

# MINING SAND CLAIMING LAND

MITTELWESER, GERMANY  
52°30'42.8"N 9°05'09.7"E

PROGRESS JOURNAL

OLIVE LOK-YAN WONG  
DIPLOMA, AHO SPRING 2023



*The following journal showcase my working methodology and thinking progress of the diploma project,*

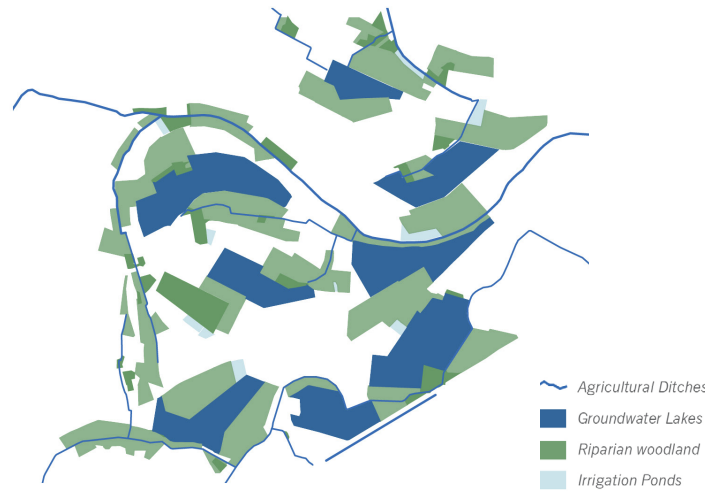
<i>Sand Mining</i>	<b>Background</b>
<i>Ideation and Design</i>	<b>1. Sketches</b>
<i>Work accross Scales</i>	<b>2. Plan Series</b>
<i>Development Methology</i>	<b>3. Section Series</b>
<i>Experience &amp; Impressions</i>	<b>4. Render</b>
<i>The Design Figure</i>	<b>5. Model</b>
<i>Design Basis</i>	<b>6. Research Documents</b>
<i>Site Exploration</i>	<b>7. Photo Journal</b>

# The Proposal

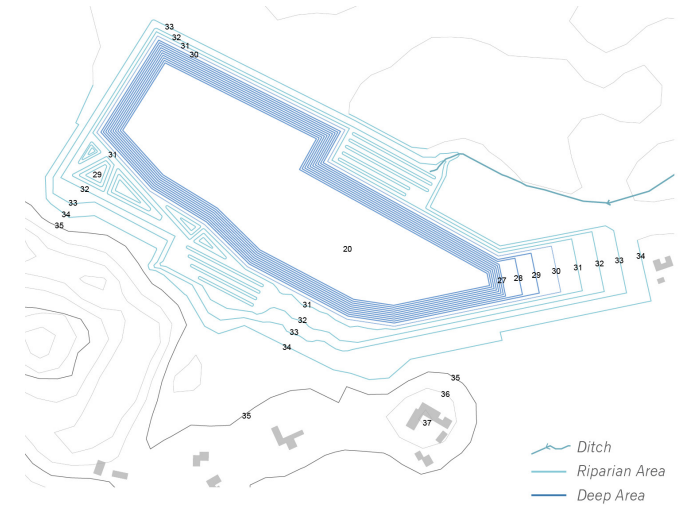
*This project focuses on the transformation of post-mining landscape into a resilient cultural landscape through scales and time.*



*1. Reduction of Mining Area to find Ecological, Social and Economical Balance*



*2. Establishing a new holistic Landscape Framework*

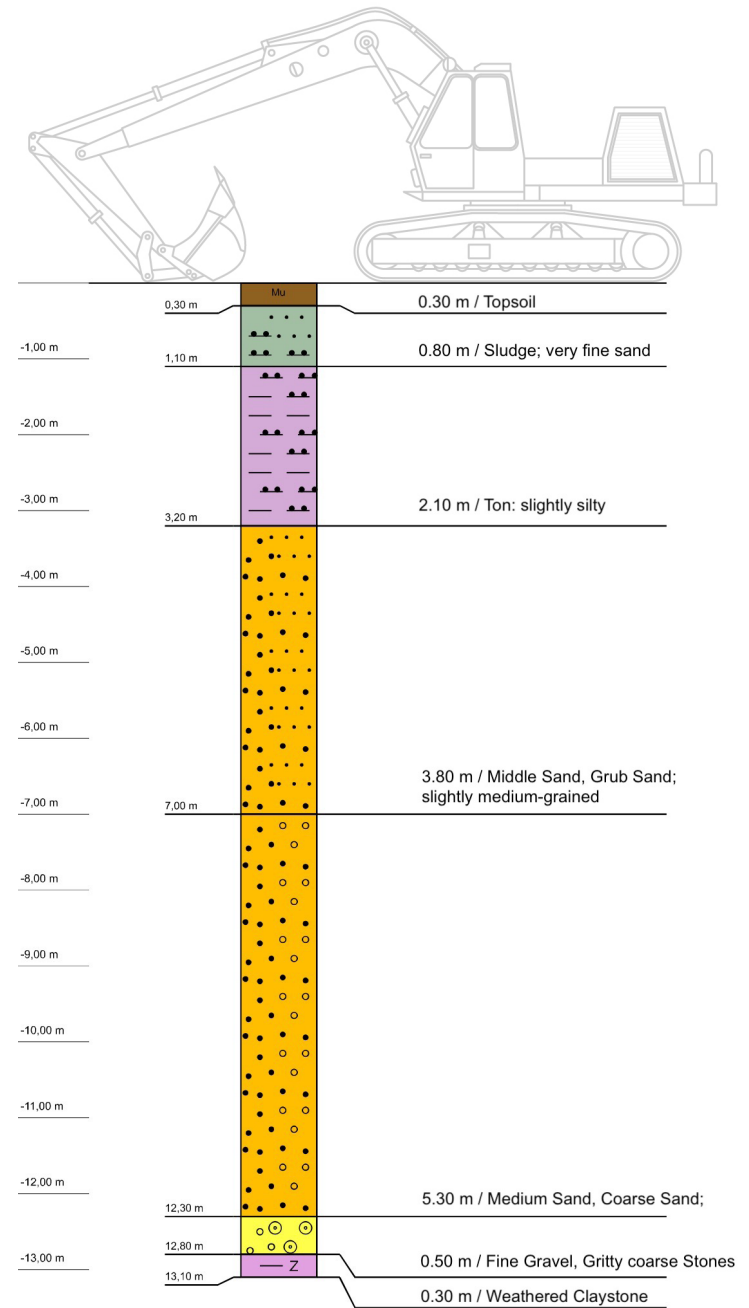


*3. Geomorphic Design for a Landscape Experience*

## *Background: Sand Mining*

*Sand is the most mined material, with 50 billion tons extracted annually for construction purposes. Mining sites are often floodplains along rivers due to their geological diversity. The mining operation digs below the groundwater table, forming groundwater lakes as a post-mining landscape.*

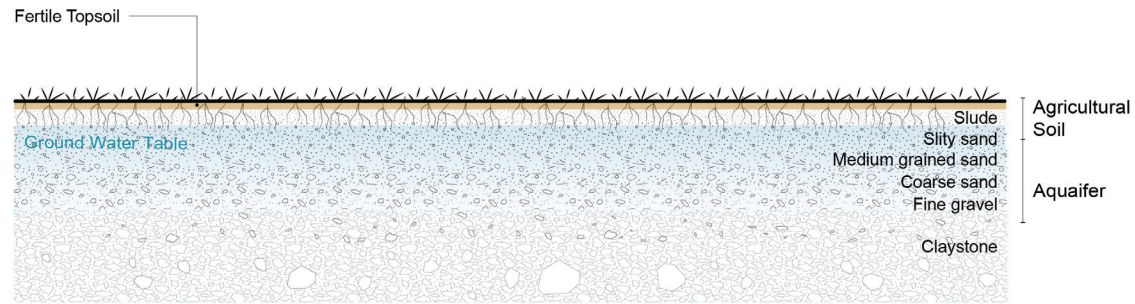
# Sand Mining



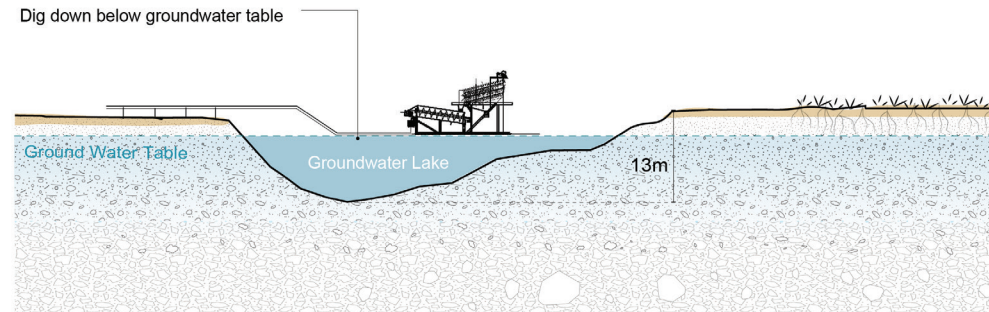
## Product Catalog from Mining Company & Soil Profile of Site

Data Source: Mining Company REESE's Website and Hydrogeological Report from Gravel Extraction Applica-

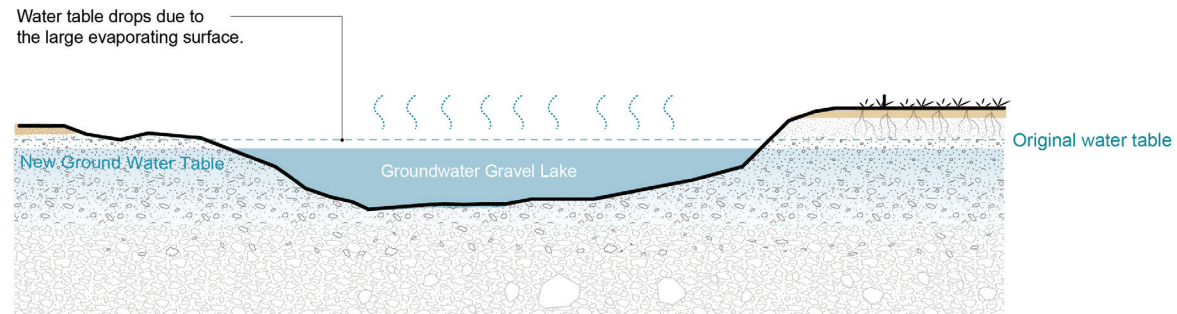
# Mining Process and Impact



*Before Mining: Agriculture farmland*



*During Mining: Extract Sand & Dig below groundwater table*



*Post Mining: Groundwater Lakes formed*

## Mining Impact and Its Post- mining Lakescape



*Agricultural Land before Mining, 1990*



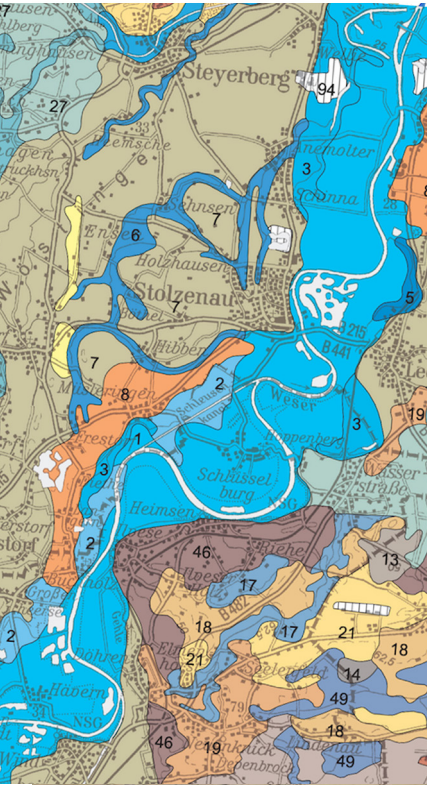
*Post Mining Lakescape, 2015*

*Aerial view between Stolzenau and Weser*

*Photo Source: Album from Mrs. Neumann and Wikipedia page*

# Tracing the landscape evolution of place to design a continuation of history

Soil Map



1759

Historical Map



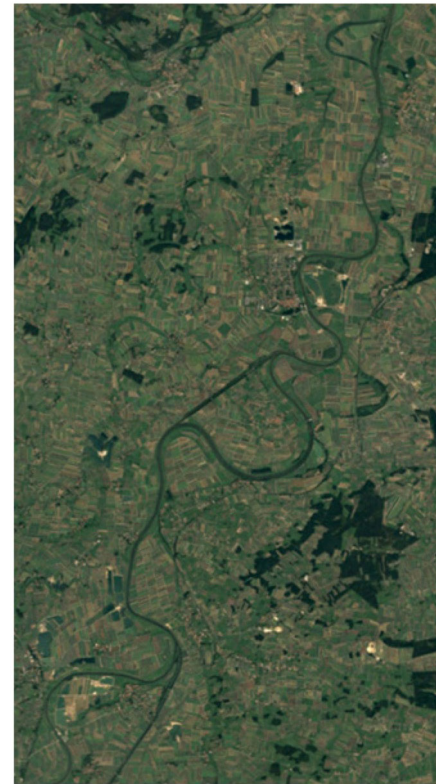
1811

Aerial, 1899



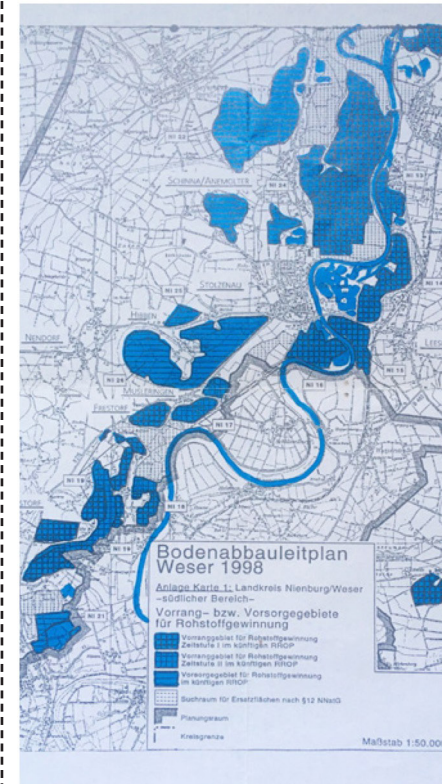
1899

Aerial Photos



1985

Mining Plan



Scenario 2035,  
disconnect  
with history



# Landscape fabric as a base of a more sensitive proposal



River Meander



Historical Streams



Agricultural Ditch

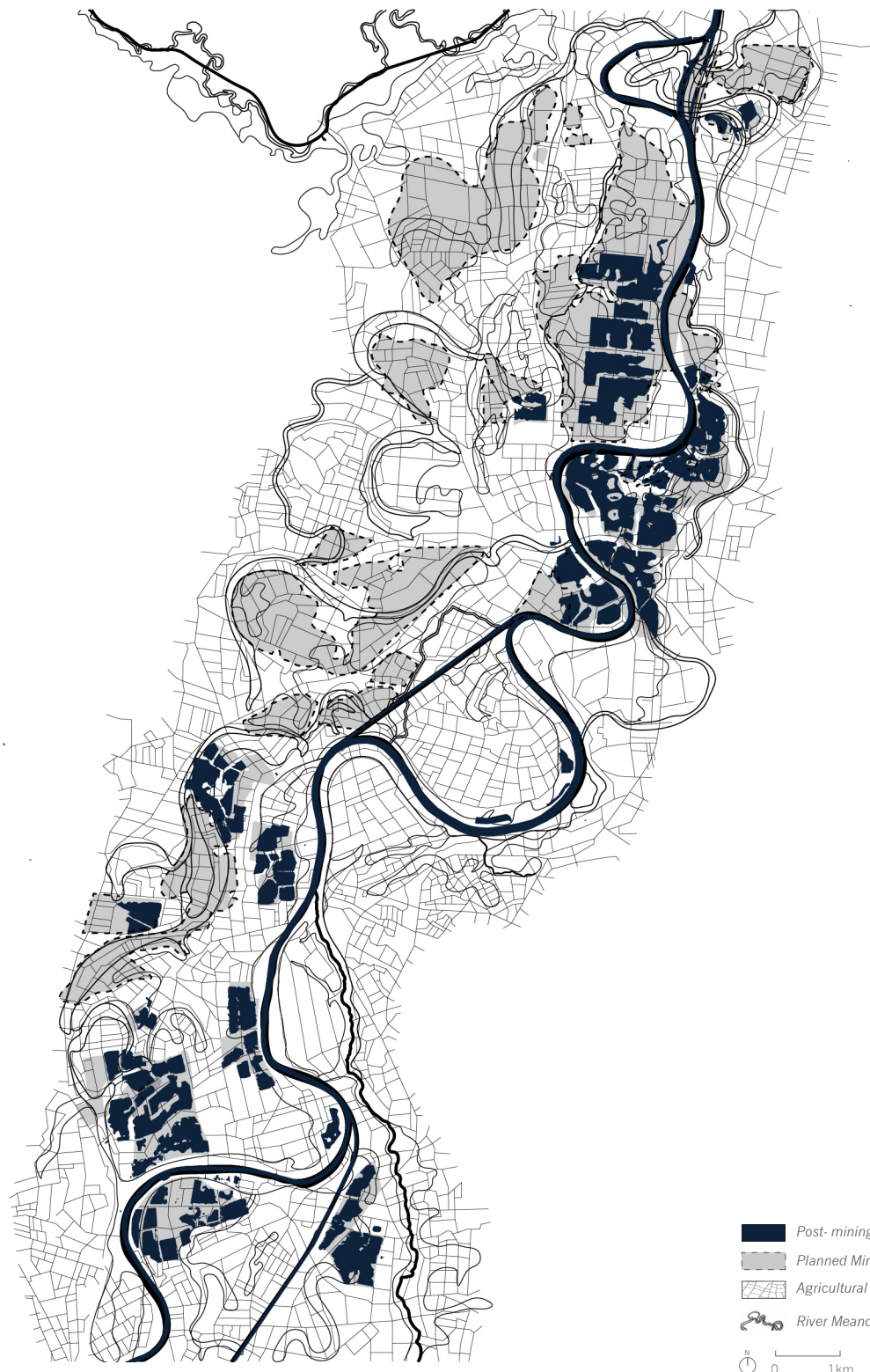






Post-mining Lakes



Planned Mines

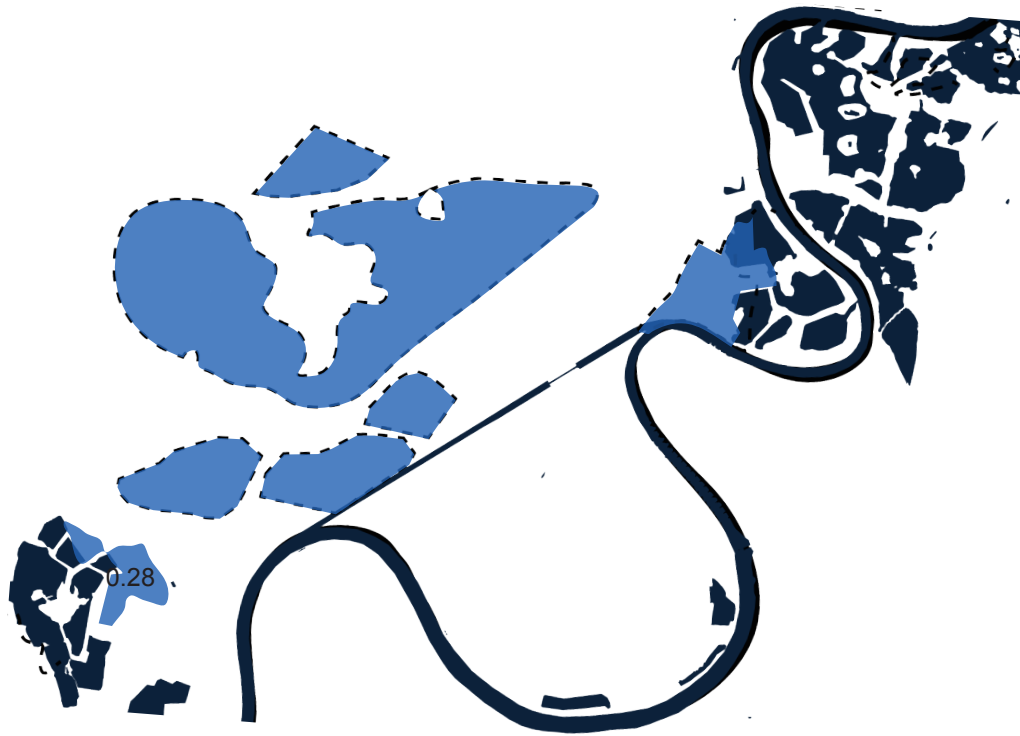
# Combined Landscape Fabric



-  *Post-mining Lakes*
-  *Planned Mines*
-  *Agricultural Plots*
-  *River Meander*

N  
0 1km

# Reduction to find Ecological, Social and Economical Balance



*Mining Company Proposal*

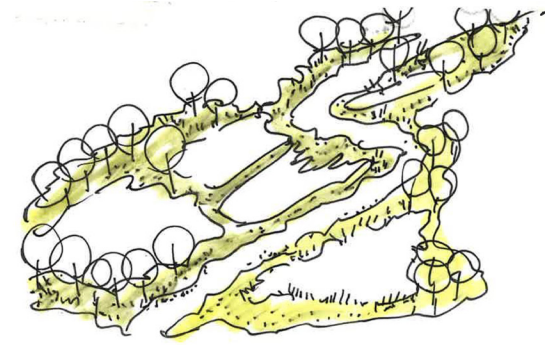
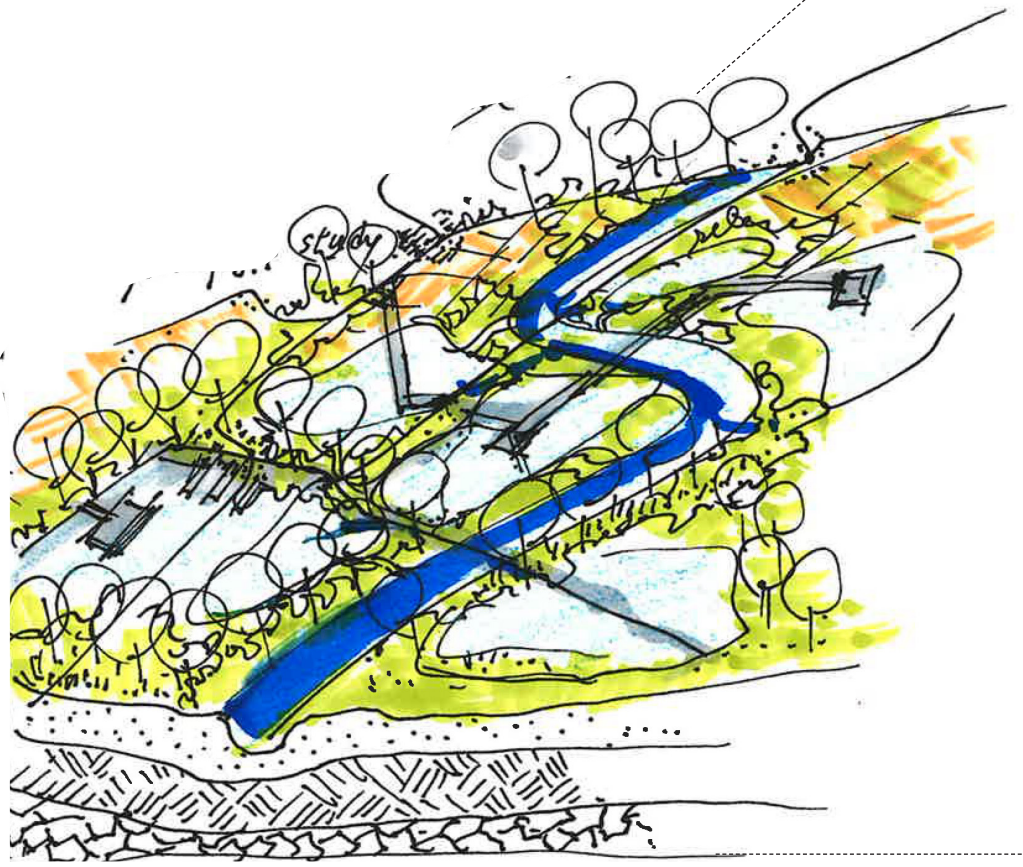


*My Proposal*

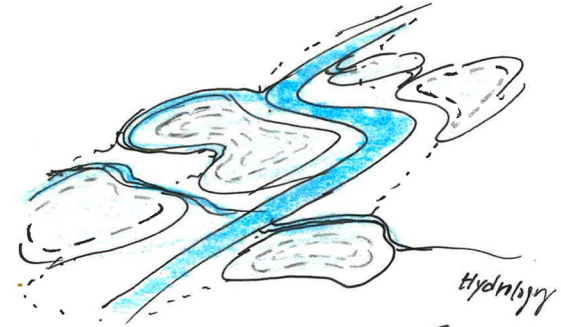
# *1. Sketches | Ideation and Design*

*I use sketches as a tool to test ideas and draw inspiration from the existing landscape patterns and traces to create a harmonious new layer that enhances the existing entities.*

# Analysis of Landscape Layers of Groundwater Lakes Area



Vegetation



Hydrology



Topography

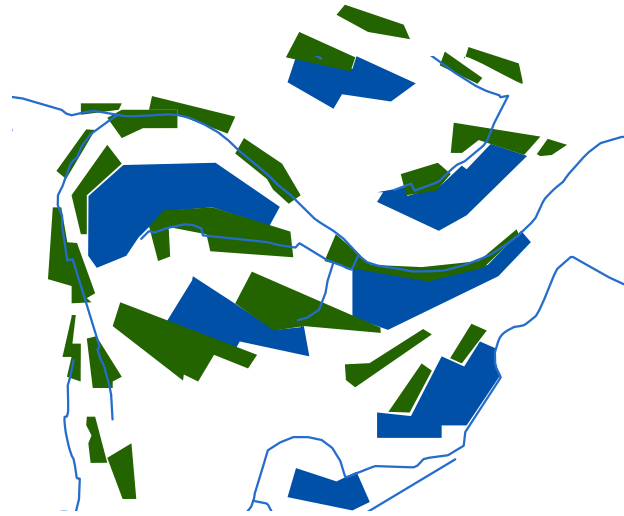


Geology

# Proposed Organization of Landscape Structures working with the Landscape Layers



1. Connect Gravel Lakes with Existing Ditches

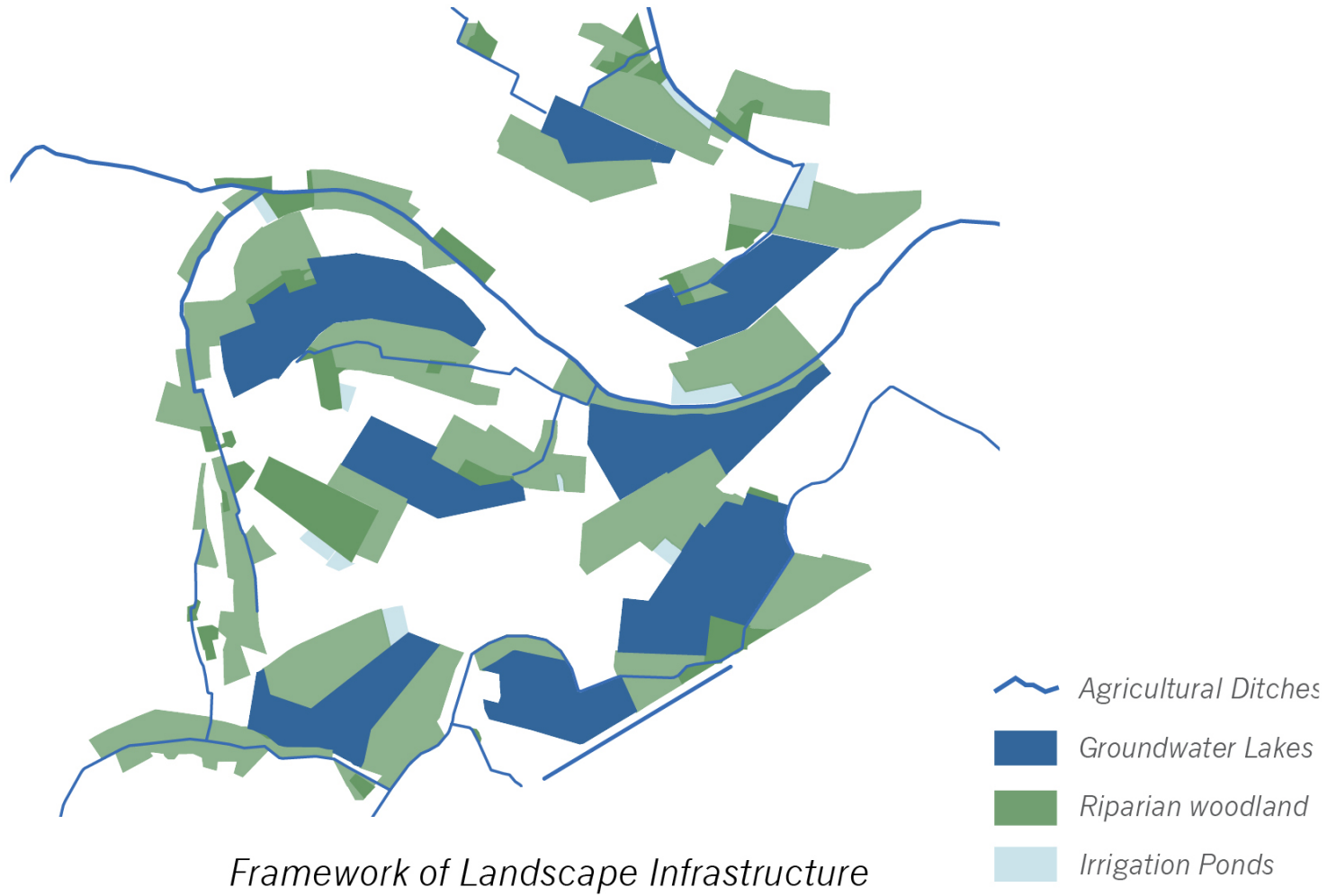


2. Expand Vegetation Patche along Lakes & Ditches



3. Form Park Corridors to Connect Villages

# Establishing a new holistic Landscape Framework

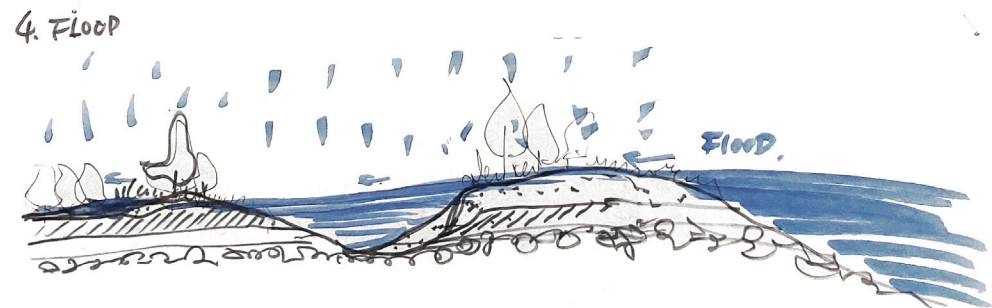
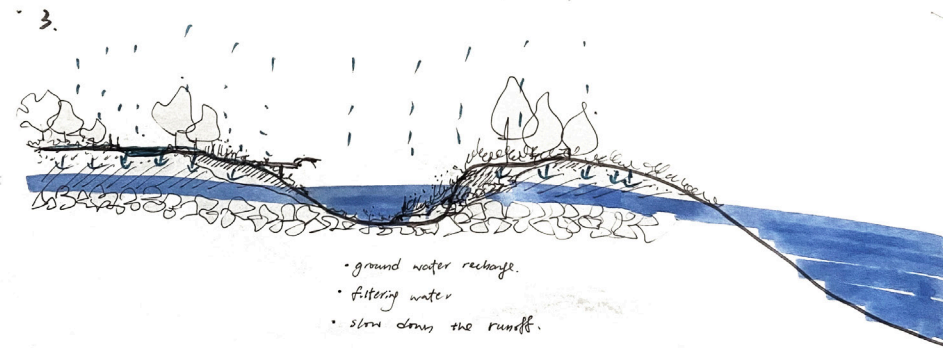
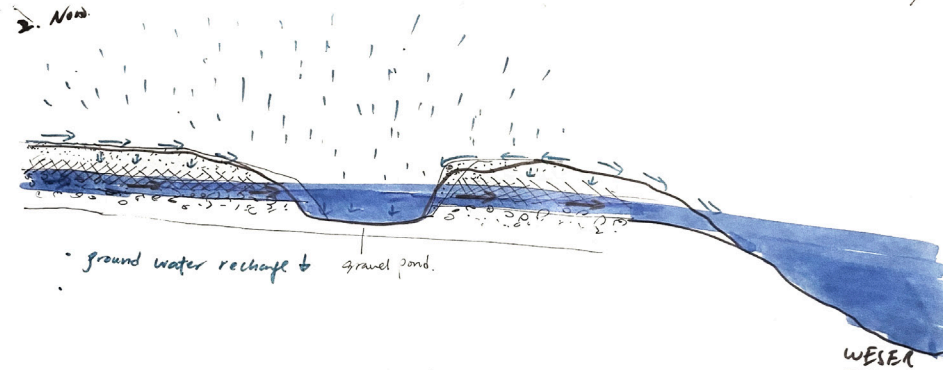
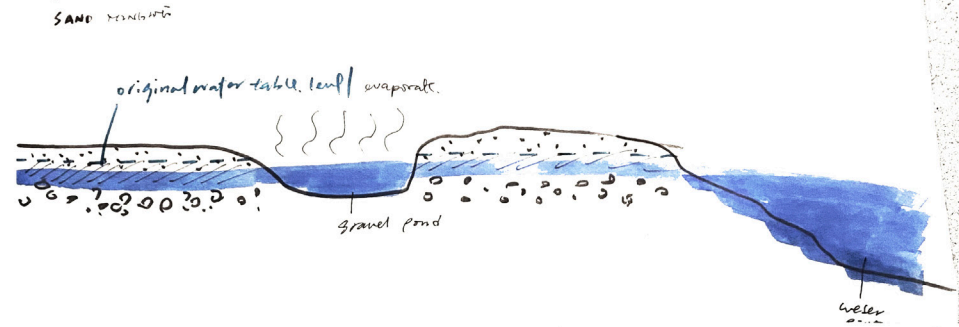


# Proposal: Masterplan Framework Guided by Farm Plots and River Meander

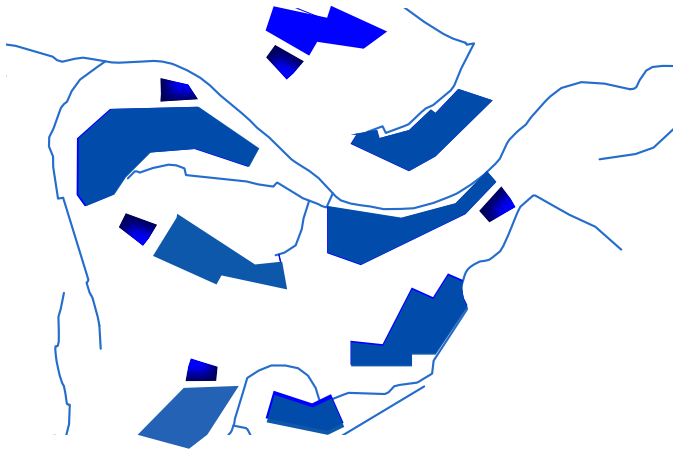




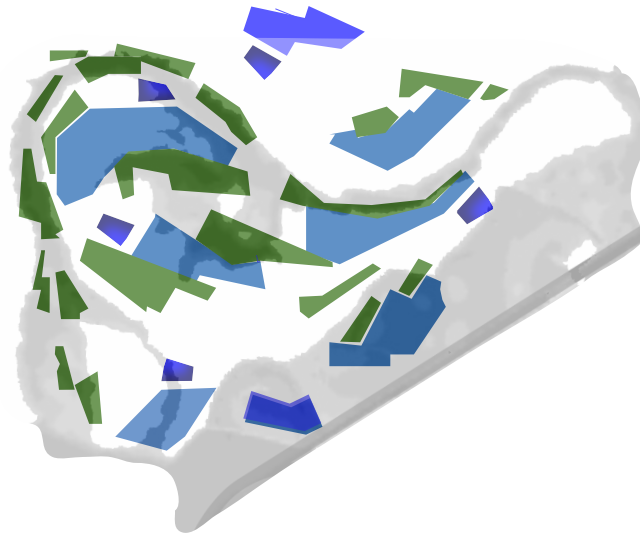
# Scenario Sketch: Groundwater Lake as Landscape Infrastructure



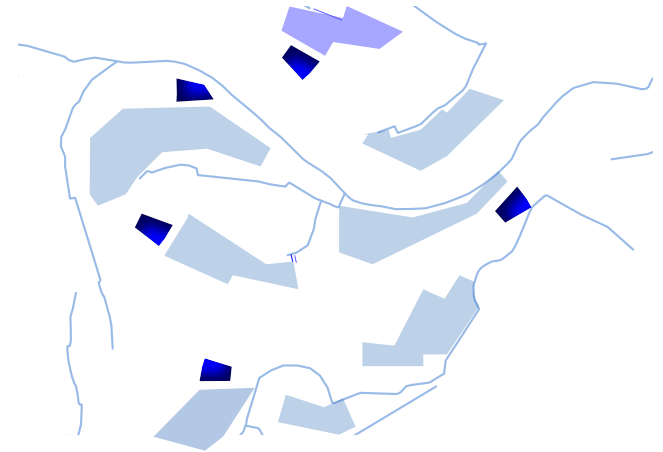
# Groundwater Lake as Landscape Infrastructure in 3 Water Scenario



*Normal Rain*



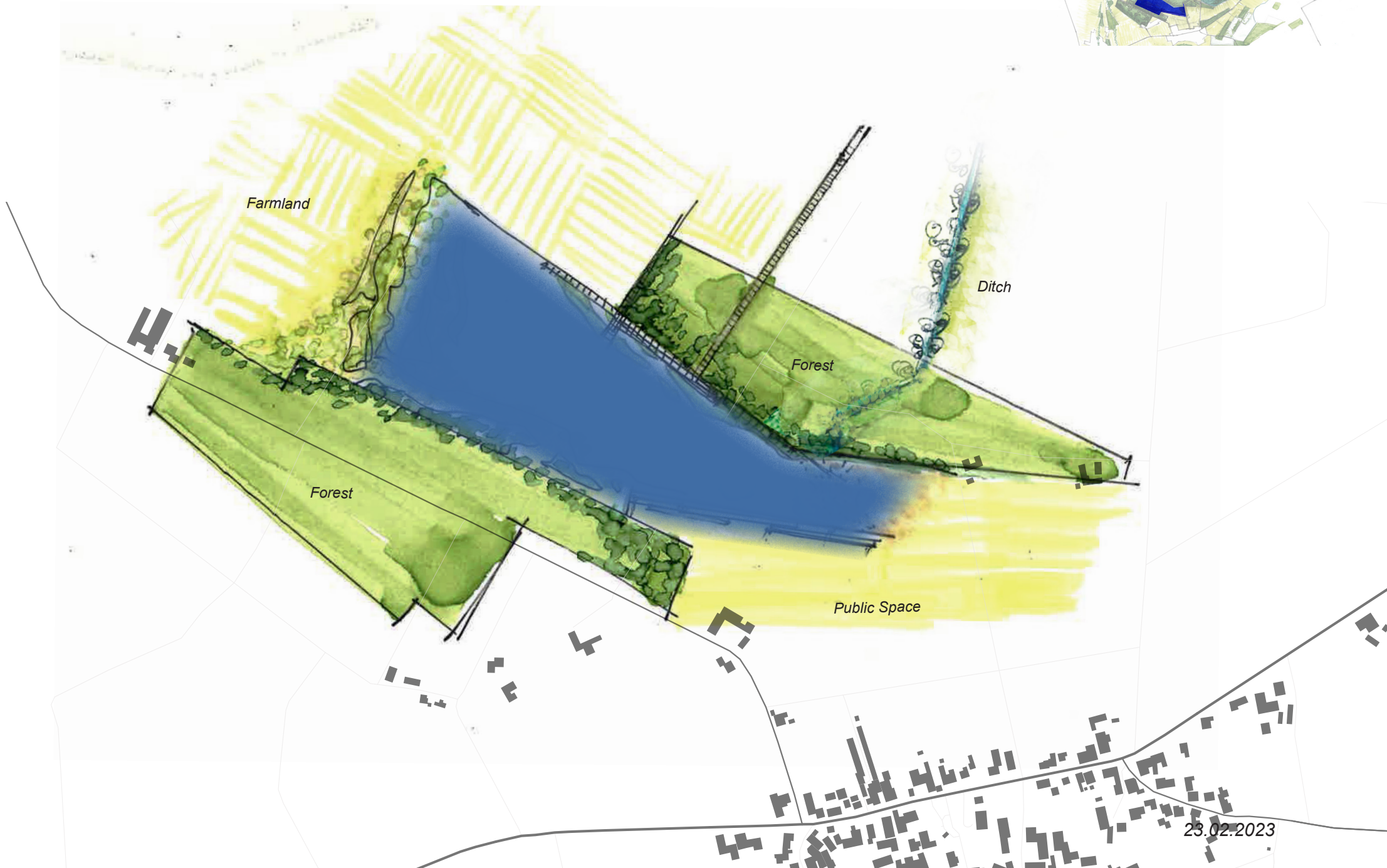
*Flood*



*Drought*

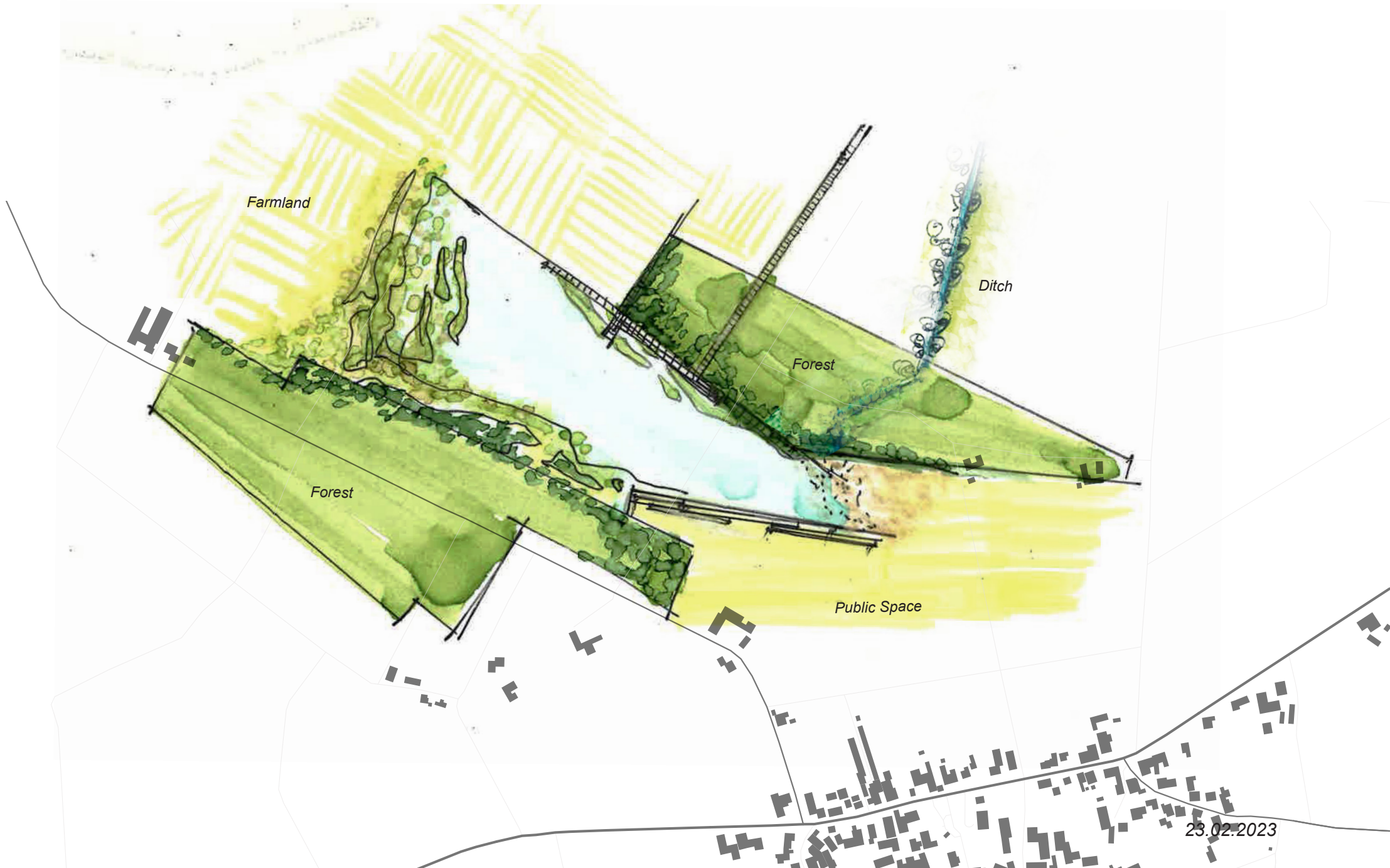
Zoom in:

# 1. Structure : Lake + Forest + Farmland + Village



Zoom in:

## 2. Edges: Programme + Habitats



Zoom in:  
3. Materials



Zoom in:  
**4. Programmes**

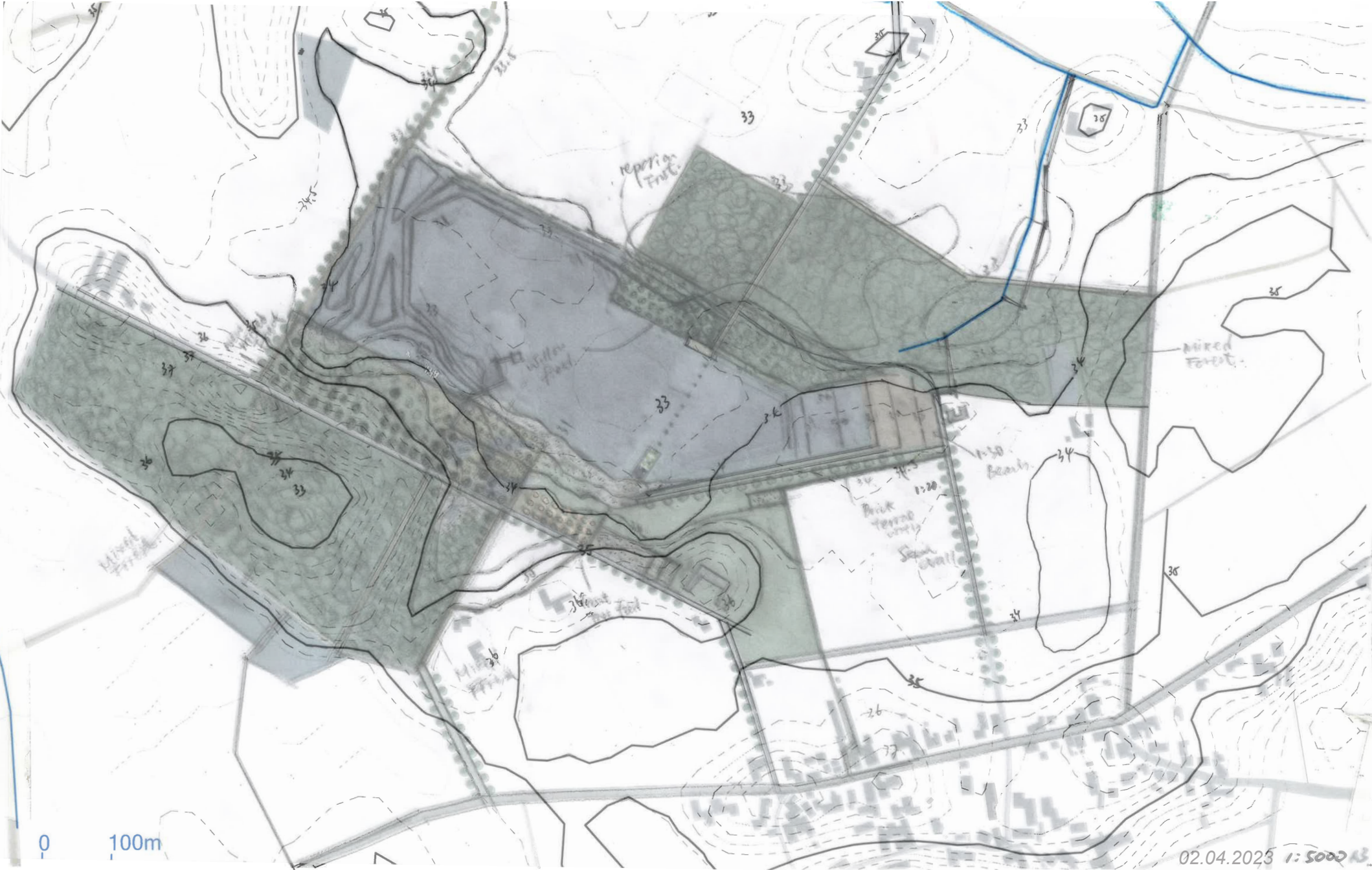
The central plan shows a large blue water feature with several paths and zones. Handwritten notes include 'Inauguration Ceremony & Installation!', 'Sandy ground', 'Gravelly stream', 'Sandy ground', 'Bears using banks ground', 'Sandy bank', 'L. Area', 'Sandy bank', and 'T. Area'. A north-south axis is marked with 'N' and 'S'. A scale bar is present with '1:10' and '1:11'.

Surrounding photographs include:

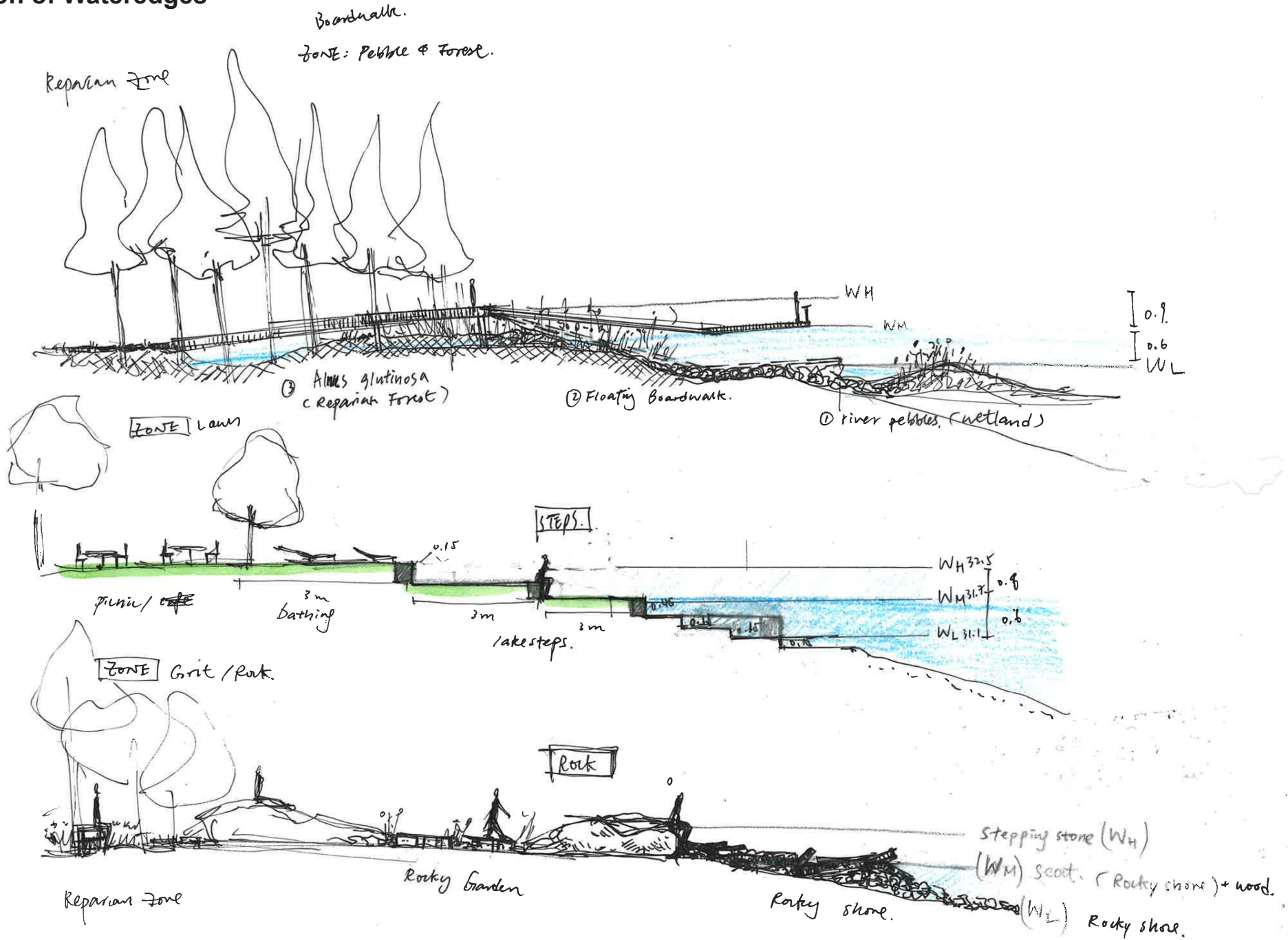
- Top left: A field with cows grazing.
- Top center: A stone bridge over a stream.
- Top right: A wooden walkway through a grassy area.
- Middle left: A close-up of a rocky stream bed.
- Middle center: A wooden deck overlooking a lake.
- Middle right: A stone path through dense greenery.
- Right side: A concrete structure in a pond surrounded by red flowers.
- Bottom left: A rocky stream bed with logs.
- Bottom center: Large grey boulders in a stream bed.
- Bottom right: People playing in a shallow water area.
- Far right: People sitting on a grassy bank near a lake.
- Far bottom left: A modern building with a landscaped area.

Zoom in:

# 5. Geomorphic Design



# Section of Wateredges

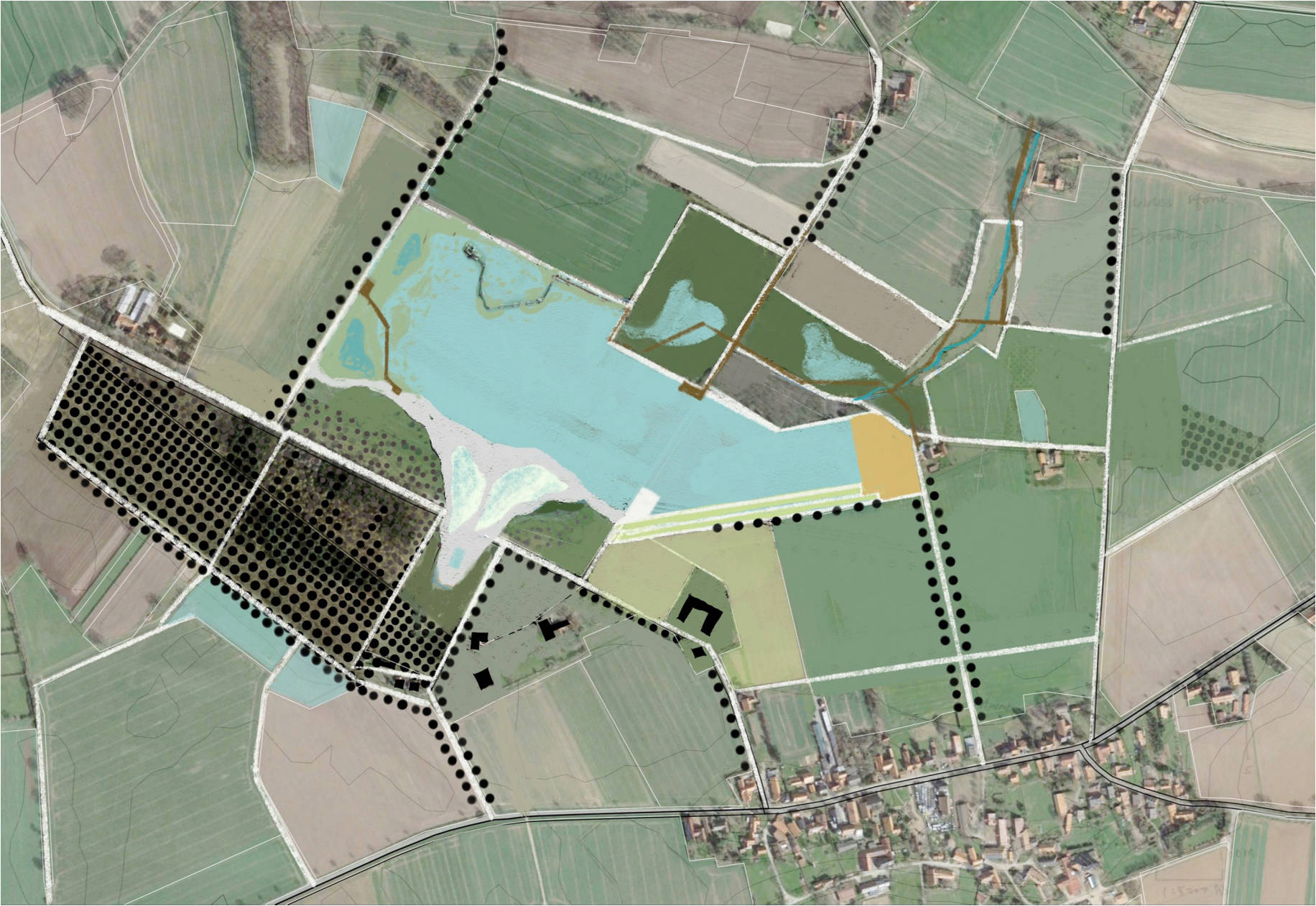




**Zoom in:  
Geomorphic Design Planting Design of Riparian Woodland**



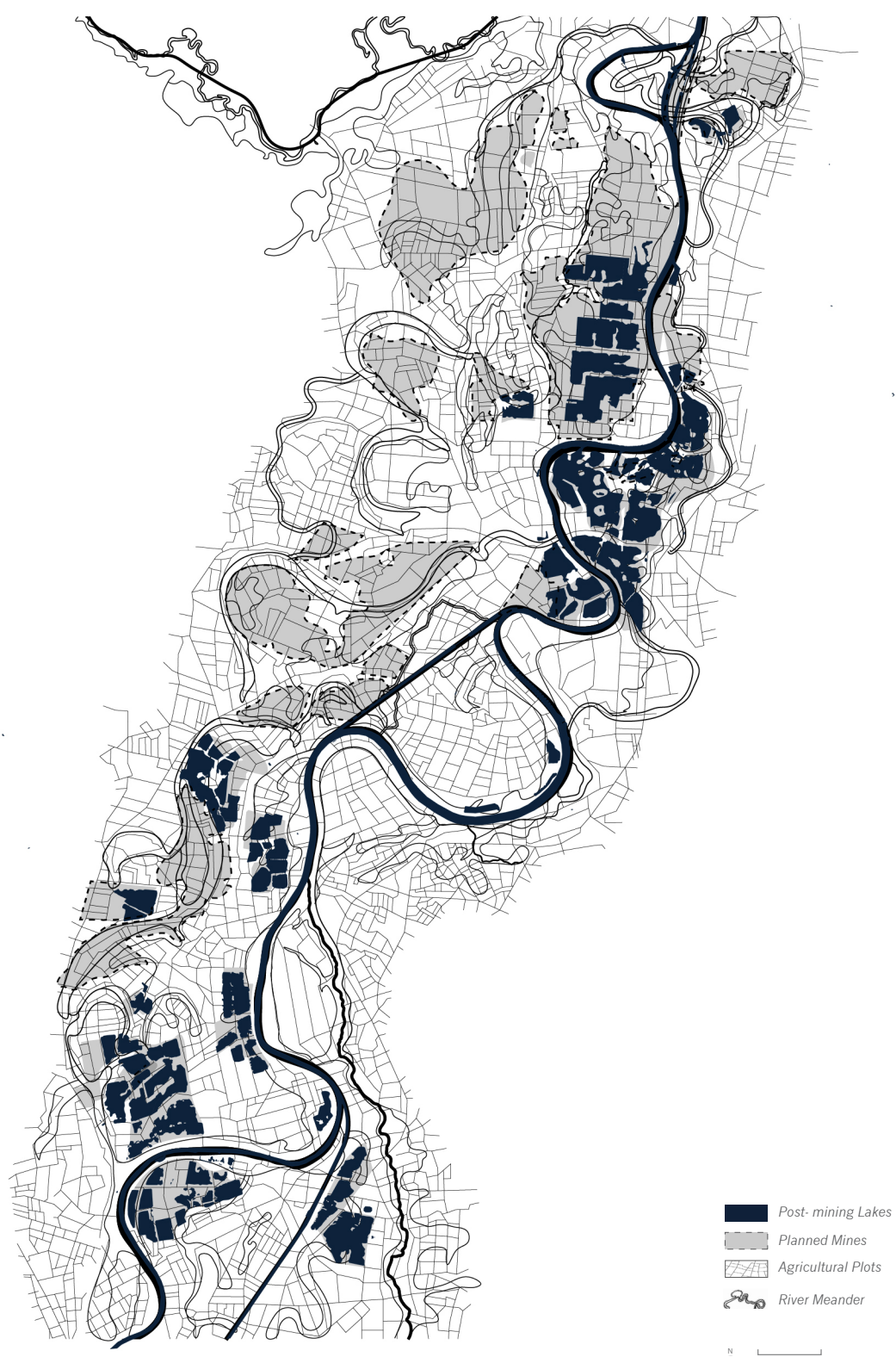
**Zoom in:  
Adjustment on Form tightly following the Farming Plots**



## *2. Plan Series | Work accross Scales*

*My design rooted with my learning and observation from site,  
I seek integration with the cultural landscape, while emphasizing functionality and aesthetic appeal.  
And approaching the landscape in various scale.*

# Landscape Evolution of Mittelweser



# Repurposed Groundwater Lakes and Current Mining Status



1. *Kayaking Deck*  
2. *Bathing Pool*

3. *Solar Farm*

4. *Fishing Lake*

5. *Nature Reserve*

6. *Nature Trail*

7. *View Point*

4B. *Fishing Lake*

8. *Beach*

4C. *Fishing Lake*

9. *Bird hide*

8B. *Beach*

10. *Seed Catcher*

8C. *Beach*

11. *Natural Coast*

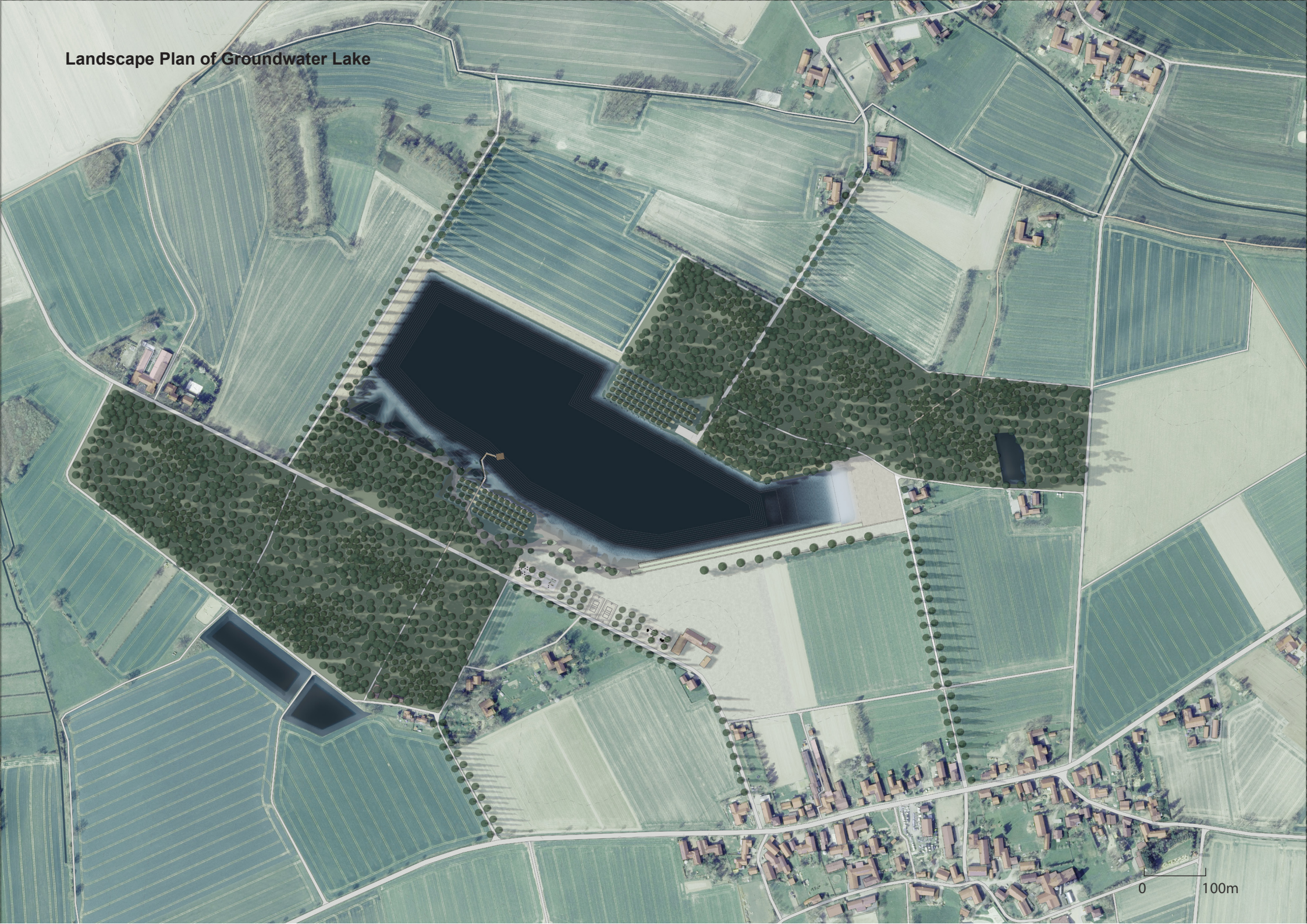
Existing Aerial Photo of stolzenau, Mittelweser



# Landscape Master Plan



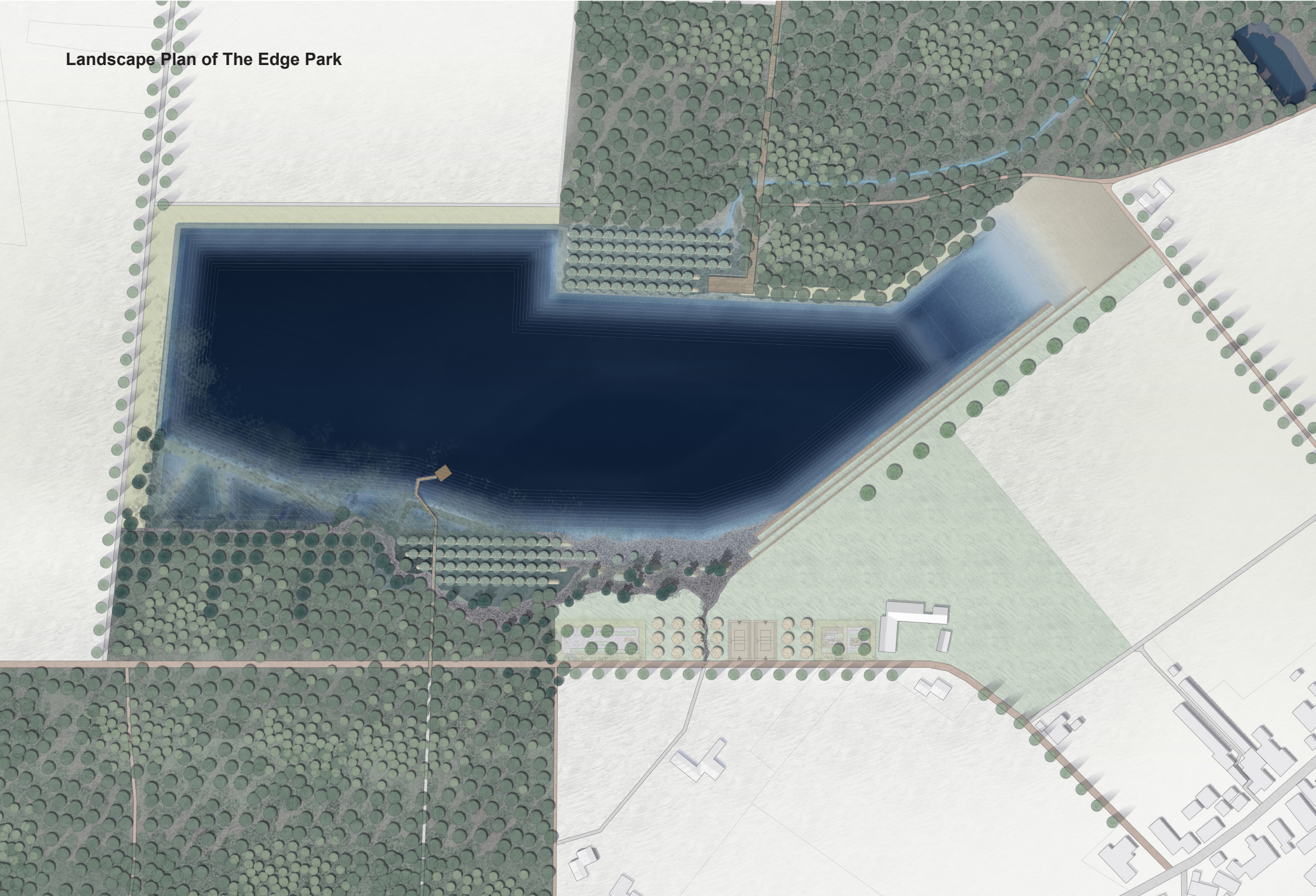
# Landscape Plan of Groundwater Lake



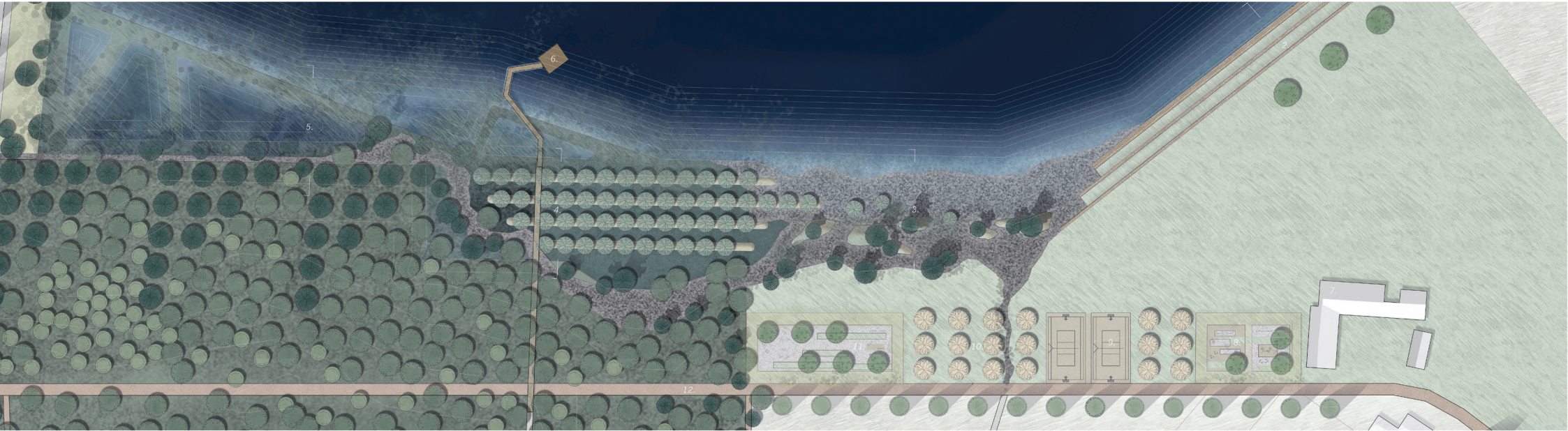
0 100m



# Landscape Plan of The Edge Park



# Landscape Plan of The Edge Park



- 1. Sandy Beach
- 2. Lakefront Seatsteps
- 3. Rocky shore
- 4. Willow Field
- 5. Wetland & Riparian Wood
- 6. Floating Conveyorbelt Walk
- 7. Activity Farmhouse
- 8. Material Playground
- 9. Sports Court
- 10. Orchard Gardens
- 11. Gravel Plaza
- 12. Forest Walk

Top Soil



Sand



Gravel



Grit



Glacial boulders



Overburden



Floating Conveyorbelt



Bricks



Timber



Barks



Branches

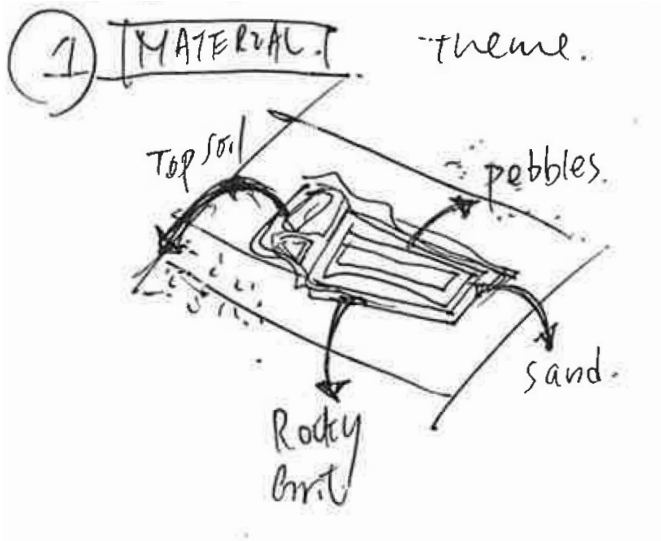


Material Palette of Mining and Local Farms

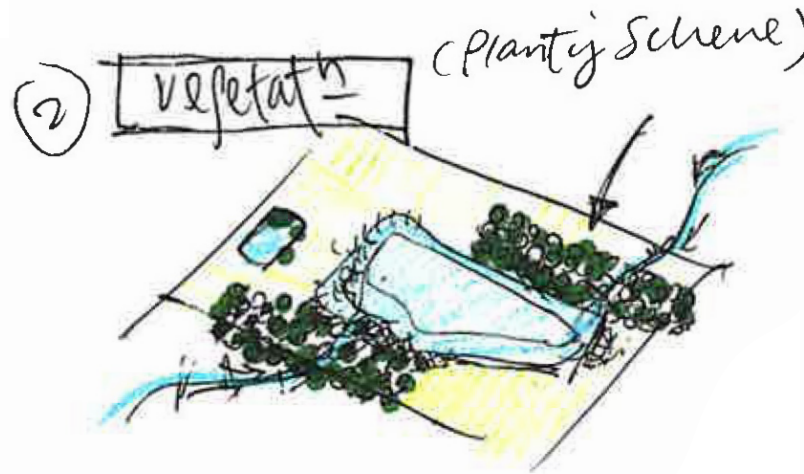
### *3. Section Series | Development Methodology*

*Section Series explain my design and construction methodology by working with the mining progress as a landscape process.  
Turning the mining activities as a helping force and resources in shaping the landscape.*

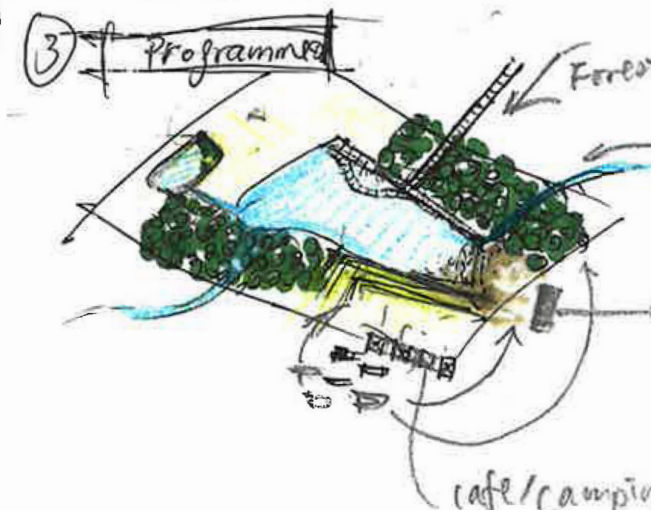
# Mining Process as Landscape Progress Idea Sketches



Step1: Geomorphic Design  
(Mine Closure)



Step2: Planting Design  
(Mine Rehabilitation)

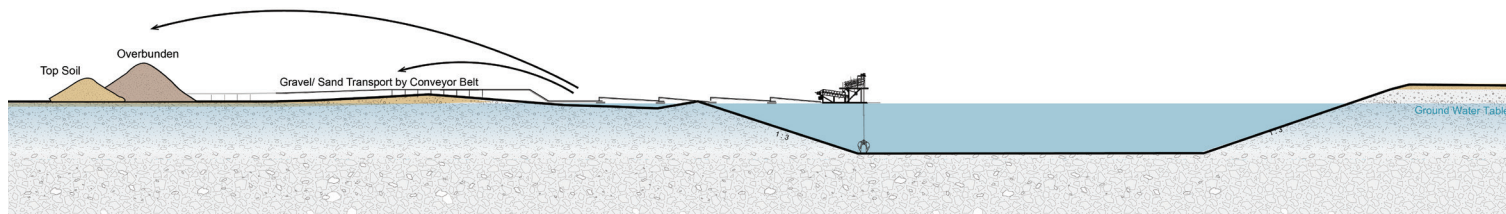


Step3: Programmes Design  
(Introduce Activities)

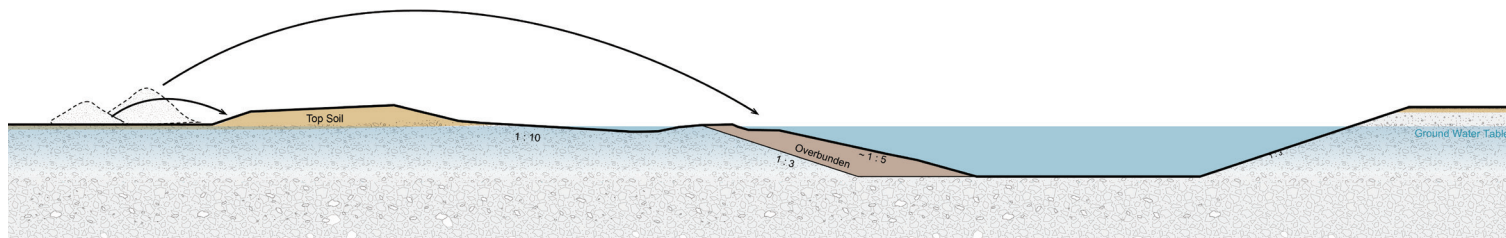
# “Cut- Fill- Cultivation” Model - Shaping Landscape through the Mining Process



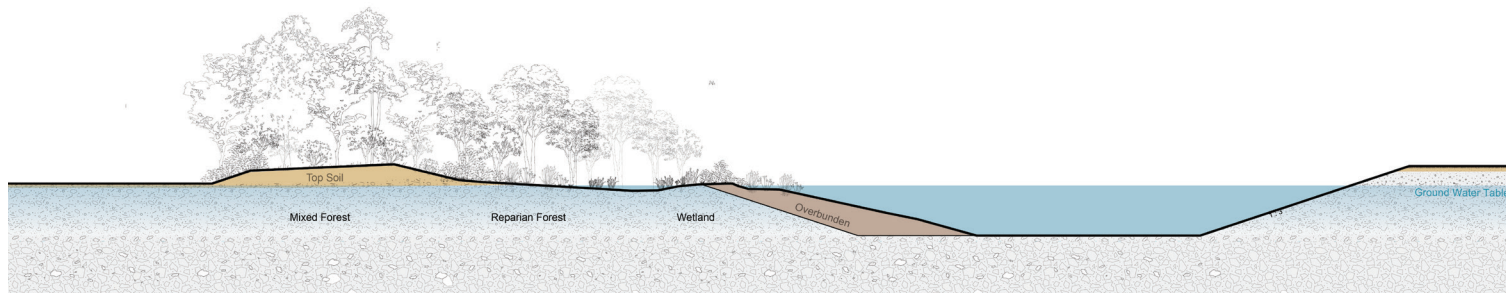
To Cut (Mine Operating - Dry Mining)



To Cut (Mine Operating - Wet Mining)



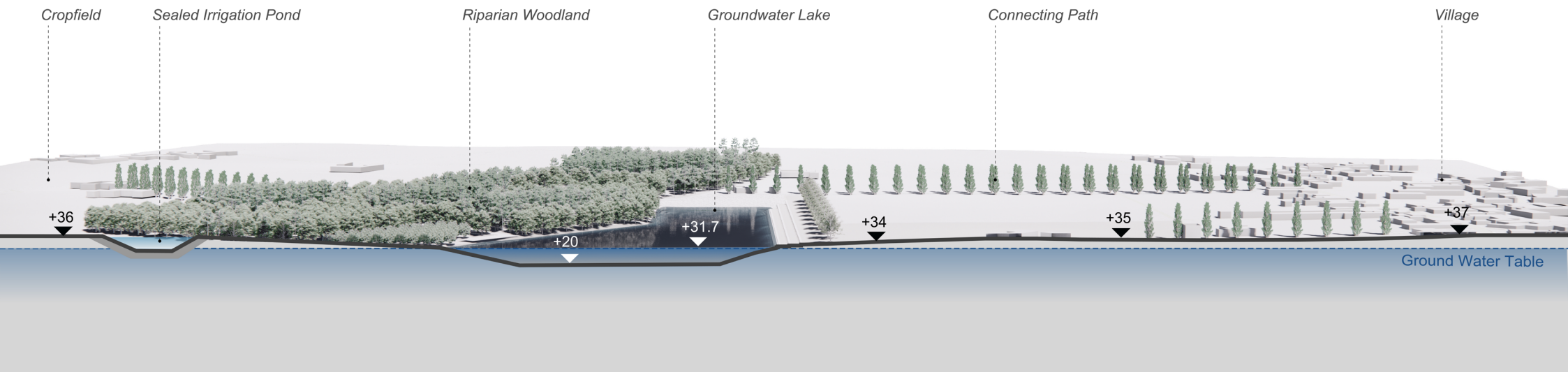
To Fill (Mine Closure)



To Cultivate (Mine Rehabilitation)

0 10m

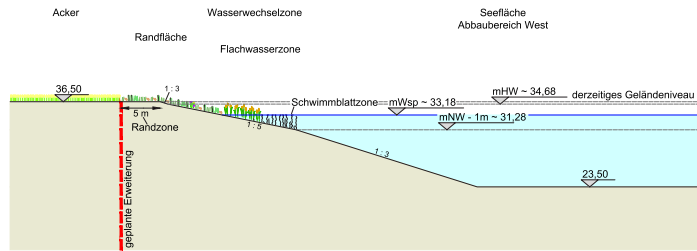
# Long Section: Relationship between Groundwater Pond, Riparian Woodland and Village



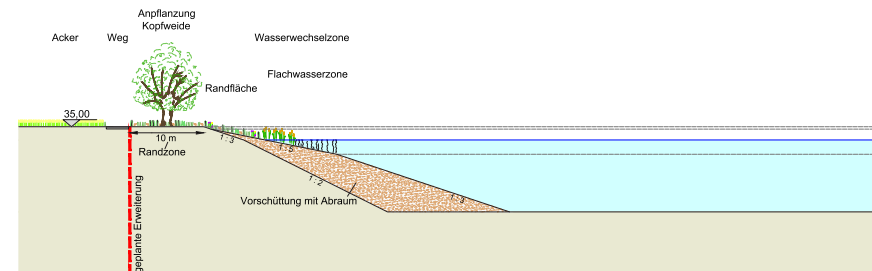
# Current Mine Closure Measures for Water Edges



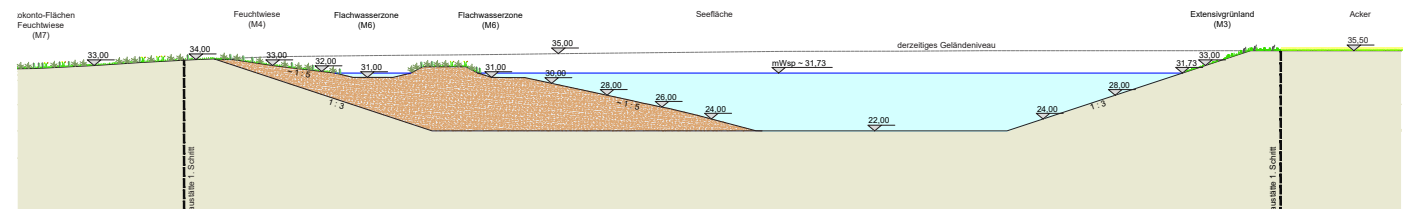
1. Extensive Grassland



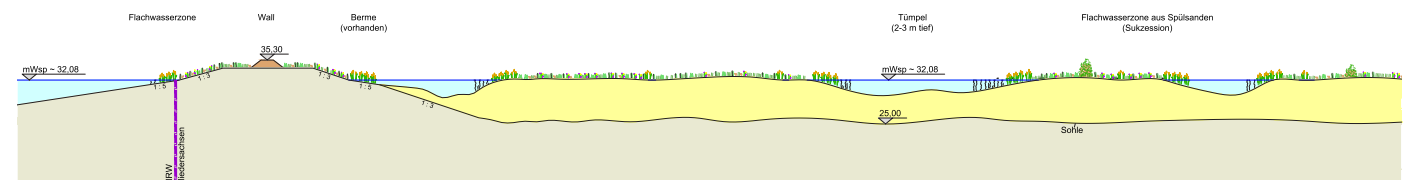
2. Woody Planting



3. Reed Bed and Meadows

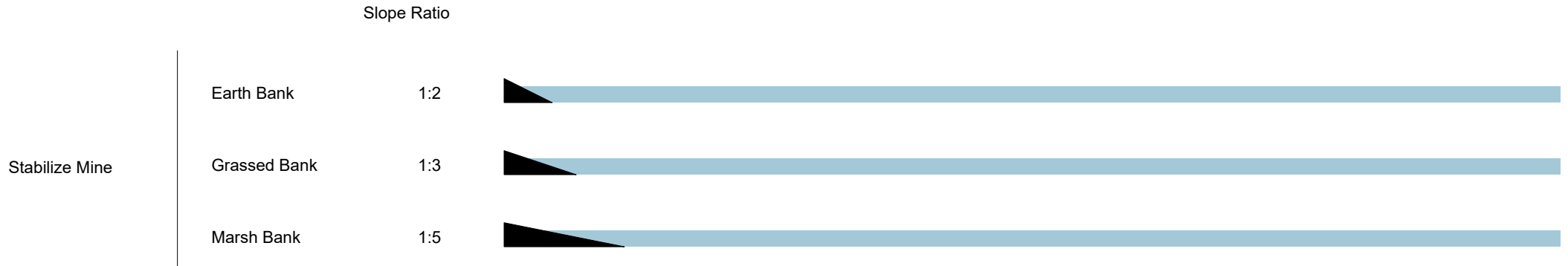


4 Shallow Water / Islands



Data Source: Samtgemeinde Mittelweser & Kortemeier Brokmann Landschaftsarchitekten

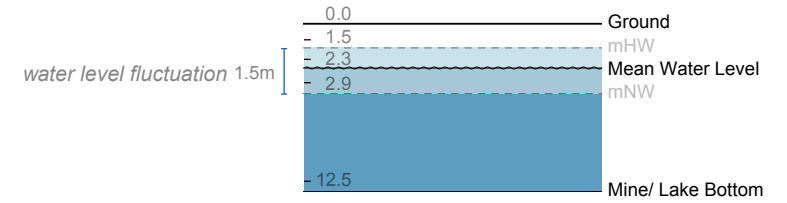
# Mine Rehabilitation Current Practice



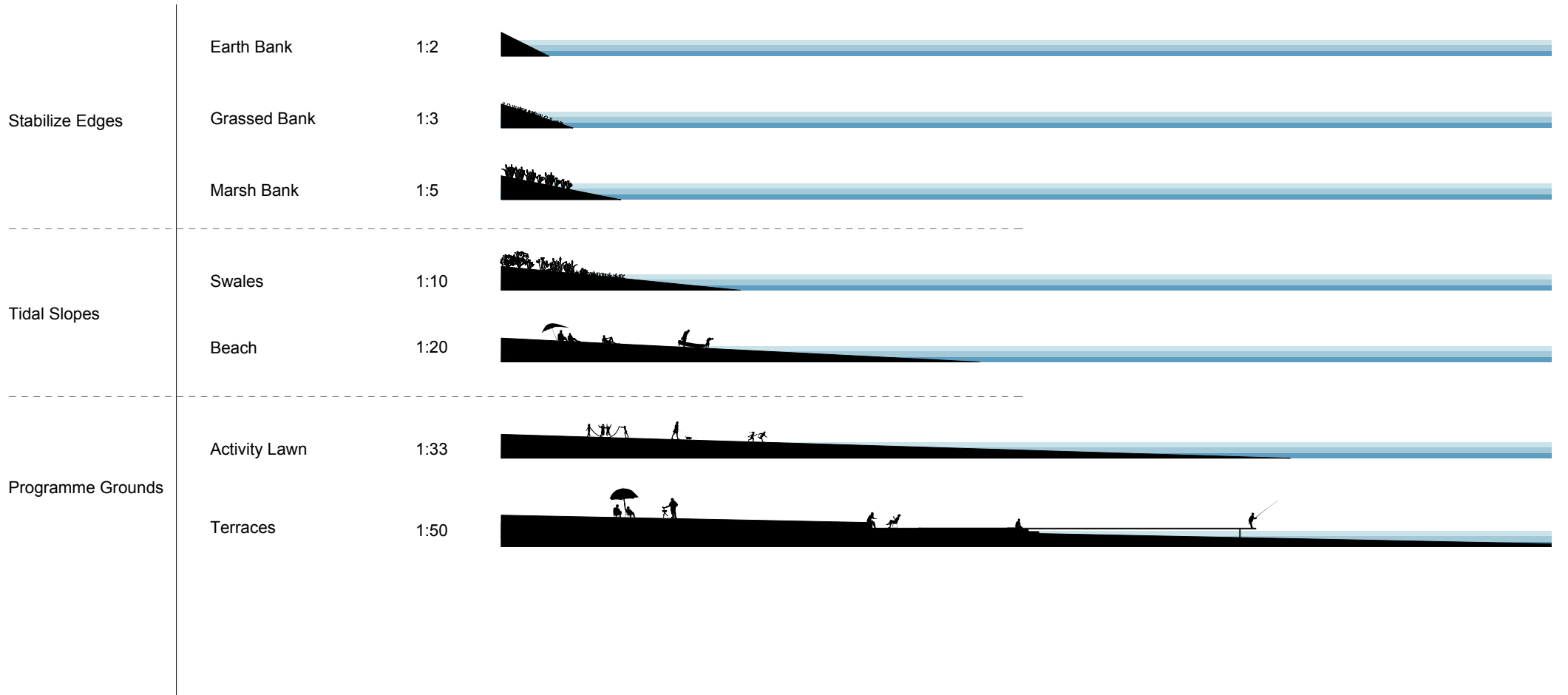


# Introduce Diverse Slope in Relation to Programme and Water Levels

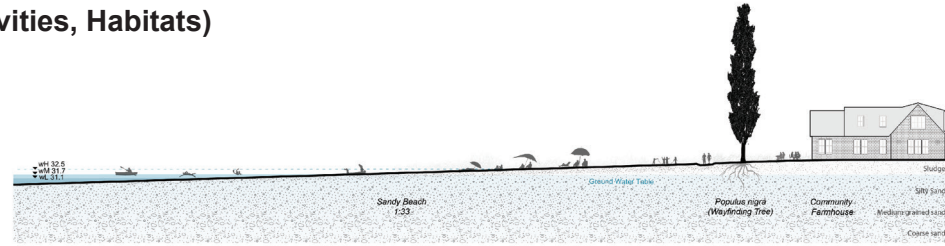
Important Terrain and Water Levels



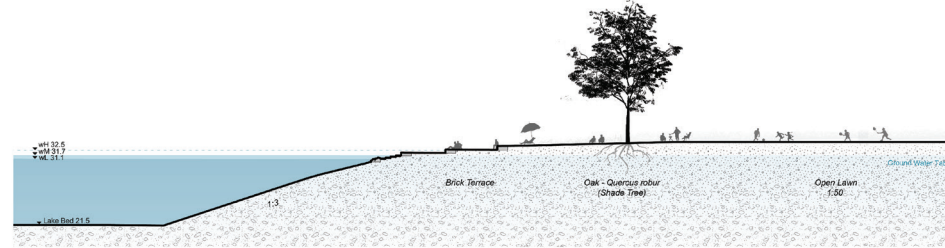
Slope Ratio



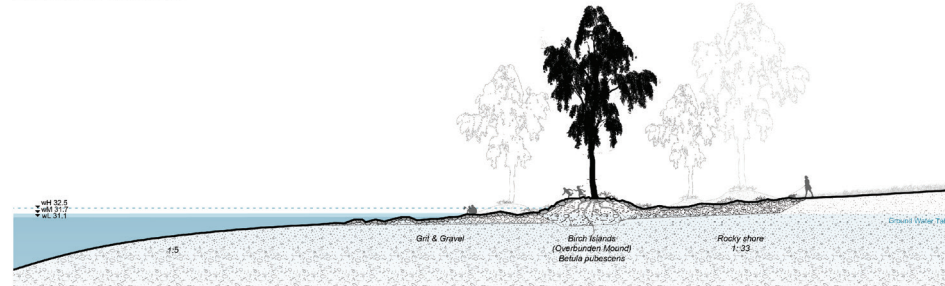
# Water Edge Typologies (Terrain Profile, Activities, Habitats)



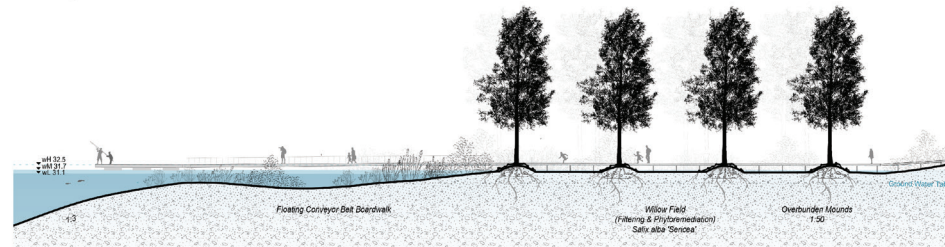
1. Sandy Beach



2. Lakefront Seatsteps



3. Rocky shore



4. Willow Field



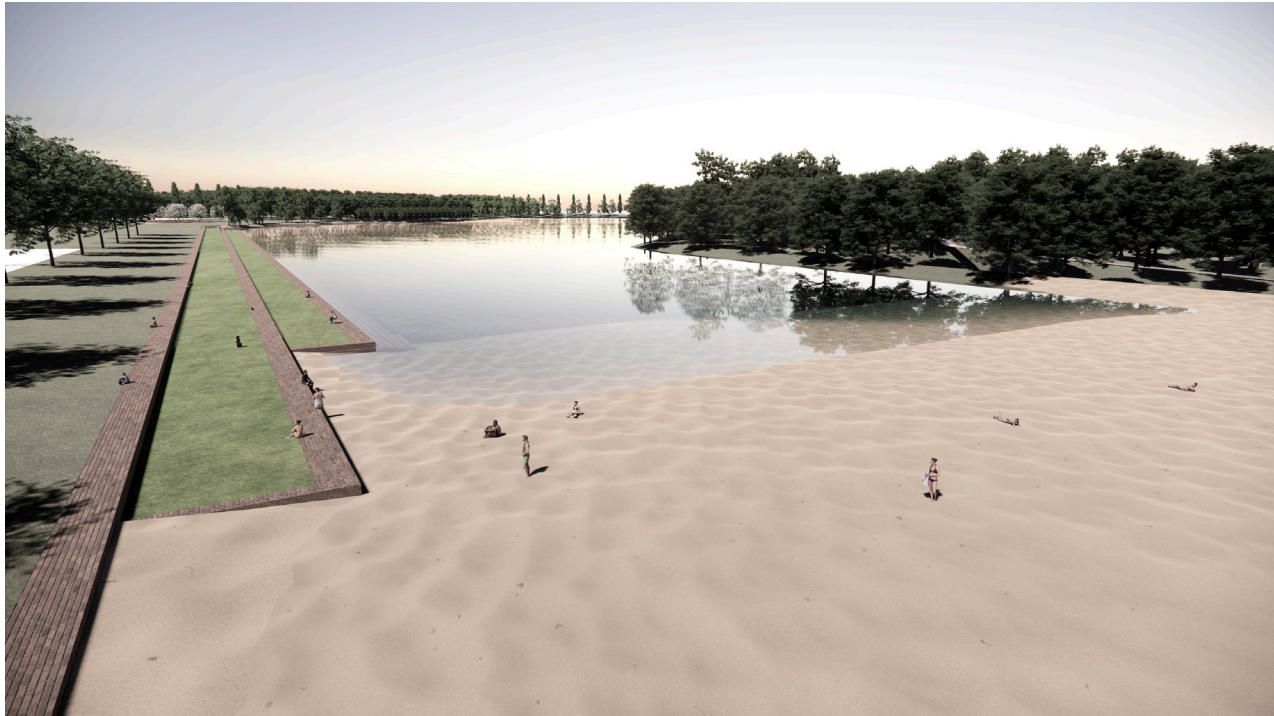
5. Wetland and Riparian Woods

## *4. Renders | Experience & Impressions*

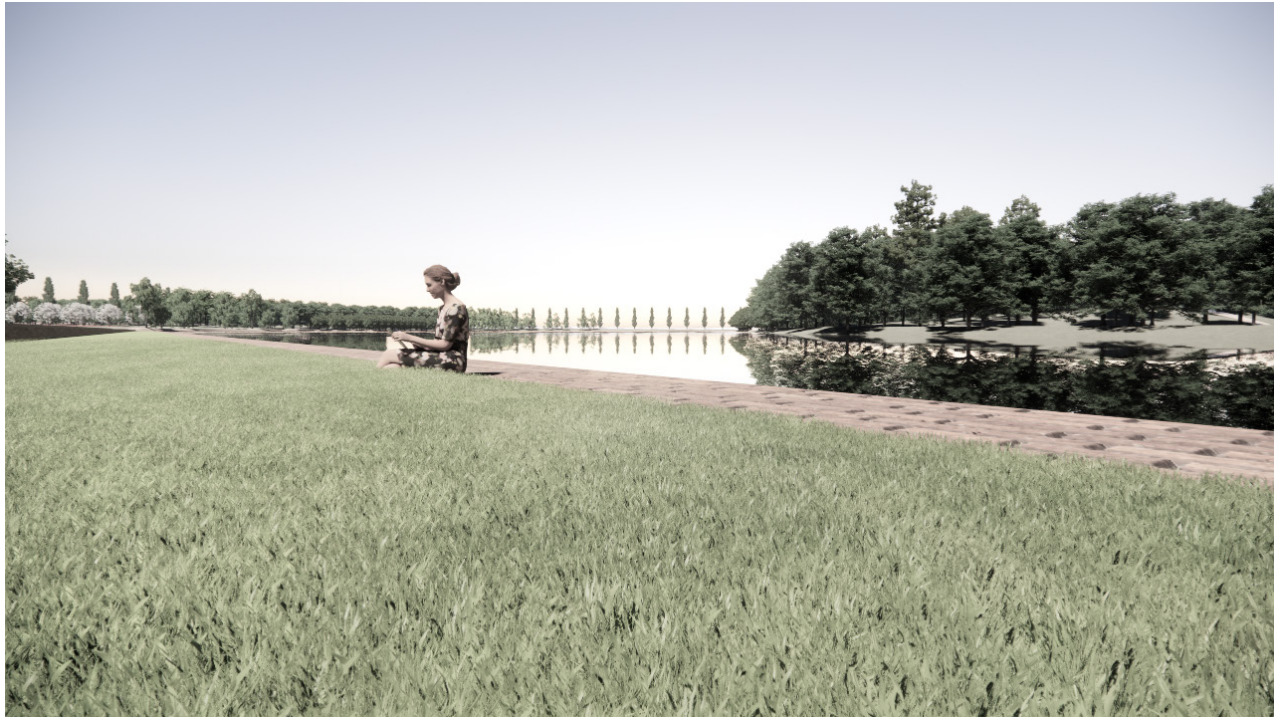
*Immerse yourself in the nurtured post mining landscape. Experiencing various wateredges which are tailored from the resources from mining and local farms.*



Sandy Beach



**Sandy Beach**



**Brick Terraces**

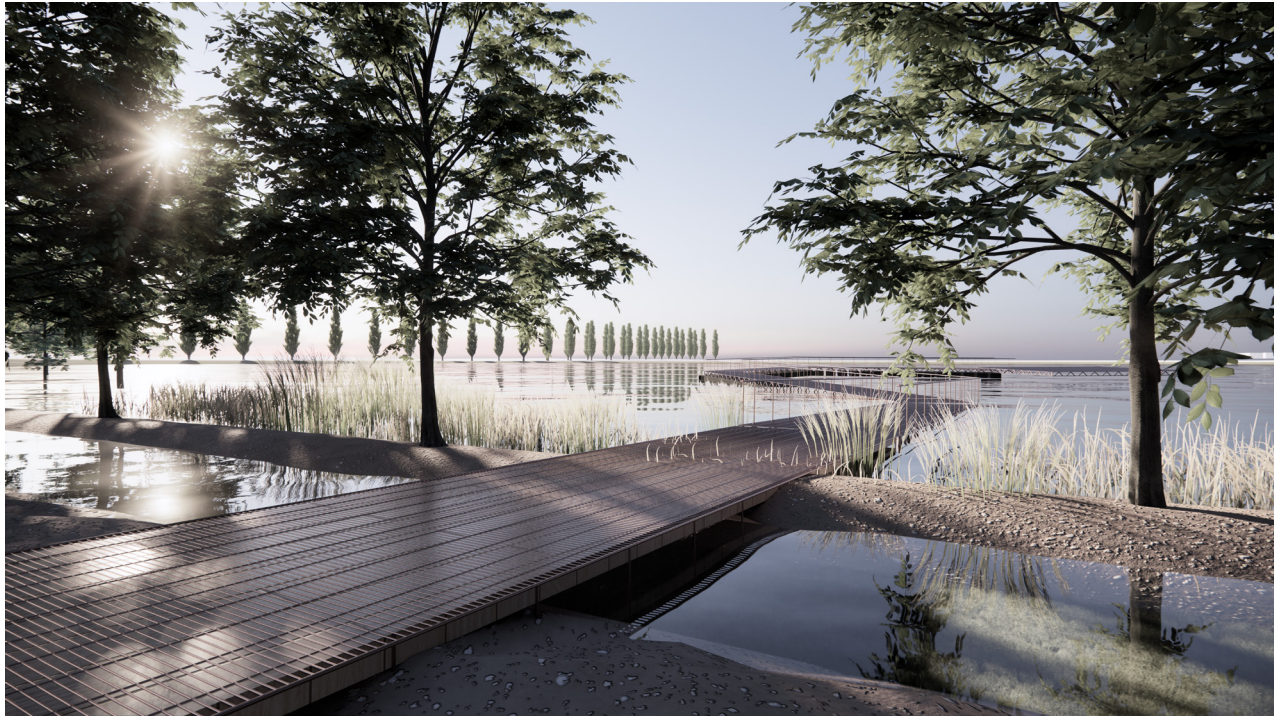


**Rocky Shore**



**Rocky Shore**

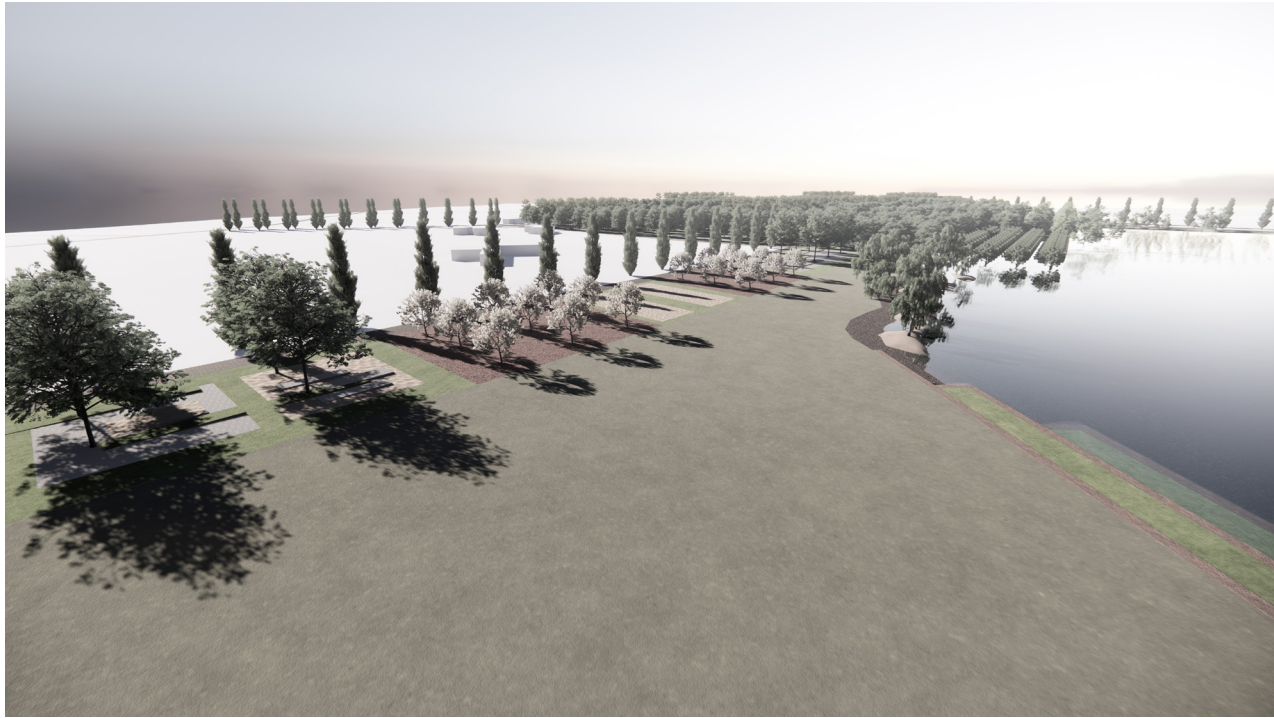




**Willow Field**



**Wetland Coveyorbelt Boardwalk**



**Orchard Garden**



**Orchard Garden**

## *5.Models | The Design Figure*

*Through an abstract model, I aim to evoke a deep appreciation of the spatial organization of design.  
Each model conveys the essence of each scale's intervention and intentions.*

**Landscape Master Plan Model**  
*Guided by Farm Plots and River Meander*  
1: 10,000



**Landscape Master Plan Model**  
*Guided by Farm Plots and River Meander*  
1: 10,000



**The Groundwater Lake Mode**  
*Landscape Structure of the Blue and Green 1:2000*





**The Groundwater Lake Mode**  
*Landscape Structure of the Blue and Green 1:2000*



**The Edge Park Model**

*Water Edge of Diverse Slopes, Materials and Habitats*

1: 1000



**The Edge Park Model**

*Water Edge of Diverse Slopes, Materials and Habitats*

1: 1000



## The Edge Park Model

*Water Edge of Diverse Slopes, Materials and Habitats*

1: 1000



## *6. Research Documents | Design Basis*

*My project is grounded with primary sources and extensive research materials.  
I analysis over news, state policies and current industry practices.  
This provides a solid foundation for proposing creative but feasible solutions.*

# Soil Map of Hannover



## MAP OF SOIL LANDSCAPE IN GERMANY

Source: BGR, The Federal Institute for Geosciences and Natural Resources

### 2 bottom region of the river landscapes

#### 2.1 Soils of the floodplains and lower terraces

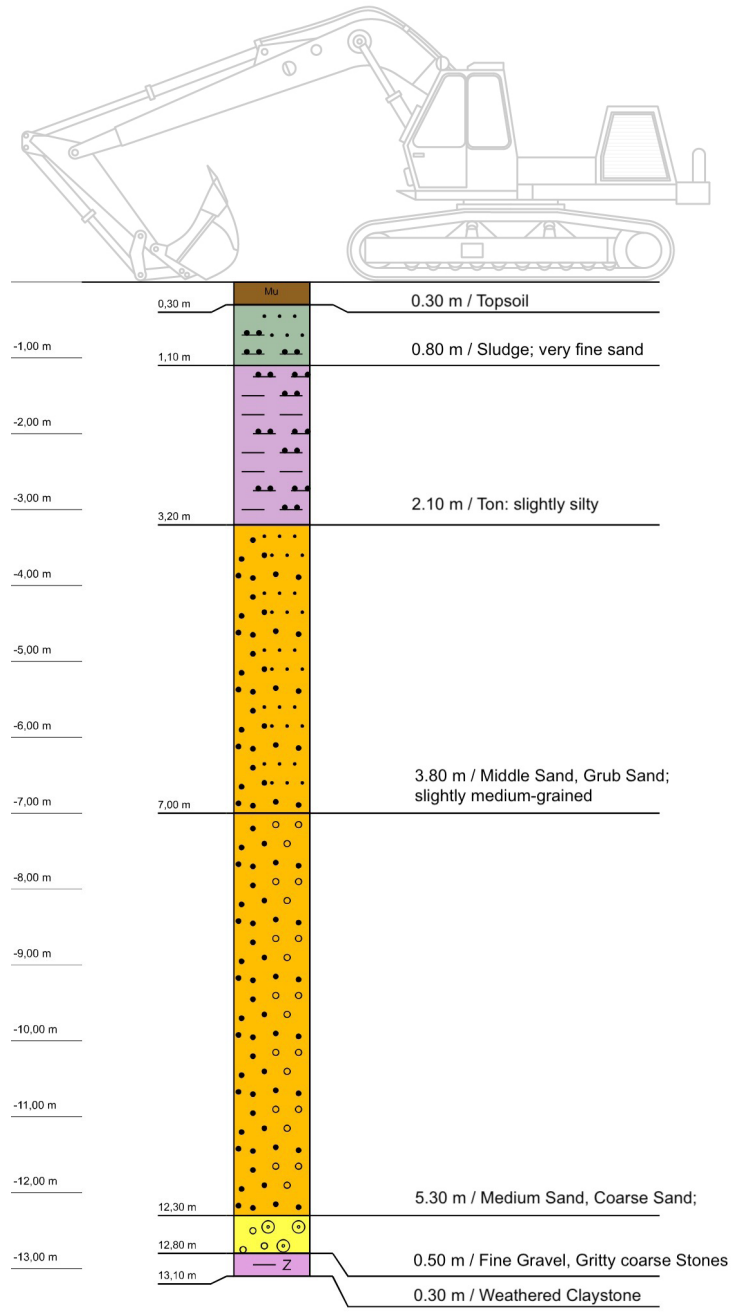
- Predominant **Vegen** and sparsely distributed **Gley Vegen** predominantly **floodplain silt**, sparsely **floodplain loam** and **wool** over **very deep lower terrace sand** and **gravel**  
Abb.: GG AB; to AB; to water divide
- Predominantly **Pseudogley Vegen** from **floodplain silt** over **floodplain clay**, **Gley Pseudogley** from **floodplain spread floodplain sand**  
SILAB; to w/o LGG Sd; to 1/50 s
- Predominant **Gley Vegen**, less common **Vegen** and **Vega Gleys**, mostly **floodplain silt**, spreading across **lower terrace sand** and **gravel**, from **Auenschluff** over **Auenton** and widespread from **Auensand**  
GleA, Abb. GG; to w/o LGG; to w/o LGG; to w/o LGG

#### 2.2 Soils of high flood loam

##### •• Terrace sand and river gravel areas

- Spreads **brown earths**, **gley brown earths**, and rarely **gleys** from **high flood loam** or **high flood sand**  
**Lower terrace sand**, rarely **sod ash** from **loam** over **high flood loam** and **deep terrace sand**  
BfB; GG BfB; GG; to water divide; to water divide
- Predominantly **sod ash** from **loam** or **sand** over **high-flood loam** or **high-flood sand** over **deep lower terrace sand**, less common  
**Ter. of high-flood loam** (Abb. BfB; GG BfB; to water divide)

# Sand Mining



## Product Catalog from Mining Company & Soil Profile of Site

Data Source: Mining Company REESE's Website and Hydrogeological Report from Gravel Extraction Applica-



*Agricultural Land before Mining, 1990*



*Post Mining Lakescape, 2015*

*Aerial view between Stolzenau and Weser*

*Photo Source: Album from Mrs. Neumann and Wikipedia page*



# „50 Prozent der Fläche wäre betroffen“

Möglicher Kiesabbau: Landwirt Christian Graue aus Böthel sieht seinen Betrieb in der Existenz gefährdet

So sieht der aktuelle Stand aus

VON JÖRN GRAUE

**BÖTHEL/HIBBEN.** Ein möglicher Kiesabbau an der B 441 bei Hibben wäre für den Hof Graue in Böthel existenzbedrohend. „50 Prozent unserer Anbauflächen für Obst und Gemüse befinden sich in dem geplanten Anbaugelände“, sagt Obstbaumeister Christian Graue (44). Zusammen mit Ehefrau Svenja (41) baut er auf einer Gesamtfläche von 120 Hektar Erdbeeren, Äpfel, Süßkirschen, Zwetschen, Himbeeren, Holunder, Johannisbeeren, Gemüse, Kartoffeln und Getreide an.

Ob die Böden tatsächlich irgendwann einmal ausgekieselt werden und im Zuge der Neuaufstellung des Regionalen Raumordnungsprogramms vom bestehenden Vorsorgegebiet in ein Vorranggebiet hochgestuft werden, steht aktuell noch nicht fest (Artikel unten). Die Familie Graue hat sich nach eigenen Worten dem „Aktionsbündnis gegen den Kiesabbau“ angeschlossen. Das hat in den vergangenen zwölf Monaten rund 1100 Unterschriften gegen den Abbau von Kies gesammelt. „Als Grundlage der Nahrungsmittel-



Mutter Svenja, die Töchter Maria und Thea, Vater Christian Graue mit Sohn Wilm sowie die Töchter Johanna und Marleen Graue (von links) fürchten ebenso wie Arbeitskreis-Sprecher Heinz Thielker um die Zukunft der Landwirtschaft bei einem möglichen Kiesabbau an der B 441 bei Hibben.

FOTO: JÖRN GRAUE

**MITTELWESER.** Zum Planungsstand in Sachen Kiesabbau in Hibben nimmt Jens Beckmeyer, Samtgemeindebürgermeister Mittelweser, Stellung: „Grundsätzlich gibt es für den Bereich ‚Hibben‘ keine veränderte planungsrechtliche Situation; ob im Rahmen der Neuaufstellung des Regionalen Raumordnungsprogramms vorgesehen ist, diesen Bereich als ‚Vorranggebiet‘ auszuweisen, bleibt abzuwarten. Die Beteiligung der Samtgemeinde durch den Landkreis wird diesbezüglich im Rahmen der Neuaufstellung des Regionalen Raumordnungsprogramms zu gegebener Zeit erfolgen. Die Samtgemeinde steht einer Veränderung insbesondere für diesen Teilbereich kritisch gegenüber“.

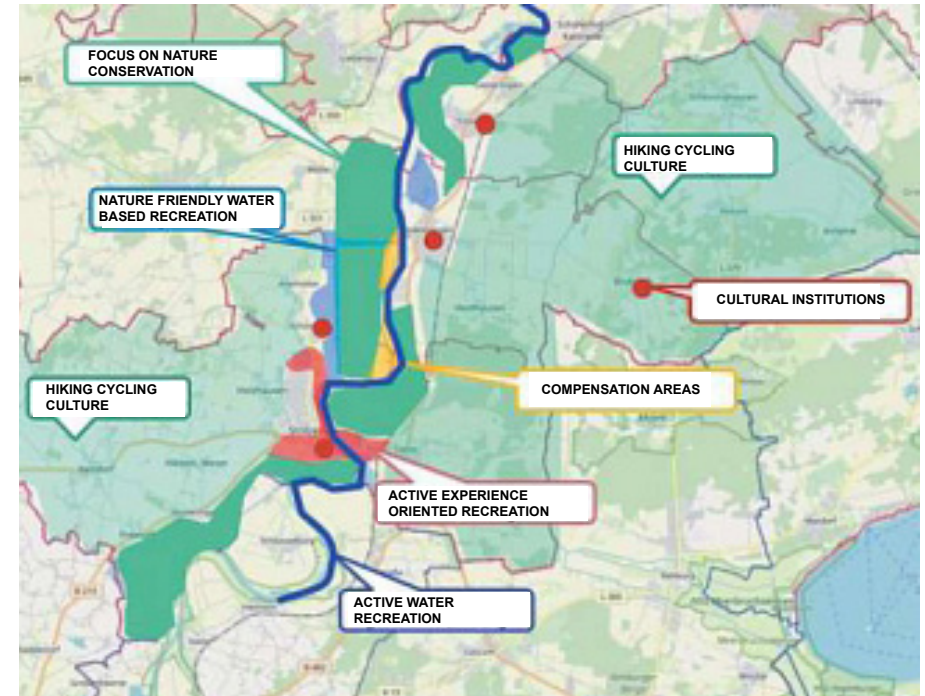
Der Verwaltungschef beschreibt auch die Möglichkeit der Gemeinde, über den Verkauf – oder in diesem Fall Nichtverkauf – von Wegeparzellen Einfluss zu nehmen: In der letzten Sitzung des Rates der Gemeinde Stolzenau wurde von mir berichtet, dass der Verwaltungsausschuss den Bürgermeister der Gemeinde Stolzenau beauftragt hat, das Stimmrecht zu einer

“50 percent of the area would be affected”

Possible gravel mining: Farmer Christian Graue from Böthel sees his business endangered in existence

Data Source: DIE HARKE. 9 MAR, 2020, newspapercut collection by Mr. Heinz Thielker

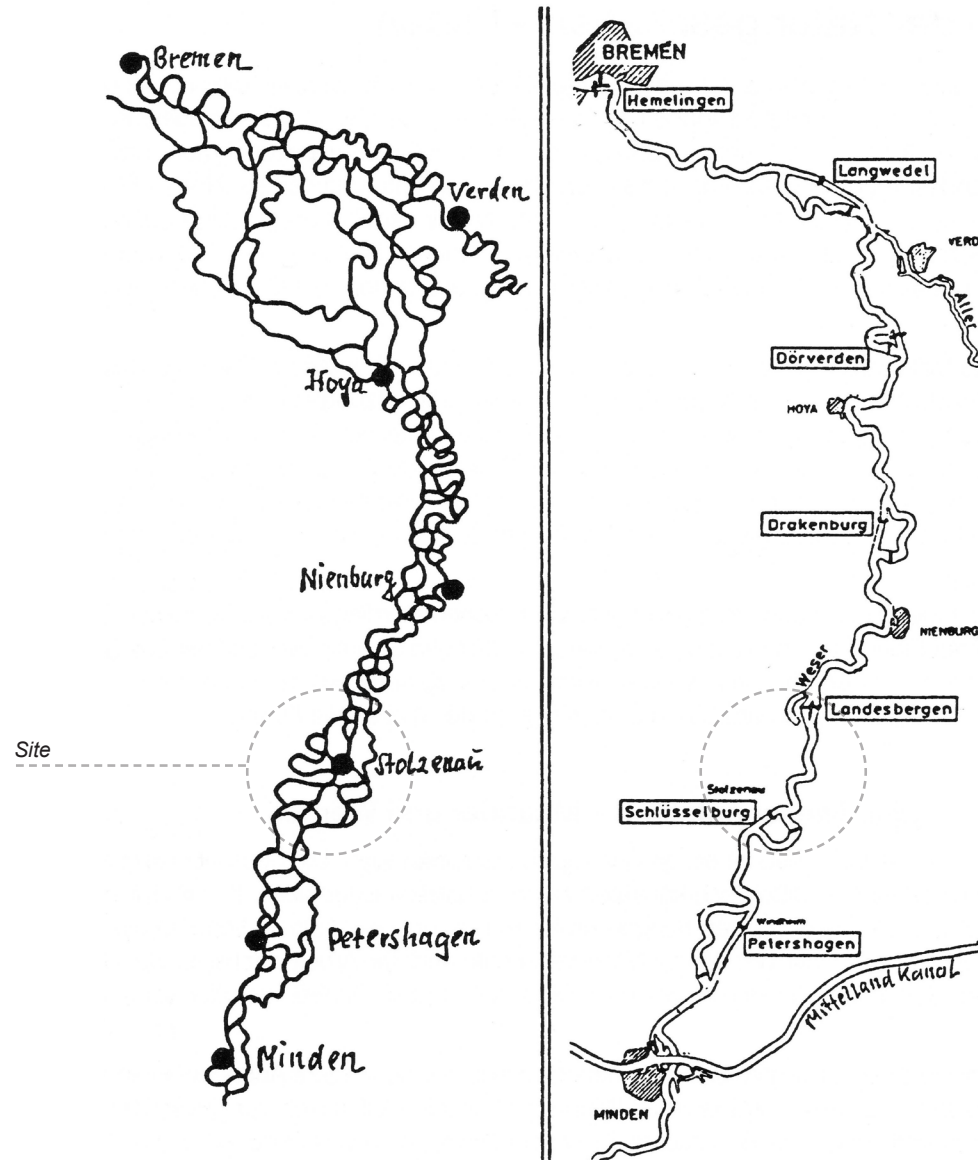
## Mining Conflicts



**Gravel lakes should attract tourists (Left), A local recreation concept developed for the Join Municipality of Mittelweser (Right)**

Data Source: DIE HARKE, 29 SEP, 2020 (left), NIENBURG ONLINE, 13 MAY, 2019 (right)

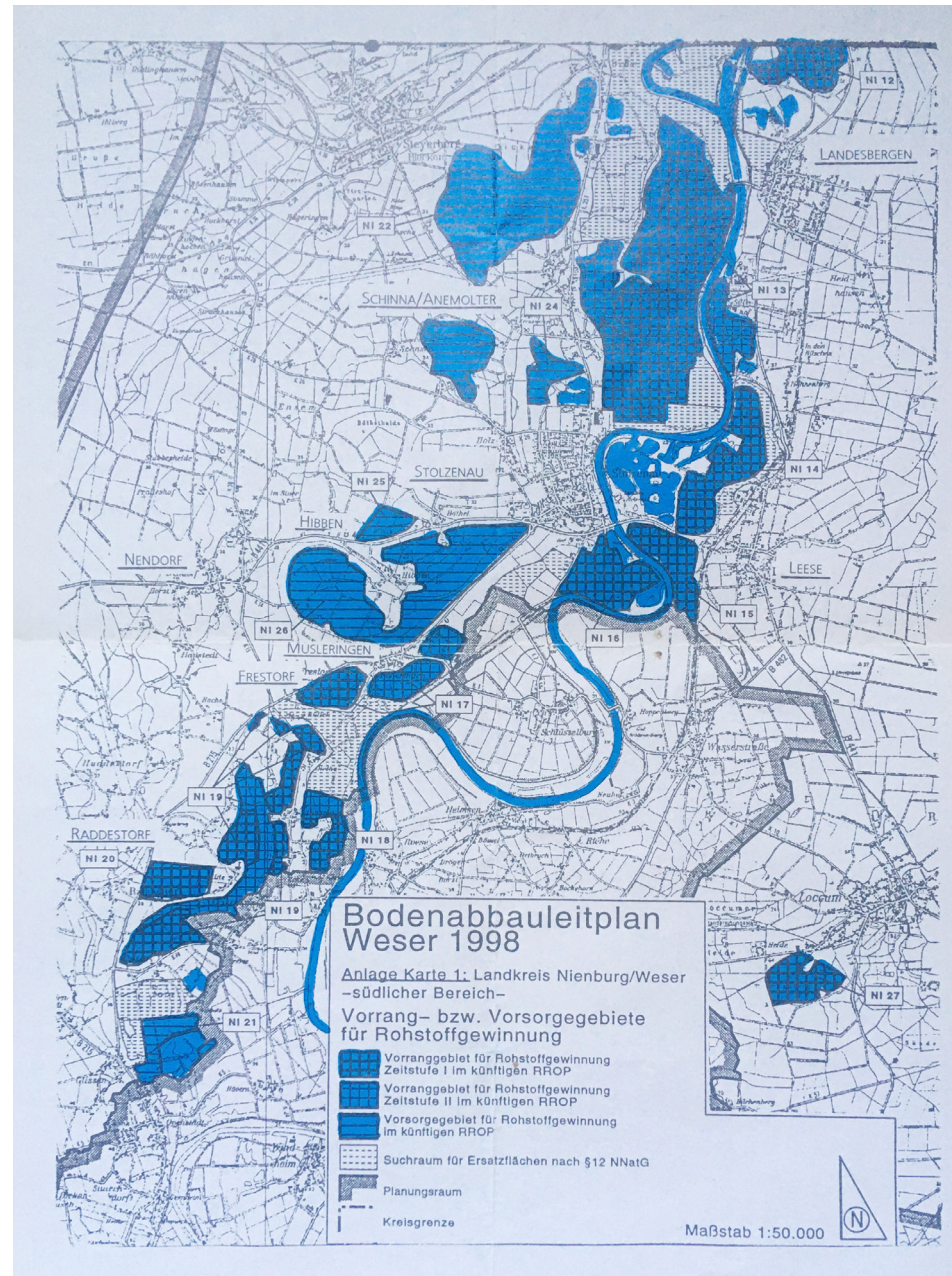
## Environmental Challenges



**Left: Mittelweser flowed in countless arms and meanders**  
**Right: Today's canalized Mittelweser with the seven barrages**

*Data Source: Maps by Oberbaurat G. Buzengeiger, WSD Hanover, Book Von Ufer zu*

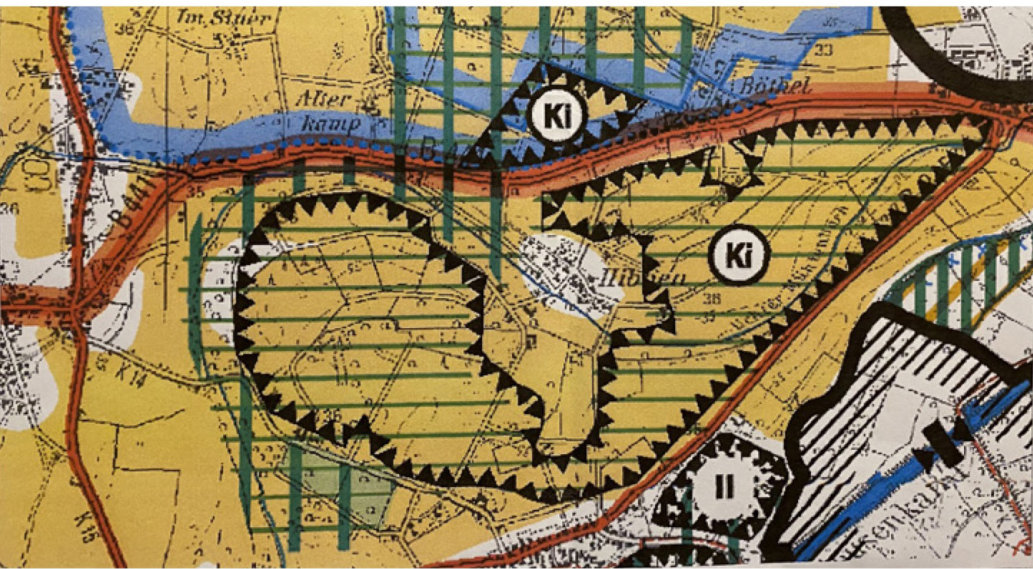
## On going Mining Plan



**Soil extraction area study plan from planning department, 1998**

*Data Source: First hand mining information leaflet from residents*

# Mining Area Plan and Visualization of Post Mining Landscape from Mining Company



# Repurposed Groundwater Lakes and Current Mining Status



1. *Kayaking Deck*  
2. *Bathing Pool*

3. *Solar Farm*

4. *Fishing Lake*

5. *Nature Reserve*

6. *Nature Trail*

7. *View Point*

4B. *Fishing Lake*

8. *Beach*

4C. *Fishing Lake*

9. *Bird hide*

8B. *Beach*

10. *Seed Catcher*

8C. *Beach*

11. *Natural Coast*

# Edge Typologies of Current Gravel Lakes

## Renaturalized Edges

1. Extensive Grassland



2. Woody Planting



3. Reed Bed and Meadows



4 Shallow Water Zones / Islands



## Programmed Edges

5. Bathing Pool



6. Rowing/ Fishing Lake & Deck



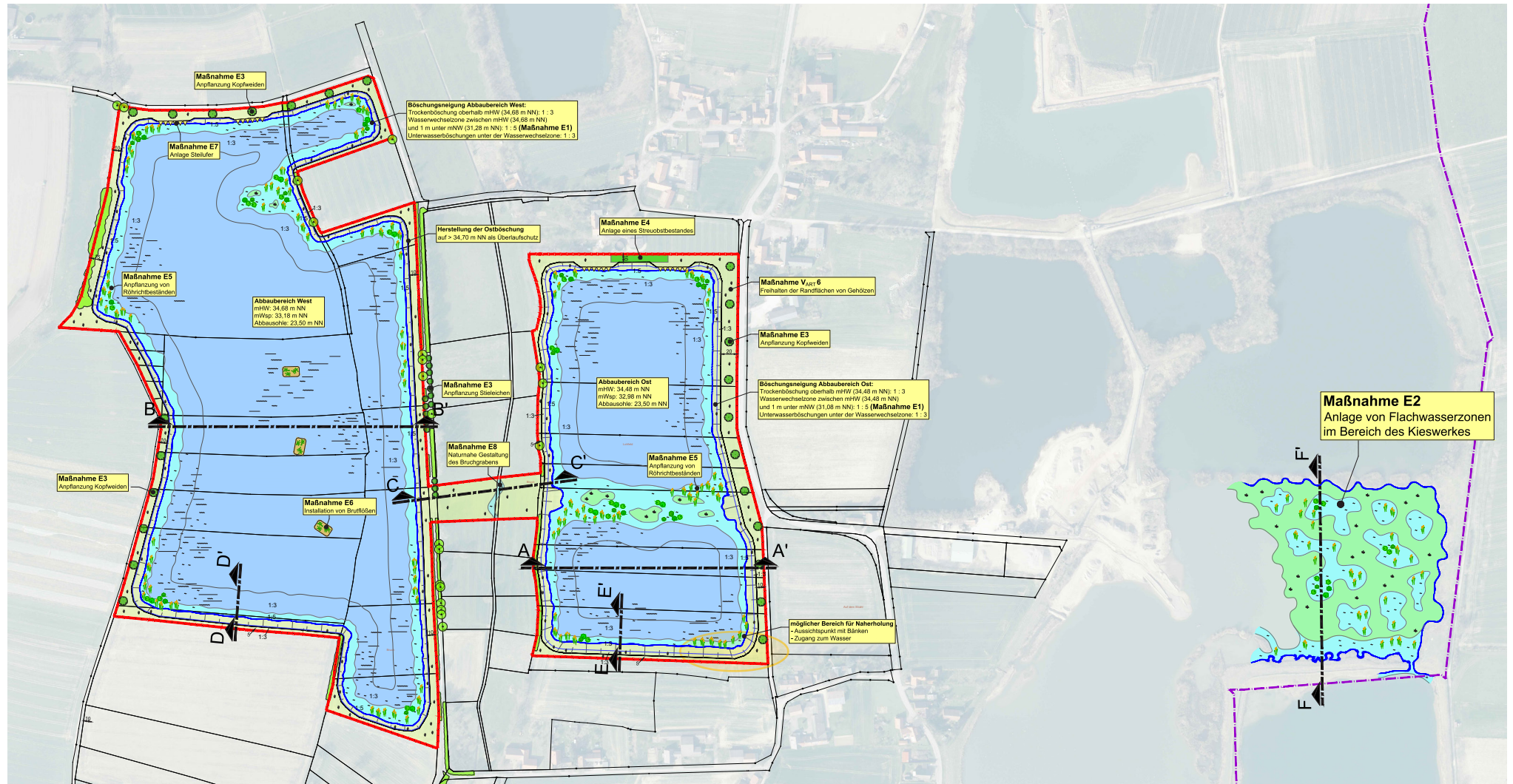
7. Beach



8. View Point



# Current Mine Closure Measures



Drawing from plan approval procedure of planned gravel extraction in Diethen.  
By Kortemeier Brokmann Landschaftsarchitekten

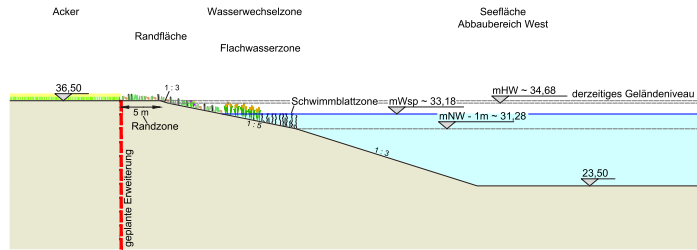
Data Source: Samtgemeinde Mittelweser/ Regional



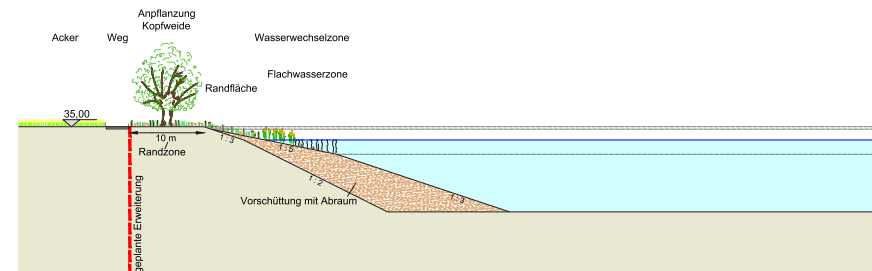
# Current Mine Closure Measures for Water Edges



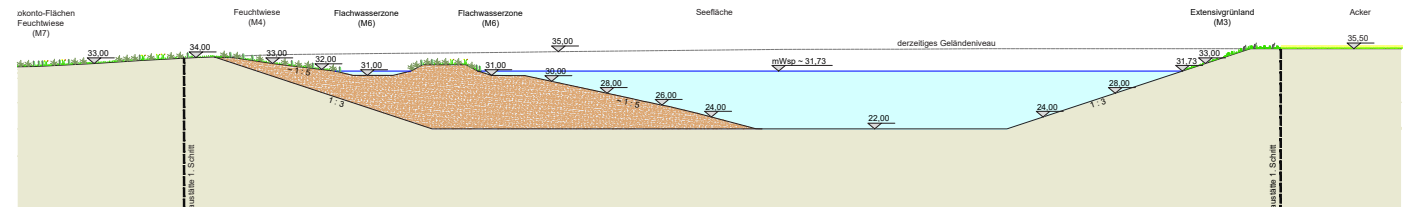
1. Extensive Grassland



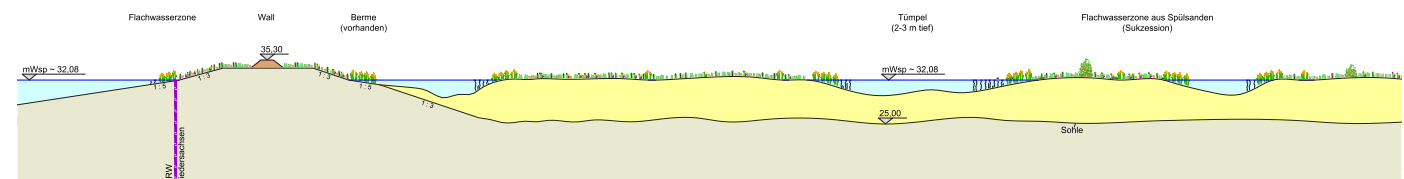
2. Woody Planting



3. Reed Bed and Meadows



4 Shallow Water / Islands



Data Source: Samtgemeinde Mittelweser & Kortemeier Brokmann Landschaftsarchitekten

### Forest promotion in Lower Saxony

Web code : 01035454

Status: 07/11/2022

The forestry promotion of the state of Lower Saxony includes the promotion of silviculture and the promotion of forestry associations. Here is a brief overview of the funded measures.

The forest in Lower Saxony fulfills important tasks for society, such as **drinking water protection, climate protection, protection against erosion and flooding**. It is also used by the population for **recreation and for a number of leisure activities**. The forest owners ensure these diverse tasks through the care and sustainable management of the forests. In order to compensate for the disadvantages of small areas or scattered ownership and to make the **forest fit for climate change, financial support is provided for certain measures.**

establishment of culture and improvement:

- up to 70% for mixed crops with at least 30% deciduous trees
- up to **85% for deciduous tree crops with a maximum of 20% conifers**



Q Forest  
© Frank Haufe

When implementing the WET, a minimum **proportion of 20% native and climate-resilient tree species (e.g. common beech, small-leaved lime, hornbeam)** must be taken into account. The type of mixture should be chosen (e.g. in troop or groups) so that the tree species are permanent (Time, continuous mixing, serving function) are preserved.

#### Promotion Forest infrastructure and Silviculture Plant list in Lower Saxony.

Source: [agrarfoerderung-niedersachsen.de/agrarfoerderung/news/](https://www.agrarfoerderung-niedersachsen.de/agrarfoerderung/news/)

**Current Forest in the Area:**

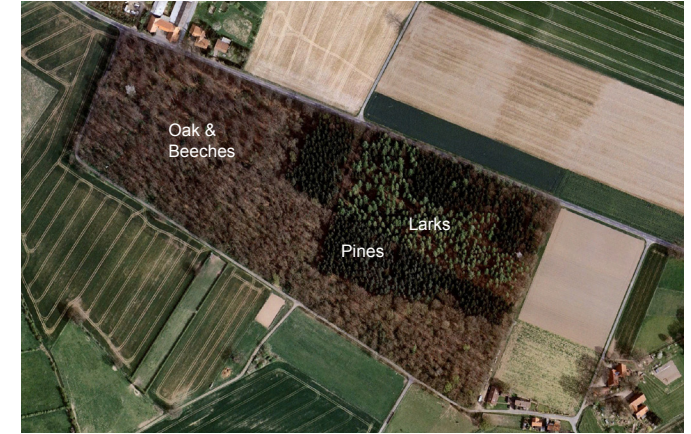
2023



2018



2011



**Surveyed Tree:**

**Conifers:**

*Larch*  
*Pines*

**Deciduous:**

*Oak*  
*Beech*

**Conifers:**



*Larch (Larix decidua)*



*Pines (Pinus sylvestris)*

**Deciduous:**



*Oak (Quercus robur)*



*Beech (Fagus sylvatica)*



*Timber & Firewood, Paper*

*Photo taken 28th Mar, 2023*

## *7.Photo Journal | Site Exploration*

*Embark on a visual journey through my personal perspective and site exploration.  
I discover the beauty and senses of the landscapes. The historical photo also offering me a chance to understand deeper of the landscape and how people enjoy it over time.*

## Site Visit



**Photo of Existing Woodland from Reforestation, Mittelweser**

*Photo Source: Site visit photo, taken in May 2023*

## Site Visit



**Photo of Agricultural Field in Stolzenau, Mittelweser**

*Photo Source: Site visit photo, taken in May 2023 and June 2022*

## Site Visit



**Photo of Operating Mine in Stolzenau, Mittelweser**

*Photo Source: Site visit photo, taken in June 2022*

## Site Visit



**Photo of Farmer Pumping water from gravel lakes for irrigation**

*Photo Source: Site visit photo, taken in June 2022*



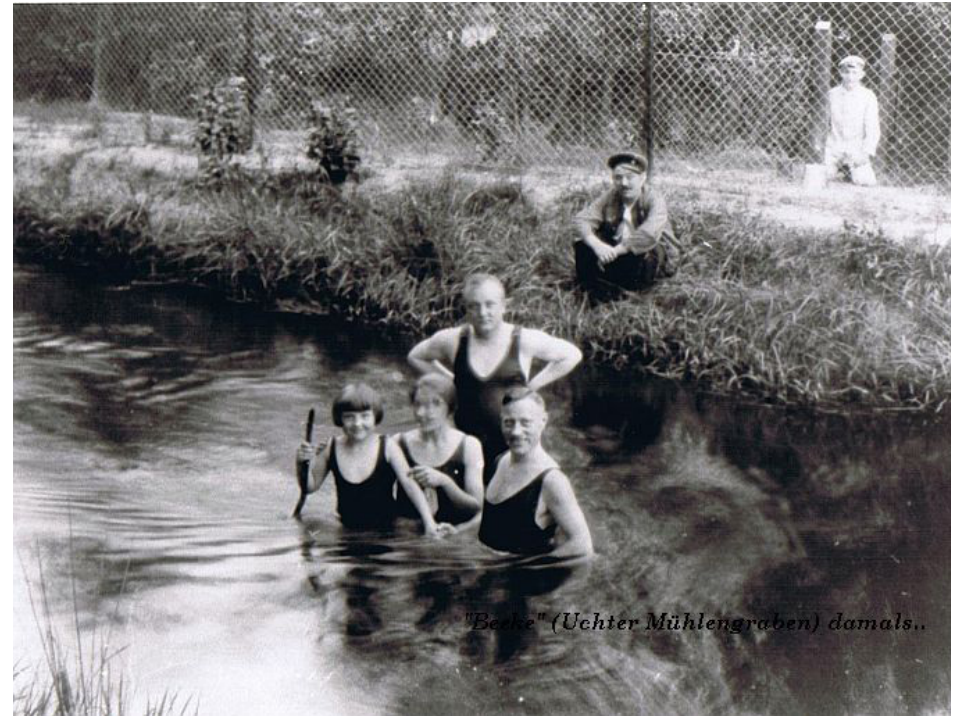
## Site Visit



**Photo of Nature Reclaiming the Post- mining Landscape**

*Photo Source: Site visit photo, taken in June 2022*

## Historical Photos



**Photo of Stolzenau and Nendorf, living along the Small Creek (Now Canalized Agricultural Ditch)**

Photo Source: <https://www.nendorf.de/>

## Historical Photos

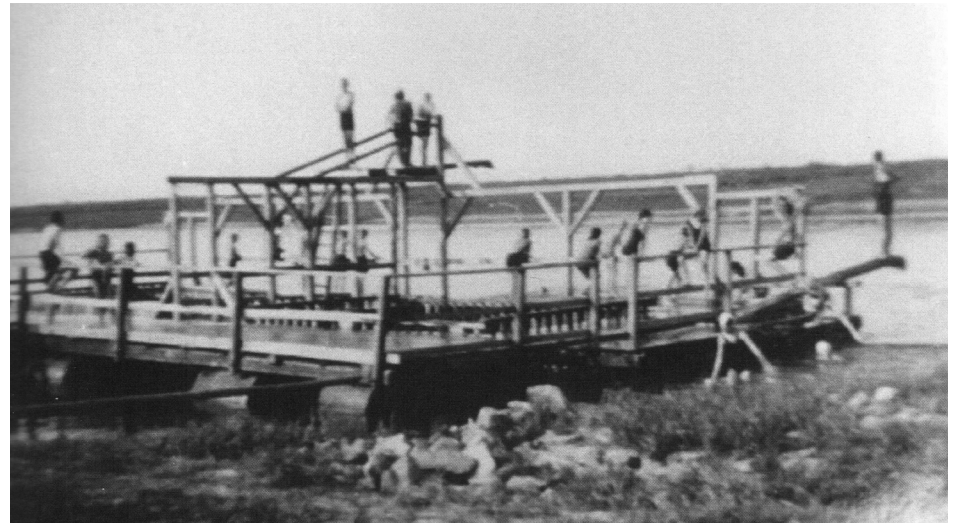


**Photo of Stolzenau and Nendorf, Agricultural Landscape**

*Photo Source: <https://www.nendorf.de/>*



## Historical Photos



**Photo of Stolzenau and Mittelweser, Different Setup in Bathing in Weser River**

*Photo Source: Book: Stolzenau Bilder aus der guten alten Zeit, Stolzenau Reineking und Oesselmann*