CITIZEN CRANE FORUM 2017

A meeting to discuss the Citizen Crane Project and shape its future

10:00	Arrival, registration and coffee
10:15	Welcome by Alison Debney (ZSL)
10:20	How the Citizen Crane Project supports the aims of the Catchment Partnership: Ilse Steyl, CVP
10.30	Citizen Crane project Updates: Citizen Crane Team
11.00	Thames Water update on the Surface Water Outfall Programme: Ruta Akelyte, Thames Water
11.10	Citizen Science Leads to Compliance: Mat Reed, EA
11:20	**Break**
11:30	Works in Harrow to improve the Yeading Brook: Mick Bradshaw, Harrow Council
11:40	Thames Water's Smarter Catchment Proposal: Yvette de Garis, TW
11.50	Riverfly plus -Examples of how other Citizen Science projects are impacting river management around the country- Steve Brooks, The Riverfly Partnership.
12:10	Options for years 4 to 6 - general discussion
12:30	**Break for Lunch**

Photo and Health and Safety Review for volunteers

HOW THE CITIZEN CRANE PROJECT SUPPORTS THE AIMS OF THE CATCHMENT PARTNERSHIP

ZOOLOGICAL SOCIETY OF LONDON
31 OCTOBER 2017

DR ILSE STEYL

Crane Valley Partnership
HARROW · EALING · HILLINGDON
HOUNSLOW · RICHMOND

CATCHMENT BASED APPROACH

- The Catchment Based Approach (CaBA) – community-led approach, engages people and groups from across society.
- 100+ catchments across England and Wales – Crane catchment is one.

Some statistics:

- Less than one-fifth of rivers in England are classed as healthy (using WFD criteria);
- Globally, 81% of freshwater species are in decline;
- In the UK, 13% of freshwater species are threatened with extinction.

(Source: WaterLife)

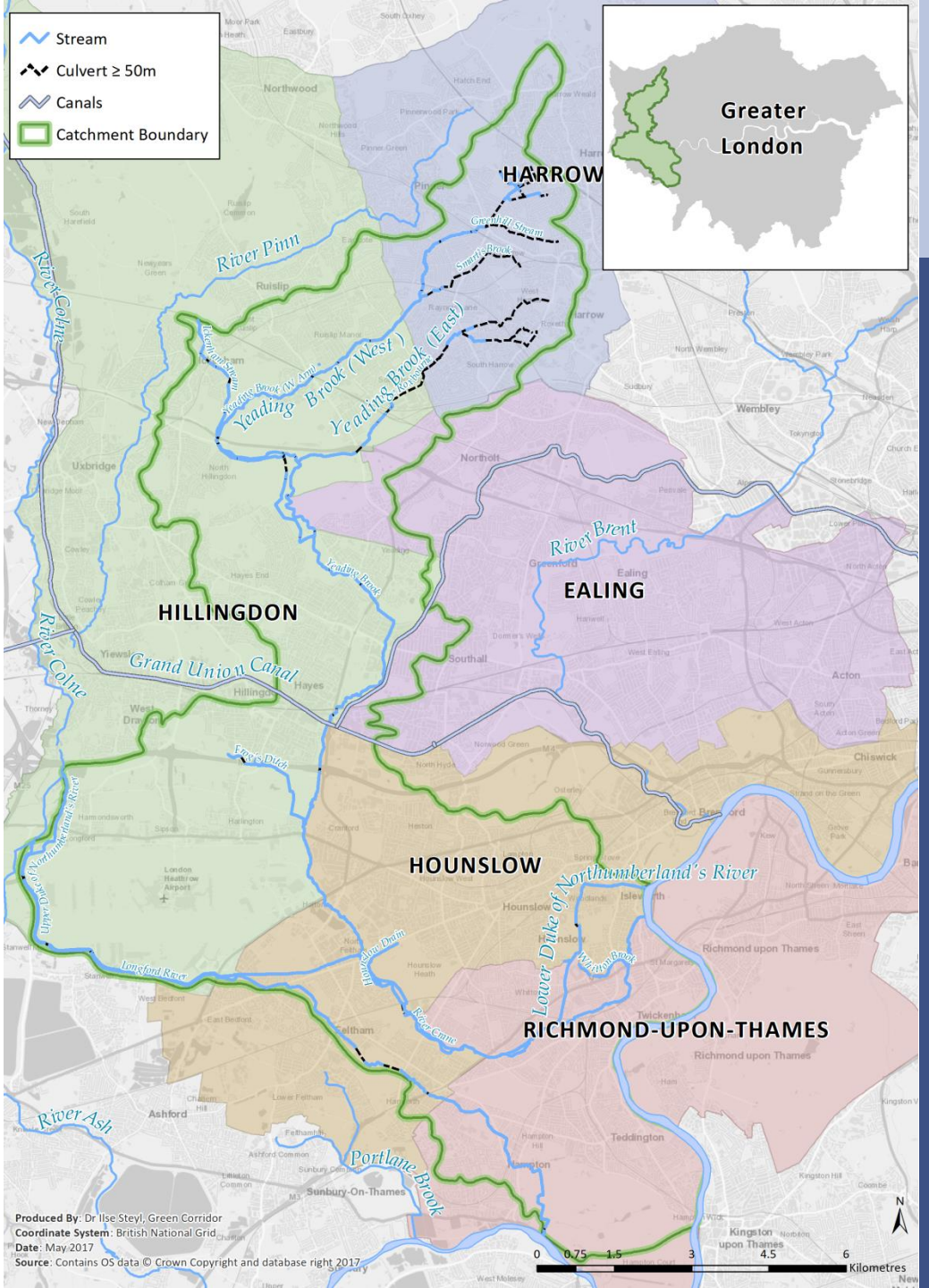
CRANE CATCHMENT OBJECTIVES

- A River Rich and Diverse in Habitats and Native Wildlife
- Clean Clear Water
- A Natural Looking and Functioning River with Sustainable Flow
- Reduced Risk of Flooding in Built-up Areas
- Collaboration and Engagement
- Awareness, Access and Appreciation
- A Celebration of the Crane's Heritage

ENGAGING LOCAL COMMUNITIES IN RIVER HEALTH

CRANE CATCHMENT

- Total size ± 127 km^2
- Typical urban catchment, suffering with chronic water quality problems, invasive species, canalisation, straightening, over-widening, etc.
- 5 London Boroughs (Harrow, Hillingdon, Ealing, Hounslow, Richmond-upon-Thames



CITIZEN CRANE

- Citizen science project – scientific research conducted, in whole or in part, by amateur scientists on a voluntary basis.
- Running for 3½ years – consistent time series dataset.
- Collaboration is key.
- Regulation alone will not address all issues or realise all benefits.

THANK YOU

FORCE
Friends of the River Crane Environment

frog environmental

ZSL
LET'S WORK FOR WILDLIFE

Thames Water

Crane Valley Partnership
HARROW · EALING · HILLINGDON
HOUNSLOW · RICHMOND

Environment Agency

Citizen Crane

Project Update

Rob Gray, Joe Pecorelli, Richard Haine
Citizen Crane

Crane Catchment Map & Monitoring Points

- 35 km main channel length
- 11 monitoring sites in 5 boroughs
- Monthly RMI and water quality (conc. and loading)
- TW labs for analysis

Project Features

- Monthly monitoring started in May 2014
- Volunteer led (50 volunteers trained to date)
- Project team: frog environmental, ZSL and FORCE
- Steering Group: CVP, EA + TW (meet quarterly)
- Annual Report and Forum
- Long term outfall monitoring since 2015
- Outfall Safari in 2016
- Funding until spring 2020

Key Previous Findings

- Method is reliable and consistent
- Upper reaches poor
- WQ generally improves downstream
- Better WQ but poor geomorphology in middle
- Upper DNR: poor P but improves RMI
- NH3N more important than P as RMI control
- Outfall Safari finds major pollution sources

Key Previous Outcomes

- Identified ~ 10 pollution incidents – enforcement and prosecution follow
- TW SWOP shifted to upper reaches
- SWOP monitoring supports clean up effort
- Increased public and council awareness of misconnection issue
- Approach applied elsewhere in London

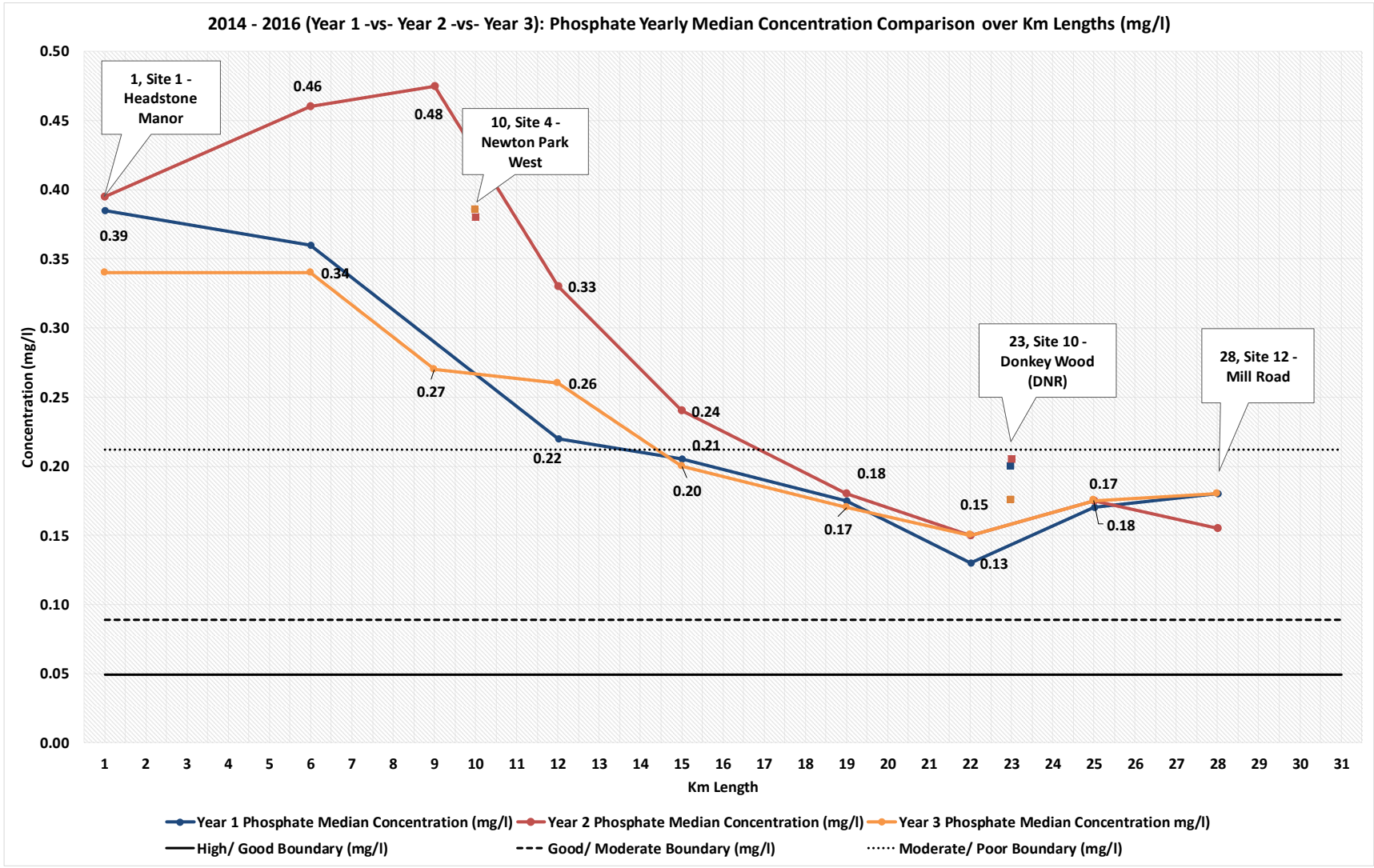
Engagement

- Local communities
- EA and TW
- CVP partners
- London wide through CaBA, CPiL etc
- Projects with ~ 10 universities

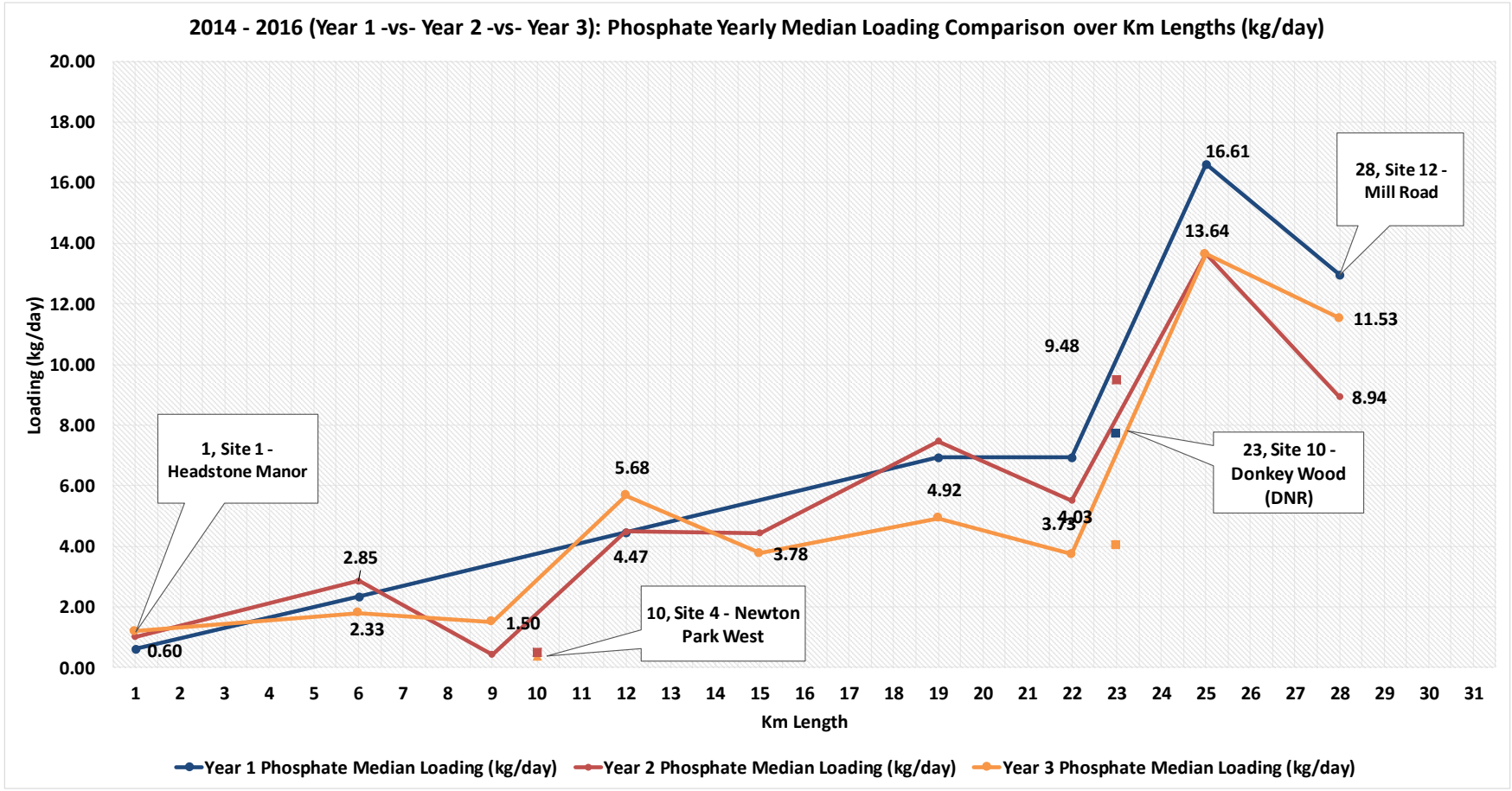
Academic Projects

Institute	Author	Area of study
St Marys University	Dr Iain Cross	**The potential of citizen science to inform expert understanding: a case study of an urban river**
St Marys University	Will Hawkins	**The Effects of Urban Influences, Including Heathrow Airport, on the Water Quality of the River Crane**
St Marys University	Gabby Judd	**Crane invertebrates in pools and riffles**
Kingston University	Andrew Carr	**An examination of spatial and temporal variance in Ammoniacal Nitrogen, Phosphorus, and Sulphate in the River Crane, alongside their impact on macro- invertebrate levels**
Royal Holloway	David Strachan	**Quantification of organic and inorganic pollutants arising from road run off in the River Crane catchment**
Cranfield	Anna Bukovski	**The identification of pollutant sources in the River Crane catchment**
Durham	Bertie Bricusse	**Water quality in an urban lowland river: The River Crane Catchment in West London**

Median P Concentrations Year 1 - 3

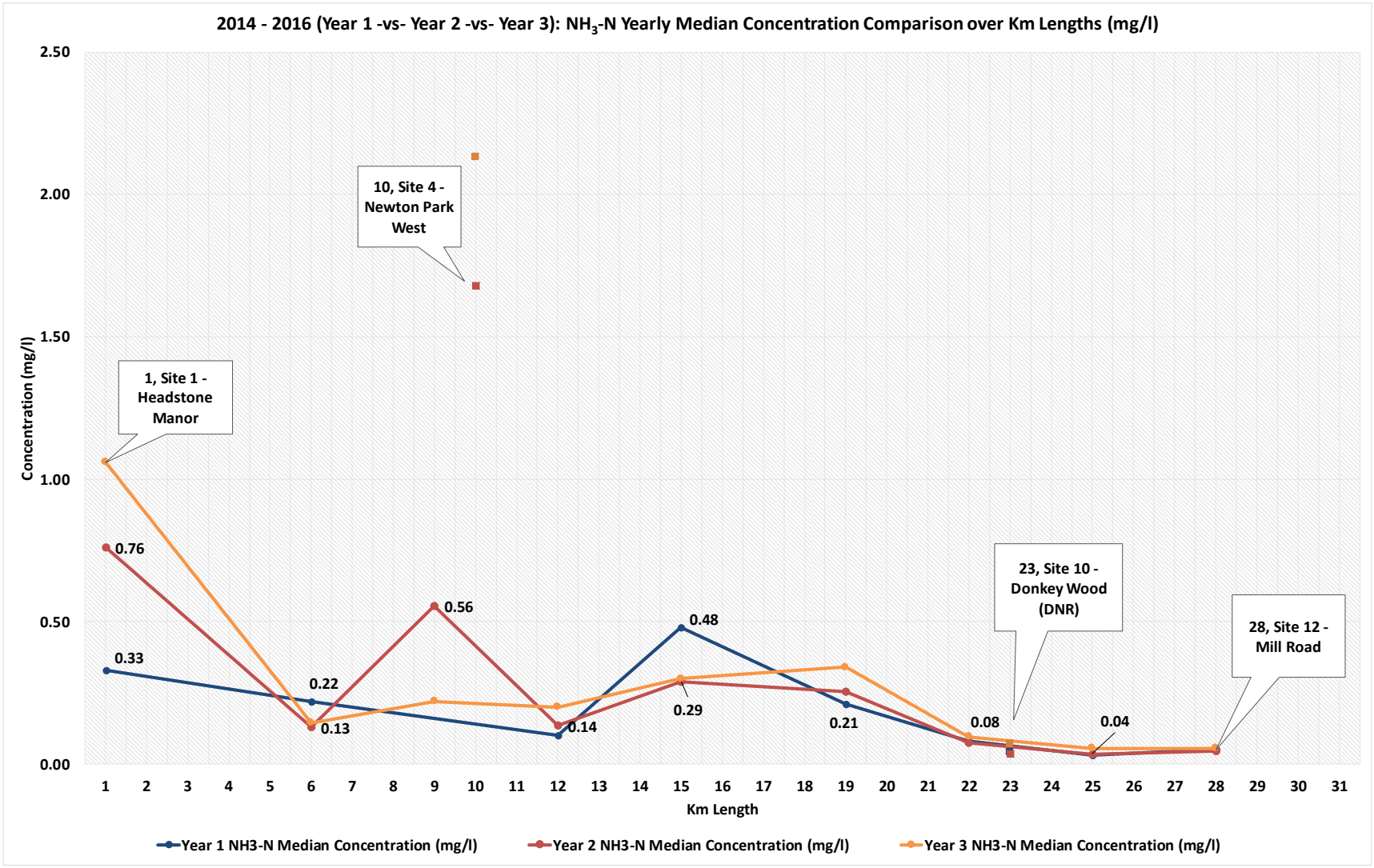


Median P loading years 1- 3 (kg/day)

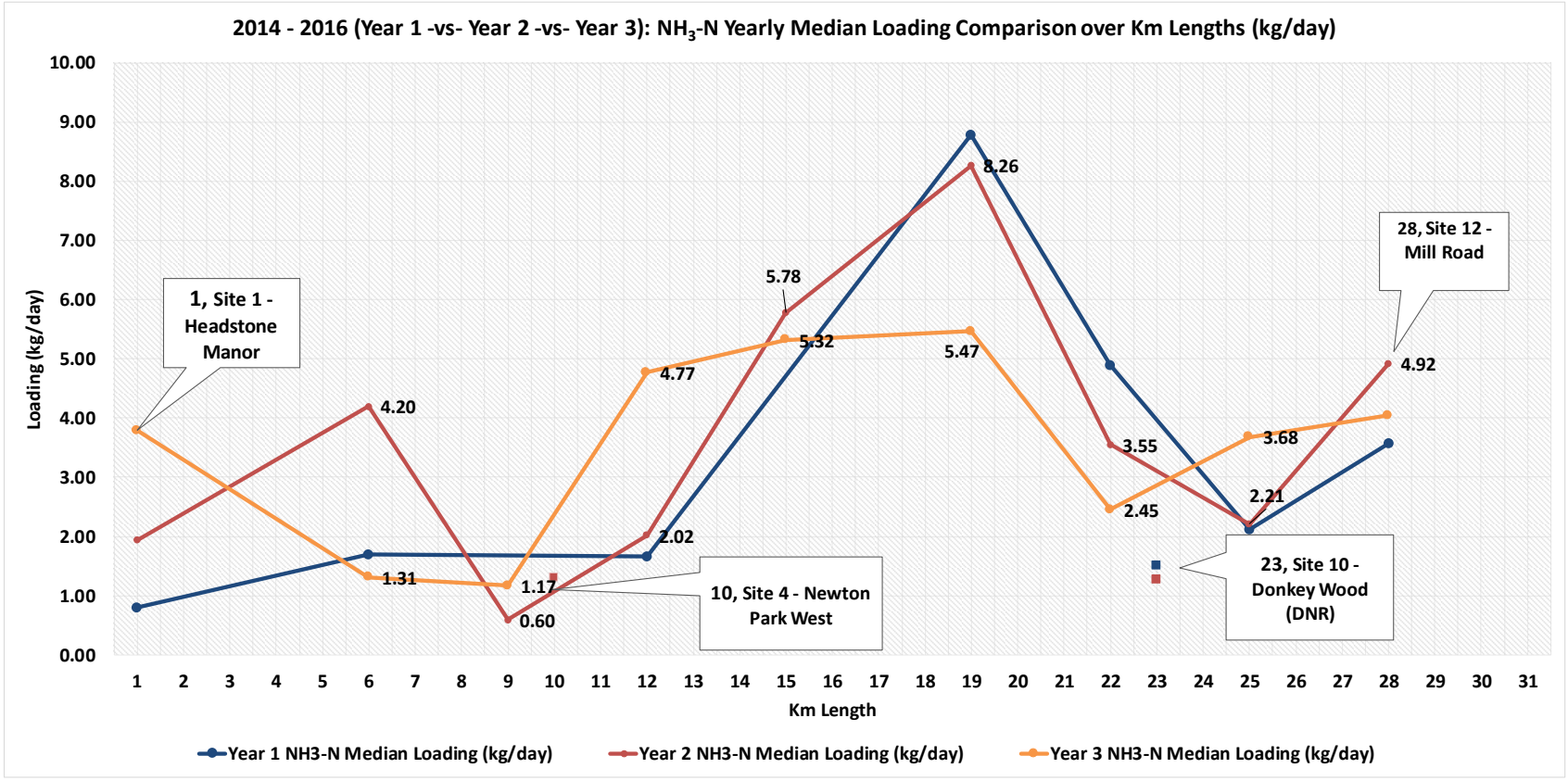


5 Tons of phosphate (expressed as gorillas)

Median NH3-N conc year 1-3



Median NH3-N Loading Data



Next steps for data collection

- Reset all gauging stations
- QA on all data collection protocols
- High confidence in loading data
- Continue sampling for another 3 years
- Data highlights problem areas and allow us to track improvement/deterioration over time
- Data feeds into other elements of Citizen Crane e.g. catchment mass balance model

Road Run off

- Investigations into impact of Road Run-off
- Royal Holloway & Cranfield University
- Major roads cross the River Crane
- What is the impact?
- How might it affect restoration efforts?

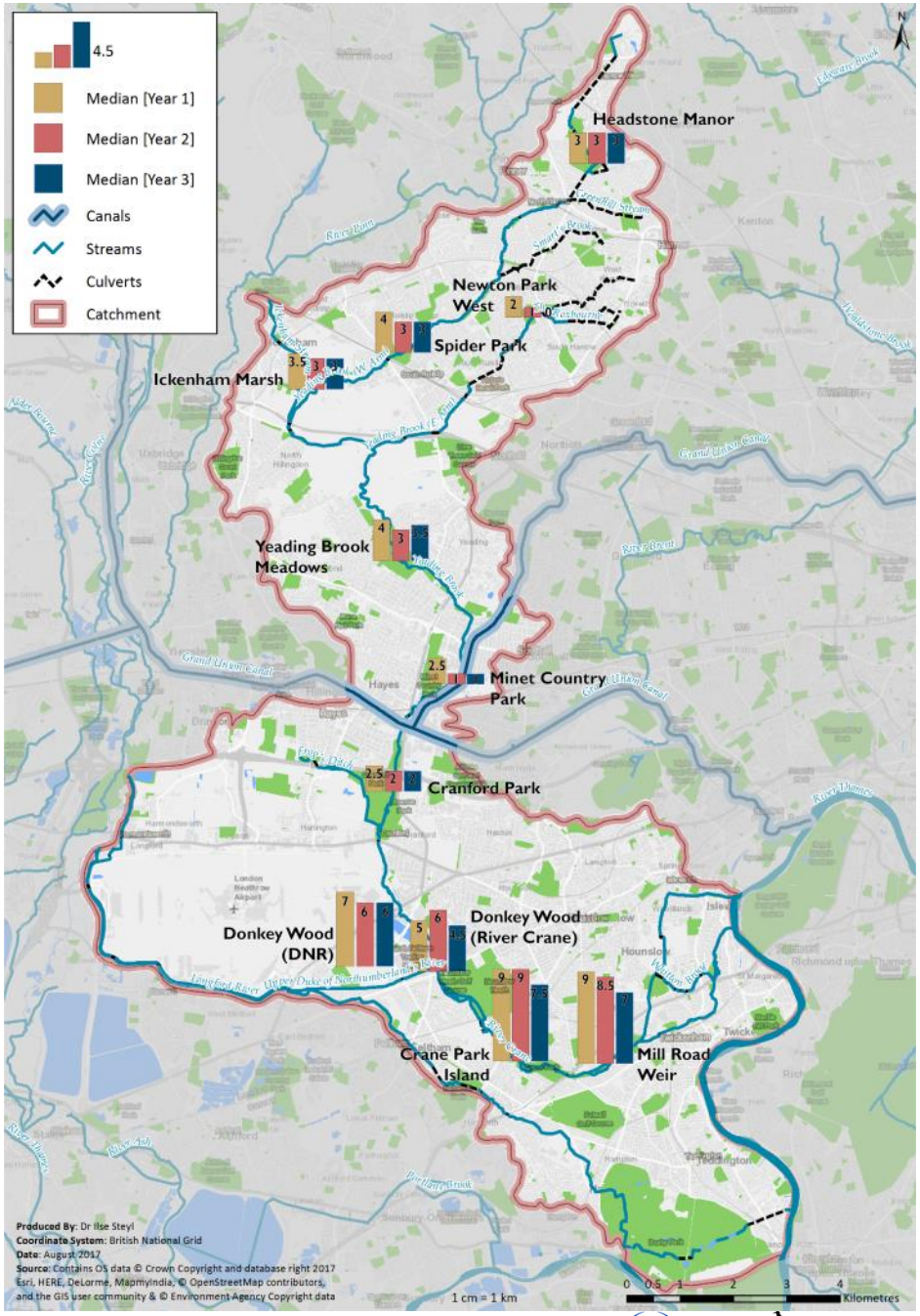
Road Run off – Sources of contamination

Contaminant	Sources relating to road runoff
Lead	Tyre wear, lubricating oil, grease, paints, dyes, lead-acid batteries (in past decades, leaded petrol would be a source)
Copper	Electrical components, engine parts, brake lining, electroplating, copper pipes (trace amounts in gasoline and engine oil)
Zinc	Street furniture, worn tyres, electroplating, galvanized iron and steel, grease (trace amounts in engine oil)
Cadmium	Worn tyres
Nickel	Metal plating, worn brake lining, asphalt, lubricating oil (trace amounts in diesel and petrol)
Antimony	Paint, enamel, textiles, matches, rubber (tyres),
Chromium	Metal plating, catalysts and refractories, brake fluid, leather tanning, plastics
Manganese	Engine components
Iron	Rusting car parts, rusting street furniture
Arsenic	(produced in trace amounts from fossil fuel combustion)
PAH's	Diesel, petrol
TPH	Diesel, petrol

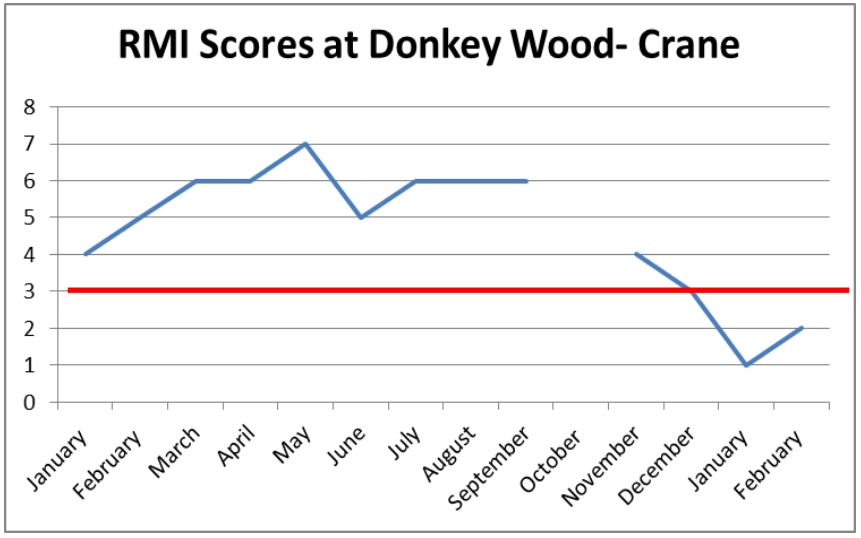
Road Run off – Key Takeaways

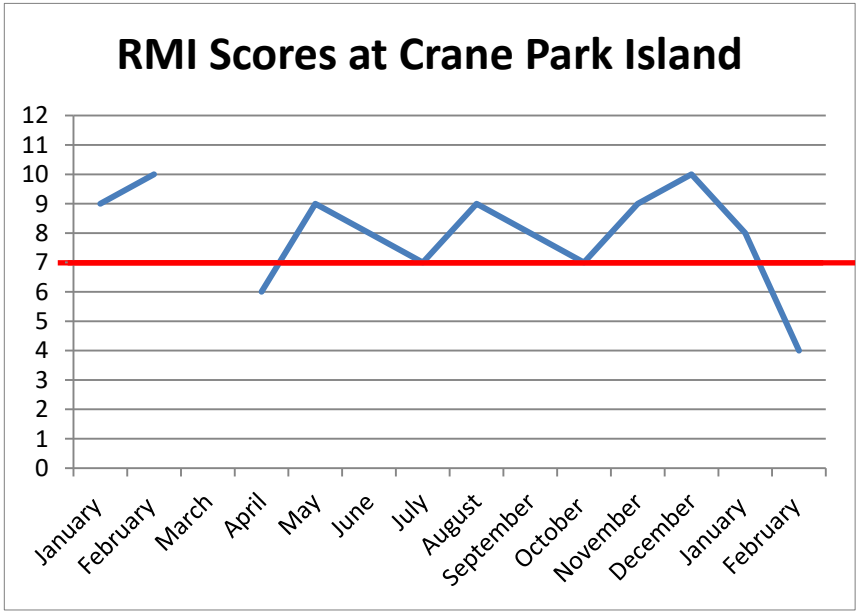
- Sediment store of organic and inorganic pollutants downstream of major roads e.g. M4
- Water samples did not return high concentrations of contaminants
- Hazardous silt can be a constraint to restoration efforts
- Working with Highways and the EA there is the potential for interventions
- There is still a legacy issue to deal with

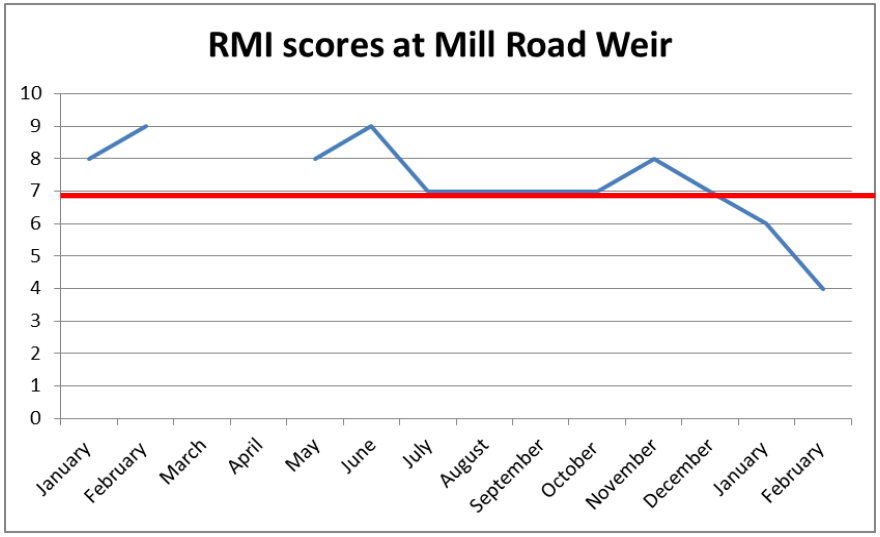
Median RMI scores by site for year 1, 2 and 3



Pollution Detection







Pollution Detection: How do we standardise reporting?

- Standard way of assessing sewage fungus-cover?
- Pro forma for other forms of pollution e.g. oil, chemical or other ?

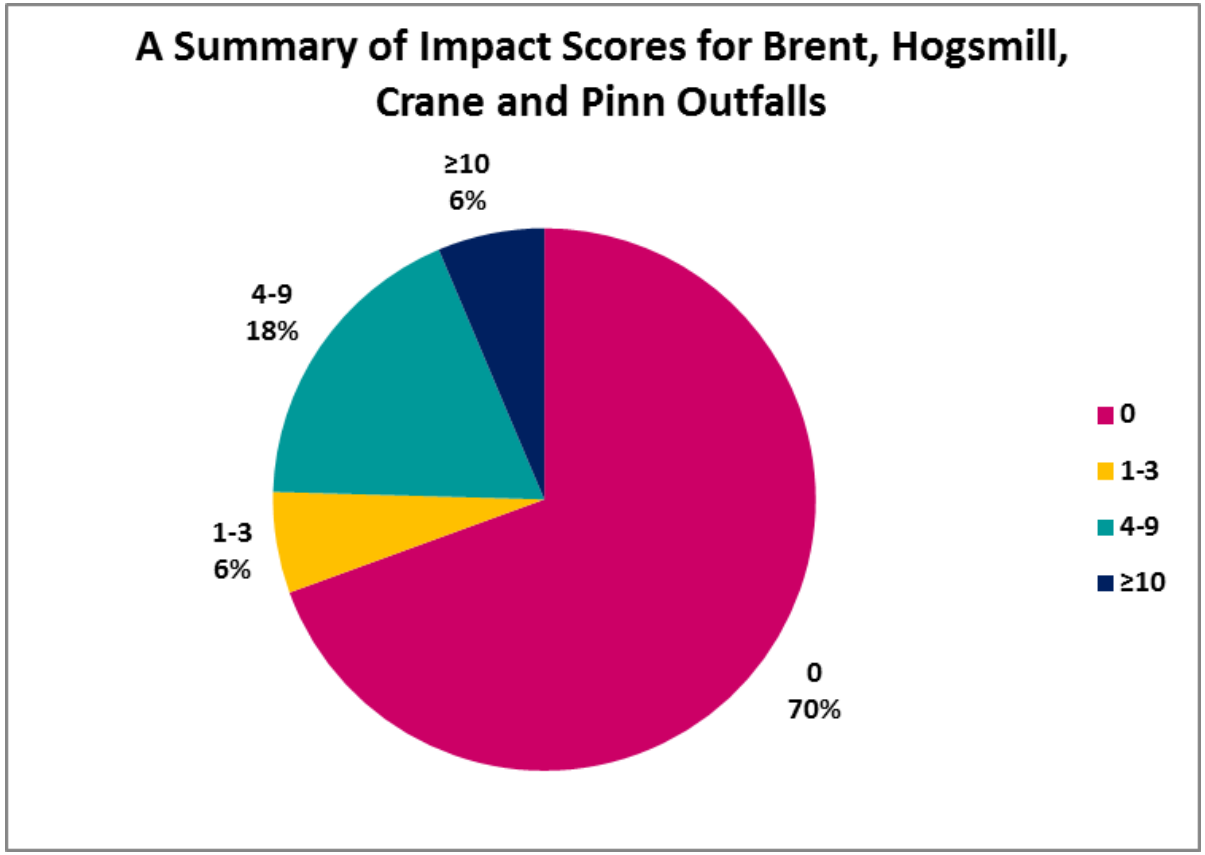
The Outfall Safari across Greater London

112 volunteers trained

104.6km of river surveyed

The Outfall Safari across Greater London

- 896 outfalls assessed
- 274 outfalls Polluting
- 2 catchments currently being surveyed: Ingrebourne and Ravensbourne
- Impact on Thames Water SWOP works



Mass Balances for P and NH3N

- Uses loading, real time and SWOP data
- First order balance subject to refinement
- Insight into key processes
- Quantification of interventions

Mass Balances

	P provisional mass balance (Kg/day)	NH_3-N provisional mass balance (Kg/day)
Inputs		
SWOP outfalls	18	18
Other outfalls	11	11
Upper DNR	10	1.0
Peak flush	N/A	0.3
Total	**39**	**30.3**
Outputs		
Dissolved outflow	11	4
Absorbed/flushed as sediment	28	–
In-river chemical processes	–	26.3
Total	**39**	**30.3**

- Importance of SWOP
- Importance of in river processes
- Importance of P load in sediment ~ 50 tonnes

FUTURE STRATEGY

1. Continue baseline monitoring
2. Support volunteers
3. New volunteer led initiatives
4. Work on mass balances – feed into AMP 7
5. Investigate ammonia pulses

FUTURE STRATEGY

6. Quantify effects of interventions
7. Assess road run-off impacts
8. London links – practitioners and academics
9. Target reductions in NH3-N and P by 2020
10. Engage public - social media etc

Thames Water Surface Water Outfall Programme

31 October 2017

Ruta Akelyte
Environmental Protection Technologist

SWOP

- A team of 6 individuals – environmental science backgrounds
- Programme developed by Thames Water and Environment Agency
- Funding approval from Ofwat
- Funding released in Asset Management Plans (AMP) – over a 5 year period
- Current (AMP6) PSWO Programme is largest ever with biggest delivery profile yet 200 (40/year)
- 101 delivered to date, 21 – in year 3
- ~ 100 live projects

AMP6 Review

- 101 outfalls have been significantly improved to date
- 1770 properties with misconnections were identified in the process
- 4024 misconnected appliances identified
- ~90% of these property owners resolved the issue voluntarily
- The remainder are passed over to local authorities for enforcement

Misconnection	Amount
Kitchen Sink	925
Washing machine	899
Hand Basin	802
Toilet	345
Dishwasher	318
Bath	255
Shower	243
Other pollution sources	250

River Crane Projects

- 22 projects singed off to date (Fulwell Park Avenue A B & C was signed off as one)
- 10 – on River Crane, 8 – on Yeading Brook, 4 – Roxbourne
- 217 properties with misconnections were identified in the process
- 531 misconnected appliances identified
- Misconnection rate – ~3.3 %
- Live Projects – 16
- 2 projects to commence in the beginning of 2018.

Misconnection	Amount
Kitchen Sink	114
Washing machine	126
Hand Basin	111
Toilet	35
Dishwasher	70
Bath	30
Shower	32
Other	2

Hospital Bridge North Outfall

- 14 misconnected properties;
- 2 outstanding;
- 1 with Local Authority – a meeting with Richmond EHO to discuss rectification has been arranged;
- CCTV to trace pollution on one road will be completed in the beginning of November.

Outfall Safari

Total Outfalls Assessed	Total scoring impact Score 10+	Outfalls not on SWOP or Hotspot List	Total scoring impact Score 5-9	Outfalls not on SWOP or Hotspot List
230	6	1	23	9

Figure 1. In-channel survey work in Harrow during the 2016 OS (taken from Citizen Crane Project Year 2 Progress Report)

Outfall Safari - Overview

Investigations completed:

Project Name & Location	Post Code	TQ Reference	Watercourse	Outfall Score	Comments/Updates
Crane Park Road (A316)	TW2 6DF	TQ1356472692	Crane	6	No sign of pollution in SW line, manhole has been caged.
Torcross Road	HA4 0TG	TQ1128686573	Yeading Brook West	8	No sign of pollution in SW line, manhole has been caged.
Appledore Avenue	HA4 0UT	TQ1091686332	Yeading Brook West	8	No sign of pollution in SW line, manhole has been caged.
Cedar Avenue (near Bourne Primary School)	HA4 6UJ	TQ11371 84872	Yeading Brook East	6	No pollution found at the outfall, just debris
Northumberland Road	HA2 7RE	TQ1334788696	Yeading Brook West	6	No pollution

Outfall Safari - Overview

Awaiting rectification:

Project Name & Location	Post Code	TQ Reference	Watercourse	Outfall Score	Comments/Updates
Hayes Road	UB2 5XJ	TQ1043778650	Crane	8	3 misconnection found and 1 food compressor leaking and not bunded causing pollution into the service water line.
North Hyde Gardens	UB3 4QR	TQ1043678948	Crane	6	1 misconnection found (overpump system from foul to surface).
Brook Drive	HA1 4RS	TQ14639 89380	Yeading Brook West	16	1 misconnection and 1 network defect found.
Bedford Road	HA4 6LT	TQ1017885848 TQ1018285853	Yeading Brook West	8	3 misconnections found.
Under Kings Road bridge - Kings Road Bridge	HA2 9JG	TQ1273986328	Yeading Brook East	6	Under investigation.

Future Work

- 14 projects on River Crane, Yeading Brook and Roxbourne River on AMP6 Waiting List
- Emerging outfalls – prioritised accordingly
- Close collaboration with Citizen Crane in shaping AMP7 SWOP
- Sample analysis at TW labs
- Thanks for helping to shape an efficient SWOP

connect right
Stop pollution

Thames Water

Thank you

Citizen Science Leads to Compliance

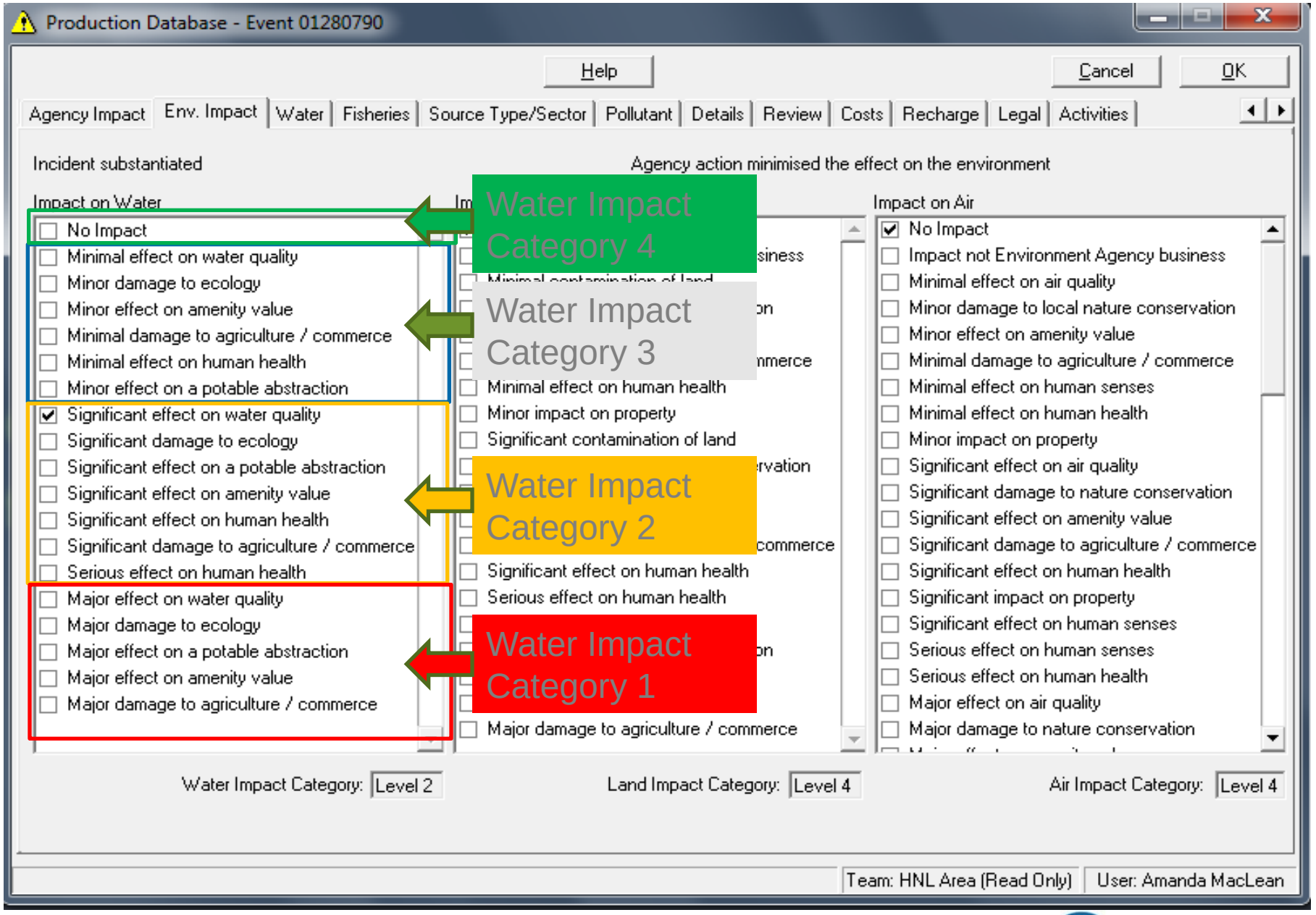
Name: Mathew Reed
Job title: WFD Technical Specialist & Regulatory Environment Officer
Date: 31 October 2017

Environment Agency

Polluted Outfall at M4 Motorway Junction 3 - Cranford Park

- Identified during Citizen Crane Outfall Safari
- Reported to the EA via the National Incident Reporting System (NIRS)
- Assessed as having a limited and localised impact around the point of discharge

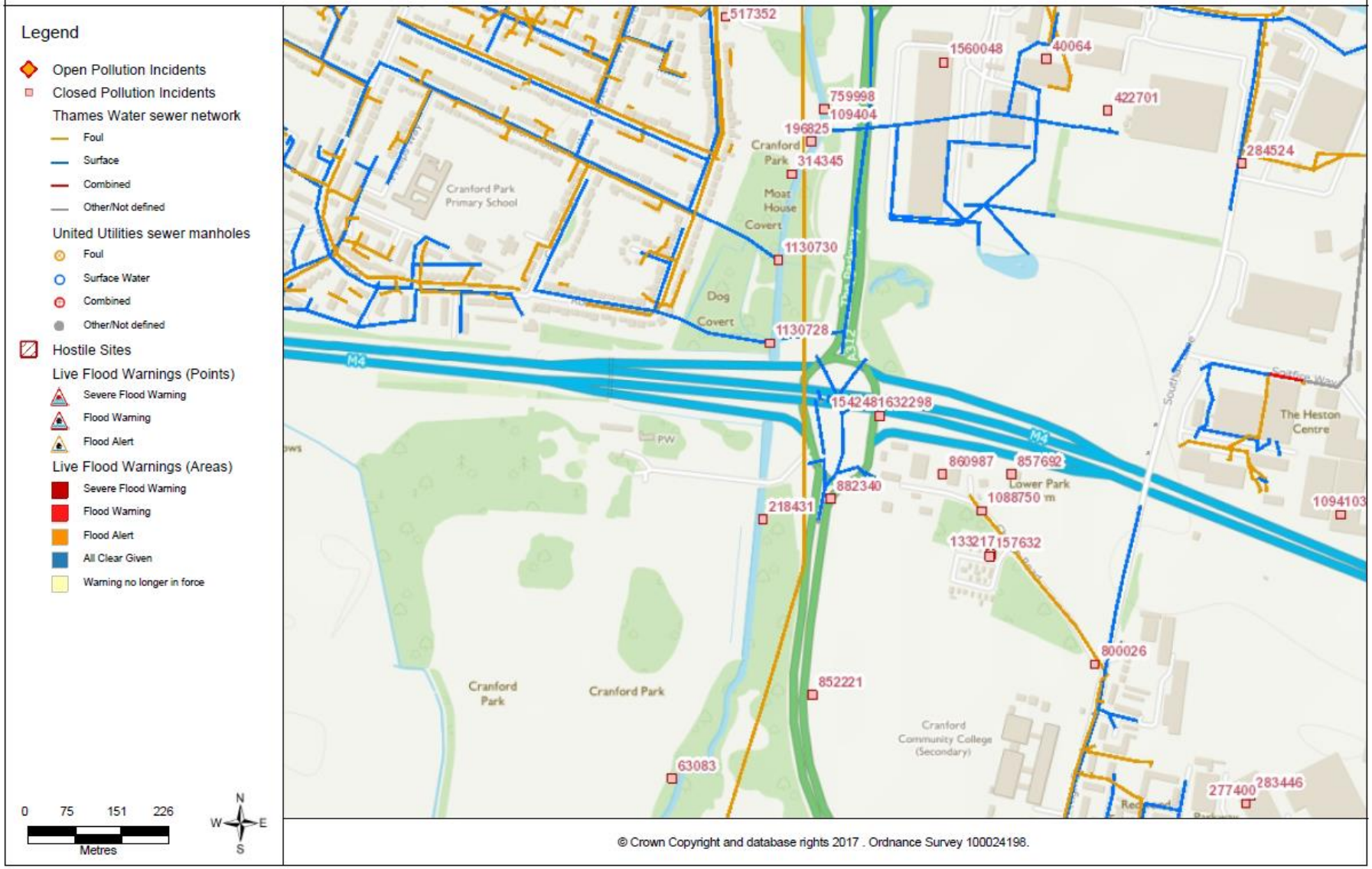
Environment Agency



Environment Agency

M4 Junction 3

Environment Agency



Environment Agency

Measurements

Reference: 731875 Point: PCRR9999

Taken: 03-Nov-2016 11:22 Material: 2CZZ

	All	Status	Determinand		Method	Result	Unit	Text	Acr	Permit	Political	Stats	User	IDV	Lab Comments	Excl stats
e		E	0061	pH	26	7.62	PHUNITS		N	U	U	U	U	U		N
e		E	0076	Temperature of	26	14	CEL		N	U	U	U	U	U		N
e		E	0077	Conductivity at 25	26	1374	uS/cm		N	U	U	U	U	U		N
e		E	0085	BOD : 5 Day ATU	21	<2.75	mg/l		Y	U	U	U	U	U	ELEVATED M	N
e		E	0111	Ammoniacal	21	6.35	mg/l		Y	U	U	U	U	U		N
e		E	0116	Nitrogen, Total	21	1.05	mg/l		Y	U	U	U	U	U		N
e		E	0119	Ammonia un-	25	0.0656	mg/l		U	U	U	U	U	U		N
e		E	0172	Chloride	21	104	mg/l		Y	U	U	U	U	U	SELECT REP	N
e		E	0180	Orthophosphate,	21	<0.01	mg/l		Y	U	U	U	U	U	SELECT REP	N
e		E	3401	ICP-MS : Metals	21	1	UNITLESS	t	N	U	U	U	U	U		N

Valid Status Determinand* Method* Result Unit Excl stats

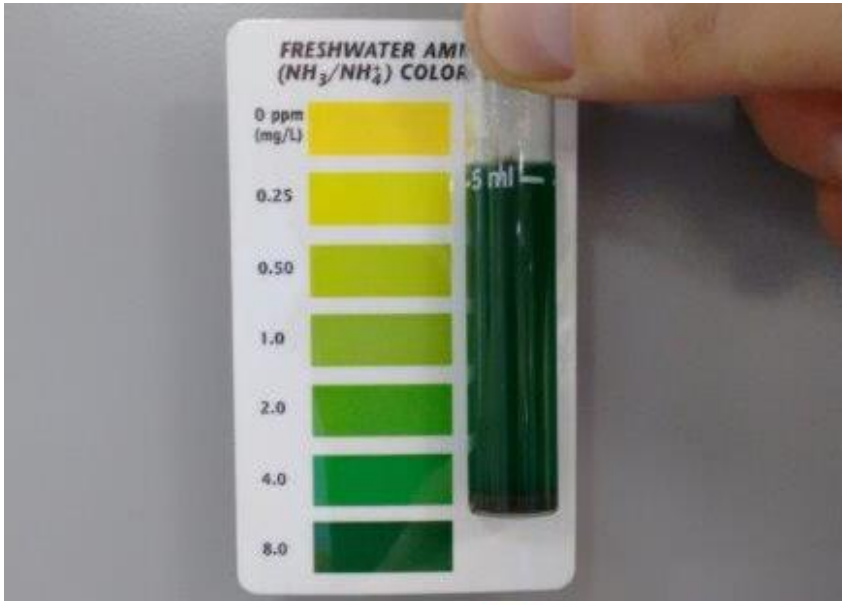
Text result Acr Permit Political Stats User IDV Lab Id Comment Analysis Timestamp

Reason for change:*

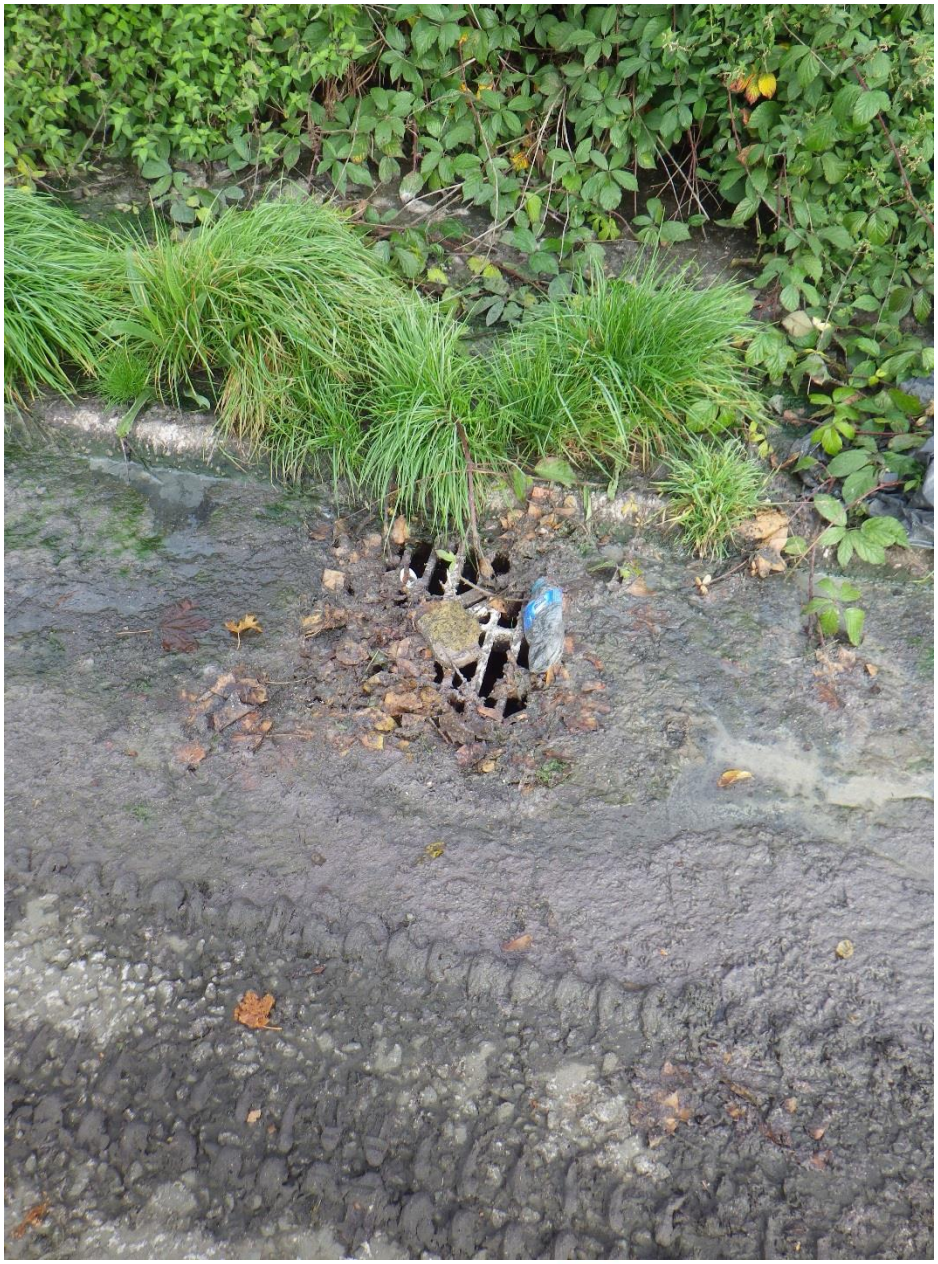
Exec qry | Edit qry | New qry

Comments | Pre-sampling | Top

Environment Agency



Environment Agency



Environment Agency


COSTA
COSTA

Project Name: M4/J3 Cranford Park

EDF Topic(s): Flooding and Water Quality, Biodiversity, Cultural Heritage

Partners: Highways England, Hillingdon and Hounslow

Aims

The EA are working with Highways England (HE) to improve water quality, water attenuation and baseline flow at Cranford Park. Biodiversity will also be enhanced in the area by creating new habitat, providing fish refuge and providing an important nursery area for juvenile fish, thus improving fish populations and the WFD status of the reach of the river. This aligns with the Environment Designated Fund sections of Flooding and Water Quality, Biodiversity and Cultural Heritage, which addresses pollution from highway runoff through measures to attenuate and improve water quality and improving the biodiversity as well as the character and quality of the built and natural landscape.

Environment Agency

REGULATIONS AND ENFORCEMENT

- **THE HAZARDOUS WASTE (ENGLAND AND WALES) REGULATIONS 2005**
- **CONTROL OF POLLUTION (OIL STORAGE) (ENGLAND) REGULATIONS 2001 (OSR)**
- **ENVIRONMENTAL PROTECTION ACT 1990**
- **ENVIRONMENTAL PROTECTION (DUTY OF CARE) REGULATIONS 1991**
- **ENVIRONMENTAL PERMITTING (ENGLAND AND WALES) REGULATIONS 2016**

ACTION: Please provide evidence that waste oil storage areas have been modified to comply with the Control of Pollution (Oil Storage) (England) Regulations 2001.

DEADLINE: 24 June 2016

PLEASE BE AWARE, FAILURE TO ADHERE TO THIS DEADLINE MAY RESULT IN ENFORCEMENT ACTION.

Environment Agency

Public Interest Factors

- Intent
- Foreseeability
- Environmental Effect
- Financial Gain
- Previous History
- Attitude of Offender
- Personal Circumstances

Environment Agency

National Incident Hotline

Freephone from landline or mobile:

0800 80 70 60

- Where is it?
- Is the water discoloured?
- Is there an odour?
- How big is the area affected?
- Have you seen any dead or distressed fish or other wildlife?

- What is the cause of the problem/where is the pollution entering the stream?
- Has this ever happened before?
- Do you have any pictures?
- Your contact details

Environment Agency

Environment Agency

November 2016

Yeading Brook & Roxbourne Stream River Improvements

Harrow COUNCIL
LONDON

Roxbourne Stream River

Newton Park West

Fig. 1 Naturalised Playing Landforms

Fig. 2 Formal Combined Path

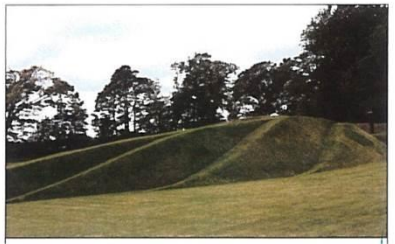


Fig. 3 Amenity Landforms

Fig. 8 Amenity Seating Bund

Fig. 4 Viewing Platform

Fig 7. Entrance Obelisks

Fig 6. Raised Informal Mown Path

Fig. 5 Naturalised Landforms

Design Legend

- Amenity Landform
- Naturalise Landform
- Naturalise Playing Landform
- Wetland Cell
- Formal Combined Path
- Informal Mown Path

Design Information

Wetland Cell 1:	766m²
Wetland Cell 2:	503m²
Wetland Cell 3:	539m²
Wetland Cell 4:	689m²
Total Area:	~2500m²

Ebsford Environmental

Client

Harrow Council, London

Harrow COUNCIL LONDON

Project

Newton Park River Restoration

Drawing Title

Concept Plan

Scale	Size	Revison
NTS	A1	001
Drawn	Approved	Date
JLF	NH	19/07/17

Client

Harrow COUNCIL LONDON

Project

Newton Park River Restoration

Drawing Title

Path Locations

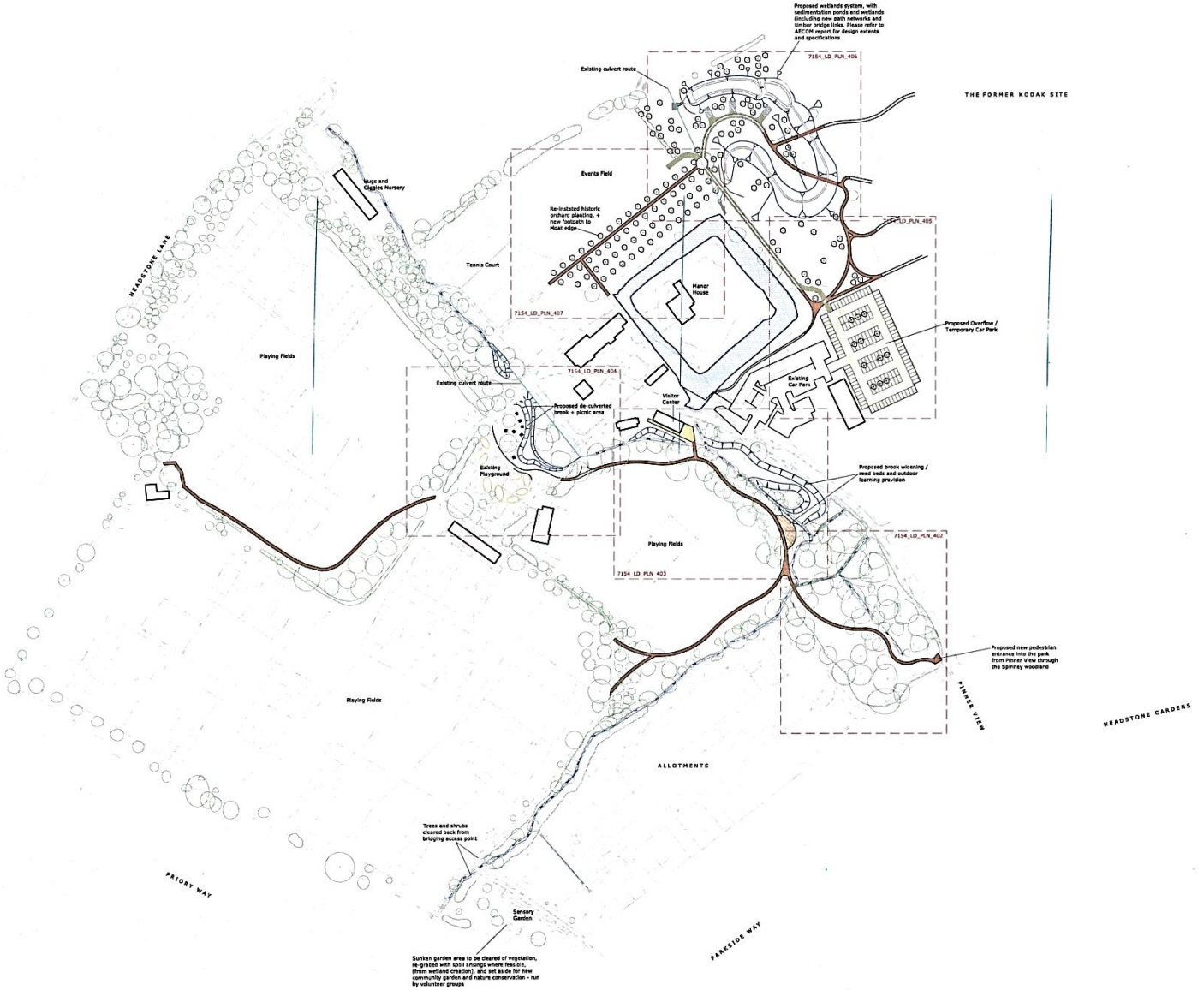
Reference Number

Scale	Drawing Size:	Revision
NTS	A3	
Drawn	Approved	Date
EJH	TBA	28/09/17


KOBELCO

Yeading Brook

Headstone Manor Park



Notes:

1. Do not scale from this drawing.
2. All dimensions must be checked on site and any discrepancies verified with landscape architect.
3. All dimensions are drawn in mm.
4. Landscape drawing only.
5. All materials/items used to be as specified or alternatives to be approved by landscape architect.

KEY:

- Detail Plans - Sheet Layouts (see drgs: 7154_LD_PLN_401-407)
- Existing Building
- Existing Tree/Hedge/Shrub Retained
- Proposed Tree Planting (size varies: see detail plans for information)
- Proposed Native Shrub/Hedge Planting (exact extents: see detail plans for information)
- Proposed New Foot Paths + Trails (size + type varies: see hardworks + detail plans for information)
- Proposed Terrace Paving (exact extents: see detail plans for information)
- Proposed Outdoor Learning Space (exact extents: see detail plans for information)
- Proposed Vehicle Access Track (extents varies: see hardworks layout plan for information)
- Proposed Overflow Car Park (exact extents: see hardworks + detail plans for information)
- Proposed Picnic Area (exact extents: see hardworks + detail plans for information)
- Proposed New Natural Play Elements (exact extents: see detail layout plans for information)
- Proposed Wetland System / De-Culverting + Reed Beds (exact extents + type: see detail plans for information)

Sheet Notes:

Please read plan in conjunction with the below:

Tree Constraints Plan (incl. Arb. tree works + removals):
Please refer to drawings 1057_00 - 0.11-S + Survey Report (by SJ Stephens), for site wide tree recommendations regarding tree removals and tree works to be carried out.

Tree Works (for design purposes) + Site Clearance:
Please refer to drawings 7154_LD_PLN_ 201-202

Proposed Hardworks Layout Plan:
Please refer to drawing 7154_LD_PLN 301

Existing Hardworks Remediation Plan + Access Audit:
Please refer to drawing 7154_LD_PLN 302 + Access Audit Report

Detail Area Plans:
Please refer to drawings 7154_LD_PLN 401-407

Site Wide Sections:
Please refer to drawings 7154_LD_PLN 501-503

For all other reports, please refer to the project drawing issue sheet for reference.

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N

#	dd.mm.yy	First issue	-	-	-
rev	Date	Issue notes	by	ch	ap

LUC
43 Chalton Street
London, NW1 1JD
T: 020 7383 5784
F: 020 7383 4798
london@landuse.co.uk
www.landuse.co.uk

Project
Headstone Manor Recreation Ground

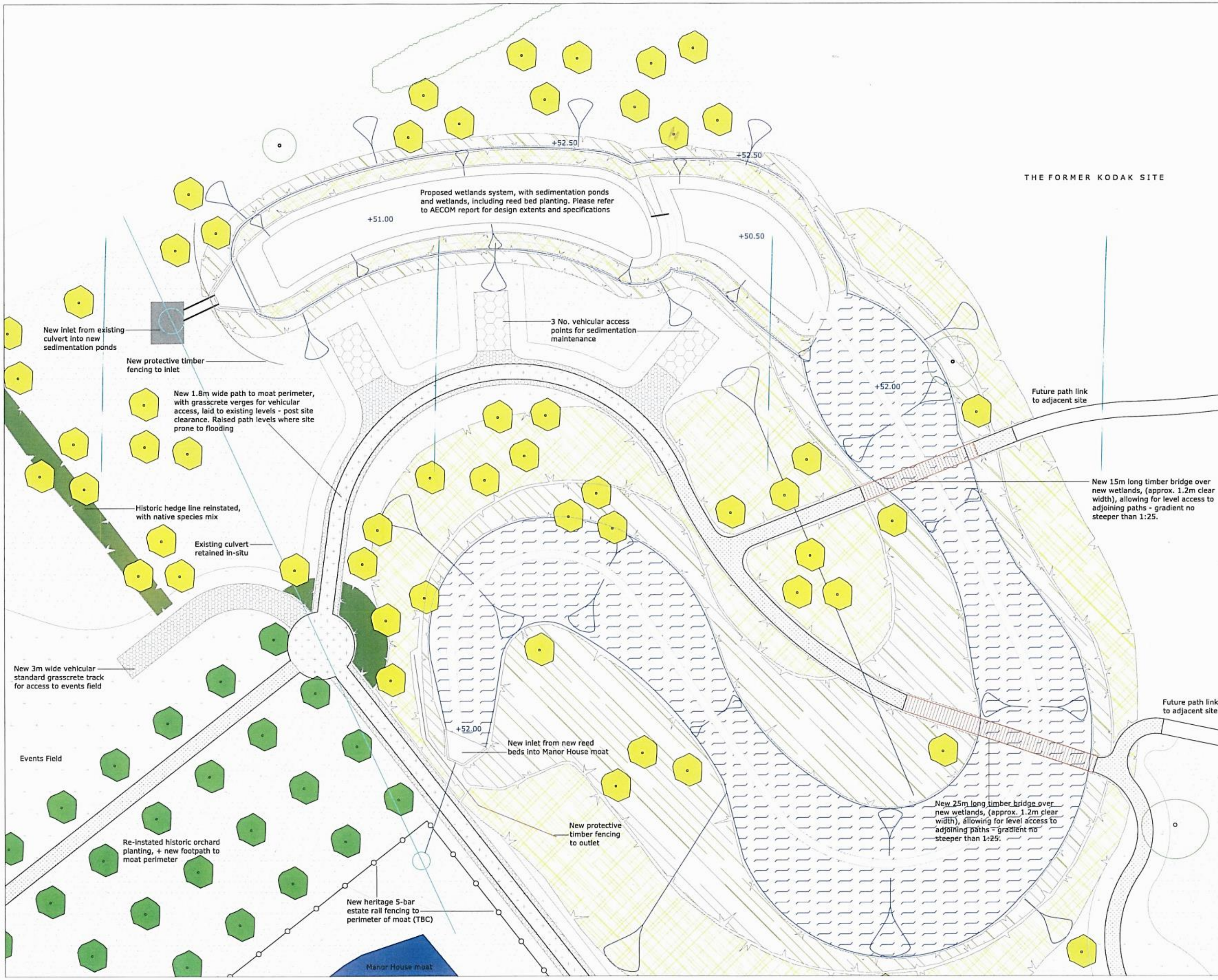
LOTTERY FUNDED

Client
London Borough of Harrow

Title
Landscape Masterplan

Scale	Status
1:1250 @ A1	DRAFT

Job No.	Drawing No.	Issue
7154	71540LD-PLN-101	-



Notes:

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3. All dimensions are drawn in mm.
4. Landscape drawing only.
5. All materials/items used to be as specified or alternatives to be approved by landscape architect.

KEY:

- Site boundary
- Existing building
- Proposed levels - wetlands (+51.00) (indicative levels for new wetland system, as per AECOM design + specification)
- Existing tree planting (retained shrub + ornamental planting, with localised cutting-back works, as required)
- Proposed tree planting - orchard (re-instated orchard planting - mixed fruit species. Feathered whip planting. See PLN_304)
- Proposed tree planting - wetlands (wetland tree planting - Willow + Alder species. Feathered whip planting. See PLN_304)
- Proposed shrub/hedge planting (reinstated hedge boundary + park wide shrub planting improvements. Feathered whip planting. See PLN_304)
- Existing grass (existing amenity/sports grass areas to be managed as per the Maintenance Management Plan - MMP)
- Parkland grass (existing grass areas to be managed as long parkland grass as per the MMP)
- Proposed reed beds - wetlands (planting to wetland system + sedimentation ponds - above 30 year storm level. Plug planting. See PLN_304)
- Proposed reed beds - wetlands (planting to wetland system + sedimentation ponds - up to 30 year storm level. Plug planting. See PLN_304)
- Proposed reed beds - wetlands (planting to wetland system + sedimentation ponds - at water level. Plug planting. See PLN_304)
- Existing water channels - moat (existing sections of the Yeading Brook)
- Proposed water channels - wetlands (new sections of widening + brook de-culverting along the Yeading Brook. Graded banks 1:3. See PLNs_304)
- Existing culvert line - retained (existing underground culvert lines to be retained for high water overflow + flood attenuation)
- Proposed culvert connections - brook (new underground culvert pipes to connect water channels into existing sections culvert. See PLNs_304)
- Proposed footpath - park wide (new 1.8m wide self-binding gravel footpath with timber edging - i.e. Coxwell gravel or similar. See PLN_301)
- Proposed footpath - vehicular (width varies, self-binding gravel footpath to vehicular standard with timber edging. See PLN_301)
- Proposed vehicular road - wetlands (new 3.0m, or as shown, vehicular road - grass-crete surfacing with timber edging. See PLN_301)
- Proposed foot bridge - park wide (new timber footbridge, with balustrades - varying lengths, assume 1.2m clear width. See PLN_301)
- Proposed Estate railing-1.3m - moat (proposed 5-bar metal decorative estate rail - black, with weld mesh to lower half + 3 No. access gates)
- Proposed protective fence - wetland (proposed Jackson's standard timber post + rail fence - nailed - or similar approved to culverts + steep banks)

Sheet Notes:

Please read plan in conjunction with the below:

Tree Constraints Plan (incl. Arb. tree works + removals):
Please refer to drawings 1057_00 - 0.11-5 + Survey Report (by SJ Stephens), for site wide tree recommendations regarding tree removals and tree works to be carried out.

Tree Works (for design purposes) + Site Clearance:
Please refer to drawings 7154_LD_PLN_ 201-202

Propsed Hardworks Layout Plan:
Please refer to drawing 7154_LD_PLN 301

Existing Hardworks Remediation Plan + Access Audit:
Please refer to drawing 7154_LD_PLN 302 + Access Audit Report

Detail Area Plans:
Please refer to drawings 7154_LD_PLN 401-407

Site Wide Sections:
Please refer to drawings 7154_LD_PLN 501-503

For all other reports, please refer to the project drawing issue sheet for reference.

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LUC
43 Chalton Street
London, NW1 1JD
T: 020 7383 5784
F: 020 7383 4798
london@landuse.co.uk
www.landuse.co.uk

Project: Headstone Manor Recreation Ground

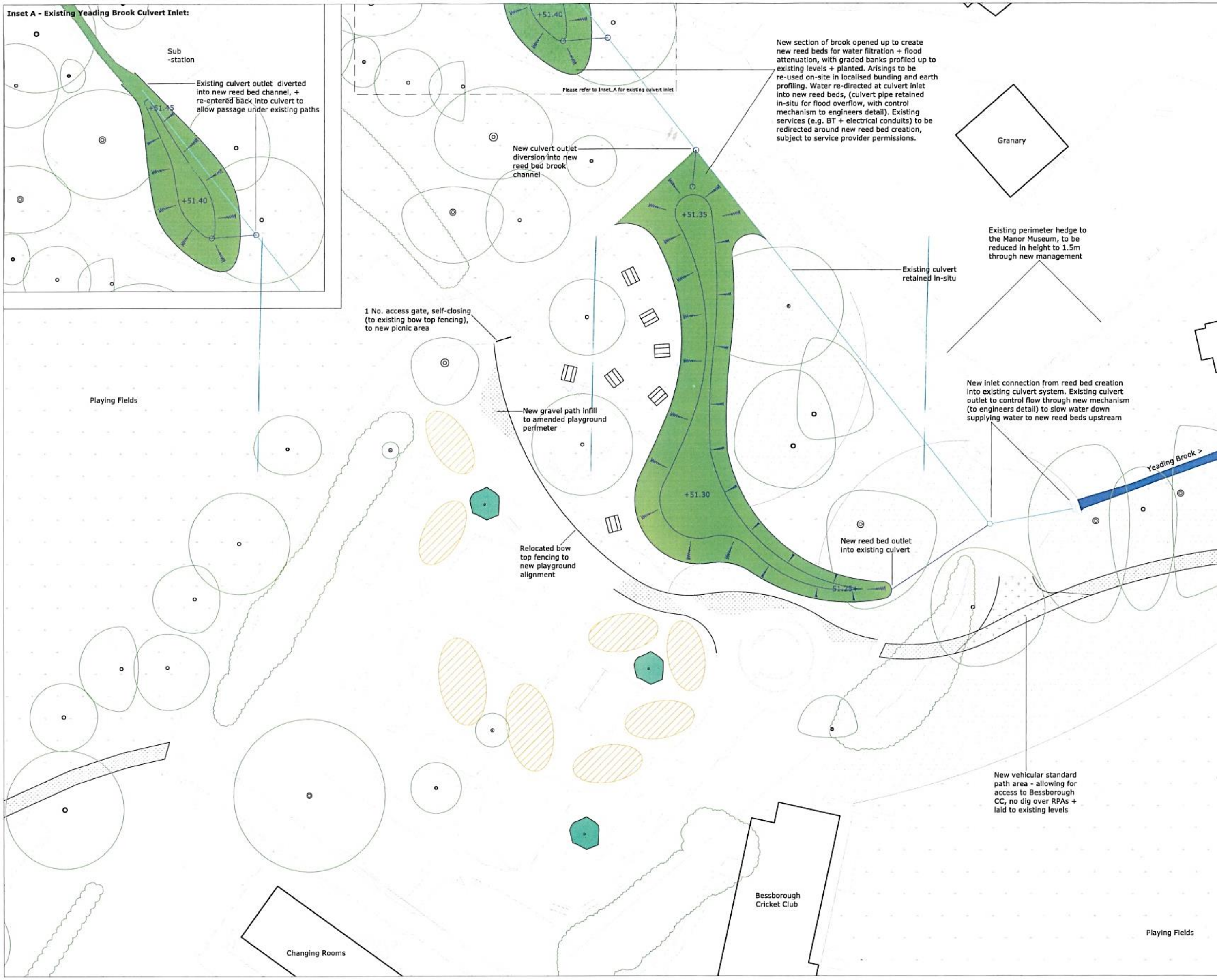
LOTTERY FUNDED

Client: London Borough of Harrow

Title: Detail Area: New Wetlands + Moat Landscape

Scale	Status
1:200 @ A1	DRAFT

Job No.	Drawing No.	Issue
7154	71540LD-PLN-406	-



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5. All materials/items used to be as specified or alternatives to be approved by landscape architect.

KEY:

- Site boundary
- Existing building
- Existing tree planting (retained shrub + ornamental planting, with localised cutting-back works, as required)
- Proposed tree planting - park wide (new tree planting to overflow car park + park wide - species vary. Standard size planting. See PLN_304)
- Proposed shrub/hedge planting (reinstated hedge boundary + park wide shrub planting improvements. Feathered whip planting. See PLN_304)
- Existing grass (existing amenity/sports grass areas to be managed as per the Maintenance Management Plan - MMP)
- Parkland grass (existing grass areas to be managed as long parkland grass as per the MMP)
- Proposed reed bed planting - brook (planting along Yeading Brook - existing footprint + newly created sections. Plug planting. See PLN_304)
- Existing water channels - brook (existing sections of the Yeading Brook)
- Proposed water channels - brook (new sections of widening + brook de-culverting along the Yeading Brook. Graded banks 1:3. See PLNs_304)
- Existing culvert line - retained (existing underground culvert lines to be retained for high water overflow + flood attenuation)
- Proposed culvert connections - brook (new underground culvert pipes to connect water channels into existing sections culvert. See PLNs_304)
- Proposed footpath - park wide (new 1.8m wide self-binding gravel footpath with timber edging - i.e. Coxwell gravel or similar. See PLN_301)
- Proposed footpath - vehicular (width varies, self-binding gravel footpath to vehicular standard with timber edging. See PLN_301)
- Proposed foot bridge - park wide (new timber footbridge, with balustrades - varying lengths, assume 1.2m clear width. See PLN_301)
- Existing play bow top - relocated (existing railing length to carefully removed and relocated to new play boundary. See PLNs_202)
- Proposed Picnic Area (new amenity grass area with 7 No. timber picnic tables - Woodscape or similar, + 1 No. litter bin - Woodscape)
- Proposed Natural Play Elements (new features including grass mounding, timber logs, 2 No. new play pieces + relocated play. See PLN_404)

Sheet Notes:

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Project
Headstone Manor Recreation Ground

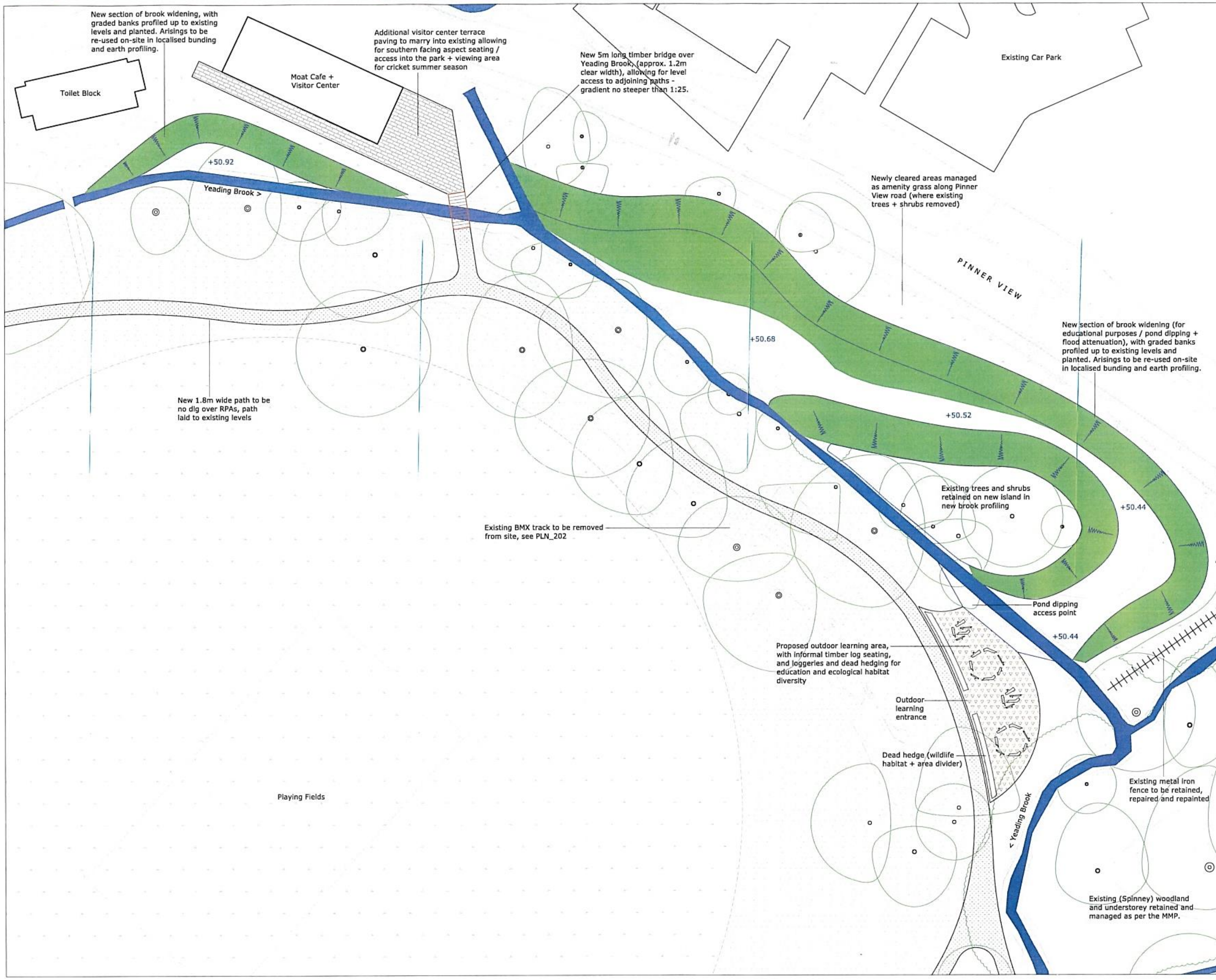
LOTTERY FUNDED

Client
London Borough of Harrow

Title
Detail Area:
De-Culverted Brook + Picnic / Play Area

Scale	Status
1:200 @ A1	DRAFT

Job No.	Drawing No.	Issue
7154	71540LD-PLN-404	-



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KEY:

- Site boundary
- Existing building
- +50.68 Proposed levels - water (indicative bed levels for sections of brook widening + de-culverting along the Yeading Brook)
- Existing tree planting (retained shrub + ornamental planting, with localised cutting back works, as required)
- Existing grass (existing amenity/sports grass areas to be managed as per the Maintenance Management Plan - MMP)
- Parkland grass (existing grass areas to be managed as long parkland grass as per the MMP)
- Proposed reed bed planting - brook (planting along Yeading Brook - existing footprint + newly created sections. Plug planting. See PLN_304)
- Existing water channels - brook (existing sections of the Yeading Brook)
- Proposed water channels - brook (new sections of widening + brook de-culverting along the Yeading Brook. Graded banks 1:3. See PLNs_304)
- Proposed footpath - park wide (new 1.8m wide self-binding gravel footpath with timber edging - i.e. Coxwell gravel or similar. See PLN_301)
- Proposed foot bridge - park wide (new timber footbridge, with balustrades - varying lengths, assume 1.2m clear width. See PLN_301)
- Proposed bark chip - outdoor learning (new learning area, bark chip clearing with timber edging, and informal timber log seating. See PLN_301)
- Proposed logs - outdoor learning (new informal timber log seating, loggeries + dead hedges for education + wildlife . See PLN_402)
- Existing iron railings -1.5m (Existing railings to be locally repaired, sanded, prepared + painted, RAL colour TBC. See PLNs_401-2)
- Proposed terrace paving - Moat Cafe (new stone block paving and kerb edging to match existing visitor center paving apron. See PLN_301)

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Project
Headstone Manor Recreation Ground

LOTTERY FUNDED

Client
London Borough of Harrow

Title
Detail Area:
Outdoor Learning + Brook Widening

Scale	Status	
1:200 @ A1	DRAFT	
Job No.	**Drawing No.**	**Issue**
7154	71540LD-PLN-403	-

Thames Water's Smarter Catchments Proposal

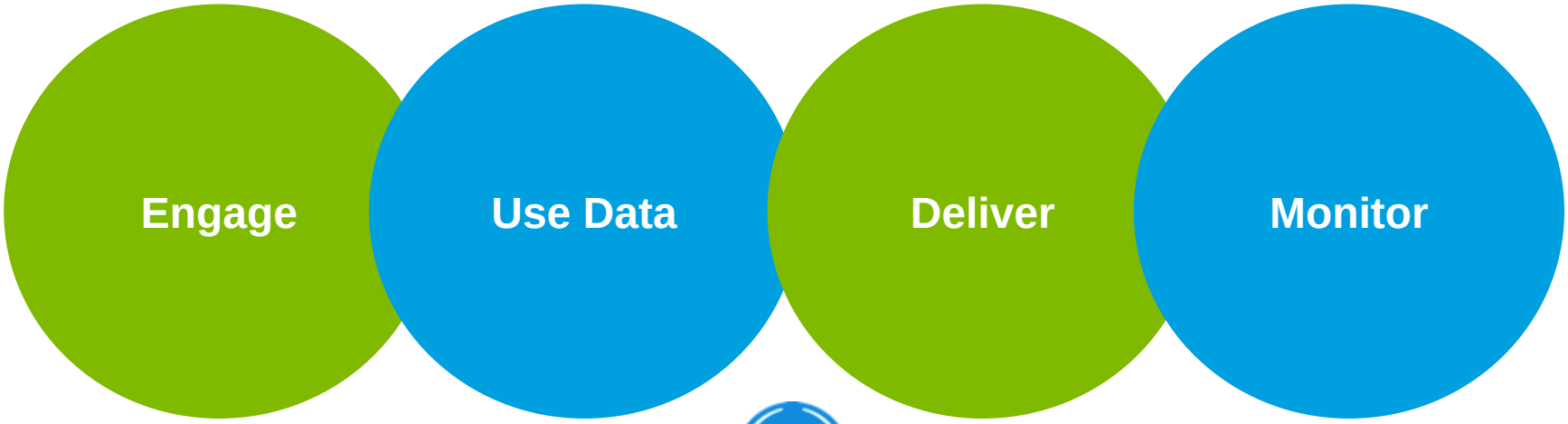
Yvette de Garis
Head of Environmental Regulation

Catchment based approach.

Local partnerships and delivery.

- **Collaborative working on a river catchment scale.**
- **Cost effective delivery.**
- **Improvements to the environment.**
- **Targeted and integrated catchment interventions.**

Catchment Based Approach
Partnerships for Action



Thames Water

Defra pioneer projects.

- **4 pioneer projects designed to support the Government's 25 Year Environment Plan**
- **Landscape, urban, catchment and marine pioneer areas**
- **Urban pilot in Greater Manchester**
- **Questionable read across to the London challenges?**

"Together there's lots of things we can do. Working with stakeholders across the city region to make sure people here have clean air to breath, quality green spaces to enjoy and also places where they can get out of their cars and onto their bikes".

Andy Burnham – Mayor of Greater Manchester

Our challenge.

Record growth

Extreme weather patterns

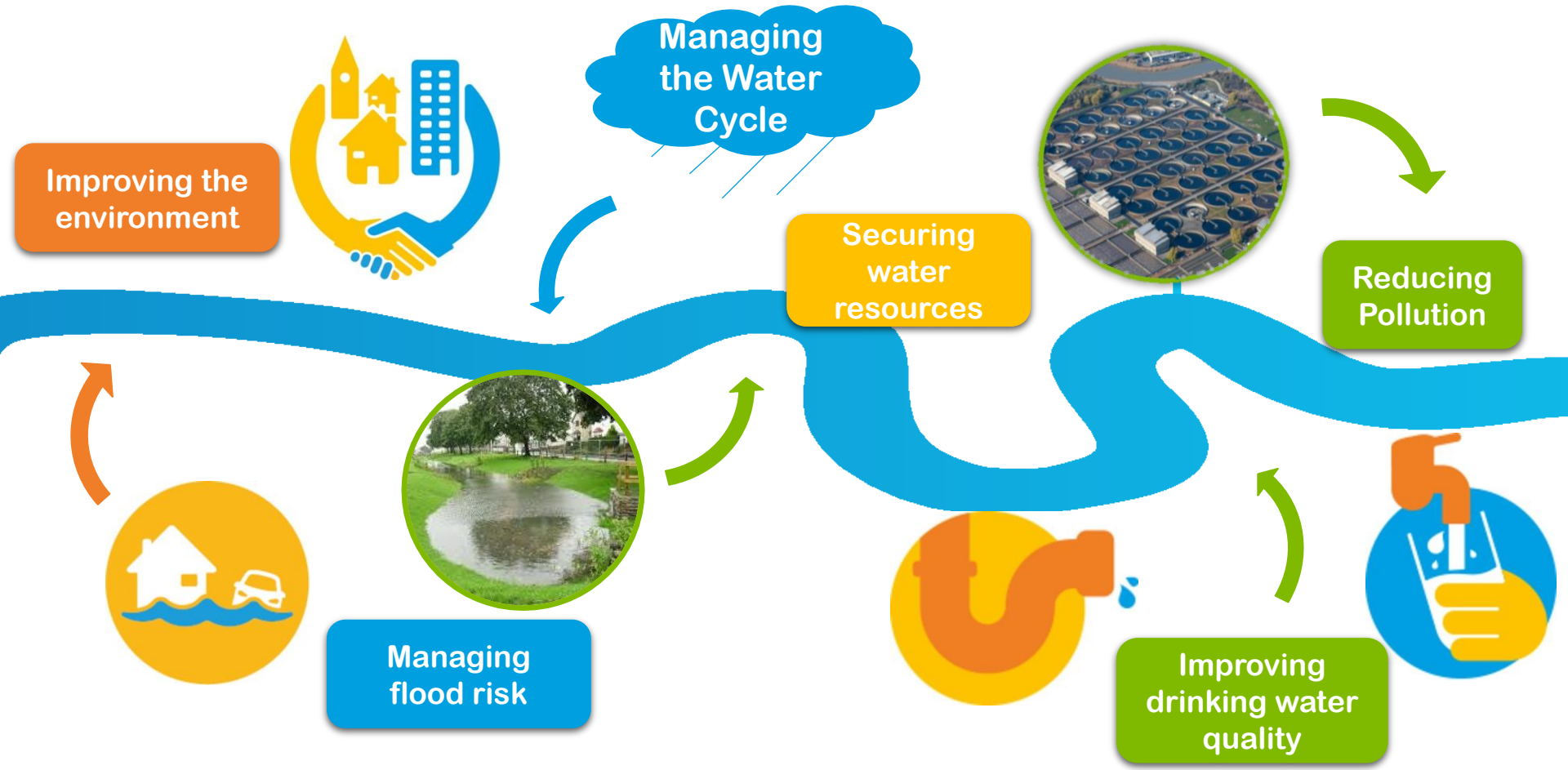
Increased expenditure in damages

Upgrades £100s millions

Tighter treatment standards

Increase in customer bills

‘Smarter’ Water Catchments.



What are the key elements of Smarter Catchments?

Managing land and surface / ground water as a system……

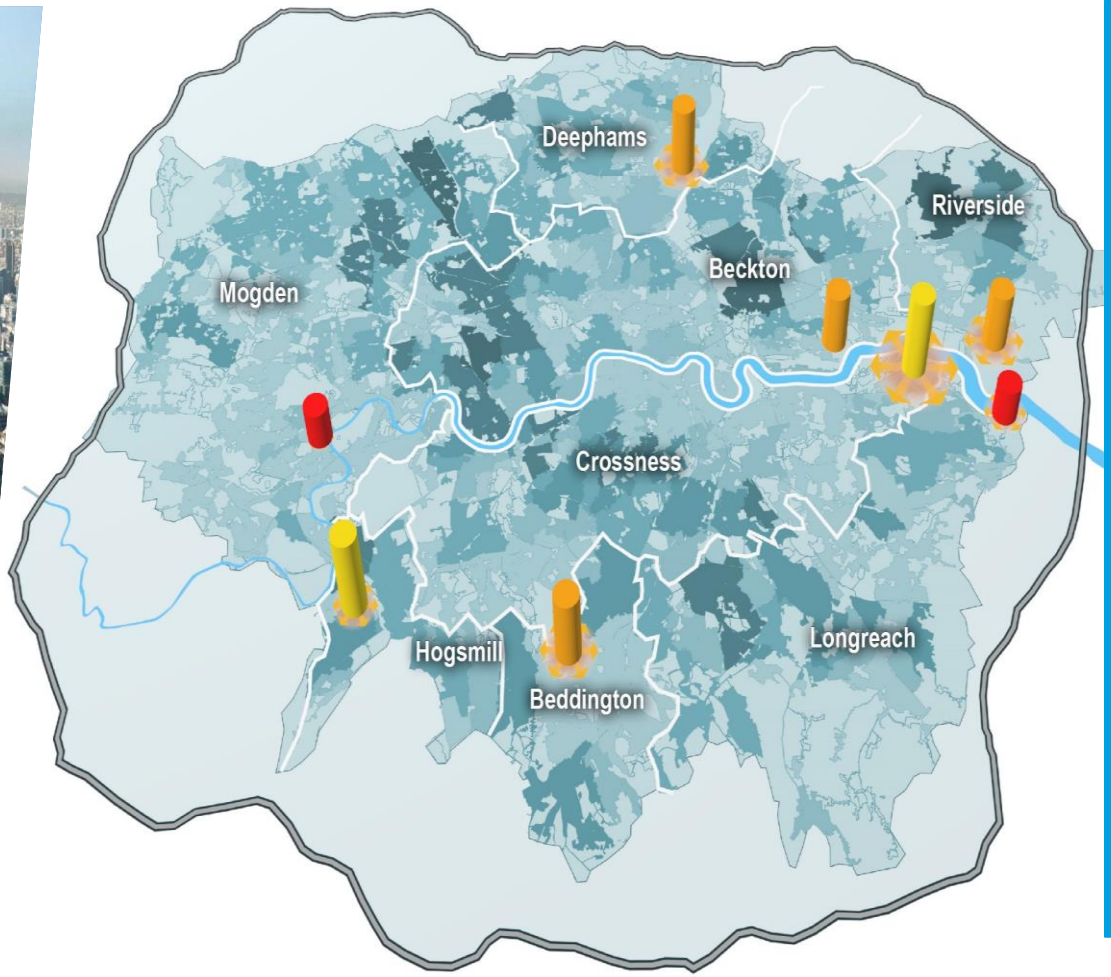
Catchment based

Multi-stakeholder approach

Engaging our customers

Delivering wider societal benefits

The London challenge.



London is growing. FAST.

From 8.6 million people today, we expect that by 2036 our five largest catchments will need to transport and treat the waste of 10.8 million people.

By 2100 that number is forecast to grow to 15 million.

We have to serve these customers and deal with issues such as climate change, ageing infrastructure, new regulations, changing markets.

Mogden sewage treatment works - 1945

Mogden sewage treatment works - 1999

Mogden STW 2017

West London catchment management pilot.

Understand the issues.

- Flooding
- Pollution
- Population growth
- Invasive species
- Modified channels
- Water resources

Meet with key external stakeholders.

Thames Rivers Trust
Restoring the Thames and its tributaries for people and wildlife

ZSL
LET'S WORK FOR WILDLIFE

Environment Agency

Berkshire Buckinghamshire Oxfordshire

The Wildlife Trusts

LOCAL COMMUNITY

Thames Water

London Borough of Hounslow

What might solutions look like?

Option	Notes
Local catchment partnership	• Discussing with LCP how we could work together
Catchment modelling	• Sophisticated map and model key for wider work • Repository for citizen science data; potential as engagement tool
Misconnections; outfall restoration; foul network issues	• Surface water in combined networks significantly increasing flow to works • Estimated 25% SWOs polluted • Opportunities for new foul network and recommissioning of old SWOs
SuDS	• Significant element of AMP7 plan
Domestic drainage schemes	• E.g. water butts; attenuators; planters • SuDS in schools
Citizen science	• Seek to extend successful existing programme • Training and quality assurance key
Education and engagement	• Programme targeting 60 schools within catchment

Our proposed pilots.

Urban catchment management - Crane

Education, engagement and behaviour change

Water resources and flood management

Rural catchment management - Evenlode

Rural catchment management - Chess

Developing environmental resilience

Progress to date.

Establish pilots within current business period ready to start delivering projects and work on the ground in AMP7.

Identified key partners for each pilot and held initial discussions to gauge support.

All potential partners are supportive but different which will demand adaptive ways of work and governance arrangements – one size does not fit all!

Crane catchment
How can we work with you to integrate our Smarter catchments proposal into your vision for the catchment?

Thank you

Riverfly Plus

Steve Brooks

The Riverfly Partnership

RiverflyPlus
What is it and why do it?

- Optional add-ons to the basic ARMI monitoring

- Limitations of ARMI

– few taxa not always best-suited for some rivers

- Record other important parameters affecting river quality

- Learn new skills

- Get to know more about your river

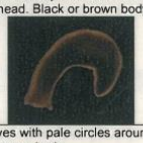
Extended riverfly monitoring

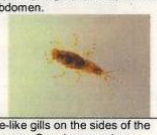
Detects effects of low flow, siltation, nutrients, impacts on urban rivers

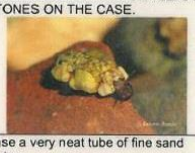
www.lincolnshirechalkstreams.org chalkstreams@lincolnshire.gov.uk

-ve score

26 target groups

Flatworms (Turbellaria)	
Planariidae (*Polycelis* sp.) Up to 15 mm.	Multiple black eyes all around the front of the head. Black or brown body. 
Dugesiidae Up to 25 mm.	Two eyes with pale circles around them, brown body. 
Dendrocoelidae Up to 30 mm.	Bright, white body. Two small black eyes on the front edge of the head. 
Segmented worms (Leeches & true worms)	
Erpobdellidae (leech) Usually 30 to 40 mm, but can reach 100 mm.	Sucker at either end. 8 eyes in 2 chevrons, dark brown body. 
Glossiphoniidae (leech) Usually 15 – 20 mm, but can reach 25 mm.	Suckers, 2, 6 or 8 eyes in parallel lines, normally pale brown body. 
Oligochaeta (true worm) Range from 1.5 mm up to 50 mm +. Usually around 10mm.	Looks like an earthworm. Can be tiny. 
Molluscs	
Planorbidae (ramshorn snails) Range from 3 mm to 30 mm in breadth.	Curled-up like a ram's horn. 
Lymnaeidae (pond snails) Usually 15 – 20 mm in height, but can reach 60 mm.	Aperture on the right (dextral). 
Hydrobiidae/Bithyniidae ('trapdoor' snails) Range from 5 mm (Hydrobiidae) to 15 mm (Bithyniidae) in height.	Hard, bony plate which seals up the shell. 
Sphaeriidae (orb & pea mussels) Range from < 2 mm up to 22 mm, but commonest species is typically around 10 mm in width.	Small to tiny bivalves. Usually shades of pale brown. 

CRUSTACEANS	
Gammaridae/Crangonyctidae (freshwater shrimps) Up to 20 mm.	Look like shrimps! 
Asellidae (water hog lice) Up to 15 mm. -ve	Aquatic woodlice. 
INSECTS	
Mayflies (Ephemeroptera)	
Ephemeridae (Green Drake/Drake Mackerel Mayfly) Up to 30 mm.	Large, pale brown nymphs with triangles on the abdomen and feathery gills. 
Ephemerellidae (Blue-winged olive) Up to 12 mm.	Stripy body, legs & tails. Spines on top of abdomen. 
Baetidae Up to 15 mm.	Plate-like gills on the sides of the abdomen. Grey-brown colour. 
Caenidae (Anglers' Curse) Up to 9 mm. -ve	Small, robust nymphs, with TWO FLAT PLATES COVERING THE GILLS AT THE BASE OF THE ABDOMEN. 
Stoneflies (Plecoptera) **WHOLE ORDER** Range from 5 mm to 16 mm.	Two spiny tails. Heads like earwigs. 
True bugs (Heteroptera)	
Corixidae (lesser water boatman) Range from 2 mm to 14 mm. Typically around 7 mm. -ve	'Paddles', brownish body with yellow stripes. SWIM THE RIGHT WAY UP. 
Notonectidae (greater water boatman) Typically around 15 mm. -ve	'Paddles', orange & black body, big eyes, SWIM UPSIDE DOWN. 

Lacewings (Megaloptera)	
Sialidae (alder flies) Typically around 15 to 20 mm. -ve	Spiny gills down the side of the abdomen and a single spine for a tail. Gnashy jaws. 
Caddisflies (Trichoptera): caseless	
Hydropsychidae Range from around 10 mm to 20 mm.	Greyish body WITH WHITISH GILLS UNDER ABDOMEN. 
Rhyacophilidae Typically 20 to 25 mm.	Green body WITH RED GILLS DOWN THE SIDES OF THE ABDOMEN AND THORAX. 
Caddisflies (Trichoptera): cased	
Goeridae Up to around 10 mm.	Smallish larvae WITH BIG BALLAST STONES ON THE CASE. 
Sericostomatidae Typically 15 to 20 mm.	Case a very neat tube of fine sand grains. 
Molannidae Up to 30 mm. -ve	Case kite-shaped, with flanges around the tube. 
True/two-winged flies (Diptera)	
Simuliidae (Blackflies) Up to 8 mm.	Shaped like a dumb-bell, with feathery mouthparts. 

RIIM

River Invertebrate Identification & Monitoring

Species bench mark for your river
Species-level identification
Bespoke species identification manual based on EA list for your river

RIIM courses are being run at:
The John Spedan Lewis Trust's Field Centre at
Leckford Hampshire
Contact:
Warren Gilchrist - gilchrist@our-home.me.uk

Caddisflies	Spring	Autumn
Silo nigricornis	15	0
Goera pilosa	4	4
Agapetus fuscipes	13	2
Lepidostoma hirtum	402	0
Potamophylax	1	0
Drusus annulatus	7	2
Chaetopteryx villosa	11	0
Anabolia nervosa	1	1
Halesus radiatus	0	1
Molanna angustata	0	1
Sericostoma personatum	97	24
Athripsodes	14	0
Mystacides	0	25
Hydroptila	7	3
Hydropsyche pellucidula	9	49
Hydropsyche siltalai	10	0
Rhyacophila dorsalis	4	0
Polycentropus flavomaculatus	0	4

Damsels	Spring	Autumn
Calopteryx splendens	1	0

Beetles & Bugs	Spring	Autumn
Elmis aenea	207	260
Limnius volckmari	52	76
Dytiscidae	0	7
Gyrinus	3	0
Haliplidae	0	1
Corixa	1	0

Crustaceans	Spring	Autumn
Gammarus pulex	1328	590
Asellus aquaticus	14	5

Leeches	Spring	Autumn
Glossiphonia complanata	0	13

Mayflies	Spring	Autumn
Ephemera danica	77	67
Serratella ignita	7	181
Baetis	361	449
Baetis scambus	0	21
Heptagenia sulphurea	37	3
Caenis rivulorum	354	0
Caenis luctuosa	1	0
Paraleptophlebia submarginata	1	0

Stoneflies	Spring	Autumn
Leuctra hippopus	11	43
Leuctra geniculata	0	16

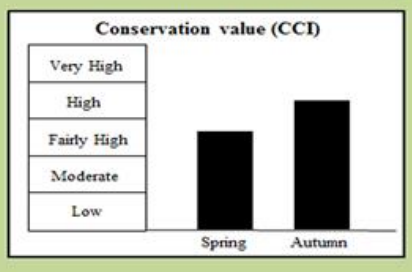
Molluscs	Spring	Autumn
Theodoxus fluviatilis	4	6
Bithynia tentaculata	14	2
Valvata piscinalis	0	2
Physa fontinalis	3	1
Potamopyrgus antipodarium	0	30
Lymnaea pereger	0	3
Planorbis	23	7
Pisidium	16	20
Ancylus fluviatilis	10	25

True Flies	Spring	Autumn
Chironomidae	41	371
Dicranota	1	1
Simulium ornatum	34	7
Tipula	1	0

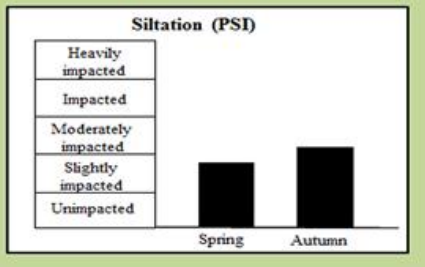
Alderfly	Spring	Autumn
Sialis lutaria	0	1

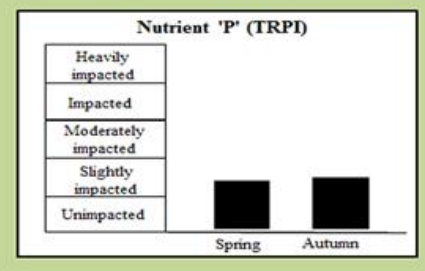
Worms	Spring	Autumn
Oligochaeta	25	0

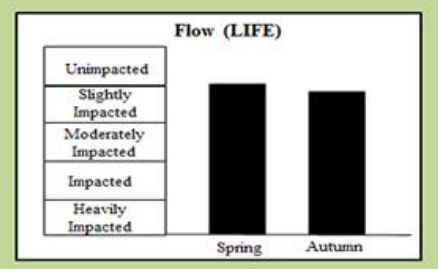
River Avon - Allenby Bridge
2015

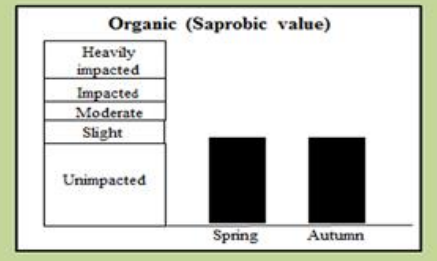


	Spring	Autumn
BMWP	196	195
WHPT	204	202
ASPT (WHPT)	6.4	6.1
Riverflies - EPT(s)	22	18
CCI	13.25	17.50
LIFE	8.11	7.72
PSI	64.63	56.58
TRPI	73.53	71.43
Saprobic	1.88	1.88







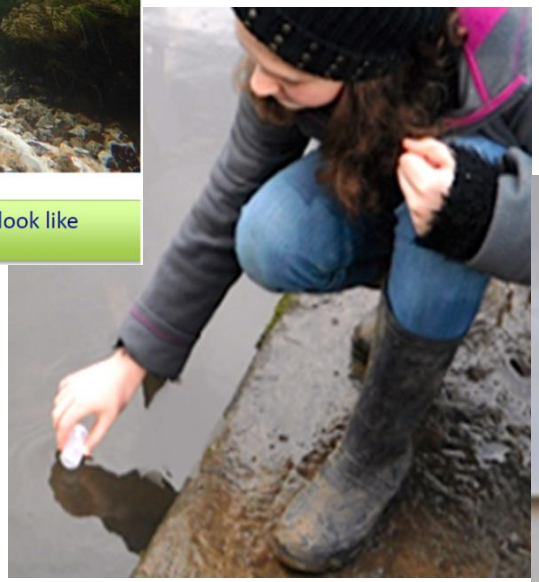


Invertebrate benchmark surveys and biometric analysis from Aquascience Consultancy Ltd

Water chemistry

Earthwatch, Freshwater Watch programme

Nitrates from vehicles and farm run-off and phosphates from domestic sources cause nutrient-enrichment of rivers with impacts on fisheries and invertebrates



https://freshwaterwatch.thewaterhub.org/

Hydromorphology

MorpH – modular river survey

Baseline data

Changes following river restoration

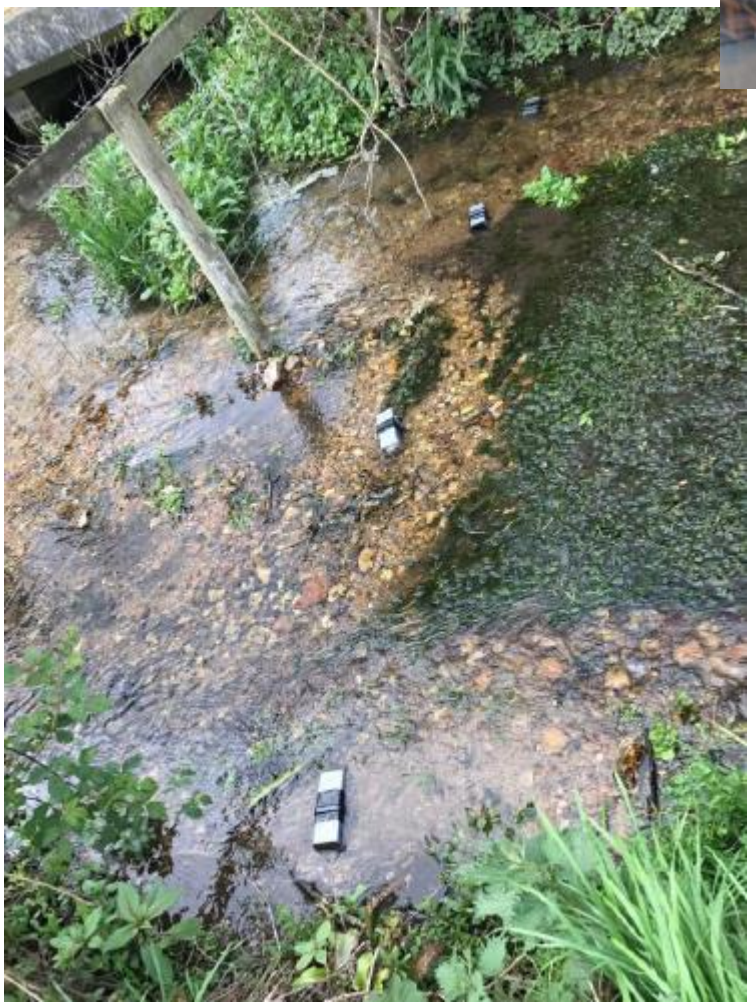
Comparisons with ARMI scores

http://www.modularriversurvey.org

Monitoring ecosystem functioning and river restoration

Liangliang Zhang

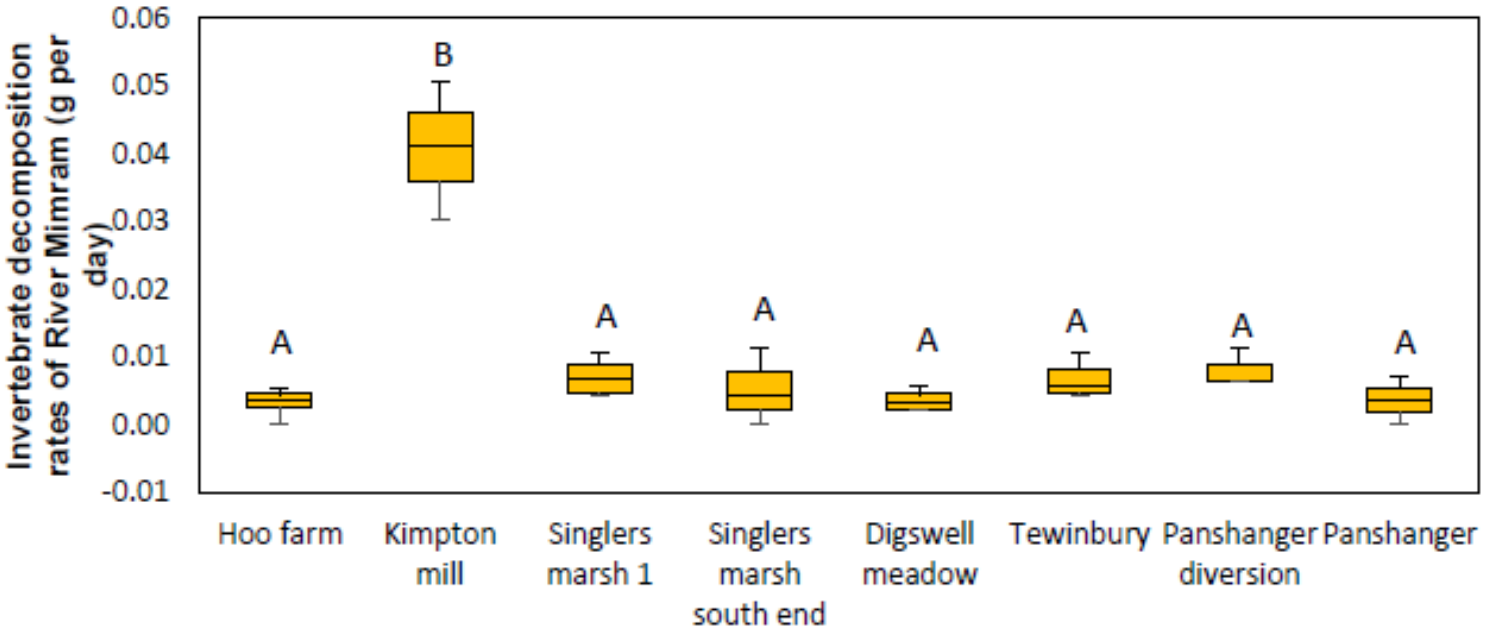
Colonisation traps designed by Dr Murray Thompson

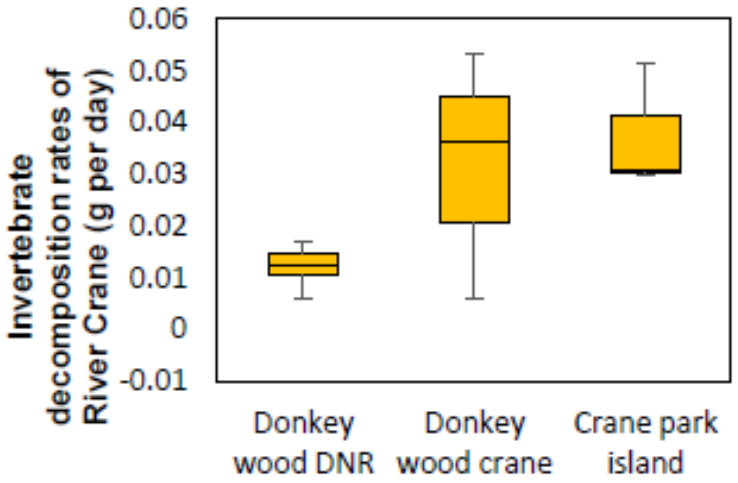


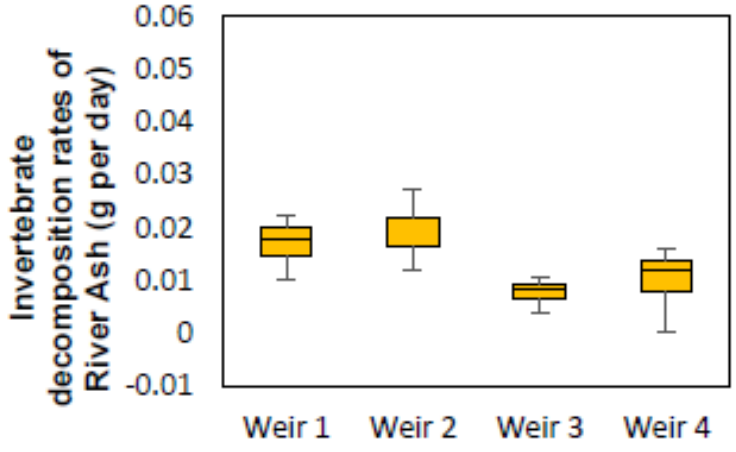
Traps in position at Kimpton Mill, River Mimram, Herts

Paper exposed to invertebrate decomposition after two weeks in R. Mimram, May 2017

Invertebrate decomposition rates





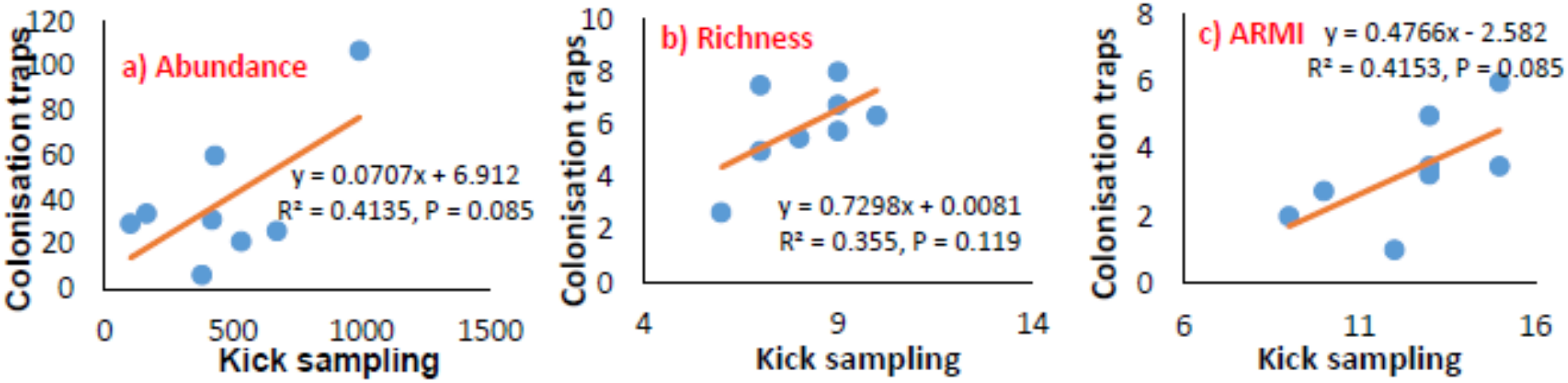


Weirs to be removed Autumn 2017

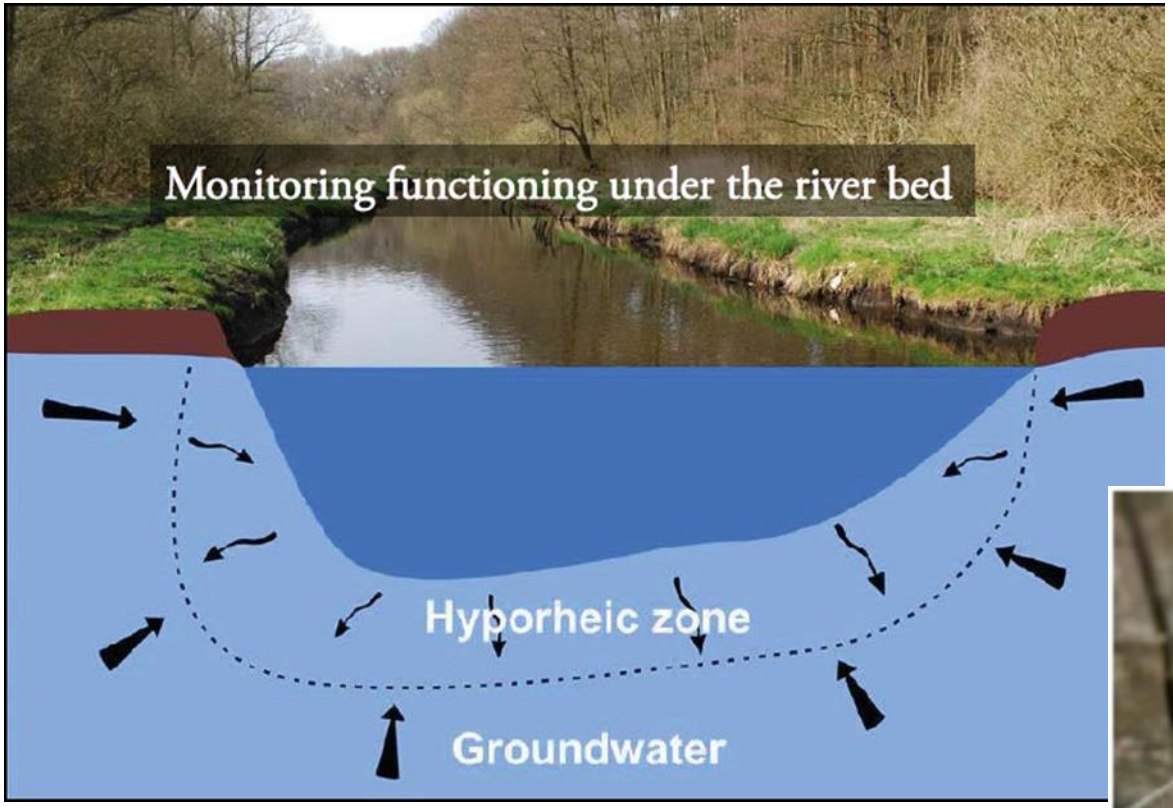
Invertebrate decomposition rates significantly correlated with

Abundance of shredders (e.g. *Gammarus*, molluscs)
Physical habitat complexity of channel and riparian vegetation (MorpH data)

Invertebrate data from traps correlated with kick sample results



Scratching below the surface



Uses teabags to measure decomposition rates below the river bed

Little known on how function affected by environmental variables

Anne Robertson Roehampton University

Pilots on R. Wey and R. Eden

Invasive species

Impacts on fisheries, invertebrates, bankside habitats and channel morphology

Gammarus orange spot

Caused by a fish parasite (the spiny-headed worm *Pomphorynchus*) which uses *Gammarus* as an intermediate host.

Up to 25 cm long, potential pathogen

Data needed to assess status of parasite in UK

Send samples to:
Hannah Bradley
Environment Agency,
National Fisheries Lab
Bromholme Lane
Brampton,
Cambridgeshire
PE28 4NE

Details of all RiverflyPlus projects mentioned here available on Riverfly Partnership website www.riverflies.org