ISO A1 841mm x 594mm

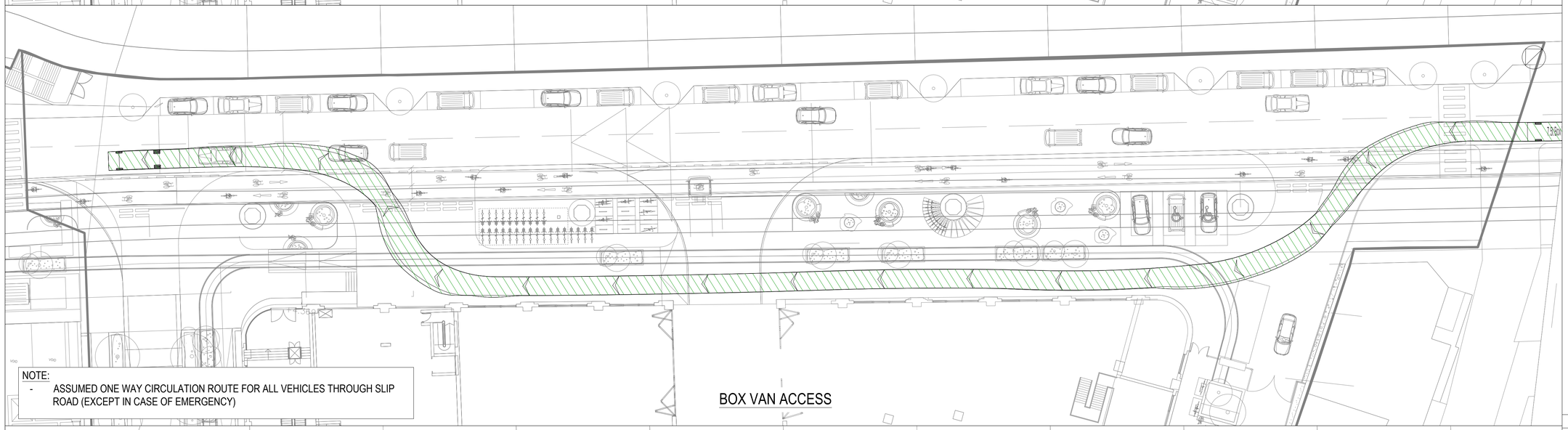
NOTE:
- TRACKING TO BE REVIEWED BY LONDON BOROUGH OF NEWHAM/FIRE SAFETY OFFICERS. REQUIREMENT FOR ANY ADDITIONAL TRACKING FOR AN ALTERNATIVE FIRE TENDER/VEHICLE TO BE CONFIRMED.
- PROXIMITY OF LANDSCAPING PLANTERS TO BE REVIEWED BY LONDON BOROUGH OF NEWHAM/FIRE SAFETY OFFICERS AND ADJUSTED BY LANDSCAPE ARCHITECT AS REQUIRED TO IMPROVE SERVICEABILITY.

NOTE:
- ALL JUNCTION INTERFACES WITH DOCK ROAD ARE TO BE CONFIRMED THROUGH DISCUSSIONS WITH TFL
- REFER TO MEINHARDT SKETCHES 2303-C-SK053 TO 2303-C-SK057 FOR MORE INFORMATION ABOUT PROPOSED JUNCTIONS WITH DOCK ROAD

NOTE:
- ASSUMED ONE WAY CIRCULATION ROUTE FOR ALL VEHICLES THROUGH SLIP ROAD (EXCEPT IN CASE OF EMERGENCY)
- DURING ONE WAY (EAST TO WEST) OPERATION THE REFUSE VEHICLE WILL EXIT DEVELOPMENT AS SHOWN. NOTE VEHICLE IS UNABLE TO COMPLETE A RIGHT TURN BACK ONTO NORTH WOOLWICH ROAD

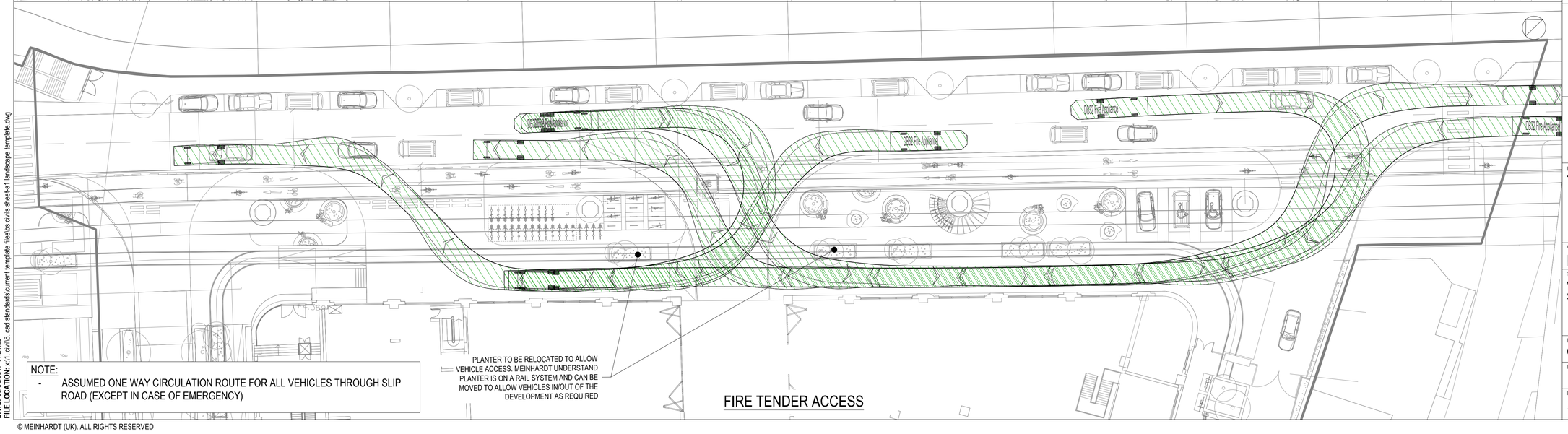
PLANTER TO BE RELOCATED TO ALLOW VEHICLE ACCESS. MEINHARDT UNDERSTAND PLANTER IS ON A RAIL SYSTEM AND CAN BE MOVED TO ALLOW VEHICLES IN/OUT OF THE DEVELOPMENT AS REQUIRED

REFUSE TENDER ACCESS



NOTE:
- ASSUMED ONE WAY CIRCULATION ROUTE FOR ALL VEHICLES THROUGH SLIP ROAD (EXCEPT IN CASE OF EMERGENCY)

BOX VAN ACCESS



NOTE:
- ASSUMED ONE WAY CIRCULATION ROUTE FOR ALL VEHICLES THROUGH SLIP ROAD (EXCEPT IN CASE OF EMERGENCY)

PLANTER TO BE RELOCATED TO ALLOW VEHICLE ACCESS. MEINHARDT UNDERSTAND PLANTER IS ON A RAIL SYSTEM AND CAN BE MOVED TO ALLOW VEHICLES IN/OUT OF THE DEVELOPMENT AS REQUIRED

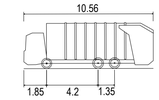
FIRE TENDER ACCESS

FOR INFORMATION

REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	EP	13.05.19
I02	REVISED ISSUE	EP	15.05.19
I03	REVISED ISSUE	BV	16.05.19
I04	REVISED TO SUIT LATEST LANDSCAPE ARCH LAYOUT	JD	12.02.20
I05	REVISED TO SUIT ALTERNATIVE REFUSE PROPOSAL	EP	18.02.2020
I06	REVISED TO SUIT UPDATED LAYOUT	JD	12.03.2020
I07	TRACKING UPDATED TO SUIT NEW LANDSCAPING LAYOUT	EP	27.04.20

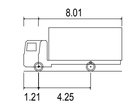
NOTES:

1. THIS DRAWING IS BASED ON:
   - PATEL TAYLOR PHASE 1 LANDSCAPE LAYOUT 522-PT-MP-TYP-DR-L-PL-1013_S2-P09 RECEIVED 17 APRIL 2020
2. TRACKING BASED ON A FORWARDS DESIGN SPEED OF 10kph AND A REVERSE DESIGN SPEED OF 5kph



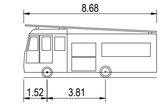
MERCEDES-BENZ ECONIC EURO 2692LL 6X2 REAR-STEER

OVERALL LENGTH	10.564m
OVERALL WIDTH	2.524m
OVERALL BODY HEIGHT	3.744m
MIN BODY GROUND CLEARANCE	0.296m
MAX TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	14.800m



7.5t BOX VAN

OVERALL LENGTH	8.010m
OVERALL WIDTH	2.100m
OVERALL BODY HEIGHT	3.556m
MIN BODY GROUND CLEARANCE	0.351m
TRACK WIDTH	2.064m
LOCK TO LOCK TIME	4.00 sec
KERB TO KERB TURNING RADIUS	7.400m



DB32 FIRE APPLIANCE

OVERALL LENGTH	8.680m
OVERALL WIDTH	2.180m
OVERALL BODY HEIGHT	3.452m
MIN BODY GROUND CLEARANCE	0.337m
MAX TRACK WIDTH	2.121m
LOCK TO LOCK TIME	6.00 sec
KERB TO KERB TURNING RADIUS	7.910m

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PROJECT
THAMESIDE WEST

CLIENT
KEYSTONE PARTNERSHIP

TITLE
VEHICLE TRACKING
SLIP ROAD - UPDATED SERVICING OPTIONS

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			NTS
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	NG	PH
DRAWING No			ISSUE
2303-C-SK044			I07

DATE: 03/08/2017 11:21:59
FILE LOCATION: A:\1. civil\8. cad standards\current template files\bs civils sheet-a1 landscape template.dwg

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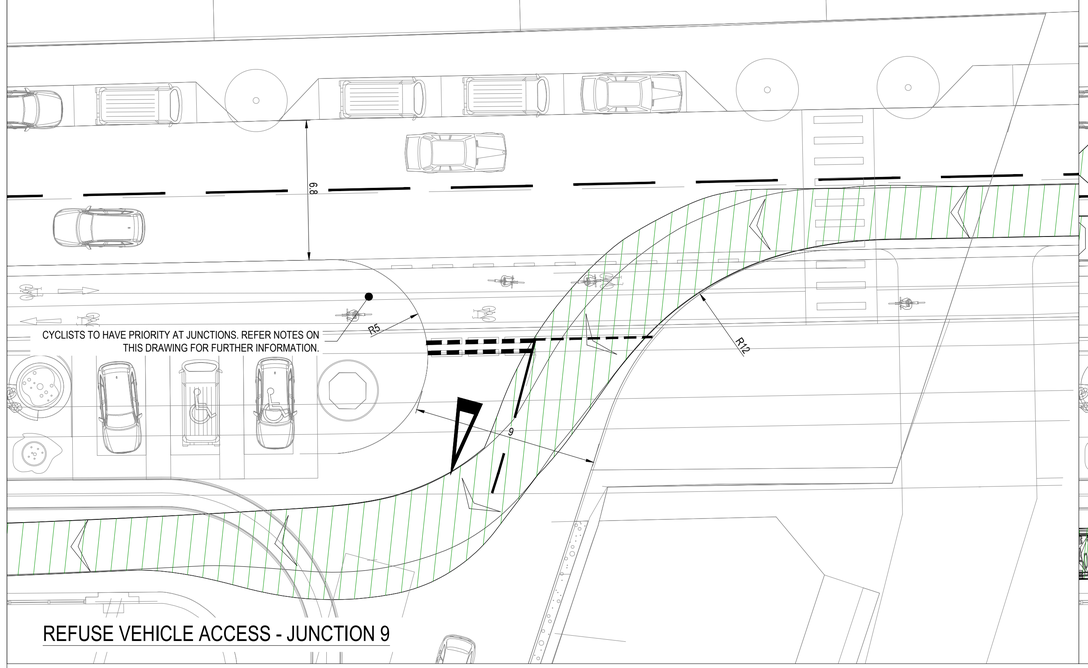
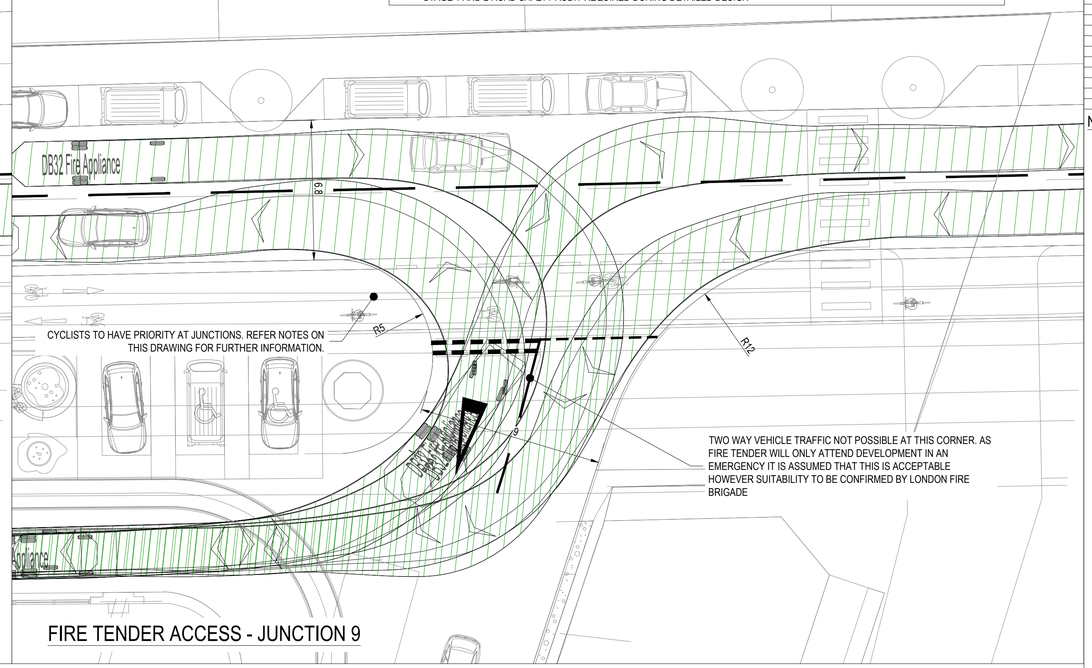
ISO A1 841mm x 594mm

NOTE:
- IT IS PROPOSED THAT THE PHASE 1 SLIP ROAD WILL OPERATE A ONE WAY IN/OUT SYSTEM
- DURING ONE WAY (EAST TO WEST) OPERATION THE REFUSE VEHICLE WILL ENTER THE DEVELOPMENT AS SHOWN
- AS DELIVERIES/SERVICE VEHICLES USING THIS SLIP ROAD WILL BE MANAGED IT IS ASSUMED THAT AT THE TIME OF A REFUSE PICKUP THE SLIP ROAD WILL BE CLEAR OF OTHER VEHICLES TO ALLOW FOR WASTE COLLECTION HOWEVER SUITABILITY OF THIS TO BE REVIEWED AND APPROVED BY LONDON BOROUGH OF NEWHAM



REFUSE VEHICLE ACCESS - JUNCTION 9

NOTE:
- VEHICLE TRACKING COMPLETED AS PART OF THIS SKETCH IS SUBJECT TO TfL'S REALIGNED DOCK ROAD DESIGN
- LINEMARKING SHOWN ON DOCK ROAD/NORTH WOOLWICH ROAD SUBJECT TO CONFIRMATION FROM TfL
- LINEMARKING SHOWN WITHIN SITE BOUNDARY INDICATIVE ONLY AND TO BE CONFIRMED DURING DETAILED DESIGN
- THE PURPOSE OF THIS SKETCH IS TO DEMONSTRATE DESIGN PRINCIPLES AND HIGH LEVEL FEASIBILITY OF EACH JUNCTION (WIDTH, GEOMETRY AND VEHICLE MOVEMENTS). FOR PEDESTRIAN AND/OR CYCLE ROUTES REFER TO PATEL TAYLOR OR BUROHAPPOLD RELEVANT INFORMATION
- TRACKING COMPLETED FOR LONDON BOROUGH OF NEWHAM REFUSE VEHICLE AND FIRE TENDER ONLY AS THESE ARE CONSIDERED THE WORST CASE DESIGN VEHICLES
- IT IS ASSUMED THE SPEED LIMIT ON THE REALIGNED DOCK ROAD WILL BE 30 MPH OR LESS
- ROAD DESIGN, JUNCTION GEOMETRY, VEHICLE TRACKING AND LINEMARKING IS SUBJECT TO FULL DETAILED DESIGN
- CYCLE LANES TO HAVE PRIORITY AT JUNCTIONS AS PER ADVICE FROM BUROHAPPOLD. MEINHARDT HAVE NOT BEEN PARTY TO ANY DISCUSSIONS WITH NEWHAM AND/OR TFL IN RELATION TO THIS PROPOSED STRATEGY
- TRACKING HAS BEEN COMPLETED BASED ON KERB RADII AS SHOWN ON PATEL TAYLOR'S LANDSCAPE LAYOUT
- STAGE 1 AND 2 ROAD SAFETY AUDIT REQUIRED DURING DETAILED DESIGN



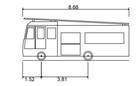
FIRE TENDER ACCESS - JUNCTION 9

FOR INFORMATION

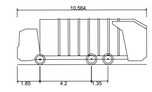
REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	EP	27.04.20

NOTES:

1. THIS DRAWING IS BASED ON:
   - PATEL TAYLOR PHASE 1 LANDSCAPE LAYOUT 522-PT-MP-TYP-DR-L-PL-1013_S2-P09 RECEIVED 20 APRIL 2020
2. TRACKING BASED ON A FORWARDS DESIGN SPEED OF 10kph AND A REVERSE DESIGN SPEED OF 5kph
3. TRACKING TO BE REVIEWED BY LONDON BOROUGH OF NEWHAM/FIRE SAFETY OFFICERS. REQUIREMENT FOR ANY ADDITIONAL TRACKING FOR AN ALTERNATIVE FIRE TENDER/VEHICLE TO BE CONFIRMED.



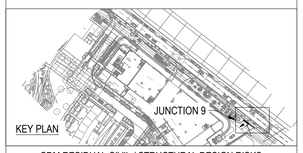
DB32 FIRE APPLIANCE	
OVERALL LENGTH	8.680m
OVERALL WIDTH	2.180m
OVERALL BODY HEIGHT	3.452m
MIN BODY GROUND CLEARANCE	0.337m
MAX TRACK WIDTH	2.121m
LOCK TO LOCK TIME	6.00 sec
KERB TO KERB TURNING RADIUS	7.910m



Mercedes-Benz Econic Euro 2692LL 6x2 Rear-Steer	
Overall Length	10.564m
Overall Width	2.524m
Overall Body Height	3.744m
Min Body Ground Clearance	0.296m
Max Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	14.800m

KEY:

PROPOSED KERB GEOMETRY (BASED ON LANDSCAPE PROPOSALS)



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www.meinhardt.co.uk

PROJECT
THAMESIDE WEST

CLIENT
KEYSTONE PARTNERSHIP

TITLE
REVIEW OF JUNCTIONS WITH DOCK ROAD PHASE 1
SHEET 2

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:150
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	CR	PH
DRAWING No			ISSUE
2303-C-SK057			I01

DATE: 09/08/2017 11:21:59
FILE LOCATION: x:\1. civil\8. cad standards\current template files\0s civils sheet-a1 landscape template.dwg

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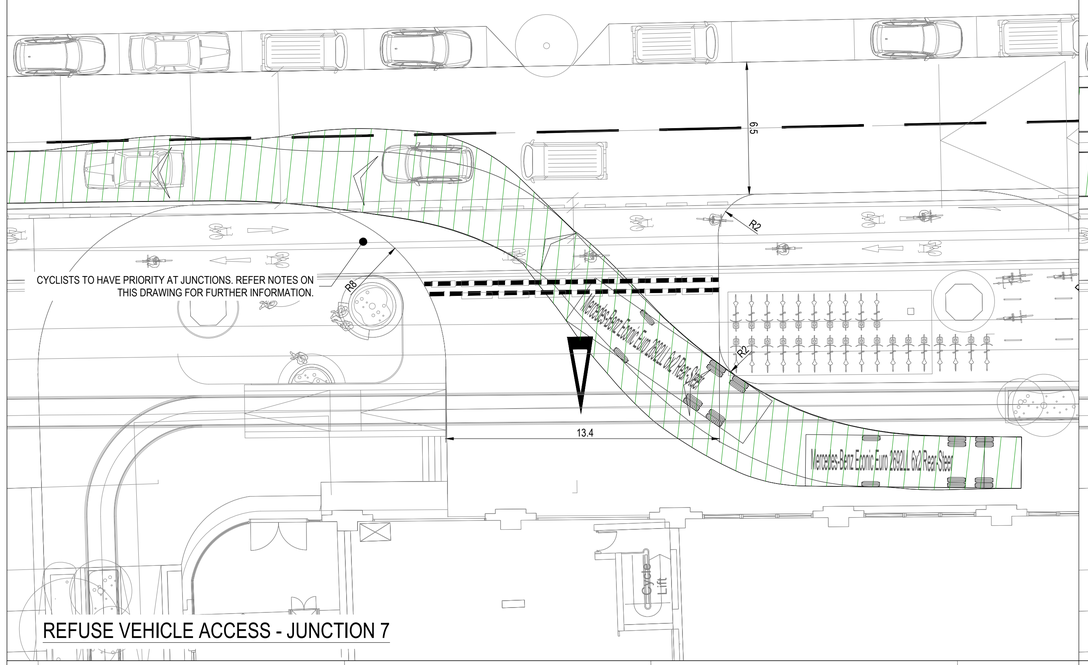
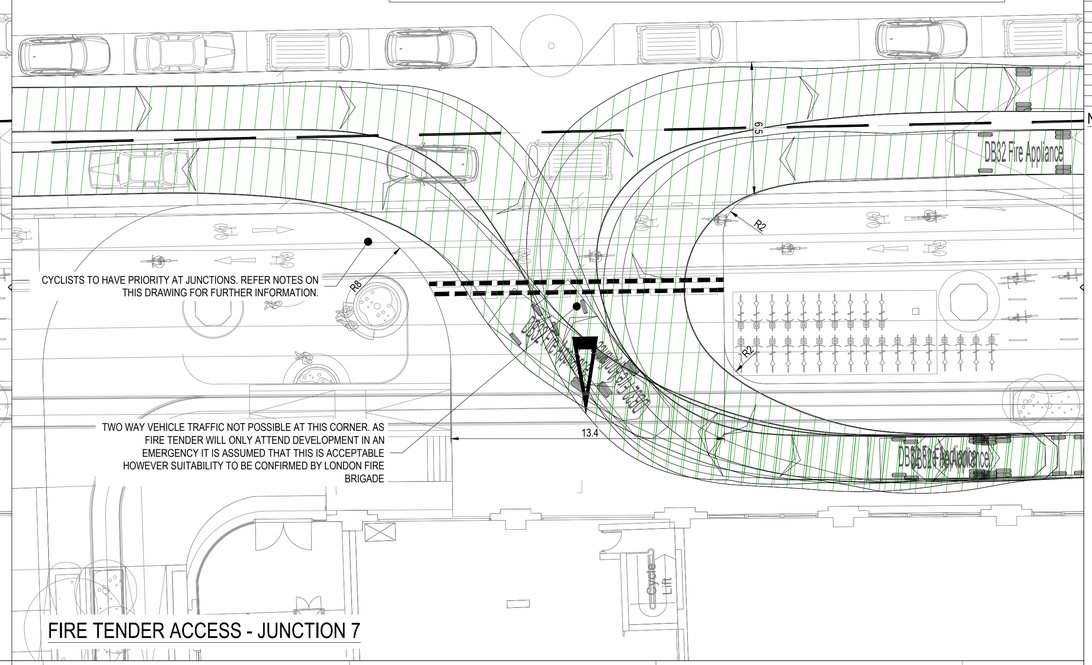
ISO A1 841mm x 594mm

NOTE:
- IT IS PROPOSED THAT THE PHASE 1 SLIP ROAD WILL OPERATE A ONE WAY IN/OUT SYSTEM
- DURING ONE WAY (EAST TO WEST) OPERATION THE REFUSE VEHICLE WILL EXIT DEVELOPMENT AS SHOWN. NOTE VEHICLE IS UNABLE TO COMPLETE A RIGHT TURN BACK ONTO NORTH WOOLWICH ROAD
- AS DELIVERIES/SERVICE VEHICLES USING THIS SLIP ROAD WILL BE MANAGED IT IS ASSUMED THAT AT THE TIME OF A REFUSE PICKUP THE SLIP ROAD WILL BE CLEAR OF OTHER VEHICLES TO ALLOW FOR WASTE COLLECTION HOWEVER SUITABILITY OF THIS TO BE REVIEWED AND APPROVED BY LONDON BOROUGH OF NEWHAM



REFUSE VEHICLE ACCESS - JUNCTION 7

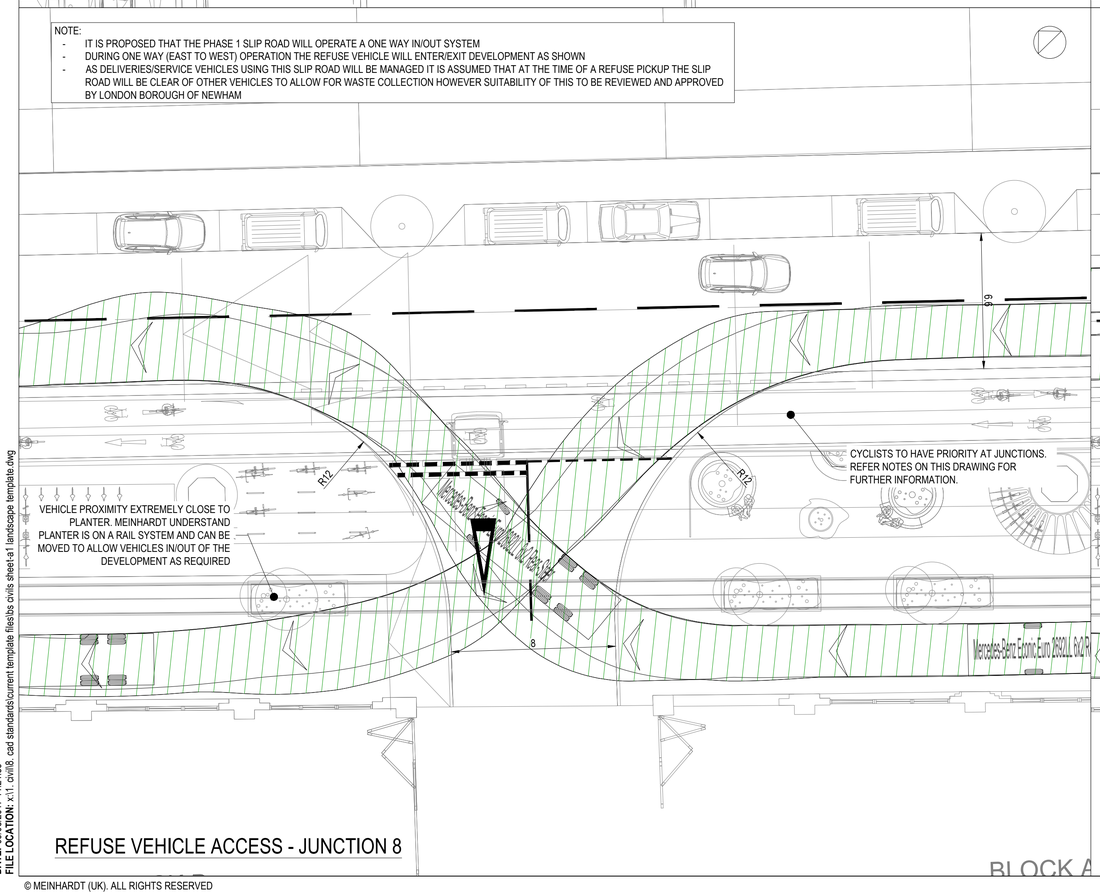
NOTE:
- VEHICLE TRACKING COMPLETED AS PART OF THIS SKETCH IS SUBJECT TO TfL'S REALIGNED DOCK ROAD DESIGN
- LINEMARKING SHOWN ON DOCK ROAD/NORTH WOOLWICH ROAD SUBJECT TO CONFIRMATION FROM TfL
- LINEMARKING SHOWN WITHIN SITE BOUNDARY INDICATIVE ONLY AND TO BE CONFIRMED DURING DETAILED DESIGN
- THE PURPOSE OF THIS SKETCH IS TO DEMONSTRATE DESIGN PRINCIPLES AND HIGH LEVEL FEASIBILITY OF EACH JUNCTION (WIDTH, GEOMETRY AND VEHICLE MOVEMENTS). FOR PEDESTRIAN AND/OR CYCLE ROUTES REFER TO PATEL TAYLOR OR BUROHAPPOLD RELEVANT INFORMATION
- TRACKING COMPLETED FOR LONDON BOROUGH OF NEWHAM REFUSE VEHICLE AND FIRE TENDER ONLY AS THESE ARE CONSIDERED THE WORST CASE DESIGN VEHICLES
- IT IS ASSUMED THE SPEED LIMIT ON THE REALIGNED DOCK ROAD WILL BE 30 MPH OR LESS
- ROAD DESIGN, JUNCTION GEOMETRY, VEHICLE TRACKING AND LINEMARKING IS SUBJECT TO FULL DETAILED DESIGN
- CYCLE LANES TO HAVE PRIORITY AT JUNCTIONS AS PER ADVICE FROM BUROHAPPOLD. MEINHARDT HAVE NOT BEEN PARTY TO ANY DISCUSSIONS WITH NEWHAM AND/OR TFL IN RELATION TO THIS PROPOSED STRATEGY
- TRACKING HAS BEEN COMPLETED BASED ON KERB RADII AS SHOWN ON PATEL TAYLOR'S LANDSCAPE LAYOUT
- STAGE 1 AND 2 ROAD SAFETY AUDIT REQUIRED DURING DETAILED DESIGN



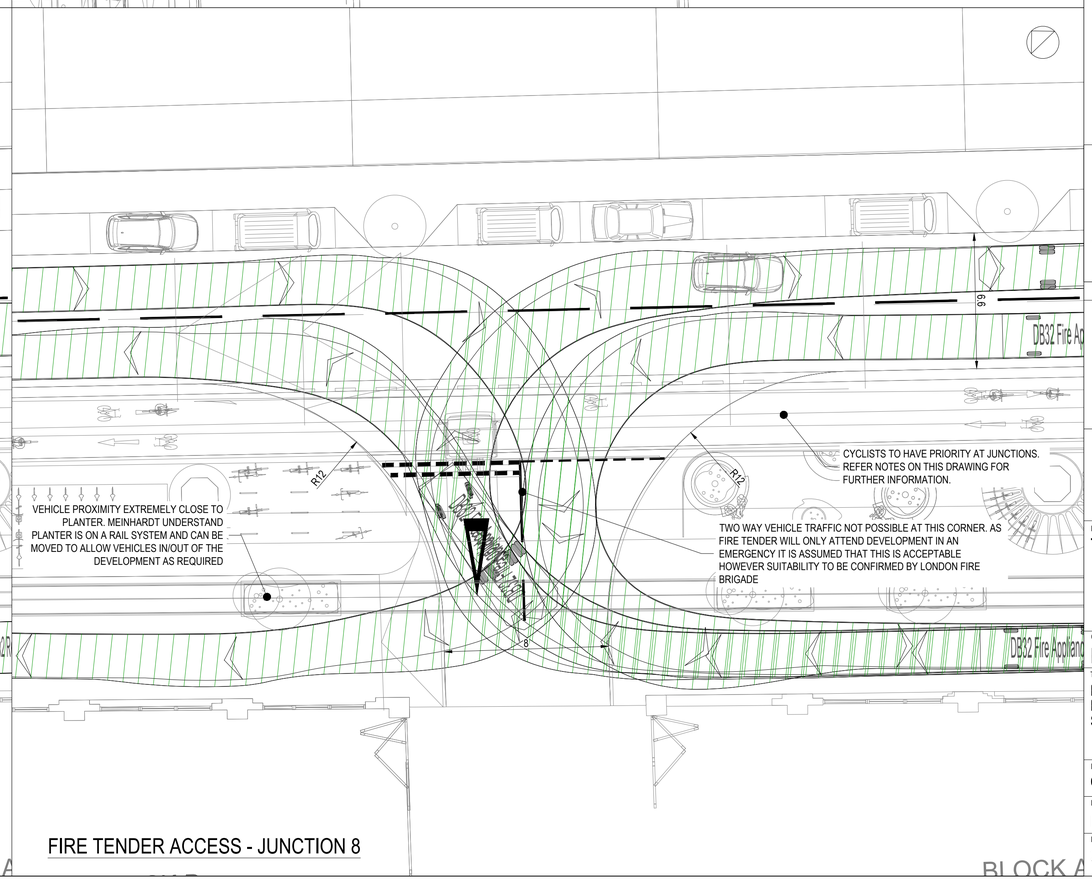
TWO WAY VEHICLE TRAFFIC NOT POSSIBLE AT THIS CORNER. AS FIRE TENDER WILL ONLY ATTEND DEVELOPMENT IN AN EMERGENCY IT IS ASSUMED THAT THIS IS ACCEPTABLE HOWEVER SUITABILITY TO BE CONFIRMED BY LONDON FIRE BRIGADE

FIRE TENDER ACCESS - JUNCTION 7

NOTE:
- IT IS PROPOSED THAT THE PHASE 1 SLIP ROAD WILL OPERATE A ONE WAY IN/OUT SYSTEM
- DURING ONE WAY (EAST TO WEST) OPERATION THE REFUSE VEHICLE WILL ENTER/EXIT DEVELOPMENT AS SHOWN
- AS DELIVERIES/SERVICE VEHICLES USING THIS SLIP ROAD WILL BE MANAGED IT IS ASSUMED THAT AT THE TIME OF A REFUSE PICKUP THE SLIP ROAD WILL BE CLEAR OF OTHER VEHICLES TO ALLOW FOR WASTE COLLECTION HOWEVER SUITABILITY OF THIS TO BE REVIEWED AND APPROVED BY LONDON BOROUGH OF NEWHAM



REFUSE VEHICLE ACCESS - JUNCTION 8



TWO WAY VEHICLE TRAFFIC NOT POSSIBLE AT THIS CORNER. AS FIRE TENDER WILL ONLY ATTEND DEVELOPMENT IN AN EMERGENCY IT IS ASSUMED THAT THIS IS ACCEPTABLE HOWEVER SUITABILITY TO BE CONFIRMED BY LONDON FIRE BRIGADE

FIRE TENDER ACCESS - JUNCTION 8

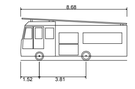
BLOCK A

FOR INFORMATION

REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	EP	27.04.20

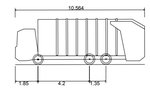
NOTES:

1. THIS DRAWING IS BASED ON:
   - PATEL TAYLOR PHASE 1 LANDSCAPE LAYOUT 522-PT-MP-TYP-DR-L-PL-1013_S2-P09 RECEIVED 20 APRIL 2020
2. TRACKING BASED ON A FORWARDS DESIGN SPEED OF 10kph AND A REVERSE DESIGN SPEED OF 5kph
3. TRACKING TO BE REVIEWED BY LONDON BOROUGH OF NEWHAM/FIRE SAFETY OFFICERS. REQUIREMENT FOR ANY ADDITIONAL TRACKING FOR AN ALTERNATIVE FIRE TENDER/VEHICLE TO BE CONFIRMED.



DB32 FIRE APPLIANCE

OVERALL LENGTH	8.680m
OVERALL WIDTH	2.180m
OVERALL BODY HEIGHT	3.452m
MIN BODY GROUND CLEARANCE	0.337m
MAX TRACK WIDTH	2.121m
LOCK TO LOCK TIME	6.00 sec
KERB TO KERB TURNING RADIUS	7.910m

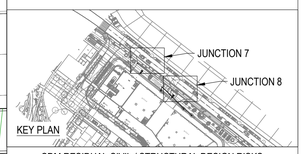


Mercedes-Benz Econic Euro 2692LL 6x2 Rear-Steer

Overall Length	10.564m
Overall Width	2.524m
Overall Body Height	3.744m
Min Body Ground Clearance	0.296m
Max Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	14.800m

KEY:

PROPOSED KERB GEOMETRY (BASED ON LANDSCAPE PROPOSALS)



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www.meinhardt.co.uk

PROJECT
THAMESIDE WEST

CLIENT
KEYSTONE PARTNERSHIP

TITLE
REVIEW OF JUNCTIONS WITH DOCK ROAD
PHASE 1
SHEET 1

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:150
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	CR	PH
DRAWING No			ISSUE
2303-C-SK056			I01

DATE: 09/08/2017 11:21:59
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Appendix D Refuse Vehicle Swept Path Diagrams (Masterplan)

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ISO A1 841mm x 594mm

NOTE:
- ALL JUNCTION INTERFACES WITH DOCK ROAD ARE TO BE CONFIRMED THROUGH DISCUSSIONS WITH TFL
- REFER TO MEINHARDT SKETCHES 2303-C-SK053 TO 2303-C-SK057 FOR MORE INFORMATION ABOUT PROPOSED JUNCTIONS WITH DOCK ROAD

REFUSE ACCESS REQUIREMENTS/PROVISIONS FOR THE "LOZENGE" SITE TO BE CONFIRMED BY FOSTER AND PARTNERS/DESIGNER OF THIS SITE DURING DETAILED DESIGN

REFER TO MEINHARDT SKETCH 2303-C-SK025A FOR CONTINUATION OF TRACKING WITHIN BASEMENT

SUITABILITY OF VEHICLE TURNAROUND TO BE CONFIRMED BY LONDON BOROUGH OF NEWHAM AS TURNAROUND SHOWN REQUIRES MULTIPLE VEHICLE MANOEUVRES/DRY TURNS TO COMPLETE A TURNAROUND.

TWO WAY VEHICLE TRAFFIC NOT POSSIBLE AT THIS CORNER. IT IS ASSUMED THAT IT WILL BE UNLIKELY THAT TWO REFUSE VEHICLES WILL BE ON SITE COMPLETING COLLECTIONS TO CREATE THIS SITUATION HOWEVER SUITABILITY OF THIS TO BE REVIEWED AND APPROVED BY LONDON BOROUGH OF NEWHAM.

REFER TO MEINHARDT SKETCH 2303-C-SK023 FOR CONTINUATION OF TRACKING WITHIN BASEMENT

DESIGN OF CROSS-ROADS INCLUDING PRIORITY DIRECTION TO BE CONFIRMED DURING RESERVED MATTERS APPLICATION

FOR TRACKING OF REFUSE AROUND PLOTS D, E AND F REFER TO MEINHARDT SKETCH 2303-C-SK034

NO KERBLINE SHOWN IN THIS AREA. HOWEVER IT IS ASSUMED THE REFUSE VEHICLE TRACKING IS WITHIN THE EXTENT OF THE PROPOSED ROAD

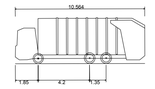
Bollards

FOR INFORMATION

REV.	DESCRIPTION	BY	DATE
I01	ORIGINAL ISSUE	EP	20.07.18
I02	UPDATED ARCHITECT LAYOUT	EP	30.08.18
I03	UPDATED LANDSCAPE LAYOUT	EP	18.10.18
I04	UPDATED ARCHITECT LAYOUT	EP	23.11.18
I05	REVISED TO SUIT UPDATED LANDSCAPE ARC LAYOUT	EP	12.03.20
I06	TRACKING UPDATED TO SUIT NEW LANDSCAPING LAYOUT	EP	27.04.20

NOTES:

1. THIS DRAWING IS BASED UPON:
   - PATEL TAYLOR MASTERPLAN LANDSCAPE LAYOUT 522-PT-MP-TYP-DR-L-PL-1001_S2-P20 RECEIVED 17 APRIL 2020
2. TRACKING BASED ON A FORWARDS DESIGN SPEED OF 10kph AND A REVERSE DESIGN SPEED OF 5kph
3. MEINHARDT HAVE NOT UNDERTAKEN ANY LIAISON WITH LBN WASTE OFFICER. ROUTES SHOWN ARE UNDERSTOOD TO BE APPROVED BY LBN WASTE OFFICER.



Mercedes-Benz Econic Euro 2692LL 6x2 Rear-Steer

Overall Length	10.564m
Overall Width	2.524m
Overall Body Height	3.744m
Min Body Ground Clearance	0.296m
Max Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	14.800m

KEY:

SITE BOUNDARY

DETAILED APPLICATION BOUNDARY

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS

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10 Aldersgate Street, London EC1A 4JU
Telephone: +44 (0)20 7831 7969
www.meinhardt.co.uk

PROJECT
THAMESIDE WEST

CLIENT
KEYSTONE PARTNERSHIP

TITLE
VEHICLE TRACKING
REFUSE VEHICLE
OVERALL PLAN

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:1000
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	AOR	PH
DRAWING No			ISSUE
2303-C-SK004			I06

DATE: 09/08/2017 11:21:59
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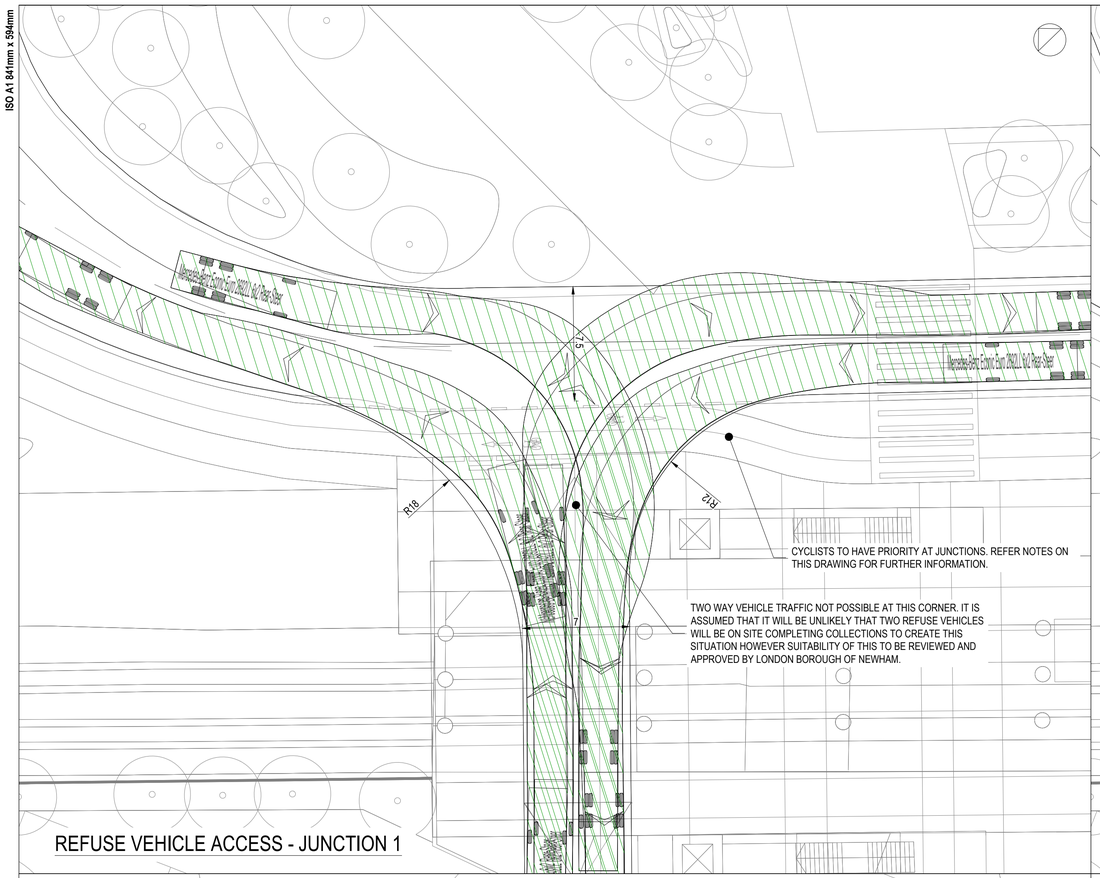
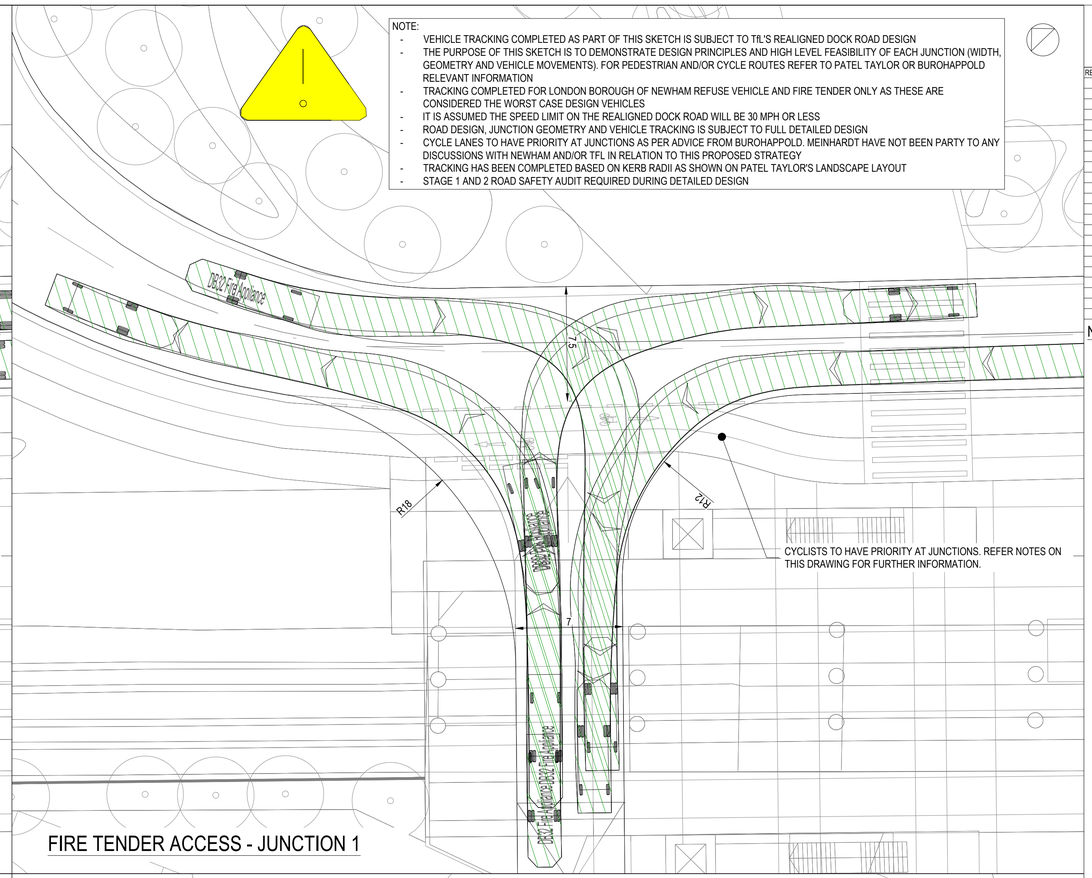
ISO A1 841mm x 594mm



REFUSE VEHICLE ACCESS - JUNCTION 1



FIRE TENDER ACCESS - JUNCTION 1

NOTE:
- VEHICLE TRACKING COMPLETED AS PART OF THIS SKETCH IS SUBJECT TO TfL'S REALIGNED DOCK ROAD DESIGN
- THE PURPOSE OF THIS SKETCH IS TO DEMONSTRATE DESIGN PRINCIPLES AND HIGH LEVEL FEASIBILITY OF EACH JUNCTION (WIDTH, GEOMETRY AND VEHICLE MOVEMENTS). FOR PEDESTRIAN AND/OR CYCLE ROUTES REFER TO PATEL TAYLOR OR BUROHAPPOLD RELEVANT INFORMATION
- TRACKING COMPLETED FOR LONDON BOROUGH OF NEWHAM REFUSE VEHICLE AND FIRE TENDER ONLY AS THESE ARE CONSIDERED THE WORST CASE DESIGN VEHICLES
- IT IS ASSUMED THE SPEED LIMIT ON THE REALIGNED DOCK ROAD WILL BE 30 MPH OR LESS
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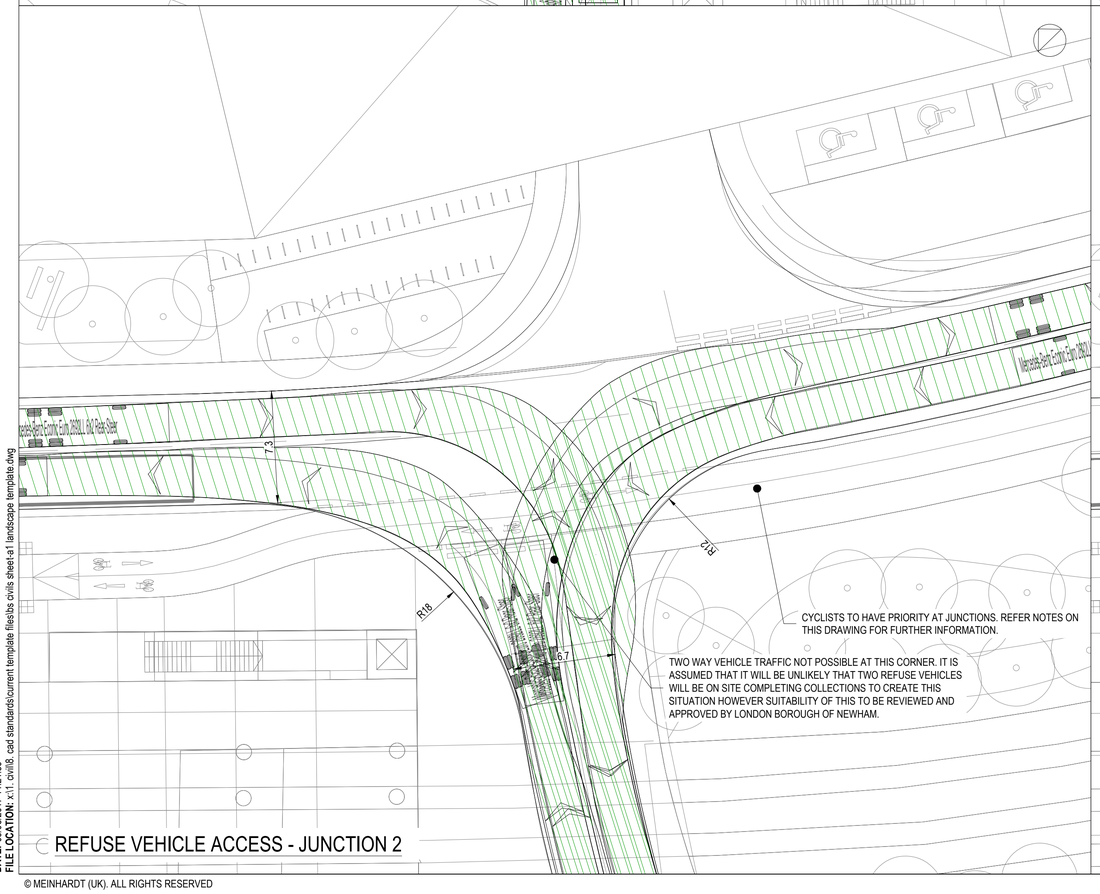
- TRACKING HAS BEEN COMPLETED BASED ON KERB RADII AS SHOWN ON PATEL TAYLOR'S LANDSCAPE LAYOUT
- STAGE 1 AND 2 ROAD SAFETY AUDIT REQUIRED DURING DETAILED DESIGN



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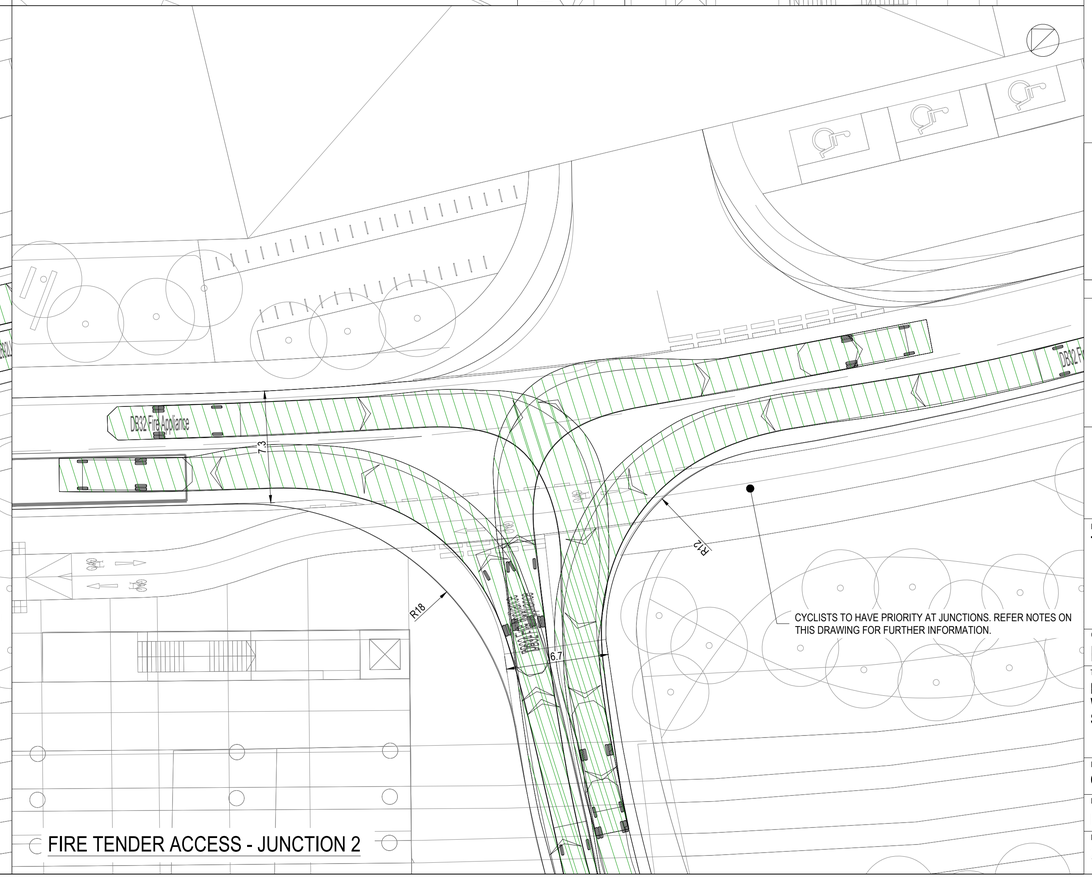


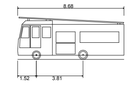
FIRE TENDER ACCESS - JUNCTION 2

FOR INFORMATION

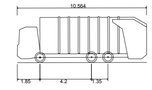
REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	EP	27.04.20

NOTES:

1. THIS DRAWING IS BASED ON:
   - PATEL TAYLOR MASTERPLAN LANDSCAPE LAYOUT 522-PT-MP-TYP-DR-L-PL-1001_S2-P20 RECEIVED 17 APRIL 2020
2. TRACKING BASED ON A FORWARDS DESIGN SPEED OF 10kph AND A REVERSE DESIGN SPEED OF 5kph
3. TRACKING TO BE REVIEWED BY LONDON BOROUGH OF NEWHAM/FIRE SAFETY OFFICERS. REQUIREMENT FOR ANY ADDITIONAL TRACKING FOR AN ALTERNATIVE FIRE TENDER/VEHICLE TO BE CONFIRMED.



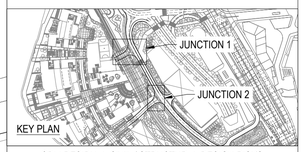
DB32 FIRE APPLIANCE	
OVERALL LENGTH	8.680m
OVERALL WIDTH	2.180m
OVERALL BODY HEIGHT	3.452m
MIN BODY GROUND CLEARANCE	0.337m
MAX TRACK WIDTH	2.121m
LOCK TO LOCK TIME	6.00 sec
KERB TO KERB TURNING RADIUS	7.910m



Mercedes-Benz Econic Euro 2692LL 6x2 Rear-Steer	
Overall Length	10.564m
Overall Width	2.524m
Overall Body Height	3.744m
Min Body Ground Clearance	0.296m
Max Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	14.800m

KEY:

PROPOSED KERB GEOMETRY (BASED ON LANDSCAPE PROPOSALS)



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PROJECT
THAMESIDE WEST

CLIENT
KEYSTONE PARTNERSHIP

TITLE
REVIEW OF JUNCTIONS WITH DOCK ROAD SHEET 1

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:200
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	CR	PH
DRAWING No			ISSUE
2303-C-SK053			I01

DATE: 09/08/2017 11:21:59
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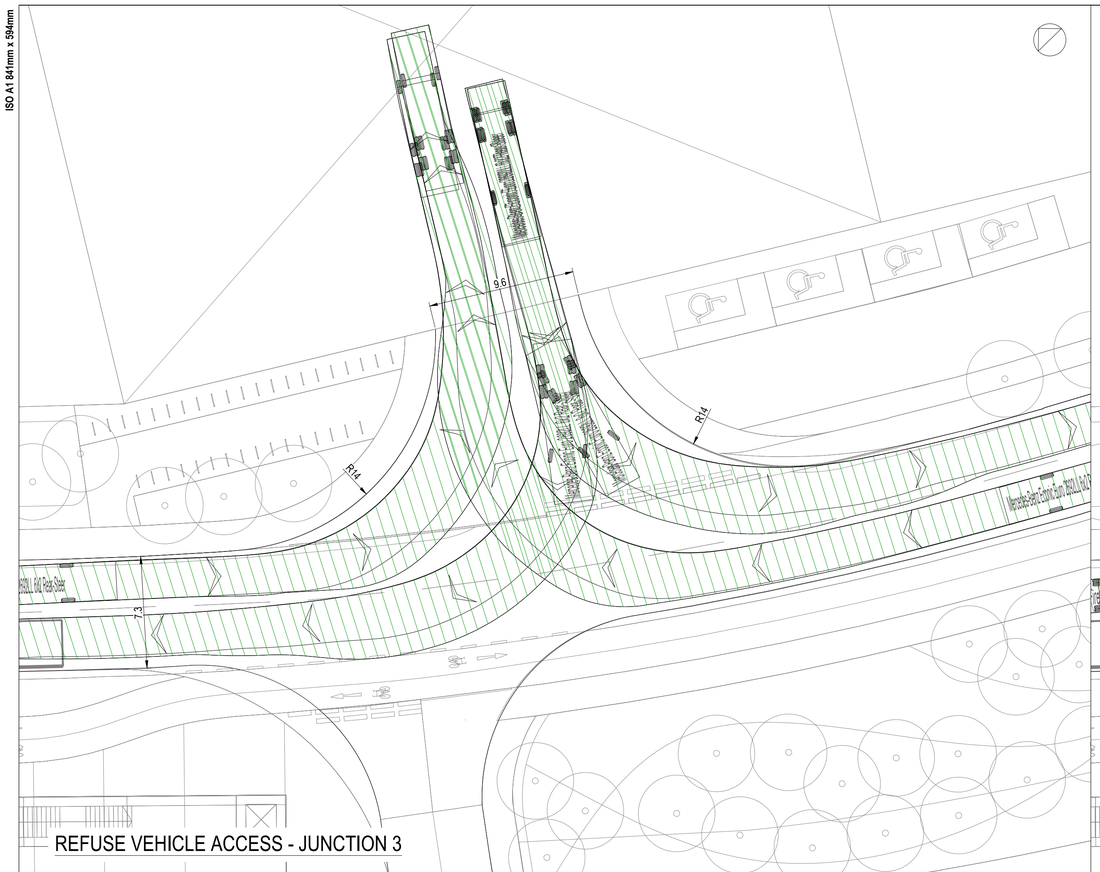
ISO A1 841mm x 594mm



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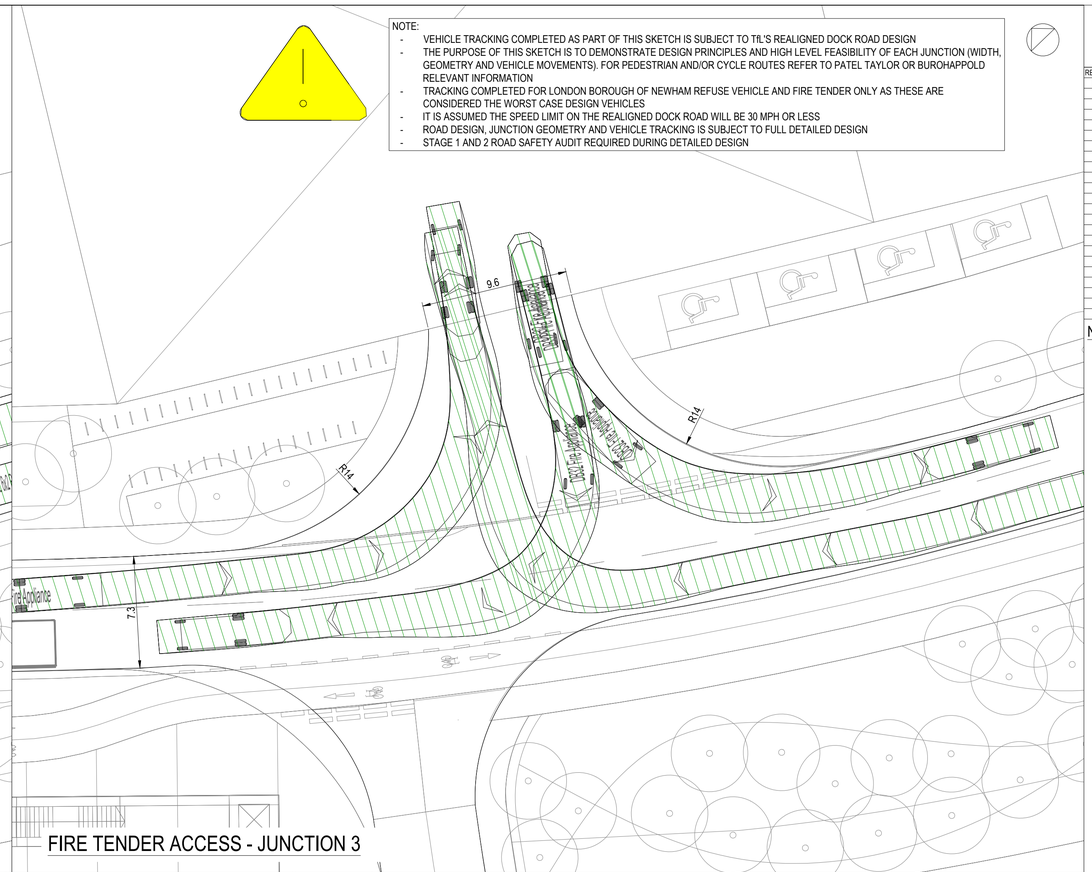
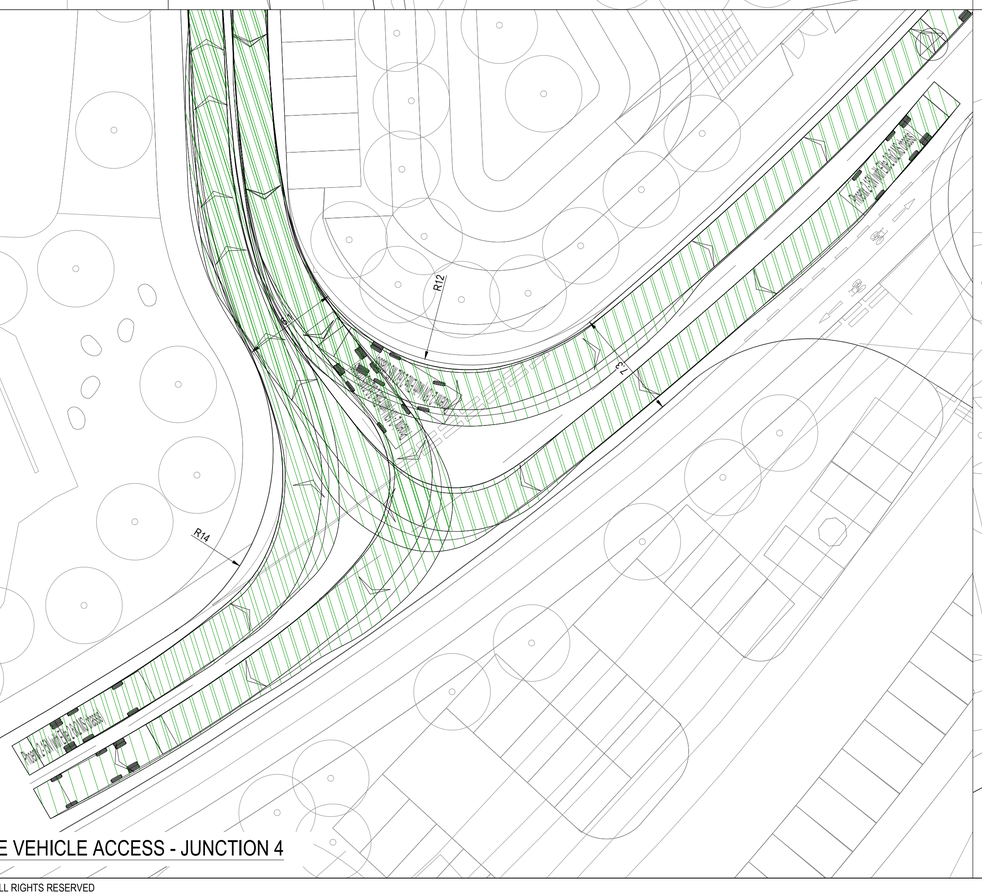


FIRE TENDER ACCESS - JUNCTION 3



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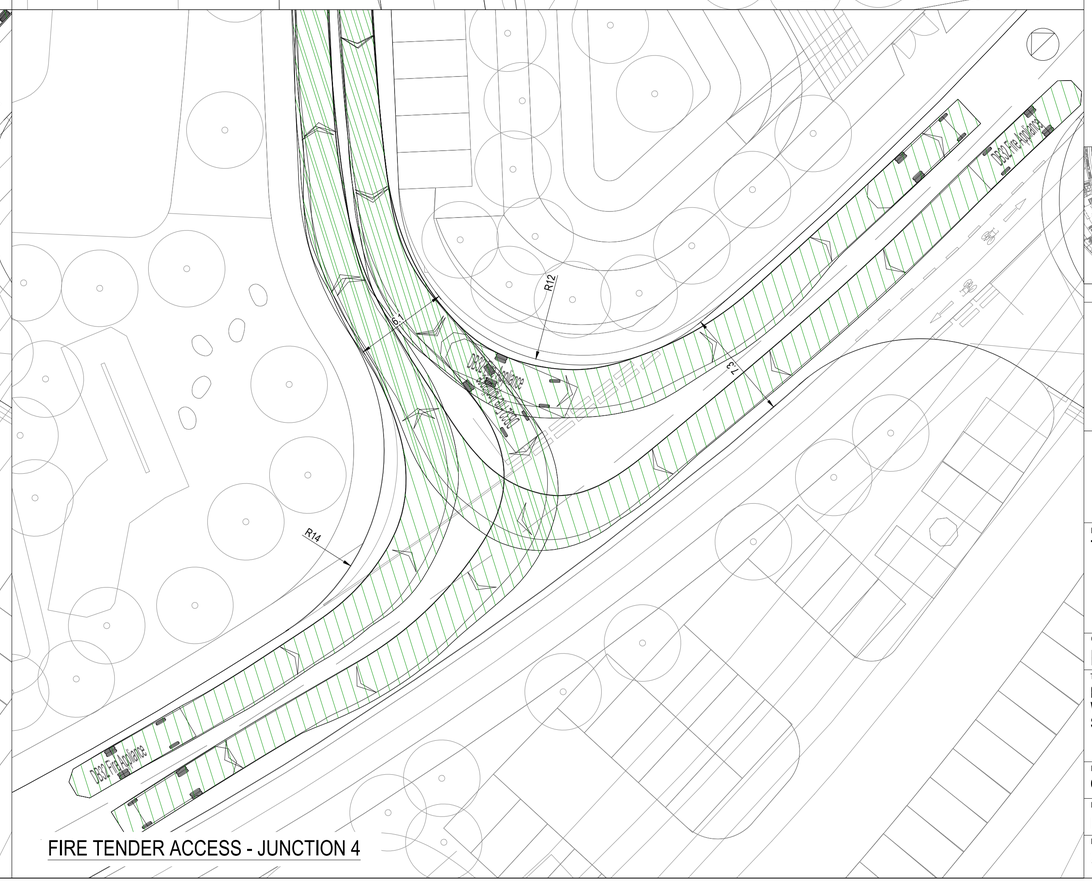

FIRE TENDER ACCESS - JUNCTION 4

NOTE:
- VEHICLE TRACKING COMPLETED AS PART OF THIS SKETCH IS SUBJECT TO TfL'S REALIGNED DOCK ROAD DESIGN
- THE PURPOSE OF THIS SKETCH IS TO DEMONSTRATE DESIGN PRINCIPLES AND HIGH LEVEL FEASIBILITY OF EACH JUNCTION (WIDTH, GEOMETRY AND VEHICLE MOVEMENTS). FOR PEDESTRIAN AND/OR CYCLE ROUTES REFER TO PATEL TAYLOR OR BUROHAPPOLD RELEVANT INFORMATION
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- STAGE 1 AND 2 ROAD SAFETY AUDIT REQUIRED DURING DETAILED DESIGN

FOR INFORMATION

REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	EP	27.04.20

NOTES:

1. THIS DRAWING IS BASED ON:
   - PATEL TAYLOR MASTERPLAN LANDSCAPE LAYOUT 522-PT-MP-TYP-DR-L-PL-1001_S2-P20 RECEIVED 17 APRIL 2020
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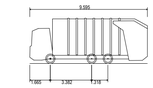
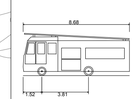
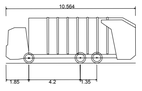


Phoenix 2-15N (with Elite 2 6x2 MS chassis)

Overall Length	9.595m
Overall Width	2.230m
Overall Body Height	3.699m
Min Body Ground Clearance	0.251m
Track Width	2.200m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	9.300m

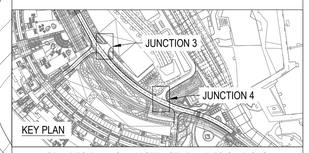




D832 FIRE APPLIANCE		Mercedes-Benz Econic Euro 2650LL 6x2 Rear-Steer	
OVERALL LENGTH	8.680m	Overall Length	10.564m
OVERALL WIDTH	2.180m	Overall Width	2.524m
OVERALL BODY HEIGHT	3.452m	Overall Body Height	3.744m
MIN BODY GROUND CLEARANCE	0.337m	Min Body Ground Clearance	0.296m
MAX TRACK WIDTH	2.121m	Max Track Width	2.500m
LOCK TO LOCK TIME	6.00 sec	Lock-to-lock time	4.00s
KERB TO KERB TURNING RADIUS	7.910m	Curb to Curb Turning Radius	14.800m

KEY:

PROPOSED KERB GEOMETRY (BASED ON LANDSCAPE PROPOSALS)



KEY PLAN

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PROJECT
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TITLE
REVIEW OF JUNCTIONS WITH DOCK ROAD SHEET 2

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:200
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	CR	PH
DRAWING No			ISSUE
2303-C-SK054			I01

DATE: 09/08/2017 11:21:59
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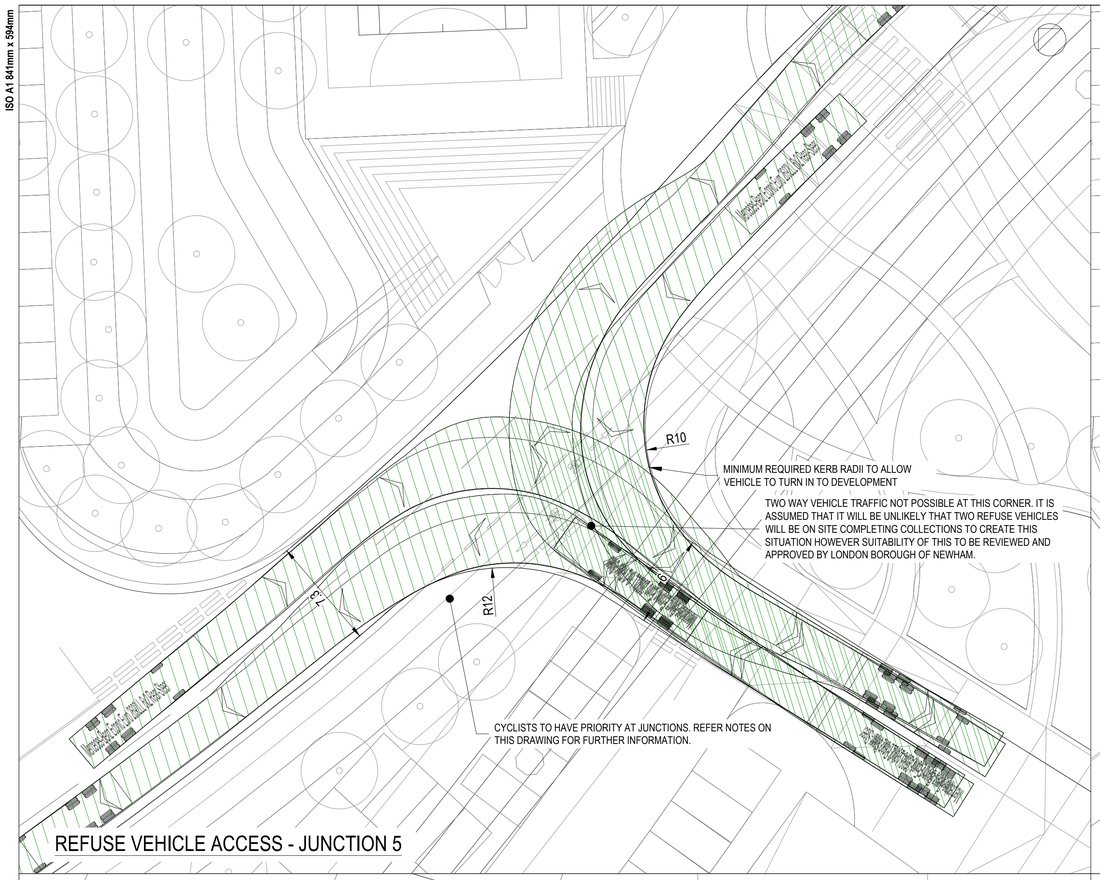

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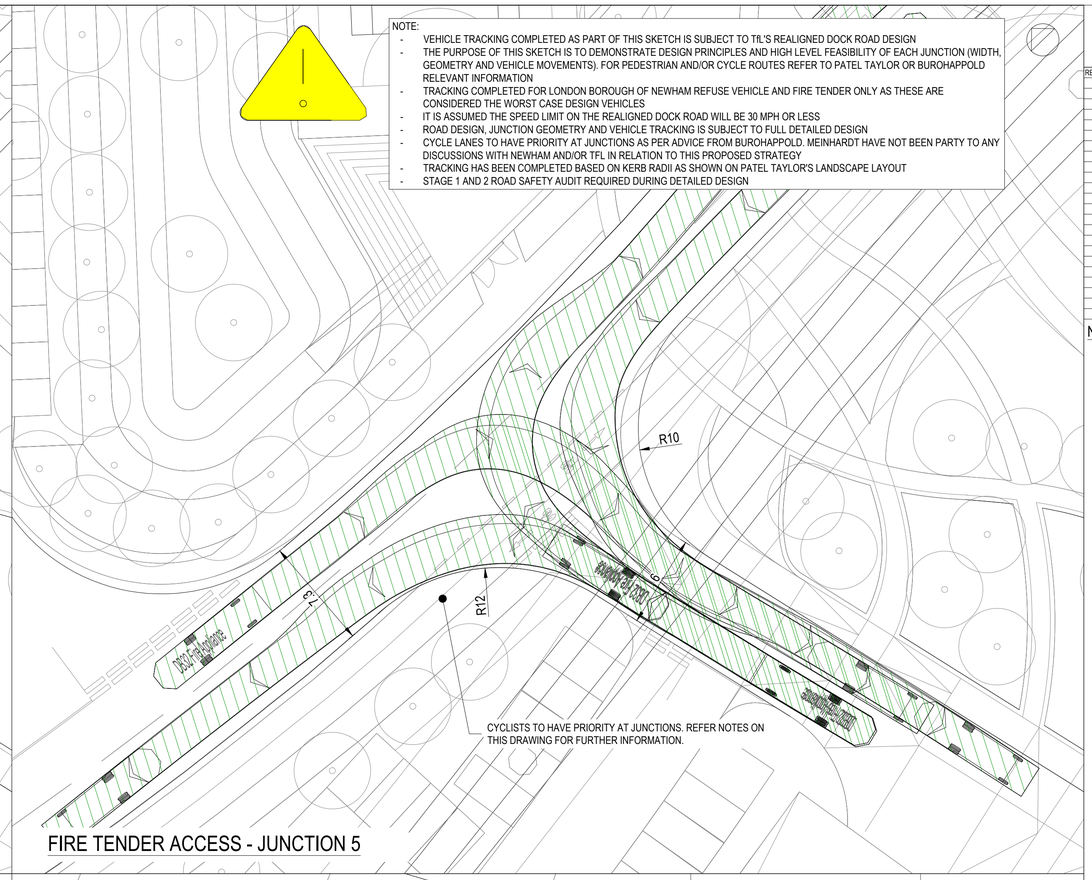

FIRE TENDER ACCESS - JUNCTION 5

NOTE:
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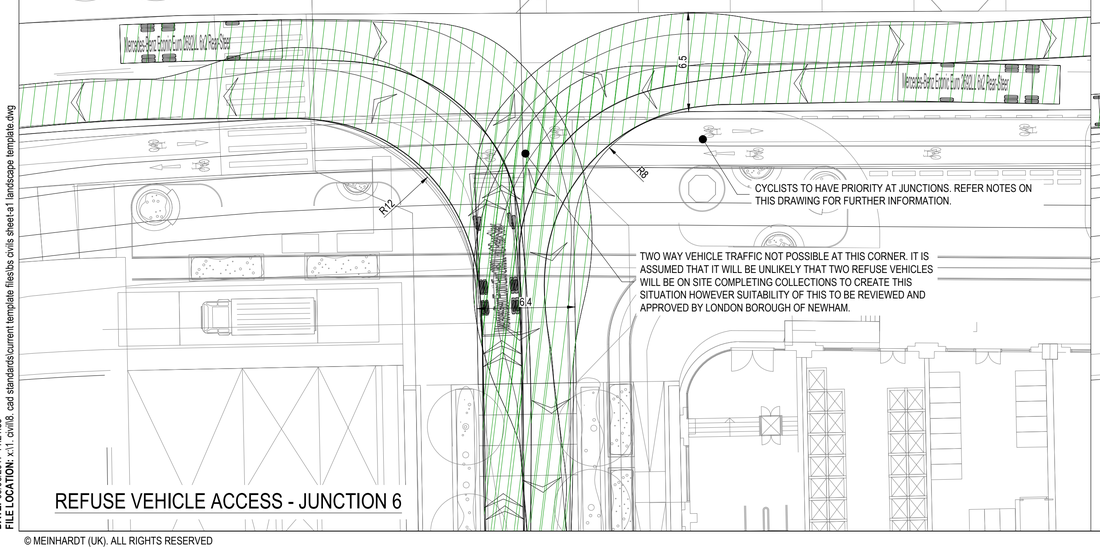

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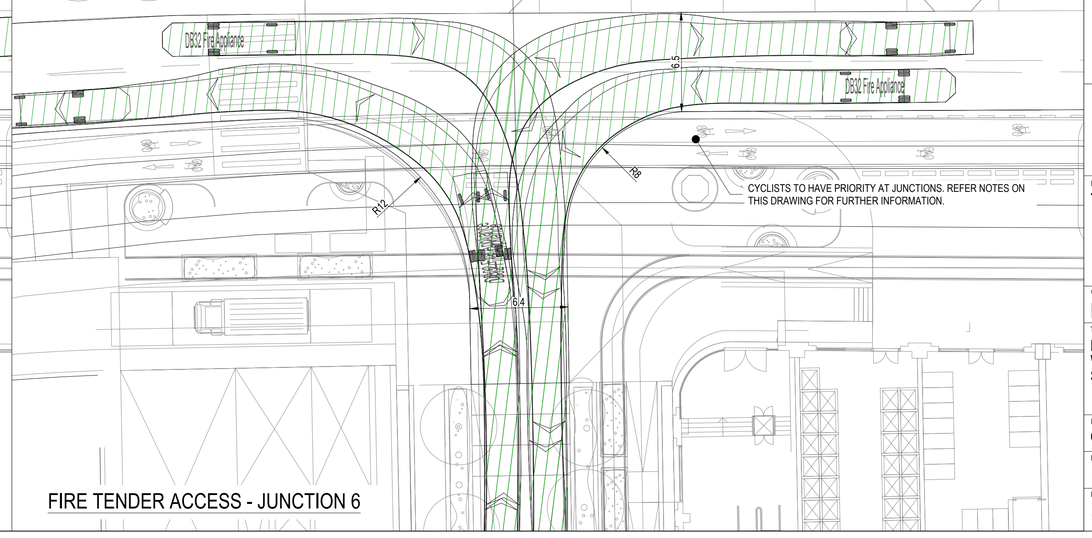

FIRE TENDER ACCESS - JUNCTION 6

FOR INFORMATION

REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	EP	27.04.20

NOTES:

1. THIS DRAWING IS BASED ON:
   - PATEL TAYLOR MASTERPLAN LANDSCAPE LAYOUT 522-PT-MP-TYP-DR-L-PL-1001_S2-P20 RECEIVED 17 APRIL 2020
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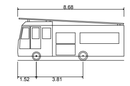
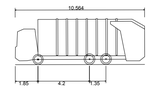


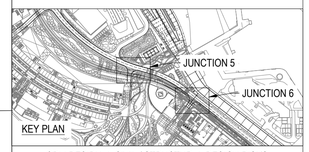
DB32 FIRE APPLIANCE	
OVERALL LENGTH	8.680m
OVERALL WIDTH	2.180m
OVERALL BODY HEIGHT	3.452m
MIN BODY GROUND CLEARANCE	0.337m
MAX TRACK WIDTH	2.121m
LOCK TO LOCK TIME	6.00 sec
KERB TO KERB TURNING RADIUS	7.910m



Mercedes-Benz Econic Euro 2692LL 6x2 Rear-Steer	
Overall Length	10.564m
Overall Width	2.524m
Overall Body Height	3.744m
Min Body Ground Clearance	0.296m
Max Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	14.800m

KEY:

PROPOSED KERB GEOMETRY (BASED ON LANDSCAPE PROPOSALS)



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PROJECT
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TITLE
REVIEW OF JUNCTIONS WITH DOCK ROAD SHEET 3

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:200
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	CR	PH
DRAWING No			ISSUE
2303-C-SK055			I01

DATE: 09/08/2017 11:21:59
FILE LOCATION: x:\1. civil\8. cad standards\current template files\ds civils sheet-a1 landscape template.dwg

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TRACKING FOR RIGID VEHICLE

TWO WAY VEHICLE TRAFFIC NOT POSSIBLE AT THIS CORNER. IT IS ASSUMED THAT IT WILL BE UNLIKELY THAT TWO DELIVERY VEHICLES WILL BE ON SITE COMPLETING COLLECTIONS TO CREATE THIS SITUATION.

FOR TRACKING OF VEHICLE ENTERING/EXITING SERVICE BAY REFER TO INSET A

PROPOSED TURN ON SPOT FOR RIGID VEHICLE. 3-POINT TURN REQUIRED

INSET A

RIGID VEHICLE TO REVERSE INTO PROPOSED LOADING BAY

BANKSMAN REQUIRED WHILST VEHICLE COMPLETING REVERSE MANOEUVRE TO CONTROL ONCOMING TRAFFIC AND MOVEMENT OF PEDESTRIANS

TRACKING FOR REFUSE VEHICLE

NOTE:
- ALL JUNCTION INTERFACES WITH DOCK ROAD ARE TO BE CONFIRMED THROUGH DISCUSSIONS WITH TFL
- REFER TO MEINHARDT SKETCHES 2303-C-SK053 TO 2303-C-SK057 FOR MORE INFORMATION ABOUT PROPOSED JUNCTIONS WITH DOCK ROAD

REFUSE VEHICLE WILL PASS IN CLOSE PROXIMITY TO THE PROPOSED TREES. SUITABILITY OF THIS TO BE REVIEWED BY LONDON BOROUGH OF NEWHAM

TWO WAY VEHICLE TRAFFIC NOT POSSIBLE AT THIS CORNER. IT IS ASSUMED THAT IT WILL BE UNLIKELY THAT TWO REFUSE VEHICLES WILL BE ON SITE COMPLETING COLLECTIONS TO CREATE THIS SITUATION HOWEVER SUITABILITY OF THIS TO BE REVIEWED AND APPROVED BY LONDON BOROUGH OF NEWHAM.

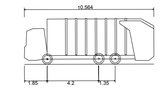
SUITABILITY OF VEHICLE TURNAROUND TO BE CONFIRMED BY LONDON BOROUGH OF NEWHAM AS TURNAROUND SHOWN REQUIRES SEVERAL MANOEUVRES TO COMPLETE TURN.

FOR INFORMATION

REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	BV	30.10.18
I02	FOR INFORMATION	BV	23.11.18
I03	FOR INFORMATION	CR	09.12.19
I04	UPDATED LANDSCAPE LAYOUT PHASE 1	EP	17.02.2020
I05	UPDATED MASTERPLAN LAYOUT	JD	12.03.2020
I06	TRACKING UPDATED TO SUIT NEW LANDSCAPING LAYOUT	EP	27.04.20

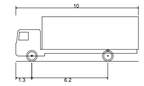
NOTES:

1. THIS DRAWING IS BASED UPON:
   - PATEL TAYLOR MASTERPLAN LANDSCAPE LAYOUT 522-PT-MP-TYP-DR-L-PL-1001_S2-P20 RECEIVED 17 APRIL 2020
2. TRACKING BASED ON A FORWARDS DESIGN SPEED OF 10kph AND A REVERSE DESIGN SPEED OF 5kph



Mercedes-Benz Econic Euro 2692LL 6x2 Rear-Steer

Overall Length	10.564m
Overall Width	2.524m
Overall Body Height	3.744m
Min Body Ground Clearance	0.296m
Max Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	14.800m



FTA DESIGN RIGID VEHICLE

Overall Length	10.000m
Overall Width	2.500m
Overall Body Height	3.645m
Min Body Ground Clearance	0.440m
Track Width	2.470m
Lock-to-lock time	3.00 sec
Kerb to Kerb Turning Radius	11.000m

KEY:

SITE BOUNDARY

DETAILED APPLICATION BOUNDARY

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS

MEINHARDT

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PROJECT
THAMESIDE WEST

CLIENT
KEYSTONE PARTNERSHIP

TITLE
VEHICLE TRACKING
REFUSE VEHICLE AND RIGID VEHICLE CIRCULATION AND TURNING CIRCLE

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:500
DRAWN	DESIGNED	CHECKED	APPROVED
BV	BV	NG	PH
DRAWING No			ISSUE
2303-C-SK034			I06

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F: +44 (0)870 787 4145
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10-B: SITE WASTE MANAGEMENT PLAN (SWMP) (UPDATED FOR MARCH 2020)

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BUROHAPPOLD ENGINEERING

Thameside West

Site Waste Management Plan

035668

29 April 2020

Revision 03

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Revision	Description	Issued by	Date	Checked
00	Draft	EW	28.11.2018	JS
01	Final	EW	13.12.2018	JS
02	May 2019 Submission	EW	17.05.2019	JS
03	April 2020 Submission	EW	29.04.2020	JS

author	**Edward Wilkins**
date	**29.04.2020**
approved	**Jose Sorribes**
signature	
date	**29.04.2020**

..

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Glossary

Term	Definition
AOD	Above Ordnance Datum
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
CD&E	Construction, Demolition and Excavation
CLP	Construction Logistics Plan
Defra	Department for Environment, Food and Rural Affairs
DCO	Development Consent Order
ES	Environmental Statement
EWC	European Waste Catalogue
GEA	Gross External Area
GFA	Gross Floor Area
GIA	Gross Internal Area
GLAP	GLA Land and Property
MRF	Materials Recovery Facility
SHL	Silvertown Homes Limited
SSP	Steel Sheet Piling
SWMP	Site Waste Management Plan
WEEE	Waste Electrical and Electronic Equipment
WRAP	Waste and Resources Action Programme

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1 Introduction

This report has been prepared by BuroHappold Engineering to accompany an Environmental Statement (ES) Addendum for the proposed Thameside West development in the London Borough of Newham (LBN). The planning application is being carried forward by Silvertown Homes Limited (SHL) and GLA Land and Property (GLAP) (the applicant). The report aims to ensure that construction, demolition and excavation (CD&E) waste from the proposed development is minimised and handled in an environmentally sustainable manner.

This report sets out a Site Waste Management Plan (SWMP) framework for the proposed development. It documents actions taken to design out waste before construction begins and also makes recommendations on how waste generation can be reduced at the construction stage. These recommendations will be further developed by the principal contractor and designated waste management company over subsequent design and construction phases.

The main aims of this SWMP are as follows:

- To document any initial waste reduction recommendations and to provide information on how waste management initiatives will be implemented throughout the construction of the project in order to minimise waste generation and increase the recovery of construction waste; and
- To enable the waste management recommendations within this report to be incorporated into a site-specific plan. The responsibility for developing the SWMP will fall with the principal contractor, who should appoint a waste champion to ensure the commitments in the plan are met.

The following tasks have been completed to enable the production of this SWMP:

- Creation of a framework SWMP at design stage;
- Estimation of baseline waste generation rates;
- Review of actions which have been or will be considered at design stage in order to design out waste;
- Review of actions which can be taken at construction stage to reduce waste generation and increase segregation; and
- Revised estimates of waste generation based on the waste minimisation actions.

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2 Project Description

Client name: Silvertown Homes Limited (SHL) and GLA Land and Property (GLAP)

Principal contractor name: TBC

SWMP prepared by: BuroHappold Engineering (the responsibility for developing the plan will be passed onto the client team after the design stage)

Project description: The applicant intends to submit a hybrid planning application comprising the following:

1. Detailed planning application for Phase 1 with works to include: The proposed demolition of existing buildings and structures, the erection of buildings, including tall buildings, comprising: 401 residential Units (Use Class C3), 3,608 sqm (GEA) of flexible employment floorspace (Use Classes B1c and B8); 230 sqm (GEA) of flexible retail floorspace (Use Classes A1-A4); a new/altered access road from Dock Road/North Woolwich Road; new streets, open spaces, landscaping and public realm; car, motorcycle and bicycle parking spaces and servicing spaces; and other works incidental to the proposed development.

2. Outline planning application (all matters reserved) for the phased delivery of the balance of the site for the proposed demolition of existing buildings and structures; the erection of buildings, including tall buildings, comprising: a new local centre; a primary school (Use Class D1); residential and older person units (Use Class C3); flexible employment floorspace (Use Classes B1c, B2 and B8); flexible retail floorspace (Use Classes A1-A4); community and leisure floorspace (Use Classes D1 and D2); the construction of a new flood defence wall and delivery of ecological habitat adjacent to the River Thames and associated infrastructure; streets, open spaces, landscaping and public realm (including new park and SINC improvements); car, motorcycle and bicycle parking spaces and servicing spaces; utilities including energy centre and electricity substations; and other works incidental to the proposed development.

The proposed development is located within the jurisdiction area of the London Borough of Newham (LBN). The location of the proposed development and the indicative planning boundary (in red) can be seen in Figure 2-1. The location and extent of Phase 1 within the wider masterplan have been marked in blue.

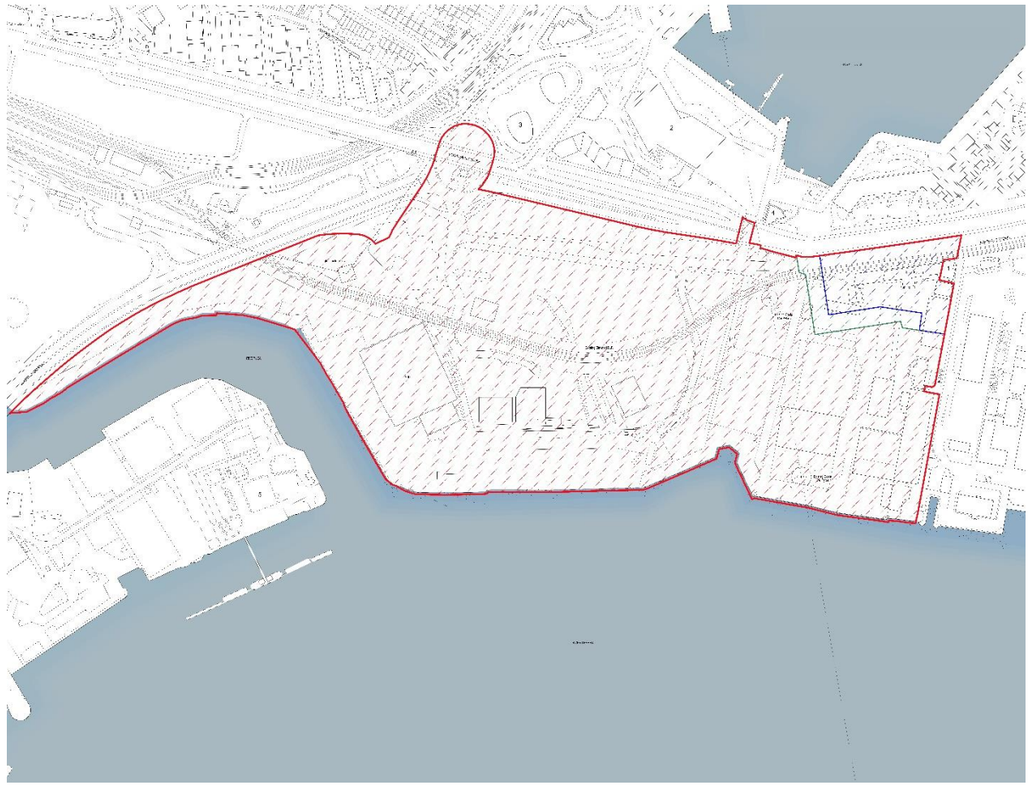

Figure 2-1 Indicative masterplan layout

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3 Waste Types and Quantities

The expected site waste quantities have been determined based on the information available at this planning stage. These are presented in the following sections.

3.1 Demolition Stage

The proposed development will be carried out in concurrence with the Silvertown Tunnel Development Consent Order (DCO) scheme, which was granted consent in May 2018.

A number of existing buildings within the DCO scheme order limits will be demolished during the tunnel's construction phase. It has been assumed that these buildings will form part of the Silvertown Tunnel scheme. As an absolute minimum, it is expected that the scale of demolition undertaken as part of the Silvertown Tunnel scheme will include those buildings located along the tunnel alignment and Dock Road re-alignment, although the actual scale of site clearance and demolition will likely extend to other buildings within the DCO boundary. The buildings to be demolished as part of the Silvertown Tunnel DCO scheme are shown by the hatched areas in Figure 3-1.

At this stage, it has been assumed that only the following buildings will be demolished as part of the Thameside West application:

- The ASD Limited buildings (buildings 1 and 2 in Figure 3-1); and
- The former Carlsberg Tetley buildings (buildings 3, 4 and 5 in Figure 3-1.

These five buildings lie outside the Silvertown Tunnel DCO boundary, but within the Thameside West site.

A desktop study of the five buildings has been carried out in order to provide information on the building perimeters, number of storeys, floor areas and the main type of materials likely to result from demolition. It should be noted that the floor areas have been re-estimated using aerial and street-level imagery since the 2017 operational development works planning application (ref: 17/02554/FUL). This explains why the values in this application differ slightly from those presented previously. The information is summarised in Table 3-1. It should also be noted that only permanent buildings have been considered, as it is assumed that temporary buildings will be removed from the site as and when tenancies are vacated.

Table 3-1 Information on existing buildings to be demolished as part of Thameside West application

Building reference	Estimated outline area (m^2)	Estimated number of storeys	Estimated floor area (m^2)	Principal materials to be produced from demolition
1	7,214	1	7,214	Concrete, masonry, metals
2	240	2	480	Concrete, masonry
3	169	2	337	Concrete, masonry
4	1,394	3	4,181	Concrete, masonry
5	234	1	234	Concrete, masonry
		Total	**12,447**	

Using an industry average waste generation benchmark of 244 kg/m^3 gross floor area (GFA)[1], in total, it is estimated that approximately 3,037 tonnes of demolition waste will be generated from those buildings demolished as part of the Thameside West application.

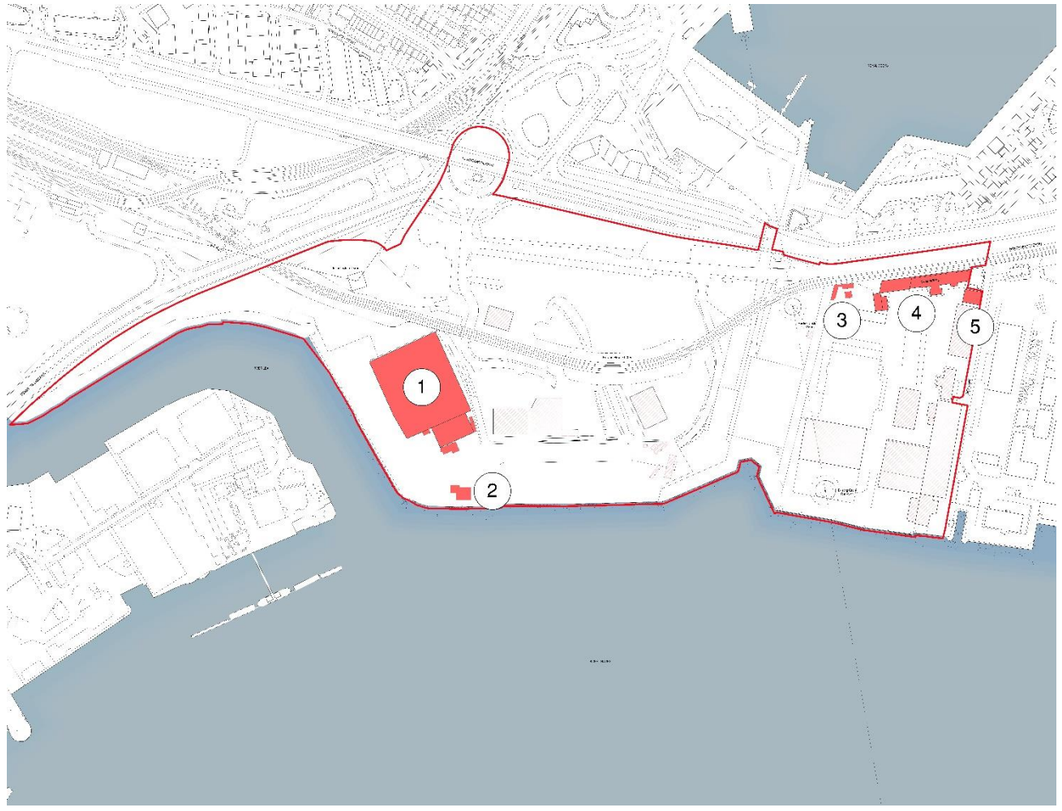

Figure 3-1 Buildings to be demolished as part of Thameside West application

3.2 Excavations

There is potential to re-use a proportion of the spoil arisings from the Silvertown Tunnel in enabling earthworks for the Thameside West site. This is one effective means of promoting the on-site recycling of CD&E waste and the principles of the circular waste economy. It is likely that a large proportion of the soil required to construct the engineered capping across the entire Thameside West site could be derived from the open-cut and cut-and-cover sections of the Silvertown Tunnel.

Basement excavation within the Thameside West application has been minimised where possible to optimise the redistribution of Silvertown Tunnel excavation spoil. That said, some areas of localised, gross or mobile contamination will be subject to excavation and treatment/removal off-site.

Preliminary assessments indicate that approximately 276,602 m^3 of spoil/waste arisings will be generated from piling and substructure excavation works.

[1] Environmental Protection Agency (2003) *Estimating Building Related Construction and Demolition Material Amounts*.

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Using the WRAP waste volume to mass conversion factor (July 2014) for excavation waste of 1.25 tonnes/m^3, it is estimated that approximately 345,752 tonnes of spoil will be generated from excavation works coming forward as part of the Thameside West application.

3.3 Construction Stage

During the construction stage, a variety of different types of waste are likely to be generated. The range of wastes associated with building construction and site preparation are described in Table 3-2, along with the associated codes for each waste stream. The classification of materials has been taken from the European Waste Catalogue (EWC).

Table 3-2 Possible waste types arising from construction

EWC code	EWC description	EWC code	EWC description
15 01 01	Paper and cardboard packaging	17 09 04	Mixed construction and demolition wastes (non-hazardous)
15 01 02	Plastic packaging	17 02 01	Wood
15 01 03	Wooden packaging	17 02 02	Glass
15 01 04	Metallic packaging	17 02 03	Plastic
15 01 05	Composite packaging	17 03 02	Bituminous mixtures
17 01 01	Concrete	17 04 01	Cooper, bronze, brass
17 01 02	Bricks	17 04 02	Aluminium
17 01 03	Tiles and ceramic	17 04 05	Iron and steel
17 01 07	Mixture of concrete, bricks, tiles and ceramics (non-hazardous)	17 04 07	Mixed metals
17 05 03*	Soils and Stones (containing some dangerous substances)	17 04 11	Cables (non-hazardous)
17 05 04	Soils and stones (non-hazardous)	17 06 04	Insulation materials (non-hazardous)

3.4 Construction Waste Generation

This section provides outline estimations of the expected quantities of waste generated during the construction stage.

River Wall Replacement

In order to manage tidal flood risk in the Thames estuary by the year 2100, the flood defence level will be raised to 6.2 m above ordnance datum (AOD). This will be achieved through the installation of a new flood defence wall, set back from the existing river wall alignment, combined with raised ground levels behind the wall. In total, approximately 1,080 m of river frontage will be upgraded.

A simplified construction methodology for the river wall has been used to identify those activities which will likely generate construction waste. These are outlined below:

- Removal of obstructions along the foot of the existing river wall and installation of first stage river wall;
- New steel sheet piling (SSP) approximately 0.5 m in front of the existing river wall;
- Local removal of fill behind existing SSP;
- Local excavation and ground improvement below second stage river wall footprint;
- Construction of second stage river wall, either in situ or precast;
- Existing river wall to be cut down to below capping beam level of new SSP;
- Cast concrete capping beam to new SSP; and
- Construction of third stage river wall.

It has been assumed that all excavated soil and removed fill will be re-used on-site for backfilling and ground profiling. This is an effective means of promoting the principles of a circular economy on-site. Additionally, it has been assumed that the new SSP will be pre-fabricated off-site and brought in in sections which will then be assembled together on-site. As such, it is anticipated that these two construction activities will generate close to zero waste on-site.

The quantities of construction waste from the river wall replacement works have been based on the volume of concrete required for the capping beam and reinforced concrete walls, as well as the volume of concrete demolished from the existing river wall. These volumes have been converted to tonnages by applying an average density for concrete of 2,400 kg/m^3.

Indicative construction waste quantities for the river wall replacement works are outlined in Table 3-3. It has been assumed that approximately 2.5% of the total weight of structural concrete required for the capping beam and reinforced concrete retaining walls will be generated as construction waste. This assumption has been extracted from BRE guidance[2].

Table 3-3 Estimated construction waste quantities (river wall replacement works)

Element	Estimated weight (tonnes)	Construction waste generated (tonnes)
Capping beam	1,453	36
Reinforced concrete retaining walls	8,088	202
Demolition of existing river wall	20,790	20,790
Total	**30,331**	**21,029**

It is expected that approximately 21,029 tonnes of CD&E waste will be produced by the river wall replacement works, if conventional construction waste management methods are followed.

Given the specific nature of the elements to be constructed and demolished, it is assumed that the construction waste from these works will predominantly be composed of concrete and structural steel trimmings.

Main Works

The total construction waste generation figure for the main site works is given in Table 3-5 and has been estimated based on the following:

- The frozen set of general arrangement plans issued by the masterplan architects;
- The frozen quantum of development;
- Information gained from the Department for Environment, Food and Rural Affairs (Defra); and
- Building Research Establishment (BRE) waste benchmarking data (updated June 2012), published based on information obtained through the use of the SMARTWaste Plan[3] (see Table 3-4).

[2] BRE (2010) *Green Guide to Specification*.

[3] BRE, 2012. *SMARTWaste: BRE benchmark data*.

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Table 3-4 Estimated construction waste generation

Project type	Average tonnes / 100 m^2 Gross External Area (GEA)
Commercial retail	27.5
Commercial office	23.8
Education	23.3
Leisure	21.6
Residential	16.8
Industrial buildings	12.6

BRE Waste Benchmarking data, although dated, provides some useful guidance on the estimated waste composition and generation expected during the development's construction phase. Maximum GEAs have been used as a proxy in order to provide an upper estimate of construction waste generation. The GEAs have been derived from the frozen development quantum for the scheme.

It should be noted that the current proposed scheme may be subject to changes in future planning and design stages, although minor alterations to the area schedule are unlikely to result in significant changes to construction waste generation quantities.

Indicative construction waste quantities are set out in Table 3-5.

Table 3-5 Estimated construction waste quantities

Land use	Total GEA (m^2)	Average generation rate (tonnes/100 m^2)	Construction waste generated (tonnes)
Commercial retail	7,368	27.5	2,026
Flexible employment floorspace*	4,441	23.8	1,057
Education	5,265	23.3	1,227
Leisure	1,790	21.6	387
Residential	441,141	16.8	74,112
Industrial buildings	15,000	12.6	1,890
		Total	**80,698**

*assumed commercial office

It is expected that approximately 80,698 tonnes of construction waste will be produced, if conventional construction waste management methods are followed.

In addition to the total construction waste generated, information on waste composition is required to fully ascertain the impacts of construction waste and any opportunities for mitigation.

The construction waste generation rates for each of the different materials have been calculated based on Waste Benchmarking Data (BRE, August 2009). Table 3-6 shows the likely material breakdown and approximate quantities of construction waste that will arise from the proposed development.

Table 3-6 Breakdown of estimated waste materials and quantities from the proposed development

Material	Estimated construction waste (tonnes)
Bricks	9,934
Tiles and ceramics	499
Concrete	20,050
Inert	17,255
Insulation	1,075
Metals	2,744
Packaging	2,758
Gypsum	2,324
Binders	228
Plastics	813
Timber	5,626
Floor coverings (soft)	97
WEEE	122
Furniture	80
Canteen/office/adhoc	1,240
Liquids	182
Oils	0
Asphalt and tar	1,538
Hazardous	483
Other	0
Mixed	13,648
Total	**80,698**

Figure 3-2 shows the likely proportion of construction waste materials arising from the proposed development. Construction waste is likely to contain significant quantities of re-usable and recyclable materials (i.e. concrete, timber, metals).

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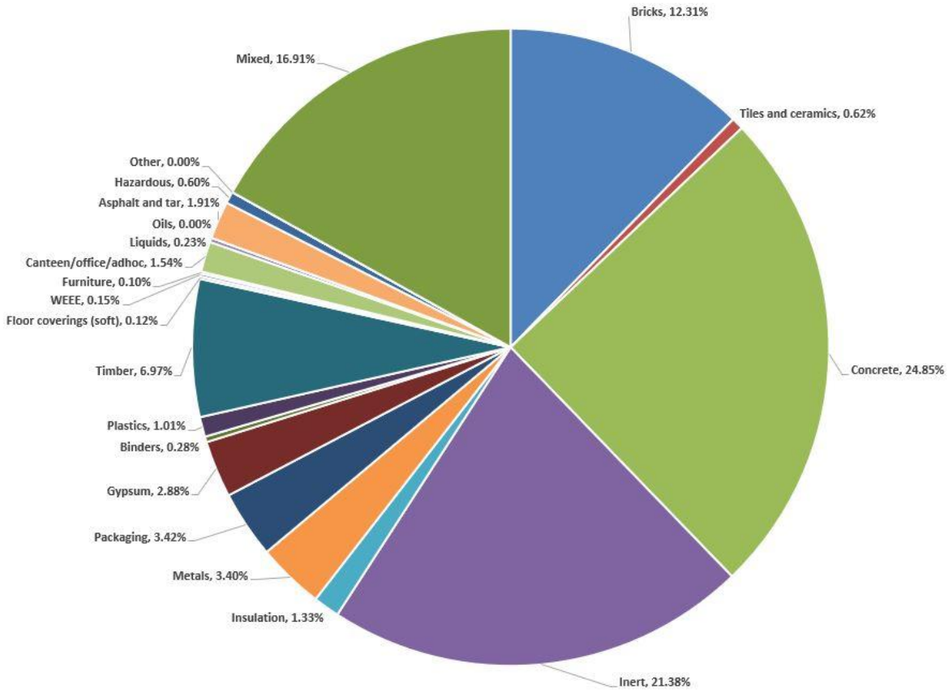

Figure 3-2 Estimated materials breakdown of total construction waste (principal materials)

3.5 Summary

In total, it is estimated that approximately 3,037 tonnes of demolition waste, 345,752 tonnes of excavation waste, 80,698 tonnes of construction waste and 21,029 tonnes of waste from the river wall replacement works will be generated from the proposed Thameside West development. This waste will likely contain high proportions of easily excludable, re-usable and recyclable materials that could be diverted from landfill disposal. There is therefore potential to achieve a high recycling rate for the proposed development.

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4 Waste Reduction through Design

4.1 Designing Out Waste

The proposed development will look to implement the waste hierarchy shown in Figure 4-1. In line with this, it will prioritise measures which look to reduce waste generation through the design process. Opportunities to design out waste have been (and will continue to be) investigated and potentially integrated as the project develops, with a number of potential options outlined in the section that follows.

Figure 4-1 Waste hierarchy

4.1.1 Measures Considered by Designers

The following measures have been considered by the Phase 1 architects and masterplanner to design out waste:

- Where possible, elements of the development will be fabricated and constructed off-site. The Phase 1 design features multiple modularity and opportunities for pre-fabrication;
- The size and design of new building elements for Phase 1 has been optimised in order to eliminate unnecessary elements and reduce off-cuts resulting from the construction process. Where practicable, this approach will also be adopted in the outline component;
- The complexity of the design has been reduced and the construction process standardised in order to reduce the quantity of materials required. There is significant repetition of components in the Phase 1 design, an effective means of reducing off-cut waste on-site; and
- Where possible, excavated material will be re-used on-site. A fundamental part of the levels strategy for the masterplan is around re-using spoil from the Silvertown Tunnel excavation works.

4.1.2 Other Design Considerations

Additional waste minimisation design measures should also be considered during subsequent design stages and, where possible, be incorporated into the project design. Options include the following:

Design solutions

- Consider matching design sizes to standard sizes of material supply in order to reduce off-cut waste;
- Maintain high quality control standards and process monitoring to ensure rejected batches of material are kept to a minimum; and
- Reduce the complexity of the design to standardise the construction process and reduce the quantity of materials required.

Logistics

- The development of a logistics plan for the project will ensure that due consideration is given to material requirements throughout the construction phase. This will enable efficient management of the delivery and storage of materials and will ensure that the most effective logistic methods are adopted;
- The site is immediately adjacent to a navigable water body (the River Thames) that is capable of accommodating freight. As such, it is feasible that a significant proportion of construction waste, including excavated spoil, could be removed from the site by marine transport. Opportunities for using marine transport to remove excavated spoil have already been identified as part of the Silvertown Tunnel DCO scheme. A detailed assessment is needed on the potential for using existing construction waste infrastructure from the Silvertown Tunnel scheme to export waste from the Thameside West application site, as is outlined in the Construction Logistics Plan (CLP) that accompanies this application;
- Adopt 'just-in-time' delivery protocols to reduce the space required for storage within the site. This will also minimise the risk of site congestion and material spoiling during bad weather; and
- Investigate the use of construction consolidation centres that provide effective supply chain management solutions, enabling the safe and efficient flow of construction materials and equipment from supplier to site.

Materials procurement

- Specific information relating to sustainable waste management should be incorporated into tender documents for third party contractors. When appointing a waste management company to handle the transportation, recovery and disposal of waste, contractual obligations should be implemented to ensure that these sustainable waste management measures are carried out;
- Reduce the amount of surplus materials by ordering the correct amount of materials at the right time;
- Material storage areas should be safe, secure and weatherproof to prevent damage and theft;
- Consider assigning the role of supply chain manager so that relationships and partnerships can be developed with suppliers who are able to implement waste minimisation at source;
- Set up agreements with suppliers to take back surplus materials and packaging;
- Engage with the supply chain to source products and materials that use minimal packaging and segregate packaging for re-use; and
- Aim to maximise the use of reclaimed and recycled materials.

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4.2 Potential Waste Reduction through Design Measures

As mentioned in Section 4.1 a number of measures can be explored which will help to reduce waste generation at design stage. Although some of these measures have not yet been considered for the outline application, it is anticipated that they will be discussed in more detail as the design stage advances. The design actions indicated in Table 4-1 include some standard actions that can be easily incorporated during the design process. The design team has been consulted to understand which actions have been considered/implemented to date. They advised that there is an aspiration to explore and implement the actions presented in Table 4-1, although stressed that these would need to be further explored and confirmed at reserved matters stages. Table 4-1 also shows the estimated waste reduction savings that each action is likely to bring about, were these to be implemented moving forward. The potential waste savings have been estimated based on previous project experience. These are considered to be conservative and achievable in most cases, although there is scope for the percentages to be revised as the project advances.

Table 4-1 Potential waste minimisation actions to be adopted at design stage

Design consideration	Comments from the design team	Estimated waste savings (%)
Off-site fabrication – can any of the components and/or buildings of the development be made off-site? (e.g. pre-cast concrete, timber frames, etc.)	Initial research has been conducted to inform basic geometry for outline planning consent, however this design area will be considered further during detailed planning application stages.	5%
Building form – has the form and shape of the building been designed in a way that minimises the use of materials on-site?	Initial research has been conducted to inform basic geometry for outline planning consent, however this design area will be considered further during detailed planning application stages.	3%
Building form – has attention been given to matching design sizes to standard sizes of material supply in an effort to reduce off-cut waste on-site?	Design consideration is too advanced for outline planning (masterplan) stage.	3%
Materials suppliers – will adequate training be received by materials suppliers?	Design consideration is too advanced for outline planning (masterplan) stage.	4%
Sustainability of materials – has consideration been given to the sustainability of materials used?	Design consideration is too advanced for outline planning (masterplan) stage.	3%
Waste minimisation – will waste minimisation key performance indicators (KPI) be incorporated into tendering contracts?	Design consideration is too advanced for outline planning (masterplan) stage.	1%
Design management – have efforts been made to prevent the major alteration of design at later stages?	MEP, fire, aviation, structural and environmental coordination will help prevent major scheme changes moving forward.	5%

The design actions indicated in Table 4-1 have been applied to specific waste materials and used to forecast the maximum achievable amount of construction waste that could be 'designed out' as part of the design stage. This will help guide the design team on what actions would contribute the most towards waste reduction. A summary of the potential waste reduction forecasts is shown in Table 4-2.

Table 4-2 Potential waste savings due to design mitigation measures

Construction material	Construction waste generated (tonnes)	Potential reduction	Potential reduction in material waste (tonnes)	Revised construction waste generation (tonnes)
All materials	80,698	24%	19,368	61,331

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5 On-Site Waste Reduction

5.1 Introduction

Sustainable waste management techniques will be considered throughout the site preparation and construction stages. A nominated waste champion will oversee the implementation plan and will ensure the project adopts the following sustainable waste management principles. Due to the scale of the proposed construction project, where reasonably practicable, the principles of on-site waste recycling and circular economy will be adhered to. This is particularly relevant in terms of excavation waste from the Silvertown Tunnel DCO scheme and river wall replacement works. A large proportion of this waste will be re-used in ground profiling works for the Thameside West application. Re-using demolition and construction waste on-site will be more challenging, although there is still potential to re-use this waste in other sites elsewhere, in the process diverting large quantities of CD&E waste from landfill.

5.2 Materials Management On-site

- The principal contractor will establish a system prior to construction commencing to ensure that the correct quantities of materials are ordered. This will reduce the volume of unused materials going to landfill;
- Dedicated areas will be created that allow for the correct storage of new building materials. This will reduce the risk of contamination/spoiling;
- Timely ordering of materials will reduce the time that materials are stored on site. This will also reduce the risk of spoiling;
- Provision of clearly marked segregated bins/skips for construction materials to avoid cross-contamination and to facilitate recycling; and
- All waste generated will be stored in designated areas that are isolated from surface drainage. Waste containers will be covered to prevent dust and litter being blown out and rainwater accumulating. Containers will be inspected regularly and replaced when full.

5.3 Waste Segregation On-site

Waste will be segregated on-site wherever possible. However, when this is not viable, mixed materials will be stored and sent to a local Materials Recovery Facility (MRF). The following recommendations should be considered to minimise the amount of waste produced and increase the proportion of waste that is segregated:

- Ideally, a specific area should be allocated and labelled to facilitate the segregation of waste materials for potential re-use, recycling and recovery;
- Efforts should be made to recover and recycle packaging waste in accordance with packaging legislation;
- Different waste streams should be segregated. As a minimum, containers/skips for hazardous/non-hazardous waste and plasterboard waste should be provided on-site. Some examples are shown in Figure 5-1;
- Recycling and waste skips will be kept clean and clearly marked to reduce contamination of materials. The labelling shall use 'Waste Stream Colour Codes';
- Training will be provided for all site personnel, informing them of the correct disposal routes for materials. A site waste champion will be appointed to oversee correct segregation/disposal and keep a record of all resources generated on-site. It is recommended that a designated senior person is appointed as site waste champion; and
- Green waste associated with landscaping works will be managed by the contractor carrying out said works. This waste will not be considered within the scope of this document; and
- It is recommended that waste produced by workers in site offices and welfare facilities is handled by a separate waste contractor to the one removing construction waste from the site. It is expected that these sources will generate minimal quantities of waste. It is recommended that this waste is segregated for reuse and recycling.

Figure 5-1 Examples of segregation skips

5.4 Site Waste Management Responsibilities

The principal contractor will be responsible for waste management upon appointment. The SWMP will be updated at least every 6 months or in the event that a major change occurs, such as a change of material supplier or waste contractor. All waste removal dockets or consignment notes must be collected and stored on-site. It is recommended that levels of waste generation are included in the monthly environmental report to allow the project team to track how the project is progressing against waste targets.

On completion of the development, a report shall be produced by the principal contractor that will detail total waste produced and actual recycling rate achieved. This will be added to this document and filed in a separate section.

The full SWMP will also include information and copies of data recording forms detailing the information recorded when any waste material leaves the site. In addition, the following aspects of site waste management should be audited:

- Delivery recording arrangements;
- Materials handling and storage;
- Use of materials (including surplus materials);
- Auditing of disposal areas (i.e. skip auditing); and
- Site staff awareness of waste management procedures.

Prospective waste management companies tendering for waste management work shall be audited and interviewed before any agreement is made between the client and waste management company. The waste management company with the best environmental performance will be selected for the project and be subject to ongoing audits to ensure that they are meeting required standards.

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6 CD&E Waste Recovery and Savings

6.1 Demolition Waste Recovery and Savings

Maximising the recovery of materials and resources from demolition has economic, as well as environmental benefits. Despite this, anticipating the percentage of demolition waste that can be recycled or reclaimed is difficult. Therefore, estimated average percentages have been extracted and adapted from BRE publications. These are shown in Table 6-1 and have been used to calculate the estimated reduction in demolition waste that could be achieved if good practice is followed.

Table 6-1 Typical recovery percentages and quantities for demolition waste

	%	Tonnes
Demolition waste generated	100	3,037
Reclaiming of demolished material	15	456
Recycling of demolished material	75	2,278
Disposal of demolished material	10	304

6.2 Excavation Waste Recovery and Savings

In total, it is estimated that approximately 345,752 tonnes of spoil will be generated from localised excavation works across the site.

The beneficial re-use of the spoil arising from excavation works will require that considerable attention is given to planning the following: the management of spoil as it arises, its segregation, transportation, temporary stockpiling, placing and compaction. This level of attention to the detail of material management would be expected of any competent contractor.

6.3 Construction Waste Recovery and Savings

Further savings could potentially be achieved throughout the construction stage if targets for waste recovery and segregation are set.

River Wall Replacement

The potential savings for the river wall replacement works are indicated in Table 6-2. These have been extracted from WRAP guidelines.

Table 6-2 Standard, good and best practice recovery rates by material (river wall replacement works)

Material	Possible disposal route	Possible recovery rate with segregation (standard practice)	Possible recovery rate with segregation (good practice)	Possible recovery rate with segregation (best practice)
Concrete	Recycled, disposal	75%	95%	100%

The potential on-site construction waste savings for the river wall replacement works are outlined in Table 6-3.

Table 6-3 Potential on-site savings by adopting WRAP best practice guidance (river wall replacement works)

Possible recovery weight (tonnes)			
Material	**Standard practice**	**Good practice**	**Best practice**
Concrete	15,771	19,977	21,029

If good practice methods are followed on-site, it is estimated that approximately 19,977 tonnes out of 21,029 tonnes of construction waste from the river wall replacement works could be diverted from landfill.

Main Works

The potential savings for the main construction works indicated in Table 6-4 have been derived from WRAP guidelines.

As a minimum, waste should be segregated as standard practice with an aim to achieve good practice diversion rates. In most cases, good practice methods are easily achievable, cost neutral and do not require a fundamental change in working practice.

Table 6-4 Standard, good and best practice recovery rates by material (main works)

Material	Possible disposal route	Possible recovery rate with segregation (standard practice)	Possible recovery rate with segregation (good practice)	Possible recovery rate with segregation (best practice)
Bricks	Recycled, disposal	75%	95%	100%
Tiles and ceramic	Recycled, disposal	75%	85%	100%
Concrete	Recycled, disposal	75%	95%	100%
Inert	Recycled, disposal	75%	95%	100%
Insulation	Recycled, disposal	12%	50%	75%
Metals	Recycled, disposal	95%	100%	100%
Packaging	Recycled, disposal	60%	85%	95%
Gypsum	Recycled, disposal	100%	100%	100%
Binders	Recycled, disposal	0%	0%	0%
Plastics	Recycled, disposal	60%	80%	95%
Timber	Recycled, disposal	57%	90%	95%
Floor coverings (soft)	Recycled, disposal	0%	0%	0%
WEEE	Recycled, disposal	0%	70%	95%
Furniture	Recycled, disposal	15%	25%	50%
Canteen / office / ad-hoc	Recycled, disposal	12%	50%	75%
Liquids	Recycled, disposal	100%	100%	100%
Asphalt and tar	Recycled, disposal	0%	0%	0%
Mixed	Recycled, disposal	12%	50%	75%

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Table 6-5 Potential on-site savings by adopting WRAP best practice guidance (main works)

Possible recovery weight (tonnes)			
Material	**Standard practice**	**Good practice**	**Best practice**
Bricks	5,662	7,172	7,550
Tiles and ceramics	284	322	379
Concrete	11,428	14,476	15,238
Inert	9,835	12,458	13,114
Insulation	98	409	613
Metals	1,981	2,086	2,086
Packaging	1,258	1,782	1,991
Gypsum	1,766	1,766	1,766
Binders	0	0	0
Plastics	371	494	587
Timber	2,437	3,848	4,062
Floor coverings (soft)	0	0	0
WEEE	0	65	88
Furniture	9	15	30
Canteen/office/ad hoc	113	471	707
Liquids	139	139	139
Oils	0	0	0
Asphalt and tar	0	0	0
Hazardous	0	0	0
Other	0	0	0
Mixed	1,245	5,186	7,779
Total	**36,627**	**50,690**	**56,129**

If good practice methods are adhered to on-site, a further 50,690 tonnes of construction waste could be diverted from landfill. This figure could rise to 56,129 tonnes diverted from landfill if best practice methods were to be used on-site. Table 6-6 summarises the potential waste savings that could be achieved if good and best practices are followed.

Table 6-6 Potential waste savings due to construction waste mitigation measures

Construction waste generated after design mitigation measures have been implemented (tonnes)	**Waste disposal quantities after segregation measures have been implemented (tonnes)**		
	Standard practice	**Good practice**	**Best practice**
61,331	24,703	10,641	5,201

6.4 Total Potential Waste Savings

It is estimated that 450,516 tonnes of waste will be generated from the demolition, excavation and construction stages of the project (3,037 tonnes from demolition; 345,752 tonnes from excavation; 80,698 tonnes from construction; and 21,029 tonnes of waste from the river wall replacement works). This total assumes that no design mitigation measures or waste recovery/diversion from landfill practices have been implemented.

Following BRE guidelines, it is anticipated that approximately 2,733 tonnes of demolition waste could be diverted from landfill.

If waste reduction measures through design are incorporated, then construction waste could be reduced by approximately 24% to 61,331 tonnes.

Furthermore, if a best practice approach is taken during the construction phase, then 56,129 tonnes of waste could be diverted from landfill through reclamation and recycling.

Finally, with regards to the river wall replacement works, if a best practice approach is taken during the CD&E works, then all 21,029 tonnes of waste generated could be diverted from landfill.

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7 Waste Management Responsibility

Responsibility for the various aspects of the SWMP is set out in Table 7-1. It should be noted that ownership roles are indicative and may vary as the project develops.

Table 7-1 SWMP responsibility matrix

Title	Responsible owner
Administration and planning	Client
Action log	Client
Design measures	Design coordinator
Responsibility for waste management	Principal contractor
Forecasting key waste production	Principal contractor
Planning re-use and recycling	Principal contractor
Register of licences, permits and movements	Principal contractor
Comparison of estimated and actual quantities	Principal contractor
The costing of site waste management	Principal contractor
Overall recycled content	Principal contractor
Implementation	Principal contractor
Final project declarations	Principal contractor

BuroHappold has highlighted potential design actions that can help minimise waste generation from the excavation and construction works. The responsibility to update and complete this document will be passed on to the principal contractor. At a later date, this updated SWMP will be provided to the client in both digital and hard copies, with the hard copy enclosed in a folder.

The principal contractor must update the SWMP prior to commencing any site works and as work progresses. They must ensure that workers on-site are aware of the SWMP and co-operate with it. This will include providing suitable site inductions, information and training. Contractors will in turn need to engage their employees and sub-contractors to ensure that any waste management objectives in the SWMP are understood and achieved.

Although the principal contractor is responsible for updating the SWMP and ensuring compliance and cooperation amongst the workers, the client will continue to have a role in ensuring its effective implementation. The client must give any reasonable direction to contractors to ensure compliance, for example, in setting contractual obligations. Both the client and the principal contractor are responsible for reviewing, revising and refining the SWMP as necessary, in particular, to ensure that roles and responsibilities are clear as the project progresses.

The SWMP must be kept at the site office and be available to any contractor carrying out work described in the plan. Once the development has finished, the principal contractor must keep the SWMP for two years after completion at their place of business or at the site of the project.

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8 Conclusion

At this early stage in the project, there are significant opportunities to reduce excavation and construction waste arising from the Thameside West development. The recommendations in this report should be adhered to, as they have the potential to significantly reduce the waste generated from the baseline estimate.

This report is a live document and it will be continually updated throughout the design and construction process. The next steps to take are as follows:

- Update the document in response to significant design changes which impact waste management;
- Ensure that ongoing design development refers to this report and integrates measures which look to design out waste;
- Integrate waste management requirements into tender documentation;
- When on-site, ensure that the SWMP is incorporated into all relevant aspects of site management;
- Retain a copy of this report and any updates to the SWMP on-site. All contractors should be made aware of its location. The original should be kept in the client offices. The waste measures stated in this report should be communicated during site inductions;
- A waste summary will be produced and added to the monthly environmental report. On completion of the works, a report shall be produced by the principal contractor that will detail total waste produced and actual recycling rate achieved;
- On completion, the principal contractor shall summarise all waste reports and compare the figures to the initial estimates in this report;
- Future recommendations to improve site waste management will be recorded and shared with the client, as well as other design and construction teams working on the development during the design stage; and
- When the work is complete, the SWMP file will be stored in the principal contractor's offices for a minimum of two years.

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12-A: RWDI TECHNICAL MEMO – PHASE 1

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TECHNICAL MEMORANDUM

DATE:	2020-04-03	**RWDI REFERENCE #:** 1804518
TO:	Gilberto Osornio Nieto	**EMAIL:** GilbertoOsornio.Nieto@burohappold.com
FROM:	Jeniffer Lowther David Hamlyn	**EMAIL:** Jeniffer.Lowther@rwdi.com David.Hamlyn@rwdi.com
RE:	**TSW Development** **Technical Memorandum** **Phase 1 Design Updates**	

Dear Gilberto,

A wind microclimate assessment of the proposed TSW development was undertaken by RWDI and reported on November 27th 2018; which accompanied the 2018 planning submission. This wind tunnel assessment was conducted with Phase 1 in detail and all other buildings in outline. It was noted that Phase 1 would require wind mitigation measures due to windier than suitable and unsafe wind conditions both on- and off-Site at ground level as well as at balcony levels. Mitigation measures were developed through an iterative wind tunnel test process with the design team present for the Phase 1 only scenario. The initial mitigation strategy was included with the results presented in the November 2018 report.

Further wind tunnel testing was undertaken in January 2019, which incorporated several design updates (including changes to balcony locations), and to develop the mitigation strategy for the Phase 1 only scenario. With the updated strategy, unsafe wind conditions would persist off-Site.

Further wind tunnel testing was recommended following the 2018 and 2019 assessments to mitigate unsafe wind conditions which persisted with the developed mitigation strategies. Furthermore, it was advised that additional mitigation testing would be required to develop an updated mitigation strategy for when the rest of the masterplan was completed prior to the RMA stages. Although the RMA stages could alter the wind conditions in comparison to the outline massing, the magnitude of unsafe wind conditions at Phase 1 with outline buildings in situ would be likely to persist at the future RMA stages. Further testing with the outline massing would inform the design team of any design features at neighbouring phases which would be required at Phase 1. Since further wind tunnel testing is required regardless for Phase 1 only scenario (due to strong winds off-site and at balconies), additional wind tunnel testing was recommended with and without the outline masterplan in situ.

Since the January 2019 wind tunnel tests, design updates have been proposed to Phase 1 and the surrounding masterplan. This Technical Memorandum will qualitatively assess the

potential wind conditions with these design changes at Phase 1 in isolation, without the surrounding masterplan. Therefore, the design changes to the rest of the masterplan have not been considered in this assessment, and these design changes should be included during subsequent RMA wind microclimate assessments.

November 2018 Technical Report Wind Conditions and Mitigation Strategy

With Phase 1 in situ, without the outline phases, many areas were shown to be suitable for the intended use. However, several areas were shown to require wind mitigation measures on the basis of pedestrian comfort and/or safety. These areas were as follows:

- Thoroughfares
    - To the east and north-west of Phase 1;
    - Off-Site on North Woolwich Road to the north of Phase 1.
- Entrances
    - The main residential entrance to the north-west corner of Phase 1.
- Amenity
    - Podium level between the towers;
    - Several balcony locations particularly on corners to the south-west.

Mitigation measures developed through wind tunnel testing (Configuration 5) comprise, in addition to the initial proposed landscaping scheme:

- 5m deep solid canopy at the at the south-western corner (near probe 280) at first floor level height;
- A 3m wide 50% porous screen beneath the canopy at full height;
- 50% porous covered walkway at the north-western corner to podium height - western thoroughfare covered from the sides and above, northern thoroughfare covered from above only;
- 1m tall shrubs on the western thoroughfare;
- 2m tall hoarding around the outline phases, with 4m tall hoarding to the south of Phase 1;
- 2.5m tall 50% porous sculpture near the residential entrance;
- Two additional 5m tall trees at the podium level between the towers;

- 1.5m tall balustrades at balcony probe locations 371, 372, 373, 374 and 375;

- Full height solid side screens at balcony locations 371, 373, 374 and 375.

It was also noted that the existing solid barrier and canopy at the railway provided mitigation to the off-site thoroughfare.

With these measures in place, the majority of locations would have conditions suitable for the intended pedestrian uses. However, two locations (probe 301 at the western thoroughfare and 371 at a balcony) would require additional wind mitigation measures which would be developed through further wind tunnel testing.

January 2019 Re-Test Wind Conditions and Updated Mitigation Strategy

The further wind tunnel testing in January 2019 was conducted to mitigate the remaining strong winds which would have persisted with the original mitigation strategy as well as to redevelop wind mitigation measures at ground and balcony levels to achieve a more desirable strategy, and to assess the wind conditions with an updated design (which included moved balcony locations).

The following mitigation strategy was developed (Figures 1 to 9):

1) An updated proposed landscaping scheme and wind mitigation measures as shown in Figure 1;

    - This includes the 5m deep solid canopy at the at the south-western corner (near probe 280) at first floor level height from the November 2018 mitigation strategy;

    - A 2.5m wide 50% porous screen below the south-western canopy which would be the full height from ground to canopy;

    - Canopy along the western façade between the larger corner canopies (2m wide); and

    - Six 4m tall trees in a 1m shrub/planter to the north-west of the Site.

2) 4m tall solid hoarding running along the southern boundary of the Site as well as 2m tall solid hoarding on the north-west boundary of the Site finishing in line with porous south west corner of the building

3) 2m tall 50% porous hoarding from the end of the solid hoarding and continued around the corner of the neighbouring site;

4) 50% porous bin store screening (2m tall) and 50% porous sculpture added (2m wide and 2.5m tall) at the north west of the Site;

5) 1m tall shrub to the south west of the Site;

6) Solid north western canopy with a 50% porous, 4m tall baffle on the diagonal to the corner;

7) Two additional deciduous trees of the same type on the podium between Blocks A and B;

8) Balustrades at 373 and 374 would be reduced to 1.1m. Balcony location 372 would also have suitable wind conditions with a 1.1m tall solid balustrade.

Although attempts were made to reduce the height of/the number of measures at locations 371 and 375, strong winds exceeding the safety threshold would persist with a reduction in the scale of the initial measures. Therefore, the required wind mitigation measures at these locations would be as stated in the November 2018 report (1.5m tall solid balustrades with full height solid side screen). All other balconies would have 1.1m tall solid balustrades as for probe locations 372 to 374.

The mitigation measures developed for the ground level wind conditions were largely successful with the updated mitigation strategy. However, off-Site strong winds at probe location 272 would persist for 2.5 hours per year. Further wind tunnel testing was recommended (as for the 2018 assessment) to mitigate these unsafe wind conditions.

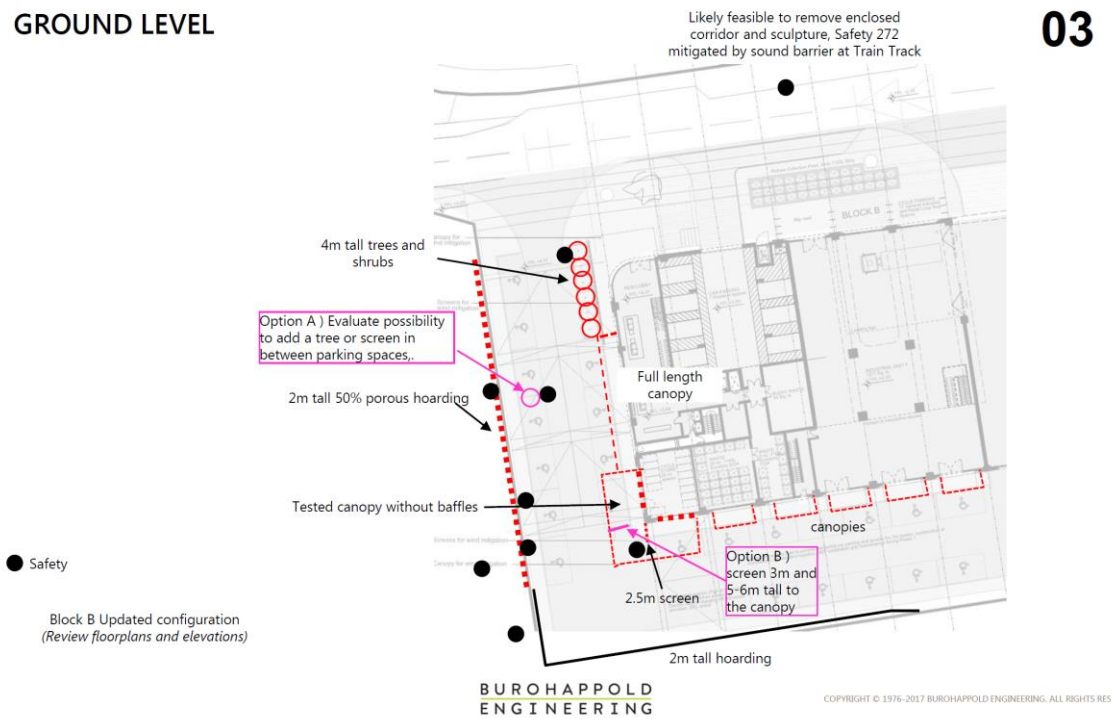

Figure 1: Updated Proposed Landscaping and mitigation measures (south-west screen and tree shown in pink removed) – Listed Mitigation Measure (1)

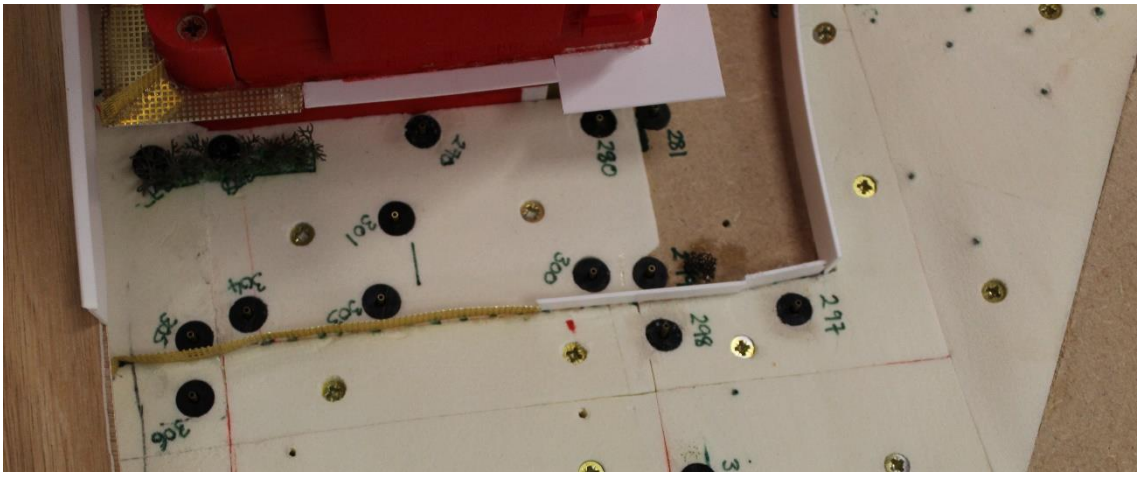

Figure 2: Hoarding to the west and south-west of Phase 1 – Listed Mitigation Measures (2) and (3)

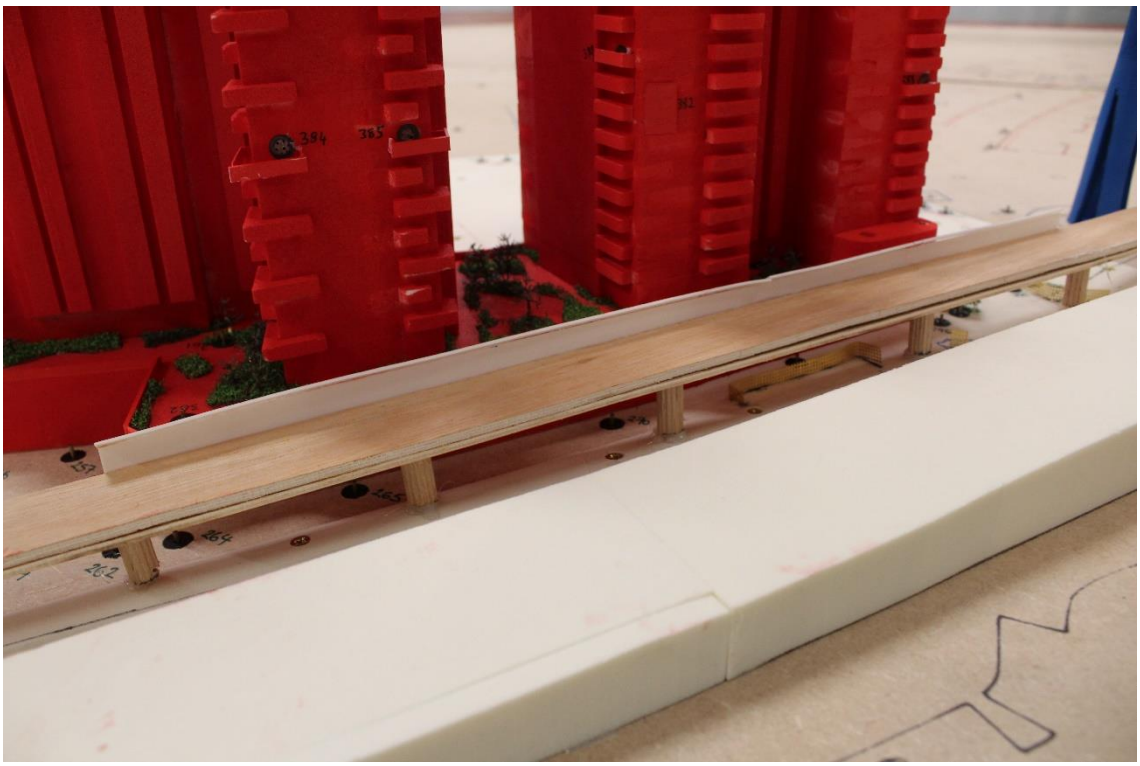

Figure 3: Bin store and porous sculpture to the north-west of the Site – Listed Mitigation Measure (4)

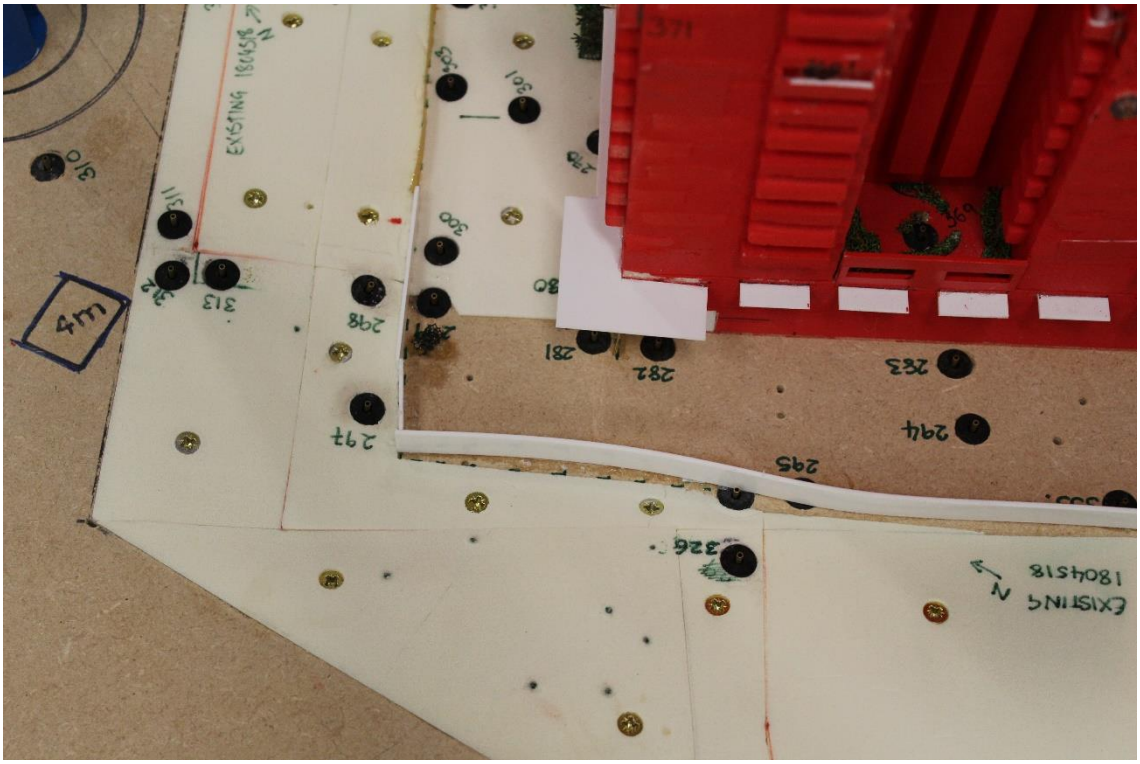

Figure 4: 1m tall shrub on western thoroughfare – Listed Mitigation Measure (5)

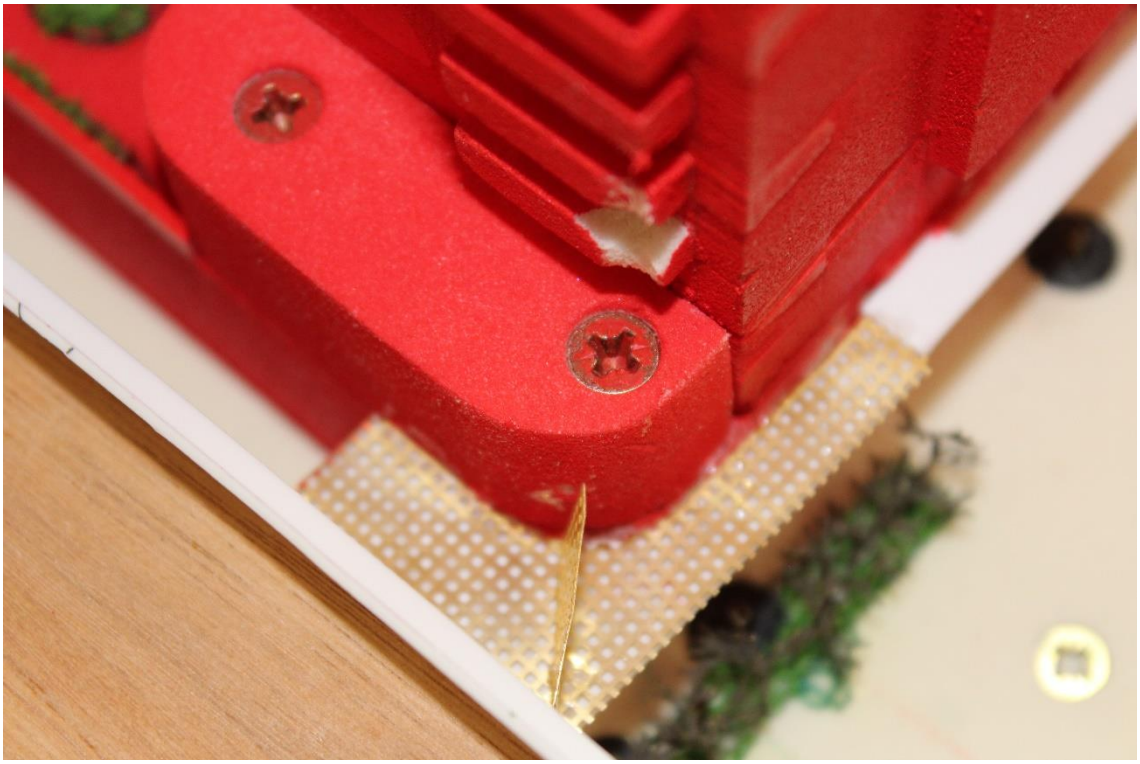

Figure 5: Solid north west canopy with baffle – Listed Mitigation Measure (6)

Figure 6: 1.1m tall solid balustrade – Listed Mitigation Measure (8)

Figure 7: Podium landscaping between Buildings A and B – Listed Mitigation measure (7)

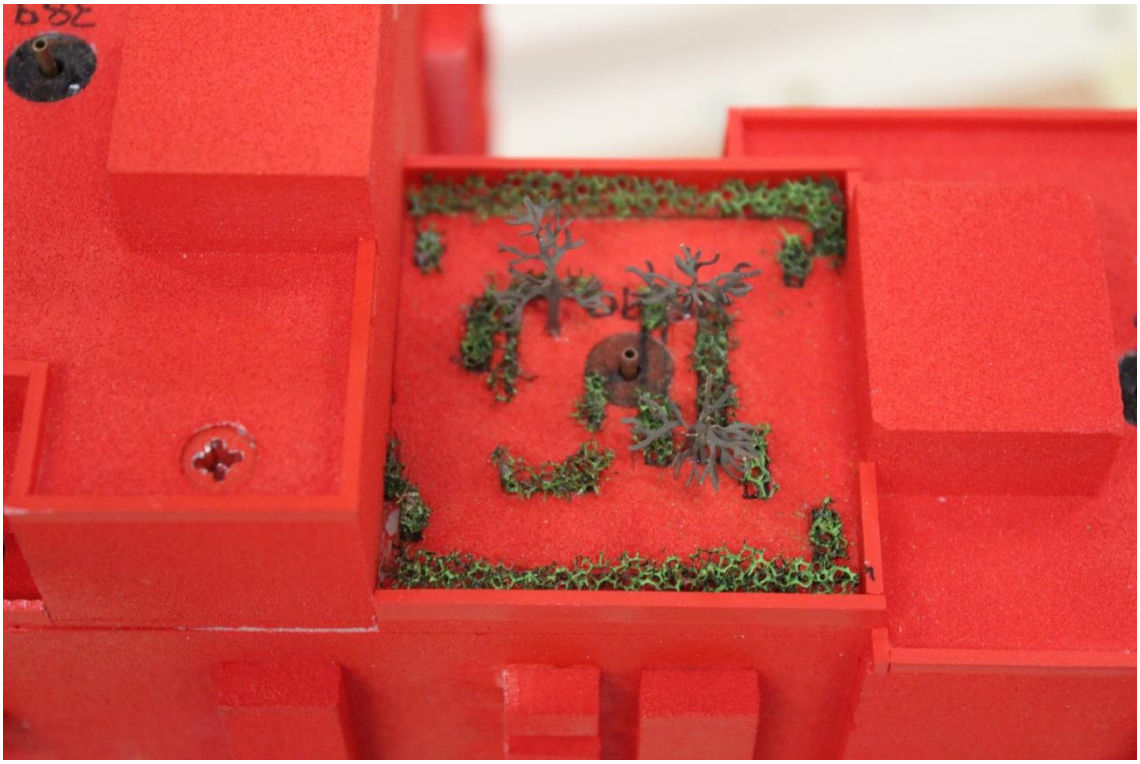

Figure 8: Block A rooftop landscaping (from south-west)

Figure 9: Podium to south-east of Block A (from south-west)

Proposed March 2020 Design Changes and Likely Wind Conditions

A comparison of the January 2019 wind tunnel model and the updated Phase 1 massing is shown in Figures 10 below.

The updated design is shorter than the November 2018 and January 2019 designs assessed in the wind tunnel. There are also changes to the "stepped" design of the buildings. The south-eastern half of Block A would be shorter than the north-western half. The relevant heights of Block B would remain similar to the previous designs. At ground level, changes have also been made to north-west of Phase 1, which includes the removal of the statue (which was part of the 2018 and 2019 mitigation strategies) to be replaced with larger, vertical, 50% porous hoarding (8m by 6m and 2m height) and three planters with shrubbery (See Figure 11). The hoarding at the bike store is also proposed to be removed.

The changes to the massing of Phase 1 is not expected to result in a material change to wind conditions at ground level. As such, the mitigation measures required at ground level would be as stated for the most recent wind mitigation strategy (the January 2019 strategy discussed above). The replacement of the statue with porous hoarding and shrubbery may lead to an increase of channelling at the north-western corner of Phase 1, which (as noted above) would require mitigation measures to ensure safe and suitable wind conditions for the intended uses. These windier conditions may lead to unsuitable and/or unsafe wind conditions at this location. Therefore, the recommendation to undertake further wind tunnel testing would remain, not only to mitigate the off-Site unsafe wind conditions to the north of Phase 1 at probe location 272 (as recommended in the 2019 assessment), but also to ensure safe and suitable wind conditions to the north-west of the Phase 1 at the residential entrance.

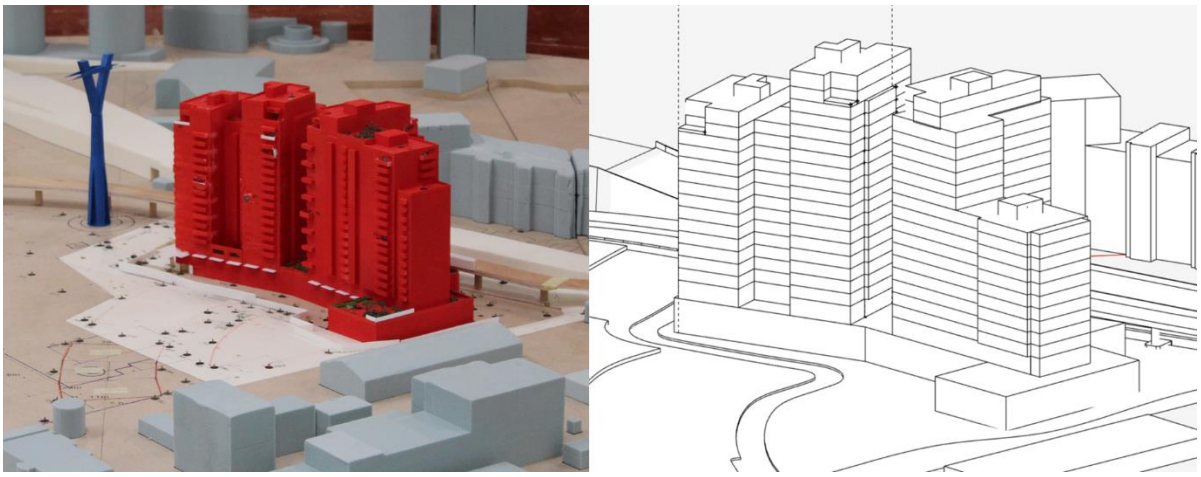

Figure 10: View from south – January 2019 wind tunnel model left, Proposed March 2020 massing right

Figure 11: Proposed ground level plan – received 2nd April 2020

At podium level, wind conditions would also not be expected to materially change due to the updated design. Therefore, the required wind mitigation measures are as for the latest wind mitigation strategy (the January 2019 strategy discussed above). No further wind mitigation is recommended for the podium level.

The Block B roof terrace levels would not be expected have materially different wind conditions with the updated design and landscaping scheme from that presented previously. Therefore, wind conditions would be expected to be suitable for the intended use and no further mitigation would be required. It is also expected that the higher rooftop level of Block A would have similar wind conditions to that of the Block A rooftop amenity space of the January 2019 assessment. Therefore, wind conditions would be expected to be suitable for the intended use and no further mitigation would be required in this amenity space.

The larger rooftop proposed amenity level of Block A is, however, expected to have windier conditions compared to the rooftop amenity area assessed in January 2019. Although the rooftop would be lower in comparison, down-washing winds from north-western section of Block A would be expected to occur (see Figure 12). The down-washing winds may be expected to lead to wind conditions which would be windier than required for the intended amenity use.

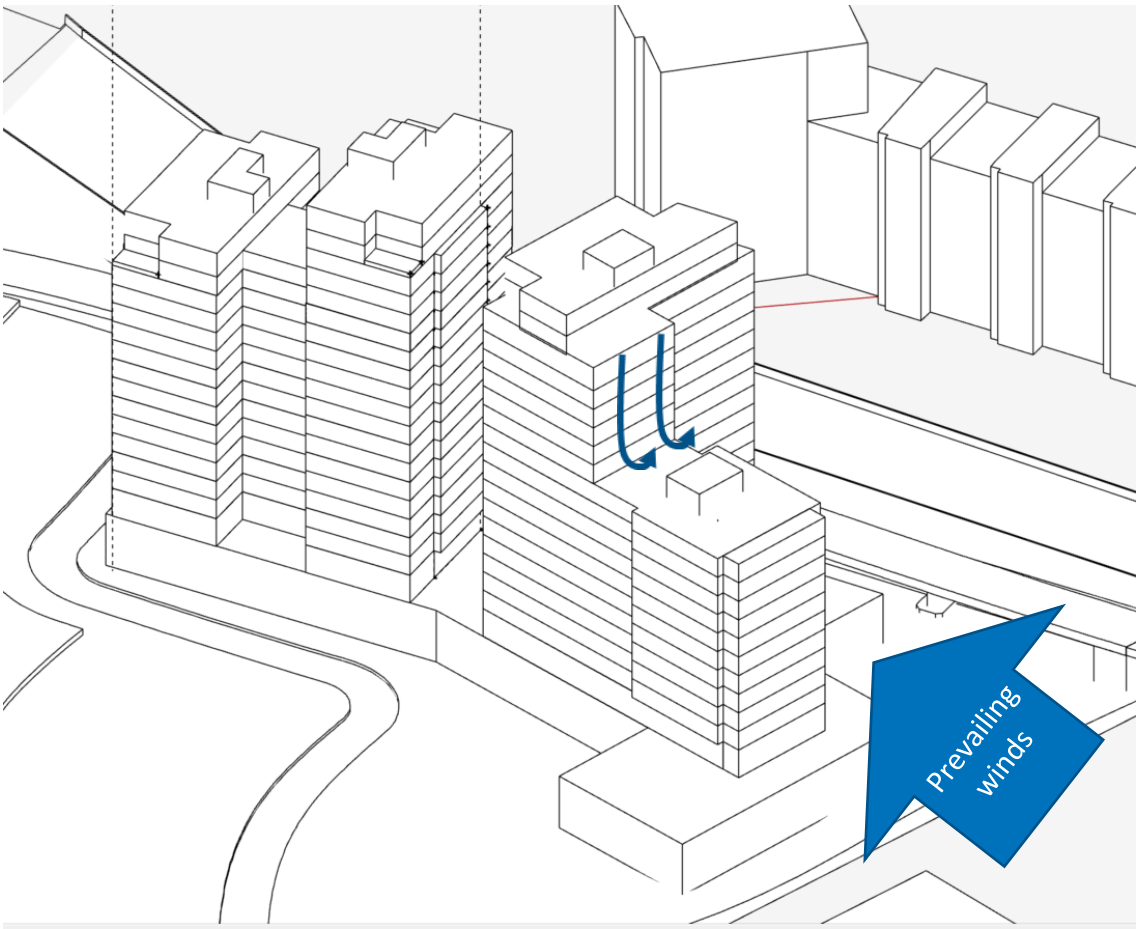

Figure 12: Proposed March 2020 massing and the expected down-washing winds on the lower Block A roof terrace

The proposed landscaping scheme (Figure 13) would include trees next to the façade where these down-washing winds would be expected to occur. These trees would be well located to diffuse and shelter occupants from the winds flowing vertically down the building façade. These trees would need to be at least 5m in height when planted, with dense full crowns which would provide shelter across the façade length. The down-washing winds may be expected to accelerate around the western corners of the core unit on the terrace. The chamfered south-west corner would be expected to be beneficial in mitigating any wind accelerating around this corner, however, the north-west corner would remain exposed and therefore there may be windier than desired conditions at this corner. Planting is beneficially located at this corner, which would restrict pedestrian access from the windier area.

Due to the down-washing winds, beneficial measures are also proposed to ensure suitable wind conditions for outdoor seating. Seating would be restricted to the eastern portion of the terrace, where wind conditions would be likely to be calmer. Planters or hedging of 1.5m height have been proposed around the seating which would be likely to provide suitable shelter to these areas. Furthermore, a glass balustrade of 1.5m to 1.7m in height around the terrace would provide shelter to the seating areas near the perimeter of the terrace (such as to the east). No further mitigation is recommended.