



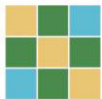
COTSWOLD
TRANSPORT
PLANNING

DANIEL FAMILY HOMES

105 Great Central Avenue, Ruislip

FLOOD RISK ASSESSMENT

JULY 2020



DOCUMENT REGISTER

CLIENT:	DANIEL FAMILY HOMES
PROJECT:	105 GREAT CENTRAL AVENUE, RUISLIP
PROJECT CODE:	CTP-20-538

REPORT TITLE:	FLOOD RISK ASSESSMENT		
PREPARED BY:	NICOLA TILEY	DATE:	JULY 2020
CHECKED BY:	KRIS TOVEY	DATE:	JULY 2020

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APPENDIX B: Topographical Survey
APPENDIX C: Thames Water Asset Records
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APPENDIX E: Environment Agency Product 4 data
APPENDIX F: Environment Agency Correspondence – Buffer Zone



1 Introduction

Background

- 1.1 Cotswold Transport Planning has been appointed by Daniel Family Homes (herein referred to as “the Applicant”) to undertake a Flood Risk Assessment (FRA) for a proposed extension to a residential dwelling off Great Central Avenue.
- 1.2 This assessment considers the risks of all types of flooding to the site including tidal, fluvial, surface, groundwater, sewer and artificial sources and provides mitigation measures to ensure that the flood risk to the site is minimised and that flood risk off-site is not increased. The FRA also includes a drainage strategy.

National & Local Policies

- 1.3 The National Planning Policy Framework (NPPF) states that a site-specific Flood Risk Assessment will be required for proposals:
 - i) that are greater than 1 hectare in area within Flood Zone 1;
 - ii) for all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3;
 - iii) in an area within Flood Zone 1 which has critical drainage problems; and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.
 - iv) in an area within Flood Zone 1 identified in a Strategic Flood Risk Assessment as being at increased flood risk in the future.
 - v) in an area in Flood Zone 1 that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.
- 1.4 As of April 2015, the legislation for dealing with FRAs changed, with additional emphasis put on the use of Sustainable Drainage Systems (SuDS) within drainage schemes for new developments.
- 1.5 In February 2016, the Environment Agency (EA) introduced new legislation relating to climate change allowance, which increased the percentage rate of climate change applied to the 1 in 100-year return period.
- 1.6 New applications will require a surface water drainage scheme submitted to accompany all planning applications and will be required to demonstrate the use of SuDS within the design and should be in line with the requirements as set out within the National Planning Policy Framework Technical Guidance (NPPFTG).



1.7 This FRA has been based on the following information and requirements:

- NPPF.
- NPPFTG.
- Thames Water (TW) records.
- The British Geological Survey (BGS).
- OS maps.
- London Borough of Hillingdon Flood Risk Assessment requirements for planning.
- Environment Agency Standing Advice for Minor Developments
- West London Strategic Flood Risk Assessment (SFRA)



2 Existing Site and Hydrology Characteristics

Site Location and Composition

- 2.1 The site is located off Great Central Avenue, Ruislip. The approximate site co-ordinates for the centre of the site are E: 511547; N: 185079, with the nearest post code of HA4 6UN.
- 2.2 The site is approximately 0.05 Ha in area and comprises of an existing dwelling with associated garden amenity areas.
- 2.3 Refer to **Appendix A** for site location.

Topography

- 2.4 The existing topographical survey shows site levels across the site vary from 33.60m AOD in the northwest to 34.05m AOD at the front, along Great Central Avenue.
- 2.5 Existing floor levels (105 Great Central Avenue) are 34.02m AOD.
- 2.6 A copy of the existing topographical survey and utilities survey can be found in **Appendix B**.

Ground Conditions

- 2.7 Geological data held by the British Geological Survey (BGS) shows that the bedrock geology underlying the site is *London Clay Formation*
- 2.8 SoilScapes Mapping indicates the underlying soil as impeded drainage clayey soils.

Existing Drainage and Hydrology

- 2.9 The Yeading Brook (Eastern Arm) runs along the eastern boundary of the site, running south from the culvert section beneath the section of railway to the north of the site.
- 2.10 The open watercourse continues south past Bourne Primary School and beneath the A40 Polish War Memorial Roundabout, located approx. 800m to the south of the site.
- 2.11 The Yeading Brook is a tributary of the River Crane.
- 2.12 Thames Water (TW) have confirmed there is a public 300mm dia stormwater asset within Great Central Avenue, which discharges directly to the adjacent watercourse. The nearest foul asset is a 225mm dia foul sewer located in Great Central Avenue
- 2.13 TW sewer records are contained in **Appendix C**.



3 Development

Site Proposals

- 3.1 The proposals are for an extension to an existing residential dwelling with the associated access, car parking and landscape arrangements.
- 3.2 The extension will be less than 250 m² and therefore classified as 'minor development'.
- 3.3 Access to the site is to be provided from Great Central Avenue.
- 3.4 A site layout plan has been included in **Appendix D**.



4 Development Vulnerability and Flood Zone Classification

National Planning Policy Framework (NPPF)

- 4.1 Local Planning Authorities, (LPA) have a statutory obligation to consult the Environment Agency, (EA) on all applications in flood risk zones. The EA will consider the effects of flood risk in accordance with the NPPF.
- 4.2 NPPF requires that, as part of the planning process:
- A 'site specific' Flood Risk Assessment will be undertaken for any site that has a flood risk potential.
 - Flood risk potential is minimised by applying a 'sequential approach' to locating 'vulnerable' land uses.
 - Sustainable drainage systems are used for surface water disposal where practical.
 - Flood risk is managed through the use of flood resilient and resistant techniques.
 - Residual risk is identified and safely managed.
- 4.3 Table 1 of NPPF, categorises flood zones into:
- Zone 1- Low probability (< 1 in 1000 years)
 - Zone 2- Medium probability (1 in 1000 - 1 in 100 years)
 - Zone 3a- High probability (> 1 in 100 years)
 - Zone 3b- The functional floodplain (>1 in 20 years)
- 4.4 The NPPF sets out a matrix indicating the types of development that are acceptable in different flood zones (see Table 4.1). The proposed development is classified as 'residential' and as per the NPPF 'more vulnerable'. The site is located in Flood Zone 2 with the defended watercourse to the east within Flood Zone 3.



Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a	Exception Test Required	✗	Exception Test Required	✓	✓
Zone 3b	Exception Test Required	✗	✗	✗	✓

Table 4.1: NPPF guidance

Sequential Test

- 4.5 As set out in the NPPF, the sequential test will be required for development in Flood Zones 2 and 3 to steer new development to areas with the lowest probability of flooding.
- 4.6 The proposed site is located within Flood Zone 2 therefore the sequential test is required although the context of the site i.e. extension to existing building, should be considered.

Exception Test

- 4.7 As set out in Table 4.1, the development proposals are classed as 'residential' within Flood Zone 2 and therefore an exception test is not required.



5 Site Specific Flooding Issues and Existing Flood Records

National Planning Policy Framework (NPPF)

- 5.1 In accordance with the National Planning Policy Framework, this Flood Risk Assessment considers all sources of flooding including:
- i) Tidal Flooding – from sea;
 - ii) Fluvial Flooding – from rivers and streams;
 - iii) Pluvial Flooding – overland surface water flow and exceedance;
 - iv) Groundwater flooding – from elevated groundwater levels or springs;
 - v) Flooding from sewers – exceedance flows from existing sewer systems; and
 - vi) Artificial sources – reservoirs, canals etc.

Historic Flooding

- 5.2 The Environment Agency or SFRA have no records of flooding at this location.

Fluvial and Tidal Flooding

- 5.3 The closest main river is the Yeading Brook (Eastern Arm) located immediately to the east of the site. This watercourse is defended.
- 5.4 The EA Flood Zone Map shows the site in Flood Zone 2.

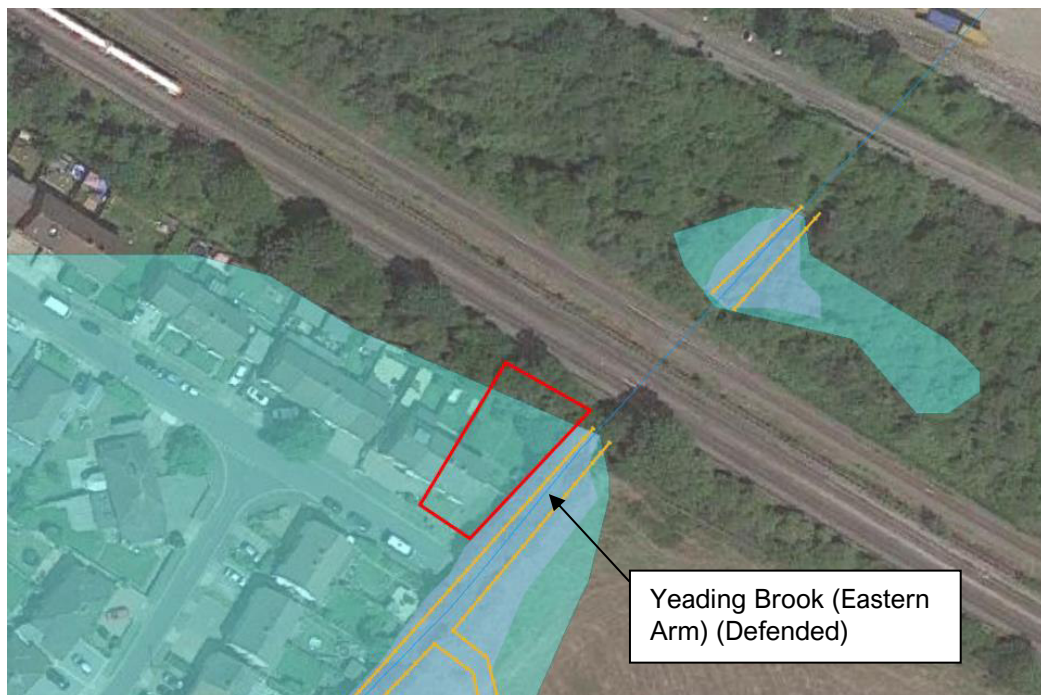


Figure 5.1: Environment Agency Flood Zone Map



5.5 The Hillingdon SFRA flood map also shows the site to be within Flood Zone 2.

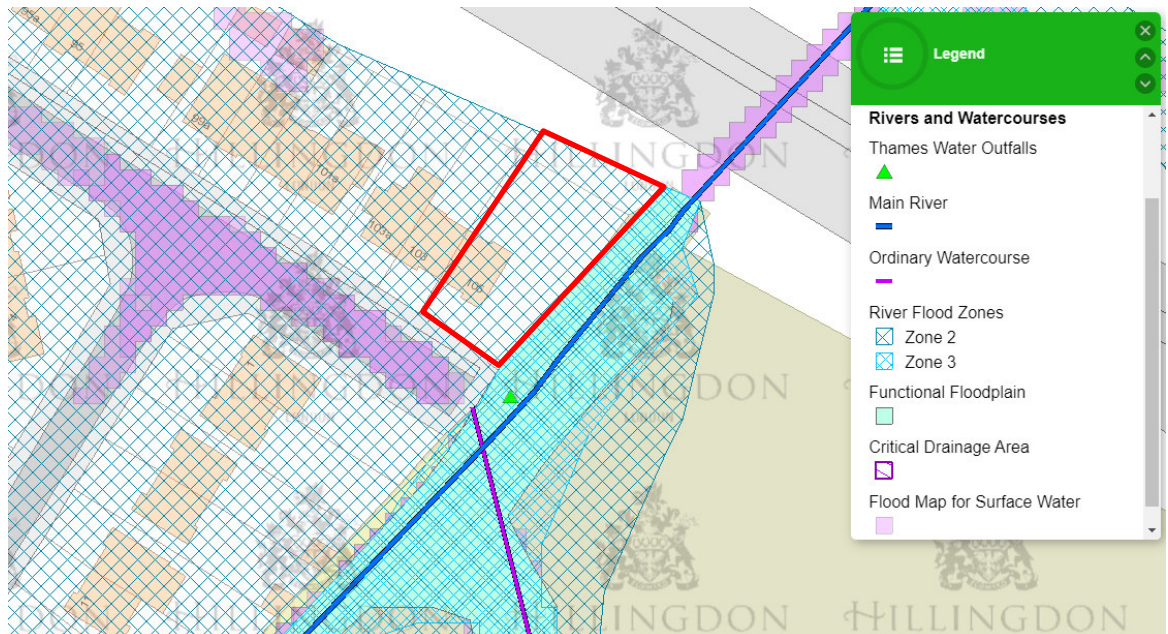


Figure 5.2: Hillingdon SFRA Flood Zone Map

- 5.6 Environment Agency Flood and defence level data has been obtained and can be found in **Appendix E**.
- 5.7 Product 4 flood levels can be summarised in table 5.1, with 1D node YE826 used as a conservative upstream data source.



Figure 5.3: Product 4 node – YE826



Probability/Return Period/Flood Zone	Flood Level (m AOD)
0.5% (20 year) - Flood Zone 3B	33.40
1% (100 year) - Flood Zone 3A	33.55
1% (100 year + 35% climate change)	33.67
1% (100 year + 70% climate change)	33.75
0.1% (1000 year) - Flood Zone 2	33.81

Table 5.1: EA Product 4 Level Data – Node YE826

- 5.8 The lowest existing ground level along the eastern boundary, with connectivity to the fluvial extents, is 33.70m AOD, above the 100-year level (Flood Zone 3) and also higher than the 100yr plus 35% climate change.
- 5.9 The existing floor level, and subsequently the proposed extension floor level, will be **34.02m AOD** which is 210mm higher than the 1,000-year level (0.1% probability).
- 5.10 Given the above, Tidal and Fluvial flood risk for the proposed development is considered to be **Low**.

Pluvial Flooding

- 5.11 The Surface Water (Pluvial) Flood map provided by the Environment Agency (Figure 5.3) indicates that the site is at low risk of pluvial flooding.
- 5.12 The pluvial map does show medium to high risk along Great Central Avenue with a connectivity to the Yeading Brook (Eastern Arm) to the east. The levels along Great Central Avenue are in the region of 33.60m AOD, some 400mm below the existing floor level.
- 5.13 The pluvial maps do not fully represent any underground drainage systems and therefore any flooding entering the site from existing roads is likely to be intercepted by road gullies and discharged into the local drainage network.



Figure 5.4: Environment Agency Surface Water Flooding Map

5.14 Therefore, the development is considered to be at **Low** risk of flooding from surface water.

Groundwater Flooding

5.15 Magic Mapping shows that the site is located in a unproductive Groundwater Vulnerability Zone.

5.16 The BGS maps show the site is underlain by bedrock geology of London Clay which is deemed impermeable.

5.17 The risk of flooding from groundwater at this stage is considered to be **Negligible**.

Flooding from Sewers

5.18 Hillingdon SFRA contains no records of flooding in the location.

5.19 The public sewers are located within Great Central Avenue and any surcharging or flooding will flow along the highway away from the site.

5.20 The risk of sewer flooding to the site is therefore considered to be **negligible**.



Flooding from Artificial Sources

- 5.21 Mapping data from the Environment Agency show that the site is not located in flood extents presented by reservoirs. There are also no canals or artificial sources of water in the vicinity of the site.
- 5.22 In respect of this, the development is considered to be at **negligible** risk of flooding from reservoirs, canals and artificial sources.

Flood Risk Summary

- 5.23 The risk of flooding is summarised as follows:

Source of Potential Flooding	Flood Risk
Tidal	Negligible
Fluvial (River)	Low
Pluvial	Low
Groundwater	Negligible
Sewers	Negligible
Artificial	Negligible

Table 5.2: Flood Risk to the site from all sources

Buffer Zone

- 5.24 The EA has been consulted on the location of the proposed extension in relation to the adjacent watercourse and confirmed an acceptance of a reduced buffer zone of 5m. Refer to **Appendix F**.



6 Proposed Drainage Strategy

Surface Water Strategy

- 6.1 The existing surface water drainage from the site, including hard surfaces and roof outlets, discharge to the existing Thames Water 300mm asset in Great Central Avenue. It is proposed to utilise the existing connections that serve No. 105 for the proposed new extension.

Foul Water Management

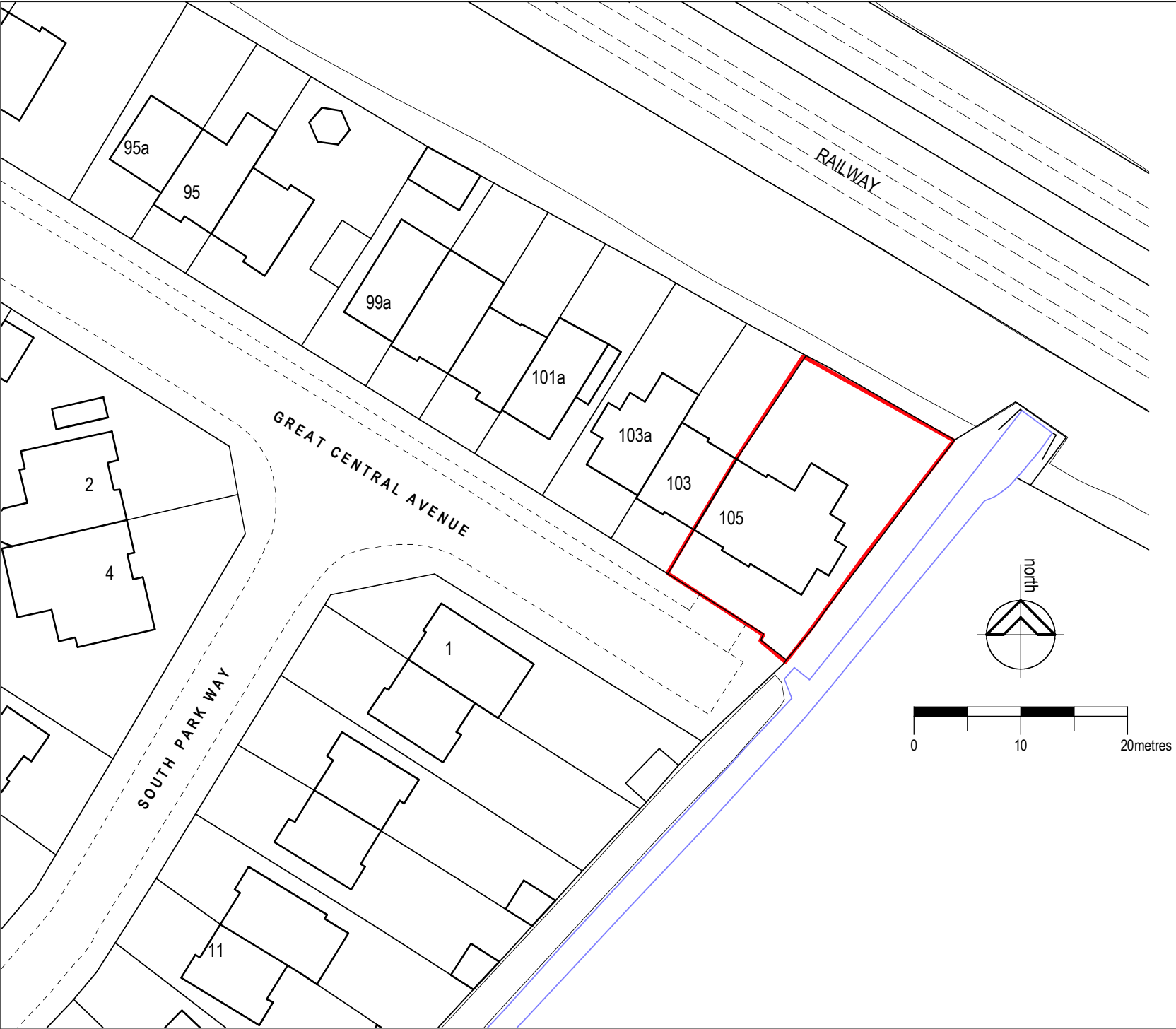
- 6.2 Anticipated foul flow increase will be negligible.
- 6.3 It is proposed to construct a network of foul sewers to gather foul water from around the buildings. Foul water will be discharged off site to the 225mm dia STW combined sewer.
- 6.4 The existing foul water drainage from the site discharges to the existing Thames Water 225mm asset in Great Central Avenue. It is proposed to utilise the existing connections that serve No. 105 for the proposed new extension.



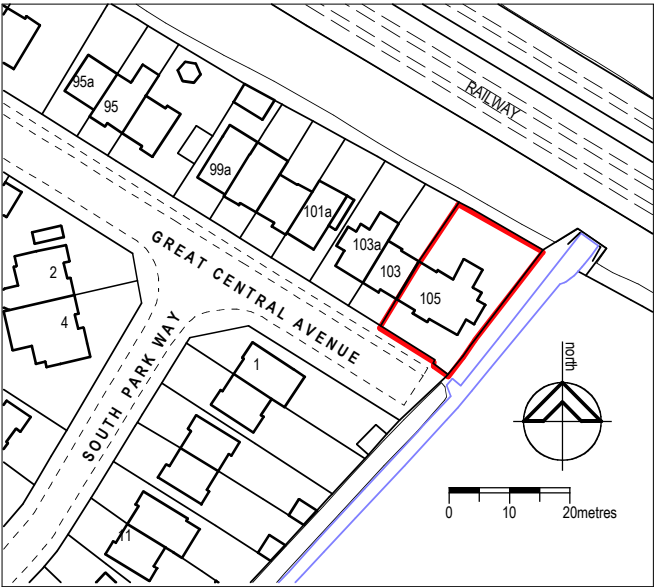
7 Summary and Conclusion

- 7.1 The site is classified as Flood Zone 2, in accordance with EA maps and West London SFRA.
- 7.2 Proposed Floor Levels will be based on existing No. 105 Floor Levels at **34.02m AOD**, which will be greater than the modelled 1,000 year flood levels.
- 7.3 Surface and Foul Water drainage is to connect to the existing public assets within Great Central Avenue via existing connections from No. 105.

Appendix A



PROPOSED SITE PLAN 1.500



PROPOSED LOCATION PLAN 1.1250



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Project

**105 GREAT CENTRAL AVENUE
RUISLIP
HILLINGDON**

Drawing

**PROPOSED SITE &
LOCATION PLAN**

Scale	Date	Drawn
1.500 @ A3	09.06.2020	j m d
Job No	Dwg No	
356	D-12	

Appendix B



A horizontal number line is shown with markings at 0m, 1m, 2m, 3m, 4m, and 5m. The segments between the markings are shaded in an alternating pattern: the segment from 0m to 1m is shaded, 1m to 2m is unshaded, 2m to 3m is shaded, 3m to 4m is unshaded, and 4m to 5m is shaded.

$$\phi_{33.59}^1$$
511600mE511610mE
$$\odot_{33.68}^2$$
511550mE511560mE511570mE511580mE

511590mE

What every effort has been made to correctly identify species of trees on the site, it is advised that an arboriculturist be consulted before any final decisions are made.

Grid coordinates are based on Ordnance Survey National Grid

Tree Schedule

ID	Girth	Spread	Height	Species
389	0.10	1.00	4.00	Hawthorn
449	0.50	5.00	7.00	Ash
449	0.40	4.00	7.00	Ash
454	0.60	6.00	8.00	Hawthorn
477	0.90	6.00	8.00	Ash
478	0.60	6.00	7.00	Hawthorn
540	1.50	6.00	7.00	Fruit MB
552	0.50	3.00	4.00	Fruit

ABBREVIATION KEY - TOPOGRAPHIC SURVEY

AV	Air Valve
BO	Boilord
BIG	Back Inlet Gully
BT	British Telecom
CPS	Concrete Paving Slabs
CL	Cover Level
CAV	Cable Television Cover
DB	Double Yellow Line
DR	Double Red Line
DW	Dashed White Line
EC	Electric Cable Lamp
EW	Electric Cable Pit
EL	Electric Pole
ER	Earth Rod
FAI	Fresh Air Inlet
FI	Fire Hydrant
F/B	Flower Bed
GS	Gas Valve
Gy	Gully
IL=	Invert Level
LC	Lamp Column
LP	Lamp Post
MB	Multi Boile
MK	Service Marker
PM	Parking Meter
RE	Roadsign
RS	Road Sign
RWP	Rain Water Pipe
SC	Stop Cock
SW	Single White Line
SY	Single Yellow Line
SV	Stop Valve
SVP	Soil or Vent Pipe
TCL	Telephone Cable Cabinet
TP	Telephone Pole
UL	Unable To Lift
WG	Weir Gully
WM	Water Meter
WO	Wash Out

ABBREVIATION KEY - BUILDING SURVEY

□	Floor To Ceiling
△	Floor To False Ceiling
AB	Air Brick
DB	Double Socket
Dh	Door Head Level
Cell HT	Ceiling Level
FL	Fire Alarm
FL	Floor Level
FS	Floor To Sill
PS	Pipe Box
G	Ground Line
Ht=	Height
LP	Light Switch
RWS	Right Water Pipe
Sk	Smoke Alarm
SD	Smoke Detector
SH	Sill To Head
SI	Single Socket
Stat	Thermostat
SW	Switch
Te	Telephone/Outlet
TV	Aerial/Cable Socket
A=	Under Arch (center)
U=	Under Opening
UB=	Under Beam
UD=	Under Deck
UP=	Under Pipe
W	Wall Light
W=	Window Head Level
W=	Window Sill Level

Co-ordinate Table

ID	Easting	Northing	Height
1	511546.908	185101.721	33.592
2	511564.468	185090.537	33.681
3	511578.266	185101.844	34.045
4	511577.364	185111.830	34.054

REV. PREFIX	DATE	INITIAL	REVISION DETAILS

LEVELLING DATUM Related To Ordnance Survey Utilising GPS					
CAD OPERATOR	CDH	APPROVED BY	BED	DATE	21.04.2020

Survey and Engineering Services Ltd 

CLIENT	
--------	--

T Daniels

LOCATION	
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105 Great Central Avenue
Ruislip

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 83

Detail Survey

ORIGINAL JOB No.	JOB No. 180420
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DRAWING No.	REVISION SUFFIX
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SCALE	DATE
1:100	21st April 2020

The Grinary Lee Farm	Registered Company No: 5366475	
-------------------------	--------------------------------	--

Lee Lane
Pinkneys Green
Maidculhead
SIL6 6PE
Tel No / Fax: +44 (0) 1628 675 781
e-mail: mail@ses-surveys.co.uk

Appendix C

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5306	34.43	33.02
5305	34.41	28.88
5310B	34.53	31.28
5304	33.81	28.9
5309	34.09	32.91
5308	34.08	32.22
5303	34.08	30.68
4003	33.14	31.63
3007	33.56	32.48
3004	33.53	31.07
3002	33.74	31.77
3006	33.73	32.83
301A	n/a	n/a
3005	33.89	33.01
3001	33.97	32.34
4103	33.82	31.31
4104	33.85	32.95
311A	n/a	n/a
411A	n/a	n/a
3102	34.27	33.31
3101	34.25	32.94
211A	n/a	n/a
4105	33.9	28.46
4107	n/a	n/a
4101	34.24	32.45
3103	n/a	n/a
3206	34.39	33.22
3202	34.39	33.35
3205	34.4	33.33
3204	34.46	33.55
3207	n/a	n/a
3201	35.08	32.81
3203	35.07	33.24
3901	32.96	31.5
4904	33.17	32
4901	33.16	31.9
391A	n/a	n/a
391B	n/a	n/a
3902	33.36	32.21
4903	33.43	32.3
4002	33.09	31.12
3504	33.46	28.28
4005	33.13	31.73
3003	33.41	30.15
4102	33.87	31.49
4106	33.87	32.8
4906	n/a	n/a
4902	33.35	32.82
491A	n/a	n/a
4004	33.67	32.59
401A	n/a	n/a
5101	33.63	32.12
511C	n/a	n/a
5001	33.65	32.42
511B	n/a	n/a
5103	n/a	n/a
511A	n/a	n/a
5102	33.55	32.49
5003	n/a	n/a
5104	n/a	n/a
6101	n/a	n/a
6102	n/a	n/a
6001	n/a	n/a
6002	n/a	n/a
7002	n/a	n/a
7001	n/a	n/a
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.		



ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

	Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Trunk Surface Water
	Trunk Foul
	Storm Relief
	Trunk Combined
	Vent Pipe
	Bio-solids (Sludge)
	Proposed Thames Surface Water Sewer
	Proposed Thames Water Foul Sewer
	Gallery
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Sludge Rising Main
	Proposed Thames Water Rising Main
	Vacuum

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Outfall
	Undefined End
	Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

	Public/Private Pumping Station
	Change of characteristic indicator (C.O.C.I.)
	Invert Level
	Summit

Areas

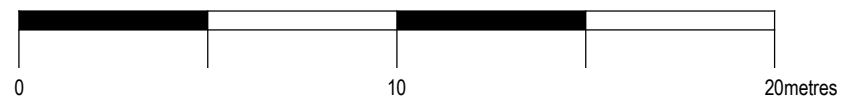
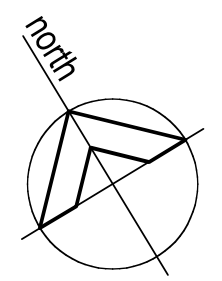
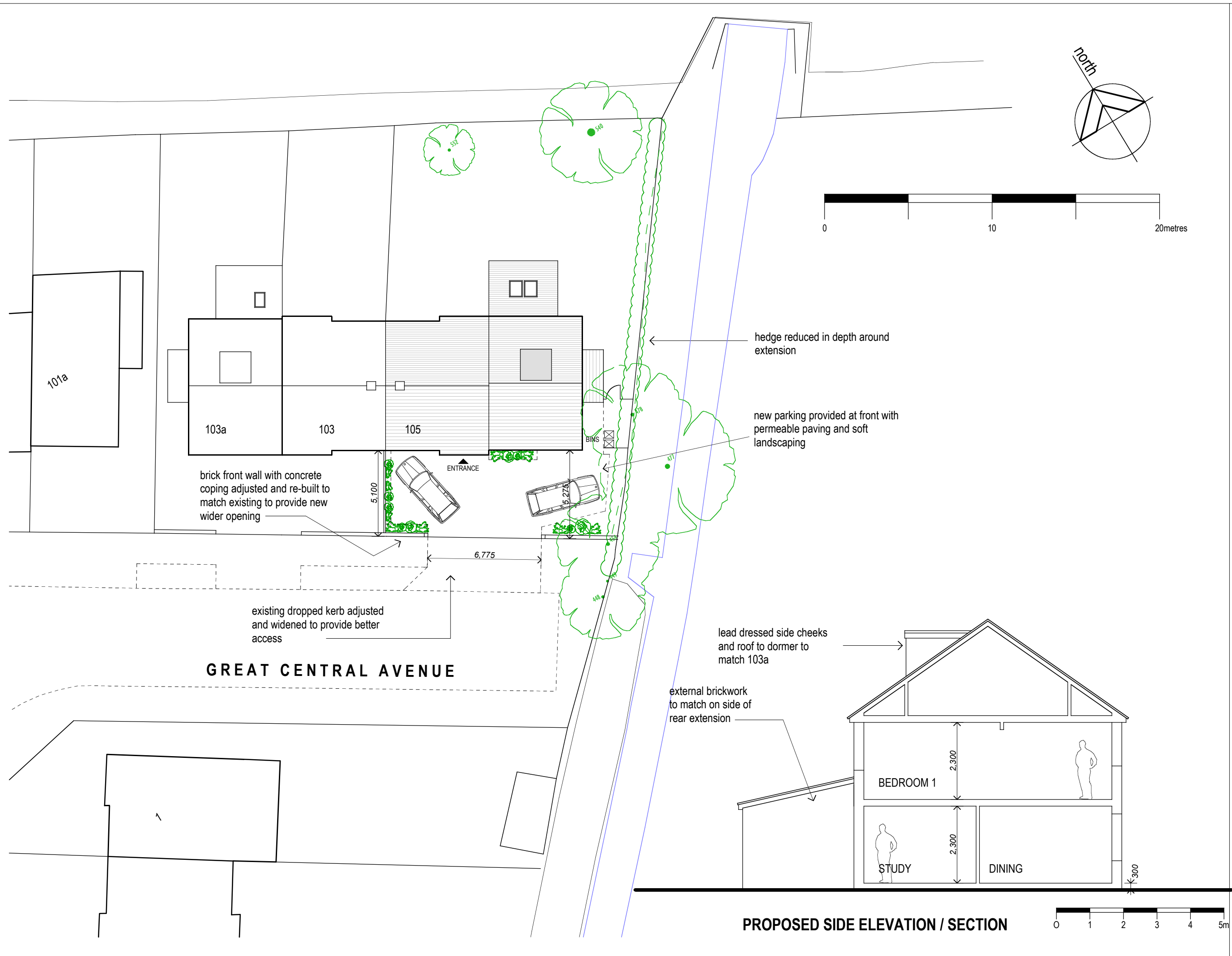
Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

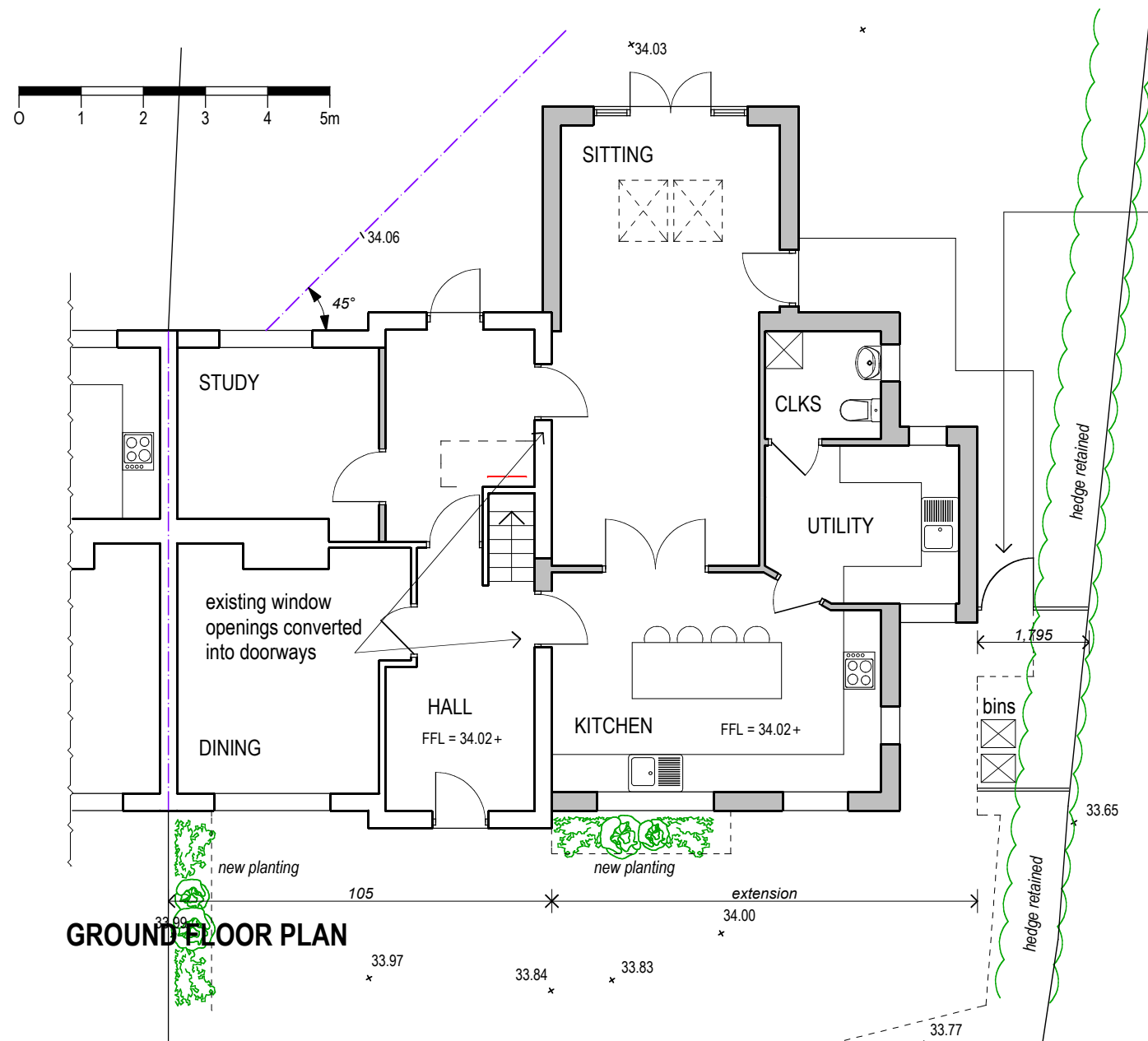
Other Sewer Types (Not Operated or Maintained by Thames Water)

	Foul Sewer		Surface Water Sewer
	Combined Sewer		Gully
	Culverted Watercourse		Proposed
			Abandoned Sewer

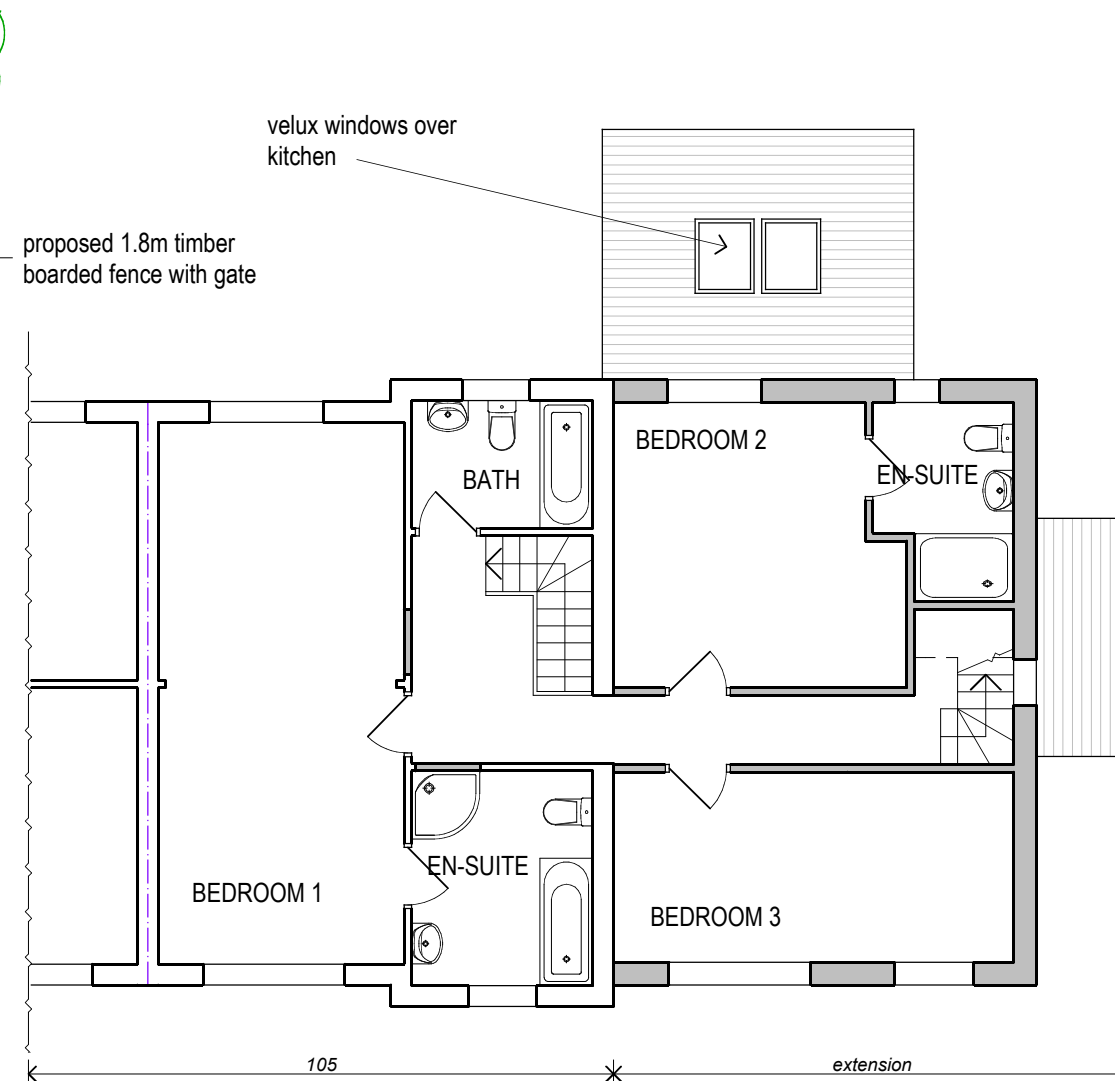
Appendix D



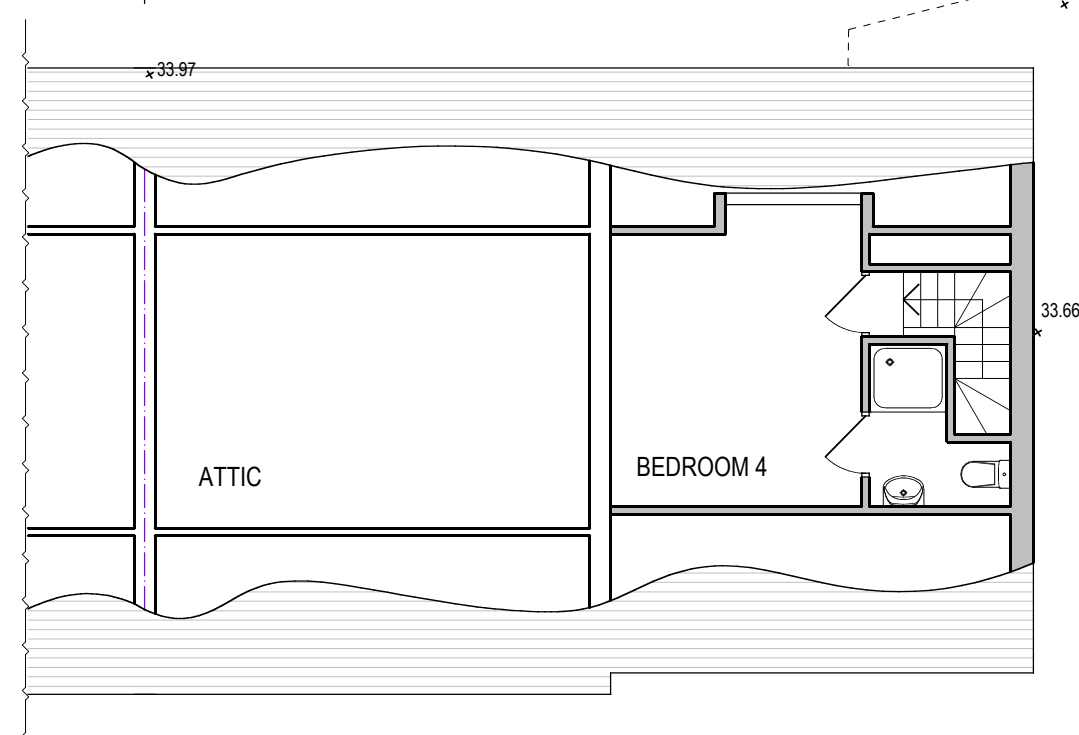
Project	105 GREAT CENTRAL AVENUE RUISLIP HILLINGDON		
	JONATHAN MARK DENNIS ARCHITECTS 67 STAUNTON ROAD, HEADINGTON OXFORD OX3 7TL t. 01865 764449 f. 01865 764449 e. jondennis@freedom255.com		
Drawing	PROPOSED SITE PLAN & SECTION		
Scale	1:200 @ A3	Date	09.06.2020
Drawn	j m d	Dwg No	356
Job No	D-10 A		



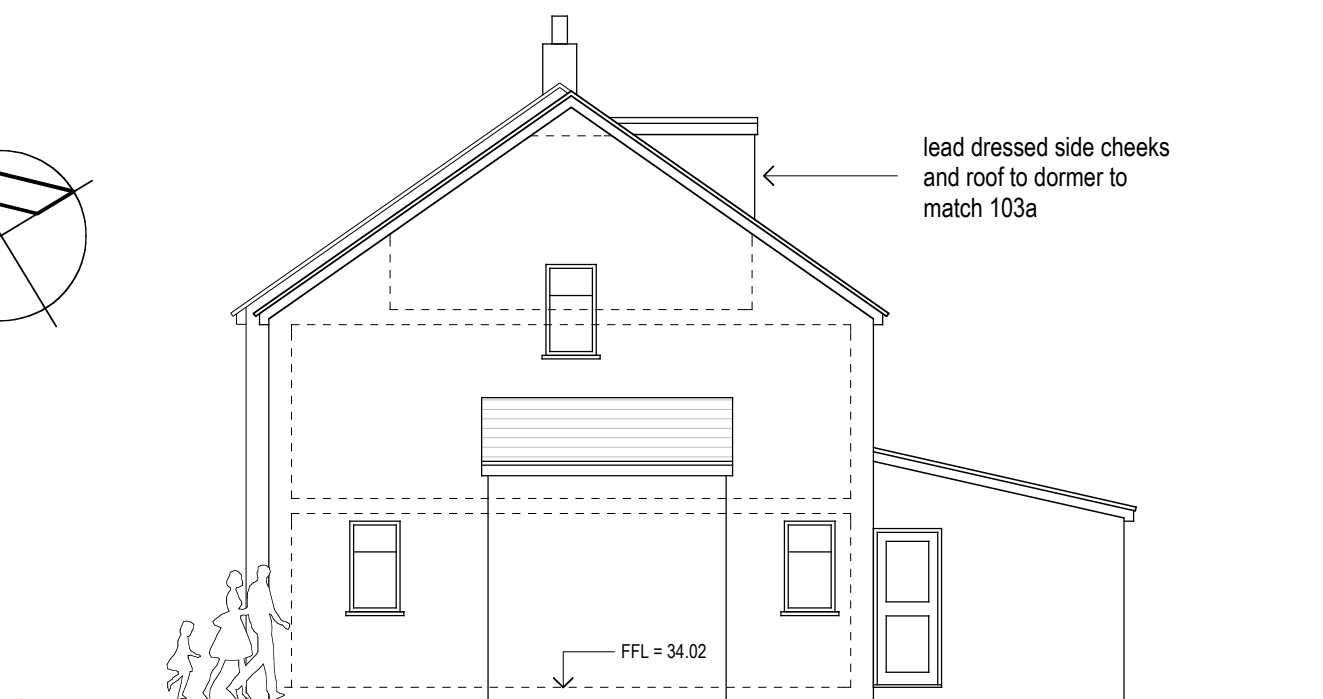
GROUND FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN



PROPOSED SIDE ELEVATION

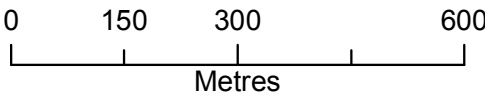
Project	105 GREAT CENTRAL AVENUE RUISLIP HILLINGDON		
	JONATHAN MARK DENNIS A R C H I T E C T S 67 STAUNTON ROAD, HEADINGTON OXFORD OX3 7TL t. 01865 764449 f. 01865 764449 e. jondennis@freedom255.com		
Drawing	PROPOSED FLOOR PLANS & SIDE ELEVATION		
Scale	1:100 @ A3	Date	09.06.2020
Drawn	j m d	Job No	356
		Dwg No	D-13 A

Appendix E

Flood Map for Planning centred on: HA4 6TU - 30/06/2020 - HNL 174021 BC



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Hertfordshire,
AL7 1HE



Legend

- Main Rivers
- Site location

Flood Map for Planning

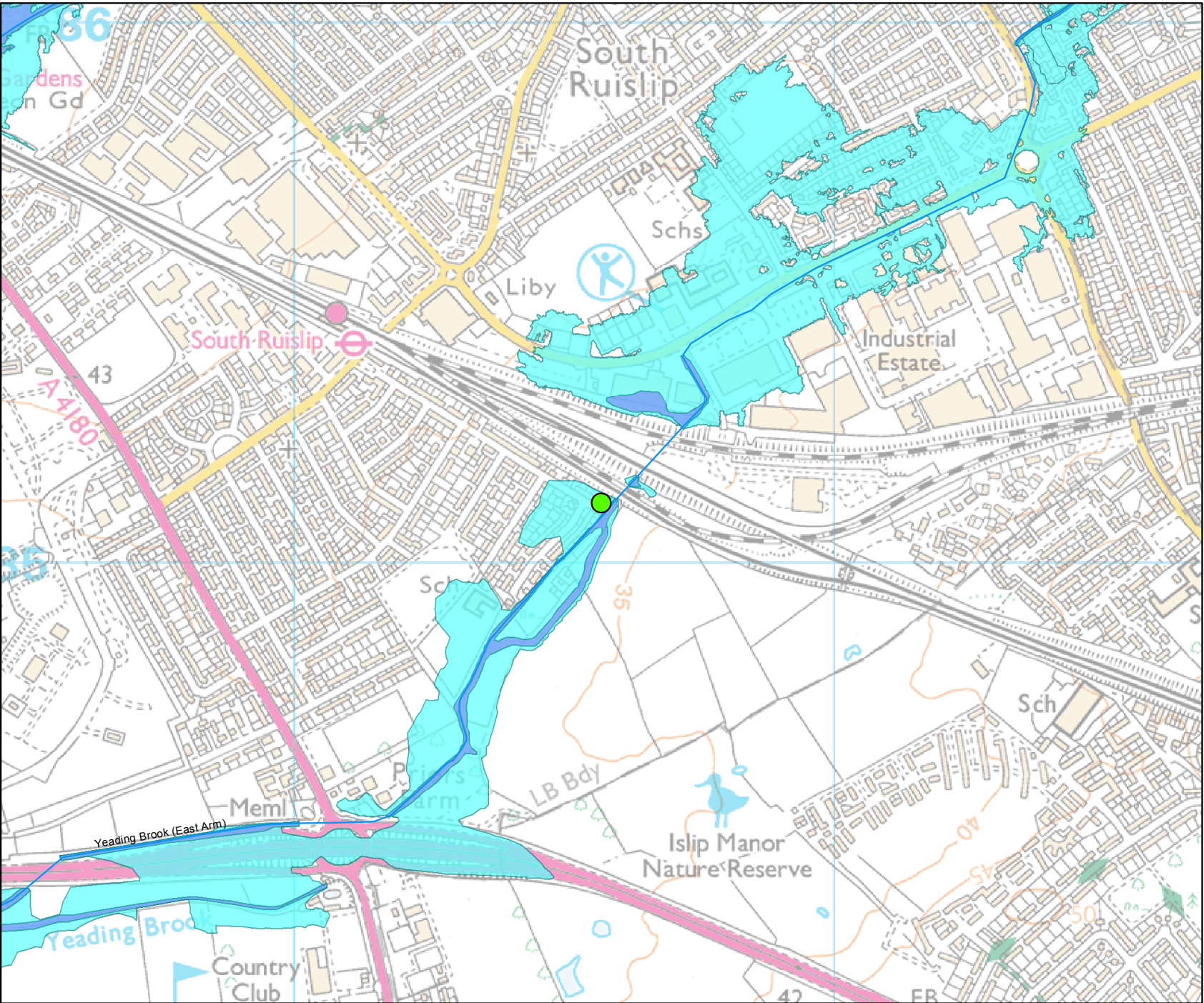
- Flood Storage Area
- Areas Benefiting from Flood Defences
- Flood Zone 3
- Flood Zone 2

Flood Map for Planning (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

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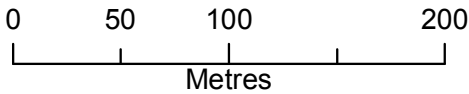


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Detailed FRA centred on: HA4 6TU - 30/06/2020 - HNL 174021 BC



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Legend

- Main Rivers
- Site location

Defended Flood Outlines

- 1 in 5 (20%) Defended

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.

Modelled outlines take into account catchment wide defences.

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence. <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

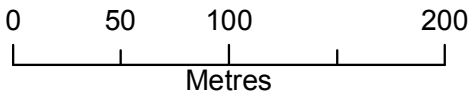
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Legend

- Main Rivers
- Site location

Defended Flood Outlines

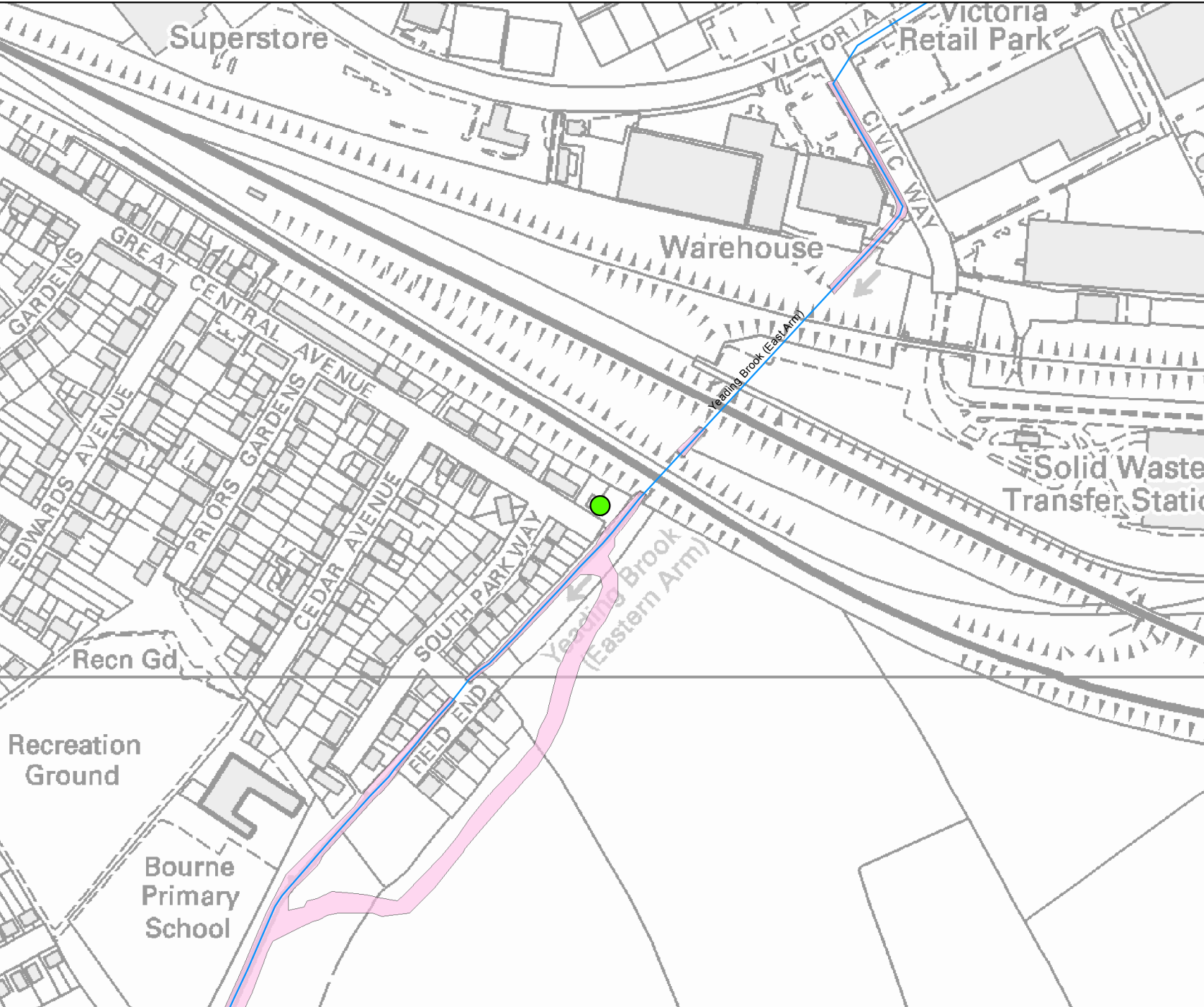
- 1 in 10 (10%) Defended

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

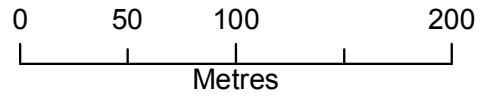
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Legend

- Main Rivers
- Site location

Defended Flood Outlines

- 1 in 20 (5%) Defended

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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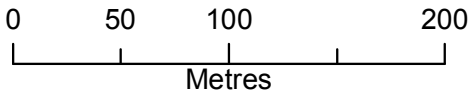
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

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Legend

- Main Rivers
- Site location

Defended Flood Outlines

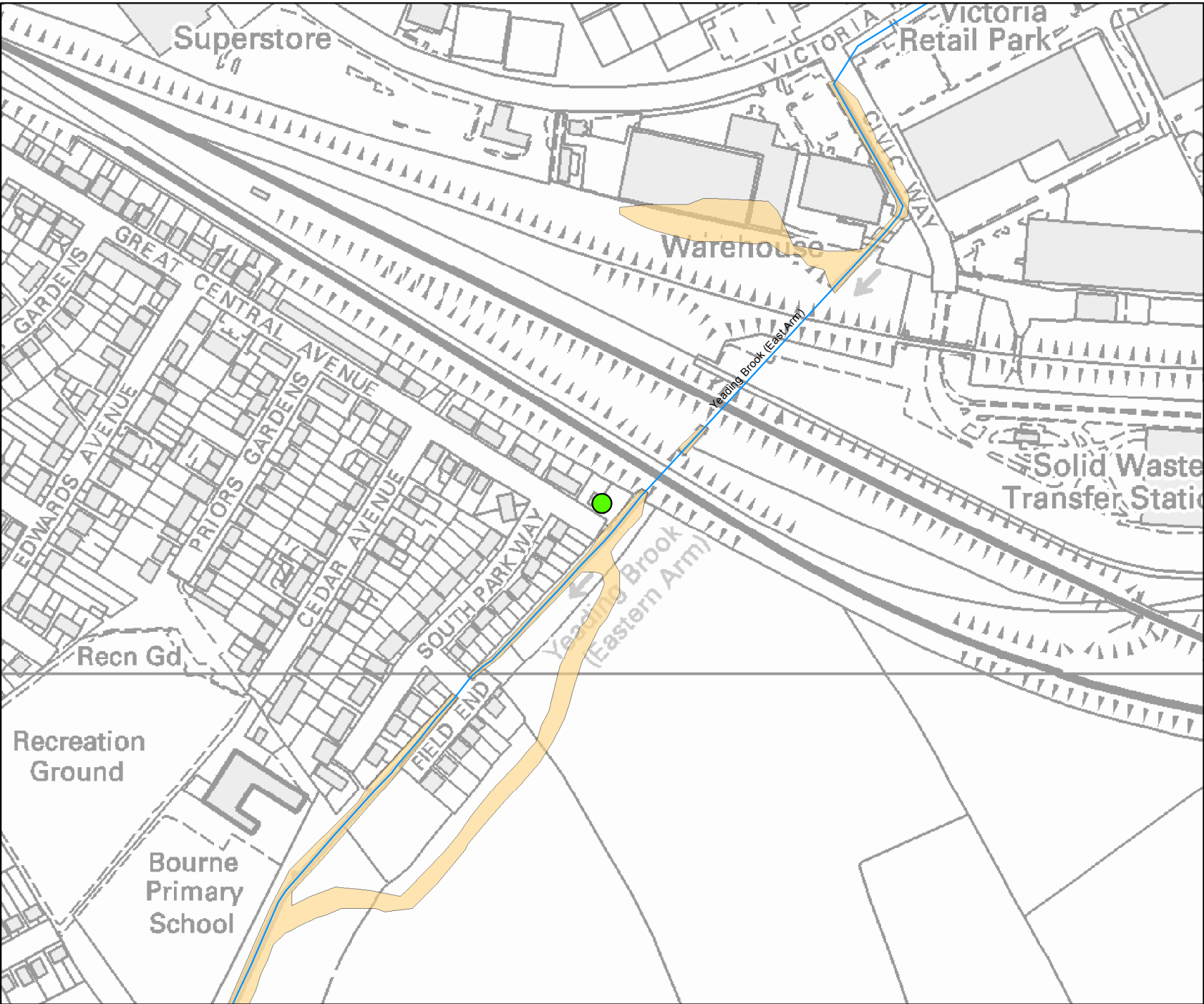
- 1 in 50 (2%) Defended

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.

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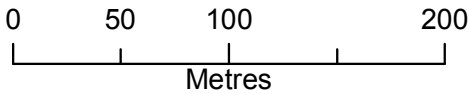
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Legend

- Main Rivers
- Site location

Defended Flood Outlines

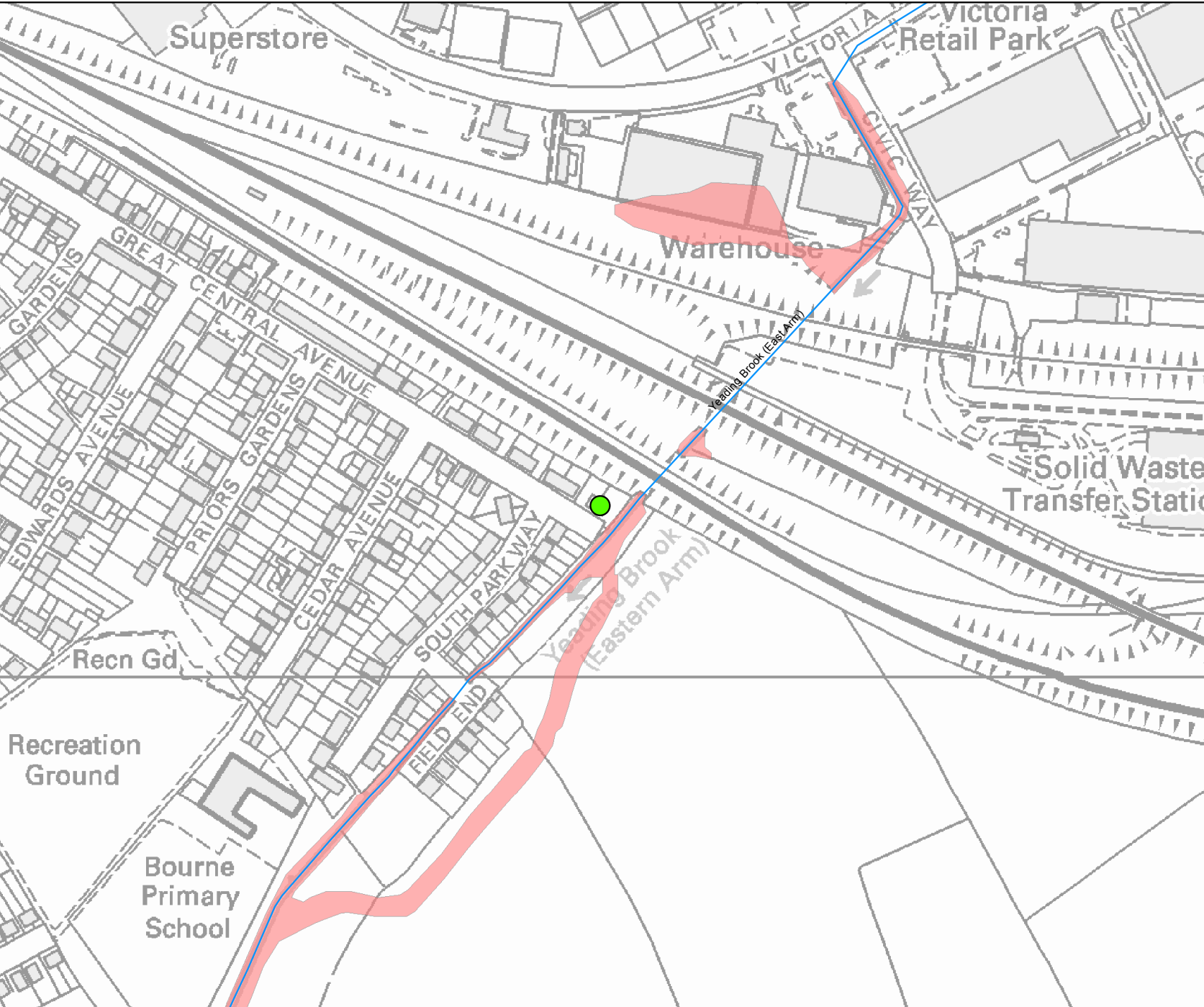
- 1 in 100 (1%) Defended

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

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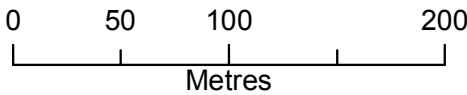


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Legend

- Main Rivers
- Site location

Defended Flood Outlines

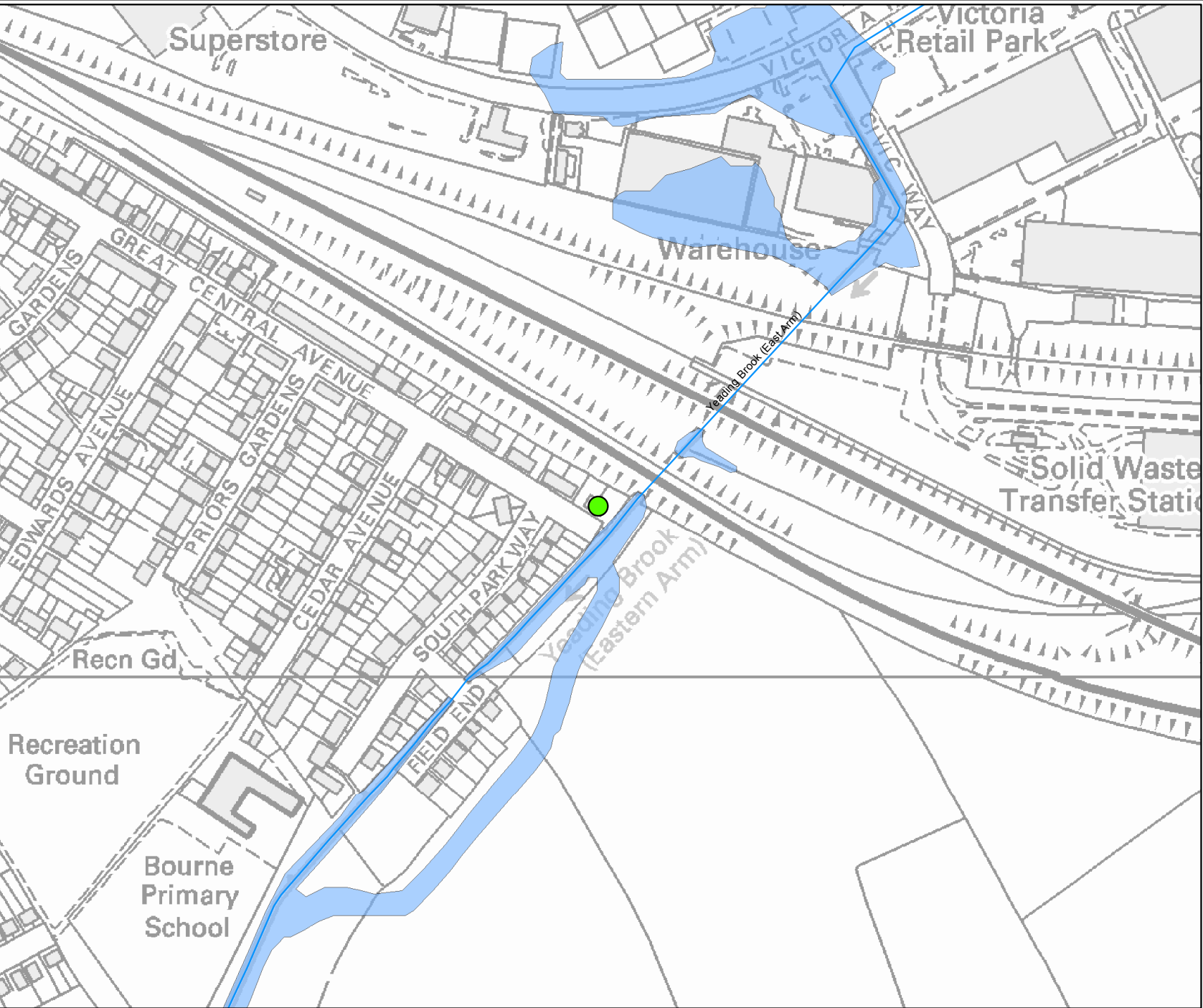
- 1 in 100+20% (*CC) Defended

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.

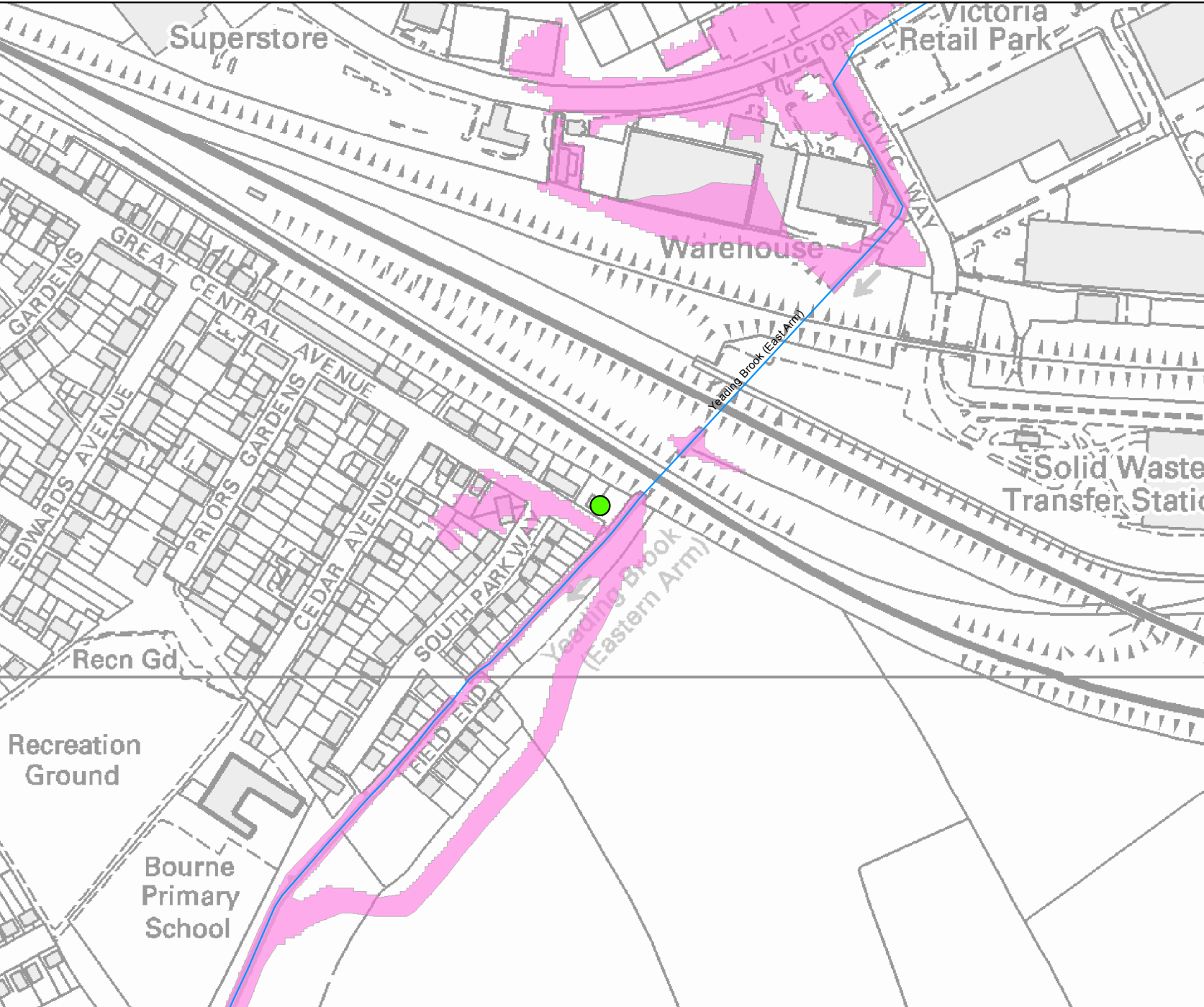
Modelled outlines take into account catchment wide defences.

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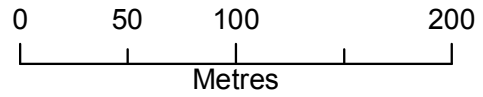
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Legend

- Main Rivers
- Site location

Defended Flood Outlines

- 1 in 100+25% (*CC) Defended

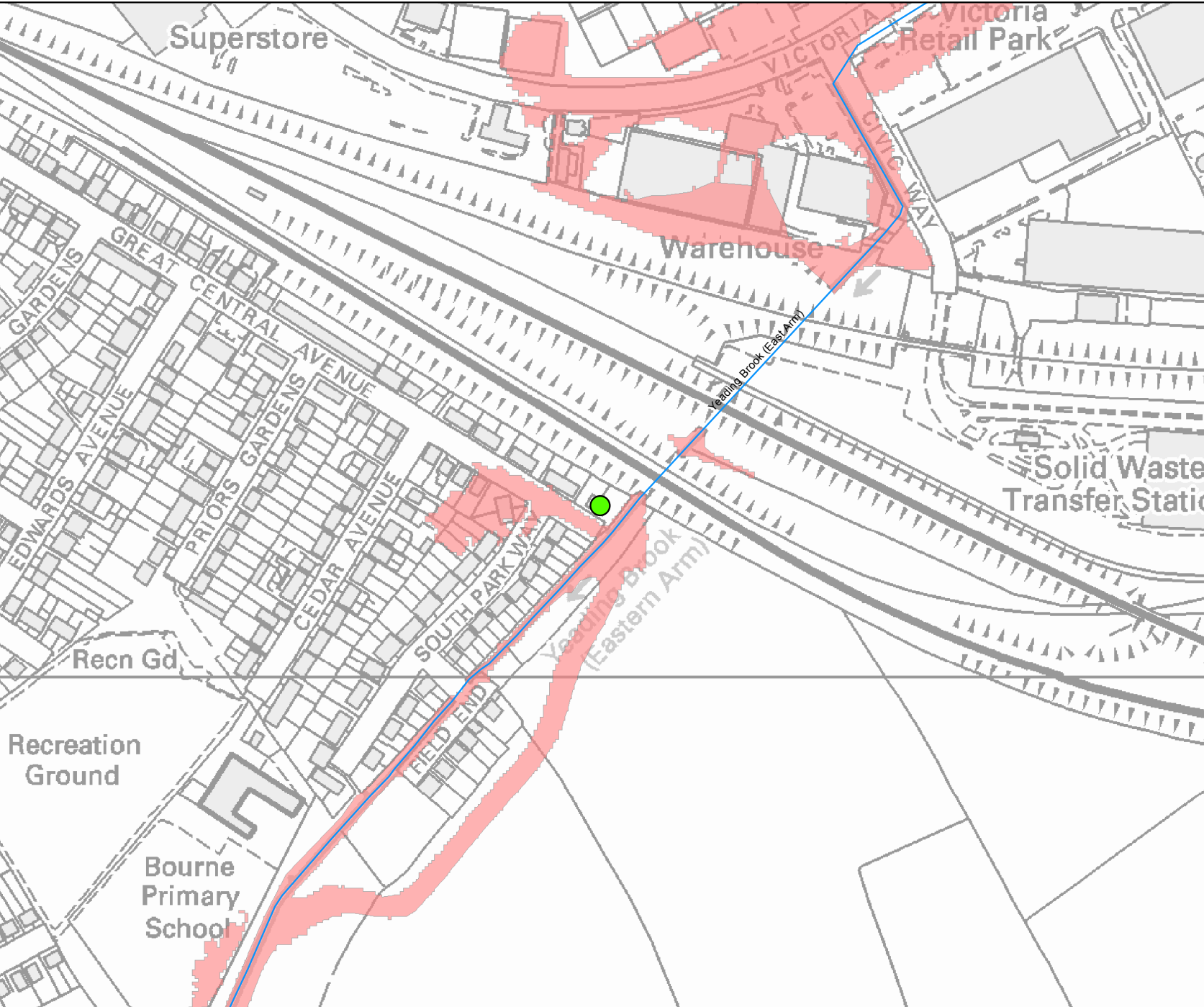
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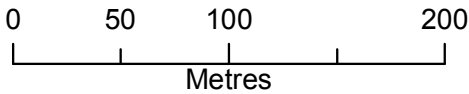
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Legend

- Main Rivers
- Site location

Defended Flood Outlines

- 1 in 100+30% (*CC) Defended

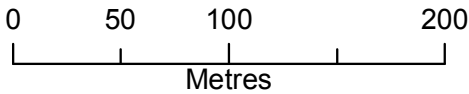
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Legend

- Main Rivers
- Site location

Defended Flood Outlines

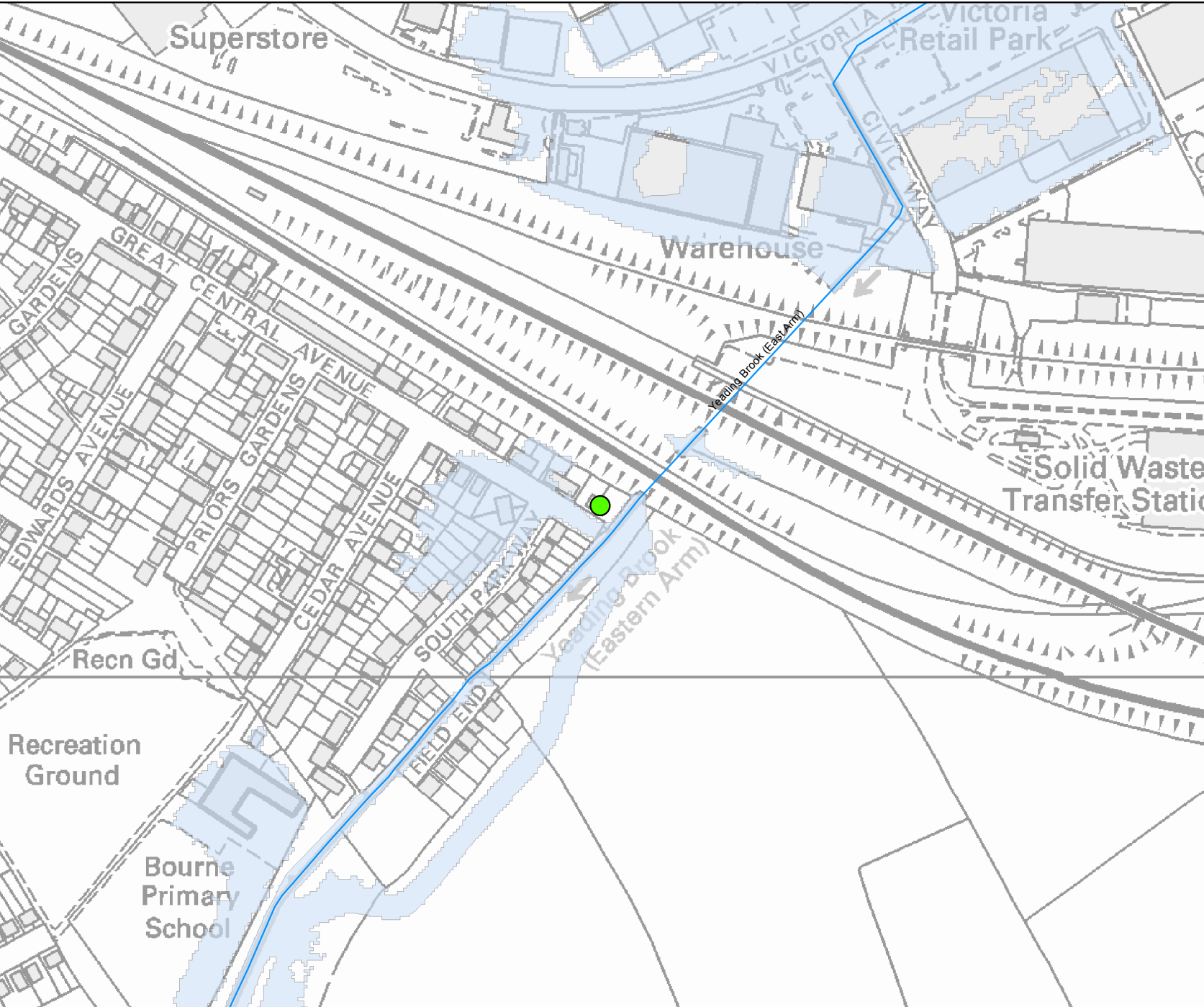
- 1 in 100+70% (*CC) Defended

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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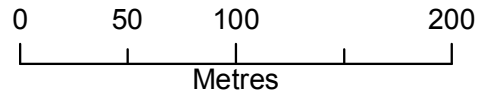
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Legend

- Main Rivers
- Site location

Defended Flood Outlines

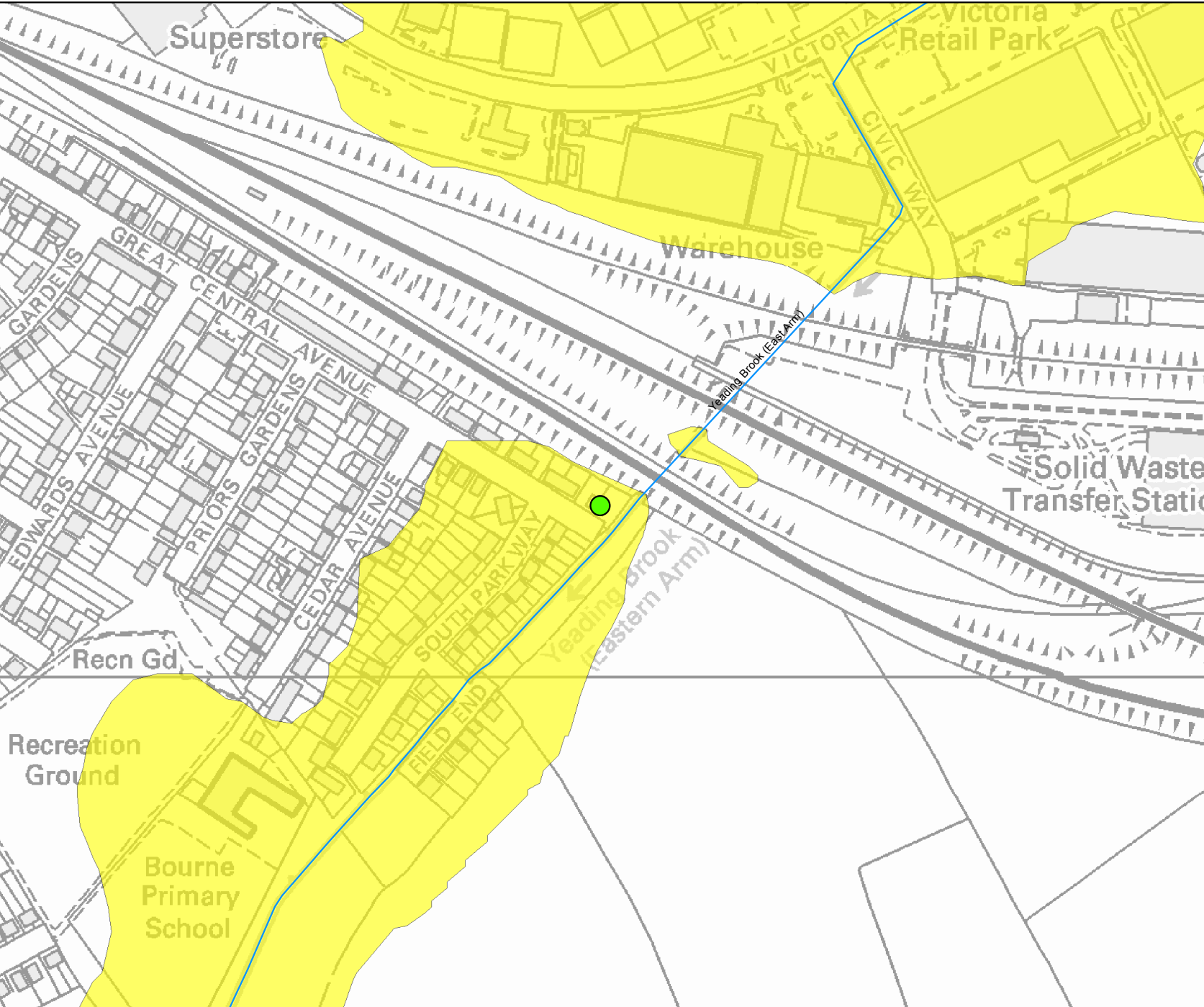
- 1 in 1000 (0.1%) Defended

The data in this map has been extracted from the River Crane Mapping Study (Halcrow 2008). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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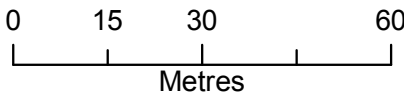


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Legend

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- Site location

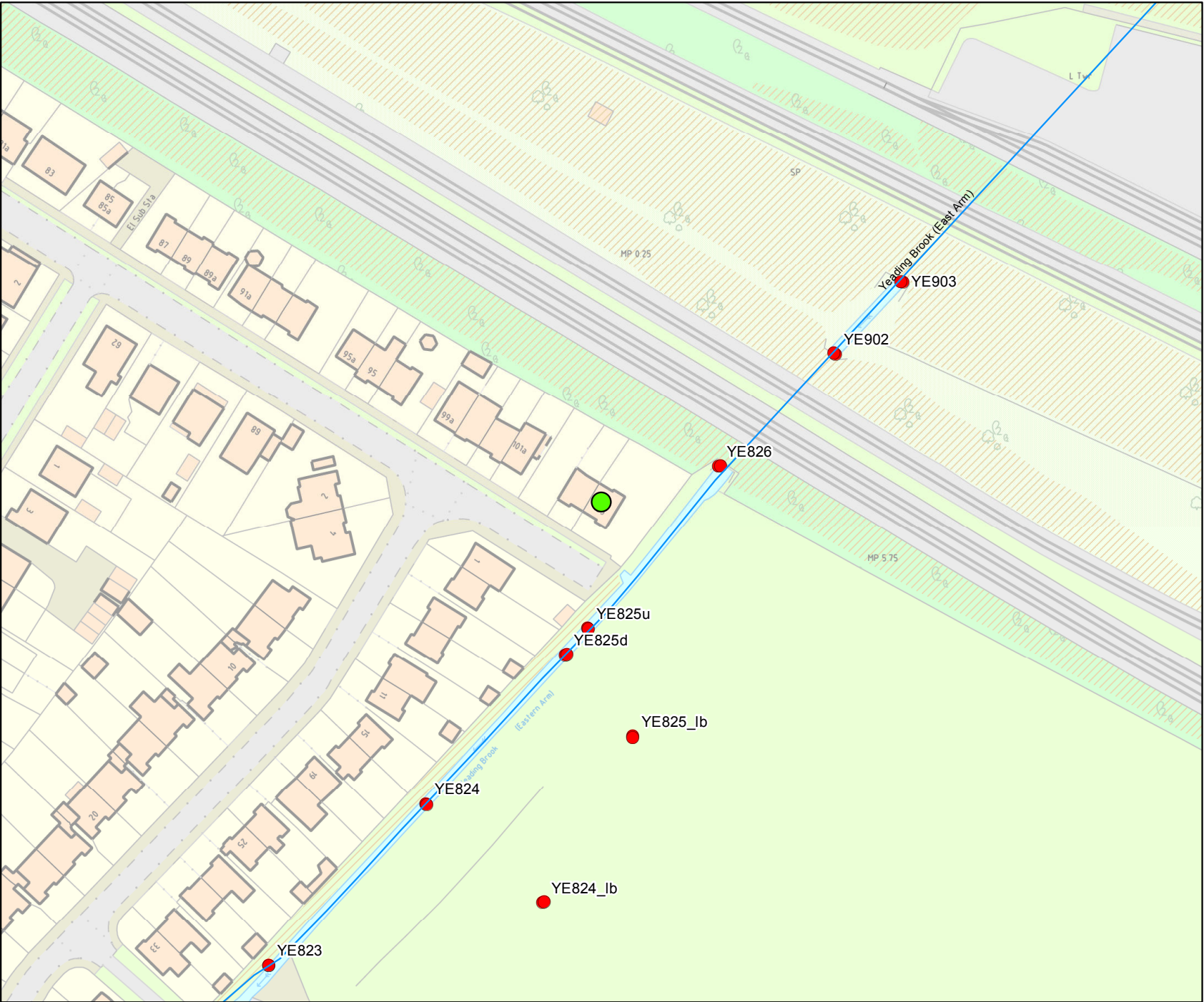
1D Node Results

- Node Results

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Environment Agency ref: HNL 174021 BC

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Caution:

The modelled flood levels and extents are appropriate for catchment wide strategic flood risk mapping. However, for more detailed flood risk assessment it is recommended that each of the underlying flood mapping, hydraulic modelling and hydrological assumptions are re-evaluated to determine the appropriateness in a more detailed analysis.

All flood levels are given in metres Above Ordnance Datum (mAOD)

All flows are given in cubic metres per second (cumecs)

MODELLED FLOOD LEVEL

			Return Period									
Node Label	Easting	Northing	5 yr	10 yr	20 yr	50 yr	100 yr	100yr + 20%	100yr + 25%	100yr + 35%	100yr + 70%	1000yr
YE826	511598	185117	33.27	33.34	33.40	33.49	33.55	33.63	33.65	33.67	33.75	33.81
YE825u	511566	185079	33.14	33.22	33.30	33.39	33.46	33.55	33.58	33.62	33.74	33.84
YE824	511533	185042	32.98	33.05	33.12	33.22	33.30	33.41	33.44	33.49	33.67	33.75
YE823	511497	185007	32.80	32.87	32.93	33.02	33.08	33.18	33.20	33.24	33.41	33.63
YE903	511639	185159	33.40	33.48	33.54	33.65	33.73	33.86	33.88	33.93	34.06	34.38
YE902	511623	185143	33.30	33.36	33.42	33.49	33.54	33.59	33.60	33.63	33.67	33.87
YE825_lb	511566	185079	32.70	32.70	32.70	32.71	32.77	32.87	32.89	32.94	33.02	33.39
YE824_lb	511558	185021	32.70	32.70	32.70	32.70	32.76	32.86	32.89	32.93	33.02	33.39
YE825d	511566	185079	33.14	33.22	33.30	33.39	33.46	33.55	33.58	33.62	33.74	33.84

MODELLED FLOWS

			Return Period									
Node Label	Easting	Northing	5 yr	10 yr	20 yr	50 yr	100 yr	100yr + 20%	100yr + 25%	100yr + 35%	100yr + 70%	1000yr
YE826	511598	185117	4.65	5.31	6.01	7.03	7.87	9.18	9.49	10.04	12.08	17.14
YE825u	511566	185079	4.65	5.31	6.01	7.03	7.87	9.18	9.49	10.03	12.08	17.13
YE824	511533	185042	4.53	5.08	5.65	6.48	7.19	8.26	8.51	8.94	10.65	15.41
YE823	511497	185007	4.53	5.08	5.65	6.48	7.19	8.26	8.51	8.94	10.65	15.39
YE903	511639	185159	4.65	5.31	6.01	7.03	7.88	9.19	9.50	10.04	12.08	17.14
YE902	511623	185143	4.65	5.31	6.01	7.03	7.88	9.19	9.49	10.04	12.08	17.14
YE825_lb	511566	185079	0.20	0.23	0.36	0.55	0.69	0.91	0.97	1.08	1.42	1.71
YE824_lb	511558	185021	0.20	0.24	0.36	0.55	0.69	0.92	0.98	1.08	1.43	1.72
YE825d	511566	185079	4.53	5.08	5.65	6.48	7.19	8.27	8.52	8.96	10.67	15.42

Structures and Defences centred on: HA4 6TU - 30/06/2020 - HNL 174021 BC



Environment Agency
Alchemy,
Bessemer Road,
Welwyn Garden City,
Hertfordshire,
AL7 1HE



Legend

— Main Rivers
● Site location

NAFRA DEFENCE	
154820	161844
46841	163509
154814	180978
154816	524356
154817	
154818	
154819	

The following information on defences has been extracted from the Asset Information Management System (AIMS)

Produced by:
Partnerships & Strategic Overview,
Hertfordshire & North London

Environment Agency ref: [HNL 174021 BC](#)

The following information on defences has been extracted from the Asset Information Management System (AIMS)

Defences

Asset ID	Asset Type	Asset Protection	Asset Comment	Asset Description	Design Standard of protection (years)	Downstream Crest Level	Upstream Crest Level	Condition of Defences (1=Good, 5 = Poor)
154819	high_ground	fluvial	Cast insitu concrete channel walls with railing and Crash barrier to crest.	Lined Channel	2	35.55	34.23	2
154816	high_ground	fluvial	vegetated channel with timber toe-boarding revetment. Part of River Crane Flood Alleviation scheme contract 2 1 in 100 SoP.	Field End Timber Camp Sheeting Bank protection.	100	34.34	33.39	2
154814	high_ground	fluvial	Vegetated channel with timber toe-boarding revetment. Part of River Crane Flood Alleviation scheme contract 2	Field End bank protection left bank	100	33.34	33.27	2
154817	high_ground	fluvial	Vegetated channel with timber toe-boarding revetment. Part of River Crane Flood Alleviation scheme contract 2 1 in 100 SoP.	Field End timber camp sheeting Bank protection.	100	33.39	33.18	2
154818	high_ground	fluvial	Vegetated channel with timber toe-boarding revetment. Part of River Crane Flood alleviation scheme contract 2 designed to 1 in 100 SoP.	Timber Camp sheeting bank protection	100	33.18	33.24	2
46841	high_ground	fluvial	Enlargened and deepened rectangular, reinforced concrete channel. Splays provided at each end to reduce head loss at the change in channel cross section. Part of river Crane flood alleviation scheme contract 2 1 in 100 yrs SoP.	Field End Channel lining	100	35.53	35.47	3

154820	high_ground	fluvial	Earth banks, probably backed by retaining wall to protect retail park.	Natural Bank	2	35.98	34.24	3
163509	high_ground	fluvial	1 in 8 gradient trapezoidal bypass channel to alleviate flooding from Yeading Brook. French drain in invert. Confluence with channel protected by Reno mattress and Enkamat geotextile. Grassed. Part of river crane FAS contract 2 1 in 100 yrs SoP.	Field End Bypass Channel L/B.	100	33.41	33.17	2
161844	high_ground	fluvial	1 in 8 gradient trapezoidal bypass channel to alleviate flooding from Yeading Brook. French drain in invert. Confluence with channel protected by Reno mattress and Enkamat geotextile. Grassed. Part of river crane FAS contract 2 1 in 100 yrs SoP.	Field End Bypass Channel R/B.	100	33.59	33.17	2
180978	high_ground	fluvial	Enlargened and deepened rectangular, reinforced concrete channel. Splays provided at each end to reduce head loss at the change in channel cross section. 1 in 100 yrs SoP.	Part of River Crane Flood alleviation scheme contract 2	100	35.52	35.86	3
524356	high_ground	fluvial	Enlarged and widened channel with 1 in 3 slopes. Part of River Crane flood alleviation scheme contract 2	Field End widened bank, slopes set at 1 in 3	100	No Data	No Data	No Data

Appendix F

Kris Tovey

From: HNL Sustainable Places <HNLsustainablePlaces@environment-agency.gov.uk>
Sent: 09 June 2020 14:04
To: Kris Tovey
Subject: RE: 55304/APP/2019/2466 - 105 Great Central Avenue, Ruislip, HA4 6TU

Hi Kris,

Our response is based on the plans which show the proximity as around 5m from the river bank and therefore no further consultation will be required. Due to the constrained space on the site, our flood risk team have allowed development within the 8m buffer zone due to the submission of loading calculations/structural survey which demonstrate the stability of the bank, and no increased flood risk, in line with national planning policy.

If however these plans are superseded and development is proposed within 5m, we would need to be reconsulted.

I hope this helps.

Kind regards,
Lucy

Lucy Read

Planning Specialist, Hertfordshire and North London Sustainable Places
Environment Agency | 2 Marsham Street, 3rd floor, London, SW1P 4DF

Email: HNLsustainablePlaces@environment-agency.gov.uk
External: 0208 4748 081



From: Kris Tovey [mailto:kris@cotswoldtp.co.uk]
Sent: 09 June 2020 13:31
To: HNL Sustainable Places <HNLsustainablePlaces@environment-agency.gov.uk>
Cc: Terry Daniel <terrydaniel@danielfamilyhomes.co.uk>
Subject: RE: 55304/APP/2019/2466 - 105 Great Central Avenue, Ruislip, HA4 6TU

Hi Lucy

Many thanks for the clarification. I can see that the objection relating to dwelling location to the existing flood defence has been lifted. The current building location is approximately 5m from the watercourse. Therefore can you confirm if we will also need to apply for a relaxation of the 8m maintenance requirement?

We want to ensure we have covered all outstanding items before engaging with the planners further.

Feel free to call if easier.