

enhancing... improving... cleaning... restoring...
changing... tackling... protecting... reducing...
create a better place... influencing... inspiring...
advising... managing... adapting...

Project Title: Northumbria Groundwater Flooding - Provision of Geological Products

Commercial Contact: [REDACTED]

Contract Code ECM_65707

Date: 15/09/22



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PART 1

Introduction to the Environment Agency

Who is the Environment Agency?

We are an Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs. Our principal aims are to protect and improve the environment, and to promote sustainable development.

Further information on our responsibilities and how we are structured can be found on our website.

<https://www.gov.uk/government/organisations/environment-agency>

What do we spend our money on?

We are a major procurer of goods and services within the UK, spending circa £600M per annum, our major spend areas are:

- Flood and Coastal Risk Management (design, construction and maintenance)
- ICT and Telecommunications
- Vehicles and Plant
- Environmental Consultancy and Monitoring
- Temporary Staff and Contractors
- Facilities Management, Energy and Utilities
- Flood Management and Water Related Services

What do we need from our suppliers?

Suppliers are vital in supporting the delivery of our corporate plan. We aim to support the economy and society whilst delivering more environmental outcomes for every pound we spend.

In many areas we are leading the way on environmental and technical developments. It is our role to ensure that suppliers clearly understand our corporate aims and objectives and know that we are committed to delivering the best value most sustainable solutions, taking into account the whole life cost of our commercial decisions. We promote diversity and equality and treat all of our suppliers fairly. Our Procurement Plan may be of interest to you as a potential supplier. It sets out our priorities and key commitments in a range of areas such as delivering our corporate plan, Government policy, supplier management and sustainable procurement.

<https://www.gov.uk/government/organisations/environment-agency/about/procurement>

Government changes and collaboration

On 28 January 2016 Defra launched the first single strategy for the whole of Defra. It provides the framework across the Defra group for how we design and deliver our goals and track delivery and measure success. At the heart of the strategy is also the first single vision for the Defra group: 'creating a great place for living'.

For further information on the 'creating a great place for living: Defra's strategy to 2020', please visit:

<https://www.gov.uk/government/publications/defras-strategy-to-2020-creating-a-great-place-for-living>

By bidding for this requirement, you may also be approached by other members of Defra Group Commercial, the Defra network, Natural Resources Wales or other public sector organisations that are specifically named in the tender document.

Further information

For further information and to see our commitments to Diversity & Equality, please visit:

Diversity and Equality: <https://www.gov.uk/government/organisations/environment-agency/about/equality-and-diversity>

Also, are you up to date on environmental legislation? See links below for further information:

Waste and Environmental Impact: <http://www.gov.uk/browse/business/waste-environment>

Environmental Regulations: <http://www.gov.uk/browse/business/waste-environment/environmental-regulations>

PART 2 – Framework Strategy

This agreement is taken from Framework 22944 [REDACTED] It is primarily intended to meet the needs of the Environment Agency. The Agency may require the successful bidder(s) to provide the goods/services on the same terms that are agreed as a result of this tender to the Department for Environment, Food and Rural Affairs, and to its associated bodies including any Agencies and non-departmental public bodies and others (the Defra Group). The Environment Agency may also require the provision of the goods/services to members of the aforementioned Defra Group via the Environment Agency, rather than directly. A full list of the Defra Group can be found at: <https://www.gov.uk/government/organisations#department-for-environment-food-rural-affairs>

The successful bidder(s) may also be required to provide the services to local authorities in England and Wales. Details may be found at: <https://www.gov.uk/find-local-council>

The successful bidder(s) may also be required to provide the services to Internal Drainage Boards in England and Wales. A full list may be found at: http://www.ada.org.uk/member_type/idbs/

Similarly, the successful bidder(s) may be required to supply the Scottish Environmental Protection Agency, the Northern Ireland Environment Agency, Natural Resources Wales, Forestry Commission Scotland, or Forestry Service Northern Ireland.

The successful bidder(s) may also be required to provide the services to Central Government departments, executive agencies, and other NDPBs. Full lists can be found at: <https://www.gov.uk/government/organisations>
<https://www.gov.uk/government/collections/public-bodies>

In no circumstances will the Environment Agency be liable for any costs incurred by the Applicants/Tenderers and their associated parties. Any expenditure, work or effort undertaken prior to contract award is accordingly a matter solely for the commercial judgment of potential Applicants and the Environment Agency will not be responsible for any such expenditure.

It should be noted that these timescales and activities might be subject to change.

PART 3 – Specification/Statement of Requirement

Ref: Contract ECM_65707 agreed in relation to Framework 22944

Title: Provision with Geological Products

1. Background

The Environment Agency requires the provision of geological products to be used nationally across the Agency for the provision of geological mapping, modelling and interpretation studies and support tasks.

2. Framework Strategy

The BGS framework agreement sets out the scope and rates under which contracts will be formed for individual project assignments. These individual call-off contracts will be scoped and managed by the Environment Agency Project Managers.

3. Requirements

The tasks/categories of work to be covered by this framework are:

Geological Modelling/Mapping and data Extraction

- Review and interpretation of important stratigraphic boreholes using the Contractor's borehole archive and other relevant datasets (some third party) to construct a 3D geology model or 2D map.
- Improvements where necessary to current 1:10,000 and 1:50,000 geological mapping.
- Production of 3D geological models in Subsurface Viewer for specified areas of investigations
- Production of Structure Contour, Isopach, Rockhead elevation maps.

Interpretation and Data Delivery

- Summarisation of the stratigraphy, facies relationships and structure of the solid geology
- Description and delineation of geological/hydrogeological domains
- Digital output in ESRI (ArcView/ArcGIS) raster grid format derived from the 3D geology model or 2D map
- Production of geological cross-sections
- Production of project report providing interpretation and illustration of the 3D geology model or 2D map.

Resources

The Contractor's staff involved in the Task shall be detailed (including any subcontractors, associates, etc.) to produce a team to complete the work on time and to the necessary high standards. The role and responsibilities of each member of staff must be clearly indicated.

PART 4 FORM OF OFFER

TO: THE ENVIRONMENT AGENCY

CONTRACT REF: ECM_65707

FOR Provision of Geological Products

We hereby offer to fulfil the requirements specified in the Invitation to Tender, at the rates, prices, and other details contained in our Tender, and subject exclusively to the terms and conditions contained or referred to in the Draft Contract.

We agree that any other terms and conditions or any general reservations which may be endorsed on any correspondence or other documents from us in connection with this tender shall not form any part of our offer.

This offer shall remain open without time limitation, and will not be withdrawn before giving you not less than 14 days prior written notice.

We certify that:

- a) This is a bona fide offer and, subject to the exceptions contained in the Instructions To Tenderers, is not made in conjunction with any third party;
- b) The fact of, and details of our Tender have not been, and will not during the currency of this offer be, communicated to any third party.

Signed: _____

Name: _____

Position: _____

Dated: _____

Duly authorised to sign tenders for and on behalf of:

Tel No: _____

Fax No: _____

Email: _____



PART 5

DRAFT FORM OF AGREEMENT

CONTRACT No: ECM_65707

ESTIMATED CONTRACT VALUE: As noted in
pricing schedule
(Inclusive of VAT)

CONTRACT RELATING TO: Provision of Geological Products

CONTRACT dated 15/09/22 between :

(1) [REDACTED]
[REDACTED] ("the Agency"); and

(2) [] whose registered office is at [] and whose registered number is [] ("the Contractor").

IT IS AGREED as follows:

1. The provisions of the following documents form part of this Contract:
 - the attached 'Conditions of Contract' — 'Research and Development, Amended Aug 2018';
 - the attached 'Pricing Schedule';
 - the attached 'Specification(s)';and which, in the case of conflict, have precedence in the order listed.
2. In consideration of the Agency's obligations under this Contract, the Contractor shall complete and deliver to the Agency such Goods and/or Services and/or such Work (as the case may be) as the Agency may order from time to time within the Contract Period in accordance with and subject to, the provisions of this Contract.
3. NO VARIATION TO THIS CONTRACT SHALL HAVE EFFECT UNLESS AGREED IN WRITING BY AN AUTHORISED OFFICER OF THE AGENCY.

Signed for and on behalf of the Contractor:
the Agency:

Signed for and on behalf of

Signature:

Signature:.....

Name:
(BLOCK CAPITALS)

Name:.....
(BLOCK CAPITALS)

Position:

Position:



PART 6 – Terms and Conditions

Ref: ECM_65707 – Terms are as agreed between Environment Agency [REDACTED]
[REDACTED]

Title: Provision of Geological Products

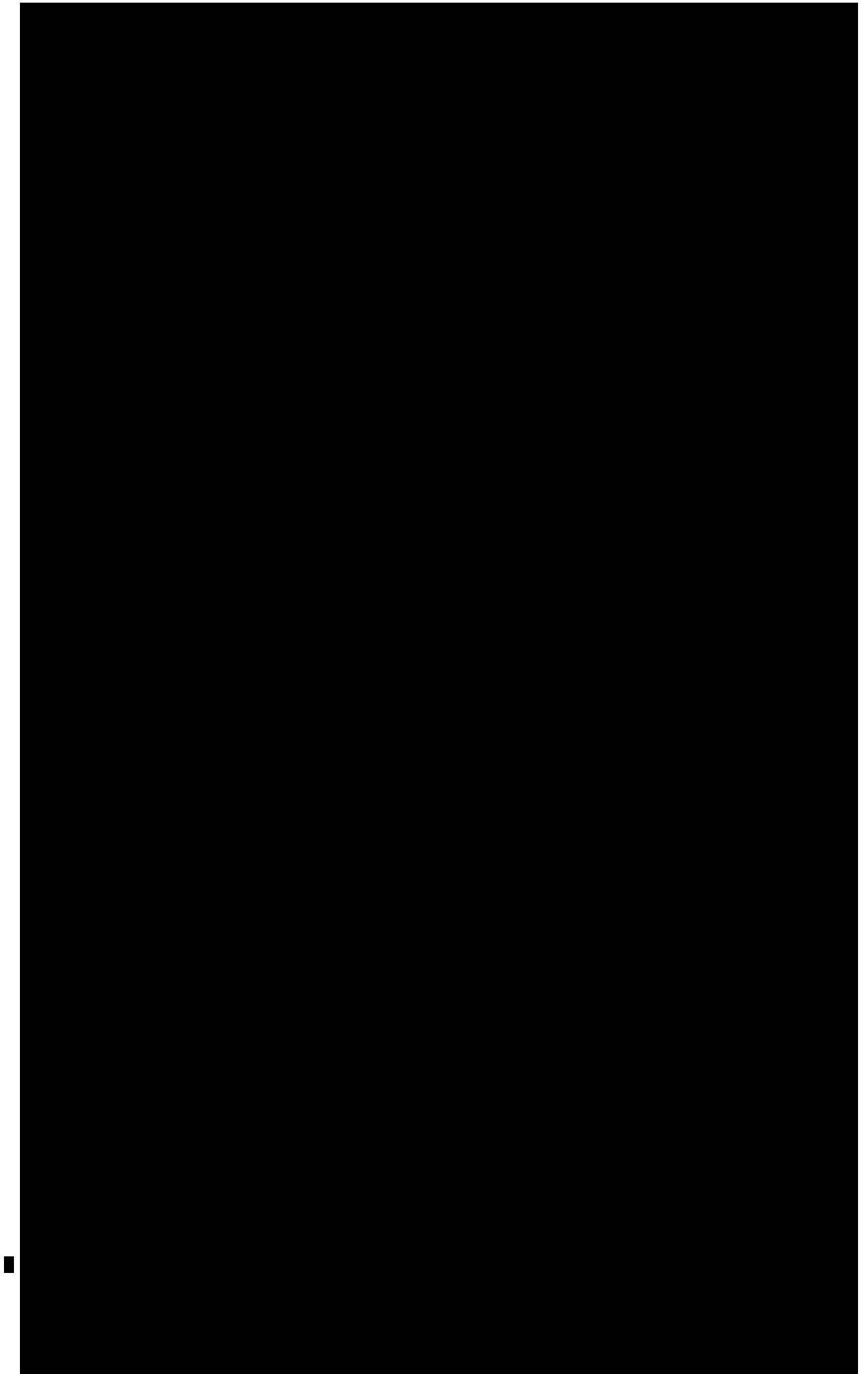
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2.	Precedence.....
3.	Contract Supervisor.....
4.	Services.....
5.	Assignment.....
6.	Contract Period.....
7.	Property.....
8.	Confidential Information.....
9.	Security.....
10.	Variations.....
11.	Extensions of Time.....
12.	Default
13.	Termination.....
14.	Determination.....
15.	Indemnity.....
16.	Limitation of Contractor's Liability.....
17.	Insurance.....
18.	Prevention of Fraud or Corruption.....
19.	Monitoring and Audit.....
20.	Contract Price
21.	Invoicing and Payment.....
22.	Intellectual Property Rights.....
23.	Warranties.....
24.	Publication of Results.....
25.	Statutory Requirements.....
26.	Environment, Sustainability and Diversity.....
27.	Law.....
28.	Waiver.....
29.	Enforceability and Survivorship.....
30.	Dispute Resolution.....
31.	General.....
32.	Freedom of Information Act.....
33.	Data Protection.....

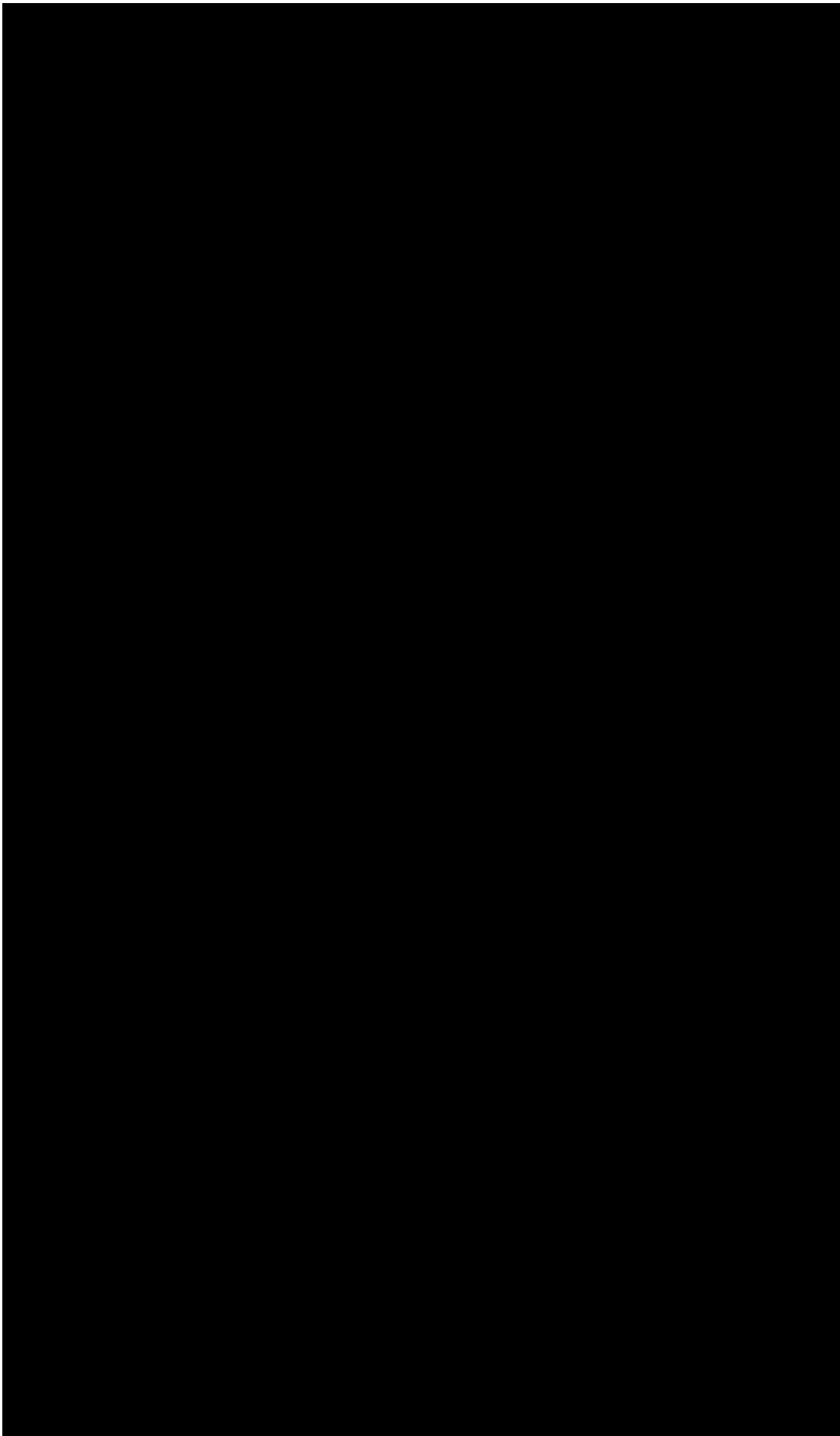
Appendix to Conditions - Research & Development.....

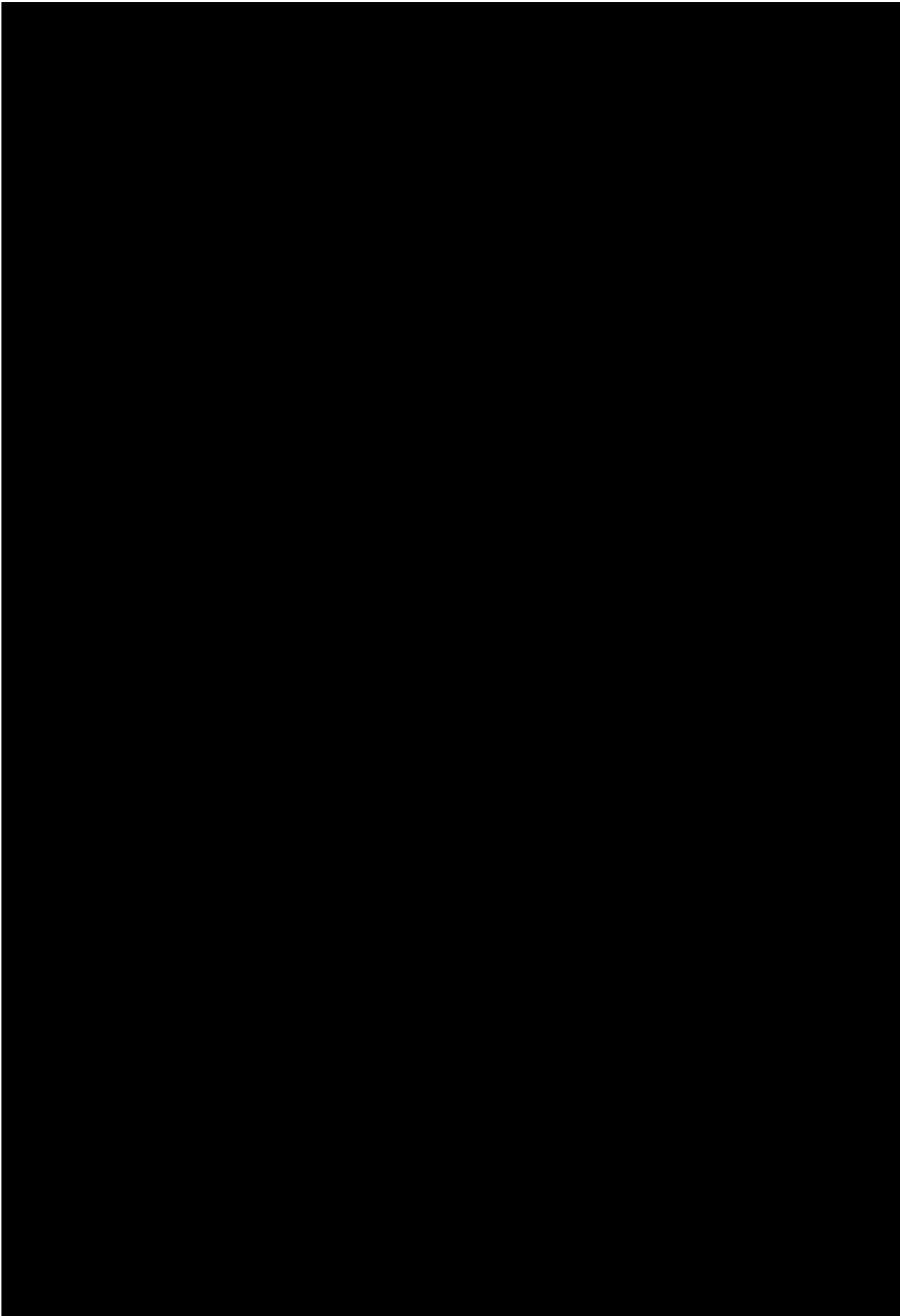
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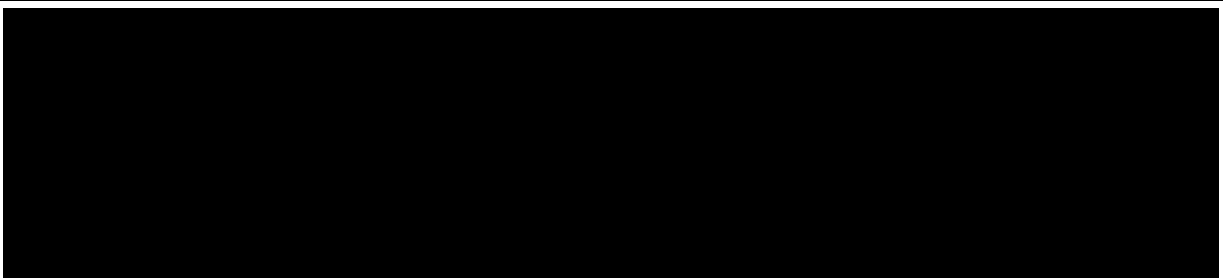
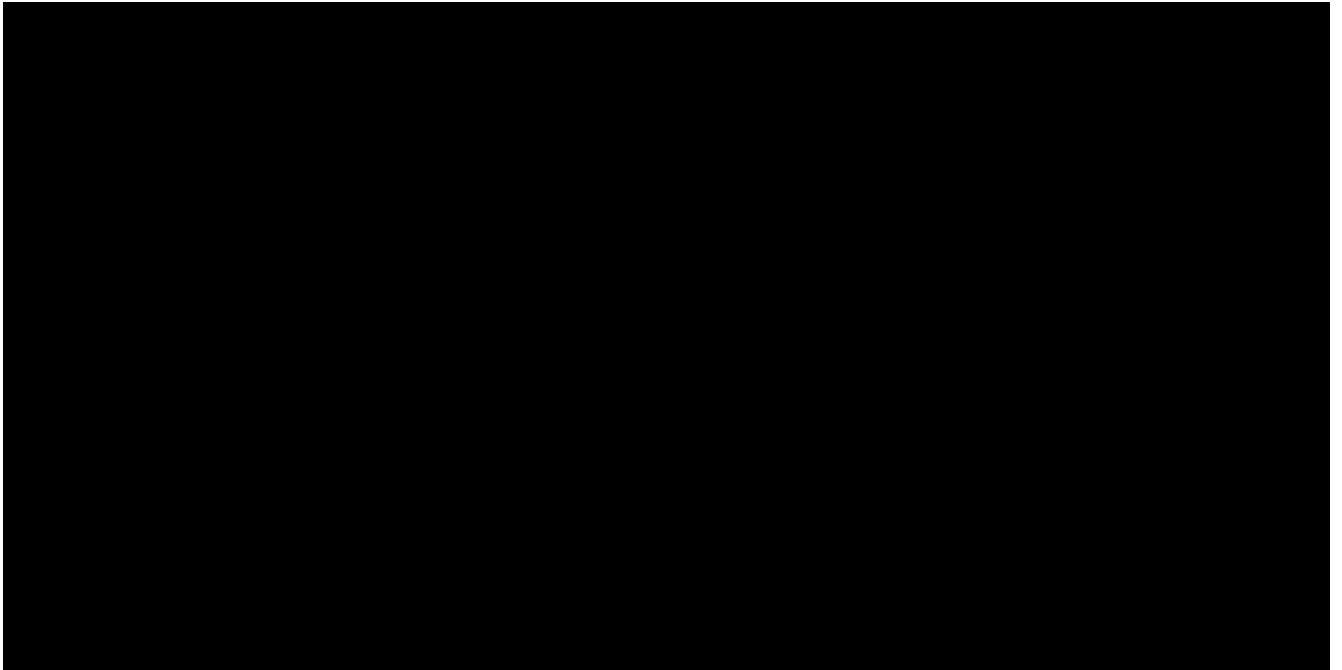
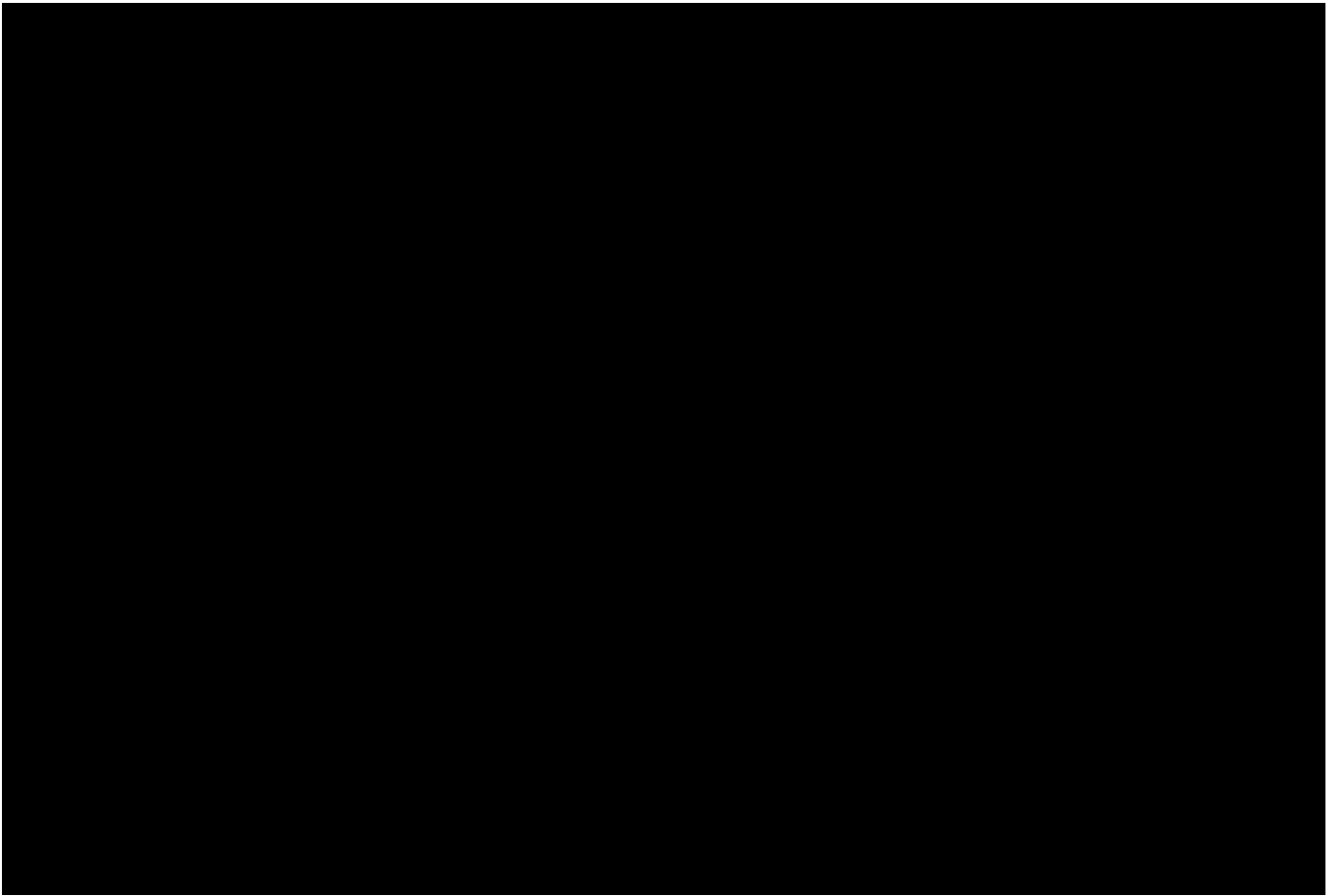
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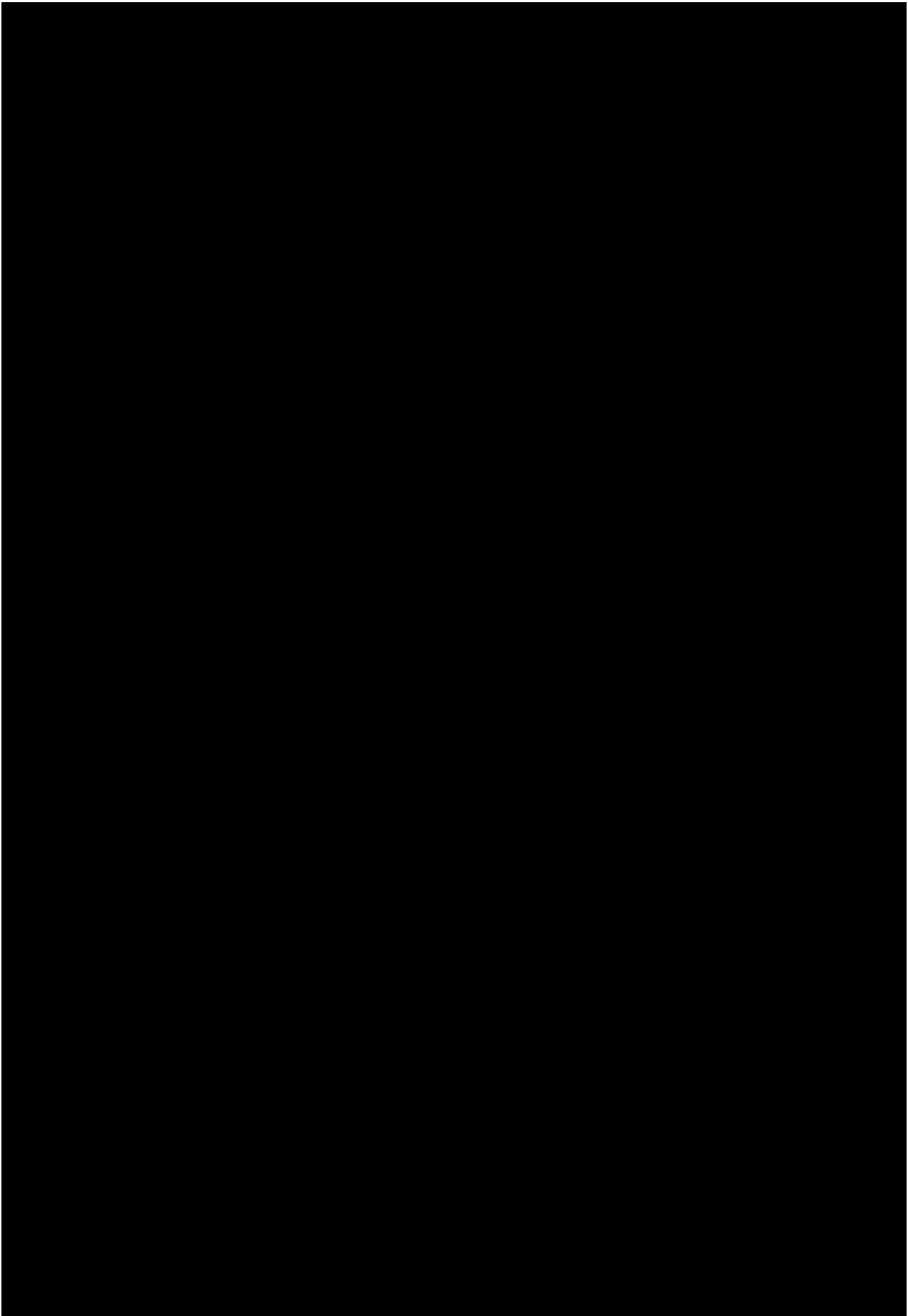
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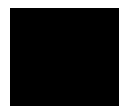
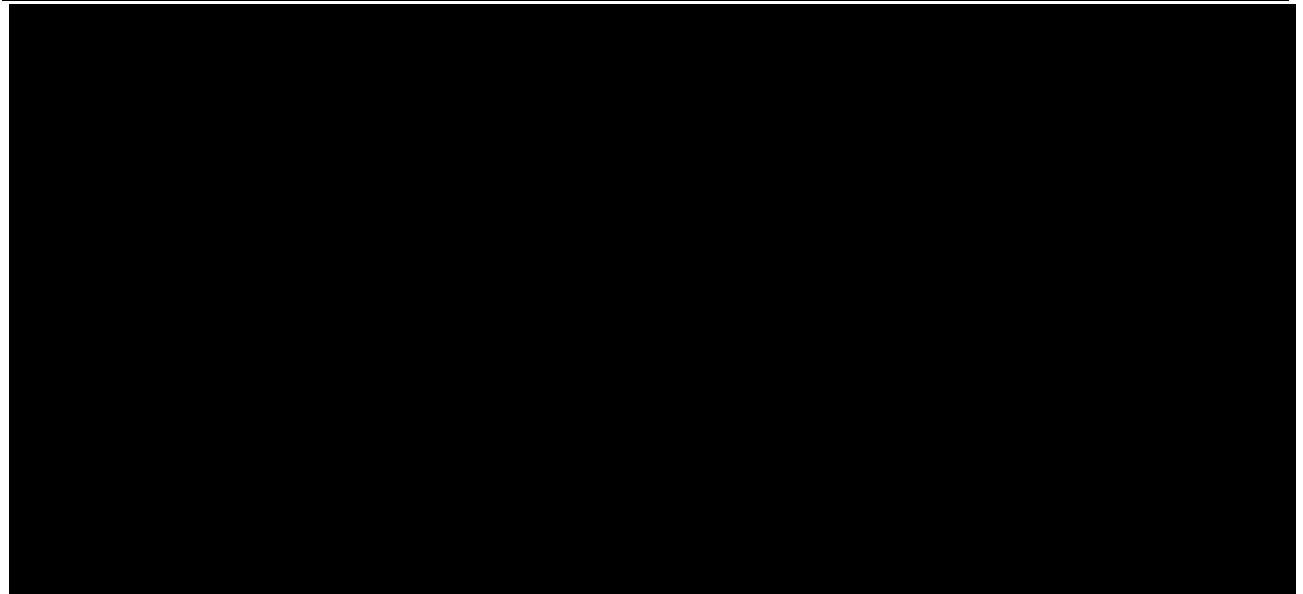
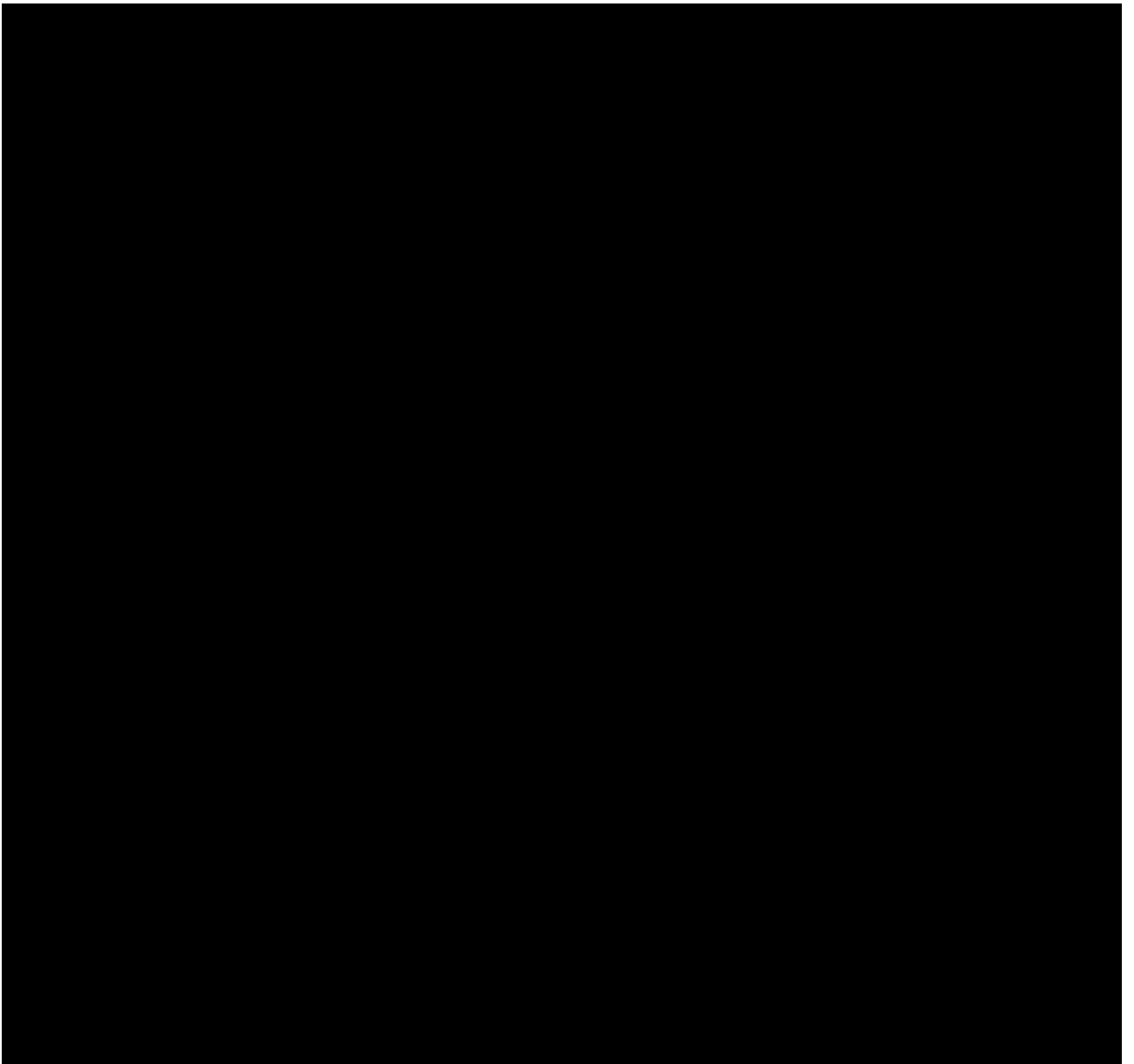
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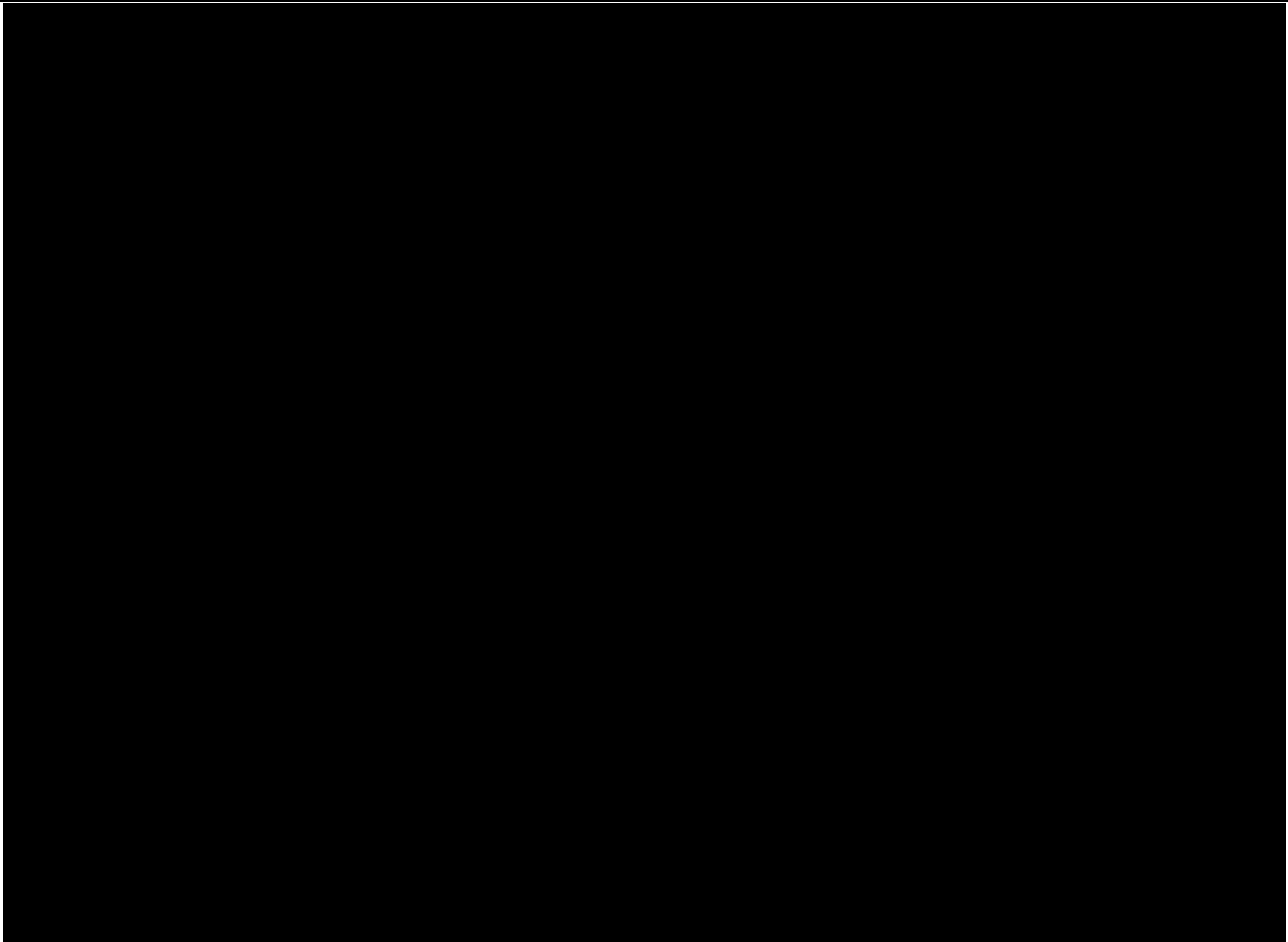
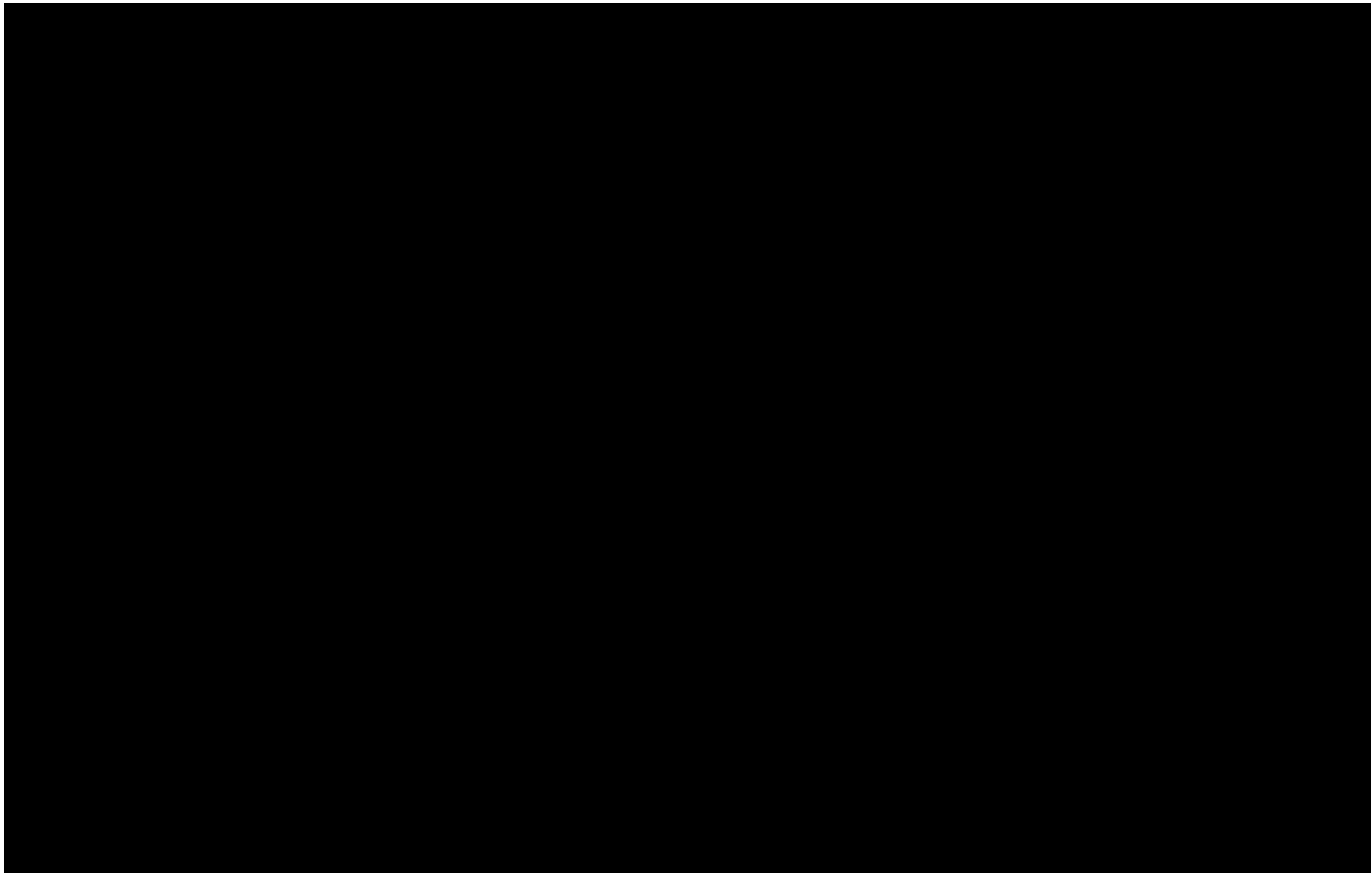
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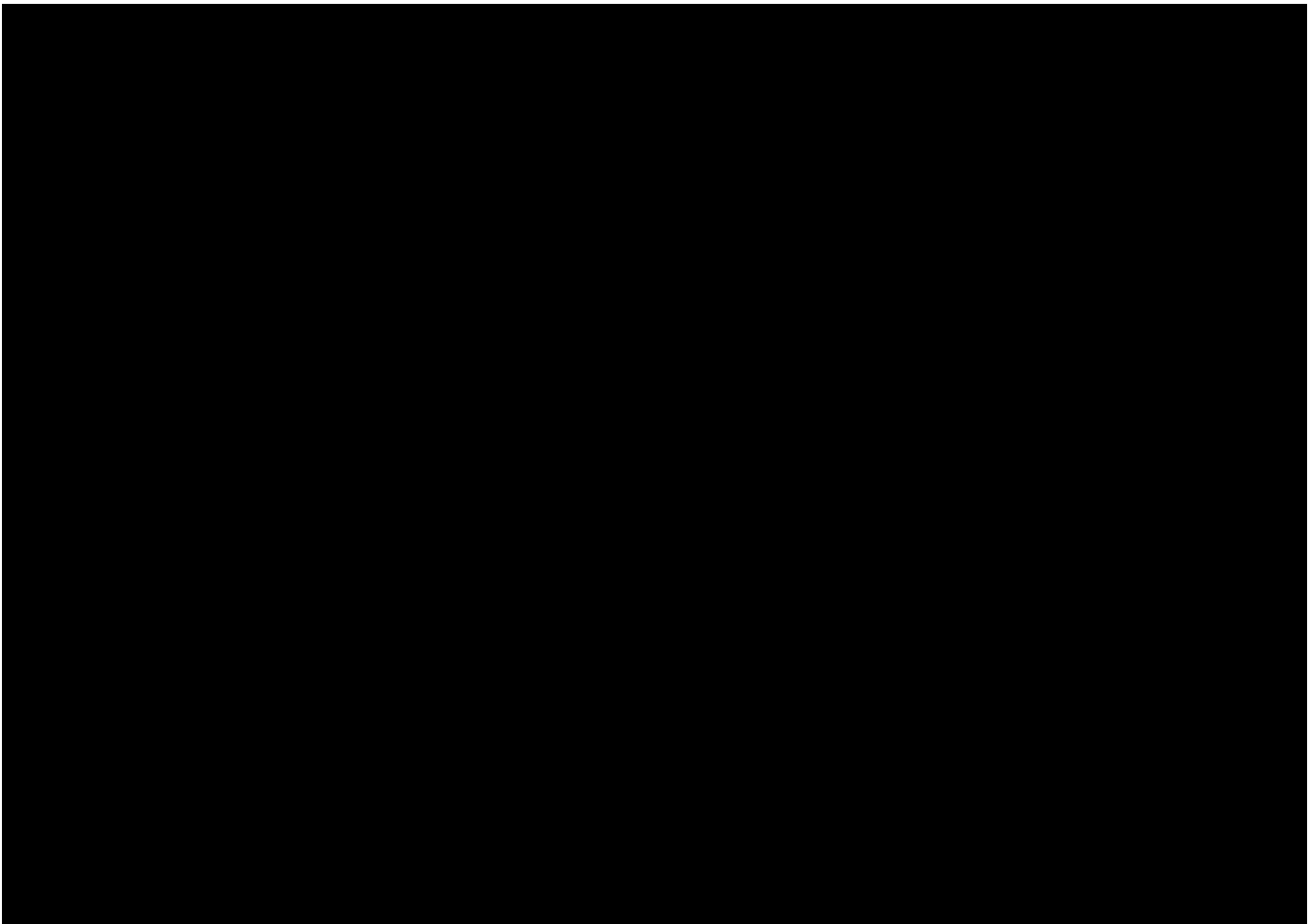


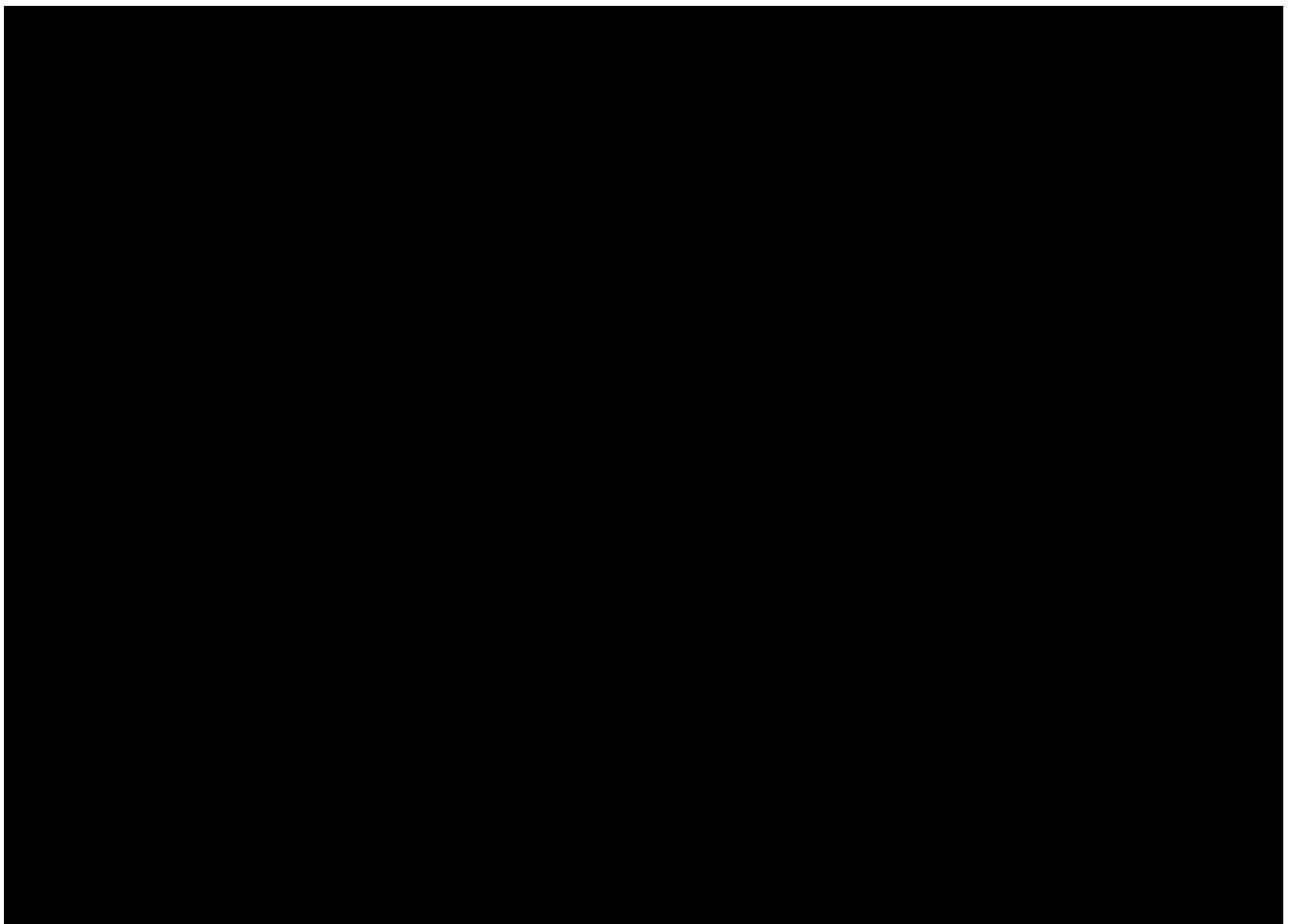
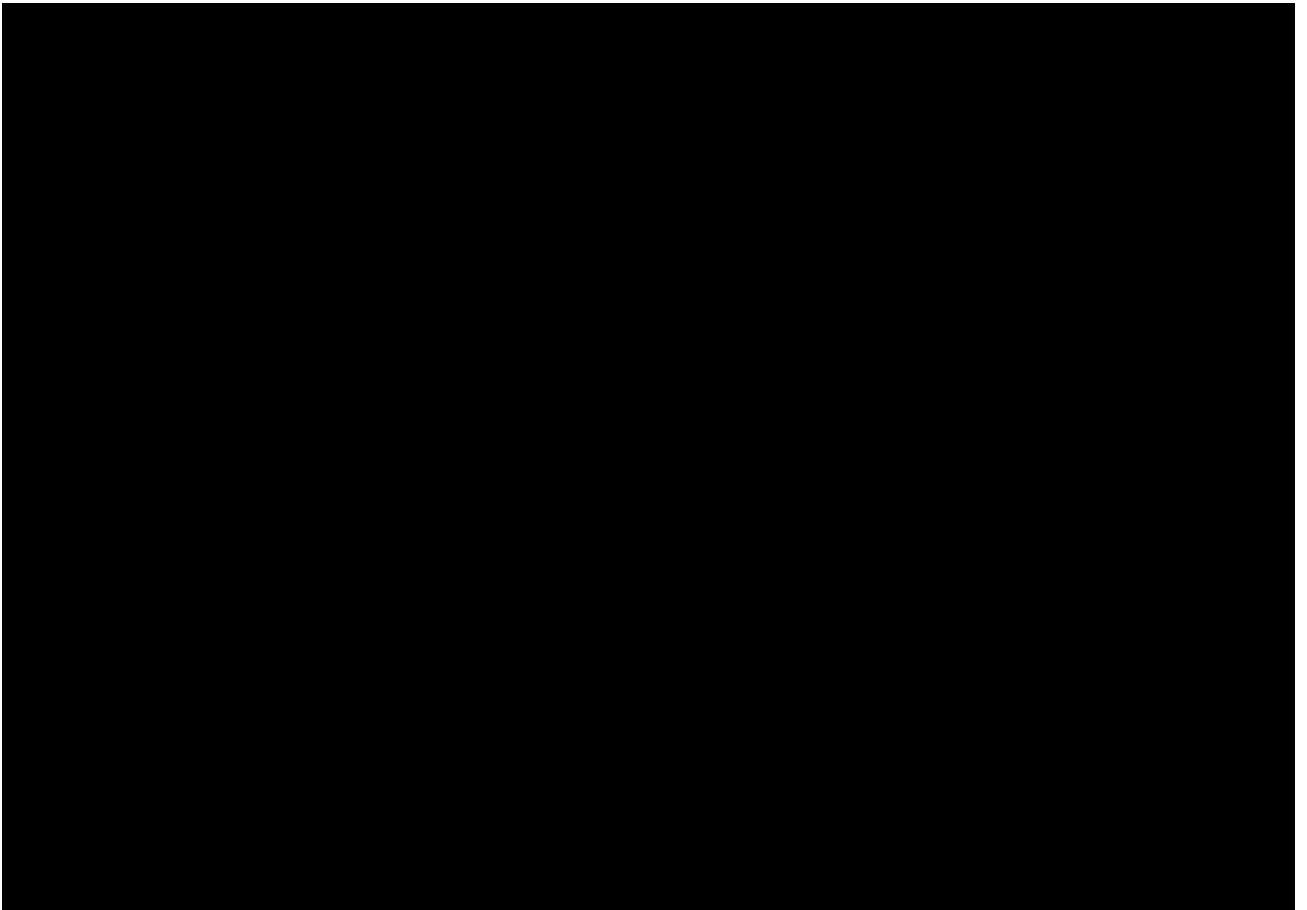


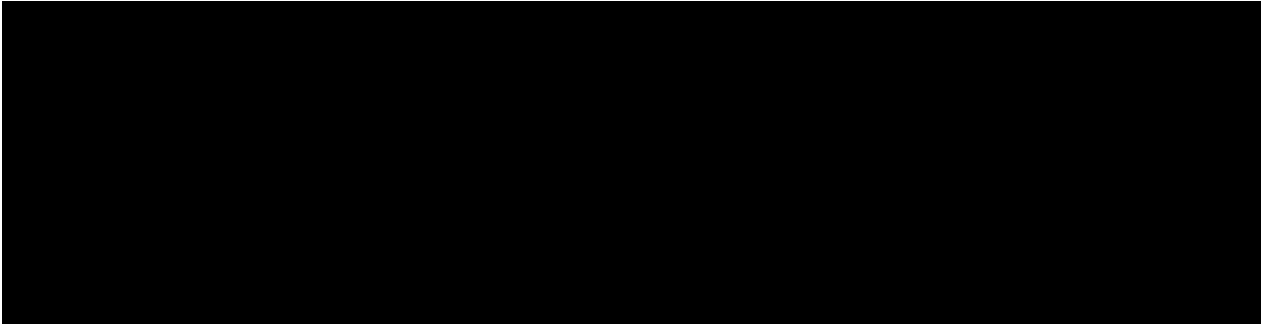
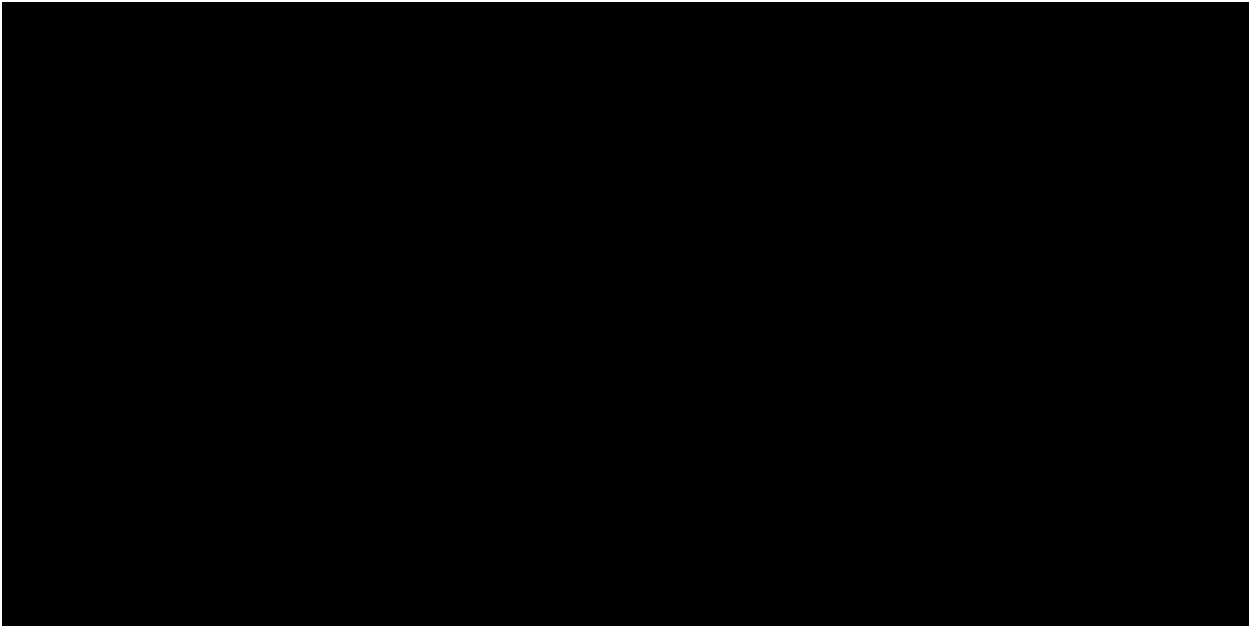
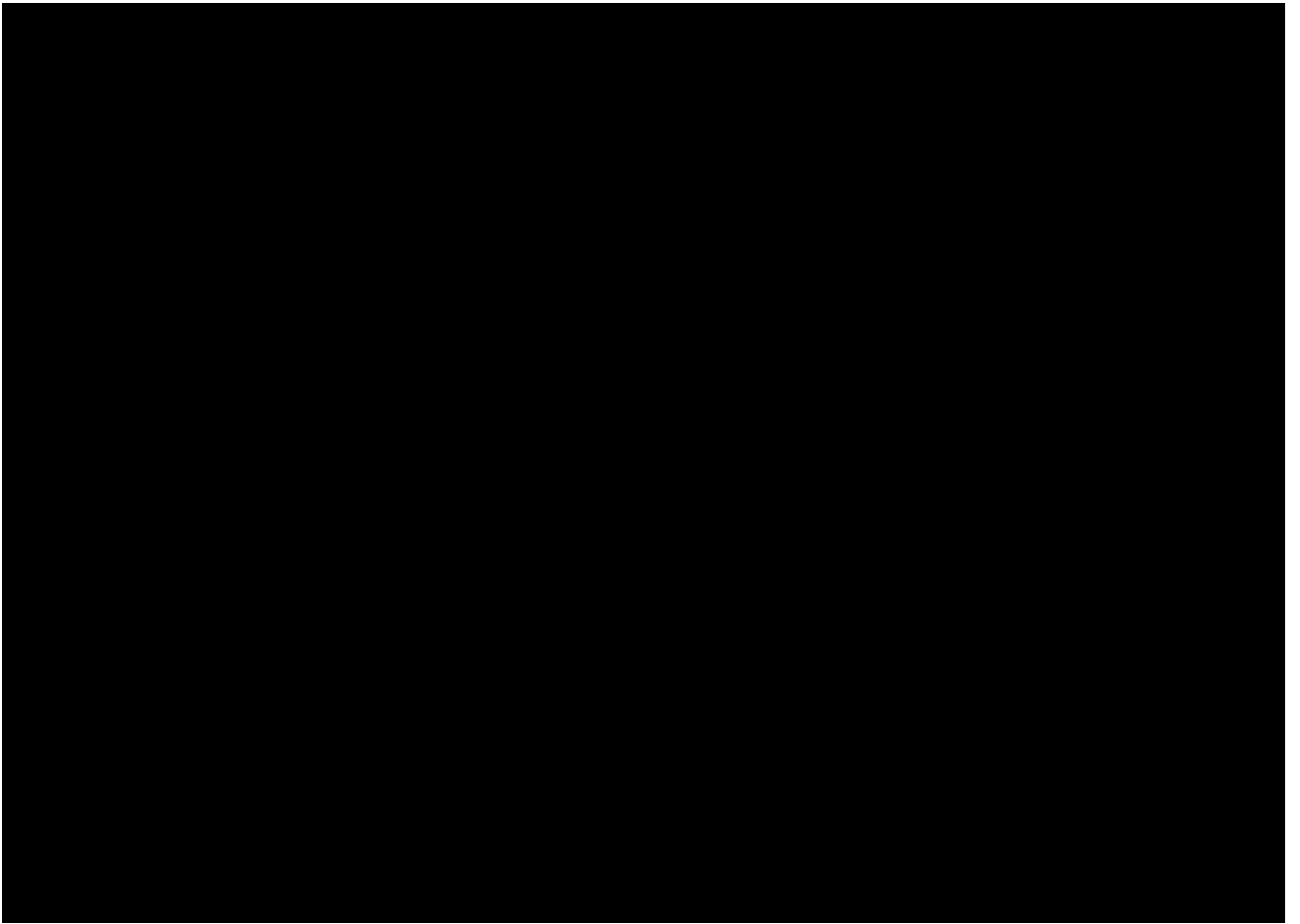


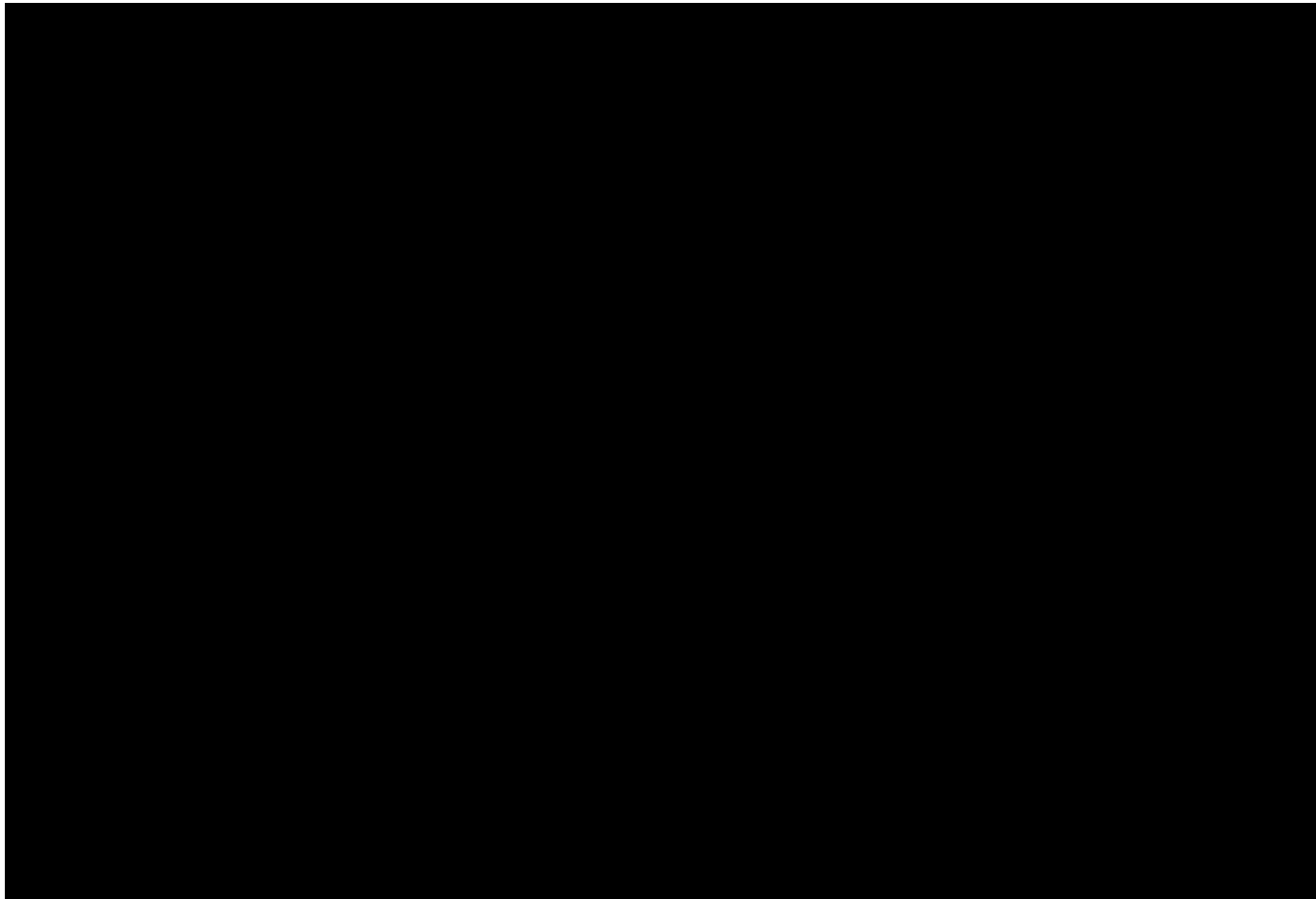


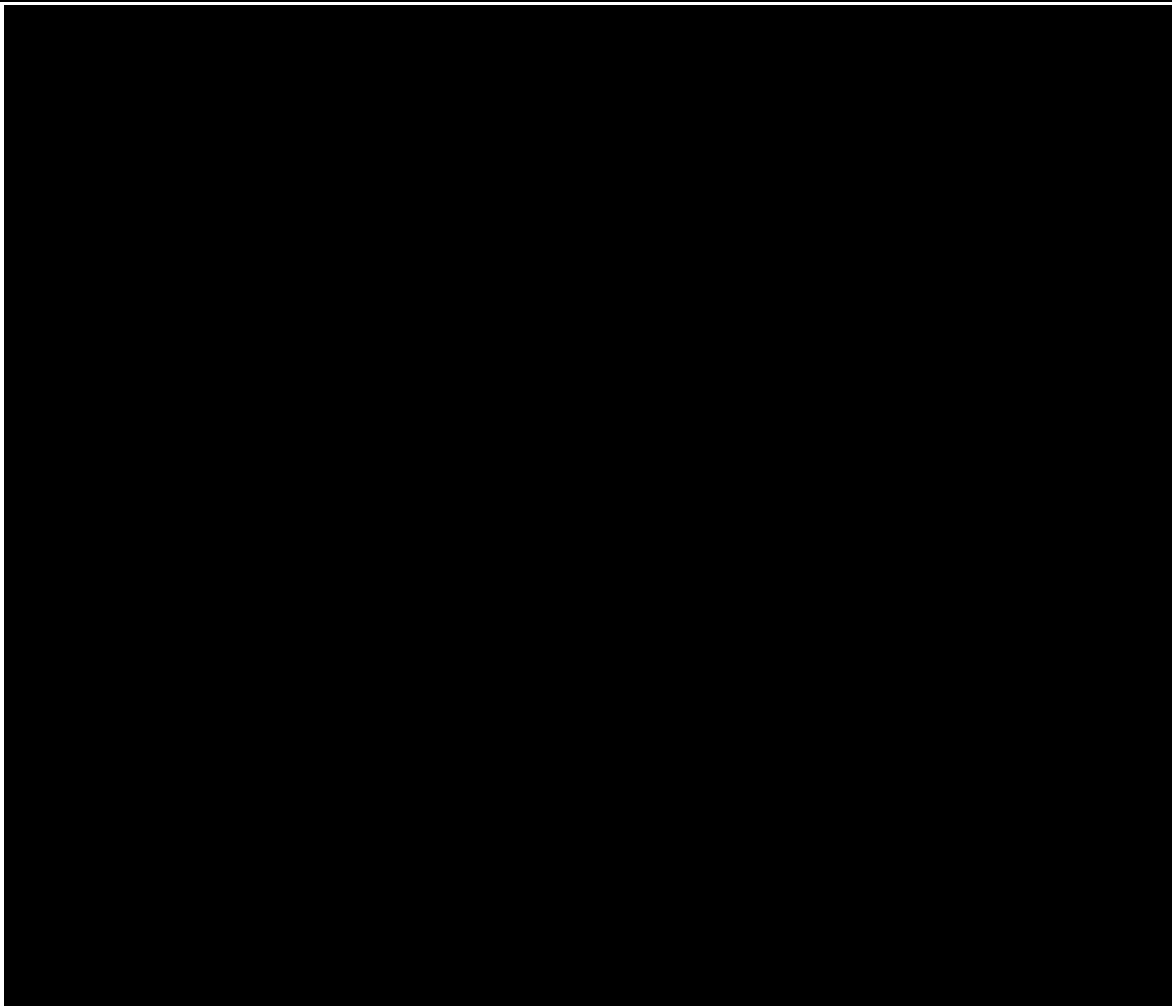
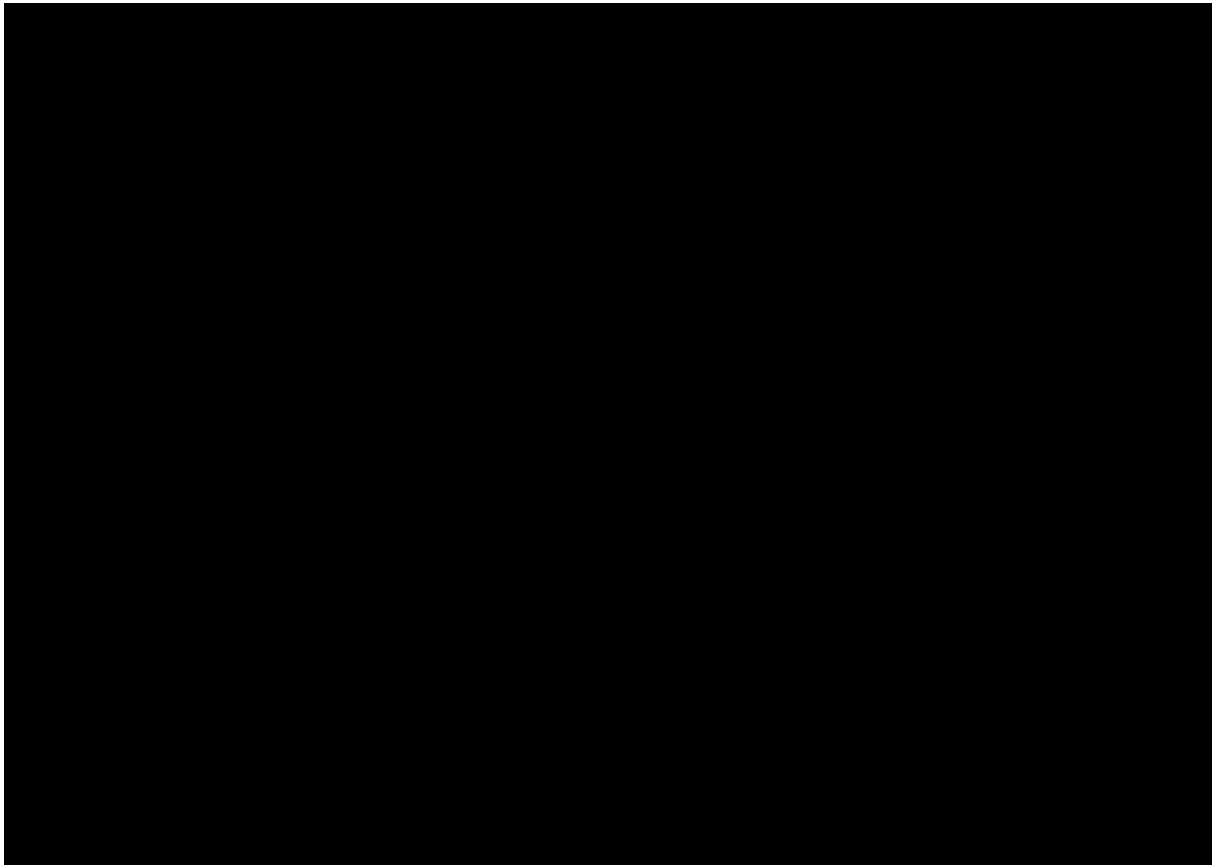


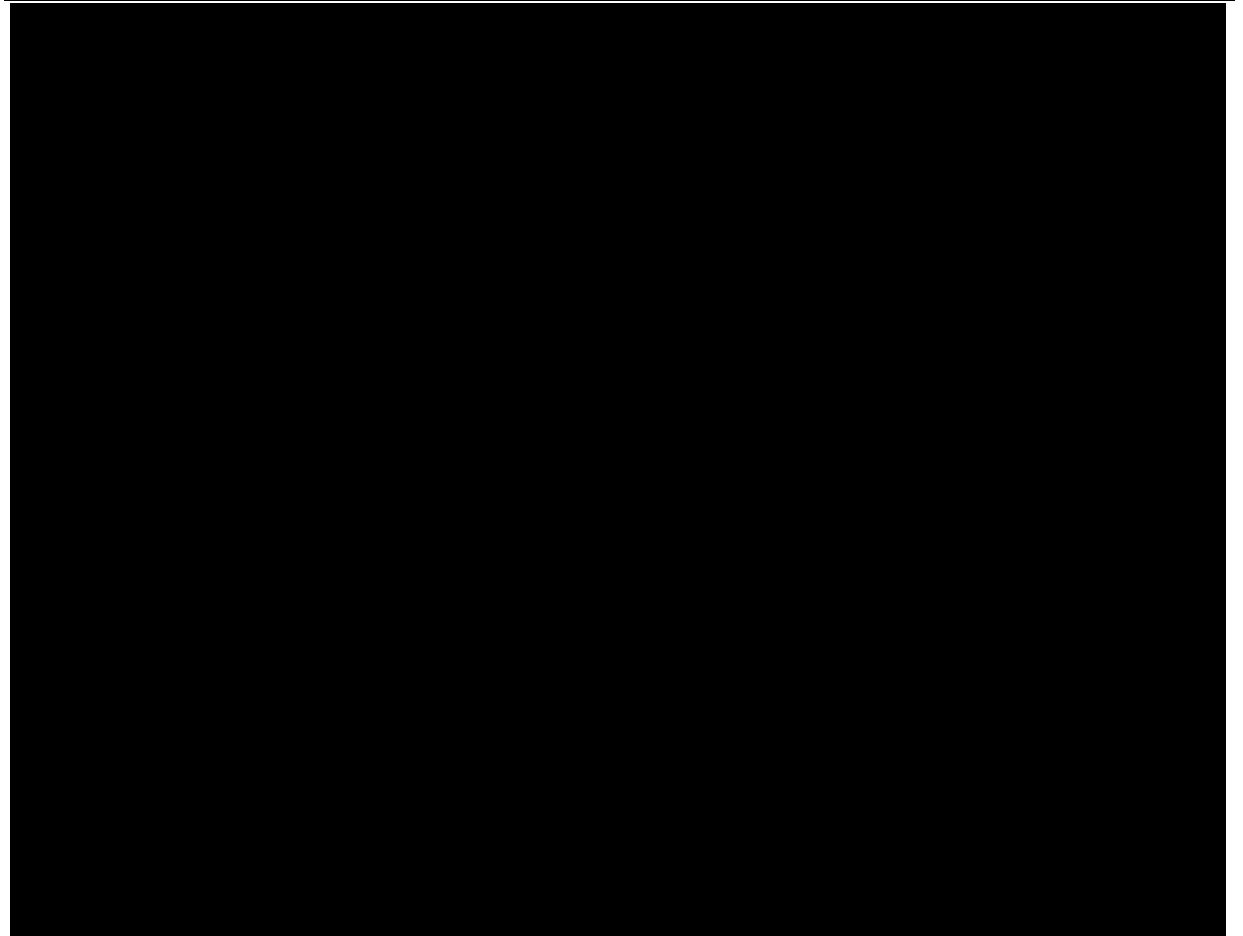
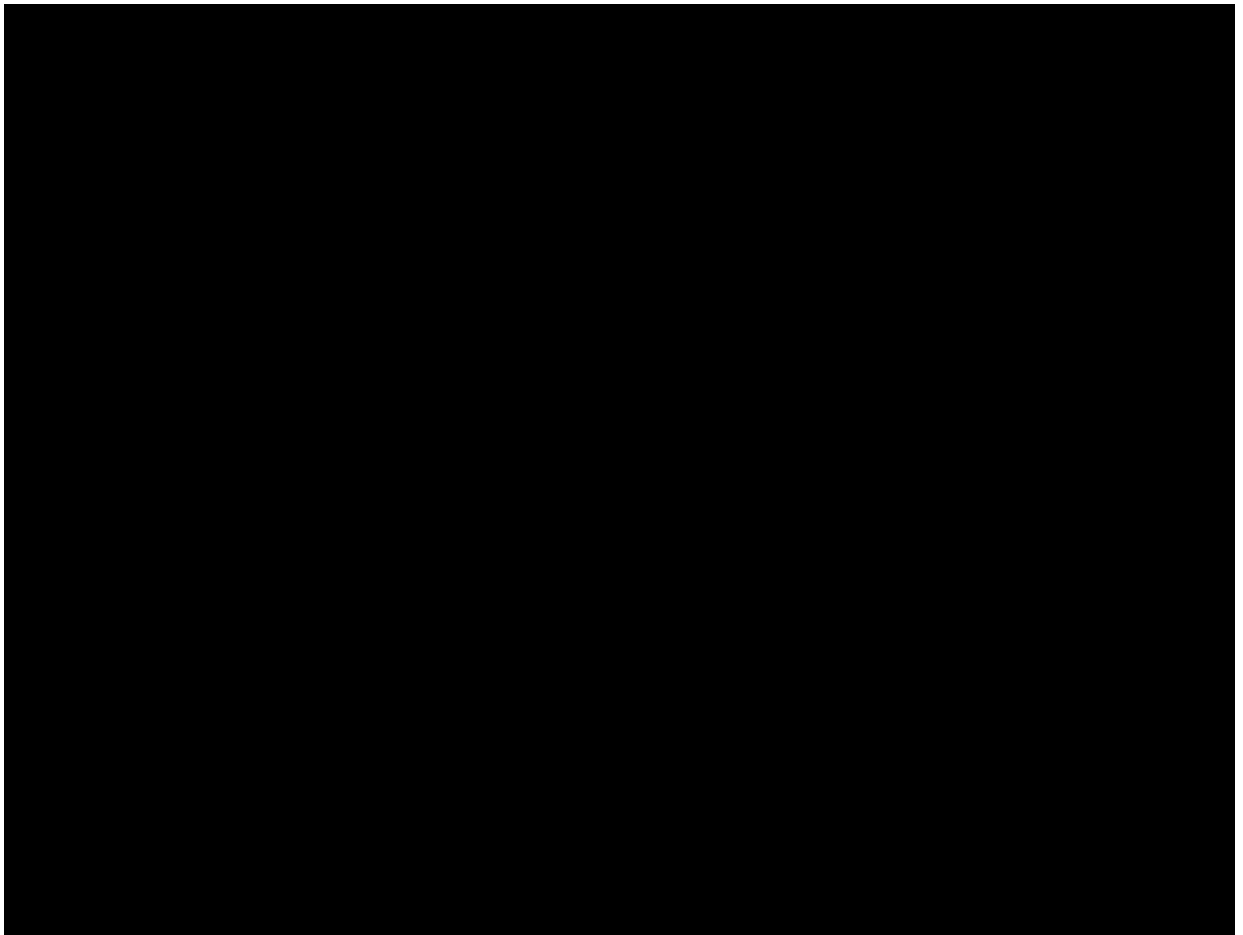


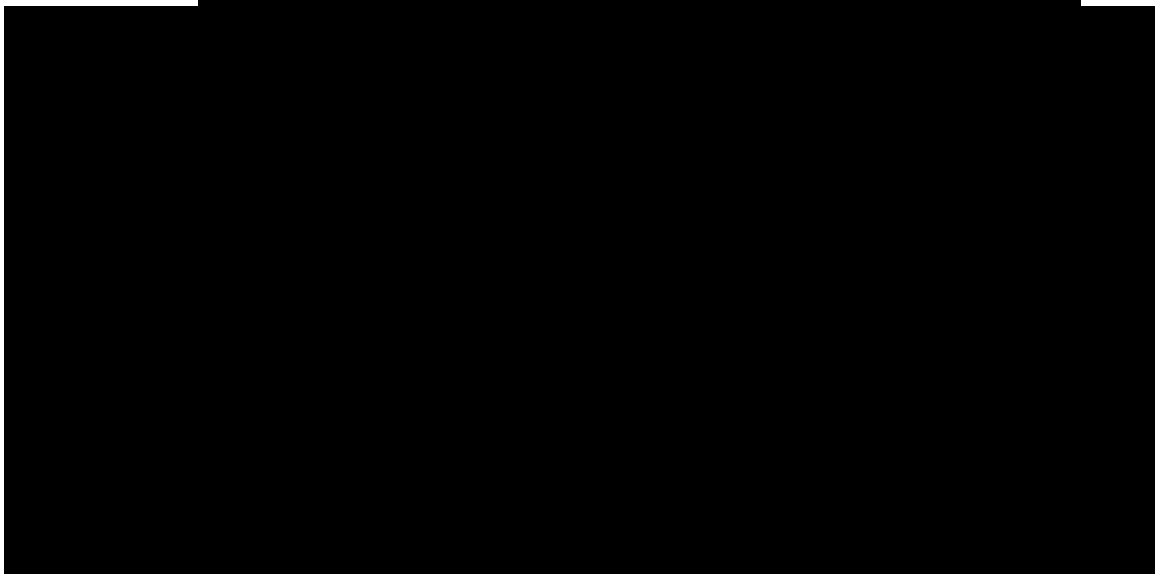


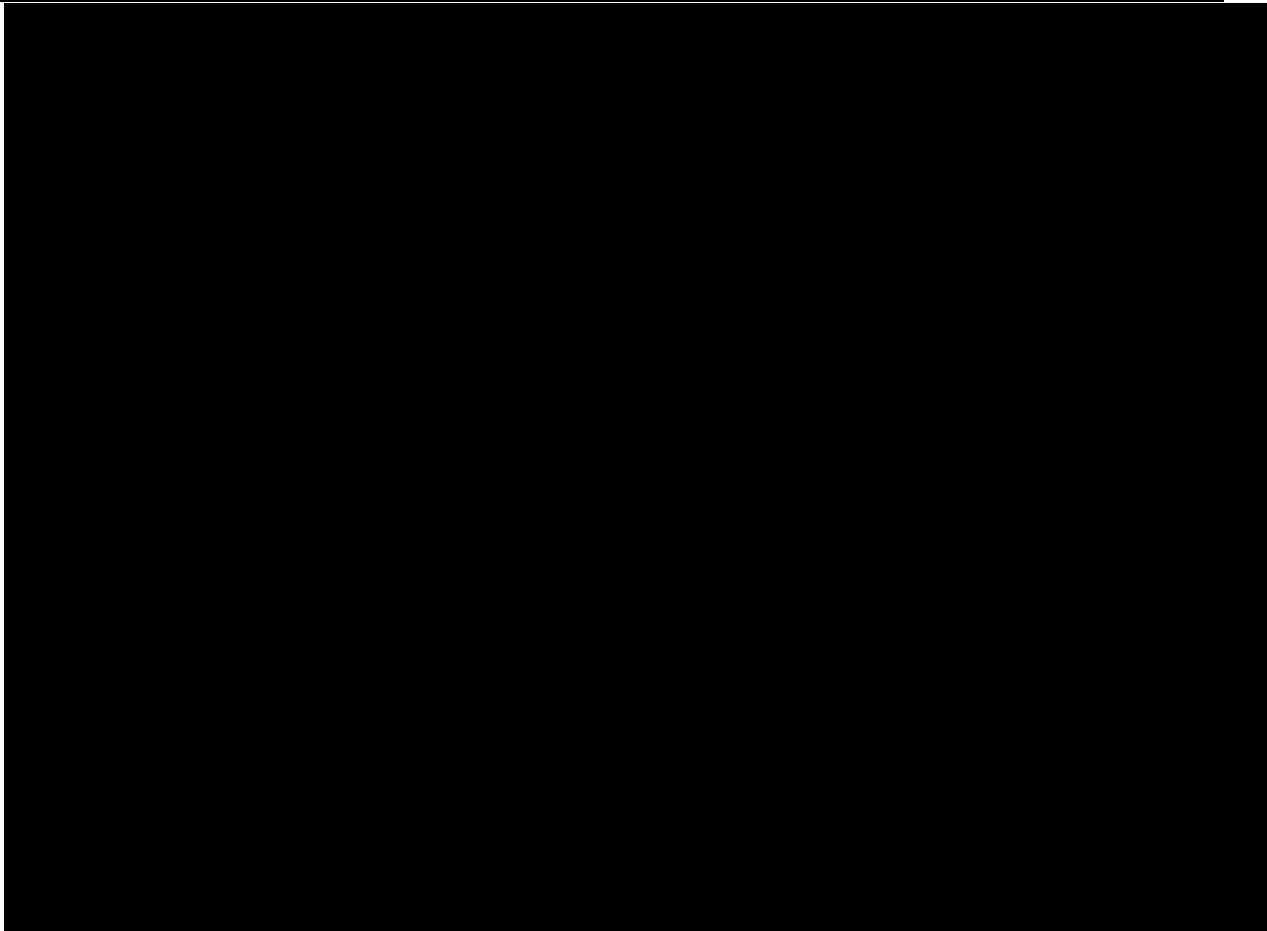
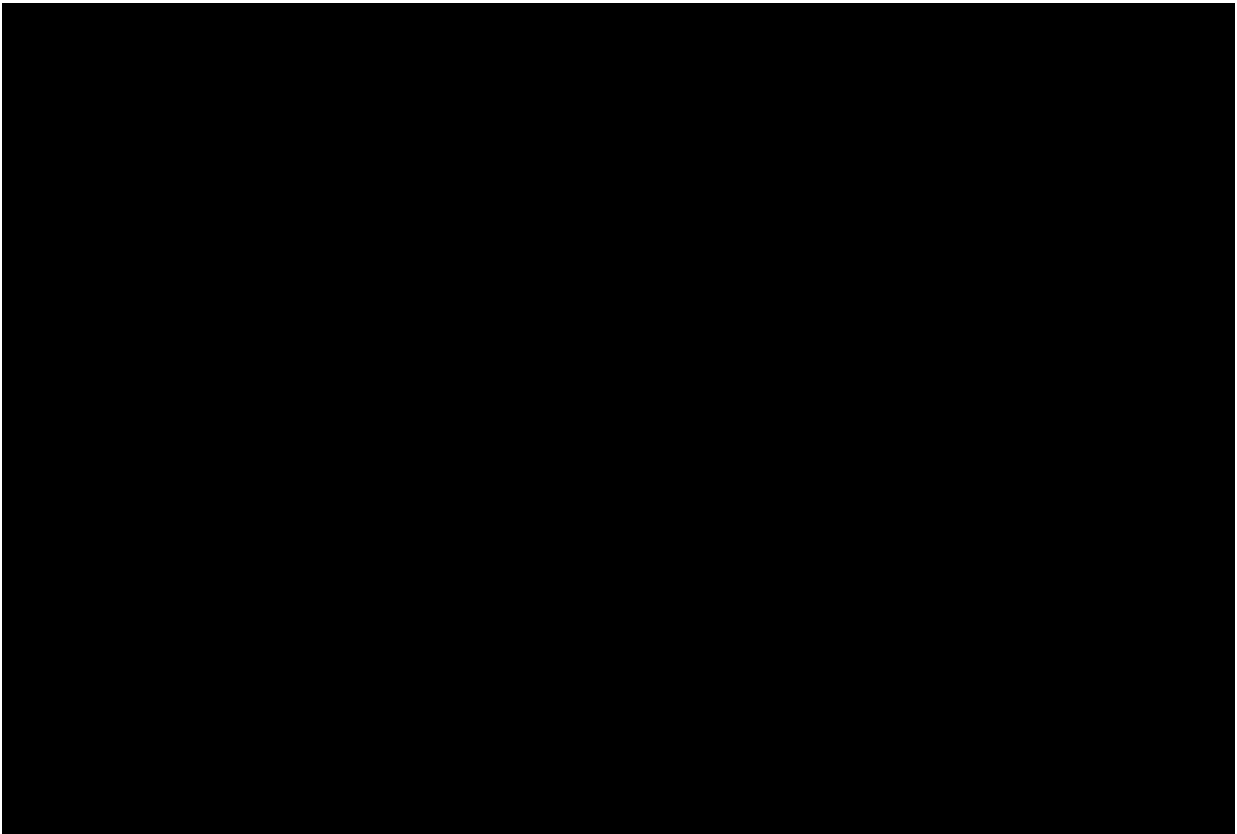












Appendix to Conditions Research and Development

Framework Ref: 22944

Title: Provision of Geological Products

		Condition
1	Contract Supervisor [REDACTED] Address:- [REDACTED] [REDACTED] [REDACTED] [REDACTED]	3
2	Contractor [REDACTED] Address: [REDACTED] [REDACTED] [REDACTED] [REDACTED]	
3	Completion Contract Start Date [REDACTED] Contract End Date [REDACTED]	6
4	Delivery Address:-	11
5	Insurance [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]	17
6	[REDACTED] [REDACTED] [REDACTED]	[REDACTED]



Appendix 1

Specification / Project Schedule for Contract ECM_65707

Project Specification:

Hydrogeological Model for the NE Coal Measures and the two study areas of the Northumbria Groundwater Flooding Project – an FCRIP innovation project run by Gateshead

Geological Work to be completed over a 3 year period (2022-24), completion of visualisation tasks 2024-2027 to incorporate non-BGS information.

An assessment, model and map of the hydrogeological properties of the superficial deposits and bedrock geology in the two following study areas:

1. Gateshead/ Newcastle (where the bedrock is predominantly the Pennine Coal Measures)
2. Spital area – (where the bedrock is predominantly the Scremerston)

Study Areas

Gateshead Area



Berwick -Spittal Area



User requirements:

- Sections, models and maps to be fit for purpose i.e. to design a conceptual and numerical hydrogeological/ hydraulic model to support a mine water/ groundwater flood monitoring and warning system

Year 1- Task 1

Draw/ construct regional and detailed cross sections as per the requirements detailed below – to be supplied as images and 3D polylines for specialist users (EA, TCA, flood risk modellers). Code key, deepest boreholes along the cross-sections, integrate coal mine plan data and provide a short accompanying text (PDF document)

Produced 3d visualisations (fly through) – supplied at video format file.

Year 2 - Task 2

Hydrodomains for Spittal and Gateshead study area superficial deposits – supplied as a JPEG/ PDF, GIS shapefiles and report (Word and PDF)

Year 2- Task 3

Detailed bedrock 3d geological model (format to be agreed) to inform the hydrogeological model and hydraulic model and mine water/ groundwater flood modelling and warning system.

Around 750 boreholes to be coded in total, across tasks 1-3

Year 2-5 - Tasks 4-5 Additional Visualisation work to be completed between years 2-5 (format to be agreed) for training and engagement purposes with stakeholders and local community (2023-27)

Produce 3D pictures, vertical sections, VR and AR to show non-technical audience geology, geological structures, connections and potential flow paths and flows below ground

Considerations required in design of geological and visualisation outputs are as follows:

A Geological/ Hydrogeological Considerations

- The outputs need to identify

The superficial hydrodomains and bedrock geology in the study area at a useable/ pragmatic resolution to identify recharge, pathways and discharge locations. The resolution will depend of areas of interest e.g. as follows:

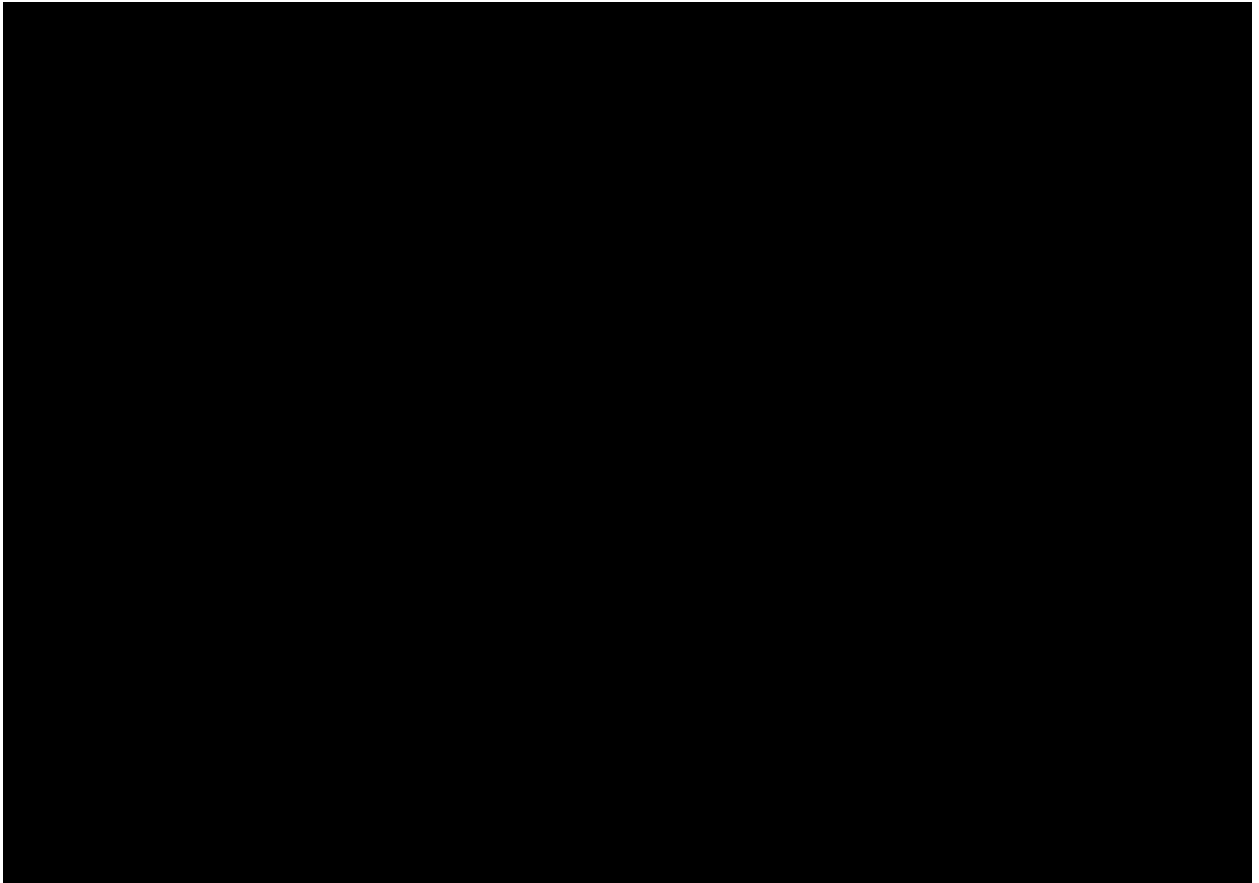
- Discharge areas - where potential diffuse discharges (geology controlled) i.e. in the river valleys where potential groundwater / mine water discharge points are expected to be located (at present control $\leq 10\text{m}$ AOD for the flooded workings and at locations of old spring lines and mine water discharges where perched groundwater/mine waters are present
- Recharge areas:
 - assessment of superficial deposits – determination of hydrodomains
 - Potential areas where permeable superficial deposits overlie bedrock sandstones and worked seams outcrop and subcrop
- Pathways – important worked coal seams, associated/ sizeable sandstones faults
- Potential for isochore map of the confining layer (i.e., the unsaturated, lower permeable bedrock strata

Shapefiles of Proposed section lines provided by TCA & EA (1 Regional and 2 Detailed). The sections lines are considered to be the starting point to decide where to focus the work re nature and spatial distribution of the superficial deposits and confining layers in the bedrock to identify areas of recharge and diffuse discharge via the geology.

These sections would then need to be modified to include the elevation of all types of connections linkages between the geology and the mine workings/ mine water blocks to help develop the 3D model quantitative flow/ hydrogeological model.

The sections would help identify recharge, discharge and flow paths when mapped with the hydrodomain assessment of the superficial deposits.





1. Regional cross sections of the overview of the geology of the NE coalfield - all red sections lines



Overview geological sections along these proposed lines or close to (clipped to just off shore, parallel to coastline unless you have data for offshore workings). Avoid going though too much faulting to simplify the drawing.

To include:

Bedrock elements:

Main worked seams

- Brockwell (S)
- Harvey(N)
- Hutton(L) and
- High Main(E) seams
- Shilbottle seam for northern most mine water block

Main structural geology:

- 90 Fathom Fault
- Causey Park Fault
- Stakeford Fault and Dyke



- Hett Whin dyke and
- Butterknowle

Coal Measures sandstones/siltstones:

- Grindstone post,
- Main Post and
- 70 fathom sandstone
- marine band (base coalfield be it base of PCM group and or base of Yoredale)

Superficial/ made ground (based on previous and existing hydrodomain classification of <5m (of all deposits no matter whether clay or sand and gravel), 5-10, 10-20 and greater than 30m) probably show anything greater than 10m, include buried valleys, Pelaw Clay

2. **Detailed geological sections for Northumbria Groundwater Project (led by Gateshead Council (black dashed section lines) Blaydon mine water block to the Algernon- Hebburn/ Walker boundary, and the two section in the Scremerston Mine water block, Spittal/ Berwick.**

The detailed sections to include:

Main worked coal seams

- High Main Seam (E)
- Maudlin (Bensham) Seam (H)
- Durham Low Main Seam (J)
- Hutton Seam (L)
- Harvey (Beaumont) Seam (N)
- Busty Seam (Q) or Bottom Busty Seam (Q2) – note that the seam splits in the area to Top and Bottom Busty
- Brockwell Seam (S)

Coal Measures sandstone units

- High Main Post
- Maudlin Sandstone = sandstone above the Maudlin Seam. There can be a mudstone above the Maudlin, and the sandstone unit can become more mudstone dominant
- Hutton Sandstone = sandstone above the Hutton Seam
- Harvey Sandstone = sandstone below the Hutton Seam and above the Harvey Seam and separated to the Harvey Seam by mudstone. It is sometimes split by a mudstone unit, or the bottom is mudstone
- Busty Sandstone = Sandstone above the Top Busty Seam, it can be fairly interbedded with siltstone and mudstone
- Brockwell Sandstone = sandstone above the Brockwell Seam

Superficial geology (possibly add a minimum thickness criteria)

- Clay dominant units
- Sand & gravel dominant units
- Pelaw Clay
- Buried valleys
- Made ground

Structural geology

- Large faults
- Igneous dykes



- Base of the Pennine Coal Measures Group – this may need interpreting if it hasn't already been contoured

We don't think the detailed section line would have the 70 Fathom Post, or Grindstone Post, but if they are present, they need adding

Note that the CA may have additional geology shaft sections which are not captured within the Geoindex- in that there are cases where shaft logs are recorded on the mine plans. Whilst we are not aware of or have no current intention to look at what is shown on the plans or to check if the known borehole scans are in the correct place, if you come across areas along the sections where there are large gaps in data the CA can look giving BGS rights to review the specific relevant mine plan data.

B Visualisation Considerations can be based on construction of 3D digital geological models of the natural geology and interconnected worked seams, potentially with other information on built infrastructure (subsurface and surface). Incremental work tasks could be built into the project to align with available information/models and project needs, e.g. (likely with increasing difficulty and cost?):

- High-level video flythroughs of the regional geology. (Delivery 2022-23)
- Detailed visualisation (as fly-through videos and/or interactive tools) of specific locations, especially showing potential groundwater flow pathways in discharge zones from mine workings through point (e.g. adits) or diffuse (superficial deposits) sources into near-surface infrastructure (e.g. constructed wetlands, storm drain networks), under different pumping (pumped, not pumped) and climate (normal, flooded) conditions, also showing planned interventions and their potential effects (Delivery tbc)
- Virtual reality / augmented reality tools for all the above

Both the detailed and ballpark costs are required for inclusion in the 5-year project in terms of a 3D model (conceptual/ detailed for non-technical audience's understanding) – this can be refined at a later stage as we progress through the project. Visualisation material can provide valuable contributions to several of the project objectives, including:

- support for the project technical teams in hydrogeological conceptualisation and building of quantitative hydrological models,
- impact assessments (e.g., to support incident management teams), and
- wider stakeholder engagement.

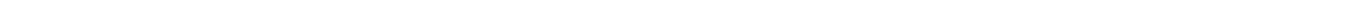
Note: as mentioned it would be good to align these with related activities, e.g., ground source centre at Hebburn, who are looking at their engagement activities, and other organisations e.g., CA and LA's Universities, and projects where digital geology, visualisation and engagement is being produce in the study area (or NE) is linked/pulled together by working in partnership to gain bigger wins for all concerned. This would collate work already done and build on gaining the bigger wins for all concerned. This would ensure we are all using the same evidence base, understanding etc to understand groundwater/ flood risk management and warning systems, speed up regulatory processes, design, locating and implementing subsurface infrastructure.

Technical Proposal; include list of main & sub tasks and deliverables:

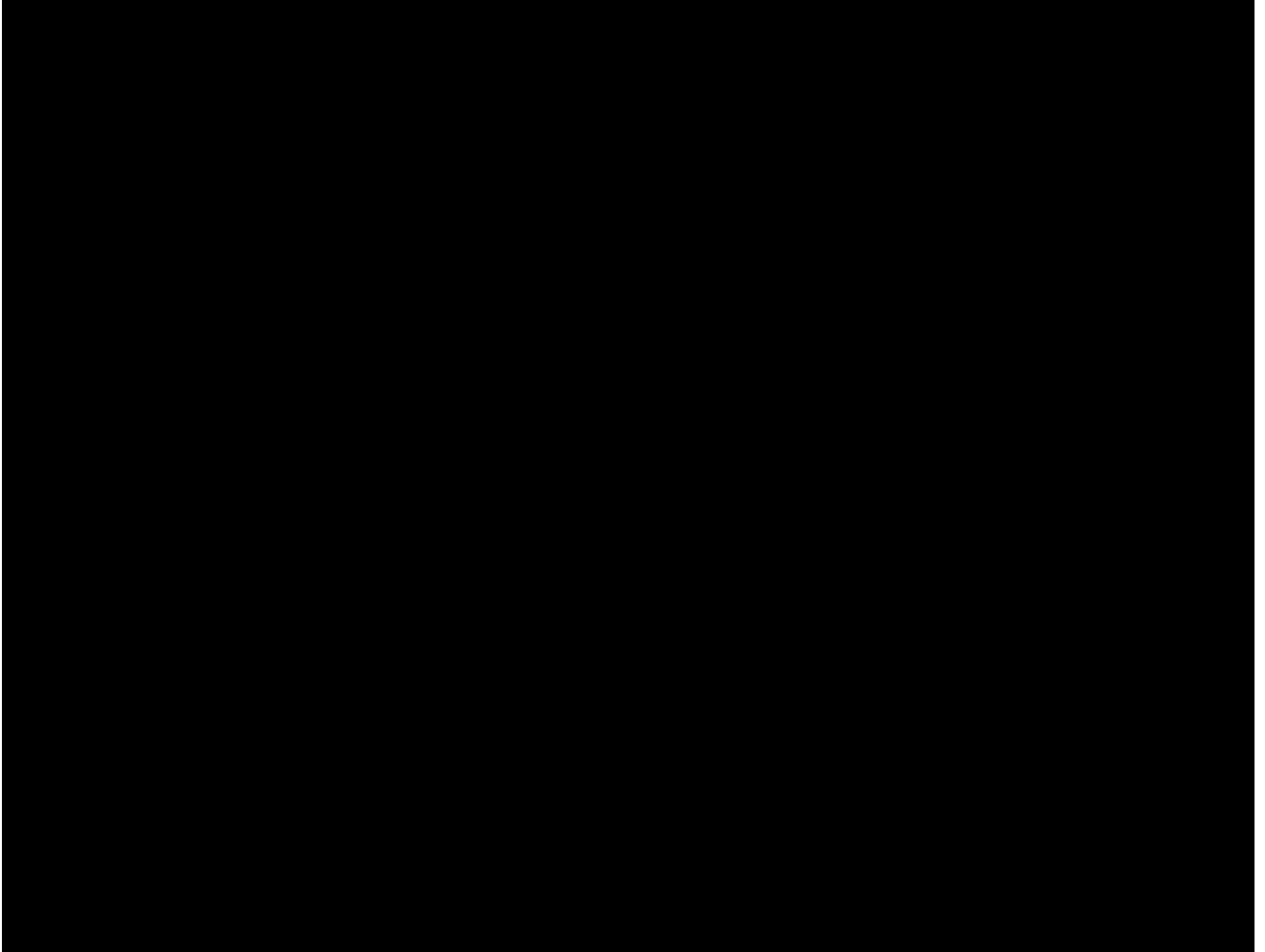
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Proposed Resources; identifying key Personnel CVs:





Appendix 2



Submission date: 07/07/2022

Edited delivery timescale 13/09/2022



[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



[REDACTED]

[REDACTED]

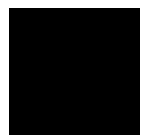
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[REDACTED]

Introduction

[REDACTED]

[REDACTED]



[REDACTED]

[REDACTED]

[REDACTED]

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- [REDACTED]
- [REDACTED]
- [REDACTED]

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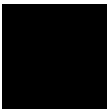
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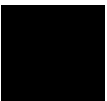
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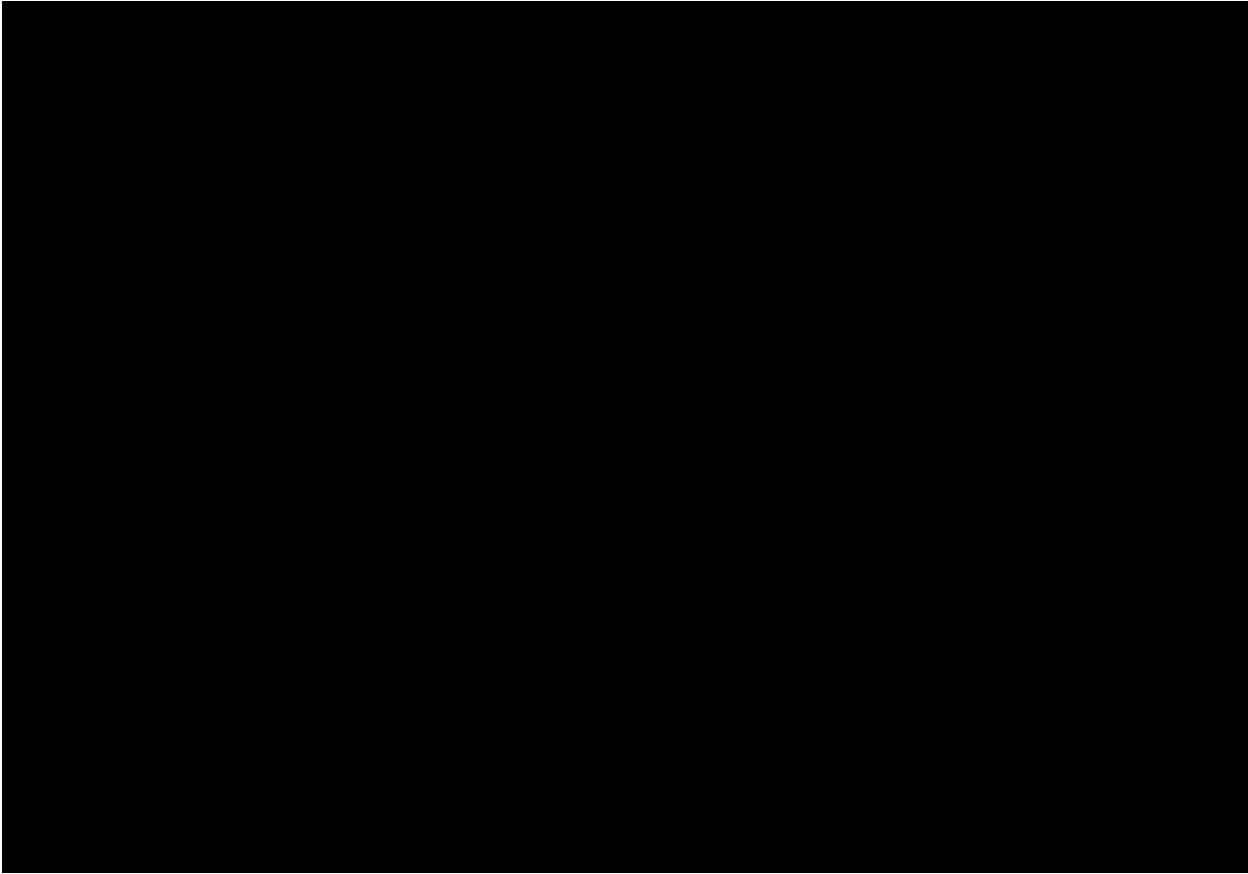
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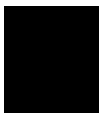
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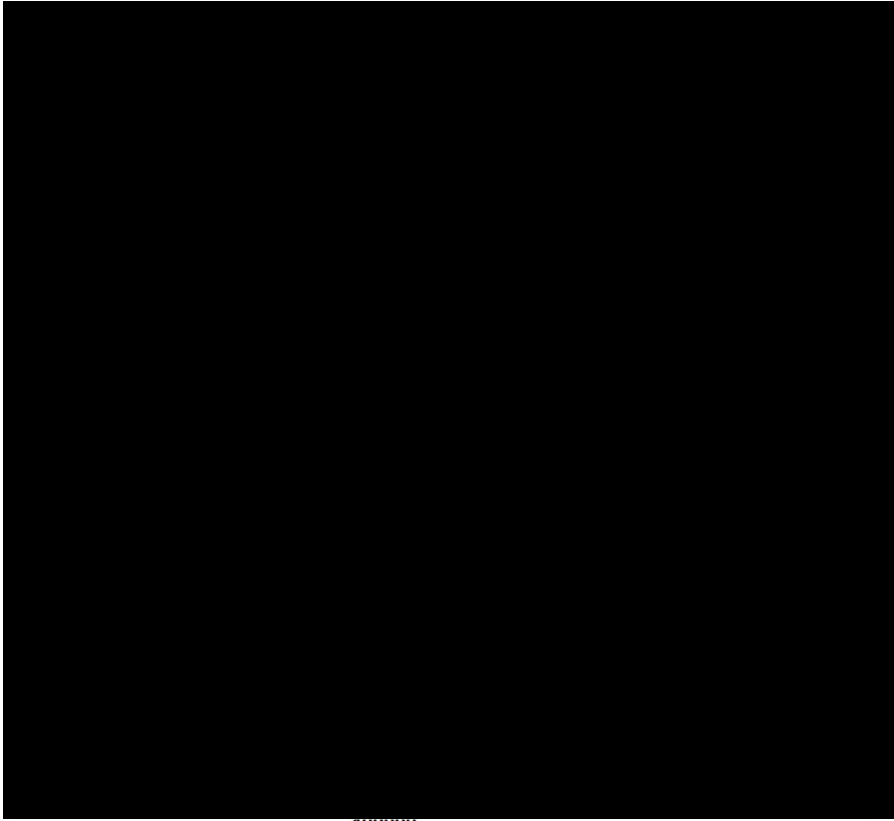


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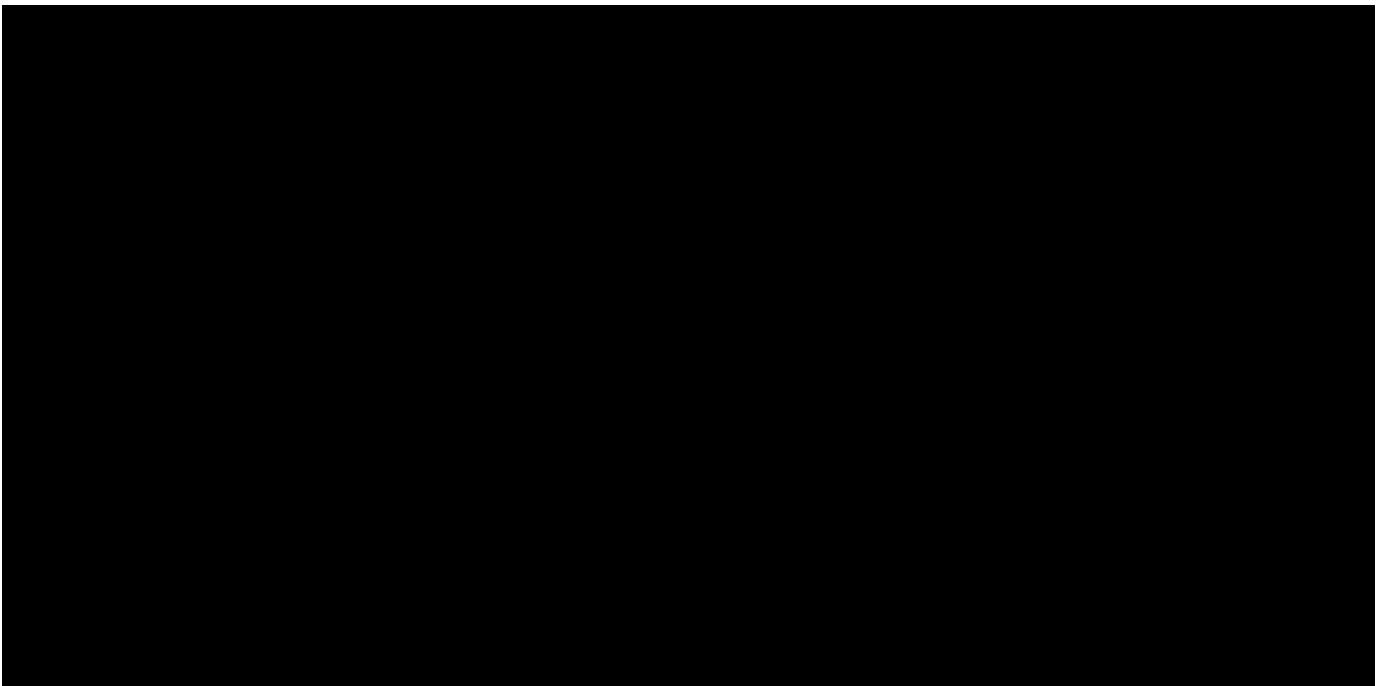
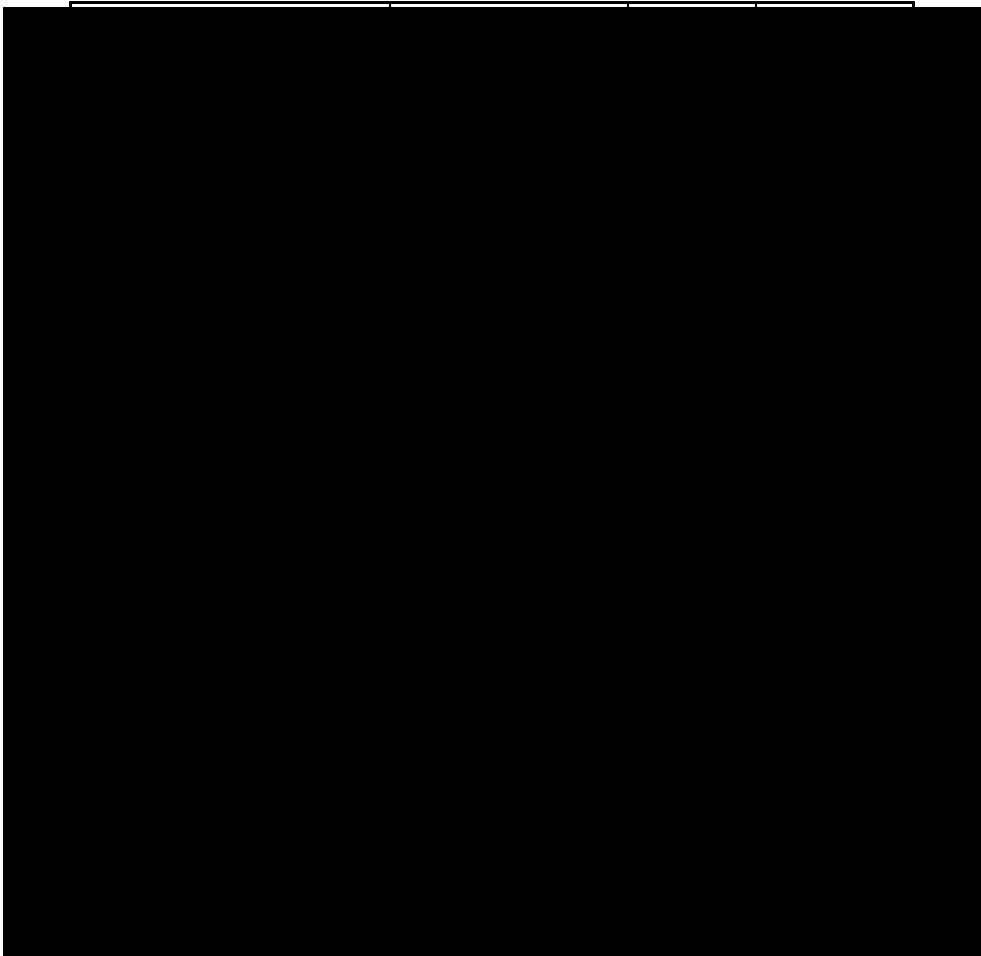
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