

Annotated User Guide

This PDF marks the parts of the Hydro Lab interface that a new user should look at first. The boxes are teaching aids only: they point to controls, evidence panels, visual modes and report outputs.

- Start by confirming the active data pack has loaded.
- Read the scenario, ground condition and map readout before interpreting colours.
- Use the Walkthrough tab to answer: what am I looking at, why does it matter, and what can I say safely?
- Check the Trust Board before upgrading any screening note into a flood-modelling claim.
- Use map layers and Visual Lab modes one at a time so the explanation does not become noise.
- Use Data Needed and Site Evidence to show what is loaded, what is missing, and what must be collected next.
- Treat LiDAR wetness proxy as a convergence/saturation clue, not a measured flood result.
- Use official-data and model-honesty panels before writing a report sentence.

Golden rule

The site should never pretend a screening footprint or wetness-proxy layer is calculated flood depth, velocity, ponding depth or arrival time. Any report must say what is observed, what is derived, and what is still uncertain.

Start Here: Data Pack, Status and Rainfall Scenario

Use this screen first. Confirm the pack has loaded, then read the active dataset and rainfall scenario before trusting any map or chart.

LTV Hydro Lab

Separate rainfall, runoff, floodwater and scenario workspace

[Guide PDF](#)

1. Loaded status

t starter loaded

Data Pack

Active dataset

2. Active dataset

ter

3. Pack metadata

River Kent starter

AREA: Kendal / River Kent starter pack

VISUAL QA: Spot checked after AOI fix

MODE: analytical screening

CRS: EPSG:27700

73 mm

RAINFALL TOTAL

23.9 mm

MAX 24H RAINFALL

1.556 m

PEAK RIVER STAGE

0.337 m

STAGE RANGE

7.3 h

INDICATIVE LAG

20 mm/hr

Heavy local rain - realistic but locally significant - adjusted stress 20.0 mm/hr

Z2 mean slope 8.9%

LTV LiDAR evidence is visible; starter collection routes are logged where available, while HAND and calibrated routing remain pending.

2 action receptors

Runoff begins - 15-30 min

Scenario

4. Rainfall intensity buttons

S2 · 20 mm/hr

Heavy local rain

S3 · 40 mm/hr

Severe rainfall

S4 · 60 mm/hr

Extreme cloudburst

S5 · 100 mm/hr

Exceptional stress-test

Antecedent condition

5. Ground wetness setting

Scenario Basis

PROVISIONAL STRESS LADDER

S2 · 20 mm/hr - serious local rainfall

Good working trigger for visible surface runoff and first receptor watch states.

PLANNER: Review plant routes, low storage, temporary works and upstream water arriving at the

Map Analysis

Walkthrough

Trust Board

Visual Lab

Report Briefs

Report Figures

Data Needed

Site Evidence

Engine Lab

Scenario Runoff Lens

S2: Heavy local rain - 20 mm/hr for 1 hour. Surface flow likely begins in steep or poorly drained areas.

Run Pulse Sequence

Sequence idle. Visual briefing cue only; not calculated flood depth, velocity or arrival time.

What am I looking at?

Kendal / River Kent starter overview under 20 mm/hr: scenario zones, receptors, gauges, main rivers and LiDAR hillshade.

Why does it matter?

Spot checked after AOI fix. This is the shared briefing view before moving into terrain truth, construction action or report caveats.

Map Layers

TOGGLE EVIDENCE

DEFAULT ON

UNTICK ALL

- Scenario zones
- LiDAR hillshade
- LiDAR slope classes
- LiDAR collection routes
- LiDAR collection hotspots
- LiDAR wetness proxy
- LiDAR contours
- LiDAR terrain zones
- Flow direction + high/low points
- Construction receptors

Guided Run and Plain-English Readout

Use the Guided Run panel when explaining the site to a new person, then read the short outcome text so the screen has a simple spoken story.

Guided Run

- 1. Pick the briefing step**
Pick a rain rate and ground wetness.
- W2 · Storm stress**
Pick a rain rate and ground wetness.
- W3 · Terrain route**
Show why water is expected to move this way.
- W4 · Site action**
Translate the model into construction decisions.
- W5 · Report caveat**
State the decision and the uncertainty together.


2. Say this in plain English Pick has and sampled LTV LIDAR evidence. The risk zones and rainfall ladder are still screening tools until FEH rainfall and formal hydraulic layers are added.

Outcome Timeline

O1 · 0-15 min Immediate checks	O2 · 15-30 min Runoff begins
O3 · 30-60 min Corridor response	O4 · 60-120 min Downstream pulse
O5 · 2 hr+ / post-event Extreme review	

3. Outcome readout
Sleeper on already wet ground begins producing visible surface runoff.
Planner: Upstream inflow routes and temporary works near crossings become the first watch items.
Ground crew: Keep tools, fuel, spoil and welfare kit out of hollows and obvious downhill lines.
Within selected rainfall stress

Data Integrity



Site barriers / hard edges
Official EA flood context
EA surface-water hazard

- Kendal / River Kent starter water corridor
- active scenario zones
- watch zones / near threshold
- LIDAR hillshade: terrain shape only
- LIDAR slope evidence zones
- LIDAR slope direction samples
- high-to-low terrain fall
- sampled low / collection point
- sampled high ground
- construction receptors
- receptor above scenario threshold
- EA statutory main rivers

Basemap roads, labels and water polygons are visual context from OSM. LIDAR hillshade, contours, slope, wetness proxy, collection routes and collection hotspots are the evidence stack; small edge mismatches should be read as source differences, not edited or invented terrain.

Terrain Truth

LIDAR-derived evidence; no invented contours, depths or timings

What am I looking at?
Sampled LIDAR terrain zones, high points, low points, high-to-low fall lines, hillshade, slope classes, wetness proxy, collection routes and collection hotspots where available.

Why does it matter?
This explains the shape of the land before any rainfall scenario is interpreted as site action.

Show Terrain Truth On Map B - direct 1m DTM sampling for terrain evidence; not yet HAND/flow-accumulation calibrated routing

TERRAIN ZONES 3 891 sampled LIDAR points across zones	RELIEF WINDOW 92.9 m highest sampled 123.9 m / lowest sampled 31.0 m	MEAN SLOPE 8.1% strongest read: Z1 at 8.6%	PRIMARY FALL 75.4 m 4.4% gradient toward sampled low ground
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SHOWN NOW Slope zones Polygons are coloured by sampled mean slope; use for landform reading.	SHOWN NOW High / low points H/L markers are sampled LIDAR points, not surveyed design levels.	SHOWN NOW Fall arrows Lines show sampled high-to-low fall, not water velocity or timing.
SHOWN NOW Hillshade 20m PNG clipped from the real LTV 1m LIDAR COG for visual terrain shape; full source coverage for pack bbox.	AVAILABLE Slope classes 20m LIDAR-derived terrain-gradient classes; mean gradient 10.1%, max cell gradient 118.3%.	STARTER Collection routes 20m unconditioned D8 terrain-convergence raster; 4,612 route cells, max contributing area 105 ha.
STARTER Collection hotspots 16 unconditioned D8 collection callouts from the highest contributing-area cells; threshold 12.6 ha, minimum spacing 600 m.	SCREENING Wetness proxy Pack-relative topographic wetness proxy from unconditioned D8 contributing area and slope; p90 9.43, p97 11.26.	AVAILABLE Contours 25m LIDAR-derived contours; 143 lines for height reading only.
BLOCKED HAND / calibrated routing Needs conditioned terrain, channel burn-in, culvert/drainage assumptions and calibration.		

Z1 · Burnside upstream runoff convergence
in selected run - strong_runoff_gradient

8.6% slope

H **L**

Z2 · Kendal river corridor
later outcome - strong_runoff_gradient

8.9% slope

H **L**

Walkthrough Tab: What Am I Looking At and Why

Use the Walkthrough tab for a first guided explanation. It turns the live pack, scenario, evidence status and current claim limits into a simple route a new user can follow.

LTV Hydro Lab

Separate rainfall, runoff, floodwater and scenario workspace

[Guide PDF](#)

Kendal / River Kent starter loaded

Map Analysis
Walkthrough
Trust Board
Visual Lab
Report Briefs
Report Figures
Data Needed
Site Evidence
Engine Lab

Data Pack

Active dataset

Kendal / River Kent starter

PACK **Kendal / River Kent starter**

AREA **Kendal / River Kent starter pack**

VISUAL QA **Spot checked after AOI fix**

MODE **analytical screening**

CRS **EPSG:27700**

Guided Walkthrough what am I looking at, and why?

1. Start with the purpose

This is a rainfall-and-terrain evidence viewer. It asks: if heavy rain hits this place, which ground is likely to send water where, and what should be checked?

For a construction team

Use it to brief access, storage, plant, temporary works and drainage inspections. It points to where evidence says "look here first".

Truth rule

No flood depth, speed, arrival time, culvert bypass or drainage-capacity claim until HAND, FEH rainfall, land cover and reviewed site evidence are loaded.

2. Current pack and claim state

Kendal / river kent starter

Current stress

S2 · Heavy local rain · 20 mm/hr

Current time step

O2 · Runoff begins

3. Evidence snapshot

Observed context

EA telemetry window latest reading: 2026-05-24T21:00:00Z. Point gauges only, not catchment design rainfall.

LIDAR LOADED

Terrain evidence

Hillshade, slope, routes, hotspots and contours are terrain-derived context.

0 SUPPLIED

Site evidence

No reviewed drains, barriers, culverts or blockage evidence supplied yet.

1 STALE/MISSING

Claim gate

Depth, velocity, arrival time, drainage capacity and culvert bypass stay blocked until the missing inputs exist.

4. Follow the explanation order

01

First ask what the app actually knows. A good answer starts with evidence, not a dramatic map colour.

For site teams: check whether telemetry, terrain and official context are loaded before making access, storage or drainage decisions.

[Open Data Needed](#)

02

Read the map like a slope story

High ground sends water downhill. The map is helping you spot likely routes, low points and places to inspect.

For site teams: use this to explain why a work area, compound, entrance or low route needs a watch point.

[Show Map Overview](#)

03

Check the LiDAR reason

Hillshade, slopes, routes and contours explain why the route is plausible. They are clues from terrain, not flood-depth calculations.

For site teams: terrain clues help choose where to walk, photograph and verify drains, screens, gullies and hard edges.

[Show Terrain Truth](#)

04

Turn the clue into a site action

The useful question is: what should someone check, move, protect, avoid or photograph next?

For site teams: focus on access, plant, stores, low compounds, temporary works and places where water may back up.

[Show Actions](#)

05

Add proof before stronger claims

If a drain, wall or blocked screen matters, record the evidence. Do not let a guess become a model input.

For site teams: use photos, dates, checker names and the observation row builder before promoting anything into mapped evidence.

[Open Site Evidence](#)

06

Finish with the caveat attached

A useful report says what is known, what is likely, and what is still missing.

[Open Report Briefs](#)

Scenario

S1 · 10 mm/hr

Normal heavy rain

S2 · 20 mm/hr

Heavy local rain

S3 · 40 mm/hr

Severe rainfall

S4 · 60 mm/hr

Extreme cloudburst

S5 · 100 mm/hr

Exceptional stress-test

Antecedent condition

Normal

Scenario Basis

PROVISIONAL STRESS LADDER

S2 · 20 mm/hr · serious local rainfall

Good working trigger for visible surface runoff and first receptor watch states.

PLANNER **Review plant routes, low storage, temporary works and upstream water arriving at the**

Trust Board: Claim Level and Evidence Passport

Trust Board is the confidence gate. It shows what the site is allowed to say now, which evidence backs that claim, and what is still blocking stronger flood-modelling statements.

LTV Hydro Lab

Separate rainfall, runoff, floodwater and scenario workspace

[Guide PDF](#)
Kendal / River Kent starter loaded

Data Pack

Active dataset

Kendal / River Kent starter

PACK **Kendal / River Kent starter**

AREA **Kendal / River Kent starter pack**

VISUAL QA **Spot checked after AOI fix**

MODE **analytical screening**

CRS **EPSG:27700**

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Report Figures

Data Needed

Site Evidence

Engine Lab

claim ladder and evidence passports for the active pack

1. Claim ladder overview

A plain claim level for Kendal / River Kent starter: Screening. This tells users how strongly the app may speak today.

Why does it matter?

The map should only move from context to screening, routed, quantified and verified when the evidence gates exist. Missing evidence stays visible.

2. Current allowed claim

Screening

Measured context plus terrain ranking.

3. Stronger claims need more evidence CURRENT

Screening

Sources and official context are visible.

This area has declared source layers, caveats and visual QA notes.

Measured context plus terrain ranking.

Likely source, route and receptor clues can be discussed as screening evidence.

03 **BLOCKED**

Routed

Conditioned terrain can route water cell by cell.

Blocked by: Hydrologically conditioned DTM / Land cover / impermeability / Built drainage / blockage

04 **BLOCKED**

Quantified

Scenario outputs have rainfall calibration and report gates.

Blocked by: FEH rainfall calibration

05 **BLOCKED**

Verified

Historic events and field evidence confirm the method.

Needs historic event replay, field checks and sign-off notes.

Open Data Needed

Open Engine Lab

Open Site Evidence

Next blockers: Routed / Quantified / Verified

4. Evidence passports READY

CLAIM LEVEL	Context
SOURCE	Kendal / River Kent Hydro Pack
DATE	manifest loaded
METHOD	Kendal / River Kent starter pack / declared CRS
CAN SAY	Defines the active area, pack scope, visual QA state and caveats.
CANNOT SAY	Does not transfer claims to another pack without switching or comparing packs.

Observed telemetry READY

CLAIM LEVEL	Context
SOURCE	Real Time Flood Monitoring API
DATE	2026-05-24T21:00:00Z
METHOD	1716 observations loaded; point gauges, not catchment design rainfall.
CAN SAY	Shows measured recent rainfall and river response for the selected gauge window.
CANNOT SAY	Does not prove catchment-wide rainfall, return period, flood depth or safe access.

LiDAR terrain evidence PARTIAL

CLAIM LEVEL	Screening
SOURCE	LiDAR Composite DTM 1m
DATE	2026-05-20
METHOD	3 terrain zones / 4 sampled receptors plus raster clues where declared.
CAN SAY	Ranks high ground, low points, fall direction, slope and likely collection clues.
CANNOT SAY	Does not prove HAND, ponding depth, velocity, formal arrival time or drainage behaviour.

Official flood context READY

CLAIM LEVEL	Context
SOURCE	EA Flood Map for Planning (Rivers and Sea)
DATE	2026-05-20
METHOD	Planning and surface-water hazard context is shown beside Hydro Lab evidence.
CAN SAY	Cross-checks the terrain story against official national-scale flood context.
CANNOT SAY	Does not turn Hydro Lab into an official warning, depth model or regulatory

Site evidence intake PENDING

CLAIM LEVEL	Context
SOURCE	not_supplied
DATE	not reviewed yet
METHOD	0 supplied rows/features; 0 field observation rows.
CAN SAY	Keeps missing drains, barriers and blockage assumptions visible rather than invented.
CANNOT SAY	Does not unlock culvert bypass, blockage

Reports and figures SCREENING

CLAIM LEVEL	Screening
SOURCE	Report Builder / Report Figures
DATE	live from loaded pack
METHOD	S2 / O2 with evidence caveats attached.
CAN SAY	Creates copy-ready screening notes and map plates with source and do-not-claim text.
CANNOT SAY	Does not create a hidden model output or remove the need for professional

Site Evidence: Field Notes Before Better Claims

Site Evidence is where real drainage, barriers, photos and field observations are staged before modelling claims are upgraded. It keeps site knowledge traceable instead of anecdotal.

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Scenario

S1 · 10 mm/hr
Normal heavy rain

S2 · 20 mm/hr
Heavy local rain

S3 · 40 mm/hr
Severe rainfall

S4 · 60 mm/hr
Extreme cloudburst

S5 · 100 mm/hr
Exceptional stress-test

Antecedent condition

Normal

Scenario Basis

PROVISIONAL STRESS LADDER

S2 · 20 mm/hr · serious local rainfall

Good working trigger for visible surface runoff and first receptor watch states.

PLANNER **Review plant routes, low storage, temporary works and upstream water arriving at the**

Site Evidence drains, culverts, barriers and blockage proof

1. Field evidence status

A pack-specific collection checklist for built drainage and blockage evidence. It is a template until real inspected features are supplied.

Why does it matter?

This is the missing link between terrain clues and construction reality: walls, kerbs, culverts, drains and blocked screens can completely change the route.

not supplied yet

0 evidence rows/features currently loaded for Kendal / River Kent starter.

2. Claim limit strip

Kendal / River Kent starter

Expected inputs

culverts / drains / gullies / ditches / outfalls / debris screens / walls / kerbs / bridges / road crests / temporary works / inspection photos / field observations

Do not claim yet

Template only; no verified site drainage evidence has been supplied. Does not support drainage capacity, culvert bypass, blockage routing, flood depth, velocity, arrival time or built-area rerouting claims.

3. Evidence file checks

built/drainage.geojson

EMPTY TEMPLATE

GeoJSON points/lines for culverts, gullies, drains, ditches, outfalls, chambers and debris screens.

Barriers and hard features

built/barriers.geojson

EMPTY TEMPLATE

GeoJSON lines/polygons for walls, kerbs, embankments, bridge openings, road crests and temporary works.

Blockage assumptions

built/blockage_assumptions.csv

EMPTY TEMPLATE

CSV rows for inspected blockage state, capacity state, confidence, date and photo reference.

Field observations

built/site-observations.csv

EMPTY TEMPLATE

Header-only CSV for field notes, photos, plan references and unresolved drainage clues before they become mapped evidence.

Evidence register

built/evidence-register.csv

EMPTY TEMPLATE

CSV index that ties each site claim to a photo, survey note, source, date and checker.

4. Observation columns

built/site-observations.csv

[Open CSV](#)
[Copy columns](#)

ASSET GROUPS: drainage / barrier / blockage / unknown_needs_classification

observation_id
asset_id
asset_group
asset_type
asset_name
latitude
longitude
location_ref
evidence_status
confidence
observed_at
observed_by

photo_ref
source
notes
claim_limit

5. Observation row builder

Type real field, photo or plan evidence, then copy a correctly ordered CSV row. Nothing is saved or promoted here.

[Validate row](#)
[Copy row](#)
[Copy header + row](#)

OBSERVATION ID	ASSET ID	ASSET GROUP	ASSET TYPE
<input type="text"/>	<input type="text"/>	Choose group	Choose type
ASSET NAME / DESCRIPTION	LATITUDE	LONGITUDE	LOCATION REFERENCE
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
EVIDENCE STATUS	CONFIDENCE	OBSERVED DATE	OBSERVED BY
Choose status	Choose grade	dd/mm/yyyy	<input type="text"/>
PHOTO / PLAN REF	SOURCE	NOTES	
<input type="text"/>	<input type="text"/>	<input style="width: 100%; height: 40px;" type="text"/>	

Map Controls, Layer Switches and Legend

This is the map-reading screen. Use focus shortcuts and layer switches, then read the legend so every colour and line has a named meaning.

CRS: EPSG:27700

Scenario

- S1 · 10 mm/hr**
Normal heavy rain
- S2 · 20 mm/hr**
Heavy local rain
- S3 · 40 mm/hr**
Severe rainfall
- S4 · 60 mm/hr**
Extreme cloudburst
- S5 · 100 mm/hr**
Exceptional stress-test

Antecedent condition
Normal

Scenario Basis

PROVISIONAL STRESS LADDER
S2 · 20 mm/hr · serious local rainfall
Good working trigger for visible surface runoff and first receptor watch states.

PLANNER Review plant routes, low storage, temporary works and upstream water arriving at the site.

CREW Keep loose material, fuel, tools and welfare kit out of hollows and downhill lines.

CALIBRATION Use as screening / stress-test rainfall until local FEH DDF values are ingested.

Guided Run

- W1 · Data check**
Confirm what is real, provisional and missing.
- W2 · Storm stress**
Pick a rain rate and ground wetness.
- W3 · Terrain route**

Scenario Runoff Lens

S2: Heavy local rain · 20 mm/hr for 1 hour. Surface flow likely begins in steep or poorly drained areas.

1. Map focus shortcuts Actions All Packs Spot checked after AOI fix screening

Claim: Screening

Run Pulse Sequence Sequence idle. Visual briefing cue only; not calculated flood depth, velocity or arrival time.

What am I looking at?
Kendal / River Kent starter overview under 20 mm/hr: scenario zones, receptors, gauges, main rivers and LiDAR hillshade.

Why does it matter?
Spot checked after AOI fix. This is the shared briefing view before moving into terrain truth, construction action or report caveats.

3. Read colours here

- water corridor
- active scenario zones
- watch zones / near threshold
- LIDAR hillshade
- LIDAR slope evidence zones
- LIDAR slope direction samples
- high-to-low terrain fall
- sampled low / collection point
- sampled high ground
- construction receptors
- receptor above scenario threshold

Map Layers TOGGLE EVIDENCE

DEFAULT ON UNTICK ALL

2. Toggle evidence layers

- LIDAR hillshade
- LIDAR slope classes
- LIDAR collection routes
- LIDAR collection hotspots
- LIDAR wetness proxy
- LIDAR contours
- LIDAR terrain zones
- Flow direction + high/low points
- Construction receptors
- Rain / river gauges
- EA statutory main rivers
- Site drainage assets
- Site barriers / hard edges
- Official EA flood context
- EA surface-water hazard

Terrain Truth: LiDAR Evidence Stack

Terrain Truth is where the map stops being flat. Hillshade, contours, slope, collection routes, collection hotspots and sampled high/low points all come from logged terrain evidence.

CRS: EPSG:27700

Scenario

- S1 · 10 mm/hr**
Normal heavy rain
- S2 · 20 mm/hr**
Heavy local rain
- S3 · 40 mm/hr**
Severe rainfall
- S4 · 60 mm/hr**
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- W1 · Data check**
Confirm what is real, provisional and missing.
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Pick a rain rate and ground wetness.
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Scenario Runoff Lens
S2: Heavy local rain · 20 mm/hr for 1 hour. Surface flow likely begins in steep or poorly drained areas.

Overview **Terrain Truth** Actions All Packs Spot checked after AOI fix screening

Claim: Screening

Run Pulse Sequence Sequence idle. Visual briefing cue only; not calculated flood depth, velocity or arrival time.

1. Terrain readout
Runoff / river catchment starter LiDAR terrain evidence: hillshade, slope classes, collection routes, collection hotspots, contours and sampled high/low fall lines.

Why does it matter?
This explains the landform behind the runoff story. Screening evidence only: not depth, velocity, formal arrival time or drainage capacity.

2. LiDAR evidence surface

3. Visual trust caveat

Map only 25m LiDAR contours LiDAR slope classes: terrain gradient only; 11% pack cells very steep

LiDAR collection routes: terrain convergence only; max contributing area 105 ha

LiDAR collection hotspots: 16 D8 callouts, screening only LiDAR slope evidence zones

Map Layers TOGGLE EVIDENCE

DEFAULT ON UNTICK ALL

- Scenario zones
- LiDAR hillshade
- LiDAR slope classes
- LiDAR collection routes
- LiDAR collection hotspots
- LiDAR wetness proxy
- LiDAR contours
- LiDAR terrain zones
- Flow direction + high/low points
- Construction receptors
- Rain / river gauges
- EA statutory main rivers
- Site drainage assets
- Site barriers / hard edges
- Official EA flood context
- EA surface-water hazard

Visual Lab: Choose The Right Map Story

Visual Lab gives four reading modes. Use it when someone asks what they are looking at, why it matters, and how strong the evidence is.

LTV Hydro Lab

Separate rainfall, runoff, floodwater and scenario workspace

Guide PDF
Kendal / River Kent starter loaded

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Engine Lab

Data Pack

Active dataset

Kendal / River Kent starter

PACK **Kendal / River Kent starter**

AREA **Kendal / River Kent starter pack**

VISUAL QA **Spot checked after AOI fix**

MODE **analytical screening**

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PLANNER Review plant routes, low storage, temporary works and upstream water arriving at the

what am I looking at, why does it matter, and how strong is the evidence?

What am I looking at?

Four map-reading modes for the active data pack: terrain truth, water pathways, wet-ground clues and a planned 3D explainer.

Why does it matter?

The visuals are useful only when the viewer can see whether each layer is context, terrain evidence, screening model or report-ready.

2. Map-reading modes

LIDAR hillshade ready

LIDAR EVIDENCE

Terrain Truth

The evidence-friendly terrain view: hillshade, contours, slope, wetness proxy, collection hotspots, high / low points and sampled fall lines.

LOOKING AT
the shape of the ground from LTV LiDAR-derived layers

WHY
it explains the landscape before a rainfall scenario is interpreted

EVIDENCE STATE
20m web raster from the real LTV 1m LiDAR source. 143 LiDAR-derived contour features.

Show Terrain Truth

starter routes ready

SCREENING MODEL

Water Pathways

Shows where terrain cells currently converge, using starter collection routes, hotspot callouts and receptors.

LOOKING AT
unconditioned terrain-convergence routes, hotspot callouts, drainage context and receptors

WHY
it moves the map beyond static polygons toward likely movement paths

EVIDENCE STATE
4,612 route cells; max contributing area 105 ha. 16 unconditioned D8 collection callouts; screening clues only. Screening only: no culverts, drains, blockages, velocity or timing.

Show Pathways

wetness proxy ready

WETNESS PROXY

Wet Ground Clues

A cautious LiDAR-derived read of likely convergence and saturation clues until depressions and HAND exist.

LOOKING AT
topographic wetness proxy plus current collection-route and hotspot layers

WHY
it flags places for site inspection without claiming ponding depth

EVIDENCE STATE
TWI proxy p90 9.43; p97 11.26. Not observed groundwater, flood depth or drainage capacity.

3. Wet Ground Clues

atlas / Imhof prototype

VISUAL CONTEXT

3D Explainer

A separate presentation view for explaining why high ground drains toward the active site.

LOOKING AT
atlas or Imhof-style terrain render from the same LiDAR source

WHY
it helps non-specialists understand the landform quickly

EVIDENCE STATE
Communication visual only until its source, scale, vertical exaggeration and caveat are carried into the app.

Prototype next

Briefing Outputs

PUBLIC READ

Kendal / River Kent starter · Heavy local rain

2 receptors within the selected rainfall and outcome window.

LOOKING AT
plain-language consequence of the selected rainfall test.

CONSTRUCTION READ

Action threshold

Keep tools, fuel, spoil and welfare kit out of hollows and obvious downhill lines.

LOOKING AT
receptors that need action, watching or later-stage attention.

same active scenario, shown for public, construction, evidence and terrain-route explanation

Wet Ground Clues: Useful, But Not Flood Depth

The wetness proxy is a LiDAR-derived convergence and saturation clue. It is not observed groundwater, ponding depth, drainage capacity, flood timing or HAND.

CRS EPSG:27700

Scenario

- S1 · 10 mm/hr**
Normal heavy rain
- S2 · 20 mm/hr**
Heavy local rain
- S3 · 40 mm/hr**
Severe rainfall
- S4 · 60 mm/hr**
Extreme cloudburst
- S5 · 100 mm/hr**
Exceptional stress-test

Antecedent condition
Normal

Scenario Basis

PROVISIONAL STRESS LADDER
S2 · 20 mm/hr · serious local rainfall

Good working trigger for visible surface runoff and first receptor watch states.

PLANNER Review plant routes, low storage, temporary works and upstream water arriving at the site.

CREW Keep loose material, fuel, tools and welfare kit out of hollows and downhill lines.

CALIBRATION Use as screening / stress-test rainfall until local FEH DDF values are ingested.

Guided Run

- W1 · Data check**
Confirm what is real, provisional and missing.
- W2 · Storm stress**
Pick a rain rate and ground wetness.
- W3 · Terrain route**

Scenario Runoff Lens
S2: Heavy local rain · 20 mm/hr for 1 hour. Surface flow likely begins in steep or poorly drained areas.

Overview Terrain Truth Actions All Packs Spot checked after AOI fix screening

Claim: Screening

Run Pulse Sequence Sequence idle. Visual briefing cue only; not calculated flood depth, velocity or arrival time.

1. Wet-ground caveat
Render riverbank starter wet-ground clue view: LiDAR topographic wetness proxy, starter collection routes, collection hotspots, sampled low points and drainage context.

Why does it matter?
This flags places to inspect for collection or saturation. It is not observed groundwater, ponding depth, drainage capacity or HAND.

2. Wetness proxy on map

3. Wetness layer toggle

TOGGLE EVIDENCE

DEFAULT ON UNTICK ALL

- LIDAR hillshade
- LIDAR slope classes
- LIDAR collection routes
- LIDAR collection hotspots
- LIDAR wetness proxy
- LIDAR contours
- LIDAR terrain zones
- Flow direction + high/low points
- Construction receptors
- Rain / river gauges
- EA statutory main rivers
- Site drainage assets
- Site barriers / hard edges
- Official EA flood context
- EA surface-water hazard

4. Proxy meaning

in shape only LIDAR collection routes: terrain convergence only; max contributing area 105 ha

collection hotspots: 16 D8 callouts, screening only LIDAR wetness proxy: convergence / saturation clue only; p90 9.43

LIDAR slope direction samples high-to-low terrain fall sampled low / collection point sampled high ground

Official Context: Flood, Surface Water and Channels

These panels keep the work honest. They separate official data layers from local screening footprints and make the limitations visible.

FRESH **NRFA Gauged Daily Flow** - UK Centre for Ecology & Hydrology / NRFA
Due in 98 days. Label proxy stations clearly; do not use daily flow as live 15-minute stage.
[source](#)

FRESH **OS Open Rivers** - Ordnance Survey
Due in 143 days. Add as next watercourse context layer; do not assume all small drains are captured.
[source](#)

FRESH **Environment Agency LiDAR Composite DTM** - Environment Agency / Defra
Due in 360 days. Regenerate derivatives when AOI, source tile, or method changes.
[source](#)

FRESH **UKCEH Land Cover Map** - UK Centre for Ecology & Hydrology
Due in 361 days. Use for surface context and runoff assumptions only after coefficients/method are declared.
[source](#)

LOADED **Real Time Flood Monitoring API** - Environment Agency
Recent telemetry and station metadata

LOADED **HadUK-Grid monthly rainfall** - Met Office
Reportable monthly rainfall evidence pack

LOADED **National River Flow Archive Gauged Daily Flow** - UK Centre for Ecology & Hydrology / NRFA
Archived daily mean river-flow context

LOADED **LiDAR Composite DTM 1m** - Environment Agency / Defra
Terrain hydrology derivatives

LOADED **LTV LiDAR hillshade 20m web derivative** - Environment Agency / Defra via LTV COG
Visual terrain context

LOADED **EA Flood Map for Planning (Rivers and Sea)** - Environment Agency / Defra
Official Flood Zone 2/3 and flood-storage context

LOADED **Risk of Flooding from Surface Water - Hazard WMS** - Environment Agency / Defra
Official probabilistic surface-water hazard context

LOADED **Statutory Main River Map** -

1. EA flood map context Environment Agency / Defra - Flood Zones published November 2023; Flood Storage Areas published May 2024

<p>FLOOD STORAGE AREAS 1 May 2024</p>	<p>FLOOD ZONE 3 111 November 2023</p>	<p>FLOOD ZONE 2 593 November 2023</p>
---	---	---

[Show Overlay](#) 705 official features; loaded lazily so the default map stays quick. [source](#)

Official EA planning context only. The service is designed to indicate flood risk to areas of land and is not sufficiently detailed to decide whether an individual property is at risk. It does not include groundwater, direct field runoff or sewer overflow. Hydro Lab uses it as a cross-check overlay, not as a calculated depth, velocity or arrival-time model.

RoFSW surface-water hazard is controlled in the separate panel below because it is a live official WMS hazard layer, not a local feature-count overlay.

2. Surface-water hazard layer Environment Agency / Defra - revision 2025-09-17

<p>ACTIVE WMS LAYER Hazard rating 0+ modelled surface-water extent</p>	<p>DATA TYPE official context Live WMS tiles; no local feature count or invented values.</p>	<p>HAZARD MEANING depth + speed Higher hazard rating means more dangerous floodwater conditions.</p>
--	--	--

[Show Overlay](#) LAYER Hazard rating 0+ - modelled surface-water extent [dataset](#) [WMS](#)

Annual chance bands behind RoFSW are high: 3.3%+; medium: 1% to 3.3%; low: 0.1% to 1%; very low: below 0.1%. The hazard layers show areas with the selected hazard rating or higher.

RoFSW is an official surface-water flood hazard context layer. It is produced from national scale modelling and compatible local LLFA modelling. It shows the likelihood of flooding with a given hazard rating or higher. Hazard ratings combine flood depth and speed; higher ratings are more dangerous. Use as context only: it is not a Hydro Lab runoff calculation, not a site drainage model, and not an arrival-time or depth forecast.

3. Statutory main river network Environment Agency / Defra - updated 2025-10-24

<p>MAIN RIVER FEATURES 317 official line features intersecting the pack bbox</p>	<p>OFFICIAL LENGTH 48.5 km segment length reported by source properties</p>	<p>MISSING BY DESIGN ordinary drains culverts, ditches, sewer capacity and blockages still need separate data</p>
--	---	---

[Hide Layer](#) B - official statutory main river extract; does not include ordinary watercourses, culverts, drains or blockage assumptions [source](#)

Official statutory main river context only. This layer identifies watercourses designated as Main River in England. It does not include every ordinary watercourse, field drain, culvert, sewer, ditch or blockage. Hydro Lab uses it as an official channel cross-check and future burn-in input, not as a calculated flow-depth or drainage-capacity model.

Model Honesty: What Is Proven and What Is Not Yet Proven

This is the anti-garbage section. It tells the reader what can be reported now, what remains a screening assumption, and what data is needed for the next modelling step.

rainfall/stage values in sampled window.

CAUTION - OBSERVED_DEMO_TIMESERIES
Rainfall gauge is a point observation about 3.1 km from Victoria Bridge and is not catchment-average rainfall.

PLANNED - ALL
NRFA evidence packs not yet ingested; HadUK-Grid monthly rainfall is now loaded.

PASS - TERRAIN_EVIDENCE
LTV 1m COG sampled successfully for 3 risk zones and 4 construction receptors; derived elevations slopes and downslope direction samples are present.

CAUTION - TERRAIN_EVIDENCE
LiDAR evidence is terrain-derived screening only; HAND flow accumulation drainage-network burn-in and hydraulic calibration are not yet complete.

PASS - TERRAIN_RASTER_HILLSHADE
LTV 1m COG clipped to the corrected Kendal / River Kent bbox and rendered as a 350x500 20m hillshade PNG with full source metadata; source coverage ratio is 100.0%.

CAUTION - TERRAIN_RASTER_HILLSHADE
Hillshade is visual terrain context only; it is not flood depth velocity timing drainage capacity or a routed runoff model.

CAUTION - SCENARIO_BASIS
Rainfall values 10 20 40 60 100 mm/hr are a provisional one-hour stress ladder and are not yet FEH DDF calibrated for return period or catchment-average rainfall.

PASS - HADUK_MONTHLY_RAINFALL
24 official HadUK-Grid 1km monthly rainfall values loaded for 2024-05 to 2026-04; nearest grid cell to rainfall gauge.

CAUTION - HADUK_MONTHLY_RAINFALL
HadUK-Grid is gridded monthly rainfall; it is not sub-hourly rainfall intensity and not a site-drainage hydraulic model.

PASS - NRFA_DAILY_FLOW_HISTORY
731/731 official NRFA Gauged Daily Flow days loaded for 2022-10-01 to 2024-09-30; same river downstream proxy.

CAUTION - NRFA_DAILY_FLOW_HISTORY
NRFA Gauged Daily Flow is archived daily mean flow; it is not live 15-minute stage and not a site drainage model.

CAUTION - RISK_OF_FLOODING_FROM_SURFACE_WATER_HAZARD_WMS
RoFSW is an official surface-water flood hazard context layer. It is produced from national scale modelling and compatible local LLFA modelling. It shows the likelihood of flooding with a given hazard rating or higher. Hazard ratings combine flood depth and speed; higher ratings are more dangerous. Use as context only; it is not a

what the current output can safely claim

1. Model readiness score

Screening ready

5 ready / 3 partial or screening / 1 pending

Current claim limit

Safe claim: terrain-derived route and receptor ranking.

Do not claim yet

Not yet: flood depth, velocity, formal arrival time or regulatory model result.

Observed telemetry

Can show measured recent rainfall / river response.

READY

Recent EA rainfall and water-level observations are loaded for the active pack.

LTV 1m terrain samples

Can rank likely source / fall / collection clues.

PARTIAL

3 terrain zones and 4 construction receptors have sampled elevation / slope evidence.

Scenario ladder

Can compare relative escalation, not return-period rainfall yet.

SCREENING

S1-S5 rainfall levels are useful stress tests, but still need FEH local calibration.

24-month rainfall context

Needed for month-by-month report context.

READY

Monthly rainfall context is registered as loaded.

River-flow history

Needed for stronger historical comparison.

READY

Longer river-flow context is registered as loaded.

Collection routes / HAND

Starter route clues only; conditioned HAND/routing needed before depth or timing claims.

PARTIAL

Starter unconditioned LiDAR D8 collection routes are loaded; HAND and conditioned routing are still pending.

Official flood overlays

Needed for regulatory context and cross-checking.

READY

Official flood-risk context is registered as loaded.

Surface-water hazard

Needed to cross-check pluvial hazard alongside the terrain route story.

READY

EA RoFSW hazard WMS is registered as a live official context overlay.

Built drainage / blockage

Needed before strong site-specific routing claims.

PENDING

Culverts, drains, walls, roads, bridges and blockage assumptions are not modelled yet.

NEXT DATA TARGETS

EA LiDAR-derived HAND / flow accumulation / slope rasters / RoFSW local extract / PMTiles for reportable feature counts and offline screenshots / Ordinary watercourses, culverts, drainage assets and blockage assumptions / EA Risk of Flooding from Surface Water layers / Site evidence: culverts, gullies, drains, walls, kerbs, bridges, outfalls, debris screens, photos and blockage assumptions

2. Data contract for real runoff modelling

data gates before stronger routing claims

Hydro Lab runoff-engine data contract

Defines the minimum data evidence needed before a Hydro Lab pack can move from screening polygons to routed runoff animation and then to quantified reporting.

6 ready / 3 partial / 4 blocked

OPEN

Screening brief

Measured recent telemetry plus terrain-derived receptor ranking.

No missing blocker for this claim gate.

BLOCKED

Routed animation

Step-through likely water movement from high ground through accumulation routes to receptors.

3 blockers: Hydrologically conditioned DTM; Land cover / impermeability; Built drainage / blockage

BLOCKED

Quantified report

Reportable rainfall context, official flood comparison and caveated model outputs.

1 blocker: FEH rainfall calibration

Engine Lab: Build Gates Before Stronger Claims

Engine Lab is the build-control sheet for the next model. It shows what is ready, what is partial, and which files are still needed before terrain-cell runoff can be claimed.

LTV Hydro Lab

Separate rainfall, runoff, floodwater and scenario workspace

Guide PDF
Kendal / River Kent starter loaded

Map Analysis
Walkthrough
Trust Board
Visual Lab
Report Briefs
Report Figures
Data Needed
Site Evidence
Engine Lab

1. Engine Lab surface

runoff-model build gates; no hidden outputs

What am I looking at?

A build-control sheet for moving from screening evidence to terrain-cell runoff. It reads the same contract as the Model Readiness panel.

Why does it matter?

It prevents the map from claiming flood depth, velocity or arrival time until the missing terrain, drainage and rainfall calibration files exist.

6 ready / 3 partial / 4 blocked

Open now

Screening brief - Measured recent telemetry plus terrain-derived receptor ranking.

Blocked next

Routed animation: Hydrologically conditioned DTM / Land cover / impermeability / Built drainage / blockage

2. Build stages

PARTIAL

02 / TERRAIN

Hydrology-ready terrain

The app has LIDAR-derived terrain visuals and official main-river context, but not a hydrologically conditioned DTM.

Create conditioned terrain with sinks, channels and known drainage breaks logged.

PARTIAL

03 / ROUTING

Flow direction, accumulation and HAND

Starter unconditioned D8 collection routes and hotspots are visual clues only.

Generate flow direction, flow accumulation, HAND and ponding/depression checks.

PENDING

04 / SURFACE

Runoff and blockage assumptions

The current model does not yet know roads, roofs, walls, kerbs, culverts, drains, debris screens or formal FEH rainfall.

Add runoff coefficients, drainage/barrier vectors, blockage assumptions and FEH DDF scenarios.

PARTIAL

05 / VALIDATION

Reportable routed model

Historical rainfall, official context and some river-flow history are available, but routed outputs remain blocked by HAND/FEH gaps.

Validate any routed animation against telemetry, official context and declared assumptions before reporting it.

Screening brief OPEN

Measured recent telemetry plus terrain-derived receptor ranking.

No missing blocker for this claim gate.

Routed animation BLOCKED

Step-through likely water movement from high ground through accumulation routes to receptors.

Hydrologically conditioned DTM / Land cover / impermeability / Built drainage / blockage

Quantified report BLOCKED

Reportable rainfall context, official flood comparison and caveated model outputs.

FEH rainfall calibration

3. Next files Create

These are contract file paths, not invented results. A file only becomes ready when it exists and the method is logged.

Hydrologically conditioned DTM PENDING

terrain/conditioned_dtm.tif / terrain/processing-log.json

Flow direction / accumulation / HAND PARTIAL

terrain/flow_direction.tif / terrain/flow_accumulation.tif / terrain/hand.tif

Land cover / impermeability PENDING

landcover/runoff_coefficients.csv / landcover/landcover.geojson

Built drainage / blockage PENDING

built/drainage.geojson / built/blockage_assumptions.csv / built/barriers.geojson

FEH rainfall calibration PENDING

rainfall/feh_ddf_scenarios.csv / scenarios/scenario_basis.json

River / channel network READY

hydrography/ea_statutory_main_river / hydrography/ea_statutory_main_rivers_summary / hydrography/channel_burn_in.geojson

4. Claim limit

Data Pack

Active dataset

Kendal / River Kent starter
▼

PACK **Kendal / River Kent starter**

AREA **Kendal / River Kent starter pack**

VISUAL QA **Spot checked after AOI fix**

MODE **analytical screening**

CRS **EPSG:27700**

Scenario

S1 · 10 mm/hr

Normal heavy rain

S2 · 20 mm/hr

Heavy local rain

S3 · 40 mm/hr

Severe rainfall

S4 · 60 mm/hr

Extreme cloudburst

S5 · 100 mm/hr

Exceptional stress-test

Antecedent condition

Normal
▼

Scenario Basis

PROVISIONAL STRESS LADDER

S2 · 20 mm/hr · serious local rainfall

Good working trigger for visible surface runoff and first receptor watch states.

PLANNER Review plant routes, low storage, temporary works and upstream water arriving at the

Evidence Chain: What Am I Looking At and Why

Use this panel to tell the reportable story in order: measured context, selected stress, terrain route, collection clue, site action and caveat.

C5 - collection hotspot
62.8 ha contributing area · 151.3 m elev · secondary_route

R1 43.0 m · slope 11.0% · bearing 223 deg

R2 40.1 m · slope 8.6% · bearing 265 deg

R3 57.8 m · slope 2.2% · bearing 218 deg

R4 44.6 m · slope 0.9% · bearing 326 deg

Construction Exposure

R1 - Victoria Bridge control point
Action: Check river-level trend, access route and temporary works near channel edge. · LiDAR 43.0 m elev, 11.0% slope

R2 - Kendal riverside access corridor
Monitor: Review plant access, low storage, welfare units and emergency egress. · LiDAR 40.1 m elev, 8.6% slope

R3 - Burneside upstream check
Action: Watch upstream pulse timing and downstream travel toward Kendal. · LiDAR 57.8 m elev, 2.2% slope

R4 - Nether Bridge downstream check
Monitor: Check downstream constriction/exposure before releasing site decision. · LiDAR 44.6 m elev, 0.9% slope

1. Active read **Event starter** Show On Map
52 - 20 mm/hr for 1 hr · 15-30 min

2. Follow this chain **Heavy local rain**
23.9 mm max 24h rainfall; Rainfall gauge 584772, near Victoria Bridge, River Kent, Kendal to Victoria Bridge, River Kent, Kendal relationship is evidence context, not a catchment model.

2 **SELECTED STRESS**
Heavy local rain - adjusted 20.0 mm/hr
Good working trigger for visible surface runoff and first receptor watch states. Antecedent state: normal.

3 **TERRAIN ROUTE**
Z1 - Burneside upstream runoff convergence
123.9 m high ground to 48.5 m low point; 75.4 m sampled fall and 8.6% mean slope.

4 **COLLECTION CLUE**
C7 - secondary route
56.6 ha contributing-area clue, 55.0 m elevation, approx 763 m from the sampled low point.

5 **SITE ACTION**
R3 - Burneside upstream check
Action at 20.0 mm/hr adjusted stress against 20 mm/hr threshold; approx 865 m from the sampled low point.

3. Caveat travels with the read
Screening chain only: observed telemetry, sampled LiDAR terrain, unconditioned D8 collection clues and construction receptor thresholds. It does not prove flood depth, velocity, arrival time, drainage capacity, culvert/blockage behaviour or design standard.

SELECTED STRESS	20.0 mm/hr
SAMPLED FALL	75.4 m
MEAN SLOPE	8.6%
CONTRIBUTING AREA CLUE	56.6 ha

How to use this
Use the chain as the verbal walkthrough: measured context, selected stress, terrain reason, collection clue, receptor action, then caveat. It is designed for reports and site briefings without overstating the model.

Current Brief Copy

Report Snapshot Copy Print

Report Snapshot: The Copyable Output

This is the section that can be turned into a client note or site briefing. It should stay factual, sourced and clear about uncertainty.

<p>2. Current brief nearby</p> <p>Kendal / River Kent starter · S2 · 15-30 min</p> <p>2 receptors within the selected rainfall and outcome window.</p> <p>PLANNER Upstream inflow routes and temporary works near crossings become the first watch items.</p> <p>GROUND CREW Keep tools, fuel, spoil and welfare kit out of hollows and obvious downhill lines.</p> <p>TERRAIN Z2 has the strongest sampled LiDAR slope signal at 8.9% mean slope, 36.7 m to 115.6 m elevation range.</p> <p>EVIDENCE 72.9 mm observed rainfall total, 23.9 mm max 24h rainfall, 0.337 m observed water-level range; rainfall gauge approx 3.1 km from the water gauge.</p> <p>RAINFALL HISTORY Met Office HadUK-Grid monthly rainfall 2024-05 to 2026-04: 3331.4 mm total, 138.8 mm mean month, wettest November 2025 (287.7 mm); 24/24 months loaded.</p> <p>FLOW HISTORY NRFA Gauged Daily Flow 73005 Kent at Sedgwick, 2022-10-01 to 2024-09-30: mean 12.85 m3/s, peak 108.10 m3/s on 2024-01-21; 731/731 days loaded; same river downstream proxy.</p> <p>OFFICIAL FLOOD CONTEXT EA Flood Map for Planning (Rivers and Sea) loaded as official context for Kendal / River Kent starter: Flood storage areas: 1; Flood Zone 3: 111; Flood Zone 2: 593. Official EA planning context only. The service is designed to indicate flood risk to areas of land and is not sufficiently detailed to decide whether an individual property is at risk. It does not include groundwater, direct field runoff or sewer overflow. Hydro Lab uses it as a cross-check overlay, not as a calculated depth, velocity or arrival-time model.</p> <p>SURFACE-WATER HAZARD Risk of Flooding from Surface Water - Hazard WMS registered as live official WMS context for Kendal / River Kent starter; active layer Hazard rating 0+: modelled surface-water extent. Hazard ratings combine flood depth and speed and show the likelihood of flooding with the selected hazard rating or higher. This is not a Hydro Lab runoff depth, velocity, drainage or arrival-time calculation.</p> <p>CHANNEL NETWORK Statutory Main River Map loaded for Kendal / River Kent starter: 317 main-river features, 48.5 km official segment length inside the pack bbox. Official statutory main river context only. This layer identifies watercourses designated as Main River in England. It does not include every ordinary watercourse, field drain, culvert, sewer, ditch or blockage. Hydro Lab uses it as an official channel cross-check and future burn-in input, not as a calculated flow-depth or drainage-capacity model.</p> <p>CAVEAT B - direct telemetry, point rainfall gauge, not catchment-average rainfall B - direct 1m DTM sampling for terrain evidence; not yet HAND/flow-accumulation calibrated routing Scenario zones remain screening geometry until FEH rainfall, HAND, flow accumulation and drainage/blockage data are added. Official flood layers are context overlays, not calculated depths or arrival times.</p>	<p>1. Report-ready summary</p> <p>Kendal / River Kent starter / S2 / Heavy local rain / 20 mm/hr for 1 hr</p> <p>OUTCOME O2 / Runoff begins / 15-30 min / adjusted stress 20.0 mm/hr</p> <p>TELEMETRY 72.9 mm observed rainfall total; 23.9 mm max 24h rainfall; 0.337 m observed water-level range.</p> <p>RAINFALL HISTORY Met Office HadUK-Grid monthly rainfall 2024-05 to 2026-04: 3331.4 mm total, 138.8 mm mean month, wettest November 2025 (287.7 mm); 24/24 months loaded.</p> <p>FLOW HISTORY NRFA Gauged Daily Flow 73005 Kent at Sedgwick, 2022-10-01 to 2024-09-30: mean 12.85 m3/s, peak 108.10 m3/s on 2024-01-21; 731/731 days loaded; same river downstream proxy.</p> <p>OFFICIAL FLOOD CONTEXT EA Flood Map for Planning (Rivers and Sea) loaded as official context for Kendal / River Kent starter: Flood storage areas: 1; Flood Zone 3: 111; Flood Zone 2: 593. Official EA planning context only. 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This layer identifies watercourses designated as Main River in England. It does not include every ordinary watercourse, field drain, culvert, sewer, ditch or blockage. Hydro Lab uses it as an official channel cross-check and future burn-in input, not as a calculated flow-depth or drainage-capacity model.</p> <p>GAUGE CONTEXT Rainfall gauge 584772, near Victoria Bridge, River Kent, Kendal to Victoria Bridge, River Kent, Kendal; approx 3.1 km separation.</p> <p>RUNOFF PATHWAY</p>
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Report Briefs: Builder And Copy Words

Report Briefs starts with a small builder for choosing the handover shape, then gives copy-ready wording with evidence, safe use and do-not-claim limits.

LTV Hydro Lab

Separate rainfall, runoff, floodwater and scenario workspace

Guide PDF
Kendal / River Kent starter loaded

Data Pack

Active dataset

Kendal / River Kent starter

PACK **Kendal / River Kent starter**

AREA **Kendal / River Kent starter pack**

VISUAL QA **Spot checked after AOI fix**

MODE **analytical screening**

CRS **EPSG:27700**

Map Analysis
Walkthrough
Trust Board
Visual Lab
Report Briefs
Report Figures
Data Needed
Site Evidence
Engine Lab

1. Report Briefs panel

copy-ready words with source and claim limits

What am I looking at?

Four short report blocks for the active pack: monthly rainfall, event telemetry, scenario stress and route / wet-ground interpretation.

Why does it matter?

Every copied brief keeps evidence, safe use and do-not-claim text together so useful wording cannot drift away from its uncertainty.

2 ready / 2 partial / 0 pending

Kendal / River Kent starter / S2 / O2

2. Report Builder

Choose the handover shape before copying words or printing figures. 4 PACKAGES

3. Handover packages

Use for a concise project-planning note on Kendal / River Kent starter / S2 / O2.

INCLUDE
Monthly rainfall context / Event telemetry brief / Scenario stress brief / Report Snapshot caveat

LEAVE OUT
Design rainfall return period / Property-level flood risk / Depth or velocity claims

Copy checklist
Use briefs

PROJECT MANAGER / GROUND TEAM
Site Briefing

Use for toolbox-style explanation of what to check first under S2.

INCLUDE
Event telemetry brief / Scenario stress brief / Site Action Board / Map Plates

LEAVE OUT
Formal design advice / Safe working clearance / Culvert or drainage capacity

Copy checklist
Open figures

PUBLIC-FACING EXPLAINER
Route / Walker Note

Use for simple explanation of likely wet or exposed routes in Kendal / River Kent starter.

INCLUDE
Route / Wet-Ground Note / Terrain Truth / Wet Ground Clues / Official context caveat

LEAVE OUT
Emergency warning / Access safety guarantee / Observed ponding or depth

Copy checklist
Open visuals

4. Technical appendix gate

Use when someone asks what would be needed before stronger hydrology claims.

INCLUDE
Report Figures / Map Plates / Model Readiness / Engine Lab gates

LEAVE OUT
Hidden hydraulic output / Unlogged assumptions / Evidence inferred from caveat text

Copy checklist
Open Engine Lab

OFFICIAL 24-MONTH BACKGROUND READY

Monthly Rainfall Context

Met Office HadUK-Grid monthly rainfall 2024-05 to 2026-04: 3331.4 mm total, 138.8 mm mean month, wettest November 2025 (287.7 mm); 24/24 months loaded.

EVIDENCE
Met Office HadUK-Grid provisional monthly rainfall. B - official gridded monthly rainfall; nearest grid cell to rainfall gauge; not sub-hourly intensity or catchment-average design rainfall No fake gap filling: unavailable months are shown as unavailable.

SAFE USE
Reportable as official gridded monthly context with coverage and nearest-grid-cell caveats visible.

DO NOT CLAIM
Do not read monthly totals as one-hour rainfall intensity, catchment-average design rainfall, flood depth, drainage capacity or arrival time.

Copy brief

MEASURED RAIN AND RIVER RESPONSE READY

Event Telemetry Brief

72.9 mm total rainfall, 23.9 mm maximum 24h rainfall and 0.337 m observed water-level range. Indicative best lag is 7.3 h.

EVIDENCE
Environment Agency Real Time Flood Monitoring API. B - direct telemetry, point rainfall gauge, not catchment-average rainfall Rain gauge is approximately 3.1 km from the water gauge.

SAFE USE
Good for event context, gauge-response explanation and briefing what happened at the monitoring points.

DO NOT CLAIM
Do not claim catchment-wide rainfall, flood volume, hydraulic routing, property-level risk or design-standard performance from these point gauges alone.

Copy brief

SELECTED S-LEVEL AND OUTCOME STAGE SCREENING

TERRAIN-DERIVED ROUTE CLUE PARTIAL

Scenario

S1 · 10 mm/hr
Normal heavy rain

S2 · 20 mm/hr
Heavy local rain

S3 · 40 mm/hr
Severe rainfall

S4 · 60 mm/hr
Extreme cloudburst

S5 · 100 mm/hr
Exceptional stress-test

Antecedent condition

Normal
▼

Scenario Basis

PROVISIONAL STRESS LADDER

S2 · 20 mm/hr · serious local rainfall

Good working trigger for visible surface runoff and first receptor watch states.

PLANNER Review plant routes, low storage, temporary works and upstream water arriving at the

Report Figures: Export-Ready Plates

Report Figures gives fixed briefing plates for evidence chain, rainfall/river response, terrain-route ranking and construction action. Use Print / Save PDF to export the four-page report pack.

LTV Hydro Lab

Separate rainfall, runoff, floodwater and scenario workspace

[Guide PDF](#)
Kendal / River Kent starter loaded

Data Pack

Active dataset

Kendal / River Kent starter

PACK **Kendal / River Kent starter**

AREA **Kendal / River Kent starter pack**

VISUAL QA **Spot checked after AOI fix**

MODE **analytical screening**

CRS **EPSG:27700**

Scenario

S1 · 10 mm/hr
Normal heavy rain

S2 · 20 mm/hr
Heavy local rain

S3 · 40 mm/hr
Severe rainfall

S4 · 60 mm/hr
Extreme cloudburst

S5 · 100 mm/hr
Exceptional stress-test

Antecedent condition

Normal

Scenario Basis

PROVISIONAL STRESS LADDER

S2 · 20 mm/hr · serious local rainfall

Good working trigger for visible surface runoff and first receptor watch states.

PLANNER **Review plant routes, low storage, temporary works and upstream water arriving at the**

Map Analysis
Walkthrough
Trust Board
Visual Lab
Report Briefs
Report Figures
Data Needed
Site Evidence
Engine Lab

Refresh
2. Print / Save PDF
Print / Save PDF

1. Report plates

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S2 · 20 mm/hr for 1 hr · 15-30 min

Figure rule

No fake data: every plate carries its own evidence and caveat. These are report visuals, not a hidden new model.

3. Evidence plate

Evidence Chain

- 1 MEASURED CONTEXT** **72.9 mm observed rain**

23.9 mm max 24h; Rainfall gauge 584772, near Victoria Bridge, River Kent, Kendal to Victoria Bridge, River Kent, Kendal.
- 2 SELECTED STRESS** **Heavy local rain · 20.0 mm/hr**

Runoff begins · 15-30 min.
- 3 TERRAIN ROUTE** **Z1 · Burnside upstream runoff convergence**

123.9 m high to 48.5 m low; 75.4 m sampled fall.
- 4 COLLECTION CLUE** **C7 · secondary route**

56.6 ha contributing-area clue; 763 m from sampled low point.
- 5 SITE ACTION** **R3 · Burnside upstream check**

Action; 20 mm/hr threshold; 865 m from sampled low point.
- 6 CLAIM LIMIT** **screening only**

Not depth, velocity, arrival time, drainage capacity or design standard.

Screening snapshot only: not an official flood warning, not regulatory hydraulic modelling, and not design advice without professional validation. FEH rainfall, HAND, flow accumulation, drainage, culverts and blockage assumptions remain required for stronger routing claims.

4. Telemetry plate

Rainfall and River Response

RAIN TOTAL

72.9 mm

observed telemetry window

MAX 24H RAIN

23.9 mm

observed rolling daily peak

STAGE RANGE

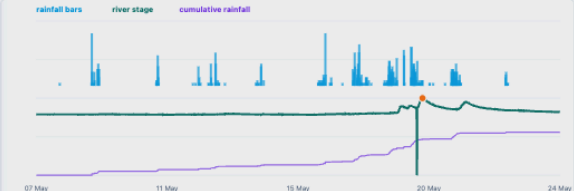
0.337 m

observed water-level movement

LAG

7.3 h

indicative only



Rainfall gauge 584772, near Victoria Bridge, River Kent, Kendal to Victoria Bridge, River Kent, Kendal; approx 3.1 km separation.

72.9 mm observed rainfall total; 23.9 mm max 24h rainfall; 0.337 m observed water-level range.

FIGURE 3 / TERRAIN REASONING

Ranked Terrain Routes

FIGURE 4 / SITE DECISIONS

Construction Action View

Report Figures: Four-Page Export And Caveat

The export is checked as a four-page A4 landscape report. The NO FAKE DATA strip must stay with the figures so the reader sees the claim limit beside the useful visual.

Scenario Basis

PROVISIONAL STRESS LADDER
S2 · 20 mm/hr · serious local rainfall
 Good working trigger for visible surface runoff and first receptor watch states.

PLANNER Review plant routes, low storage, temporary works and upstream water arriving at the site.

CREW Keep loose material, fuel, tools and welfare kit out of hollows and downhill lines.

CALIBRATION Use as screening / stress-test rainfall until local FEH DDF values are ingested.

Screening snapshot only: not an official flood warning, not regulatory hydraulic modelling, and not design advice without professional validation. FEH rainfall, HAND, flow accumulation, drainage, culverts and blockage assumptions remain required for stronger routing claims.

FIGURE 3 / TERRAIN REASONING

Ranked Terrain Routes

Z1 · Burnside upstream runoff convergence in selected run · threshold 20 mm/hr	SAMPLED FALL 75.4 m	MEAN SLOPE 8.6%
Z2 · Kendal river corridor later outcome · threshold 40 mm/hr	SAMPLED FALL 78.9 m	MEAN SLOPE 8.9%
Z3 · South Kendal downstream pulse later outcome · threshold 60 mm/hr	SAMPLED FALL 59.6 m	MEAN SLOPE 6.9%

LTV LiDAR-derived terrain evidence. Screening route strength only; not calibrated flow, depth, velocity or arrival time.

1. Final action plate

Construction Action View

ACTION 2 threshold crossed in selected outcome	WATCH 0 within 70% of selected stress gate	LATER 0 beyond selected outcome window
ACTION Victoria Bridge control point		20.0 MM/HR / 20 MM/HR
ACTION Burnside upstream check		20.0 MM/HR / 20 MM/HR
MONITOR Kendal riverside access corridor		20.0 MM/HR / 40 MM/HR
MONITOR Nether Bridge downstream check		20.0 MM/HR / 60 MM/HR

S1 10 mm/hr		monitor	10.0 mm/hr adjusted
S2 20 mm/hr		2 action	20.0 mm/hr adjusted
S3 40 mm/hr		2 action	40.0 mm/hr adjusted
S4 60 mm/hr		2 action	60.0 mm/hr adjusted
S5 100 mm/hr		2 action	100.0 mm/hr adjusted

Keep tools, fuel, spoil and welfare kit out of hollows and obvious downhill lines.

2. Caveat travels with export

point rainfall gauge, not catchment-average rainfall B – direct 1m DTM sampling for terrain evidence; not yet HAND/flow-accumulation calibrated routing B – official gridded monthly rainfall; nearest grid cell to rainfall gauge; not sub-hourly intensity or catchment-average design rainfall No fake gap filling: unavailable months are shown as unavailable. 1 source family is stale or missing a date; refresh before formal reporting. 0 pending source targets; 18 caution/caveat QA checks. Screening snapshot only: not an official flood warning, not regulatory hydraulic modelling, and not design advice without professional validation. FEH rainfall, HAND, flow accumulation, drainage, culverts and blockage assumptions remain required for stronger routing claims.

Outcome Timeline

O1 · 0-15 min Immediate checks	O2 · 15-30 min Runoff begins
O3 · 30-60 min Corridor response	O4 · 60-120 min Downstream pulse
O5 · 2 hr+ / post-	

Map Plates

Fixed map-frame visuals from the same loaded pack. Use these when the reader needs place, route and site action before reading the chart plates.

MAP PLATE 1 / TERRAIN ROUTE
Source, Route and Collection

MAP PLATE 2 / SITE ACTION
Construction Receptors and Gauges

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