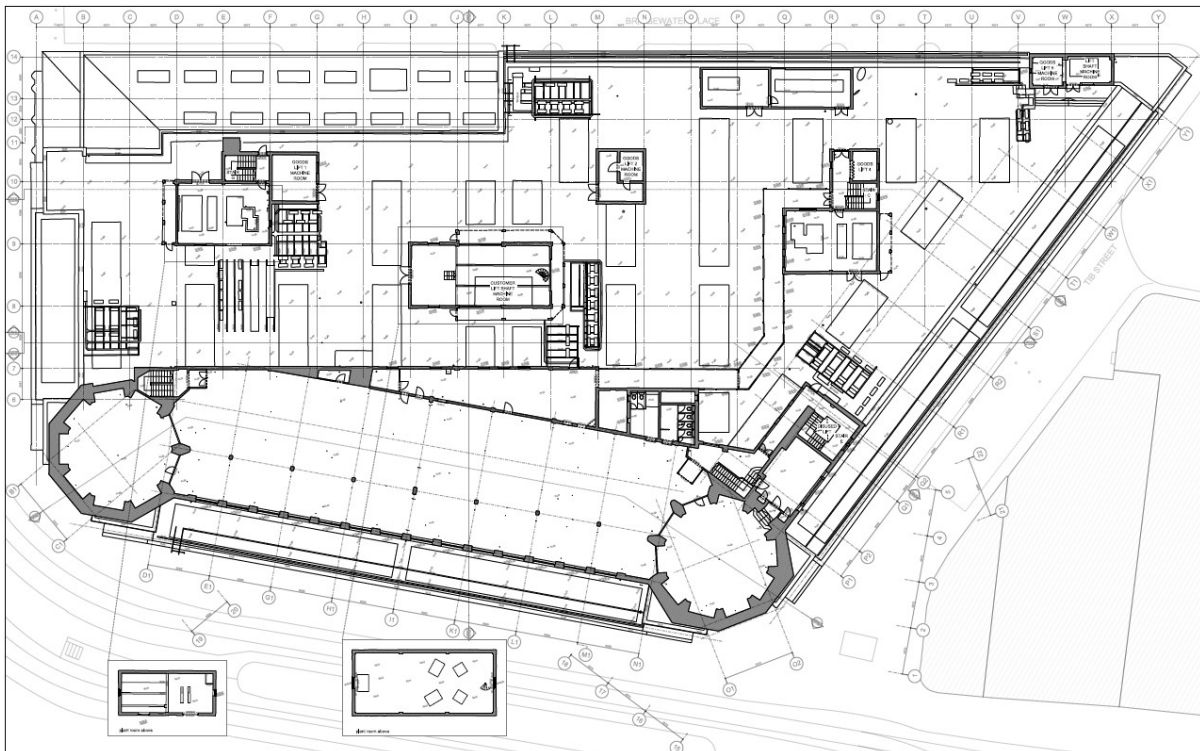
Fifth Floor



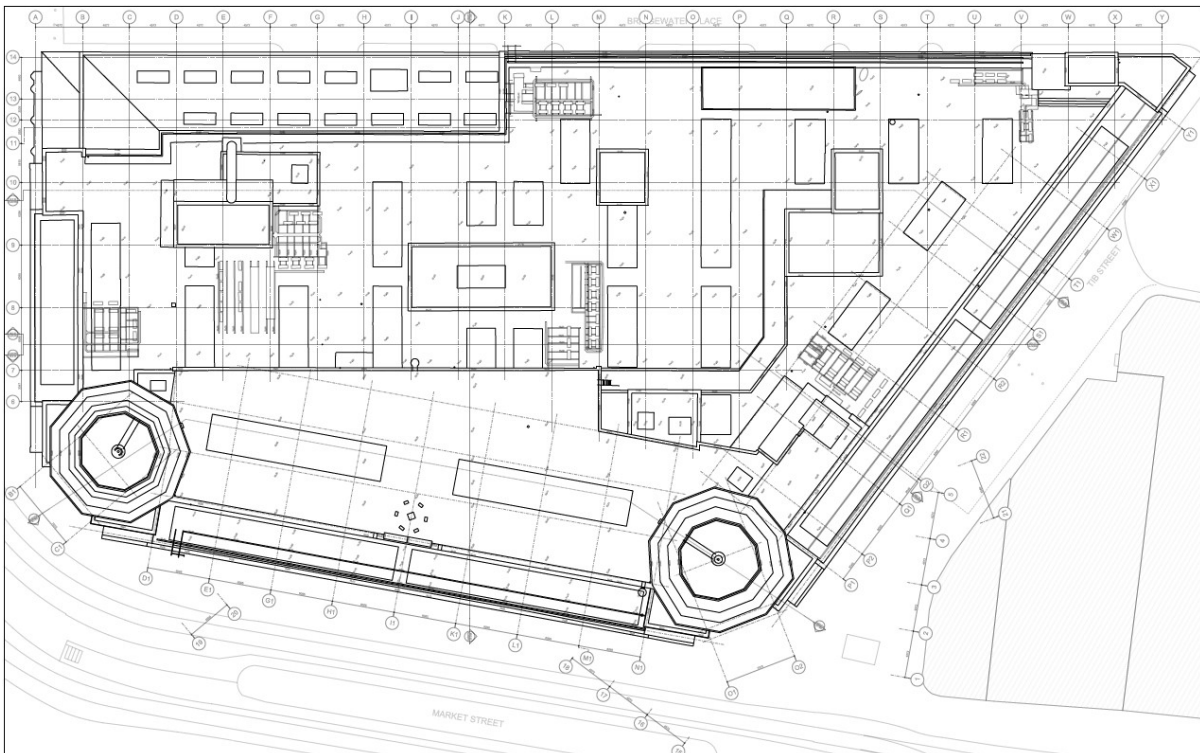
Sixth Floor



Seventh Floor



Roof



APPENDIX B SITE WASTE MANAGEMENT PROCEDURE

PR-EN013 – Site Waste Management Procedure

1. Responsibilities

- a. The requirements for a SWMP is no longer a legal requirement since January 2014, however can be requested by the client or required for BREEAM certification. It is an offence by the principal contractor if the waste produced is not recorded and waste described on the Waste Transfer Notes. In a principal contractor role, RUSSELLS is responsible for:
 - obtaining relevant information from sub-contractors;
 - updating the SWMP as the project progresses;
 - identifying waste removal contractors;
 - keeping the SWMP up to date;
 - ensuring that other sub-contractors know where the SWMP is kept;
 - allowing other sub-contractors and the client access to the SWMP during the project;
 - handing the completed SWMP back to the client at the end of the project, if required/requested
 - keeping a copy of the SWMP for two years.
- b. Ultimate responsibility for achieving the above lies with the business Managing Director. Operational responsibility must be assigned to the Project Lead who will implement Russells areas of responsibility of the SWMP.
- c. This person needs to:
 - negotiate during the tender process to define contractual responsibilities for completion and maintenance of the SWMP;
 - be able to communicate to everyone working on-site and motivate them to follow the SWMP;
 - be able to provide or source the necessary resources and training;
 - have a good knowledge of the contract and the various parties involved.

2. General

- a. The SWMP must identify:
 - the person responsible for waste management on-site;
 - the types of waste that will be generated;
 - waste management options for these waste streams;
 - the use of appropriate and licensed waste management contractors and sites;
 - a plan for monitoring and reporting on the quantity of waste.
- b. To be effective, it is vital that the SWMP is simple and easy to follow, with clear procedures for waste management.
- c. A SWMP involves the following stages:
 - writing the SWMP;
 - assigning responsibility for implementation;
 - identifying likely waste arisings, types and amounts;
 - determining the best waste management methods (on-and off-site) for the different wastes;
 - optimising the supply and procurement of materials;
 - communicating the plan on how it will be implemented;
 - setting up systems to segregate and handle wastes on-site to encourage recovery;
 - making sure the site complies with the Duty of Care;
 - collecting data on waste generated during the project;
 - reviewing and updating the SWMP upon a change in the project, waste management status
 - drawing up recommendations for future projects.

3. Creating the SWMP

- a. The responsibilities for the production of the SWMP must be agreed at the start of the contract. The principal contractor is responsible for its production, implementation and use.
- b. If the SWMP is written at the pre-planning stage to take account of design and waste minimisation issues, then the developer or client or the architect's representative may be responsible, if the client requires a SWMP to be in place at this stage.
- c. If the SWMP is written at the tender stage or at the beginning of the construction phase, then the principal contractor will be largely responsible. The principal contractor may also have to develop and use any SWMP produced by the client. Sub-contractors will need to comply with the principal contractor's SWMP.
- d. It is important that the person or team writing the SWMP has adequate knowledge of waste issues and the construction programme. Ideally, they must also be responsible for implementation of the SWMP.
- e. The writer of the SWMP should be supported by the wider project team, which must be consulted in a partnership approach.
- f. The project team may include:
 - client;
 - design team;
 - regulators;
 - project team members;
 - HSEQ department;
 - sub-contractors (especially the demolition contractor);
 - relevant supply chain organisations,
- g. To ensure the SWMP is completed fully, a SWMP checklist should be used.

4. Making the SWMP work

- a. The SWMP must be:
 - viewed as common practice on-site;
 - embedded within the businesses existing policies and site procedures.
- b. It is essential that the SWMP is supported by the management team and accepted by the project team (including sub-contractors). It is also important that the SWMP is communicated effectively to everyone on-site and be made widely available. Training should be given as required and records kept of this training.

5. Identifying likely waste arising, types and amounts

- a. Knowledge of the types of waste and the estimated amounts arising from each part of the work programme is essential in order to determine:
 - what types/numbers of containers are needed for the different project stages;
 - when best to implement segregation for different waste streams.
- b. Estimates should be recorded using table on the "Waste Data Chart" once the waste types have been identified. Waste can be split into three categories; Demolition, Excavation, Construction.

6. Planning for waste management

- a. The various options for the likely waste generated on-site should follow the waste hierarchy e.g. initially prevent and reduce waste; followed by re-use and recycling (on-and off-site); recovery of energy and finally disposal.
- b. Planning for waste management will help to:
 - decide whether any specialised equipment is required on-site, e.g. a mobile crusher for recycling aggregates;
 - provide advance warning if exemptions or licences are required;
 - plan for the appropriate use of space and containers.
- c. This information can be combined with the waste estimates to set targets for:
 - segregation on-site;
 - recycling of materials;
 - diversion of waste from landfill.

7. Optimising material supply and procurement

- a. The amount of waste generated on-site can be reduced significantly by looking at the way in which materials are procured and supplied to site.
- b. Wastage rates for materials can be reduced through:
 - better ordering systems;
 - less packaging;
 - take-back schemes.
- c. The business individual with the procurement responsibilities may therefore become part of the SWMP process.

8. Communication and training

- a. Communication of the SWMP is essential in order for all Russells' staff, subcontractors and third parties to be aware of their responsibilities. The SWMP can be communicated through means such as site induction, toolbox talks and project review meetings. The SWMP must be held on site and be readily available to all sub-contractors and other third parties.

9. Segregation of materials and waste handling on-site

- a. To promote effective waste management, where practicable, waste materials must be segregated on-site. Information on construction recycling segregation is available in the CIRIA Environmental Good Practice on Site Pocket Book.

10. Working with sub-contractors

- a. All Russells' appointed sub-contractors must segregate the waste they produce where stated in the SWMP.
- b. Where sub-contractors remove their own waste, they must provide a waste transfer note containing the legally required information as per Environmental Protection Act 1990, Section 34; and the necessary certification.

11. Hazardous waste

- a. All hazardous wastes must be segregated in separate skips for disposal.
- b. Hazardous waste skips must have adequate identification signage and be secure.
- c. Avoid contaminating other wastes with hazardous materials (to avoid even higher disposal costs).
- d. Where sub-contractors remove their own waste, they must provide a hazardous waste consignment note containing the legally required information as per The Hazardous Waste (England and Wales) Regulations 2016; and the necessary certification. All 5 section must be completed.
- e. For advice on all aspects of hazardous waste, including the rules governing its transfer off-site and disposal, contact the HSEQ Department.

10. Complying with the Duty of Care

- a. A SWMP must provide a framework to ensure that Russells complies with the Duty of Care requirements. These include:
 - ensuring that all wastes are stored safely and securely;
 - checking that all waste contractors have the appropriate licences;
 - filling out waste transfer notes properly;
 - filling out consignment notes for hazardous waste properly;
 - keeping copies of all waste transfer notes for two years, and hazardous waste consignment notes for three years.
- b. Practical ways for complying with Duty of Care requirements can be obtained from the business Health and Safety Department. Or by information available in the CIRIA Environmental Good Practice on Site Pocket Book.

11. Data collection and analysis

- a. Collection and analysis of data is required to monitor the effectiveness of the SWMP. A designated person is required to collect and report on relevant data at site level.

11.1 Data collection

- a. Data on the waste generated from the project may include:
 - i. type of waste generated on-site;
 - ii. amount of waste generated on-site;
 - iii. segregation rates;
 - iv. re-use on- and off-site, recycling rates and diversion of waste from landfill;
 - v. wastage rates of different materials;
 - vi. costs and savings;
 - vii. waste movements;
 - viii. sources of waste;
 - ix. waste profile over the course of project;
 - x. levels of damaged materials.
- b. The appointed waste management contractor may be able to provide waste data as follows:
 - i. the type of waste generated (broken down by EWC codes);
 - ii. tonnages generated/removed;
 - iii. amounts recycled (typically for the waste facility overall and not per construction site).

11.2 Data analysis, benchmarking and setting targets

- a. Waste generated as part of the project must be analysed to:
 - i. provide feedback about the SWMP to site workers, clients, designers and other members of the project team;
 - ii. monitor performance in minimising waste;
 - iii. set realistic targets within the SWMP;

11.3 Key performance indicators

- a. KPI data can be used to compare performance across projects, against previous projects and - if appropriate - national averages. The two most common are typically:
 - i. volume of waste (m3) per £100,000 of project value;
 - ii. volume of waste (m3) per 100 m2 of project floor area.

12. Updating the SWMP

- a. Once the SWMP is implemented it must be reviewed by the project team to ensure it is:
 - i. being followed;
 - ii. practical and appropriate;
 - iii. amended as necessary.
- b. Whenever waste is removed from the site Russells, as a principal contractor, must record on the site waste management plan
 - i. the identity of the person removing the waste;
 - ii. the types of waste removed; and
 - iii. the site that the waste is being taken to.
- c. At project completion, Russells as principle contractor to sign the SWMP and explain deviations applied, if any.
- d. When any waste is removed the principal contractor must record on the plan
 - i. the identity of the person removing the waste;
 - ii. the waste carrier registration number of the carrier;
 - iii. a copy of, or reference to, the written description of the waste required by section 34 of the Environmental Protection Act 1990; and
 - iv. the site that the waste is being taken to and whether the operator of that site holds a permit under the Waste (England and Wales) Regulation 2011 or is registered under those Regulations as a waste operation exempt from the need for such a permit.
- e. As often as necessary to ensure that the plan accurately reflects the progress of the project, and as a minimum within six months, Russells, as the principal contractor must:
 - i. review the plan;
 - ii. record the types and quantities of waste produced;
 - iii. record the types and quantities of waste that have been—
 - (a) re-used (and whether this was on- or off-site);
 - (b) recycled (and whether this was on- or off-site);
 - (c) sent for another form of recovery (and whether this was on- or off-site);

- (d) sent to landfill; or
- (e) otherwise disposed of; and

- iv. update the plan to reflect the progress of the project.

13. Record Keeping of Waste off Site

The responsible person will be required to create the Waste Transfer Consignment Notes and include an accurate description of waste which will also be described on the Waste Carrier tickets who is removing the waste off site. The Waste Transfer Consignment Notes must be issued as a season ticket for a period of maximum 12 months given that the waste description remains unchanged.

Russells Waste Transfer Notes will be kept electronically for the required 2 years. The responsible person will issue the WTN to the Registered Waste Carrier to complete the WTN by signing the Transferee section.

The waste figures recorded will then be transferred into the SWMP.

The original Waste Carrier tickets are sent into the Russells Head Office and is stored with the invoices and can be pulled up by the Russells Financial Department if requested by a third party. Some of the waste carrier contractors keep records of waste movements electronically which can be accessed by Russells remotely.

14. Applying the lessons learnt

- a. It is important that recommendations and lessons learnt from the implementation of one SWMP can be applied to other sites, throughout the business and throughout Russells.
- b. This can be achieved by various means:
 - i. debrief the client and project team in terms of the successes, targets, recommendations, good and bad practice.
 - ii. Include the SWMP as an agenda item for post-contract reviews.
 - iii. establish benchmarks and new targets based on SWMP experience, aiming for continual improvement.
 - iv. sharing best practice within Russells to improve SWMP efficiency.

15. Further Information Sources

- a. Further free advice on how to reduce the volume of raw materials and other resources used during a construction build is available from Government website - <https://www.gov.uk/waste-legislation-and-regulations>

16. Document retention

- a. Waste Transfer Notes must be retained for a period of two years.