Department of Computer Science & Engineering
The University of Texas at Arlington

# System Requirements Specification
# CSE 4316: Senior Design I
# Summer 2025

# AR Wetlands Watchers
# Water Pollution Simulator

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## Revision History

| Revision | Date | Author(s) | Description |
|---|---|---|---|
| 0.1 | 06.30.2025 | MM | Document Creation |
| 1.0 | 07.09.2025 | AM, MMS, NA, YE, MNA | Complete Draft |

# Contents

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# 1 Product Concept

The Interactive AR Table is an educational system that uses augmented reality to display 3D models and visual content on a physical tabletop. The tabletop provides a guided experience that includes animations, voiceover narration, and timed visual sequences. The main goal of the system is to raise awareness and help users better understand important topics related to civil engineering, water systems, and environmental impact. One of the key focuses of this project is highlighting how human activities such as construction and runoff contribute to water pollution, helping viewers understand the long-term effects of these actions. The project is sponsored by the U.S. Army Corps of Engineers (USACE) and is intended to be used in outreach and educational settings.

## 1.1 Purpose and Use

The purpose of the Interactive AR Table is to provide an immersive and accessible way to educate the public about the environmental consequences of human activity, especially in relation to water pollution and civil infrastructure. The table is meant to serve as a passive learning tool, where users can observe real-world scenarios brought to life through visual storytelling. By combining animations, 3D scenes, and audio narration, the experience helps communicate complex ideas such as stormwater runoff, erosion, and development impact in a way that is easy to follow. It is especially useful in settings where interactive demonstrations are limited, and visual context can enhance understanding.

## 1.2 Intended Audience

This product is designed for a wide range of users, including students, community members, government officials, and professionals in training. The table is intended to be displayed in locations such as public outreach centers, open houses, educational labs, and agency offices. The primary audience includes individuals who may not have a strong technical background but need to understand the environmental and civil consequences of certain actions. For example, the AR Table may help explain to a community how urban development increases runoff and affects nearby water sources. It can also serve as a visual aid during briefings or demonstrations hosted by the U.S. Army Corps of Engineers or other educational institutions.

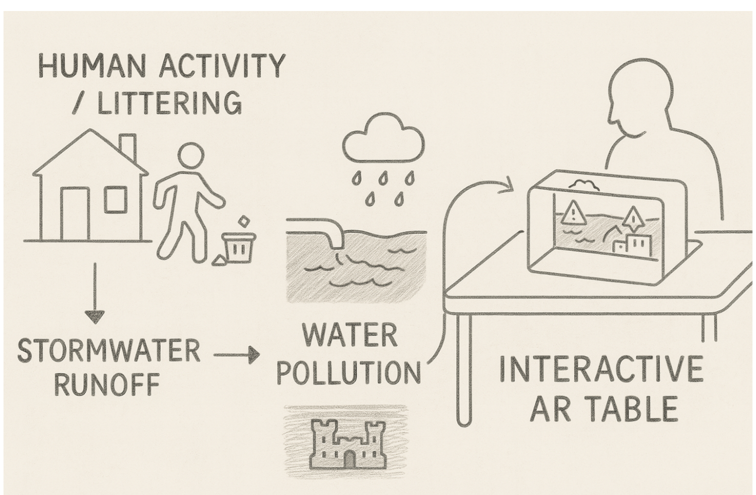


Figure 1: Conceptual drawing of the Interactive AR Table

# 2 Product Description

This section provides the reader with an overview of the Interactive AR Table, an educational display system that uses augmented reality to visualize complex environmental concepts. It allows users to observe how human actions such as construction and littering can affect water systems. The primary purpose of this product is to enhance public understanding of civil and environmental engineering topics through a guided visual experience that combines narration, 3D animations, and selective user-triggered interactions.

## 2.1 Features and Functions

The Interactive AR Table is designed to deliver a guided educational experience using augmented reality to visualize environmental concepts such as stormwater runoff, erosion, and pollution. The physical table acts as a visual stage where printed markers or objects are recognized by a dedicated mobile application, which activates and overlays animated 3D content in real time. This mobile app serves as the primary interface for triggering and displaying AR content, allowing users to view augmented scenes through a tablet or smartphone held over the table.

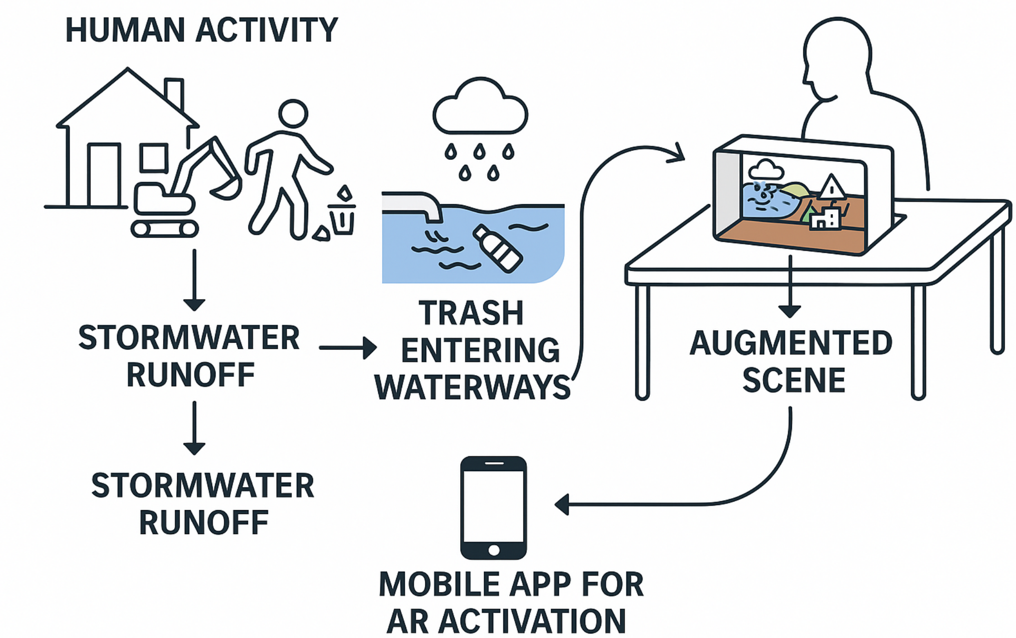


Figure 2: System overview diagram showing marker-based activation and mobile AR rendering.

The product includes the following main features:

- A physical tabletop surface containing visual markers and scene elements
- A companion mobile application that uses the device camera to detect markers and render 3D content
- Predefined AR animations and narration sequences that play based on marker detection
- Educational content designed to illustrate cause-and-effect relationships in urban development and environmental impact

- AR labels and audio narration triggered by a built-in timeline

Although the system primarily operates in a passive display mode, it includes optional interactivity. For example, a user gesture or approaching the table may trigger an animation or narration sequence, offering a slightly adaptive experience. This makes it suitable for both exhibit-style deployment and more dynamic classroom use.

**What the product does not do:**

- It does not support freeform exploration or dynamic interaction with 3D models beyond the pre-defined animations
- It does not allow users to edit, build, or create new AR scenes directly through the app or table
- It is not an open-ended simulation platform and does not respond to complex user inputs or voice commands

External elements such as pre-rendered media, configuration files, and narration tracks are stored locally within the device. There is no requirement for continuous internet access during operation.

## 2.2 External Inputs & Outputs

The system requires very minimal input during regular use. The Interactive AR Table relies on a companion mobile application to handle all external data inputs and outputs. These external data flows include downloading AR assets from the internet, capturing sensor data from the user's device, and rendering visual and auditory output for the user. The table itself is non-digital and serves as a physical reference surface containing printed markers, while the mobile app manages content recognition and delivery. Below is a summary of the system's key external inputs and outputs:

| Name | Description | Use |
|---|---|---|
| Device Camera Feed (Input) | Real-time video from the mobile camera detects printed markers on the table surface. | Triggers and aligns AR visualizations with physical markers. |
| Motion / Sensor Data (Input) | Uses the device's gyroscope, proximity, and orientation sensors to detect motion or user presence. | Optionally triggers animations or adjusts AR scenes. |
| Augmented Scene Rendering (Output) | The mobile app displays 3D content and effects over the real-world table view using augmented reality. | Presents environmental simulations (e.g., runoff, erosion). |
| Audio Narration (Output) | Playback of synchronized audio explaining what is being shown in the AR scene. | Enhances accessibility and user understanding. |

Table 2: External inputs and outputs for the Interactive AR Table.

## 2.3 Product Interfaces

The user interface is entirely visual, presented on the AR display surface. There are no touchscreens or physical input buttons on the table. The presentation loop is designed for hands-free operation, with limited interaction capabilities. Interfaces include:

- Visual display of 3D environments with labeled features (e.g., "stormwater", "erosion", "construction")

- Audio narration synced with each animated sequence
- Optional gesture-based interaction or motion-triggered content initiation
- A simple administrative menu (accessible via hidden input) used only by maintainers for diagnostics or media updates

No physical buttons or interfaces are present on the AR Table itself. All operational control occurs through the mobile application, which serves both as a viewing tool and a light administrative console. The interface is designed to require minimal training and ensures accessibility by supporting both visual and audio channels.

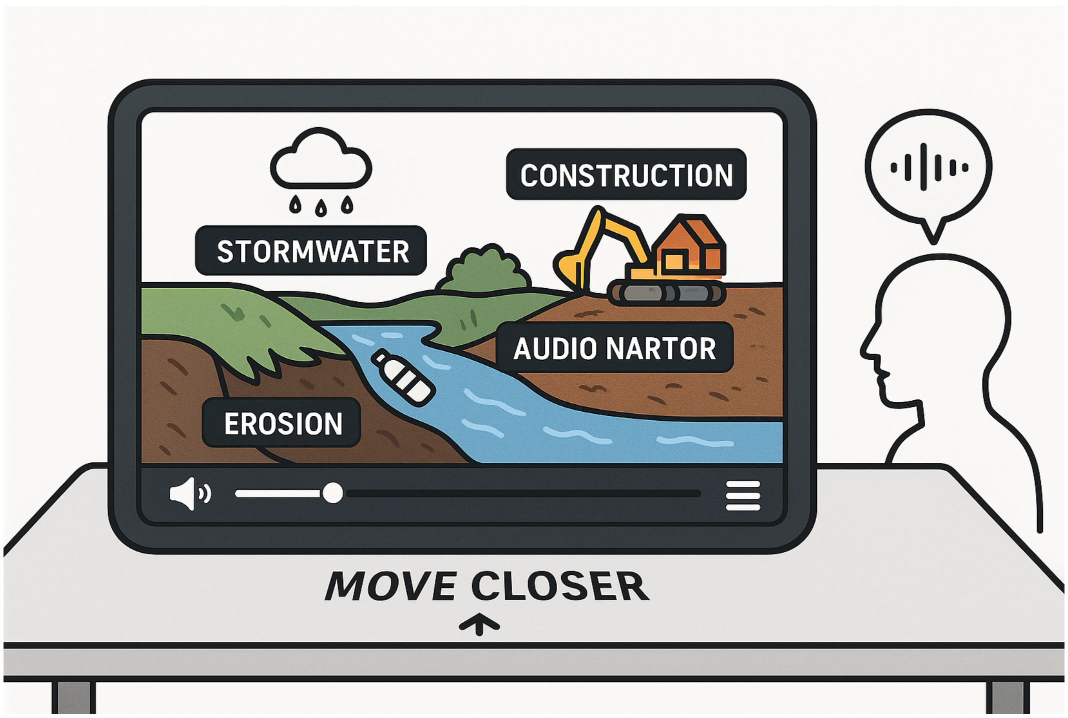


Figure 3: Mocked-up interface showing AR display with labeled features and narration feedback.

# 3 Customer Requirements

The AR Wetlands product is designed for public education and outreach, specifically targeting water system awareness and environmental impact caused by urban development and environmental factors. This system combines a physical tabletop and mobile AR app to present users with visual, narrated, and animated simulations of real-world scenarios. These customer requirements define the key features that the user will directly observe or interact with. All items in this section have been derived from consultation with the sponsor (USACE), potential end-users, and team consensus. These requirements are stable and may only be revised with the explicit agreement of the customer.

## 3.1 Educational Scenario Playback

### 3.1.1 Description

The product shall display animated AR scenes that depict storm-water runoff, littering, erosion, and other relevant civil engineering phenomena. The animations shall be triggered automatically or via user interaction. This ensures effective visual learning for non-technical users. Example: animation showing rain falling over a neighborhood and flowing into drains.

### 3.1.2 Source

USACE sponsor (Jason Knight), Team alignment.

### 3.1.3 Constraints

- Device hardware limitations (older smartphones/tablets may render fewer frames)
- Outdoor use may reduce screen visibility; ideal indoor lighting conditions should be recommended
- Predefined scenes limit dynamic simulation
- Material selection may be limited by budget and availability.

### 3.1.4 Standards

- Unity AR Foundation rendering pipeline
- ADA visual accessibility guidelines (contrast, text legibility)

### 3.1.5 Priority

- Critical

## 3.2 Marker-Based AR Scene Activation

### 3.2.1 Description

The system shall recognize printed markers on the tabletop surface using the mobile app camera and display corresponding 3D models. Markers will be placed in key locations to indicate environmental scenarios (e.g., homes, storm drains, parks).

### 3.2.2 Source

USACE sponsor (Jason Knight), Team Requirements Workshop

### 3.2.3 Constraints

- Tabletop design must maintain consistent lighting and surface clarity
- Marker misalignment may result in false detection or jitter
- Must not require continuous internet connection

### 3.2.4 Standards

ARCore/ARKit marker tracking

### 3.2.5 Priority

Low

## 3.3 Voice Narration for Educational Events

### 3.3.1 Description

Add audio narration to accompany on-screen educational prompts when a user interacts with a trigger. This would improve accessibility and learning retention for younger users or those with visual impairments.

### 3.3.2 Source

Team and Sponsor(Jason Knight) alignment

### 3.3.3 Constraints

- Narration must match scene timing exactly
- Requires natural/professional sounding voice, be it text-to-speech or recorded.

### 3.3.4 Standards

- Unity Audio Manager scripting best practices

### 3.3.5 Priority

Low

## 3.4 Physical Tabletop Unit

### 3.4.1 Description

The AR experience must be anchored to a physical tabletop unit that includes printed markers and labeled areas representing environmental features such as roads, buildings, water drains, and vegetation. This table must serve as the visual base for AR overlays and must maintain spatial consistency so that virtual content aligns correctly when viewed through a mobile device.

The tabletop should be portable, durable, and visually engaging. It will serve as the main interface with the user in physical space and should require minimal setup at demonstration sites.

### 3.4.2 Source

USACE sponsor (Jason Knight) specification and Team alignment.

### 3.4.3 Constraints

- Materials must meet school and public exhibit safety standards
- Printed markers must be laminated or coated for water and UV resistance
- Sponsor (USACE) is responsible for shipping the physical tabletop, and delivery may be delayed. Development and testing must proceed with a placeholder surface if the final table is not available on time.

### 3.4.4 Standards

- General accessibility guidelines for public demonstration units

#### 3.4.5 Priority

- Critical

# 4 Packaging Requirements

The AR Wetlands Watchers system consists of two main components:

- a portable physical table
- a downloadable AR application for Android.

These packaging requirements define how the final deliverables will be presented to the customer, including physical appearance, assembly expectations, branding, and software distribution. Software will be delivered precompiled with installation instructions; hardware will be finished and branded for field use. No customer assembly is required.

## 4.1 Tabletop Delivery and Setup

### 4.1.1 Description

The tabletop will be about 2.5' x 2.5' plywood board mounted on foldable legs. It will include affixed printed markers and laminated labels, requiring no setup beyond unfolding. Corners will be rounded and sanded for safety. It shall include an affixed project title plaque and QR code linking to documentation.

### 4.1.2 Source

Team design discussion, Outreach deployment requirements

### 4.1.3 Constraints

- Materials must be low-cost, weather-resistant
- Graphics must not fade with moderate UV exposure

### 4.1.4 Standards

OSHA portable display surface safety

### 4.1.5 Priority

High

## 4.2 Downloadable AR Application for Android

### 4.2.1 Description

The AR Wetlands Watchers mobile application must be provided as a downloadable Android Package (APK) that can be side-loaded onto compatible devices. It should also be prepared for optional deployment to the Google Play Store, pending approval and final polish. The application will allow users to launch the AR experience, recognize tabletop markers, and render environmental simulations in real time. The app shall include a branded splash screen, in-app privacy policy link, and basic startup instructions.

All necessary assets (e.g., 3D models, narration files, animations) must be bundled into the app so that it functions entirely offline once installed. The app must not require login credentials and should request camera access at runtime.

### 4.2.2 Source

Team design discussion

### 4.2.3 Constraints

- Application size must remain below 500 MB for ease of distribution
- Android 10 (API level 29) or newer required
- Play Store submission optional for initial release due to time and certification constraints

### 4.2.4 Standards

- Unity AR Foundation packaging standards

- Google Play Policy Center: Security and Privacy Requirements

### 4.2.5 Pmriority

Critical

# 5 Performance Requirements

This section outlines the key performance benchmarks the AR application must meet to deliver a smooth and informative user experience during demonstrations and real-world use.

## 5.1 AR Surface Detection Speed

### 5.1.1 Description

The application must detect the physical table surface and initialize the AR overlay within certain seconds of launching the AR view. This ensures minimal setup time and maintains user engagement.

### 5.1.2 Source

Public expectations and sponsor (USACE) expectations

### 5.1.3 Constraints

Depending on device hardware and lighting conditions, performance may vary slightly. The system will most likely be tested on Mid-range Android devices

### 5.1.4 Standards

Unity AR Foundation

### 5.1.5 Priority

High

## 5.2 App Startup Time

### 5.2.1 Description

The application must fully launch and be ready for AR scanning (including camera access and surface recognition readiness) within 10 seconds of the user tapping the app icon. This includes loading assets, initializing Unity, and setting up the AR session.

### 5.2.2 Source

Team members

### 5.2.3 Constraints

Performance may vary depending on device specifications. Optimization must account for slower startup on lower-end devices.

### 5.2.4 Standards

Follows standard mobile UX guidelines, where startup times longer than 10 seconds are considered poor for user engagement

### 5.2.5 Priority

High

## 5.3 3D Objects Quality

### 5.3.1 Description

3D objects rendered in the AR application must maintain a moderate level of visual quality to ensure user clarity and immersion, while balancing performance on mid-range mobile devices. Visual fidelity should be sufficient to distinguish key features (e.g., pollutants vs. clean objects) without excessive polygon count or texture resolution.

#### 5.3.2 Source

Team members

#### 5.3.3 Constraints

Rendering quality may vary depending on device capabilities. Optimization should prioritize performance over ultra-high detail on lower-end devices to avoid lag or crashes.

#### 5.3.4 Standards

Follows Unity AR Foundation and mobile AR best practices for optimized 3D rendering, targeting mid-range device performance.

#### 5.3.5 Priority

Moderate

# 6 Safety Requirements

The AR application and accompanying physical display setup are designed with safety in mind to ensure they can be used in public environments without risk of injury or harm. The system does not involve any toxic materials, hazardous chemicals, or sharp components in its operation. Physical components such as the display table are built with smooth edges and placed on stable surfaces to avoid tipping or injury. Additionally, users are reminded to stay aware of their surroundings while using the mobile AR app to prevent tripping or accidents. All equipment and demonstrations will adhere to basic physical safety and ergonomic guidelines to protect both users and bystanders.

## 6.1 Laboratory equipment lockout/tagout (LOTO) procedures

### 6.1.1 Description

Any fabrication equipment provided used in the development of the project shall be used in accordance with OSHA standard LOTO procedures. Locks and tags are installed on all equipment items that present use hazards, and ONLY the course instructor or designated teaching assistants may remove a lock. All locks will be immediately replaced once the equipment is no longer in use.

### 6.1.2 Source

CSE Senior Design laboratory policy

### 6.1.3 Constraints

Equipment usage, due to lock removal policies, will be limited to availability of the course instructor and designed teaching assistants.

### 6.1.4 Standards

Occupational Safety and Health Standards 1910.147 - The control of hazardous energy (lockout/tagout).

### 6.1.5 Priority

Critical

## 6.2 National Electric Code (NEC) wiring compliance

### 6.2.1 Description

Any electrical wiring must be completed in compliance with all requirements specified in the National Electric Code. This includes wire runs, insulation, grounding, enclosures, over-current protection, and all other specifications.

### 6.2.2 Source

CSE Senior Design laboratory policy

### 6.2.3 Constraints

High voltage power sources, as defined in NFPA 70, will be avoided as much as possible in order to minimize potential hazards.

### 6.2.4 Standards

NFPA 70

### 6.2.5 Priority

Critical

## 6.3 RIA robotic manipulator safety standards

### 6.3.1 Description

Robotic manipulators, if used, will either housed in a compliant lockout cell with all required safety interlocks, or certified as a "collaborative" unit from the manufacturer.

### 6.3.2 Source

CSE Senior Design laboratory policy

### 6.3.3 Constraints

Collaborative robotic manipulators will be preferred over non-collaborative units in order to minimize potential hazards. Sourcing and use of any required safety interlock mechanisms will be the responsibility of the engineering team.

### 6.3.4 Standards

ANSI/RIA R15.06-2012 American National Standard for Industrial Robots and Robot Systems, RIA TR15.606-2016 Collaborative Robots

### 6.3.5 Priority

Critical

## 6.4 Physical Display Table Edge Safety

### 6.4.1 Description

The physical display table used for the AR experience will be constructed with smooth, rounded edges to prevent injuries. All exposed corners will be sanded or covered with protective material to eliminate sharp edges that could cause cuts or scrapes during interaction, especially in public or classroom settings.

### 6.4.2 Source

Basic Physical Safety Practices

### 6.4.3 Constraints

Material selection may be limited by available resources, but all efforts will be made to choose wood, plastic, or coverings that are safe for close-up interaction.

### 6.4.4 Standards

General workshop and classroom safety guidelines

### 6.4.5 Priority

High

## 6.5 Situational Awareness During AR Usage

### 6.5.1 Description

Since the AR application requires users to move their phones around to scan surfaces and interact with virtual objects, users must remain aware of their physical surroundings at all times to prevent accidents such as tripping, bumping into objects, or disturbing others nearby. The app will display a brief safety reminder before launching the AR experience, encouraging users to use the app in open, safe areas.

### 6.5.2 Source

General AR usage guidelines

### 6.5.3 Constraints

The app cannot detect the user's environment or enforce spatial awareness; it relies on user compliance with the safety reminder.

### 6.5.4 Standards

This guideline aligns with industry-recommended mobile AR safety messaging

### 6.5.5 Priority

High

## 6.6 Secure Placement of Display Table

### 6.6.1 Description

The physical display table used for the AR demonstration must be placed on a stable, level surface with a solid foundation to prevent tipping, sliding, or falling during use. The table should not be positioned near any edges or high-traffic areas where it could be accidentally knocked over. open, safe areas.

### 6.6.2 Source

Common physical safety practices for public

### 6.6.3 Constraints

Stability may depend on the quality of available tables or demonstration spaces

### 6.6.4 Standards

No formal standards apply, but follows general exhibit/display safety guidelines for physical prototypes.

### 6.6.5 Priority

Medium

# 7 Security Requirements

It is crucial to prevent any security breaches while providing an experience for everyone. That is why with our mobile application, we will set standards to mitigate any security or privacy issues by doing the following: No user login/credentials will be taken. Ask for device camera permission before continuing with AR experience and including a privacy policy.

## 7.1 No User Login Credentials

### 7.1.1 Description

Upon startup of our AR mobile application, the user will be greeted with a main menu screen which will have a start button to initiate the AR experience. Where once clicked, will then open up the camera (with granted permission) and start the our AR Wetlands Watchers Simulation. No user credentials are ever collected, stored, or transmitted.

### 7.1.2 Source

Team agreement

### 7.1.3 Constraints

- The app must operate entirely without back-end authentication.
- No network call may ever include user ID or credential data.
- Must not write any Personal Identifiable Information or device identifiers to local storage.

### 7.1.4 Standards

- Dedicated main menu page with a "Start" button or similarly noted.
- Use only device-provided unique session IDs (not user-related).
- Follow Android and iOS security best practices for sandboxing.
- OWASP Mobile Top 10 (M2: Insecure Authentication) [9]
- Company Privacy Policy v1.2, Section 3.1: "Minimal User Data Collection" [8]

### 7.1.5 Priority

High

## 7.2 Ask User for Camera Access

### 7.2.1 Description

Before the AR experience can begin, the app must request runtime permission to access the device's camera. This happens immediately after the user taps "Start" on the main menu screen. If the user denies permission, the app should show a rationale dialog explaining that camera access is essential, and provide a button to retry or open the system settings.

### 7.2.2 Source

Team agreement

### 7.2.3 Constraints

- Have a dedicated main menu page to begin the AR simulation
- Include a Start/go button to begin the simulation via the mobile devices camera within the app.
- Cannot proceed to AR if camera permission is denied. Must fallback to an informative screen to re-allow permission.

#### 7.2.4 Standards

- Android Developer Documentation: Requesting Permissions at Run Time [6]
- Apple Human Interface Guidelines: “Requesting Access” [7]
- NIST SP 800-124r2: “Restrict permissions (e.g., camera access) assigned to apps”
- NIST SP 800-53 Rev 5 (AC controls: explicit user consent for sensor access)

#### 7.2.5 Priority

High

### 7.3 Include a Privacy Policy

#### 7.3.1 Description

This will be a clickable link labeled as "Privacy Policy" at the bottom of the application in the startup main menu page. Where once clicked will pop up a page within the app to display the privacy policy which you can scroll through. And will include a way back via an "X" or back swipe to return to the home screen.

#### 7.3.2 Source

Team agreement

#### 7.3.3 Constraints

- Must clearly describe camera usage and user rights.
- Must be accessible via app store metadata and within the app itself.
- Must state that the app collects no personally identifiable information.

#### 7.3.4 Standards

- NIST SP 800-53 privacy controls (PR.PO-1: Transparency).
- Comply with GDPR/CCPA principles of transparency and user control. [12]
- Use headings, bullet points, and simple formatting for readability.
- Include an active link to the full policy in the app’s main menu. [11]
- NIST SP 800-124r2 (mobile security guidance)
- IEEE P1912 Privacy Standards
- Google Play and Apple App Store requirements for privacy policy inclusion

#### 7.3.5 Priority

High

# 8 Maintenance & Support Requirements

Once the AR table and mobile application have been delivered, ongoing maintenance and support will be essential to ensure its continued performance, compatibility with mobile operating system updates, and resolution of any unforeseen bugs or usability issues. Since this product will be used in public outreach, education, or awareness events, it is important to ensure that maintainers have proper documentation, access to source code, and knowledge of the development environment. This section outlines the requirements for maintaining and supporting the product after deployment.

## 8.1 BUG FIXING

### 8.1.1 Description

Developers must be able to access the source code repository and development environment (Unity) in order to deploy bug fixes, patch vulnerabilities, and ensure compatibility with newer versions of Android. A version-controlled Git repository must be maintained.

### 8.1.2 Source

- Internal developer team policy
- Industry best practices for mobile software lifecycle maintenance

### 8.1.3 Constraints

- Must maintain compatibility with the latest OS version for Android.
- Changes must be tested before deployment using provided testing devices and simulators
- Developers must document fixes and patch notes

### 8.1.4 Standards

- Semantic versioning (e.g., v1.2.3)
- Follow CI/CD workflow using GitHub Actions or equivalent
- Ensure code adheres to platform-specific AR SDK requirements

### 8.1.5 Priority

Critical

## 8.2 MAINTENANCE ENVIRONMENT REQUIREMENTS & APP UPDATES

### 8.2.1 Description

Maintainers must have access to compatible development tools, including Unity, the appropriate mobile SDKs, and testing devices in order to add future app updates. A list of dependencies and version requirements must be maintained and updated.

### 8.2.2 Source

- Project development toolchain
- Unity build settings and environment configurations

### 8.2.3 Constraints

- Requires Unity Editor version 6.0 or later
- Requires Android Studio and/or Xcode for platform-specific builds

### 8.2.4 Standards

- Follow Unity and mobile SDK versioning compatibility matrices
- Use environment.yml or equivalent configuration management

#### 8.2.5 PRIORITY

High

# 9 Other Requirements

This section defines additional technical, platform, and accessibility requirements that are necessary for the AR Wetlands water pollution simulator application to be considered complete. These include requirements related to offline functionality, platform eligibility (Google Play Store and iOS App Store), audio enhancements for accessibility, and long-term cross-platform deployment goals. These requirements ensure that the product is modular, scalable, and ready for future expansion across devices and audiences.

## 9.1 Offline Operation

### 9.1.1 Description

The application must be fully functional without the need of an internet connection. This ensures usability in outreach settings such as schools or field events where Wi-Fi may not be available.

### 9.1.2 Source

Team and Sponsor(Jason Knight) alignment

### 9.1.3 Constraints

All AR assets, data, and scenes must be embedded in the application package.

### 9.1.4 Standards

- Android storage use cases best practices [1]
- Android Offline Caching best practices [4]
- Addressables: Planning and best practices [10]

### 9.1.5 Priority

Low

## 9.2 Google Play Store Eligibility

### 9.2.1 Description

The application must meet all necessary requirements to be eligible for deployment on the Google Play Store, although publishing to the store is optional. This ensures that the app meets distribution standards and provides flexibility for future public release.

### 9.2.2 Source

Team and Sponsor(Jason Knight) alignment

### 9.2.3 Constraints

Must comply with Play Store security, privacy, and user experience policies.

### 9.2.4 Standards

- Google Play Developer Policy Center [5]

### 9.2.5 Priority

Low

## 9.3 iOS Compatibility

#### 9.3.1 Description

The application must meet all necessary requirements to be eligible for deployment on the iOS App Store, although publishing to the store is optional. This ensures that the app meets distribution standards and provides flexibility for future public release.

#### 9.3.2 Source

Team and Sponsor(Jason Knight) alignment

#### 9.3.3 Constraints

Deployment to iOS will require macOS and an Apple Developer account; initial testing will be done on Android only.

#### 9.3.4 Standards

- Apple Developer Documentation [2]
- ARKit API Standards [3]

#### 9.3.5 Priority

Future

# 10 Future Items

This section outlines requirements and features that were discussed during the planning of the AR Wetlands project but will not be implemented in the current version due to limitations in time, budget, or scope. These items are considered valuable enhancements that could improve accessibility, platform reach, and educational impact. While they are not essential for the current prototype to be considered complete, they remain important for future development opportunities and long-term goals of the AR Wetlands system.

## 10.1 iOS Compatibility

### 10.1.1 Description

The application must meet all necessary requirements to be eligible for deployment on the iOS App Store, although publishing to the store is optional. This ensures that the app meets distribution standards and provides flexibility for future public release.

### 10.1.2 Source

Team and Sponsor(Jason Knight) alignment

### 10.1.3 Constraints

Deployment to iOS will require macOS and an Apple Developer account; initial testing will be done on Android only.

### 10.1.4 Standards

- Apple Developer Documentation [2]
- ARKit API Standards [3]

### 10.1.5 Priority

Future

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