



Game Design Document

Version 1.1

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*One person can change the world*

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S1 2020

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# Design History

This design history section of the document is here to show how our project was designed in small increments over time. This information also highlights the teams use of version control, as Git was used alongside GitKraken and Github throughout the life of the project.

## Version 0.1.0

Version 0.1.0 involved the creation of the project.

The initial commit included the following:

* Initial Unity Project
* Documents folder structure to ensure assets are neatly separated

## Version 0.1.1

Version 0.1.1 includes some numerous new additions to the project.

This update included the following:

* Camera Look Feature - No player movement but the camera can now look around the scene with mouse input
* Movement with New Input System
* Dynamic Keyboard and Mouse to Gamepad input scripts
* Changed from Lightweight Render Pipeline to Universal Render Pipeline
* Implemented Oculus XR Plugin (For use with VR)
* Implementation of basic main menu

## Version 0.1.2

Version 0.1.2 was another big update following on from 0.1.1, adding new features, as well as making some minor tweaks., It implemented the prototype dialogue system, a system designed to allow for written character dialogue to appear, as well as a simple pause menu.

This update included the following:

* Implementation of Basic Dialogue System
* Removed Library Folder – This folder wasn’t required in the git project and was therefore removed
* Pause Menu UI - Added to project, although functionality is minimal

## Version 0.1.3

Version 0.1.3 saw fixes made to the Pause Menu UI implemented in the prior version, alongside some newly added audio functionality, an item pickup/drop mechanic, and some Input and UI fixes.

This update included the following:

* Pause Menu Fixes
* Fixed Pause Children
* Adjusted button scale
* Allowed player to pause and resume the game and user input
* Locked buttons into grid
* Added Audio Functionality
* Main Menu now has a theme
* In-game now has a theme
* Music stops in-game when player enter the pause menu
* User Input and UI fixes
* Cleaned up UI and User Input bugs
* Pickup and Drop Mechanic
* Added pickup and drop mechanics for objects with a rigidbody and a tag of pickup

## Version 0.1.4

Version 0.1.4 marked the creation of the level used in the prototype build of the game. This update also contained numerous fixes.

This update included the following:

* Began the creation of the backyard prototype level
* Fixed bugs with the pickup system
* Fixed bugs with gamepad sensitivity
* Fixed trigger bug with picking up objects with gamepad

## Version 0.1.5

Version 0.1.5 saw the addition of a tip system indicating what interactable items are. There were also small UI fixes, as well as a fix to minimize issues when stacking picked up items.

This update included the following:

* Added Tooltip for interactable items
* Fixed velocity stacking for picked up items
* Small bug fixes with UI

## Version 0.1.6

Version 0.1.6 was an artistic update that saw the addition of a splash screen sporting the development team logo, as well as adding the games logo to the main menu.

This update included the following:

* Added Splash Screen with new background and TerraBite Team logo
* Replaced The Model Citizen title with the Games Logo

## Version 0.1.7

Version 0.1.7 was an update that fixed issues with systems established in prior updates.

This update included the following:

* Fixed a bug where the player could drop picked up items under the ground
* Added a UI prompt to show pick up details
* Added functionality to toggle UI prompts between different input types i.e. Xbox and PS gamepads and PC Keyboard and Mouse

## Version 0.1.8

Version 0.1.8 was an update that fixed issues and bugs of features established in older updates.

This update included the following:

* Rolled back work on planting puzzle to fix some bugs
* Fixed some prefab issues with player input and dialogue manager/ Now apart of the player prefab to keep all settings between scenes.
* Fixed a bug where the player could put items under the ground or items would fall though the ground.

## Version 0.1.9

Version 0.1.9 was an enormous update that saw new features implemented, alongside bug fixes for older features. The features added were ones that were essential to the design of our prototype.

This update included the following:

* Updated the Look of the Main Menu and Pause Menu
* Fixed UI Bug that allowed for 2 buttons to be highlighted at once
* Implemented Keyboard/Mouse/Controller UI interaction all together
* Added actions manager to manage different puzzle actions
* Reworked some parts of the UI Switcher
* Fixed some ground collisions by making the ground plane a cube
* Added basic ability to pick up the seed packet and use the action button to take the seed out of the packet.
* Added controls document with breakdown of each action and their corresponding key binding for a given controller

## Version 0.1.9.1

Version 0.1.9.1 was quick update that was required to resolve a merge error that had occurred.

This update included the following:

* Fixed merge conflict in VS Code, Corrected errors in backyard scene

## Version 0.2.0

Version 0.2.0 was an update that saw new features added to the PauseUI prefab. The update also further improved UI functionality.

This update included the following:

* Improved UI Functionality
* Added Options Submenu
* Implemented Audio Slider

## Version 0.2.1

Version 0.2.1 was an update that saw some UI/UX stylistic changes to the Pause Menu UI. It also added an in-game button in the games credits that links to the website of the creator of the music, as per their requests for adequate credit.

This update included the following:

* Added Credits page to menu
* Added Button on Credits page that links to the album used in-game

## Version 0.2.1.1

Version 0.2.1.1 was an update that saw numerous fixes made to existing aspects of the game. It also led to the finding of bugs of unknown origin, with these bugs marked for investigation in order to fix them in a future update.

This update included the following:

* Fixed a bug where the player could take a seed without holding the seed packet
* Fixed a bug where objects kept moving forever when dropped by the player
* Added hole prefab, triggered when the seed is dropped on top (for now)

\*\*To Be Investigated\*\*

* Player trying to display details without looking at an object - Couldn't find bug, more testing needed
* Camera movement with gamepad is slow - Checked input actions and vector is being scaled correctly. More testing needed.

## Version 0.2.1.2

Version 0.2.1.2 was a further big fix only update that served to add null checking to aspects of the code that otherwise caused game breaking crashes.

This update included the following:

* Fixed a bug where when the scene loads, and the player tries to view details of the item they have looked at before looking at any items. Null checking added

## Version 0.2.2

Version 0.2.2 was an update that saw the inclusion of the house, the area in which the game will take place.

This update included the following:

* Added model for house in backyard scene, will need doors to stop the player from going inside in future update

## Version 0.2.2.1

Version 0.2.2.1 was an update that saw fixes and further additions to the house model implemented.

This update included the following:

* Fixed sizing between the player and the house.
* Added deck out the back

\*\*To Be Implemented\*\*

* Need to fix collisions issue between the house and objects. Maybe changing to a different collision mode.

## Version 0.2.3

Version 0.2.3 was an important update that saw fixes, additions and the creation of the pre-alpha prototype build.

This update included the following:

* Added more detail into the house in the backyard scene. Still mostly empty
* Imported extra trees and vegetation packs
* Fixed a collision bug with picked up items with the house

\*\*Finished\*\*

* Dropping a seed into a hole now creates a tree in its place (more detail will be added soon)

\*\*Builds\*\*

* 0.2.3 is available from the releases tab, built for windows, can build for macOS if required.

## Version 0.2.3.1

Version 0.2.3.1 was a small update that fixed a mesh collider bug in the house.

This update included the following:

* Fixed a read/write bug with the houses mesh collider

## Version 0.2.4

Version 0.2.4 was an update that saw the UI for the prototype completed.

This update included the following:

* Completed Prototype UI
* Implemented Resolution and graphical options in Display Menu
* Commented Main Menu and Pause Menu Scripts as per Assignment Requirements

\*\*To Be Fixed\*\*

* Audio Slider and Resolution Changes don't carry between scene
* Some Resolution Changes cut the UI off

## Version 0.2.4.1

Version 0.2.4 was a tiny update that only served to remove file duplicates.

This update included the following:

* Deleted select file duplicates

## Version 0.2.4.2

Version 0.2.4 was an update that added a feature and fixed numerous bugs. This update serves as our latest build version.

This update included the following:

* Added the ability for trees to grow after being planted. Once the tree reaches a set height it stops growing
* Fixed UI Update bug where using a gamepad would still show PC key bindings
* Fixed a null reference when pressing the action button after dropping the seed on the ground and not a hole.
* Fixed an issue with how gamepads and the camera movement work, camera is now smooth with both mouse and gamepad
* Fixed game audio not looping at the end of track
* Fixed a bug caused by changing resolutions, objects can now be picked up after changing resolution

\*\*To be Investigated\*\*

* Gamepad UI doesn't update in the game build but does in the editor
* Gamepad can't be used to change resolutions or screen modes

## Version 0.2.5

Version 0.2.5 was an update that added more flexibility to in-game prompts and changed the way trees grow. This update serves as our latest build version.

This update included the following:

* Changed the way the Prompts work allowing more flexibility with types of prompts and how they work
* Added the ability to have multiple different trees grow when placing a seed in the hole

## Version 0.2.6

Version 0.2.6 was an update that added control details to the menus, basic objective text stating the objective of the prototype, as well as a story scene that forms the bridge between the main menu and game scenes. This update serves as our latest build version.

This update included the following:

* Added Controls to Control Menu on Main Menu and Pause Menu
* Added objective text to ensure players know what to do in prototype
* Added a story segment scene between the Main Menu and Game scenes

## Version 0.3.0

Version 0.3.0 was an update that sought to finalise the prototype into a deliverable form. The update saw the objective tracker better implemented, alongside a bug fix for fast growing trees.

This update included the following:

* Added Objective UI and trackers
* Fixed a bug causing trees to grow faster when changing graphical settings.

## Version 0.3.1 (FINAL PROTOTYPE BUILD)

Version 0.3.1 was an update that finalised the prototype into a deliverable form. The update saw a couple of bugs resolved before the prototype was submitted.

This update included the following:

* Fixed a bug where there was player input null errors on the main menu
* Fixed navigating dialogues and options menus with the gamepad

\*\*Known Bugs\*\*

* We know of a bug where the input device event doesn't trigger changing the players input from pc to gamepad, still working on a fix

## Version 0.3.2F1

Version 0.3.2f1 was an update that added the terrain generation tool Gaia to the project. While Gaia is contained within the project at this point in time, once a suitable terrain for the game is created we will be stripping Gaia out of the project and keeping the generated terrain.

This update included the following:

* Added Gaia to the project and created a base terrain to build off, changes can and will be made to the design. Added to get the world feeling a little less flat

## Version 0.3.2F2

Version 0.3.2f2 was an update that acted as a quickfix for some compilaiton issues that the team had when the prior update was pushed.

This update included the following:

* Fixed compile errors with the project, still a few to fix but should work

## Version 0.3.3

Version 0.3.3 was an update that made some small changes to fixes.

This update included the following:

* Made rocks around holes destroy when seeds are planted
* Fixed missing references in the pause script

## Version 0.3.4

Version 0.3.4 was an update that made some stylistic changes to the seed and seed packet assets.

This update included the following:

* Added new models for the seed packet and seed

## Version 0.3.5

Version 0.3.5 was an update that made it possible to separate objectives as tutorial, main and end objectives.

This update included the following:

* Added the ability to change from tutorial, main and end objectives

## Version 0.3.6

Version 0.3.6 was an update that added the car and bike assets into the game. These assets once interacted with will end the game.

This update included the following:

* Added Car and Bicycle in Garage

## Version 0.3.7

Version 0.3.7 was an update that furnished the living room, kitchen and bedroom, to make the house more lifelike.

This update included the following:

* Prototype furnishing of Living Room/Kitchen/Bedroom

\*\*To Be Fixed\*\*

* Mesh Collisions for some equipment need to be implemented

## Version 0.3.8

Version 0.3.8 was an update that added further stuff in the house, while also adding pick-up functionality to some items in the home.

This update included the following:

* Further furnished the house
* Gave some items pick up functionality to trial some things

## Version 0.3.9

Version 0.3.9 was an update that added post processing, lighting to a lamp in the living room, and the ability to see object information on an object you can’t pick up.

This update included the following:

* Added the ability to only view information of an item when using the "Information" tag with the pickup system
* Added some post processing to make the scene feel more natural
* Added some lighting to the lamp in the living room

##  Version 0.3.10

Version 0.3.10 updated the UI assets that were used in the prototype with cleaner assets. It also saw the addition of more items in the bedroom, such as the clothes that will be used in the tutorial task.

This update included the following:

* Added new UI assets
* Added more objects to bedroom
* Begun adding clothes for bedroom tutorial

## Version 0.3.11

Version 0.3.11 was a tiny update that added in a sun that rotates around the environment over time, allowing for shadows to adjust over time.

This update included the following:

* Added sun into the game that rotates over time

## Version 0.3.12

Version 0.3.12 was another small that sought to change the locations of some of the items in the main game scene.

This update included the following:

* Changed location of items in the scene

## Version 0.3.13

Version 0.3.13 was an important update that added a working laundry collection puzzle in bedroom for use in the tutorial level. It also added a sound effect that notified the player when the objective was complete, while also marking off the objective on the objective list. It also fixed a bug in which the laundry basket would fall through the environment, as well as a bug that saw all objectives marked as completed when one objective was complete.

This update included the following:

* Laundry Collection! Added the laundry collection puzzle into the tutorial objectives
* Added a spicy sound effect for finishing objectives (to be changed)

\*\*Fixed\*\*

* Fixed a bug when completing objectives in a list would cause other objectives to be marked as complete
* Fixed a bug where the laundry items wouldn't sit on the surface correctly and fall though the floor

## Version 0.3.14

Version 0.3.14 was another big update that made numerous changes and fixes. It changed UI prompts, the look of the trees and seeds, and also made it possible to pick a seed from the packet without needing to pick up the packet. (At the recommendation of the assignment marker).

This update included the following:

* Changed the way UI prompts work so information items and pick up items show the correct prompt
* Changed the tree meshes and materials of the planted seeds to match other trees in the environment
* Made it possible to pick up a seed from the packet without already holding the packet

\*\*Fixed\*\*

* Fixed a bug where pressing the action button would cause a null error
* Fixed a bug where taking a seed without already holding the seed packet.
* Fixed a bug where UI Prompts wouldn’t show the correct action name

## Version 0.3.15

Version 0.3.15 was a small update that added a fence around the home, restricting the player to the play area.

This update included the following:

* Added a fence around the home to restrict the game location

## Version 0.3.16

Version 0.3.16 was an update that added bins for the rubbish puzzle, while also adding materials in the environment that can go in the bin. It also added further items in the home.

This update included the following:

* Added Bins for the rubbish puzzle
* Added materials in the environment to place in the bins
* Further furnished the house

## Version 0.3.17

Version 0.3.17 was an update that added the code required for the rubbish puzzle to work, while also fixing some of the colliders on the trash items.

This update included the following:

* Added garbage collection puzzle code
* Fixed some bugs with colliders on trash items

## Version 0.3.17

Version 0.3.17 was an update that added the code required for the rubbish puzzle to work, while also fixing some of the colliders on the trash items.

This update included the following:

* Added garbage collection puzzle code
* Fixed some bugs with colliders on trash items

## Version 0.3.18

Version 0.3.18 was an update that added some items to the bedroom and laundry, while fixing an issue that same some pickup items fall through the environment.

This update included the following:

* Added some content to the bathroom and laundry rooms
* Fixed an issue that saw some pickup items fall through the environment

## Version 0.3.19

Version 0.3.19 was a big update that added more rubbish for the bin puzzle, a washing machine for the laundry puzzle, a clothesline for the laundry puzzle, and a power socket asset for use in the unplugging puzzle.

This update included the following:

* Added more rubbish for bin puzzle
* Added Washing Machine for Laundry Puzzle
* Added Clothesline for Laundry Puzzle
* Added Power Socket Asset for use in the unplugging puzzles

## Version 0.3.20

Version 0.3.20 was another update that added more wall sockets into the environment, as well as some lightbulbs for use in the changing lightbulbs puzzle.

This update included the following:

* Added more wall sockets to the game to fit the placement of current electrical devices
* Added lightbulbs and set up one in the bedroom to test the view

## Version 0.3.21

Version 0.3.21 was a small update that fixed the hierarchy of gameobjects in Unity. This was done to better organize the objects.

This update included the following:

* Re-arrange the gameobjects in the hierarchy

## Version 0.3.22

Version 0.3.22 was an update that saw the addition of the tracking system, which currently tracks completed objectives and mistakes made. The update also updated the bin collection puzzle to allow for the incorrect bins to keep items inside them, as opposed to respawning the item next to the bins, allowing for the player to try again.

This update included the following:

* Added the base tracking system
* Changed how a rejected or wrong bin item is handled by bins

## Version 0.3.23

Version 0.3.23 was an update that saw the dialogue system implemented in the form of scriptable objects. It also added triggers into the puzzle manager that allow for dialogue to trigger for GOV Bot.

This update included the following:

* Changed dialogues into scriptable objects
* Added triggers into the puzzle manager to trigger dialogues from GOV Bot

## Version 0.3.24

Version 0.3.24 was an update that changed the opening story sequence to fit in with the main game narrative as opposed to the smaller narrative used in the prototype. It also changed the descriptions of some objects.

This update included the following:

* Updated opening story piece to fit the main game as opposed to the prototype
* Updated the descriptions of some objects

## Version 0.3.25

Version 0.3.25 was a massive update that all current dialogue implemented in the form of scriptable objects, however not all are set to their respective triggers yet. It also added lights to each room, added replacement eco-friendly bulbs into the garage, added descriptions for most household items, adjusted weight of objects to fix a bug that allowed objects to be kicked long distances, as well finally adding an updated Washing Machine asset.

This update included the following:

* Added all dialogue that needs to be triggered in-game
* Added lights to each room
* Added replacement lights to garage
* Added Descriptions to most household items
* Adjusted weight of objects to fix kicking objects
* Added new Washing Machine asset

## Version 0.3.26

Version 0.3.26 was an update added the mechanics for the lightbulb puzzle, while also updating the meshes for rubbish items, which previously were a little buggy. It also fixed the trash objective not completing when completed, as well as a bug that would see the game crash occasionally when holding an item.

This update included the following:

* Added the base mechanics to change lights
* Updated mesh for rubbish items
* Fixed rubbish objective from not completing
* Fixed holding item bug

## Version 0.3.27

Version 0.3.27 was an update that added windows to the home, while also fixing an error that caused the installed lightbulbs to float out of a position. The update also saw more descriptions added to in-game objects.

This update included the following:

* Added windows to the house
* Fixed floating lightbulb error
* Added descriptions

## Version 0.3.28

Version 0.3.28 was an update that added objective tracking for the lightbulb changing objective, while also making numerous fixes.

This update included the following:

* Added objective tracking for the light changing
* Fixed a bug where the player didn’t need to take the old light bulb out before placing the replacement in.
* Fixed a bug where incorrect items in the bin were duplicated when being tracked.
* Fixed the texture issue on the sides of the house.
* Fixed an issue with pickup distance being too far.

\*\*To Be Fixed/Added\*\*

* Adding colliders to the trees when planted
* Fix a holding bug that sometimes picks up an item you were previously holding when trying to pick-up nothing

## Version 0.3.29

Version 0.3.29 was an update that added further items and descriptions to the home, such as doors and a dryer in the laundry for use in the washing clothes puzzle.

This update included the following:

* Added further items and descriptions
* Placed doors in areas where they should be installed in the future
* Added dryer in laundry for use in the washing clothes puzzle

## Version 0.3.30

Version 0.3.30 was an update that contained numerous fixes and additions.

This update included the following:

* Fixed - Mouse clicking after putting clothes in basket or items in bins causes nullreferenceexception
* Fixed – Once two items have been placed in the bin, any item entered correctly afterwards will spew the same prompt
* Fixed an issue that made the player unable to climb steps
* Added placing into washing machine and dryer with temperature settings and tracking (clothesline to soon be added to the drying objective)
* Added the ability to make new objectives as others have been completed(e.g. dry your clothes objective doesn’t display until wash clothes objective is complete)

## Version 0.4.0

Version 0.4.0 was a major update that saw numerous additions and a change that saw greenhouse gas emissions measured in kilograms.

This update included the following:

* Added a new objective for trashing lightbulbs
* Added a new trash can in the kitchen
* Started adding percentages to objectives and weights (still under construction)
* Added doors triggering when tutorial is complete.
* Added black fade in and opening dialogue trigger
* Changed tracking manager to track greenhouse gases in kg

## Version 0.4.1

Version 0.4.1 was another large update that saw numerous fixes, alongside the addition of UI feedback for the timer on the washer and dryer in the form of a loading bar.

This update included the following:

* Fixed kitchen bin errors
* Fixed issues with pause menu interaction
* Fixed the ability to open the pause menu when in a dialogue
* Made dialogue no longer active in scene when not in use
* Fixed lightbulb scale issue
* Fixed doors not being placed correctly
* Added a UI feedback for the timer on washing and drying machines

## Version 0.4.2

Version 0.4.2 was an update that saw the washing and drying puzzle finalized, alongside some bug fixes.

This update included the following:

* Finished washing and drying puzzle with dryer and clothesline, dialogue implemented and temps tracked
* Fixed an issue with taking washed clothes out of the washing machine
* Fixed the visibility issue with prompts

## Version 0.4.3

Version 0.4.3 was an update that changed the objectives list asset, spaced out the dialogue for use in the dialogue system, while also making other fixes and additions.

This update included the following:

* Objectives list changed
* All dialogue correctly spaced out
* Added fridge magnet showing bin management (needs to have an option added to allow for it to be seen bigger in UI)
* Added Box collider to backyard to stop objects from being able to get stuck under the patio
* Misc description changes and additions

## Version 0.4.4

Version 0.4.4 was an enormous update that added numerous things, while also fixing a multitude of issues.

This update included the following:

* Fixed - Pausing while on the Wash/Dry UI breaks the buttons and doesn't allow you to leave the screen
* Fixed - Dryer progress bar doesn't work properly
* Fixed - when placing an object that shouldn't go in the bins,
* if the bin puzzle is completed it will make the objective complete noise and play the dialogue each time an object is added
* Fixed - Touching the kitchen bin respawns the player object, meaning that you can see the character model to the left of your POV
* Fixed -You can keep taking infinite loads of washing out of the machine, and keep drying them
* Added 2 more items on the clothesline
* Rebuilt pause UI, should now scale correctly with screen resolutions
* Changed resolution to only show 1080p, 720p, 1440p and 4K varients
* Rewrote some functions for the pause menu that wasnt triggering the correct method or variable ie Screen.FullscreenMode over Screen.fullscreen which is only if the screen is full screen, never sets the screen mode.

## Version 0.4.5

Version 0.4.5 was an update that mainly added stylistic changes to house, alongside the addition of the CCS documents that give real information on solar activity and earth rotation.

This update included the following:

* Moved some objects in the home
* Removed one power socket in kitchen
* Added Light Switches
* Added CCS Documents asset
* Misc description changes and additions
* Added another box collider to side of patio to stop small objects from becoming unobtainable beneath it

## Version 0.4.6

Version 0.4.6 was a small update that added accurate clothing to the clothesline to match the clothes washed, alongside miscellaneous description and asset additions.

This update included the following:

* Updated clothesline to include the pants and underwear when clothes are placed on it
* Misc description and asset additions

## Version 0.4.7

Version 0.4.7 was an update that added the phantom power puzzle into the game, alongside a fix that saw lightbulbs break the ability to complete the garbage collection puzzle.

This update included the following:

* Added phantom power puzzle (3/5 power points set up)
* Fixed a bug where light bulbs were causing the garbage collection puzzle to not complete

## Version 0.4.8

Version 0.4.8 was an update that added the food buying puzzle into the game, alongside an inspect option for the bin magnet on the fridge to aid in the garbage collection puzzle.

This update included the following:

* Added food buying puzzle
* Added inspect fridge magnet

## Version 0.4.9

Version 0.4.9 was an update that swapped the buy food UI from the buy food puzzle to the tablet on the fridge instead of the fridge. It also added UI to the CCS documents, the ability to turn the lamp light off when unplugging a lamp, as well updates to the position of light switches and the details and descriptions of some items.

This update included the following:

* Swapped Buy Food UI from fridge to tablet attached to fridge
* Added UI for CCS Documents
* Added ability for lamp to turn off when unplugged
* Updated Light Switches
* Updated Descriptions and Details of Misc Items

## Version 0.4.10

Version 0.4.10 was an update made numerous fixes, while also adding further dialogue triggers for GOV Bot.

This update included the following:

* Fixed - Pausing while on the Dryer UI breaks the buttons and doesn't allow you to leave the screen
* Fixed – Eco bulbs when plugged in don't change to "information" leading to it still being pick up which causes a crash when picked up
* Fixed - Incandescent Bulbs if the player collides with them float away from their fixture.
* Fixed - Plugged in items still show unplug prompt after being unplugged
* Changed, Washer and dryer are already information tags and trigger when the basket is placed into them.
* Fixed - You can constantly repurchase meals which duplicates the objective (allow it to only happen once then remove ability)
* Fixed the player being able to get their head in the roof
* Made CCS documents use one script
* Fixed an issue where CCS doc 2 never showed the UI
* Added triggers for meeting GOV Bot and its objective

## Version 0.4.11

Version 0.4.11 was an update that reverted a decision from a prior update, while adding animation and more dialogue to GOV Bot.

This update included the following:

* Reverted the dryer being unplugged when the clothesline is used, Will make it so the player can’t use the dryer if its unplugged though
* Added movement to GOV Bot
* Added meet GOV Bot trigger

## Version 0.4.12

Version 0.4.12 was an update that made some fixes and changes to the game.

This update included the following:

* Fixed a bug where player input for the camera would jump to the old mouse position when allowing input for the first time.
* Allowed a dialogue to trigger when the player tries to dry their clothes when the dryer has been unplugged, might add the ability to plug it back in.
* Separated main objectives and side objectives in the objective list

## Version 0.4.13

Version 0.4.13 was an update that made some a few additions and fixes.

This update included the following:

* Rebuilt the Main Menu UI and functions
* Started changing sounds completions
* Started changing sounds for completion (removing placeholder sounds)
* Fixed a resolution changing bug where pick-ups don’t work correctly
* Misc small changes

## Version 0.4.14

Version 0.4.14 was an update that made some more additions and fixes.

This update included the following:

* Added separate tracking list for side objectives
* Added dialogue trigger for when all main objectives are complete (dialogue object not yet added to trigger, just coded ready)
* Fixed a bug where the temp controller was trying to change values on a slider that was destroyed
* PromptChanger null errors gone???
* Updated puzzle manager to allow correct tracking of side objectives

## Version 0.4.15

Version 0.4.15 was an update that made some bug fixes and updated the puzzle manager.

This update included the following:

* Fixed a bug where the camera input would snap to the path of the mouse when setting to the center of the screen
* Fixed a bug where a seperate prompt would show up when the seed packet is picked up
* Fixed a bug where the main prompt would show on scene loadPromptChanger null errors gone???
* Updated puzzle manager to allow correct tracking of side objectives

## Version 0.4.16

Version 0.4.16 was an update that made some bug fixes and added the puzzle tracking and scripts for the final objective.

This update included the following:

* Fixed a bug where after the player meets GOV Bot the camera input is disabled
* Added puzzle tracking and scripts for final objective

## Version 0.4.17

Version 0.4.17 was an update that made some changes to the dialogue system and triggers

This update included the following:

* Dialogue can now have more than one dialogue triggered at once
* Garage door for leaving now opens when all core tasks are complete
* Final Triggers for the end task

## Version 0.4.18

Version 0.4.18 was an update that fixed some bugs and added more dialogue.

This update included the following:

* Fixed CCS Doc2 inspect
* Shut dryer/washer doors due to not animating them
* Fixed Coffee Cup Mass
* Added More Dialogue
	+ FoundCCSDoc
	+ FoundAllCCSDocs
	+ CoreAndOptionalObjectivesCompleted (should trigger after last core task is completed IF all optionals have been completed)
	+ OptionalTasksComplete (triggers after all optional tasks are completed)
* Fixed text overflow on MenuToGame scene
* Misc Dialogue changes

## Version 0.4.19

Version 0.4.19 was an update that added the math that tracks total CO2 levels. as well as the overall weighted score of each objective for use in the scoring system.

This update included the following:

* Added math for the total co2 the player saves
* Added correct objective percentage tracking for their requirement
* Added correct weights for each objective
* Multiple bug fixes and changes

## Version 0.5.0 (Final Release Alpha)

Version 0.5.0 was a major update that saw the scoring system built up in prior updates finally implemented, alongside some fixes.

This update included the following:

* Added final scoring system
* Added Final Scoring UI
* Added a tracker for ccs documents
* Fixed objective weights, percentages and math
* Fixed a hitch with the camera when pausing
* Changed objectives to scriptable objects
* Changed Drying clothes to a main objective

## Version 0.5.0f1

Version 0.5.0f1 was a tiny update that fixed some spelling mistakes and sentence structure issues.

This update included the following:

* Fixed spelling mistakes in MenuToGame
* Fixed spelling mistakes and sentence structure in dialogue

## Version 0.5.1

Version 0.5.1 was another major update that contained numerous additions and bug fixes.

This update included the following:

* Fixed Default details prompt from showing when inspecting objects
* Adjusted the Ui for Details Prompt
* Fixed Fence Colliders
* Fixed Gamepad Deadzone
* Fixed Controller Camera input locking on gamelaunch
* Fixed House Material being shiny
* Fixed a bug where unplugging the first device duplicated the dialogue
* Fixed a bug where objective scriptable object broke
* Fixed an issue with the MenuToGame loading the main game scene
* Added the ability to contaminate a bin with the wrong item
* Added road
* Added Window Next to sofa to see bins
* Added Dialogue triggers for Completing core tasks and objective tasks
* Added Image for Gamepad controls
* Added Sound effects manager for changing sounds for different tasks
* Added Dialogue triggers for CCS documents
* Moved GOV Bot closer to the player trigger for meeting
* Changed food options
* Updated UI for gameplay
* Made Buttons more visible to the player when highlighted
* Changed Food buy objective to a main required objective

## Version 0.5.1f1

Version 0.5.1f1 was a tiny update that made minor miscellaneous updates.

This update included the following:

* Misc Updates

## Version 0.5.2

Version 0.5.2 was another major update that made multiple fixes, while also removing files from the game that weren’t in use.

This update included the following:

* Fixed Issues with trash items falling out of the house
* Fixed Controller navigation in menus
* Fixed incorrect trash items total on end screen
* Made display options and quit game options in menus work correctly in webGL
* Run an unused asset remover in the project to remove assets that were not in use to reduce file sizes

## Version 0.5.2f1

Version 0.5.2f1 was a tiny update that made minor fixes.

This update included the following:

* Fixed issues with objectives not loading
* Fixed an issue with CCS docs not displaying correctly

## Version 0.5.3

Version 0.5.3 was another decently sized update that made multiple fixes.

This update included the following:

* Fixed an issue with trash lights objective not displaying
* Fixed an issue where gamepad prompts wouldn’t display (only supports Xbox gamepads atm)
* Fixed an issue where the final objective couldn’t be completed (not tested in-game)
* Fixed CCS document viewing issues and button controls.
* Fixed issues with the Food UI not allowing button navigation

## Version 0.5.4

Version 0.5.4 was a tiny update that made minor fixes to the dialogue and file structure of the game project.

This update included the following:

* Misc Dialogue, File Structure, and Hierarchy changes

## Version 0.5.5

Version 0.5.5 was a large update that made multiple fixes to the game to ready it for release.

This update included the following:

* Fixed an issue where CCS documents wouldn't show correctly in the final screen
* Fixed an issue where the final objective wouldn't complete
* Fixed an issue where the stats text would merge together
* Fixed dialogue triggering bugs
* Fixed small UI issues
* Fixed percentages
* Reduced the game volume in main game
* Fixed fullscreen toggle in main menu
* Added camera sensitivity slider to controls in pause menu

## Version 0.5.6

Version 0.5.6 was another large update that made multiple fixes to the game to ready it for release.

This update included the following:

* Fixed loading screen
* Fixed Completed objectives dialogue not triggering
* Fixed Lights in general waste
* Fixed UI on magnet
* Fixed action button on final screen
* Fixed non-disposable items in bins as mistakes

## Version 0.5.7 (RELEASE BUILD)

Version 0.5.7 was yet another big update that made multiple fixes to the game to ready it for release, while also changing the game scene in the WebGL version to improve performance.

This update included the following:

* Fixed a bug where the magnet ui wouldn't exit
* Fixed a bug where the Final stats ui wouldn't navigate
* Fixed order of end dialogues
* Fixed image displayed in the controls menu
* Removed player model from render

Fixed light bulb objective not completing when in the wrong bin

* Added a new mainGame Scene for webGL

# Game Overview

## Philosophy

### Philosophical point #1

The Model Citizen serves to raise awareness of climate change and what can be done by the individual to help minimise its devastating effects. We are trying to raise this awareness through video games, a media form that each member of the TerraBite Team loves to create. We all believe that video games can be more than just simple fun, and that they can be used as a driver for education and change. While serious games themselves have been around for years, we aim to be one of the first groups to develop a notable serious game that focuses on climate change and reducing our carbon footprint. By focusing on what the individual can do on a personal level in order to help fight climate change, we believe we can build a product that players will be informed and inspired by.

### Philosophical point #2

While our prototype build is for Windows PCs, The Model Citizen when finally released will be available on Windows, Linux, MacOS and through internet browsers utilising Unity WebGL. The reason for this is to distribute the game into as many hands as possible, as a simple link to the game could make it readily available to almost any user in the case of the Unity WebGL port. The more people we can reach, the more we can inform and educate, and the greater impact our product will have.

### Philosophical point #3

The Model Citizen at its core is a serious game, however we believe that serious does not have to mean that the game cannot be fun and entertaining also. If the game is entertaining and enjoyable to play, players are more likely to invest themselves in the game, which in turn allows the serious aspects of the game to make far more of an impact. While it isn’t easy to mix serious educational teachings and fun into one package, we at the TerraBite have faith in our game design ideas.

## Common Questions

### What is the game?

The Model Citizen (TMC) is a low-poly first person exploration serious game that makes use of light puzzles and environmental interaction, exploration, and investigation to reinforce and inform what can be done to combat climate change in the player’s own home.

**Hook:** *“Randomly enlisted by the Government to be the model citizen of the Climate Correction Scheme (CCS), you are tasked with showing the people of society what can be done in everyday life to reduce their carbon emissions. From planting trees in your backyard, to installing solar panels, it’s up to you and the knowledge you have to improve the climate. As the model citizen your decisions are important; if you fail to address certain climate risk tips, we could see the Earth reach its tipping point.”*

### Why create this game? (Purpose)

We are creating The Model Citizen in order to raise awareness of climate change, as well as what the average person can do to reduce their carbon footprint within their home. The game was requested by the client Andre D’Souza of The Harry Butler Institute.

### What are the learning objectives?

The Model Citizen seeks to educate and raise awareness of climate change by focusing on the following key factors:

* Greenhouse gases
* Earth’s rotation
* Solar activity
* Vegetation
* Aerosols

The learning objectives include:

* Educate the player about the key factors causing climate.
* Educate the player on what can be done to reduce carbon emissions at home.
* Encourage the player to make changes to their real-life climate output.
* Encourage the player to opt for the greener alternative.
* Reinforce learning through trial and error (getting it wrong the first time will encourage the player to do it correctly the next time, which reinforces the learning).

The game will make use of puzzles and in-game documents to help educate the player about these climate change factors, while also exploring approaches that can be taken to minimise their effects. As the game can be finished with some objectives incomplete, we feel that if the game adequately highlights that some things have been missed or have been done incorrectly, it will encourage the player to try again for a better outcome. Once done correctly, it will reinforce their knowledge, allowing the player to come away from the game having proven that they learnt something.

We hope that educating the players on what can be done at home to minimise climate change will encourage people to act on minimising their carbon footprint in everyday life.

**This information was raised in our concept document and was approved by the client**

### Where does this game take place?

The Model Citizen takes place within the residence of the player character’s home. In terms of country, the game is set in Australia. The game is set in the not-so-distant future, at a time in which society is realising that it finally needs to fight back against climate change before it’s too late.

### What is the rating of the game?

The Model Citizen is a game with a “G” rating as it is suitable for everyone. This rating would be approved by The Office of Film and Literature Classification as per its requirements.

### What does the player control?

The Model Citizen sees the player take control of the titular character ‘The Model Citizen’. The Model Citizen is a human character meant to represent the player, and for this reason The Model Citizen does not have any given gender. The player moves The Model Citizen throughout the game environment, interacting with objects and puzzles in order to complete carbon emission cutting objectives, which in turn progresses the narrative and the game overall.

### How many characters does the player control?

The Model Citizen is the only character that the player controls throughout the game. Sometimes the player may interact with the environment outside of the character’s body, such as navigating UI menus.

### What is the main focus?

The main focus of the game is decidedly simple – do what you can within your home to reduce your carbon footprint. There is a catch however, as actions taken by The Model Citizen are what every individual in society will use as a baseline when trying to reduce their carbon footprint. Do poorly and the world will fail to make an impact, do well and the world will reap the benefits of a lower carbon footprint. In order to reduce their carbon footprint, the player must use their knowledge on what reduces emissions, whether it be unplugging electronics at the socket, or planting trees to reduce carbon dioxide levels.

### What’s different?

What sets The Model Citizen apart from other serious games, and other games in general, is the fact that it centers on an issue that has rarely been addressed in the medium. Climate change is one of the biggest issues that the world is facing, so we deem it essential to create a product that can teach the individual on how they can play a role in the fight against climate change. So often climate change is presented as a problem that only large industry can impact in any meaningful way, however the average person can make small differences to their lifestyle in order to reduce their carbon footprint, which can have a knock-on effect. If people are educated well on how to achieve this, plenty of individuals could pitch in, which in turn could see a reduction in greenhouse gases, etc. The Model Citizen seeks to reinforce the knowledge people have on climate change and what can be done to curb emissions, whilst also providing information on lesser known approaches that may be less obvious, thus allowing the user to learn and come away from the game with a greater understanding.

# Feature Set

## General Features

* Interactable 3D Home
* Enjoyable narrative
* Low Poly 3D graphics
* Detailed Menus with options to change resolution, audio levels etc.
* TREES THAT GROW!
* Beautiful Soundtrack by artist Pine Voc called Green Ideas (An album about building a sustainable, green future)
* Keyboard and Gamepad support
* Unique item-pick up system that allows for the user to investigate objects in their environment
* Dialogue system used to present dialogue and tips provided by NPCs to the player
* Core objectives that must be completed alongside optional objectives that can be missed
* Plenty of objectives to complete
* Objective system that allows
* Hidden objectives that the player must find themselves!
* Different ranks and overall scores based on how many objectives the player completes

## Gameplay

* Interact within the home and use your climate reduction knowledge to reduce the carbon footprint of the home
	+ Planting trees
	+ Recycling efficiently (What goes in each bin)
	+ Changing to energy efficient lightbulbs
	+ Washing laundry on low temperatures to save carbon emissions
	+ Drying laundry using a clothesline instead of a machine
	+ Unplugging electronics that can be turned off to reduce phantom power waste
	+ Ordering a meal that is as carbon friendly as possible
	+ Using a bike or car for transport
* Pretty much everything interactable has a reason for being there, with the item inspection system providing information on what the object is. It may even state what it could be used for.
* Find mystery notes strewn throughout the home that offer up information that could potentially otherwise be missed (information on Earth’s Rotation and Solar Activity and their impact on climate change).

# The Game World

## Overview

This section of the game design document covers aspects of the physical game such as the key locations, the scale of the world, the means in which the player traverses it, and the interactable elements within it.

## The Physical World

### Overview

The following describes the key components of the physical world:

### Key Locations

The key locations within the game include:

* The backyard
* The kitchen
* The bedroom
* The living area
* The laundry
* The bathroom

The tasks the player completes are initiated in appropriate locations and often require them to gather or interact with objects around the room.

The player can walk and run around the environment. They can also jump over low obstacles. Realistic barriers such as walls and fences are used to keep the player inside the designated play area. Movement controls are outlined in section [7.2](#_Controls).

### Scale

The scale of the objects and environment in the game are meant to accurately represent scale in the real world. For example, the size of the house, doorways and in-game objects should appear to be appropriate for human use.

### Objects

See the “Objects Appendix” for a list of all the objects found in the world.

* Interactable objects – objects that can be picked up and/or interacted with in the environment. They can also be inspected.
* Inspectable objects – object that can be inspected for details and descriptions and can’t be picked up
* Environmental/setting objects – objects that form the world but cannot be picked up nor inspected for details

### Weather

The weather is always sunny and clear in The Model Citizen.

### Day and Night

The final game does not make use of a day and night cycle, however what is included is a sun that moves over time to represent the progression of the day. This causes shadows to move and the overall look of the environment does change as the player progresses through the game. The reason for this is because TMC occurs within the morning/afternoon of a single day, so there is no need for the game to enter a night period and then become morning again.

### Time

In our final build time is measured, however it does not have an impact on the overall score or rank that the player receives at the completion of TMC. We do not want players to feel overwhelmed and rushed by a time limit, as we want to reinforce the learnings of the content within the game.

As mentioned in section [4.2.6](#_Day_and_Night), a change in the time of day can be seen in the environment, in the form of the sun moving, and washing and drying clothes does take some real-world time before being complete. However, that is all that is tracked for the purpose of this game.

##  Camera

### Overview

The camera is placed to mimic the first-person perspective of The Model Citizen. The camera follows the character around the environment. The in-game camera never deviates from that first-person view

###  Camera Detail #1

The game is played in first person, with the camera placed where the character’s eyes would be. The player can control the camera (and by extension TMC) through controls outlined in section [7.2](#_Controls).

### Camera Detail #2

The camera does present multiple menus such as the pause menu, and the menu that allows the player to set the temperatures for the washer and dryer. It does so by simply overlaying the GUI atop the pre-existing first-person perspective.

## Game Engine

### Overview

We are making use of Unity to develop The Model Citizen. We are using Unity because it’s a great engine that is relatively simple to use, and also because it is a requirement of the unit to do so.

### Water

There is some water to the side of the home in a river. It does not serve any purpose other than to add more realism to the world outside of the home, with the flowing water helping immerse the player into the world of TMC.

### Collision Detection

Collision detection is handled through default Unity colliders such as box and sphere colliders. We make use of mesh colliders also, as the build for a collider is based on a given mesh asset. Colliders are attached to most things to ensure that both the player cannot walk through objects that would be perceived as solid, and that items, when picked up and placed on other objects, do not fall through each other.

## Lighting Models

### Overview

TMC makes use two directional lights that act as a sun, as well as a point light used to provide lighting to a lampshade in the living room. A directional light will emit a wall of parallel rays in the direction the light is facing over an infinite distance, while a point light emits light equally in all directions over a certain distance, making it a perfect light to use to represent a lamp.

### Sunlight

During the daytime, there will be lighting provided by the ‘Sun’. This sun is comprised of two directional lights that provide the basis for the general lighting in the environment. The sun also rotates, meaning that the light will move around the environment, as if it were a real sun.

### Lamp

The only other form of light present in the game can be seen coming from the lamp located in the living room/kitchen area. The light is a simple point light and it can be turned off by unplugging the lamp from the wall, which is one of the many optional objectives of the game.

# The World Layout

## Overview

The game world will consist of a house and a backyard. The rooms in the house include:

* The bedroom
* The living area
* The kitchen
* The bathroom
* The laundry
* The backyard
* The garage

## Bedroom

The Bedroom is where the player (the titular The Model Citizen) starts in TMC. The Climate Correction Scheme Robot “GOV Bot” prompts the player to pick up their dirty clothes from the floor before leaving the room. The door is locked shut until the player completes the given objective, as the bedroom initially serves as the tutorial level that aims to address the mechanics of the game.

The room houses the sort of furnishings expected in a bedroom with shelves, a clothes drawer, bed and bedside table making up a majority of the room. TMC also has a nice little office desk setup overlooking the front of the home. Other items strewn about include a basketball and books, which were included to give TMC a bit of character without building any sort of gender bias. We want the TMC character to be perceived as any gender the player wants to associate the player with, so we tried to make the furnishings as gender neutral as possible.

In terms of items of importance in the bedroom, the clothes on the floor are the objects that needed to be collected by the player and placed in a basket to complete the tutorial and grant access to the rest of the home. Although the tutorial room, the bedroom still has optional tasks in it that the player can complete to achieve a higher overall score. The cola can is recyclable and should be recycled correctly to aid in completing the ‘Collect the trash’ objective, while unplugging devices and changing the lightbulb in the room also work towards the completion of the respective optional objectives.

## Living area

The living area is the first area the player can visit after completing the tutorial room. The living area is essentially an amalgamation of the house hallway, living room, and kitchen, however the kitchen is technically separate. The living area contains walkways to each room in the house as well as a path to the backyard. The living area has a couch, TV, lamp, dining table, and even GOV Bot; the climate conscious bot who provides the player character (TMC) with tasks to be completed alongside interesting climate facts.

Objective-wise, the living room does not have a core task, instead it is comprised of items that aid in the completion of other objectives. An empty chip packet and apple half are items to be used in the trash collection puzzle, the lamp can be unplugged to get closer to completing the phantom power puzzle, and two lightbulbs can be removed, disposed of, and replaced to complete other objectives. The dining table also has a CCS document on it that when inspected gives the player information on solar activity and its effect on climate change.

## Kitchen

The kitchen is located within the same space as the living area, up against the wall opposite the living area. The kitchen contains typical kitchen staples in the form of a stove, sink, microwave, fridge, oven, kitchen bench and trash can.

The main objective in the kitchen is to use the food ordering tablet located on the fridge to order the most carbon efficient meal from the given options. The fridge also contains a viewable three-bin-system fridge magnet that can aid the player in determining what items should go in which bin, of the three that are present outside. The general waste bin in the kitchen serves as an option for the player to dispose of general waste items if they don’t want to do so outside. This was done to make sure that the player didn’t have to constantly go back and forth in binning general waste (red lid) items. It also serves as a cautionary tale as to taking the easy option when disposing of household waste; often the easiest option is not the best option.

Optional objective items in the kitchen include the used coffee cup and greasy pizza box that are part of the trash puzzle, as well as the plug that can be found next to the microwave.

## Bathroom

The bathroom is located to the left of the main hallway near the living area/kitchen. It contains a sink, bench, mirror, stand-in bath, toilet, as well as numerous rolls of toilet paper. The bathroom does not contain any main objectives; however, it does have a rusty razor, empty toothpaste tube and a used toilet paper roll that can be disposed of. It also has a lightbulb that can be removed, disposed of and replaced, alongside a power plug that can be removed to minimise phantom power.

## Laundry

The Laundry is located to the left of the main hallway near the living area/kitchen just after the bathroom. The room contains a bench, that has some towels stored underneath, alongside a washing machine and a dryer. The washer and dryer are used as part of the clothes washing/drying puzzle. The lower the temperature that is selected for washing the clothes the lower power usage and thus carbon output. The carbon free alternative to using the tumble dryer is to dry the clothes on a clothesline outside.

Optional objectives items in the laundry include a lightbulb that can be removed, disposed of and replaced, as well as two cables, each coming from the washing machine and dryer respectively that should be unplugged after use. There is also another CCS document present on the laundry bench that gives information on the Earth’s Rotation and the related effects on climate change.

## Backyard

The Backyard is located at the end of the main hallway and is the largest single area in the game. The backyard features trees, some holes that can be used to plant trees, a clothesline, a patio, a soccer ball, a packet of seeds, three different bins and last but not least, a pet boulder named Gravy. The clothesline is used in the clothes drying aspect of the wash/dry puzzle, while the seed packet provides the user with the seeds required to plant trees and complete the ‘Plant the trees’ core objective. The backyard also contains the three bins that are used to dispose of the various trash items found within the home as part of the optional trash objective. The bin with the green lid is the food organics (FOGO) bin, the yellow lid is the recycling bin, and the red lid is the general waste bin.

Other than the bins, there are no other optional objective items present in the backyard.

## Garage

The Garage is the first room the player can enter from the main hallway after leaving the bedroom. It contains a toolbox with tools, a table, a set of new LED lightbulbs, a ladder, a car, and a bicycle. The car and bicycle are part of the final core objective of the game, in which the player decides on what method of transport they are going to use to pick up the food they ordered earlier via the online food ordering tablet. Optional objective-wise, the room contains all the eco-bulbs required to replace the old bulbs within the home and garage itself.

# Game Characters

## Overview

The Model Citizen does not feature many characters, but those that do play an important role in the player’s engagement.

## The Model Citizen (TMC)

As mentioned above, The Model Citizen character is a human character that represents the player, and for this reason, does not have an explicit gender. As the appearance/gender of this character is at the discretion of the player, we made the decision to not implement a character model for it, instead opting to utilise a first-person perspective to serve as the character’s view.

## Mr. Green

Although never seen in the game physically, Mr. Green is head of the Climate Correction Scheme who contacts The Model Citizen at the beginning of the game. Mr. Green also sends out GOV Bot to observe The Model Citizen, who will note the actions of The Model Citizen before returning to Mr. Green with the results. Mr. Green essentially sets the events of the game into motion.

## GOV Bot

GOV Bot is an intelligent robot that is sent by the Climate Correction Scheme to monitor and help The Model Citizen. GOV Bot is mentioned in the message sent to the TMC by Mr. Green, and is the only non-player character visible in-game.

GOV Bot’s role is to direct the player with information, while also reinforcing why the player’s actions throughout the game have an impact on the environment. GOV Bot notifies the player of the core objectives they must complete, while also hinting that there are hidden objectives. It also makes sure to tell the player some climate statistics at the completion of an objective, to teach the player about the simulated impact they are having.

GOV Bot is crucial for giving purpose to the players actions, and without it the game flow would suffer heavily.

# User Interface

## Overview

For a game to succeed it needs a User Interface that is both intuitive and reliable. At TerraBite team we put plenty of time into both our in-game controls but also our HUD and controls within in-game menus.

## Controls

### Keyboard & Mouse

* ‘W’, ‘A’, ‘S’, ‘D’ to walk
* Spacebar to jump
* Left click to grab/hold, release/click again to drop
* ‘Shift’ to inspect object details
* ‘T’ to take seed from seed packet, unplug devices, inspect CCS docs etc
* Mouse to look around

### Gamepad

Controls outlined here are based on a standard Xbox One controller.

* Left thumb stick to walk
* ‘B’ button to jump
* ‘A’ button to grab/hold, release/press again to drop
* Left Trigger button to inspect object details
* ‘Y’ button to take seed from seed packet, unplug devices, inspect CCS docs
* Right thumb stick to look around

## HUD

* Crosshair to assist with hovering over objects
* Hand icon on hover to indicate that item can be picked
* Prompts to pick item up/inspect item
* Description box that gives name and information of device when inspected
* Objective List – Shows Current Core and Optional Objectives
* Dialogue Prompts that show dialogue from GOV Bot

## Title Menu

* Start game – launches the game
* Options
	+ Audio
		- Audio Slider – Allows for adjusting of volume
	+ Display
		- Resolution Dropdown – Allows for changing of resolution sizes and refresh rates based on capabilities of the monitor
		- Fullscreen toggle – Allows for user to play the game in fullscreen or windowed modes
	+ Credits – Shows off TerraBite Team Members and credits the music creator Pine Voc, clicking on the ‘Music by Pine Voc’ button will link the player to where they can buy the album
	+ Controls – Shows the Keyboard/Mouse and Gamepad controls for the game in its prototype state
* Quit – quits the game

## Pause Menu

* Resume – resumes the game
* Options
	+ Audio
		- Audio Slider – Allows for adjusting of volume
	+ Display
		- Resolution Dropdown – Allows for changing of resolution sizes and refresh rates based on capabilities of the monitor
		- Fullscreen toggle – Allows for user to play the game in fullscreen or windowed modes
	+ Credits – Shows off TerraBite Team Members and credits the music creator Pine Voc, clicking on the ‘Music by Pine Voc’ button will link the player to where they can buy the album
	+ Controls – Shows the Keyboard/Mouse and Gamepad controls for the game in its prototype state (placeholder information used)
* Quit – quits the game

# Game development TOOLS

## Overview

The Model Citizen is being developed in collaboration with numerous different people, so it makes sense for this project to make use of tools that ensure that multiple people can incrementally make additions to the product over time without causing any issues. Version Control and Collaboration tools make this possible.

3D Modelling tools on the other hand serve to make for the creation of in-game assets easier.

## Version control tools

Our team is utilising the version control tool, Git, over others like CVS and SVN. The is due to the fact that all of our team members are already familiar with Git and GitHub, and as such will afford an easier transition into the game development cycle. Other factors for using this tool over others include the free price, readily available UI clients like GitKraken, and the expansive community support online.

## Collaboration tools

For collaboration our team is using a combination of three tools. For communication and meetings, Discord is already used by all members, and so was an easy choice to implement. It also has benefits over other tools in the same vein such as Slack and Microsoft Teams, in that it has a quick and easy free screen share tool, that allows team members to demonstrate ideas or display work remotely. This has been vital in the recent changes to course limitations during the COVID-19 outbreak. Trello is a tool that most team members are familiar with and is a simple way to communicate individual task progress as well as view the overall development timeframe. For document collaboration we have decided on Microsoft OneDrive as a reliable tool. OneDrive has come significant advantages over other tools like Google Docs in that the formatting and presentation features of the Microsoft Office suite lend itself better to our goals than the simplistic nature of Google Documents and Slides. As this tool is not being used for the storage of the game files the 5GB storage size is of little issue.

## 3D Modelling tools

In terms of 3D assets creation, our team primarily uses Blender. This in mainly due to the free price tag, as the limited to no monetary funding makes using other tools such as 3DS Max and Maya inaccessible outside of the university machines. All tools have readily available tutorials and plenty of guides online for beginner users, and while 3DS Max may lend itself better to static asset construction, and Maya lends itself better to textures and animation, Blender still performs admirably in all aspects while maintaining an open license.

# Musical Scores and Sound Effects

## Overview

Here the sounds and tracks used in the product are outlined and discussed. We will be using licensed scores with approval from the artist in the prototype and final product.

## Music and Score

In terms of music, all songs in The Model Citizen are tracks from the album titled *Green Ideas* by the artist Pine Voc. This album seemed like a perfect fit for the game in part due to its lo-fi aesthetic, something that the game exhibits visually in its art direction. The tracks, despite not having any words, are written with the inspiration of building a sustainable green future, aligning with what The Model Citizen strives to achieve. Most of the tracks are named after environmentally friendly aspects, such as ‘Sustainability’ and ‘100% Natural’. We thought it was both cute and clever to have songs about environmental conservation within a game focused on trying to save the environment by reducing carbon emissions.

## Sound Effects

Sound effects in-game mainly play when the player has completed an objective. There are however sound effects that play when doing things correctly and incorrectly. These are there reinforce that the player is doing the right thing. If they hear an audible ding, the player will know they are doing things correctly.

# StoryBoarding

## Overview

This section of the GDD serves to chronicle all of the story ideas for the game, as well as how they affect the overall length of the game and the victory conditions.

## Story

Below is the story information given in the form of an email at the beginning of the game. This email sets the narrative in motion, clearly stating what needs to be done to progress, while also stating the ramifications that may come to bear if the player fails to properly complete the objectives.

### Introduction Email

|  |
| --- |
| *Congratulations!* *You have been enlisted by the Government to be the Model Citizen of the Climate Correction Scheme (CCS), a scheme that seeks to reduce the carbon emissions of everyday households.* *As you may have heard, if we don’t act fast in reducing our carbon footprint, our beautiful planet will face irreparable damage. This is where you come in...* *As The Model Citizen (TMC for short), you are tasked with showing the people of society what can be done at home to reduce their carbon emissions.* *The decisions you make are important; if you fail to address certain climate reducing tips, we could see the Earth react its tipping point.* *We have sent a GOV Bot to your location, an eco-friendly robot who will outline some tasks for you, while also overseeing your performance.* *It's not going to tell you everything that can be done, however. As the TMC we expect you to put your own knowledge of carbon reduction to the test, exploring the home for further ways to reduce your carbon footprint.* *The planet is counting on you.* *Thank you for your time.* *Mr. Green**Head of the Climate Correction Scheme* |

### Story Summary

Below is the basic premise of the story of The Model Citizen. This short story summary serves to make it clear in a paragraph what the overarching story of The Model Citizen is.

|  |
| --- |
| *“Randomly enlisted by the Government to be the model citizen of the Climate Correction Scheme (CCS), you are tasked with showing the people of society what can be done in everyday life to reduce their carbon emissions. From planting trees in your backyard, to installing solar panels, it’s up to you, and the knowledge you have, to improve the climate. As the model citizen your decisions are important; if you fail to address certain climate risk tips, we could see the Earth reach its tipping point.”* |

## Gameplay/Narrative Flow

Fig x. Game flow diagram



The above flow chart serves to highlight the flow of the game alongside the narrative. The story in TMC isn’t complex and is mainly told through the game through dialogue. This flow chart addresses how a playthrough of TMC plays out.

### Email from Mr. Green

The email/text message from Mr. Green sets the scene for TMC. It highlights that the character has been randomly enlisted by the Government to be the Model Citizen of the Climate Correction Scheme, while also promptly stating what the CCS aims to achieve. It also clearly explains what the player’s role is as TMC, while also stating that GOV Bot is coming to monitor their performance and suggest some tasks.

This email serves to set the narrative into motion, providing the player with a reason for wanting to complete the tasks in-game.

### Complete Tutorial

The completion of the tutorial content in the bedroom highlights that GOV Bot is in the living room of the home waiting for the player, and it introduces them to the sort of gameplay they will expect to see in the rest of the home.

### Meet GOV Bot

Meeting GOV Bot leads to dialogue in which it refers to the contents of the email you receive at the start of the game from Mr. Green. It gives the player the core tasks required to complete the game, while also highlighting that there are hidden side objectives that can be found.

### Core Objectives Complete?

#### No – Complete Objectives

If the core objectives given by GOV Bot haven’t been completed, then the player will need to complete them in order to progress

#### Yes – GOV Bot tells player they can leave

If the core objectives given by GOV Bot have been completed, then it will notify the player that it is time to leave the home to pick up the food order they placed in the food purchasing puzzle. If there are remaining side missions, it will highlight the fact that more work does remain and if there isn’t anything left, it will say that the player has completed all of the core and optional tasks.

### Optional Objectives Complete?

#### No – Complete Optional Objectives

Optional objectives don’t have to be completed, so the player can ignore them if they want, however the player will achieve a better overall rank if they complete them. If they don’t want to do them, they can finish the game by leaving via the car or bike.

#### Yes – Player leaves game via the bike or car

The player can finish the game by leaving the home by taking either the car or the bike. GOV Bot announces this was the final test of the TMC program, and the game promptly cuts to black.

### Game Session Ends

The game is finished, and the results screen is up highlighting what players overall score, as well as how much greenhouse gas emissions they saved throughout the duration of the playthrough.

## Length of the Game

The Model Citizen is a game that we believe will only take roughly 10-15 minutes to complete. We do not want the game to drag on and negatively affect how it gets its message across, while we also aim for the game to be long enough to ensure that players retain information. Considering the short development cycle, we deem this amount of time to be both realistic, fair, and achievable.

## Victory Conditions

The player does not ‘win’ but rather achieves a scale of success based on the tasks completed. The game can be completed once the player has achieved a stipulated number of tasks, and once they choose their mode of transportation for work, signaling the end of their choices. Completing the bare minimum of tasks will produce the poorest outcome. The more tasks the player completes correctly, the better outcome they will produce.

# Game Elements

## Overview

This segment aims to show the sort of game elements that are present within The Model Citizen.

## Alarms

*Alarms are abstract game elements that provide information about particular game state changes*

Examples of alarms in TMC are:

* Completing objectives – audible noise and marking them off visually from the objective list
* Audible noises when things are done correctly/incorrectly
* Objectives being added to the objective list
* GOV Bot telling the player that objectives are complete

## Buttons

*Buttons are game elements that players can use to activate events or actions in the game world.*

Examples of buttons in TMC are:

* Unplugging plugs from the wall turns of power devices.
* UI buttons appear in numerous parts of the game, with buttons being used to complete in-game objectives and/or give important information
	+ Buy Food puzzle
	+ Wash/Dry puzzle
	+ CCS Information Documents

## Clues

*Clues are game elements that give the player information about how the goals of the game can be reached.*

Examples of Clues in TMC are:

* Fridge Magnet that shows what contents should go in each of the three rubbish bins.
* GOV Bot hints that there are side objectives to find when the player first meets them.
	+ Also indicates that there are hidden objectives remaining before the game finishes if they want to look for them.
* The description that can be seen when hovering over an item can sometimes have clues attached to them.
	+ E.g. The Eco-friendly bulbs stating that they are eco-friendly hints that the other bulbs should be replaced with them.

## Goal Points

*Goal Points are locations in the game world which the players can enter in order to complete a goal.*

Examples of Goal Points in TMC are:

* Placing all the clothes in the basket in the bedroom completes the tutorial and opens the next level which is the rest of the house.
* Leaving the house via the bike or car is the final goal point in the game.

## Helpers

*Helpers are game elements that support the player in completing goals by giving advice or by performing actions.*

Examples of Helpers in TMC are:

* Gov BOT serves as the ultimate helper in the game, it states what main objectives need to be done while also stating it has optional objectives for the player to find themselves. It will also notify the player upon the completion of goals.
* Even when the player is about to leave the house, GOV Bot will warn them if they still have any other optional objectives left to complete.

## HIgh Score Lists

*High Score lists give players the chance to rank themselves against other players who have previously played the game.*

In TMC a score is generated at the end of the game as well as a rank that indicates how well they completed the objectives. The player can easily compare their final score and rank with other players, while also seeing their initial score as one to improve upon (so long as they didn’t get a perfect first run). Even if the player achieves a perfect run, beating the game as fast as possible could also serve as a way for players to rank themselves amongst others, as a completion time does appear at the end of the game.

## Inaccessible Areas

*Inaccessible Areas are parts of the Game World the player can perceive but cannot currently enter, such as areas behind locked doors or sufficiently high ledges.*

An example of an Inaccessible Area in TMC can be seen below:

* The rest of the home isn’t accessible to the player until they have satisfied the tutorial requirements in the bedroom

## Resource Generators

*Resource Generators are specific places or game elements producing resources, in effect tying the production of resources in the game to a particular place in the game world.*

An example of a Resource Generator in TMC can be seen below:

* The seed packet that is used to collect seeds to plant trees is a resource generator, as it provides seeds for the player until the packet is empty.

## Spawn points

*Spawn Points are positions in games where the player, items or enemies appear in the game world.*

An example of Spawn Points in TMC can be seen below:

* The bedroom acts as a spawn point for the player at the beginning of the game, as the bedroom serves as the tutorial room.
* There are also respawn locations located near to bins to respawn the items that are placed in bins that aren’t objects to be trashed.

# Miscellany

## Overview

This segment of the Game Design Document seeks to highlight some additional features implemented in the product.

## Extra Features

### Audio Slider

An audio slider has been implemented in the audio section of the main menu and pause menu.

### Fullscreen Toggle

A fullscreen toggle has been implemented in the display section of the main menu and pause menu.

### Resolution Dropdown

A resolution dropdown has been implemented in the display section of the main menu and pause menu. It provides different resolutions and refresh rates dependent on the users display.

### Item Information that appears in HUD

Each interactable item in the game has a details page that can appear on screen if the player wishes to investigate it. While this feature in its current form is used only to state what an item is, it will be used to give hints and further information to the player in future builds.

# Appendices

## Appendix A: Objects

* Interactable objects – objects that can be picked up and/or interacted with
	+ Clothes – clothes in the tutorial are interacted with to complete the tutorial puzzle
	+ Basket - basket in the tutorial are interacted with to complete the tutorial puzzle (also used in the wash/dry puzzles)
	+ Lightbulb – used in the changing lightbulbs/binning old ones
	+ Seed Packet – packet of seeds required to plant the trees
	+ Seedling – seed that can be grabbed from the packet
	+ Cola Can – used in the collect the trash puzzle
	+ Electrical Sockets – have devices plugged in to them that can be unplugged to complete the unplug devices puzzle
	+ Eco Friendly Bulbs – used to replace the old bulbs in the house in the replace the bulbs puzzle
	+ Gov BOT – provides dialogue with the player but doesn’t play a role in puzzles (is technically an inspectable but in-game he is perceived as interactable)
	+ CCS Docs – When interacted with it gives player climate change information
	+ Fridge Magnet – When interacted with it shows player what goes in each bin
	+ Bins – Can be inspected to state what type of bin they are, interactable objects can be placed in them if they are rubbish
	+ Washing Machine/Dryer – Can be interacted with by colliding clothes basket with machine
	+ Food Orderer – Can be interacted with to order food to satisfy the buy food puzzle
	+ Car – While initially an inspectable only item, at the end of game it can be interacted with to complete the final puzzle
	+ Bike – While initially an inspectable only item, at the end of game it can be interacted with to complete the final puzzle
	+ Briefcase – plays no role in puzzle, used to pad out environment
	+ "How to C# Book" – plays no role in puzzle, used to pad out environment
	+ "How to Unity Book" – plays no role in puzzle, used to pad out environment
	+ Basketball – plays no role in puzzle, used to pad out environment
	+ Boulder – plays no role in puzzle, used to pad out environment
	+ Soccer Ball – plays no role in puzzle, used to pad out environment
* Inspectable objects – object that can only be inspected for details and descriptions
	+ Phone – plays no role in puzzle, used to pad out environment
	+ Crystal – plays no role in puzzle, used to pad out environment
	+ Light Switch – plays no role in puzzle, used to pad out environment
	+ Ladder – plays no role in puzzle, used to pad out environment
	+ Toolbox – plays no role in puzzle, used to pad out environment
	+ Fridge – plays no role in puzzle, used to pad out environment
	+ Microwave– plays no role in puzzle, used to pad out environment
	+ TV – plays no role in puzzle, used to pad out environment
	+ Toilet Paper – plays no role in puzzle, used to pad out environment
	+ Towels – plays no role in puzzle, used to pad out environment
* Environmental/setting objects – objects that form the world but cannot be picked up nor inspected for details
	+ House
		- Objects in bedroom
			* Bed
			* Lamp
			* Desk (includes everything on it)
			* Cupboards
			* Bedside table
		- Objects in bathroom
			* Toilet
			* Sink
			* Bath
		- Objects in kitchen
			* Fridge
			* Kitchen bench
			* Microwave
		- Objects in Living Area
			* Table
			* Couch
			* TV Table
		- Objects in backyard
			* Deck
			* Fuse box
			* Fencing
			* Trees (when planted)
			* Holes for trees
			* Rocks
			* Bushes
		- Objects in laundry
			* Bench
		- Objects in garage
			* Table