



DATA VS. CONTEXT: THE CITIZEN CHALLENGE

thematic: citizen engagement, governance and data



Introduction

The **Data vs. Context** protocol is a gamified activity in the field of data literacy. We are all surrounded by data. Identifying and analyzing it is a complex process, especially in real-world scenarios.

It is specifically crucial to have a solid foundation of critical data analysis when applying the scientific method to an investigation. Thus, this protocol is a good introductory activity to other SteamCity experiments.

In the way the SteamCity experiment methodology is constructed, learners will often be confronted with the use of sensor-based devices that collect data, always at a specific time and place. Being able to understand the context and question the results provided by these devices is a crucial skill.

Through the Data vs. Context protocol, students will be pushed to investigate independently and build their understanding of **what data is, and how it differs from information; and more importantly, how data is far from sufficient to build knowledge**. In other words, they will be pushed to critically analyze the context in which data emerges, to strengthen their ability to investigate complex systems and concepts.

Interdisciplinarity



civil & moral education
technology

Sustainable Development Goals



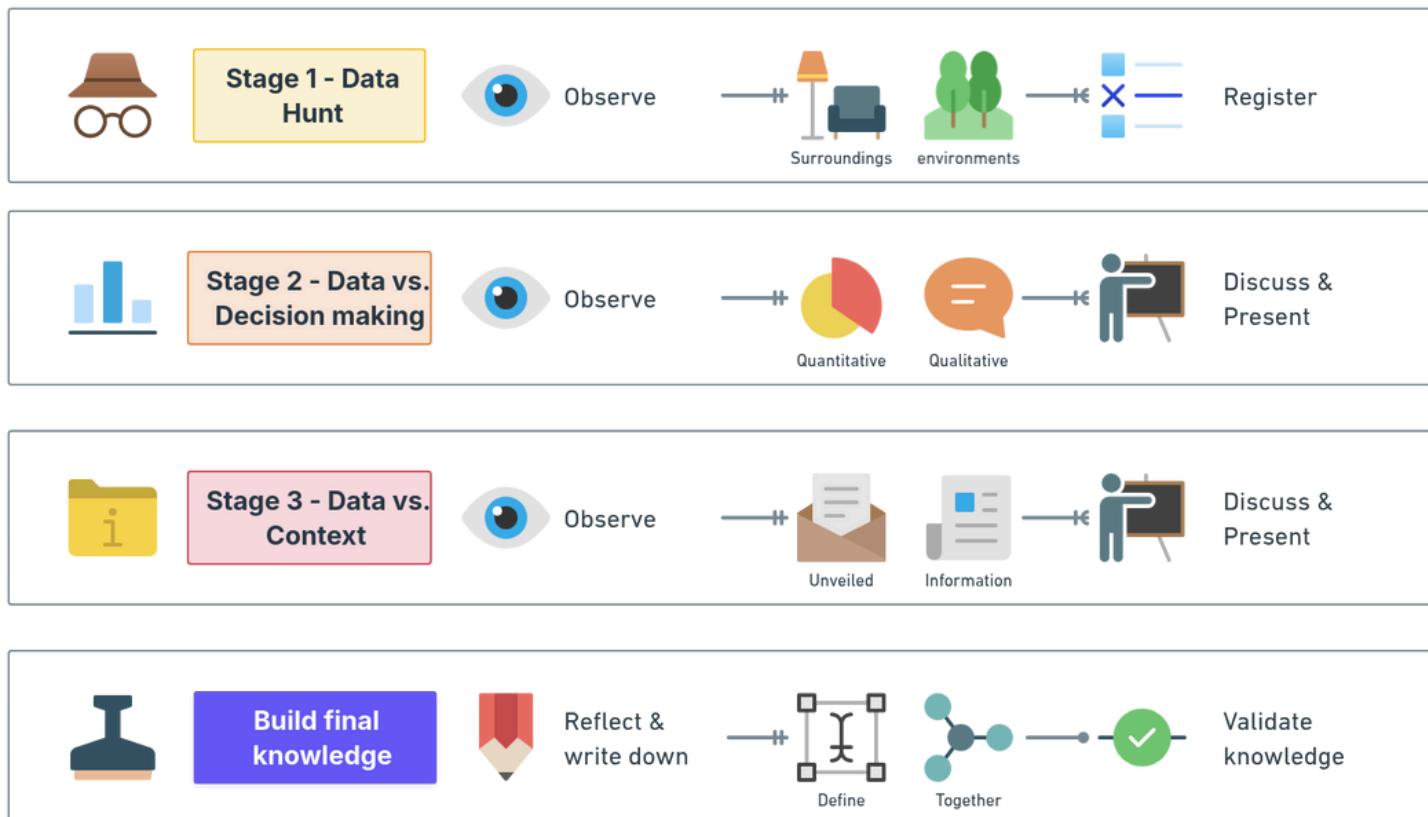


Overview

Protocol Structure

The **Data vs. Context protocol** aims to accompany the students in the co-creation of data, information and knowledge definitions, and how they differ. It gives them a concrete setting to approach how context plays a crucial role in investigating a complex system, concept or question. We are proposing a three-stages approach in which students are confronted with increasingly complex situations forcing them to reflect on these three definitions:

1. In stage 1 ("**Data Hunt**"), the students will complete a short introductory activity in which they will hunt for data in their surroundings. They will probably in this process, propose answers that cannot be considered as data. For instance, "I see a radiator" is not a data; but "The room is equipped with 1 white radiator" then becomes two datas: the fact that there is one radiator in the room (quantitative data) and the fact that the radiator is white (qualitative data). By forcing them to identify and quote orally data in a structured and qualified way, the objective is for the students to gain in precision and accuracy.
2. In stage 2 ("**Data vs. Decision Making**"), the students will be organised in small groups for a role-play activity. Each group will be given with a specific assignment such as "Improve road safety for pedestrians" or "Find solutions for increasing park frequentation" to be analysed using dataset given by the teachers. These datasets might include statistics, graphs, reports ... and should lead to the proposition of several public policy proposals to improve the given situation. Students will be tasked to present their findings, outlining the causes and effects, and how they processed the datasets.
3. In stage 3 ("**Data vs. Context**"), the students are still organised in the small groups created in stage 2, with the same assignment. However, they are given a new piece of information, that was not revealed in the previous step. They should discuss if and how this new resource impacts their findings. They can refine their proposals of public policies and reflects on the way they have constructed their knowledge of the situation throughout the activity.



Getting started

Steps	Duration	Difficulty	Material
5 minutes, 20 data	10 minutes	★☆☆☆☆	<ul style="list-style-type: none">1 whiteboard to write down students' suggestions during the data hunt1 note sheet to keep track of the conclusions and collective reflections carried out at the end of the activity
Data vs. Decision Making	25 minutes	★☆☆☆☆	<ul style="list-style-type: none">1 data set per group of students and per situation to print. You can choose to have all groups work on the same situation and compare their results, or you can choose to give a different situation to each group1 "Data Storytelling" template per group to compile ideas and analyses
Data vs. Context	25 minutes	★☆☆☆☆	<ul style="list-style-type: none">1 additional piece of information per group of students and per situation to print1 "Data Storytelling" template per group to compile ideas and analyses

Glossary

Keywords & Concepts	Definitions
Data	raw, unprocessed facts that need context to become useful
Information	data that has been processed, organized, and interpreted to add meaning and value
Knowledge	awareness, understanding that has been obtained by experience or study
Context	the situation within which something exists or happens, and that can help explain it
Data literacy	ability to read, understand, create, and communicate data as information
Dataset	a collection of data
Data accuracy	data correctly represents the real-world events or objects it is intended to describe
Data Storytelling	art of presenting data with a contextual narrative
DIKW pyramid	class of models representing purported structural or functional relationships between data, information, knowledge, and wisdom

Useful links

[Ressources | infolabs.io](#)

[What is Data Storytelling and Data Storytelling Examples | Microsoft Power BI](#)

[20 Best Data Storytelling Examples \(updated for 2023\) – Juice Analytics](#)

[DIKW pyramid \(Wikipedia\)](#)



Protocol

Step 1 - 5 minutes, 20 data



Background and description of the problem to be solved in this step: This first stage should last max. 10 minutes, including introduction and conclusion. It can be done within the classroom, in the schoolyard, in the neighbourhood, during a visit ... The objective is to identify what is data thanks to a data hunt i.e. chasing a maximum of data in a given environment with a limited time. The students will need to orally and unequivocally announce data. Teachers are validating or not their proposal based on what can be considered or not as "data".

Learning Objectives: Actively explore the definition of data, learn to unequivocally formulate data, either being quantitative or qualitative.

Conceptualisation

Within the SteamCity project, and generally in each investigation, data-driven activities are often proposed, either through manual collection (such as questionnaires or interviews) or through the use of programmed sensors, to illustrate and analyse concepts, issues and situations. As an introduction to all of these activities using data, students should be able to qualify if their observations of their surroundings can be considered or not as data. This introductory step is here to illustrate what is data thanks to an active workshop.



Study hypothesis: Identifying data in a familiar environment will allow students to better understand the nature of data and develop a "reflex" to recognize what can be considered data in different contexts

Students Investigation



Advice for teachers: Make sure that the room/location where the hunt will take place is sufficiently invested with data to be collected, so that the activity fully achieves its objective. If this is not the case, add elements that will make the data hunt more dynamic

The activity is launched by the teacher with the support of the whiteboard (*draw two columns on the board, one for accepted data and one for rejected data*) or on A3 sheets (*take two A3 sheets for accepted data on one side and rejected data on the other*). This will keep track of each proposal made by the students for the restitution phase. The teacher explains the purpose of the game, the duration and the general rules:

- **Purpose:** Identify as many data as possible in a given and limited environment, being either qualitative or quantitative
- **Duration:** 5 minutes maximum to unveil a maximum number of data
- **Rules:** Students can explore the environment freely / Students announce orally the data identified taking good care in formulating it unequivocally / The teacher will validate or invalidate the proposal / Students can try to rephrase their proposal as many times as they want until accepted or move on to another data

The teacher starts the timer for 5 minutes.

The students should hunt their surroundings to find data - with no constraint of type. The teacher is in charge of validating or not their proposal. Each time data is supposedly found, students should express it clearly and orally. The teacher validates or invalidates it (orally or using a **red** or **green** flag for instance). If data is validated, the teacher will register it on the whiteboard in the column '**data**' using a sticky note or a marker; on the contrary, for feedback

reflection, the invalidated answer will be registered in the column ‘**not data**’. It is important to keep track of rejected proposals so that you can reflect and analyze errors during the restitution phase.

Conclusion & Further Reflexion

When the timer is ringing at the end of the activity, all the students gather around the whiteboard to discover what data have been identified, and which proposals have been rejected. Together, they can evaluate the results and answer several questions:

- **Are we able to identify major types of data?** (As a teacher, you can then show the official classification of data, and how they have been sorted to cover a maximum of data)

Qualitative data		Quantitative data	
nominal data	ordinal data	continuous quantitative data	discrete quantitative data
name or category in no particular order	values defined by an ordering relationship between the different possible categories	fixed and non-decomposable, infinite number of real values within a given interval	finite number of possible real values within a given interval, vary over time, can be decomposed
Type of accommodation, name of newspaper, mode of transport	Customers' assessment of the quality of a company's services	Height and weight of a human being, height of a building	number of employees in a company, size of a household

- **Is it easy to obtain and re-use this data?**
- **Can the data be shared freely?**
- **Are there problems with the quality or accuracy of some of the data?**

Use this time to assess how the class feels about the activity. Ask questions such as: What did you learn? How do you feel about the activity? What information is missing that you need to define what data is? To keep track of your conclusions, a reflection table around the activity is available in the **appendix**.

Step 2 - Data vs. Decision Making

Background and description of the problem to be solved in this step: In this step, the classroom is divided in small groups (3/4 students) that will be given a problem to analyse. The objective is for the students to discover the data in the framework of public policies' analysis. They will act urban planners or citizens in charge of analysing a difficult situation and proposing solutions exemplified and supported by data. Topics will be related to diverse urban planning policies such as transportation, environment, and energy management. The problems delivered to the students should be specific enough to orientate a concrete discussion.



Learning Objectives: Critically analyze data and make informed decisions based on their understanding; work with data sets and understand the importance of data sorting, cleaning and visualisation; discuss decision-making processes and engage in collaborative discussions about the impact of data interpretation; take on the role of engaged citizens and make data-informed decisions for the betterment of their communities; discover the practices of data storytelling.

Conceptualisation

By leveraging data analysis, governments can enhance how they deliver public services. For instance, predictive analytics can forecast public health emergencies, while geospatial data can improve public transportation routing to better meet community needs. This results in more effective and responsive public services that cater to the populace. Moreover, data analytics allows for continuous assessment of policy effectiveness. By regularly tracking data, governments can evaluate the real-time performance of policies and make necessary adjustments. This ongoing process helps fine-tune strategies and ensures that policies fulfill their intended objectives.

Through this stage, the objective will be for students to deliver public policy recommendations, related to a specific urban situation, relying only on datasets. By integrating data storytelling into this stage, students will not only learn to analyze data but also to communicate their findings effectively. This enhances their critical thinking and presentation skills, which are essential in both academic and real-world settings. Each group of students will be given a situation to analyze. In a classroom, each group can have a different one, or each group can have the same with different or similar datasets to compare their findings. As they work through the datasets, students will develop hypotheses, make data-driven decisions, and refine their understanding of the urban issues at hand, ultimately preparing them to propose well-informed public policies.

To communicate their results properly, students will be encouraged to use data storytelling practices. Data storytelling is the practice of building a compelling narrative based on complex data and analytics, which helps convey the story and influence a particular audience. This approach can enhance their ability to present data in a meaningful way, improving their critical thinking, and fostering better decision-making skills.



Study hypothesis: the use of quantitative and qualitative data allows for the formulation of more precise and effective public policy recommendations.

Students Investigation



Advice for teachers: In this step, students will work in small groups around given situations. Each group can be given a different problem to study, but you can also propose the same topic to the whole class in order to compare their results. By working on the data sets, students will develop hypotheses, make data-driven decisions, and refine their understanding of the urban problems at hand, preparing them to propose well-informed public policies.

After explaining the rules, teachers will distribute the different topics and associated data sets to each group of students. We provide examples of topics (**full resources in the appendix**):

Subject	Themes	Mission	Data provided
The Mystery of the Hollyhock Neighborhood	<ul style="list-style-type: none"> Urban mobility Sustainability 	<u>Student role:</u> Member of the neighborhood committee. <u>Mission:</u> to improve road safety for pedestrians at a specific intersection	<ul style="list-style-type: none"> Weather and precipitation Number of accidents Average speed (km/h) Pedestrian complaints
The Iris neighborhood park dilemma	<ul style="list-style-type: none"> Use of parks Engagement Planning 	<u>Student role:</u> Member of the municipal parks and recreation team. <u>Mission:</u> increase the number of users of the Iris district public park and improve its uses	<ul style="list-style-type: none"> Housing units Recent comments on the park and its facilities Weather conditions Competing recreational facilities
Wildlife Protection in Greenwood	<ul style="list-style-type: none"> Engagement Transparency Coordination of services 	<u>Student role:</u> Environmental expert. <u>Mission:</u> To discover trends and potential causes of the decline of the blue-winged bird	<ul style="list-style-type: none"> Blue-winged bird population Conditions d'habitat Pollution and human impact
Fight against heat islands	<ul style="list-style-type: none"> Preservation of natural spaces Heat islands 	<u>Student Role:</u> Energy Analyst. <u>Mission:</u> Identify key factors contributing to increased heat and the urban heat island effect	<ul style="list-style-type: none"> Temperatures Construction and road materials Energy consumption of buildings

The timer will be set for 15 minutes. In groups, of 3 to 4 students, the learners will then discover their assignment and the resources provided for analysing the problem given. They are expected to analyze the data to understand the causes of the situation according to their perspectives and make hypotheses.

At this stage, they should question themselves: **What is the problem we are trying to solve? What does the data suggest about the causes of this situation? Are there any patterns or anomalies in the data? What additional information might we need to confirm our hypotheses?**

In a second step, they will discuss potential solutions and formalise them in their data storytelling presentation. Data storytelling is the concept of building a compelling narrative based on complex data and analytics that help tell your story and influence and inform a particular audience. To ensure that the data story is valuable, students must think about their **theory and what they aim to prove or disprove**.

They need to **collect the necessary data to develop their story**. Students should outline everything from the introduction to the conclusion, asking themselves whether their initial hypothesis was correct and how this shapes the narrative of their data story. Hereunder is a simple table that can be used for guiding the students in their storytelling:

	Once upon a time...	When one day...	Because of this...	We offer...
	<i>Describe the context according to the available data</i>	<i>Describe the reason for the change</i>	<i>Describe the challenges encountered subsequently</i>	<i>Describe possible solutions</i>
Your assumptions, your story, your conclusions				
What data helped you at this stage and how?				
What data or information is missing?				

Conclusion & Further Reflexion

When the timer is ringing at the end of the activity, the classroom gathers to discover the results of each group analysis. Make students present their findings and discuss how they feel during the activity. Question their understanding of data analysis using such questions:

- **How has your understanding of data changed? Do you have identified different types of data in your process of analysis?**
- **Is it easy to re-use this data? What challenges did you encounter during the data analysis process?**
- **Are there problems with the quality or 'accuracy' of some of the data?**
- **What do you think is the importance of the data display?**
- **How did working in a group influence your approach to data analysis?**

Complete your reflective discussion with questions such as: What did you learn? How do you feel about the activity? In order to keep track of the evolution of students' reflections around the concept of data, you can continue to fill in the reflection table available in the **appendix**.

Step 3 - Data vs. Context



Background and description of the problem to be solved in this step: In the final step of the protocol, the objective is to understand the importance of contextualization in data analysis and how data differs from information and knowledge. The students will be again separated into groups (the same as for the previous step). They will need to refine their storytelling and conclusions based on pieces of information unveiling new perspectives in their findings. Through this step, the objective will also be to discuss the importance of differencing data from knowledge and to help students gain in methodology and scientific accuracy.

Learning Objectives: Understanding the importance of context in interpreting data accurately; understanding complex systems by showing how data and context interact within larger social and environmental systems; Developing a methodological approach of data analysis.

Conceptualisation

Understanding the context is essential for accurate data interpretation. Data may show trends that are coincidental or not analyzable without additional information and context. In such cases, a strict methodology should be applied, recognizing that data alone cannot be the only perspective. This step helps students grasp that raw data can be misleading and that interpretation requires a comprehensive understanding of the circumstances surrounding the data. They will learn to critically evaluate whether the trends observed in data are genuinely indicative of underlying phenomena or merely coincidental. By incorporating additional contextual information, students will be able to discern the true implications of data and make more informed decisions. This process underscores the necessity of viewing data within a broader framework and recognizing that data alone does not constitute knowledge.

To help students conceptualize the activity, it is beneficial to introduce the **DIKW pyramid**, which stands for **Data, Information, Knowledge, and Wisdom**. This model provides a framework for understanding the hierarchy of data processing and its transformation into actionable insights.

- **Data:** Raw facts and figures without context. Example: temperature readings from sensors.
- **Information:** Processed and organized data. Example: sorting temperature readings by time and location to identify patterns.
- **Knowledge:** Understanding relationships and principles derived from information. Example: recognizing that a rise in temperature at certain times correlates with increased energy consumption.
- **Wisdom:** Using knowledge to make informed decisions and apply insights effectively. Example: implementing energy-saving measures during peak temperature times to reduce consumption.

By understanding the DIKW pyramid, teachers can guide students through the stages of data analysis, helping them transform raw data into meaningful insights and informed decisions, which is crucial for the activities in this protocol.



Study Hypothesis: Raw data alone can be misleading and must be interpreted with context and in-depth analysis to effectively guide decision making

Students Investigation

At the beginning of the step, and after having explained the rules, teachers will distribute the new information unveiled to each of the group. **The timer will be set for 10 minutes.** Reforming the groups of step 2, students will be tasked with re-evaluating their initial conclusions based on new information provided. They must critically assess how the new context affects their previous analysis and update their data storytelling accordingly. Students can then update their storytelling with new insights:

Once upon a time...	When one day...	Because of this...	We offer...
<i>Describe the context according to the available data</i>	<i>Describe the reason for the change</i>	<i>Describe the challenges encountered subsequently</i>	<i>Describe possible solutions</i>
How did the information change your perception?			

Each group will present their refined findings and discuss the implications of the additional context on their decision-making process. This exercise highlights the importance of context in interpreting data and helps students develop a comprehensive understanding of data analysis in real-world scenarios. In the **Appendix**, you will find 4 additional information suggestions corresponding to the 4 study topics proposed in Step 2.

Conclusion & Further Reflexion

When the timer is ringing at the end of the activity, the classroom gathers to discover the results of each group analysis. Open a discussion where the students can share their decision-making processes and reflect on how the complete context could have influenced their decisions. Use the following questions to guide the students:

- **How did the additional context provided in the later stages influence your initial conclusions?**
- **Were there any surprising patterns or anomalies in the data that affected your understanding of the problem?**
- **What challenges did you face during the data analysis process, and how did you overcome them?**
- **What are the limitations of the data you analyzed, and how can they be addressed in future research or analysis?**
- **What would you do differently if you were to analyze a similar dataset in the future?**
- **How can you apply the skills and knowledge gained from this activity to real-world situations?**

In order to keep track of the evolution of the students' thoughts and conclude the activity, you can finish filling in the reflection table available in the appendix.



Explore data-oriented careers

Data Scientist



expert in **statistics, predictive modeling and machine learning**, capable of transforming raw data into valuable information

Data Manager



oversees data management, ensuring its **quality, security and compliance** with regulations

Data Engineer



builds and maintains the **data infrastructure**, enabling other data professionals to work with **reliable and accessible data**

Data Protection Officer



ensures compliance with **regulations** on the **protection of personal data**

Chief Data Officer



ensuring **optimal governance and use** of data

Machine Learning Engineer



wizard of machine learning algorithms, capable of creating **predictive models** to solve complex problems

Data Mining



data mining expert, able to **extract valuable information** from huge data sets

Data Architect



designs and manages the **company's data architecture**, ensuring data is **organized and accessible**

Data Steward



works closely with technical and business teams to ensure **data quality, accuracy and consistency**



Open discussions on public services

Following on from this protocol, teachers can open a discussion on public services and governance. These exchanges will allow students to deepen their understanding of public management mechanisms. It is also an opportunity to encourage their critical thinking on the role of citizens in city life and to stimulate their civic engagement. Here are some examples of themes that can be addressed based on the situations provided during the protocol:

The Mystery of the Hollyhock Neighborhood



- Urban mobility:** How can intelligent transport systems reduce congestion and promote sustainable mobility options?
- Environmental sustainability:** How smart cities? What role can citizens play in promoting green practices?
- Community Engagement:** How can technology empower citizens to express their concerns and ideas?

The Iris neighborhood park dilemma



- Use of urban parks:** How can recreational spaces strengthen community cohesion and encourage active participation of residents in their maintenance?
- Public engagement:** How can open dialogues strengthen inclusion and improve local governance on public facilities issues?
- Public planning:** How can citizens understand planning processes and provide informed input to future initiatives?

Wildlife Protection in Greenwood



- Public engagement:** How to effectively integrate residents' concerns into decisions relating to natural heritage for more inclusive governance?
- Transparency:** How can open communication mechanisms prevent or mitigate the impacts of environmental incidents?
- Inter-departmental coordination:** How can closer collaboration between municipal services enable faster and more effective management of environmental incidents?

Combating urban heat islands



- Preservation of natural spaces in urban areas:** How can public policies support the preservation of natural spaces in cities in the face of land issues? What benefits do these areas offer in terms of biodiversity and citizen well-being, and how can their protection be integrated into urban planning?
- Urban heat islands:** How can public policies and sustainable practices mitigate the heat island phenomenon, and what role can citizens play?



Appendix. Reflection tool

Restitution of step 1 - Discover the data that surrounds me

Learnings

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Feeling



Step 2 Feedback - Making Decisions from Data

Learnings

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Feeling



Feedback from step 3 - Giving meaning to data through contextualization

Learnings

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Feeling





Appendix. Dataset

The Mystery of the Hollyhock Neighborhood

As a freshly newly arrived citizen of the Hollyhock District of Enigma City, you have been tasked by your fellow citizens to propose solutions during the next neighbourhood council regarding the mysterious increase in the number of accidents at a pedestrian crossing in the district, located after a turn.

You must analyze open data provided by the city council to solve the problem. A way for you to get integrated into the district with your fresh eyes!

Your objective: Find the cause of the increase in accidents and recommend solutions.



Propose your solutions in a structured manner to present them to the neighborhood council at the next meeting. You will present them on a narrative framework using your talents and your eloquence in front of your new neighbors.



You have access to a dataset about accidents at the pedestrian crossing that is regularly constituted by the city council and uploaded in their open data repository.

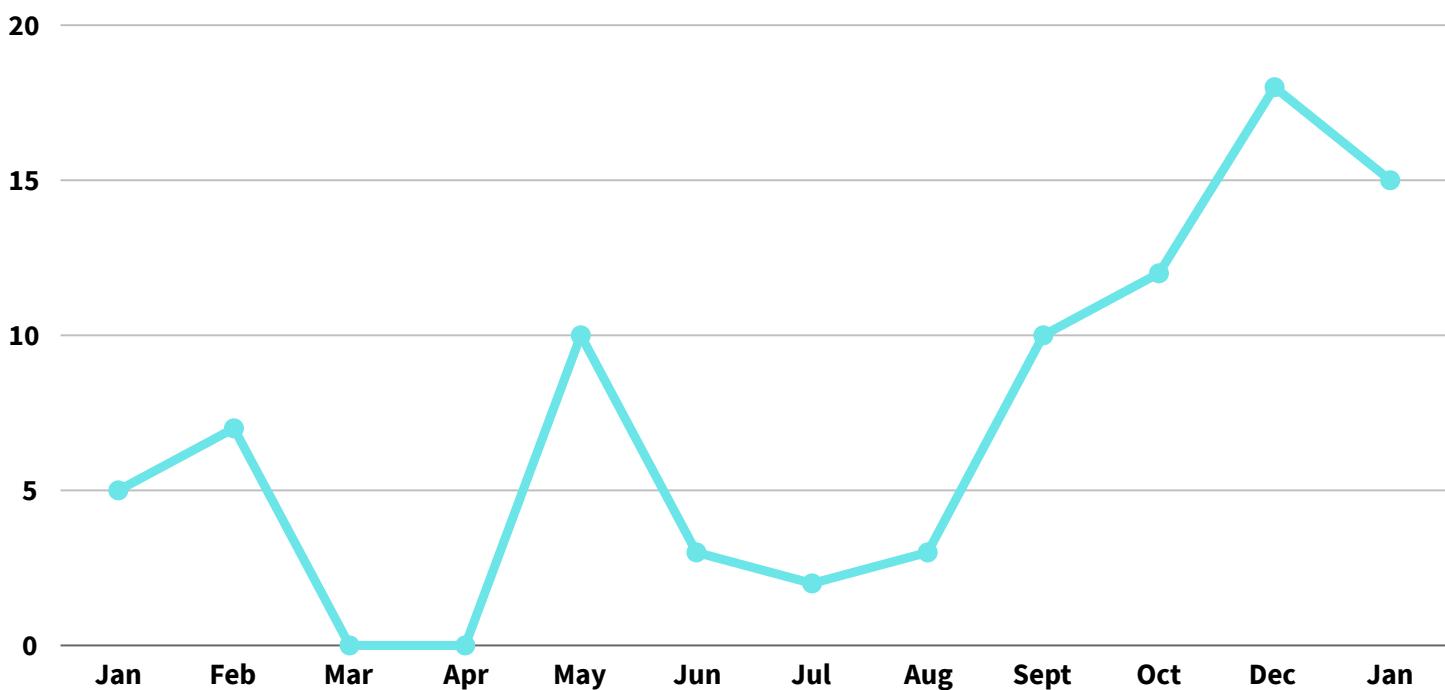
The data includes information such as weather, number of accidents, average speed, or more qualitative information such as pedestrian complaints.

You must analyze the data to find trends and correlations.

Data extracted from data.gouv

Year	Month	Weather	Number of Accidents	Average Speed (km/h)	Pedestrian Complaints
2023	Jan	Sunny	1	50	1
2023	Feb	Rainy	0	45	2
2023	Mar	Cloudy	1	55	1
2023	Avr	Sunny	2	48	1
2023	May	Rainy	0	40	2
2023	June	Cloudy	1	52	1
2023	July	Sunny	2	47	1
2023	August	Sunny	1	43	2
2023	September	Cloudy	5	40	7
2023	October	Rainy	7	38	4
2023	Dec	Rainy	4	35	5
2024	Jan	Rainy	6	34	6

● Average Rainfall Height in mm



Extract from pedestrian complaints

"I noticed that the pedestrian crossing near the bend is very dangerous. Cars often come too fast around the corner, making it difficult for pedestrians to cross safely."

"As a regular pedestrian in the neighborhood, I have witnessed several near misses at the crosswalk. This has become a serious safety concern for our community."

"I've had a few near misses crossing the road on this bend. Visibility is poor, especially when it's raining, and cars don't seem to slow down."

"I've had a few near misses crossing the road on this bend. Visibility is poor, especially when it's raining, and cars don't seem to slow down."

"I've heard from other neighbors about the increasing number of accidents at the crosswalk. We should do something about this problem."

For the teachers only - Hints to stimulate the discussion

Encourage students to use statistical tools to visualize trends and correlations in the data. They could graph the number of crashes against weather conditions or average speed to see if there are any obvious trends. They could calculate the rate of increase in crashes over time to quantify how much the problem is getting worse. They could also look at the frequency of crashes on rainy days versus non-rainy days. This can help them determine if weather is a significant factor in crashes.



Also ask them to categorize complaints by common themes, such as visibility issues, speeding cars, or inadequate signage. This can help them identify the most common problems. They can then prioritize these issues when suggesting solutions. Complaints suggest that visibility and speeding cars are important safety issues.

Given the correlation between precipitation and crashes, strategies could include improving weather forecasts and communicating potential hazards to drivers. Providing real-time weather updates to drivers could help them adjust their driving behavior accordingly.



Appendix. Dataset

The Iris neighborhood park dilemma

As a member of the Parks and Recreation Development Team for the Iris neighborhood of Nova City, you are tasked with understanding the low percentage of Iris residents using local park amenities over the past 6 months.

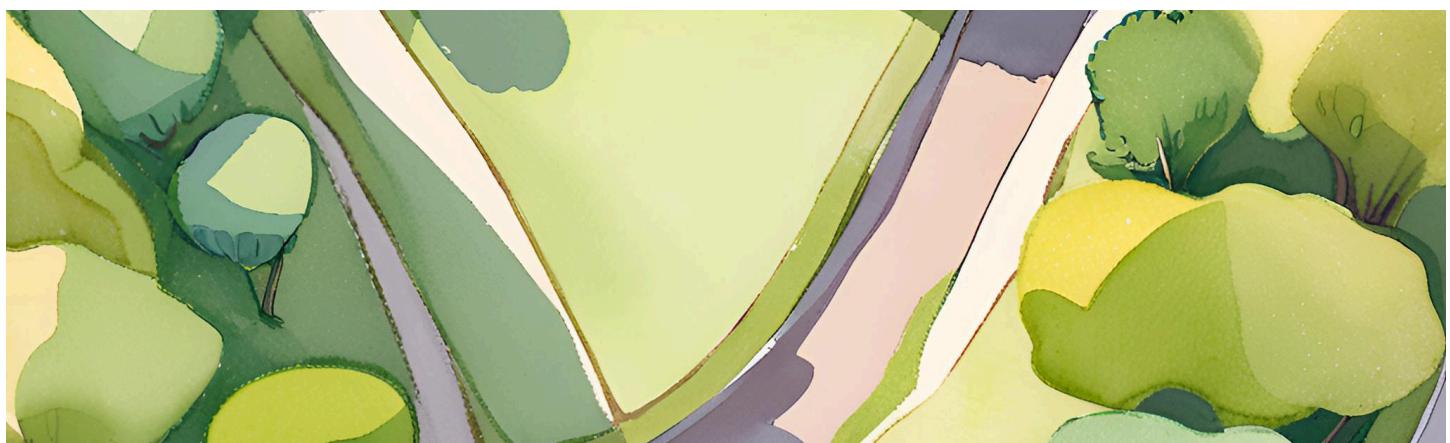
The Iris Quarter of Nova City is home to a significant community park, recognized for its abundant greenery and a broad range of recreational facilities. The park plays an essential role as a central hub for community interaction, offering a variety of amenities. The infrastructure of the park comprises a well-maintained children's playground, walking paths, picnic tables, and an open field suitable for various sports. On sunny days, the playground is a hive of activity with children engrossed in different games. Families frequently use the park's picnic tables and shaded areas for outdoor meals. The open field in the park is multipurpose. On any given day, it might serve as a soccer field for local youth or transform into a venue for community events such as weekend markets or outdoor concerts.

For the past 6 months, the Iris quarter has recently seen a surge in population due to a massive neighborhood construction project. Anticipating a rise in park usage due to the population surge, significant investment was made in enhancing the park's amenities. However, despite the new additions and rich resources available, the expected increase in park usage, six months post-enhancement, has not materialized. This unexpected trend has raised concerns for the Parks and Recreation Development Team.

Your objective: Analyze datasets to identify potential reasons for the park visits situation and propose strategies to boost park utilization.



Propose your solutions in a structured manner to present them to the Parks and Recreation team. You will present them on a narrative framework using your talents and your eloquence in front of your colleagues and community representatives.



You receive a dataset from the city's Parks Department containing information on park attendance, event schedules, maintenance records, and recent park reviews. Analyze the data to identify possible reasons for the situation and propose strategies to increase park utilization.

Detailed Populations and Residential Units (June 2022 - September 2023)				
Month	Year	Population totale	New housing	Population increase
June	2022	4520	0	0
July	2022	4520	0	0
August	2022	4540	4	20
September	2022	4540	0	0
October	2022	4555	3	15
November	2022	4555	0	0
December	2022	4570	3	15
January	2023	4570	0	0
February	2023	4850	50	280
Mars	2023	4850	0	0
April	2023	5150	60	300
May	2023	5170	4	20
June	2023	5500	70	330
July	2023	5520	4	20
August	2023	5800	60	280
September	2023	5820	4	20

Recent reviews and comments on the park and its facilities			
Date	Reviewer Profile	Notation	Comments
June 2023	Elderly resident	4	“Enjoy the new, easy-to-ride trails.”
July 2023	Young professional	5	“Great place to relax after work, love the garden.”
August 2023	Middle-aged visitor	3	“We need more activities for adults and seniors.”
September 2023	Senior Resident	2	“We need more seating.”
October 2023	Parent with a toddler	5	“The new playground is fantastic, my kids love it!”
November 2023	Young professional	2	“Too noisy on weekends, difficult to enjoy quiet spaces.”
December 2023	Parent with baby	4	“Very family friendly, but could use more baby changing areas.”
January 2024	Elderly couple	3	“The events are too noisy.”
February 2024	Young worker	1	“The noise from the sports area is sometimes unbearable.”
Mars 2024	Parent d'adolescents	5	“The sports facilities are top notch, perfect for my teenagers.”
April 2024	Elderly resident	2	“It's hard to relax with the constant noise of sports activities.”

Local weather data (June 2022 - September 2023)				
Month	Year	Prevailing weather	Average temperature (°C)	Rainy days
June	2022	Warm and sunny	26°C	3
July	2022	Warm and partly cloudy	28°C	6
August	2022	Warm and partly cloudy	29°C	7
September	2022	Soft and pleasant	25°C	4
October	2022	Cool and cloudy	20°C	8
November	2022	Cold and cloudy	13°C	10
December	2022	Cold and snowy	8°C	5
January	2023	Cold and snowy	3°C	6
February	2023	Cold and snowy	4°C	7
Mars	2023	Cool and rainy	10°C	12
April	2023	Mild and rainy	14°C	15
May	2023	Mild and rainy	16°C	14
June	2023	Warm and cloudy	21°C	11
July	2023	Warm and cloudy	22°C	13
August	2023	Hot and rainy	23°C	16
September	2023	Mild and cloudy	20°C	9
Details of competing recreational facilities				
Installation Name	Location	Equipment		
Serenity Senior Center	1.5 km east	Fitness classes for seniors, social lounges		
The gardens of calm	1 km north	Peaceful garden spaces, meditation areas		
SILVERACT Gym for Active Seniors	2 km south	Low impact exercise equipment, group classes		
Nova Community Center	1.5 km north	Indoor pool, gym, yoga studio		
Elite Fitness Gym	2 km east	2km gym, open 24 hours, personal training services		

For the teachers only - Hints to stimulate the discussion

You can guide your students to analyze the rate of population growth and the development of new housing units. Encourage them to identify trends in the comments and feedback. Noise complaints from various demographic groups may suggest that park amenities are not meeting the needs of the community as a whole.

This might lead them to conclude that the increase in population may have led to an increase in noise and congestion in the park, which could discourage use of the park. Based on these findings, students could suggest strategies such as introducing quieter, less crowded areas in the park and balancing activities for different age groups as potential solutions.

Encourage them to identify other challenges as well. A high number of rainy days or extreme temperatures may deter visitors. In this case, students can consider strategies such as installing weather-resistant facilities or creating arrangements for indoor activities.

Finally, discuss the amenities provided by competing facilities. If these facilities better meet the needs of certain demographic groups, this may explain the park's low attendance. One effective strategy your students could propose might be to improve the park's amenities to more effectively compete with these other facilities.



Appendix. Dataset

Wildlife Protection in Greenwood

As a newly appointed environmental specialist in the Greenwood District, you are tasked with addressing the declining numbers of the local Bluewing Bird species, a beloved symbol of the community's natural heritage.

The Bluewing Bird is a species native to the Greenwood District, cherished as a symbol of the community's natural heritage. It is known for its distinct blue wings, which make it a unique and recognisable part of the local wildlife. However, recent data indicates a decline in the Bluewing Bird population. While the specific reasons for this decline are yet to be determined, it's clear that this species is facing some challenges. As an environmental specialist, it is your task to investigate this issue further, using available data and resources to develop strategies to safeguard the Bluewing Bird population.

Your objective: Analyze the data to uncover trends and potential causes behind the decline of the Bluewing Bird. Develop a set of actionable strategies to protect and possibly increase the bird's population.



Propose your solutions in a structured manner to present them to the community development team. You will present them on a narrative framework using your talents and your eloquence in front of your colleagues and community representatives.



You have access to diverse datasets including wildlife monitoring reports, recent surveys, and historical data on the Bluewing Bird population, information on habitat conditions, including vegetation coverage and water sources within local parks, data on park attendance, activities, and periods of high foot traffic, studies on pollution levels and human impact on wildlife habitat

Blue-winged bird population data (monthly observations from June 2022 to September 2023)

Month	Year	Estimated population	Nesting sites observed
June	2022	120	30
July	2022	115	28
August	2022	110	25
September	2022	108	24
October	2022	105	23
November	2022	103	22
December	2022	100	20
January	2023	98	19
FEBRUARY	2023	97	18
Mars	2023	95	17
April	2023	90	15
May	2023	85	14
June	2023	80	12
July	2023	75	10
August	2023	73	9
September	2023	70	8

Housing conditions (June 2022 - September 2023)				
Month	Year	Vegetation cover (%)	Water source quality	Pedestrian traffic (visitors/day)
June	2022	80	GOOD	100
July	2022	79	GOOD	80
August	2022	78	Moderate	90
September	2022	77	Moderate	75
October	2022	76	Moderate	95
November	2022	75	Moderate	100
December	2022	74	Moderate	80
January	2023	74	Moderate	70
February	2023	73	Moderate	75
Mars	2023	72	Moderate	80
April	2023	71	Moderate	90
May	2023	70	Moderate	110
June	2023	70	Moderate	175
July	2023	65	Poor	160
August	2023	63	Poor	190
September	2023	63	Poor	220

Pollution and human impact data (June 2022 - September 2023)

Month	Year	Air quality index	Noise levels (dB)	Reported disruptions
June	2022	40	50	2
July	2022	41	52	3
August	2022	43	55	5
September	2022	44	56	4
October	2022	42	50	2
November	2022	40	48	1
December	2022	38	45	1
January	2023	37	44	0
February	2023	36	45	0
Mars	2023	38	47	1
April	2023	40	50	2
May	2023	42	53	4
June	2023	44	55	5
July	2023	46	57	6
August	2023	47	60	8
September	2023	48	62	10

For the teachers only - Hints to stimulate the discussion

This dataset can be analyzed to identify trends in bird populations and nesting sites. This may involve looking at changes over time and correlating these changes with factors such as seasonality. Declines in population and nesting sites suggest habitat degradation or disruption, which may be due to human activities or environmental changes.

The analysis could also provide information on how changes in vegetation cover, water source quality and foot traffic are impacting the bird population. A decrease in vegetation cover could lead to a loss of habitat or food sources, while a decrease in water source quality could impact bird health. High foot traffic could lead to disturbance and stress for birds.



This data can finally be analyzed to understand the impact of air quality, noise levels and reported disturbances on the bird population. High noise levels and air pollution can cause stress or health problems for birds, leading to population declines.

Based on the analysis of these datasets, several strategies could be implemented. These could include measures to restore and protect the bird's habitat, reduce foot traffic in sensitive areas, improve the quality of water sources, and reduce noise and air pollution. In addition, public education programs on the importance of preserving the blue-winged bird's habitat could be useful.



Appendix. Dataset

Combating urban heat islands

For several months, the urban heat island effect is a significant issue in the Solaris District of Helios Town. It increases energy consumption as the demand for air conditioning rises during hot periods, leading to increased emission of greenhouse gases. It exacerbates the health effects of heat, leading to heat strokes and other heat-related illnesses among the population. Furthermore, it can cause a decrease in water quality as warmer waters flow into area streams, affecting local aquatic ecosystems. The urban heat island effect, therefore, presents a considerable challenge to the sustainability of cities and the well-being of their inhabitants.

Your goal: As an environmental analyst, your task is to develop strategies to mitigate the growing urban heat island effect.



Use datasets to identify key factors contributing to increased heat and develop appropriate mitigation strategies. Use data visualization and storytelling to present your findings and recommendations to the District Environmental Council. Construct your solutions to present to your local council's environment, energy, and community teams. You will present them in a narrative format using your skills and eloquence to your colleagues and community representatives.



You have access to comprehensive datasets including temperature records, information about the materials used in the construction of buildings and roads, including their heat absorption properties, and data on energy usage in residential and commercial buildings, particularly air conditioning usage during summer months.

Temperature Record Dataset (June 2022 - September 2023) - Aggregated Data for Entire District

Month	Average temperature (°C)	Maximum temperature (°C)	Minimum temperature (°C)
2022-06	29.0	34.0	24.0
2022-07	30.0	36.0	25.0
2022-08	30,5	36,5	24,5
2022-09	28,5	34.0	23.0
2022-10	24.0	29.0	19.0
2022-11	20.0	25.0	15.0
2022-12	15.0	20.0	10.0
2023-01	14.0	19.0	9.0
2023-02	16.0	21.0	11.0
2023-03	18.0	24.0	12.0
2023-04	25.0	31.0	19.0
2023-05	27.0	33.0	21.0
2023-06	31.0	37.0	25.0
2023-07	32.0	38,0	26.0
2023-08	31,5	37,5	25,5
2023-09	30.0	36.0	24.0

Construction and road materials dataset

Material type	Usage	Heat absorption index	Albédo	% of district covered
Concrete	Buildings	High	Weak	40%
Asphalt	Routes	High	Very weak	35%
Glass	Buildings	Average	Average	10%
Brick	Buildings	Average	Average	10%
Grass	Landscaping	Weak	High	5%

Building Energy Consumption Dataset (June 2022 - September 2023) - Aggregated Data for the Entire District

Month	Total energy consumption (kWh)	Alternating current consumption (kWh)	% increase in air conditioning use (compared to previous month)
2022-06	75000	45000	-
2022-07	77500	46500	3,33%
2022-08	80000	48000	3,23%
2022-09	72500	43500	-9,38%
2022-10	65000	39000	-10,34%
2022-11	55000	33000	-15,38%
2022-12	45000	27000	-18,18%
2023-01	43500	26100	-3,33%
2023-02	47500	28500	9,20%
2023-03	52500	31500	10,53%
2023-04	62500	37500	19,05%
2023-05	67500	40500	8,00%
2023-06	75000	45000	11,11%
2023-07	80000	48000	6,67%
2023-08	81250	48750	1,56%
2023-09	78750	47250	-3,08%

For the teachers only - Hints to stimulate the discussion

This dataset provides a clear picture of temperature variations in the Solaris district over a period of more than a year. In particular, maximum temperatures can help identify the months when the heat island effect is most severe. You can guide your students to look for trends and correlations in the temperature data and to examine how these correlate with the timing of peak energy consumption.



The data also provides information about the different materials used in the neighbourhood and their heat absorption indices and albedo values. These are key factors contributing to the urban heat island effect. You can encourage students to think about how alternative or additional materials could be used to reduce heat absorption in the neighbourhood. For example, using more reflective materials or installing green roofs could be effective strategies.

Finally, students have access to data on energy needs during peak heat periods, particularly due to the use of air conditioning. You could stimulate discussions about alternative cooling methods that could be implemented to reduce energy consumption during peak periods. For example, improving building insulation or using more energy-efficient air conditioning systems could be potential solutions.



Appendix. Context

The Mystery of the Hollyhock Neighborhood

123, rue Anywhere, Enigma

ENIGMA CHRONICLES

September 22, 2023

MORNING EDITION

UNTANGLING STORIES, CONNECTING COMMUNITY



Installation of a bus stop on the famous curved street of Hollyhock "Blossom Lane"

NEW BUS STOPS TRANSFORM URBAN MOBILITY

Enigma, a city known for its commitment to progress and community well-being, has embarked on a transformative journey to improve urban mobility and connectivity. On September 10, 2023, the city witnessed the inauguration of four new bus stops, strategically placed in different neighborhoods, as part of the city council's vision to create a more accessible and interconnected urban landscape.

These new bus stops, which will benefit residents of Hollyhock, Meadowbrook Estates, Oakwood Heights and Willow Creek, represent a significant step forward in addressing transportation challenges and promoting equitable access to public services. Let's explore how these developments will impact each of the neighborhoods.

1. Hollyhock Neighbourhood: The Hub of Opportunity
Hollyhock, a central neighbourhood in Enigma, has long sought to improve its public transport options. The introduction of a new bus stop promises to be a game changer for residents. With easier access to city services, employment centres and educational institutions, Hollyhock is poised for a new era of growth and prosperity.

2. Meadowbrook Estates: Nestled in the quiet suburbs of the city, Meadowbrook Estates now enjoys seamless connectivity to the city centre with the addition of a new bus stop. This development opens up endless possibilities for residents, simplifying travel and facilitating recreational outings.

3. Oakwood Heights: Oakwood Heights, known for its vibrant community, welcomes the new bus stop as a means of improved mobility. Residents can now effortlessly access the city's healthcare facilities, shopping centers and cultural attractions, while reducing their carbon footprint.

4. Willow Creek: Situated along the scenic Enigma River, Willow Creek has enthusiastically welcomed the new bus stop. The initiative provides convenience to residents looking to explore the city's natural beauty or commute to work with ease, all while enjoying a scenic route.

Mayor Sarah Anderson expressed her enthusiasm for the project, saying: "The deployment of these new bus stops is a testament to Enigma's commitment to creating a more connected and sustainable city. Our goal is to provide accessible and efficient public transport options for all residents."

Each of the new bus stops is equipped with modern amenities, including shelters, seating and real-time arrival information. These features are designed to make public transit a more comfortable and reliable option for residents, encouraging its use.

With these initiatives, Enigma reaffirms its position as a city at the forefront of urban development and sustainability, setting an example for communities striving to achieve excellence in all aspects of urban life.



Appendix. Context

The Iris neighborhood park dilemma



Organized by

Hannah Morales
Housing Service

Prepared for

Jamie Chastain
Mayor

REPORT HOUSING AND CONSTRUCTION OUTLOOK

YEAR 2023

IRIS QUARTER

Information on the neighborhood construction project

Phase de construction	Completion date	New units	Demographics of new residents
Phase 1	February 2023	50	Young professionals, single or without children
Phase 2	April 2023	60	Elderly people, some requiring accessible living options
Phase 3	June 2023	70	Mix of middle-aged and elderly residents
Phase 4	August 2023	60	Mainly aimed at the elderly, with a focus on high accessibility

Annex 8

Recent improvements to park equipment

Type of improvement	Completion date	Description
Expansion of the playground	Mars 2023	Added new play equipment for children
Modernization of sports facilities	July 2023	Modernized basketball and tennis courts
Expansion of the picnic area	August 2023	Expanded picnic areas with more barbecue spots

Annex 9





Appendix. Context

Wildlife Protection in Greenwood

The voices of nature are expressed through Emily Hartwell

THE WHISPERS OF NATURE



Urgent Environmental Alert: Oil Spill in Greenwood Park

Date : 15 avril 2023

This article comes amid troubling circumstances that demand immediate attention from our community and local authorities.

An oil leak has been identified in the central reservoir, a critical water source within our community's beloved park, especially for wildlife. This incident was observed during a routine ecological survey, where I noticed an unusual sheen on the water, indicating oil contamination.

The leak covers an area of approximately 20 square meters and poses a significant threat to water quality and the local ecosystem.

Immediate action was taken, local environmental agencies were notified and preliminary containment measures were quickly implemented. Floating booms and absorbent materials are currently in place to prevent further spread of the oil.

Cleanup operations are underway and crews are working diligently to remove oil from the affected area.

Complete recovery of the reservoir is critical and is expected to require significant time and resources to ensure the environmental health of the park is restored.

This event highlights the fragility of our natural environments and the need for continued vigilance to protect them.

I will keep you informed of the progress of the cleanup operations and any significant developments. Your awareness and support for these efforts is invaluable.



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Appendix. Context

Combating urban heat islands

Official Decision - Solaris District Business Development Plan

Published by: Helios City Planning Department

Document Number: HTMPD-2023-045

Publication Date: January 15, 2023

Operational Date: April 2023



This official decision approves the development of a new commercial area in the Solaris district of the city of Helios, which will result in the removal of 15% of the existing green space in the designated development site. This decision is supported by comprehensive impact assessments covering economic benefits, commercial improvements and mitigated environmental impacts.

Project Overview

Development Location: Solaris Central District, Helios City Total Development Area: 2.5 square kilometers Green Area Affected: 0.375 square kilometers (15% of the development area) Nature of Development: Mixed-use commercial complex comprising retail, office and recreational facilities

Justification and objective

- Economic impact:** The project is expected to generate approximately \$50 million in annual revenue from commercial and retail leases. It is expected to create more than 500 permanent jobs and 1,000 temporary construction jobs.
- Commercial Impact:** The complex will serve as a regional hub for business and commerce, which is expected to attract additional investment and improve the commercial viability of the district. Provision of essential services and amenities to meet the growing demands of the Solaris District's growing population.
- Environmental impact:** The removal of 15% of existing green spaces was assessed. Mitigation strategies include the integration of sustainable building practices and the creation of rooftop gardens to compensate for the loss of greenery at ground level. The project adheres to environmental standards aimed at minimizing ecological disturbance and improving urban sustainability.

Detailed development plan

- Retail area: 40,000 square metres housing a range of shops and boutiques.
- Office space: 60,000 square meters designed for multi-tenant use, focused on high-tech and green businesses.
- Recreational facilities: 5,000 square meters including a cinema, restaurants and a fitness center.
- Green features: Installation of solar panels, green roofs and energy efficient systems to reduce the building's carbon footprint.

Expected results

- Economic growth: strengthening the local economy through new job opportunities and increased consumer spending.
- Improved retail landscape: The development is expected to raise the neighborhood's profile as a premier retail destination.
- Environmental sustainability: Despite the initial reduction in green space, the long-term design of the project includes significant sustainability practices aimed at achieving a net positive environmental impact.

Approval and future actions

- Approval Status: The project has been fully approved by the City of Helios Municipal Planning Department.
- Next steps: Construction is expected to begin in June 2023, with an anticipated completion and commissioning date of April 2024.
- Monitoring and evaluation: Regular evaluations will be carried out to ensure compliance with environmental commitments and to measure the impact of the project on the local community.

Marianne Caldwell

Head of the Urban Planning Department of the City of Helios

Marianne Caldwell
