



Developing a climate resilient school estate.

**Crawford Wright - Head of Architecture & Design -
Department for Education**

Sponsored by



The Design Team:
Architecture/Building/Climate

75 years of the Design Team

Setting standards for good
education buildings since 1949.



Department
for Education



**ENSURING ALL
SCHOOLS AND
COLLEGES ARE:**

**HEALTHY AND
PRODUCTIVE**

THE RIGHT SIZE

**SAFE, SECURE AND
SUSTAINABLE**

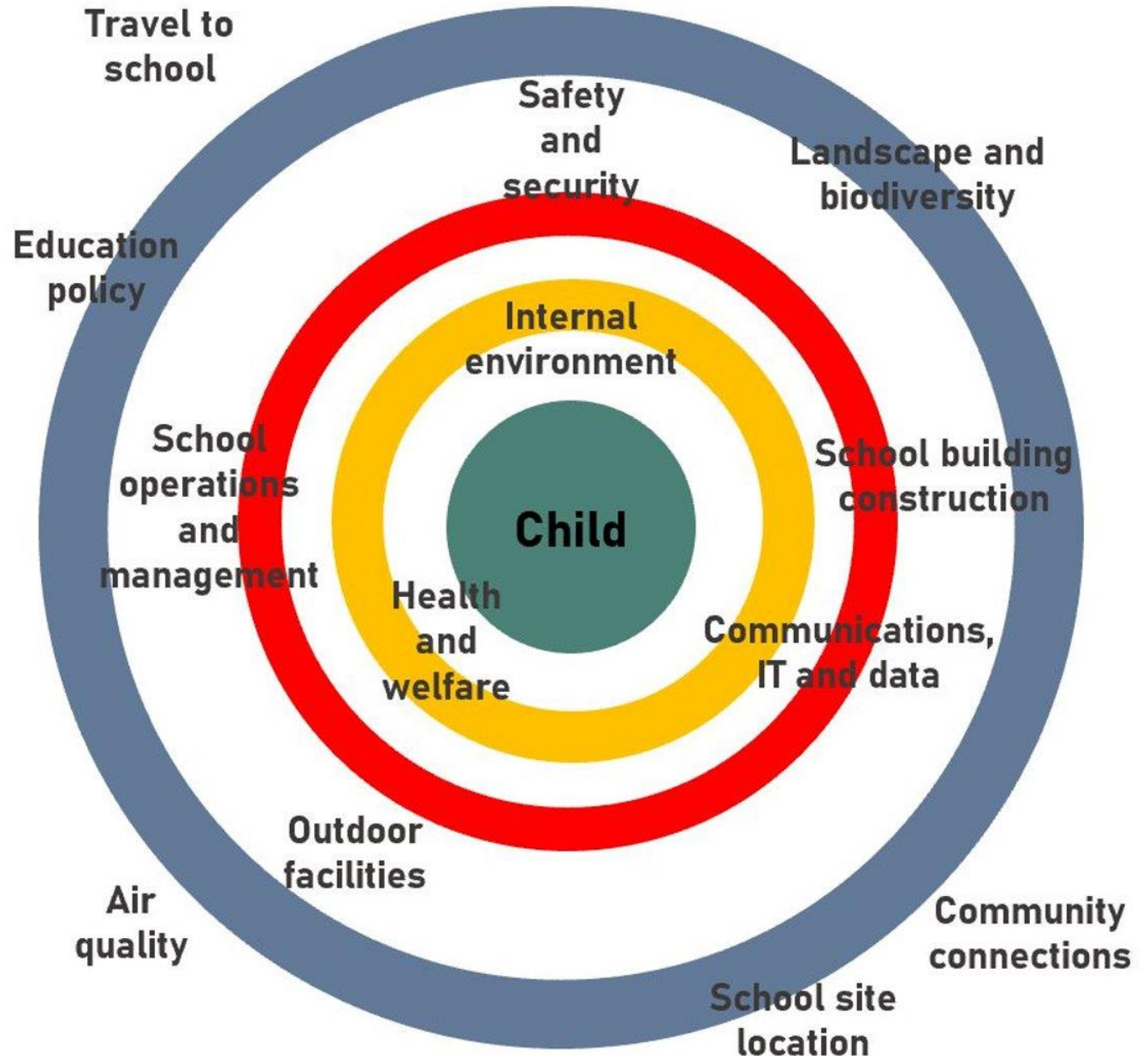


**Department
for Education**



The ecology of the school

The key relationships of elements of a good school with one another and to the outside, placing the child at the centre of everything that is done.



The Resilient School Project

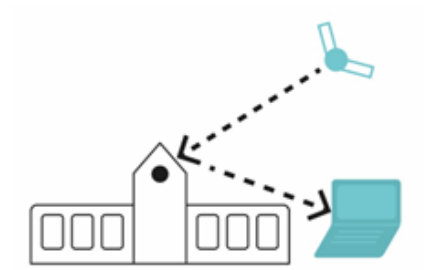
Delivering high impact, efficient and scalable retrofit solutions



Creating a better school environment through:



Improve ventilation



Improve connection



Energy generation and efficiency



Increase resilience

Project Aims

Condition Data Collection 2 (CDC2)

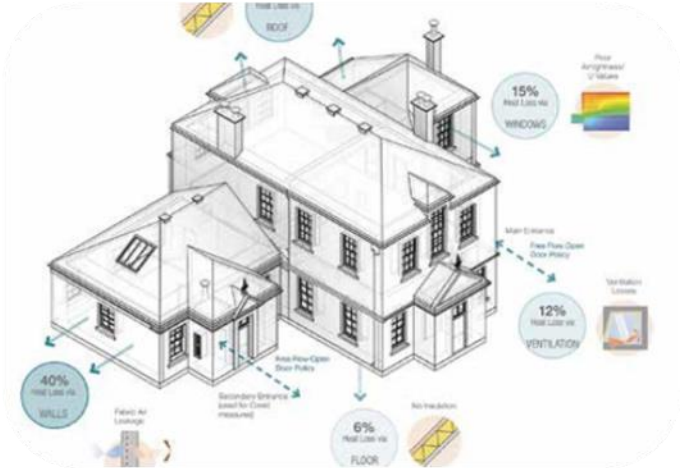
Programme Guide

March 2021

Condition



Typology



Interventions

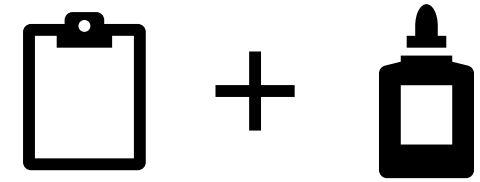


Value for Money

Project Strategy



Increasing Resilience
Identify Low Cost,
High Impact Solutions



End User Focused
Resilience, Comfort
& Wellbeing



Scalability
Testing a school led
delivery model



Supporting Schools
Guidance
& Case Studies

Impacts
& Outputs

Weakness: Limited external shading
 Intervention: Explore repositioning of down plant to external areas.
 Outcome: Increased rainfall and reduced risk of damp.

Lack of ventilation to Classroom Biomeat (Roof)
 Intervention: Survey current provision of ventilation. External ventilation system is to be considered in classrooms. Current ceiling to be considered should this be feasible.
 Outcome: Improved ventilation, and increased comfort.

Lack of external lighting
 Intervention: Re-position external lighting to car park and external spaces for increased energy resilience and PV implementation.
 Outcome: Improved energy resilience and PV provides operational resiliency.

BMS System Service and TUV Backstage Checks
 Intervention: Improve resilience manual with regular volume linked to BMS and service BMS to ensure user management practice.
 Outcome: Improved thermal comfort, operational efficiency, better controls.

External PV Panels
 Intervention: Survey roof capacity to the PV Panels.
 Outcome: Connect PV panels to increase solar energy output and increase sustainability.

Lack of external lighting - Car Park
 Intervention: Additional LED lighting to car park and external spaces for increased security.
 Outcome: Improved safety and safeguarding to car park, playground and entrance.

Improve External Shading/Screening
 Intervention: Explore options for complementary design.
 Outcome: Increased resilience and enhance play space.



Reduced Court School, Exposure to Wildlife Issues
 Intervention: Behaviour and/or resources to be fixed to court, minor intervention requires long back view.
 Outcome: Increased resilience and biodiversity, best use of external green space in playground for education.

Disabled Play Area
 Intervention: In fill with massive planting / grass, trees to create shade and play space. Tree growth / canopy will cover meadow areas, etc. Additional signage and guidance for increased safety of children to be increased.
 Outcome: Increase tree and connection to wider fabric. Opportunity to create more dense / improved play / learning experience for the school park and court.

Down Plant Located Internally, Reduce to External
 Intervention: External repositioning of down plant to external areas of walls.
 Outcome: Improved resilience and biodiversity.

Additional Tree Planting
 Intervention: Increase tree cover and plant trees within landscaping and surround to provide canopy and shade.
 Outcome: Reduced surface water run-off, additional shade and car park play space.

Overheating of South Facing Classroom (New Training)
 Intervention: Add solar film, and reduce PVH controls and adjustments to improve comfort. Capacity of number of games units can be reduced. Optimize ventilation.
 Outcome: Improved comfort of space in the learning environment.

Improve Hot Water System
 Intervention: Insulate pipe work to prevent heat loss.
 Outcome: Reduced heat loss and avoid energy wastage and increase sustainability.

Byron Primary School

Move On Street to Suitable External Location
 Intervention: Consider and move bins to a more appropriate location outside school grounds.
 Outcome: Increased safety and comfort.

Lack of ventilation to Student Restrooms
 Intervention: VC detection ventilation and additional transfer airflow to external areas.
 Outcome: Improved ventilation, and increased comfort.

Lack of external lighting
 Intervention: Additional LED lighting to car park and external spaces for increased security.
 Outcome: Improved safety and safeguarding to car park, playground and perimeter.

Hot and cold air, lighting to classroom
 Intervention: Insulate and draughtproof door. Review BMS functionality and controls. Thermal insulation: ensure to make more accessible, ventilation.
 Outcome: Increased comfort for all and reduce amount of heating required in the space, increase sustainability.

External Lighting, Draught-Proofing to Classrooms
 Intervention: Upgrade generalised external lighting ventilation system (type) located in 1000 to provide fresh air cooling. (Status operator PV).
 Outcome: Increased comfort for all and reduce greenhouse effect canopy create in back classrooms.

BMS System Service and TUV Backstage Checks
 Intervention: Improve resilience manual with regular volume linked to BMS and service BMS to ensure user management practice.
 Outcome: Improved thermal comfort, operational efficiency, better controls.

External Hot Water System
 Intervention: Insulate pipe work to prevent heat loss.
 Outcome: Reduced heat loss and avoid energy wastage and increase sustainability.



Increase Resilience to Rain Water
 Intervention: Improve resilience to surface water flooding and ground biodiversity.
 Outcome: Increased privacy and ecological resilience.

Improve External Street Shading
 Intervention: Explore down and window and external plant. Create space between storage and external area. CO2+ - more screen accounts for external protection. Plants to help with design.
 Outcome: Increased security and safety and better local connectivity of building.

Solar Cells from External Canopy
 Intervention: Have canopy bonded and ventilation to Class + comfort cooling to be considered if feasible.
 Outcome: Increased comfort and ventilation.

Provide Additional External Shading / Screened / Safe Upstairs to Play Area
 Intervention: Improve and increase external connectivity to the playground to prevent flooding and carbon water. Provide screen of surface and reduce overexposure.
 Outcome: Reduced surface water and increased resilient against weather events.

Access to External Entrance
 Intervention: Improve access and safety to top of path with external panel and near fence screen.
 Outcome: Reduced surface water and increased resilient against weather events.

Install Hot Water System
 Intervention: Insulate pipe work to prevent heat loss.
 Outcome: Reduced heat loss and protect energy output and increase sustainability.

Keelham Primary School

Weakness: Limited external shading
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Lack of ventilation to Student Restrooms
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Overheating of South Facing Classroom
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Improve Hot Water System
 Intervention: Insulate pipe work to prevent heat loss.
 Outcome: Reduced heat loss and avoid energy wastage and increase sustainability.



Enhanced Community Perimeter Planning and Play to Play at Home
 Intervention: Improve community planning around perimeter to increase something to screen and safeguarding for nursery play area.
 Outcome: Enhanced resilience and increased biodiversity and resilience. Make use of fencing to host additional play features to increase diversity of play provision.

Overheating and lack of ventilation to South Facing Classrooms
 Intervention: Biocool solar film, roof seal, use of security / CCTV blind panels.
 Outcome: Improved thermal environment, ventilation, and reduced overheating.

Reduce External Shading
 Intervention: Patch screen with external play screen required.
 Outcome: Better external ventilation, improved external play.

Use Heat Meter Manual System (Energy Performance)
 Intervention: Reconnection existing distribution and control energy operational control.
 Outcome: Improved thermal comfort, low carbon output and efficient system.

All Buildings on Manual LED
 Intervention: Upgrade manual with digital volume linked to BMS and use of security / CCTV blind panels where feasible.
 Outcome: Improved thermal comfort, operational efficiency, better controls.



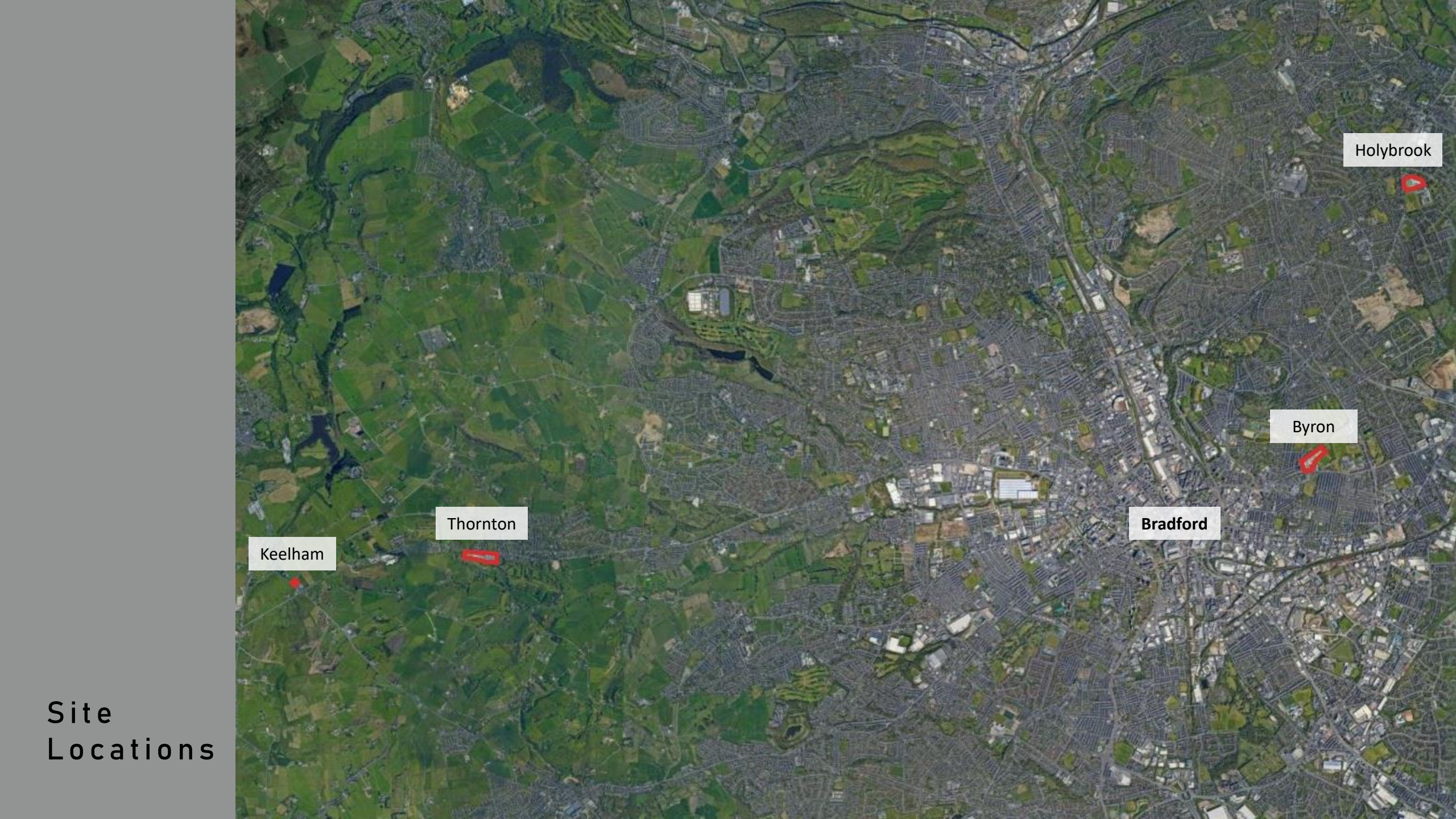
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Thornton Primary School

The Schools



Holybrook

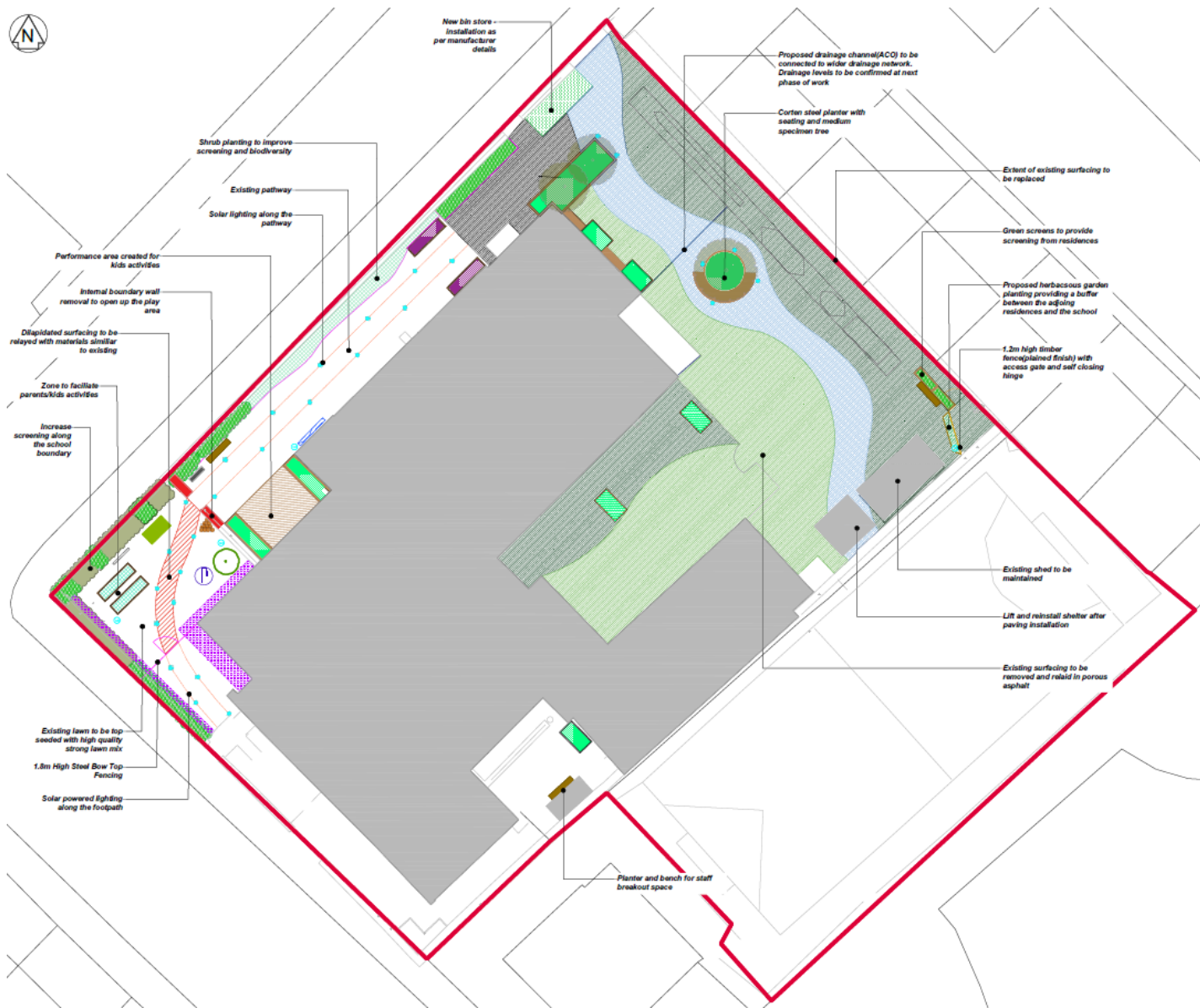
Byron

Bradford

Thornton

Keelham

Site
Locations



SuDs (permeable surfacing)
 Green barrier to roadside (AQ)
 Tree planting for solar shading

BMS commissioning
 Monitor & sensors
 Energy efficient ICT

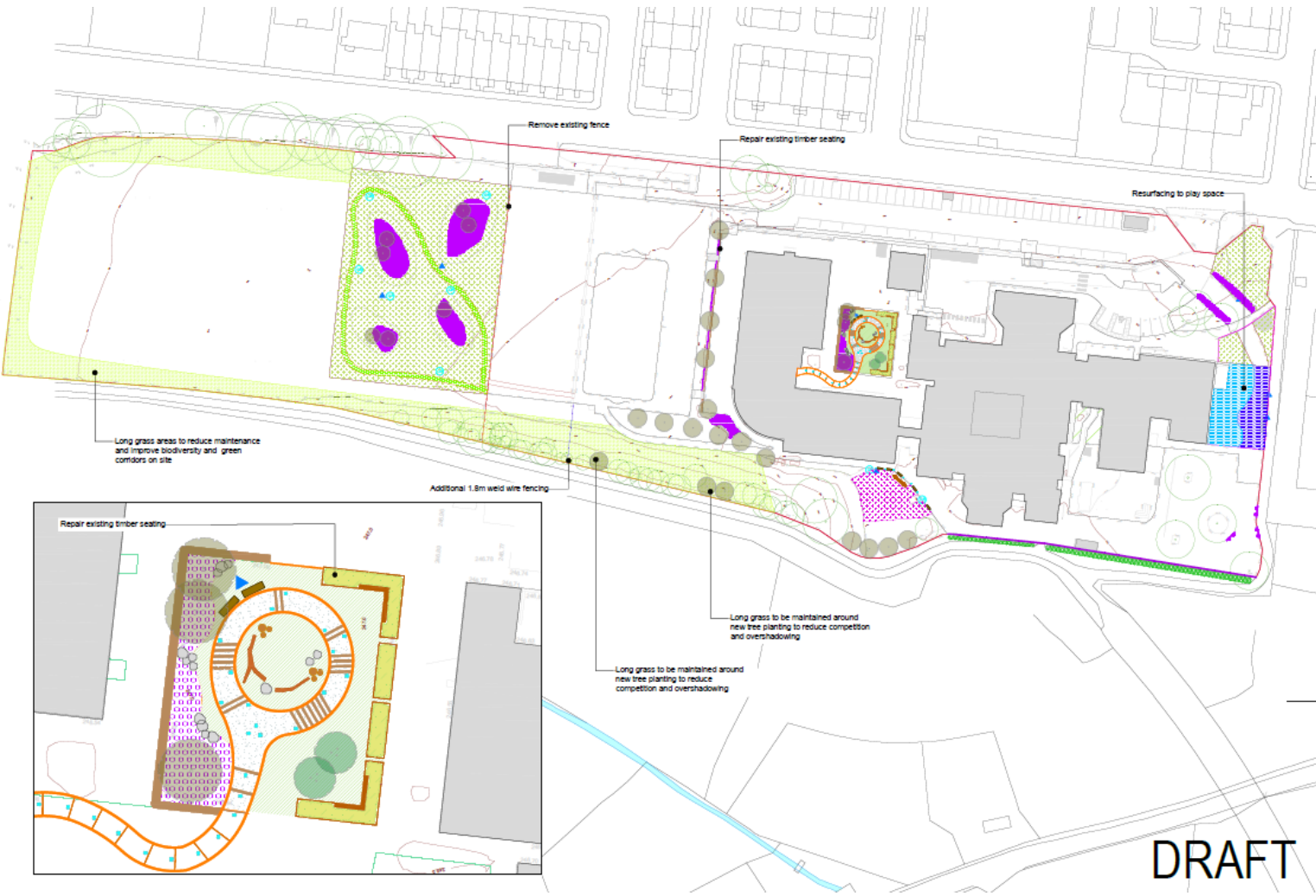
Window & door replacements
 Installation of PIR LED lighting
 Installation of PV panels

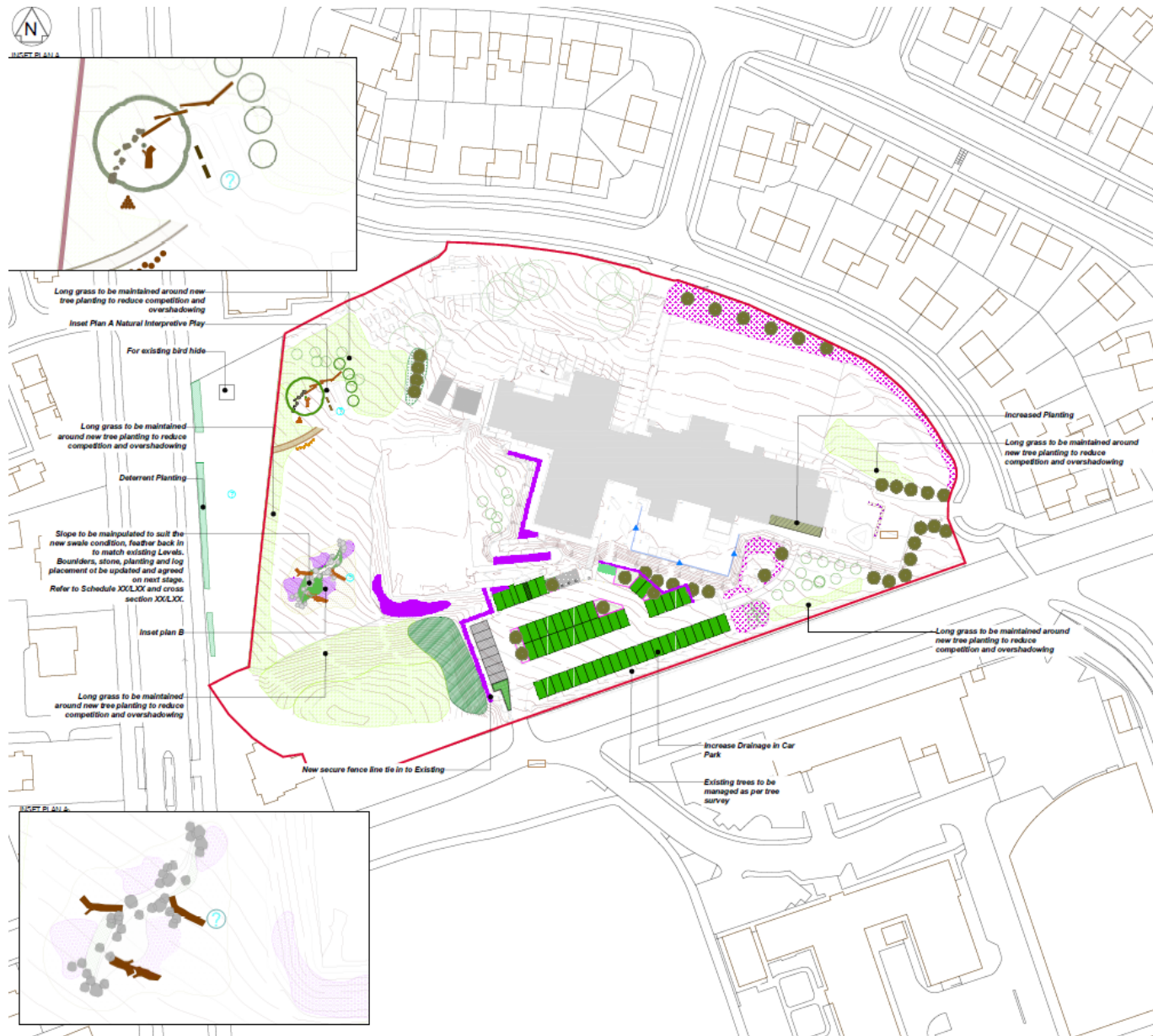


Tree planting for solar shading
Outdoor teaching & town square
SuDs and drainage

BMS commissioning
Monitor & sensors
Energy efficient ICT

Insulation & plant upgrades
Installation of PIR LED lighting
Solar film to windows



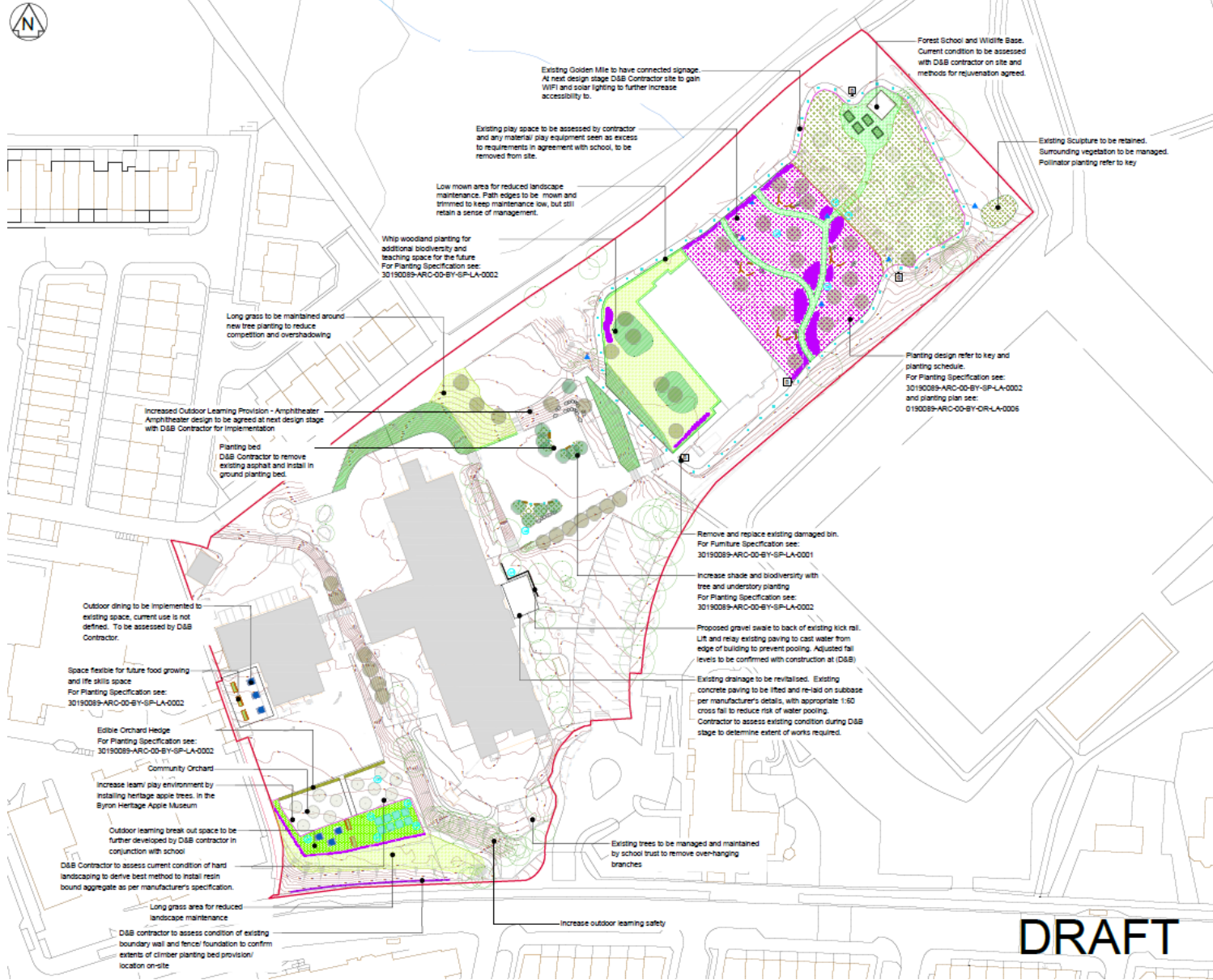


SuDs & raingardens to car park
 Tree planting for solar shading
 Woodland planting & natural play

BMS commissioning
 Monitor & sensors
 Energy efficient ICT

Solar film to windows
 Installation of PIR LED lighting
 Installation of PV panels





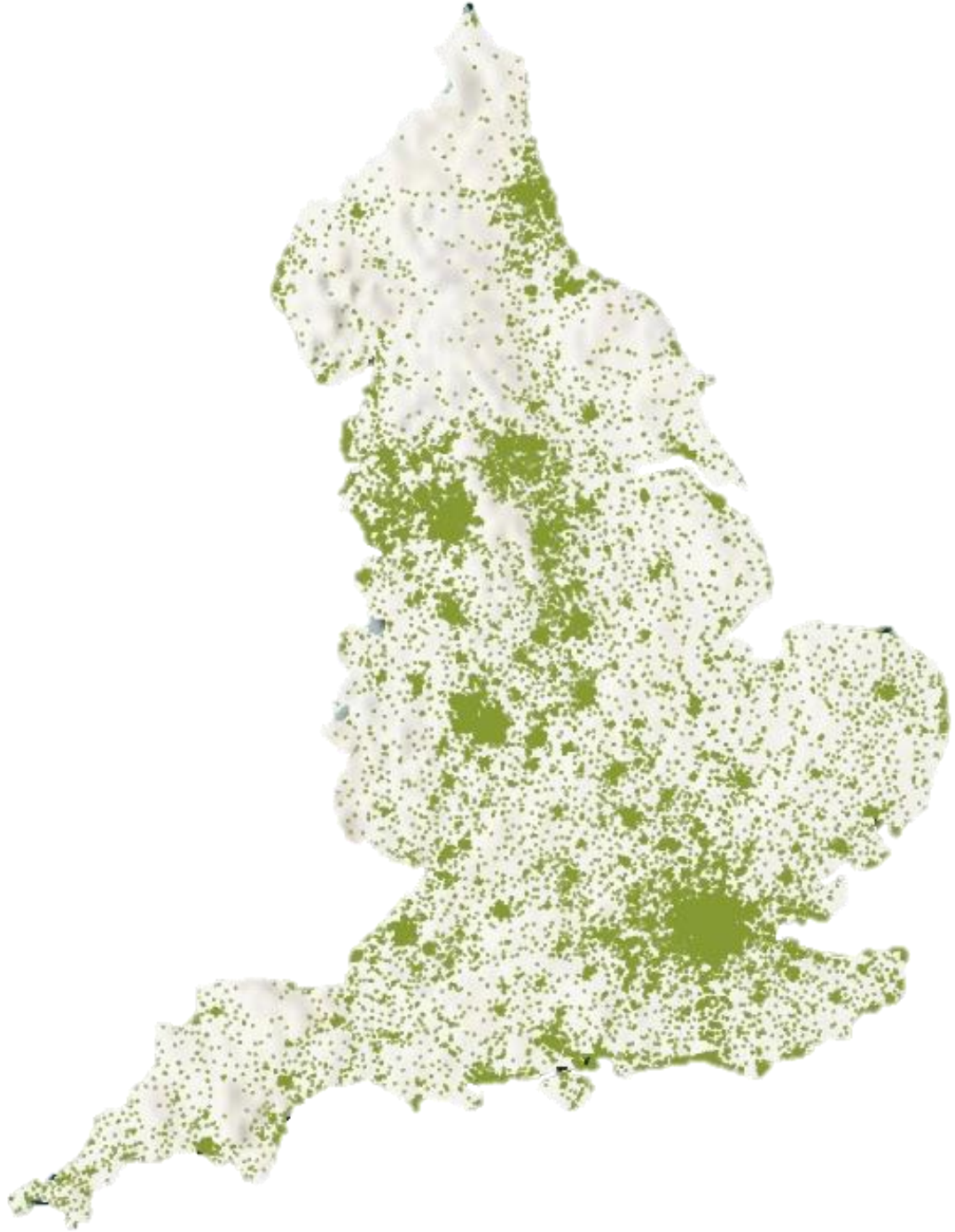
SuD
 Tree planting for solar shading
 Outdoor teaching & dining

BMS commissioning
 Monitor & sensors
 Energy efficient ICT

Solar film to windows
 Installation of PIR LED lighting
 Installation of PV panels



School sites:



Thank you



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for Education