APPENDIX 2 – EXPLORATORY HOLE RECORDS

WINDOW/ WINDOWLESS SAMPLING BOREHOLE RECORD

		Exploratory Hole No:	WS1
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	JT	Date Commenced:	12/02/2018
Checked By:		Date Completed:	12/02/2018
Type and diameter of equipment:	Window Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field description.
2: No water reported.
3: VOC readings of each sample given in ppm.
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
P+J D	0.25								0.00				Soft* consistency dark brown sandy gravelly clay. Gravel consists of fine to coarse sub-angular to sub-rounded brick, concrete and flint. Contains frequent rootlets. No black staining or hydrocarbon odour noted. (MADE GROUND).	
	0ppm													
P+J D	0.50								0.50		0.60			
	0ppm												Very stiff* mottled brown-grey CLAY. No black staining or hydrocarbon odour noted. (LONDON CLAY).	
P+J D	1.00								1.00					
	0ppm													
SPT		1	1	2	3	2	2	9	1.50					
P+J	2.00								2.00					
	0ppm													
SPT		1	2	2	3	2	3	10	2.50					
P+J	3.00								3.00					
	0ppm													
SPT		1	2	3	4	3	3	13	3.50					
P+J	4.00								4.00					
	0ppm													
SPT		1	2	3	3	3	4	13	4.50					
P+J	5.00								5.00		5.00			
	0ppm													
SPT		2	2	4	4	4	4	16						

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

		WINDOW/ WINDOWLESS SAMPLING BOREHOLE RECORD	
		Exploratory Hole No:	**WS2**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	JT	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Window Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field description.
2: Metal bar (approx. 15mm in diameter) hit at approx. 1.05m bgl.
3: Seepage of black oily water at approx. 1.10m bgl.
4: VOC readings of each sample given in ppm.

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									0.00					
											0.20		Reinforced concrete. (MADE GROUND).	
P+J D	0.50								0.50				Soft* consistency dark brown sandy gravelly clay. Gravel consists of fine to coarse sub-angular to sub-rounded brick, concrete and flint. No black staining or hydrocarbon odour noted. (MADE GROUND).	
	0ppm													
P+J D	1.00								1.00					
	0ppm										1.10			
													No recovery from 1.00-4.00m bgl (except one vial from approx. 2.50m bgl).	
									1.50					
									2.00					
VIAL ONLY	2.50								2.50					
	18ppm													
									3.00					
									3.50					
											4.00			
									4.50					
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

WINDOW/ WINDOWLESS SAMPLING BOREHOLE RECORD

		Exploratory Hole No:	**WS3**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	JT	Date Commenced:	12/02/2018
Checked By:		Date Completed:	12/02/2018
Type and diameter of equipment:	Window Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field description.
2: No water reported.
3: VOC readings of each sample given in ppm.
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N	0.00					
											0.20		Reinforced concrete. (MADE GROUND).	
P+J D	0.40												Soft* consistency mid to dark brown sandy gravelly clay. Gravel consists of fine to coarse sub-angular to sub-rounded brick, concrete and flint. No black staining or hydrocarbon odour noted. (MADE GROUND).	
	0ppm								0.50					
P+J D	0.80										0.90			
	0ppm													
SPT	1.00	1	1	1	2	2	1	6	1.00				Very stiff* mottled brown-grey CLAY. No black staining or hydrocarbon odour noted. (LONDON CLAY).	
									1.50					
P+J D	2.00								2.00					
	0ppm													
SPT		1	1	2	2	2	3	9						
									2.50					
P+J	3.00								3.00					
	0ppm													
SPT		1	1	2	2	2	3	9						
									3.50					
P+J	4.00								4.00					
	0ppm													
SPT		1	2	2	3	4	4	13						
									4.50					
P+J	5.00								5.00		5.00			
	0ppm													
SPT		2	4	3	5	4	6	18						

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

WINDOW/ WINDOWLESS SAMPLING BOREHOLE RECORD

		Exploratory Hole No:	**WS4**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	JT	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Window Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: Field description.
2: Water seepage at approx. 4.50m bgl.
3: VOC readings of each sample given in ppm.
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N	0.00					
											0.50		Reinforced concrete. (MADE GROUND).	
P+ J D	0.70								0.50				Very stiff* mottled brown-grey CLAY. No black staining or hydrocarbon odour noted. (LONDON CLAY).	
	0ppm													
P+ J D	1.00								1.00					
	0ppm													
SPT		1	0	1	0	1	2	4	1.50					
P+ J D	2.00								2.00					
	0ppm													
SPT		1	2	2	3	4	4	13	2.50					
P+ J	3.00								3.00					
	0ppm													
SPT		1	2	2	3	4	4	13	3.50					
P+ J	4.00								4.00					
	0ppm													
SPT		1	2	3	3	4	4	14	4.50					
SPT	5.00	1	2	4	4	5	4	17	5.00		5.00			

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

		WINDOW/ WINDOWLESS SAMPLING BOREHOLE RECORD	
		Exploratory Hole No:	**WS5**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	JT	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Window Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field description.
2: No water reported.
3: VOC readings of each sample given in ppm.
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N	0.00					
											0.08		Concrete. (MADE GROUND).	
											0.30		Concrete. (MADE GROUND).	
P+J D	0.50								0.50				Soft* consistency mid to dark brown sandy gravelly clay. Gravel consists of fine to coarse sub-angular to sub-rounded brick, concrete and flint. Some black staining and a moderate hydrocarbon odour noted throughout. (MADE GROUND).	
	2ppm													
P+J D	1.00								1.00					
	8ppm													
SPT		1	1	0	1	0	1	2			1.20			
P+J D	1.60								1.50				Very stiff* mottled brown-grey CLAY. Dark black staining and a strong hydrocarbon odour noted from approx. 1.50m-2.00m bgl. Softer consistency and wetter from approx. 2.00m-3.00m bgl. (LONDON CLAY).	
	24ppm													
SPT	2.00	0	0	0	0	0	0		2.00					
P+J	2.50								2.50					
	1ppm													
SPT	3.00	0	1	0	0	1	1	2	3.00					
P+J	3.50								3.50					
	0ppm													
SPT	4.00	1	2	2	3	2	3	10	4.00					
P+J	4.50								4.50					
	0ppm													
SPT	5.00	2	2	2	3	4	4	13	5.00		5.00			

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

WINDOW/ WINDOWLESS SAMPLING BOREHOLE RECORD

		Exploratory Hole No:	**WS6**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	JT	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Window Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: Concrete corer refused at 0.60m due to presence of vertical rebar.
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N	0.00				Reinforced concrete. (MADE GROUND).	
									0.50		0.60			
									1.00					
									1.50					
									2.00					
									2.50					
									3.00					
									3.50					
									4.00					
									4.50					
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

		WINDOW/ WINDOWLESS SAMPLING BOREHOLE RECORD	
		Exploratory Hole No:	**WS7**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	JT	Date Commenced:	12/02/2018
Checked By:		Date Completed:	12/02/2018
Type and diameter of equipment:	Window Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: *Field description.
2: No water reported.
3: VOC readings of each sample given in ppm.
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									0.00					
											0.25		Reinforced concrete. (MADE GROUND).	
P+J D	0.40												Soft* consistency mid brown sandy gravelly clay. Gravel consists of fine to coarse sub-angular to sub-rounded brick, concrete and flint. No black staining or hydrocarbon odour noted. (MADE GROUND).	
	0ppm								0.50					
P+J D	0.90													
SPT	0ppm1.00	1	1	1	2	1	2	6	1.00		1.00			
P+J D	1.50												Very stiff* mottled brown-grey CLAY. No black staining or hydrocarbon odour noted. (LONDON CLAY).	
	0ppm								1.50					
SPT	2.00	1	2	2	2	3	2	9	2.00					
									2.50					
P+J	3.00								3.00					
	0ppm													
SPT		1	2	3	2	3	3	11						
									3.50					
P+J	4.00								4.00		4.00			
	0ppm													
SPT		1	2	3	3	3	3	12						
									4.50					
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH1		
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	RD	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Dando 4000	Sheet No:	1 Of 5

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No water reported
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N	0.00				Concrete. (MADE GROUND)	
											0.30			
D	0.40								0.50				Brown medium to high strength silty CLAY.	
D	1.00								1.00					
U	1.50								1.50					
									2.00					
D	2.50								2.50					
S		2	2	2	3	3	3	11						
									3.00					
D	3.50								3.50					
									4.00					
U	4.50								4.50					
	45 blows for 100% recovery													
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

		CABLE PERCUSSION BOREHOLE RECORD	
		Exploratory Hole No:	**BH1**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	RD	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Dando 4000	Sheet No:	2 Of 5

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No water reported
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									5.00				Brown medium to high strength silty CLAY.	
D	5.50								5.50					
S		2	4	4	4	4	4	16						
									6.00					
D	6.50								6.50					
S		2	4	4	4	4	5	17						
									7.00					
U	7.50								7.50					
	60 blows for 100% recovery													
									8.00					
D	8.50								8.50					
S		3	4	4	5	5	6	20						
									9.00					
D	9.50								9.50					
S		3	4	5	5	5	6	21						
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	**BH1**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	RD	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Dando 4000	Sheet No:	3 Of 5

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No water reported
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									10.00				Brown medium to high strength silty CLAY.	
U	10.50								10.50					
	80 blows for 100% recovery													
									11.00					
D	11.50								11.50					
S		4	5	5	5	6	6	22						
									12.00					
											12.40			
D	12.50								12.50				Grey high to very high strength CLAY. (LONDON CLAY)	
S		3	4	5	6	6	7	24						
									13.00					
U	13.50								13.50					
	80 blows for 100% recovery													
									14.00					
D	14.50								14.50					
S		3	4	5	6	6	7	24						
									15.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	**BH1**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	RD	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Dando 4000	Sheet No:	4 Of 5

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No water reported
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									15.00				Grey high to very high strength CLAY. (LONDON CLAY)	
D	15.50								15.50					
S		3	4	5	6	7	7	25						
									16.00					
U	16.50								16.50					
	70 blows for 100% recovery													
									17.00					
D	17.50								17.50					
S		4	5	6	7	7	9	29						
									18.00					
D	18.50								18.50					
S		4	5	6	7	8	9	30						
									19.00					
U	19.50								19.50					
	80 blows for 100% recovery													
									20.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	**BH1**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	RD	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Dando 4000	Sheet No:	5 Of 5

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No water reported
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N	20.00				Grey high to very high strength CLAY. (LONDON CLAY)	
D	20.50								20.50					
S		4	5	7	7	8	10	32						
									21.00					
D	21.50								21.50					
S		5	7	8	8	9	9	34						
									22.00					
U	22.50								22.50					
	150 blows for 55% recovery													
									23.00					
D	23.50								23.50					
S		4	7	8	8	9	11	36						
D	24.00								24.00					
S	24.50	7	8	9	10	10	12	41	24.50					
											24.95			
									25.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	**BH2**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	RS	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Dando 4000	Sheet No:	1 Of 5

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No water reported
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N	0.00				Concrete. (MADE GROUND)	
											0.30			
D	0.40								0.50				Brown medium to high strength silty CLAY.	
D	1.00								1.00					
S	1.50	2	2	2	2	2	2	8	1.50					
D	2.00								2.00					
U	2.50								2.50					
	60 blows for 100% recovery													
									3.00					
D	3.50								3.50					
S		2	3	2	3	3	3	11						
									4.00					
D	4.50								4.50					
S		2	3	3	4	4	4	15						
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	**BH2**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	RS	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Dando 4000	Sheet No:	2 Of 5

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No water reported
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									5.00				Brown medium to high strength silty CLAY.	
U	5.50								5.50					
	60 blows for 100% recovery													
									6.00					
D	6.50								6.50					
S		3	3	4	4	4	5	17						
									7.00					
D	7.50								7.50					
S		3	3	4	4	5	5	18						
									8.00					
U	8.50								8.50					
	70 blows for 100% recovery													
									9.00					
D	9.50								9.50					
S		2	3	4	4	4	6	18						
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	**BH2**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	RS	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Dando 4000	Sheet No:	3 Of 5

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No water reported
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	10.50								10.00				Brown medium to high strength silty CLAY.	
S		3	4	4	4	5	6	19	10.50					
									11.00					
U	11.50								11.50					
	70 blows for 100% recovery										11.60			
													Grey high to very high strength CLAY. (LONDON CLAY)	
									12.00					
D	12.50								12.50					
S														
									13.00					
D	13.50								13.50					
S		3	4	6	6	7	7	26						
									14.00					
U	14.50								14.50					
	65 blows for 100% recovery													
									15.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	**BH2**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	RS	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Dando 4000	Sheet No:	4 Of 5

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No water reported
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									15.00				Grey high to very high strength CLAY. (LONDON CLAY)	
D	15.50								15.50					
S		4	4	5	6	7	8	26						
									16.00					
D	16.50								16.50					
S		4	5	6	7	8	9	30						
									17.00					
U	17.50								17.50					
	70 blows for 100% recovery													
									18.00					
D	18.50								18.50					
S		4	7	7	8	8	11	34						
									19.00					
D	19.50								19.50					
S		4	5	6	8	9	10	33						
									20.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

		CABLE PERCUSSION BOREHOLE RECORD	
		Exploratory Hole No:	**BH2**
Site Address:	140 Highgate Road, Highgate, London, NW5 1PB	Project No:	P1323J1303
Client:	Design Ventures Highgate Ltd	Ground Level:	
Logged By:	RS	Date Commenced:	13/02/2018
Checked By:		Date Completed:	13/02/2018
Type and diameter of equipment:	Dando 4000	Sheet No:	5 Of 5

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No water reported
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									20.00				Grey high to very high strength CLAY. (LONDON CLAY)	
U	20.50								20.50					
	70 blows for 100% recovery													
									21.00					
D	21.50								21.50					
S		4	7	8	8	9	10	35						
									22.00					
D	22.50								22.50					
S		4	8	8	9	10	10	37						
									23.00					
U	23.50								23.50					
	80 blows for 100% recovery													
									24.00					
D	24.50								24.50		24.50			
S		4	8	9	10	11	11	41						
									25.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

Advice Note on contents of a Surface Water Drainage Statement

London Borough of Camden

1. Introduction

1.1 The Government has strengthened planning policy on the provision of sustainable drainage and new consultation arrangements for 'major' planning applications will come into force from 6 April 2015 as defined in the Written Ministerial Statement (18th Dec 2014).

1.2 The new requirements make Lead Local Flood Authorises statutory consultees with respect to flood risk and SuDS for all major applications. Previously the Environment Agency had that statutory responsibility for sites above 1ha in flood zone 1.

1.3 Therefore all 'major' planning applications submitted from 6 April 2015 are required demonstrate compliance with this policy and we'd encourage this is shown in a **Surface Water Drainage Statement**.

1.4 The purpose of this advice note is to set out what information should be included in such statements.

2. Requirements

2.1 It is essential that the type of Sustainable Drainage System (SuDS) for a site, along with **details of its extent and position**, is identified within the planning application to clearly demonstrate that the proposed SuDS can be accommodated within the development.

2.2 It will now not be acceptable to leave the design of SuDs to a later stage to be dealt with by planning conditions.

2.3 The NPPF paragraph 103 requires that developments do not increase flood risk elsewhere, and gives priority to the use of SuDS. Major developments must include SuDS for the management of run-off, unless demonstrated to be inappropriate. The proposed minimum standards of operation must be appropriate and as such, a **maintenance plan** should be included within the Surface Water Drainage Statement,clearly demonstrating that the SuDS have been designed to ensure that the maintenance and operation requirements are economically proportionate Planning Practice Guidance suggests that this should be considered by reference to the costs that would be incurred by consumers for the use of an effective drainage system connecting directly to a public sewer.

2.4 Camden Council will use planning conditions or obligations to ensure that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.

2.5 Within Camden, SuDS systems must be designed in accordance with London Plan policy 5.13. This requires that developments should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve **greenfield run-off rates** and ensure that surface water run-off is managed as close to its source as possible in line with the following **drainage hierarchy**:

1 store rainwater for later use
2 use infiltration techniques, such as porous surfaces in non-clay areas
3 attenuate rainwater in ponds or open water features for gradual release
4 attenuate rainwater by storing in tanks or sealed water features for gradual release
5 discharge rainwater direct to a watercourse
6 discharge rainwater to a surface water sewer/drain
7 discharge rainwater to the combined sewer.

2.6 The hierarchy above seeks to ensure that surface water run-off is controlled as near to its source as possible to mimic natural drainage systems and retain water on or near to the site, in contrast to traditional drainage approaches, which tend to pipe water off-site as quickly as possible.

2.7 Before disposal of surface water to the public sewer is considered all other options set out in the drainage hierarchy should be exhausted. When no other practicable alternative exists to dispose of surface water other than the public sewer, the Water Company or its agents should confirm that there is adequate spare capacity in the existing system taking future development requirements into account.

2.8 Best practice guidance within the non-statutory technical standards for the design, maintenance and operation of sustainable drainage systems will also need to be followed. Runoff volumes from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the **greenfield runoff volume** for the same event.

2.9 Camden Development Policy 23 (Water) requires developments to reduce pressure on combined sewer network and the risk of flooding by limiting the rate of run-off through sustainable urban drainage systems. This policy also requires that developments in areas known to be at risk of surface water flooding are designed to cope with being flooded. Camden's SFRA surface water flood maps, updated SFRA figures 6 (LFRZs), and 4e (increased susceptibility to elevated groundwater) , as well as the Environment Agency updated flood maps for surface water (ufmfsw), should be referred to when determining whether developments are in an area at risk of flooding.

2.10 Camden Planning Guidance 3 (CPG3) requires developments to achieve a greenfield run off rate once SuDS have been installed. Where it can be demonstrated that this is not feasible, a minimum 50% reduction in run off rate across the development is required. Further guidance on how to reduce the risk of flooding can be found in CPG3 paragraphs 11.4-11.8.

2.11 Where an application is part of a larger site which already has planning permission it is essential that the new proposal does not compromise the drainage scheme already approved.

3. Further information and guidance

3.1 Applicants are strongly advised to discuss their proposals with the Lead Local Flood Authority at the pre-application stage to ensure that an acceptable SuDS scheme is submitted.

3.2 For general clarification of these requirements please Camden's Local Planning Authority or Lead Local Flood Authority

Surface Water Drainage Pro-forma for new developments

This pro-forma accompanies our advice note on surface water drainage. Developers should complete this form and submit it to the Local Planning Authority, referencing from where in their submission documents this information is taken. The pro-forma is supported by the Defra/EA guidance on Rainfall Runoff Management and uses the storage calculator on www.UKsuds.com. This pro-forma is based on current industry best practice and focuses on ensuring surface water drainage proposals meet national and local policy requirements. The pro-forma should be considered alongside other supporting SuDS Guidance.

1. Site Details

Site	138-140 Highgate Road
Address & post code or LPA reference	138-140 Highgate Road, London NW5 1PB -LPA Ref 2018/1528/P
Grid reference	TQ 28625 85795
Is the existing site developed or Greenfield?	Developed (Former Garage and Petrol Station)
Is the development in a LFRZ or in an area known to be at risk of surface or ground water flooding? If yes, please demonstrate how this is managed, in line with DP23?	No
Total Site Area served by drainage system (excluding open space) (Ha)*	0.0521hectares

* The Greenfield runoff off rate from the development which is to be used for assessing the requirements for limiting discharge flow rates and attenuation storage from a site should be calculated for the area that forms the drainage network for the site whatever size of site and type of drainage technique. Please refer to the Rainfall Runoff Management document or CIRIA manual for detail on this.

2. Impermeable Area

	Existing	Proposed	Difference (Proposed-Existing)	Notes for developers
Impermeable area (ha)	.069	.052	.017	If the proposed amount of impermeable surface is greater, then runoff rates and volumes will increase. Section 6 must be filled in. If proposed impermeability is equal or less than existing, then section 6 can be skipped and section 7 filled in.
Drainage Method (infiltration/sewer/watercourse)	Sewer	Sewer	N/A	If different from the existing, please fill in section 3. If existing drainage is by infiltration and the proposed is not, discharge volumes may increase. Fill in section 6.

3. Proposing to Discharge Surface Water via

	Yes	No	Evidence that this is possible	Notes for developers
Existing and proposed MicroDrainage calculations		X	Calculations using Modified Rational Method	Please provide MicroDrainage calculations of existing and proposed run-off rates and volumes in accordance with a recognised methodology or the results of a full infiltration test (see line below) if infiltration is proposed.
Infiltration		x	Sub-soil Is clay	e.g. soakage tests. Section 6 (infiltration) must be filled in if infiltration is proposed.
To watercourse		x		e.g. Is there a watercourse nearby?
To surface water sewer	x		Refer to TW Consultation inc in statement	Confirmation from sewer provider that sufficient capacity exists for this connection.
Combination of above		x	Refer to statement	e.g. part infiltration part discharge to sewer or watercourse. Provide evidence above.
Has the drainage proposal had regard to the SuDS hierarchy?	X		Each element in hierarchy was considered	Evidence must be provided to demonstrate that the proposed Sustainable Drainage strategy has had regard to the SuDS hierarchy as outlined in Section 2.5 above.
Layout plan showing where the sustainable drainage infrastructure will be located on site.	x		18035 D100	Please provide plan reference numbers showing the details of the site layout showing where the sustainable drainage infrastructure will be located on the site. If the development is to be constructed in phases this should be shown on a separate plan and confirmation should be provided that the sustainable drainage proposal for each phase can be constructed and can operate independently and is not reliant on any later phase of development.

4. Peak Discharge Rates – This is the maximum flow rate at which storm water runoff leaves the site during a particular storm event.

	Existing Rates (l/s)	Proposed Rates (l/s)	Difference (l/s) (Proposed-Existing)	% Difference (difference /existing x 100)	Notes for developers
Greenfield QBAR	0.471	N/A	N/A	N/A	QBAR is approx. 1 in 2 storm event. Provide this if Section 6 (QBAR) is proposed.
1 in 1	9.35	2	7.35	79	Proposed discharge rates (with mitigation) should aim to be equivalent to greenfield rates for all corresponding storm events. As a minimum, peak discharge rates must be reduced by 50% from the existing sites for all corresponding rainfall events.
1 in 30	26.73	2	24.73	92.5	
1in 100	33.71	2	31.71	94	
1 in 100 plus climate change	N/A	2	41.8	95.5	The proposed 1 in 100 +CC peak discharge rate (with mitigation) should aim to be equivalent to greenfield rates. As a minimum, proposed 1 in 100 +CC peak discharge rate must be reduced by 50% from the existing 1 in 100 runoff rate sites.

5. Calculate additional volumes for storage –The total volume of water leaving the development site. New hard surfaces potentially restrict the amount of stormwater that can go to the ground, so this needs to be controlled so not to make flood risk worse to properties downstream.

	Greenfield runoff volume (m^3)	Existing Volume (m^3)	Proposed Volume (m^3)	Difference (m^3) (Proposed-Existing)	Notes for developers
1 in 1	.32	16.8	13.0	-3.8	Proposed discharge volumes (with mitigation) should be constrained to a value as close as is reasonably practicable to the greenfield runoff volume wherever practicable and as a minimum should be no greater than existing volumes for all corresponding storm events. Any increase in volume increases flood risk elsewhere. Where volumes are increased section 6 must be filled in.
1 in 30	5.3	33	21.5	-12.5	
1in 100 6 hour	14.2	42.3	32.6	-9.7	
1 in 100 6 hour plus climate change	18.5	55.0	42.4	12.6	The proposed 1 in 100 +CC discharge volume should be constrained to a value as close as is reasonably practicable to the greenfield runoff volume wherever practicable. As a minimum, to mitigate for climate change the proposed 1 in 100 +CC volume discharge from site must be no greater than the existing 1 in 100 storm event. If not, flood risk increases under climate change.

6. Calculate attenuation storage – Attenuation storage is provided to enable the rate of runoff from the site into the receiving watercourse to be limited to an acceptable rate to protect against erosion and flooding downstream. The attenuation storage volume is a function of the degree of development relative to the greenfield discharge rate.

		Notes for developers
Storage Attenuation volume (Flow rate control) required to meet greenfield run off rates (m^3)		Volume of water to attenuate on site if discharging at a greenfield run off rate. Can't be used where discharge volumes are increasing
Storage Attenuation volume (Flow rate control) required to reduce rates by 50% (m^3)		Volume of water to attenuate on site if discharging at a 50% reduction from existing rates. Can't be used where discharge volumes are increasing
Storage Attenuation volume (Flow rate control) required to meet [OTHER RUN OFF RATE (as close to greenfield rate as possible] (m^3)	20.1 cu m @ 2l/s	Volume of water to attenuate on site if discharging at a rate different from the above – please state in 1st column what rate this volume corresponds to. On previously developed sites, runoff rates should not be more than three times the calculated greenfield rate. Can't be used where discharge volumes are increasing
Storage Attenuation volume (Flow rate control) required to retain rates as existing (m^3)		Volume of water to attenuate on site if discharging at existing rates. Can't be used where discharge volumes are increasing
Percentage of attenuation volume stored above ground,	1.1	Percentage of attenuation volume which will be held above ground in swales/ponds/basins/green roofs etc. If 0, please demonstrate why.

7. How is Storm Water stored on site?

Storage is required for the additional volume from site but also for holding back water to slow down the rate from the site. This is known as attenuation storage and long term storage. The idea is that the additional volume does not get into the watercourses, or if it does it is at an exceptionally low rate. You can either infiltrate the stored water back to ground, or if this isn't possible hold it back with on site storage. Firstly, can infiltration work on site?

			Notes for developers
Infiltration	**State the Site's Geology and known Source Protection Zones (SPZ)**	London Clay	Avoid infiltrating in made ground. Infiltration rates are highly variable and refer to Environment Agency website to identify and source protection zones (SPZ)
	Are infiltration rates suitable?	No	Infiltration rates should be no lower than $1x10^{-6}$ m/s.
	State the distance between a proposed infiltration device base and the ground water (GW) level	n/a	Need 1m (min) between the base of the infiltration device & the water table to protect Groundwater quality & ensure GW doesn't enter infiltration devices. Avoid infiltration where this isn't possible.

	Were infiltration rates obtained by desk study or infiltration test?	Desk Study	Infiltration rates can be estimated from desk studies at most stages of the planning system if a back up attenuation scheme is provided..
	Is the site contaminated? If yes, consider advice from others on whether infiltration can happen.	Possibly used as petrol station and garage.	Advice on contaminated Land in Camden can be found on our supporting documents webpage Water should not be infiltrated through land that is contaminated. The Environment Agency may provide bespoke advice in planning consultations for contaminated sites that should be considered.
In light of the above, is infiltration feasible?	**Yes/No? If the answer is No, please identify how the storm water will be stored prior to release**	No	If infiltration is not feasible how will the additional volume be stored?. The applicant should then consider the following options in the next section.

Storage requirements

The developer must confirm that either of the two methods for dealing with the amount of water that needs to be stored on site.

Option 1 Simple – Store both the additional volume and attenuation volume in order to make a final discharge from site at the greenfield run off rate. This is preferred if no infiltration can be made on site. This very simply satisfies the runoff rates and volume criteria.

Option 2 Complex – If some of the additional volume of water can be infiltrated back into the ground, the remainder can be discharged at a very low rate of 2 l/sec/hectare. A combined storage calculation using the partial permissible rate of 2 l/sec/hectare and the attenuation rate used to slow the runoff from site.

		Notes for developers
Please confirm what option has been chosen and how much storage is required on site.	Option 1 Simple	The developer at this stage should have an idea of the site characteristics and be able to explain what the storage requirements are on site and how it will be achieved.

8. Please confirm

		Notes for developers
Which Drainage Systems measures have been used, including green roofs?	Green Roofs, Garden terraces	SUDS can be adapted for most situations even where infiltration isn't feasible e.g. impermeable liners beneath some SUDS devices allows treatment but not infiltration. See CIRIA SUDS Manual C697.
Drainage system can contain in the 1 in 30 storm event without flooding	Yes Network designed for 1:30	This a requirement for sewers for adoption & is good practice even where drainage system is not adopted.
Will the drainage system contain the 1 in 100 +CC storm event? If no please demonstrate how buildings and utility plants will be protected.	Yes	National standards require that the drainage system is designed so that flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.
Any flooding between the 1 in 30 & 1 in 100 plus climate change storm events will be safely contained on site.	Yes	**Safely:** not causing property flooding or posing a hazard to site users i.e. no deeper than 300mm on roads/footpaths. Flood waters must drain away at section 6 rates. Existing rates can be used where runoff volumes are not increased.
How will exceedance events be catered on site without increasing flood risks (both on site and outside the development)?	See Statement and Sketch	**Safely:** not causing property flooding or posing a hazard to site users i.e. no deeper than 300mm on roads/footpaths. Flood waters must drain away at section 6 rates. Existing rates can be used where runoff volumes are not increased. Exceedance events are defined as those larger than the 1 in 100 +CC event.
How are rates being restricted (vortex control, orifice etc)	Vortex with By-Pass	Detail of how the flow control systems have been designed to avoid pipe blockages and ease of maintenance should be provided.
Please confirm the owners/adopters of the entire drainage systems throughout the development. Please list all the owners.	Single Developer	If these are multiple owners then a drawing illustrating exactly what features will be within each owner's remit must be submitted with this Proforma.
How is the entire drainage system to be maintained?	Developer will set up a management company with mutual obligations to maintain drainage and SuDS	If the features are to be maintained directly by the owners as stated in answer to the above question please answer yes to this question and submit the relevant maintenance schedule for each feature. If it is to be maintained by others than above please give details of each feature and the maintenance schedule. Clear details of the maintenance proposals of all elements of the proposed drainage system must be provided. Details must demonstrate that maintenance and operation requirements are economically proportionate. Poorly maintained drainage can lead to increased flooding problems in the future.

9. Evidence Please identify where the details quoted in the sections above were taken from. i.e. Plans, reports etc. Please also provide relevant drawings that need to accompany your proforma, in particular exceedance routes and ownership and location of SuDS (maintenance access strips etc

Pro-forma Section	Document reference where details quoted above are taken from	Page Number
Section 2	Sustainable Drainage Strategy-Sketches of Areas	14 &15
Section 3	Sustainable Drainage Strategy - Constraints and application of Heirarchy	5,6,7,13 & 32
Section 4	Sustainable Drainage Strategy - Calculations	17-21
Section 5	Sustainable Drainage Strategy - Calculations	17-31
Section 6	Sustainable Drainage Strategy - Calculations	17-31
Section 7	Sustainable Drainage Strategy - Drawing	13
Section 8	Sustainable Drainage Strategy - Roof plan,SW Calc,Attenustion Calcs, Drawing, sketch.	11.13.16.21-31 , 41

The above form should be completed using evidence from the Flood Risk Assessment and site plans. It should serve as a summary sheet of the drainage proposals and should clearly show that the proposed rate and volume as a result of development will not be increasing. If there is an increase in rate or volume, the rate or volume section should be completed to set out how the additional rate/volume is being dealt with.

This form is completed using factual information from the ~~Flood Risk Assessment~~ Sustainable Drainage Strategy and Site Plans and can be used as a summary of the surface water drainage strategy on this site.

Form Completed By. Nick Kramer

Qualification of person responsible for signing off this pro-forma BA Engineerin Science (oxon) Chartered Engineer MIStructE

Company. AMA Consulting Engineers (Trading Name of C&R Design Ltd)

On behalf of (Client's details) Design Ventures Highgate Ltd

Date. 02 July 2019