

Higher Design Proposal: Train Station Platform Lighting

Robert Veitch

Context:

As part of the higher product design course in Scotland, we are required to complete a Design Proposal and a Design assignment.

The format of each is essentially the same but the Assignment is marked by the SQA (Scottish Qualifications Authority) as 50% of the final exam grade while the Proposal serves as a 'dry run', marked internally. Each time, we are given a brief with four specifications for products which we must solve over eight A3 pages in a limited amount of time. Shown here is the front page of the assignment, outlining very briefly, the requirements of the folio.

For my design proposal, the task was to create a product for a highly wealthy and contemporary faux train company looking to expand their image. The choices of products to design were; Platform Lighting, Bicycle storage, Platform Seating and Luggage transpiration. I choose lighting design as I saw it to have the most potential for innovation and engineering ability.

In this document I have scanned and photographed each of the eight sheets and added annotations with explanations of annotations which are too small to read and the format of a proposal/ assignment by Eastwood High School's standards.

Candidates must only submit a design proposal for one Design Assignment task.

With reference to the *Product Design Higher, Design Assignment Guidance* document, the individual candidate should, **on no more than 8 single sided sheets of A3 paper:**

- produce a wide range of diverse ideas (15 marks);
- extensively develop the ideas towards a design proposal (30 marks);
- effectively communicate the idea generation and development throughout the folio (10 marks);
- clearly justify the reasons for decisions taken throughout the folio (10 marks);
- effectively communicate the proposed solution (5 marks).

Total 70 marks

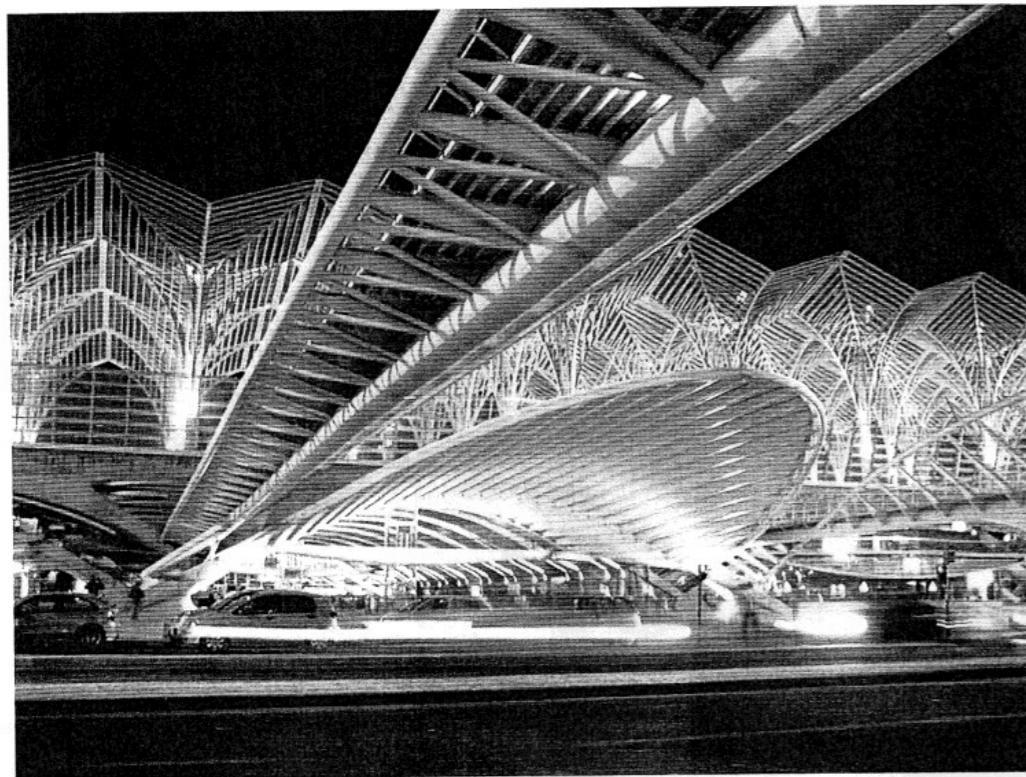
Original (ie, not photocopied or scanned) **full size** work must be submitted.

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Shown here is the brief, giving a description of the faux company 'Apex Rails' and the specification of the task I choose.

Situation



Apex Railways is the largest transport operator in the country with responsibility for almost 20,000 miles of track and over 2500 mainline and branch stations. The company has a reputation for providing a safe, reliable and cost effective service.

Last year the company had an annual turnover of £5 billion and made a profit of over £400 million.

Rail travel is recognised as having a relatively low environmental impact. With over 40% of each person's carbon footprint coming from personal travel, the company is keen to encourage more passengers to use the rail network and help reduce carbon emissions.

The company is now planning a major investment programme, including train and station refurbishments, which will lead to a better journey experience for all passengers.

Your task is to produce a design proposal for **one** of the four specifications provided. Your design proposal should meet all the requirements of the specification. You **must** make use of the material provided and may supplement this with additional research.

CHOOSE ONE OF THE FOLLOWING DESIGN TASKS

DESIGN TASK 1—Platform Lighting

As part of the refurbishment programme, updated platform **lighting** is required.

The specification for this product is as follows:

1. *Function*

- 1.1 It must provide lighting suitable for illuminating a section of platform.
- 1.2 The lighting direction must be adjustable by railway personnel.
- 1.3 It must be permanently fixed to the ground.
- 1.4 It must incorporate at least one standard bulb and holder as shown in the research materials.

2. *Safety*

- 2.1 It must be stable and secure.
- 2.2 It must be easy to clean and maintain.
- 2.3 It must be safe in all weather conditions.
- 2.4 It must be resistant to vandalism.

3. *Materials and Manufacture*

- 3.1 Materials used must be weatherproof and corrosion resistant.
- 3.2 Materials used must be durable to protect against wear and tear.
- 3.3 It must have a product lifespan of approximately 20 years.
- 3.4 40,000 units are required.

4. *Aesthetics*

- 4.1 It must complement the style and branding of Apex Railways.

EHS Unit 2 Developing a design proposal – Higher

Reinforced bullet glass makes the shelter transparent to feel less intrusive and allow users to watch the rain run down. 3.1, 3.2, 3.3, 2.4

Swooping shape complements apex railings contemporary style. 4.1

The base is zinc-plated stainless steel. Zinc is corrosion resistant making the base more durable. The steel structure gives it strength with large rods securing the shelter to the ground. 2.1, 2.3, 3.1, 3.3, 1.3

The outer frame would be aluminium as it's aesthetic appeal suits apex railings and it has a good strength to weight ratio meaning it can hold up the light.

Section without placing too much pressure on the ground supports. 3.3, 2.1

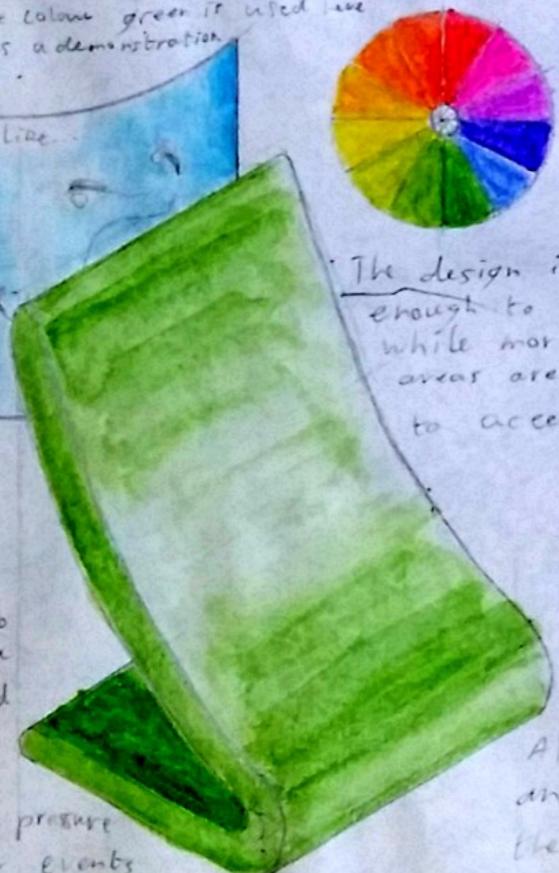
The colour green is used here as a demonstration.

A combination of billboards and facial recognition means the unit can show personal adverts based on a person's purchase history.

An example is shown in this flexible OLED screen.

The base is secured into concrete and allows the unit to swivel should a user sit in it. 1.3, 2.1

When a user does so, pressure detectors can trigger events such as a lighting colour change or the advert start.



The design is simple enough to wipe down while more intricate areas are not so easy to access. 2.2

The components used and hydraulics that allow the unit to open will be standard components for future repairs. 3.3,

A hidden, discrete light and side lighting illuminate the platform regardless of the direction the unit is facing. 1.1, 1.4.

Solar panels and internal battery reduce the power taken off the grid and light the bulb contained within a sheet of light-diffuse acrylic. 1.1, 1.4

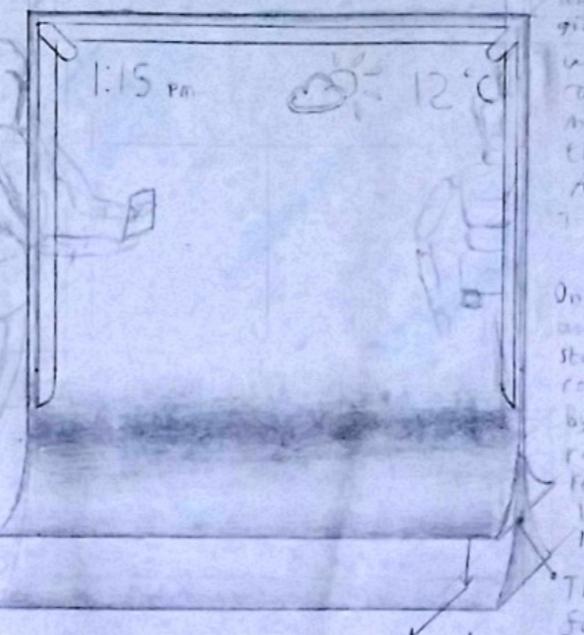
Light doubles as a shelter proximity illumination for users.

The main components are flat and so easy to create from sheet material. 3.4

This also means cleaning. It requires only four relatively smooth faces to be wiped. 2.2

This design incorporates the use of an interactive, transparent OLED screen for users to search the web, train times, watch videos etc. By default the screen will display status such as time, weather etc but up to four users can use its range of other applications.

Wooden paints The unit would be suspended from a secure structure such as a shelter. 1.3 texture gives the spinners an explosive look. 2013

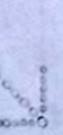


Polished aluminium is used for the base and frame to give the unit a unified look. Aluminium can be polished to a mirror-like shine that complements Apolo style. 4.1, 3.2

The 'drops' can be raised or lowered. On adjustable panels are an array of standard bulbs that can be adjusted by personnel. The light reflects off of the reflective aluminium base as shown. 1.1, 1.2

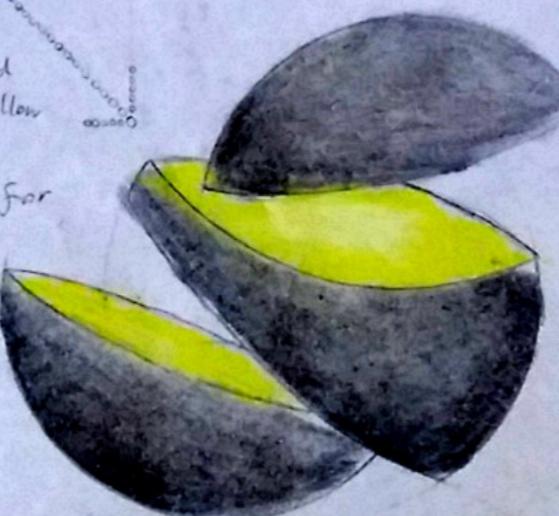
The covers detach to allow for ease of cleaning. 2.2

During the day this design is a sphere shape, when activated, it opens to its second position. This gives it a unique look. 4.1



The panels angles can be adjusted to direct the light in other directions. 1.2

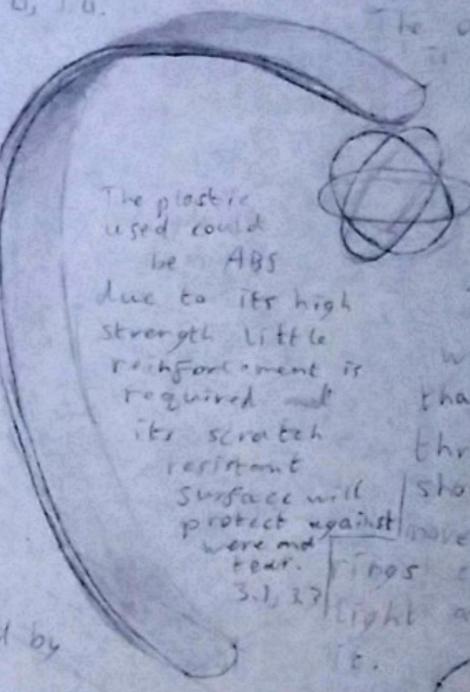
The flat base and stainless steel bolts (for strength and corrosion resistance) mean the unit is secure. 1.3, 2.1



The outside is mat painted grey to suit apex rail look. 4.1

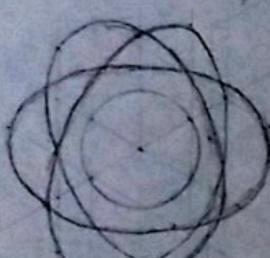
The inside panels are again light diffuse acrylic illuminated by standard bulbs to light the platform. 1.1, 1.2,

A concrete base and anchoring rods made of stainless steel for its durability and strength. Keep it secure and safe. 1.3, 2.1, 2.2



The light 'orb' would use two standard bulbs to illuminate the platform. 4.1, 1.1

This design utilises magnet technology to suspend a glowing orb's light.



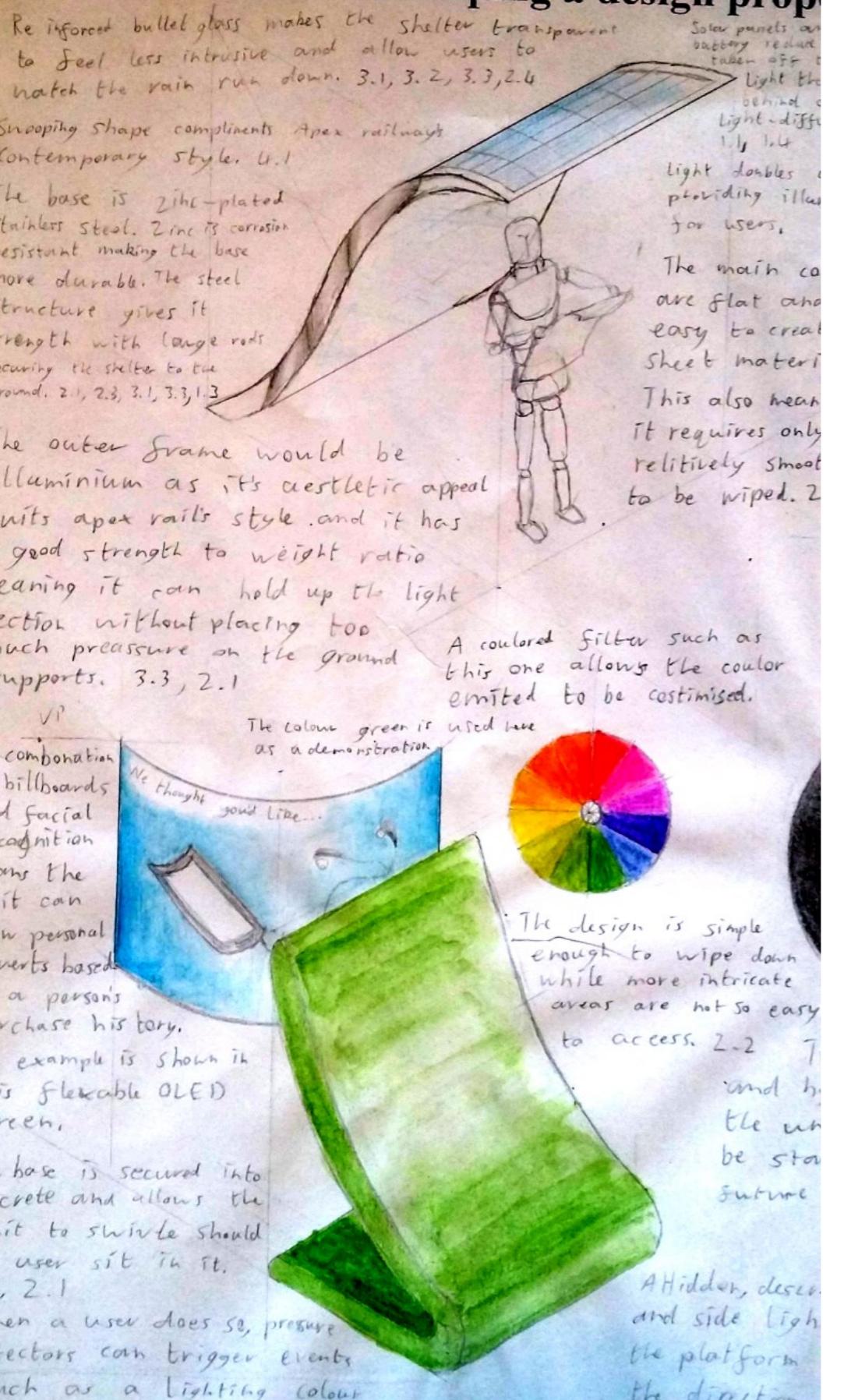
The orb is suspended in the air by magnetic field which also powers it by inducing a current within.

This is contained within three rings that turn on all three axis as shown. The motorized rings creates shaped light and disperses

movement of the light and disperses 3.1, 2.2

A concrete base and anchoring rods made of stainless steel for its durability and strength. Keep it secure and safe. 1.3, 2.1, 2.2

EHS Unit 2 Developing a design prop

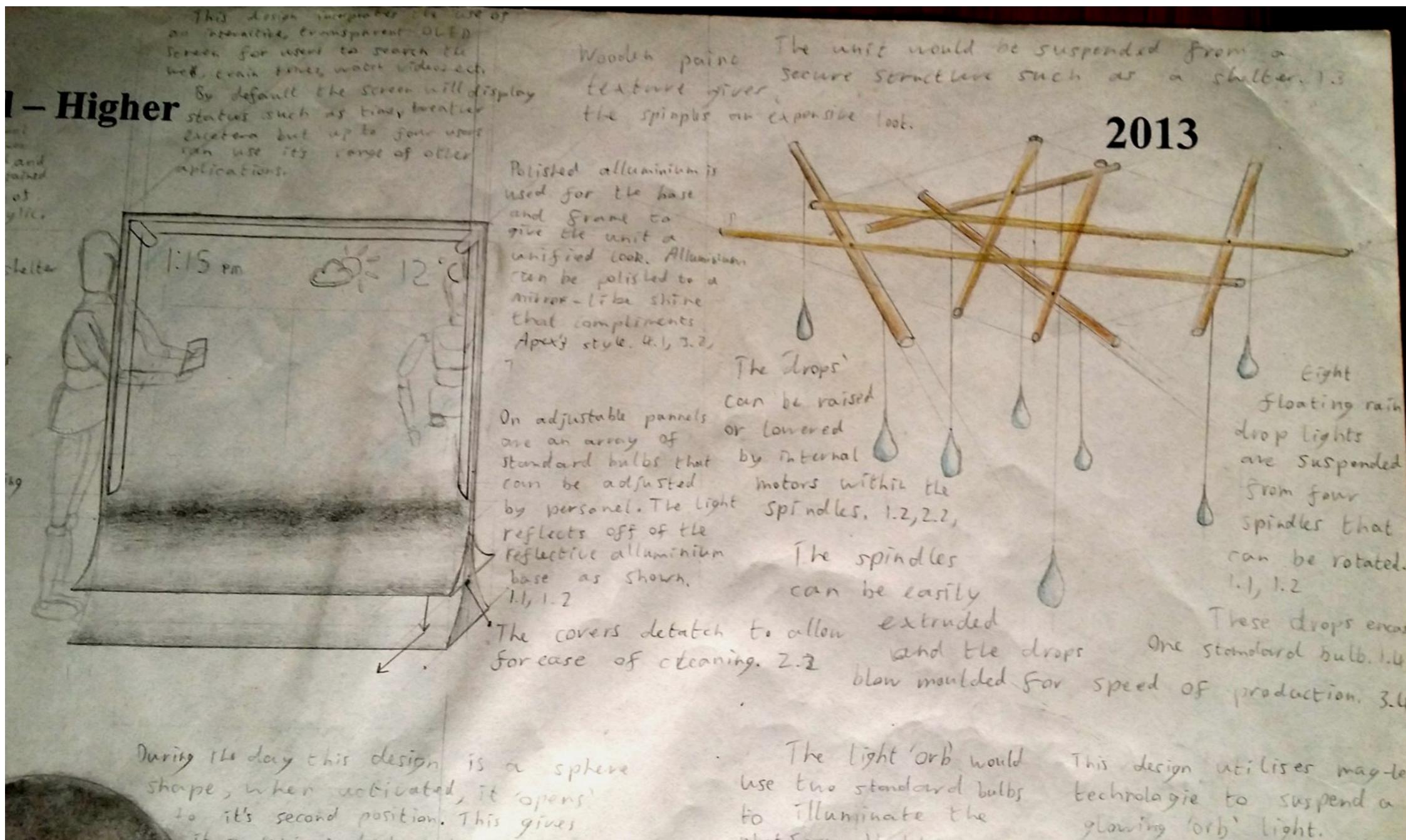


The first page is usually dedicated to initial ideas which are intended to be undeveloped and diverse as possible to find the best possible design solution concept. I laid my ideas out horizontally so shown here is design idea One and Four.

Design Idea one aimed to incorporate a secondary function inspired by the previous year's assignment for an environmentally friendly shelter. The unit is in the shape of a wave and is comprised entirely of textured glass on the back with stainless steel supports at either side. The top contains a desecrate solar panel to power batteries internally or feed into the stations power supply. Ambient light is projected downwards, which, in tandem with rain cascading down the glass, will create and ambience which I hope reflects the look and feel required.

Design Idea four followed a similar theme as it doubles as platform seating for users. In addition I included features such as body-heat and pulse rate monitors to gauge the mood of the user which would then be reflected in the colour of light projected. The entire outer frame is light diffusing polycarbonate with light projected from within. In addition I conceptualised the addition of curved screens to display custom advertising of media to augment the waiting experience.

1 – Higher



For design idea Two aimed to create an identity for Apex, the faux company which we were designing for, by using emerging technology to push the boundaries of what the consumer sees as possible. The unit uses a transparent LED screen to display information such as train times, with light being emitted from curved, wavy panels at the bottom to refract light as far as possible over the platform. The general public is usually not aware of the possibility for flexible, ultra thin or transparent screens but are familiar with such products from science fiction. In general, consumer demand is not aware that this technology is possible therefore, its inclusion will make this design seem futuristic and ultra-contemporary.

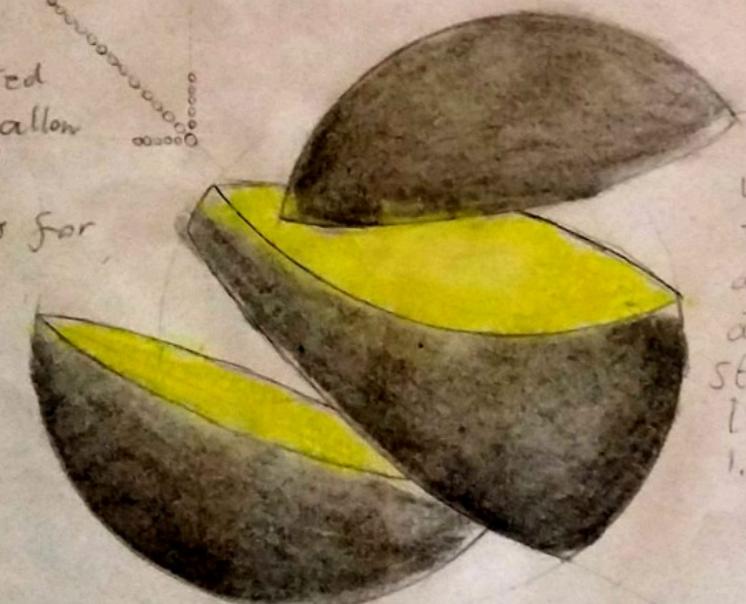
Design idea three aimed to move away from the idea of contemporary products being sterile and devoid of nature and natural influence. The unit is in essence a chandelier configuration with the top structure comprised of a matrix of struts which resemble bamboo shoots. The struts have usually two connections to other struts by extendable wires to allow it to be compact (2.5 dimensional) or stretched out to cover an area of roughly 3x3x3 meters. Hanging from these struts would be teardrop shaped orbs to resemble water drops which will emit light. These too will be connected via extending cords which, like the struts, will be controlled remotely to either move and change position gradually or to move into pre-sets via the counterpart computer program to allow a large variety of shapes and configurations to be created by the controller.

During the day this design is a sphere shape, when activated, it 'opens' to its second position. This gives it a unique look. 4.1

The panels angles can be adjusted to direct the light in other directions. 1.2

The flat base and stainless steel bolts (for strength and corrosion resistance) mean the unit is secure. 1.3, 2.1

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the light
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4.

The light 'orb' would use two standard bulbs to illuminate the platform. 1.1, 1.4.

This design utilises mag-lev technology to suspend a glowing 'orb' light.

The orb is suspended in the air by magnetic field which also powers it by inducing a current within.

The plastic used could be ABS

due to its high strength little reinforcement is required and

its scratch resistant

surface will protect against movement of the

wear and tear.

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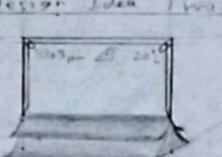
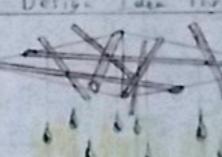
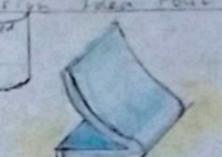
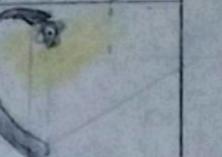
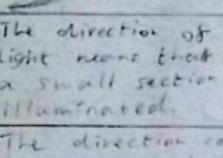
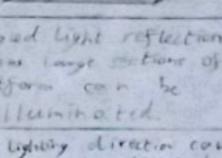
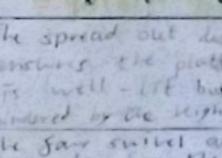
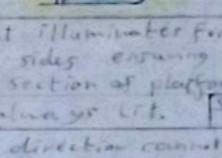
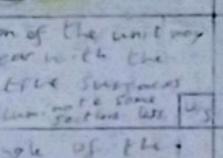
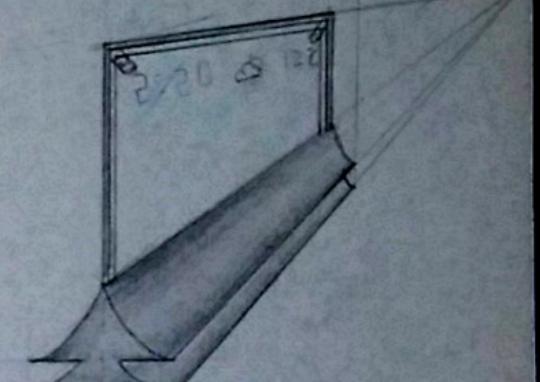
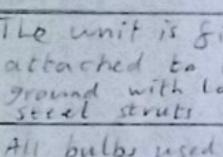
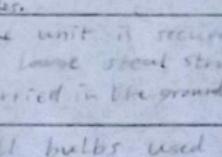
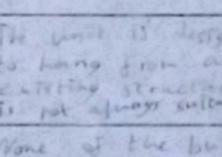
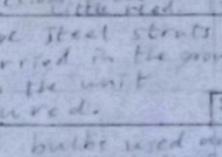
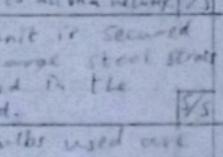
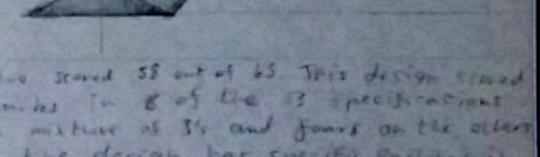
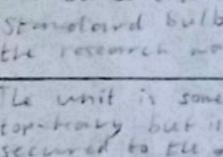
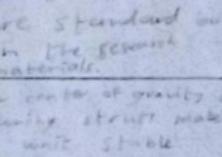
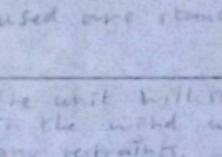
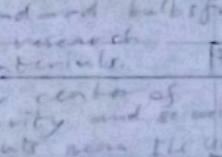
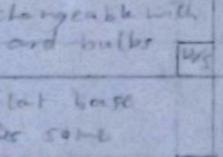
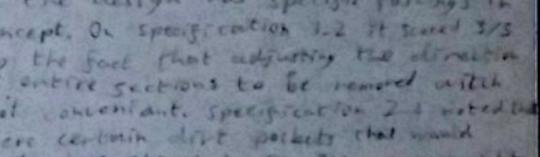
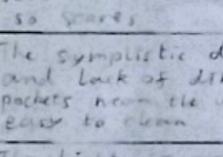
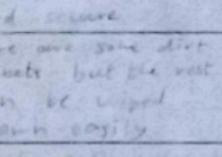
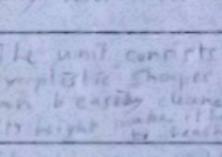
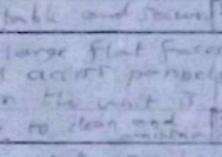
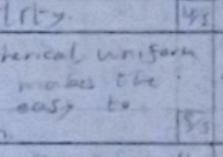
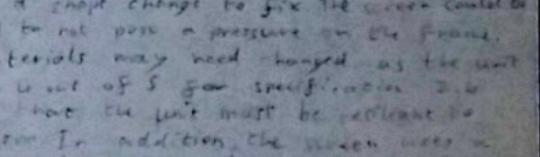
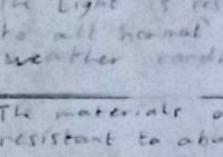
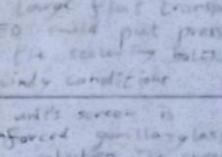
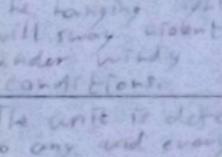
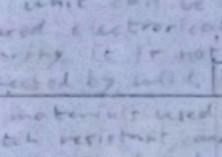
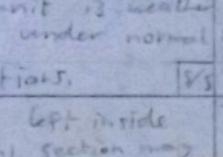
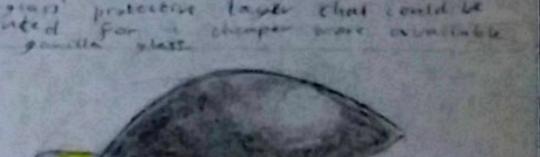
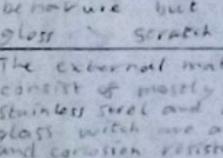
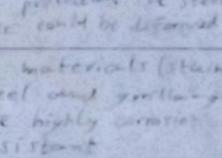
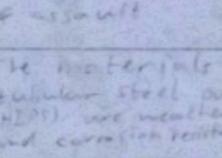
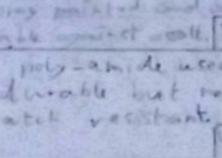
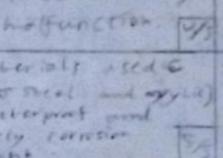
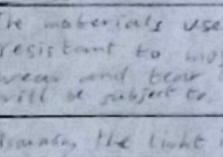
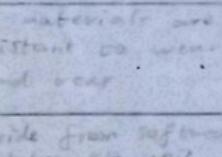
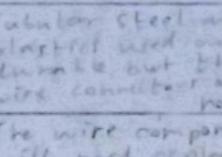
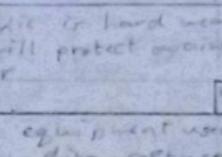
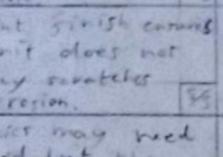
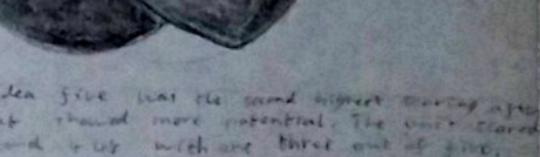
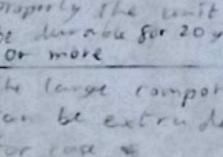
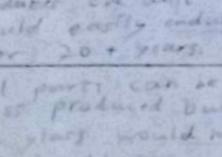
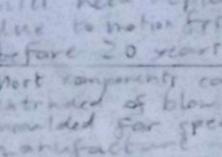
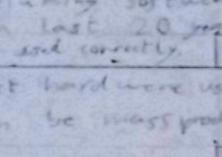
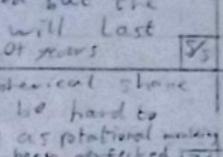
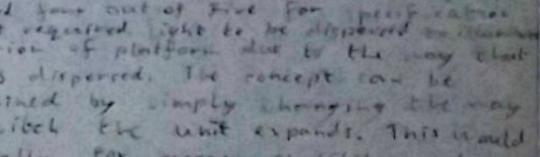
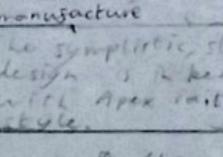
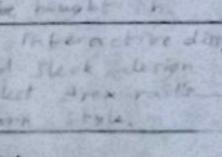
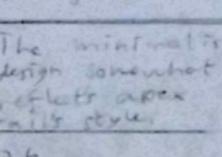
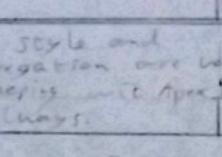
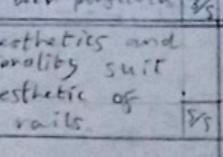
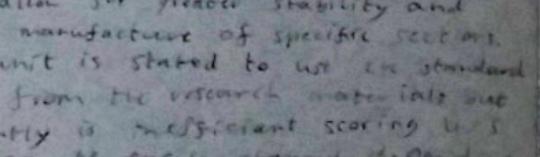
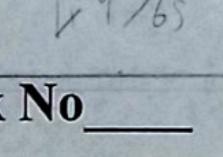
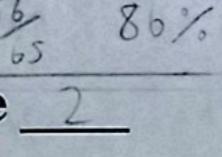
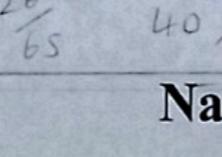
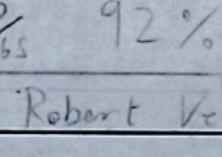
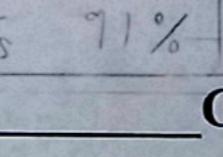
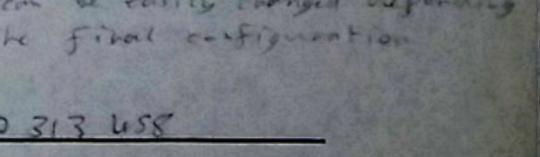
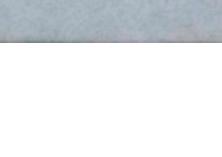
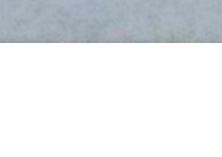
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EHS Unit 2 Developing a design proposal – Higher

2013

Specification	Design Idea One	Design Idea Two	Design Idea Three	Design Idea Four	Design Idea Five	Design Idea Six
1.1 It must provide lighting suitable for illuminating a section of platform.	The direction of the light means that only a small section of platform can be illuminated. 	Angled light reflection covers large sections of platform can be illuminated. 	The spread out design covers large sections of platform is well-lit but is hindered by the light. 	Light illuminates from all sides ensuring the section of platform is always lit. 	The design of the unit may interfere with the reflective surfaces and illuminating the section of platform. 	The light may not reach the distance required to illuminate a section of platform. 
1.2 The lighting direction must be adjustable by railway personnel.	The direction cannot be adjusted in its current state. 	The lighting direction can be skewed but adjusted by removing a cover but is still limited to one side. 	The same curved arm only allows for the area of illumination to be altered. 	The angle of the plates can be adjusted but as light is dispersed in all directions there is no control. 	The three axis rotating rings can be rotated to disperse light in different ways. 	
1.3 It must be permanently fixed to the ground.	The unit is secured by loose steel struts buried in the ground. 	The unit is designed to hang from an existing structure so it is not always suitable. 	Large steel struts buried in the ground support the unit. 	The unit is secured with large steel struts buried in the ground. 	The structural frame with large steel struts is connected to a large rod stuck into the ground. 	
1.4 It must incorporate at least one standard bulb and holder as shown in the research.	All bulbs used are standard bulbs from the research materials. 	All bulbs used are standard bulbs from the research materials. 	None of the bulbs used are standard materials. 	All bulbs used are standard bulbs from the research materials. 	The bulb used is not standard. 	
2.1 It must be stable and secure.	Low center of gravity and securing struts make the unit stable and secure. 	The unit will stay in the wind without any restraints. 	Low center of gravity and securing struts make the unit stable and secure. 	The flat base provides some stability. 	The curved shape means the unit may not be stable in the wind. 	
2.2 It must be easy to clean and maintain.	The symplistic design and lack of dirt pockets near the unit is easy to clean. 	There are some dirt pockets but the rest can be wiped down easily. 	The unit consists of symplistic shapes that can be easily cleaned but the light makes it hard to clean. 	The large flat face and curved panels mean the unit is easy to clean and maintain. 	The spherical uniform shape makes the unit easy to clean or replace. 	
2.3 It must be safe in all weather conditions.	The light is resistant to all thermal weather conditions. 	The large flat transparent glass could put pressure on the surrounding bolts in windy conditions. 	The hanging lights will sway violently under windy conditions. 	The unit can be secured electrically ensuring it is not affected by wind. 	The unit is weather-proof under normal conditions. 	
2.4 It must be resistant to vandalism.	The materials are resistant to abuse but the glass is scratchy. 	The unit's screen is reinforced gamilar glass for protection. The screen hole could be deformed. 	The unit is designed to cope with any form of assault. 	The materials used are scratch resistant and the light section may be sprung pointed and be damage against walls. 	The material left inside the unit does not cause malfunction. 	
3.1 Materials used must be weatherproof and corrosion resistant.	The external materials consist of mostly ABS, stainless steel and reinforced glass which are all weather and corrosion resistant. 	The materials (stainless steel and gamilar-plast) are highly corrosion resistant. 	The materials used are highly corrosion resistant. 	The poly-amide used is durable but not scratch resistant. 	The materials used (stainless steel and acrylic) are waterproof and relatively corrosion resistant. 	
3.2 Materials used must be durable to protect against wear and tear.	The materials used are resistant to most wear and tear they will be subject to. 	The materials are resistant to wear and tear. 	Tabular steel and plastic used are durable but the wire connects are not. 	Acrylic is hard wearing so will protect against wear. 	The paint finish covering the unit does not show any scratches or corrosion. 	
3.3 It must have a product lifespan of approximately 20 years.	Assuming the light is used properly the unit should be durable for 20 years or more. 	A aside from software update the unit should easily endure for 20+ years. 	The wire components will need replacing due to metal fatigue over 20 years. 	The equipment used (excluding software) will last 20 years if used correctly. 	Hydraulics may need replaced but the best will last for 20+ years. 	
3.4 40 000 units are required.	The large components can be extruded for ease of manufacture. 	All parts can be mass produced but the glass would need to be bought in. 	Most components can be extruded of blow moulded for speed of manufacture. 	Most hard-wire used can be mass produced. 	The spherical stone could be hard to limit in number and produce as rotational making so could be produced in sets not been perfected. 	
3.5 It must complement the style and branding of Apex railways.	The symplistic sleek design is keeping with Apex railways modern style. 	The interactive display and sleek design reflect apex railways modern style. 	The minimalist design somewhat reflects apex rail style. 	The style and integration are very fitting with apex railways. 	The aesthetics and functionality suit the aesthetic of apex rail. 	
Total	✓ 9/65 75%	56/65 80%	26/65 40%	60/65 92%	59/65 91%	49/65 75%

Design Task No _____ Page _____

Name _____

Candidate No _____

010 313 658

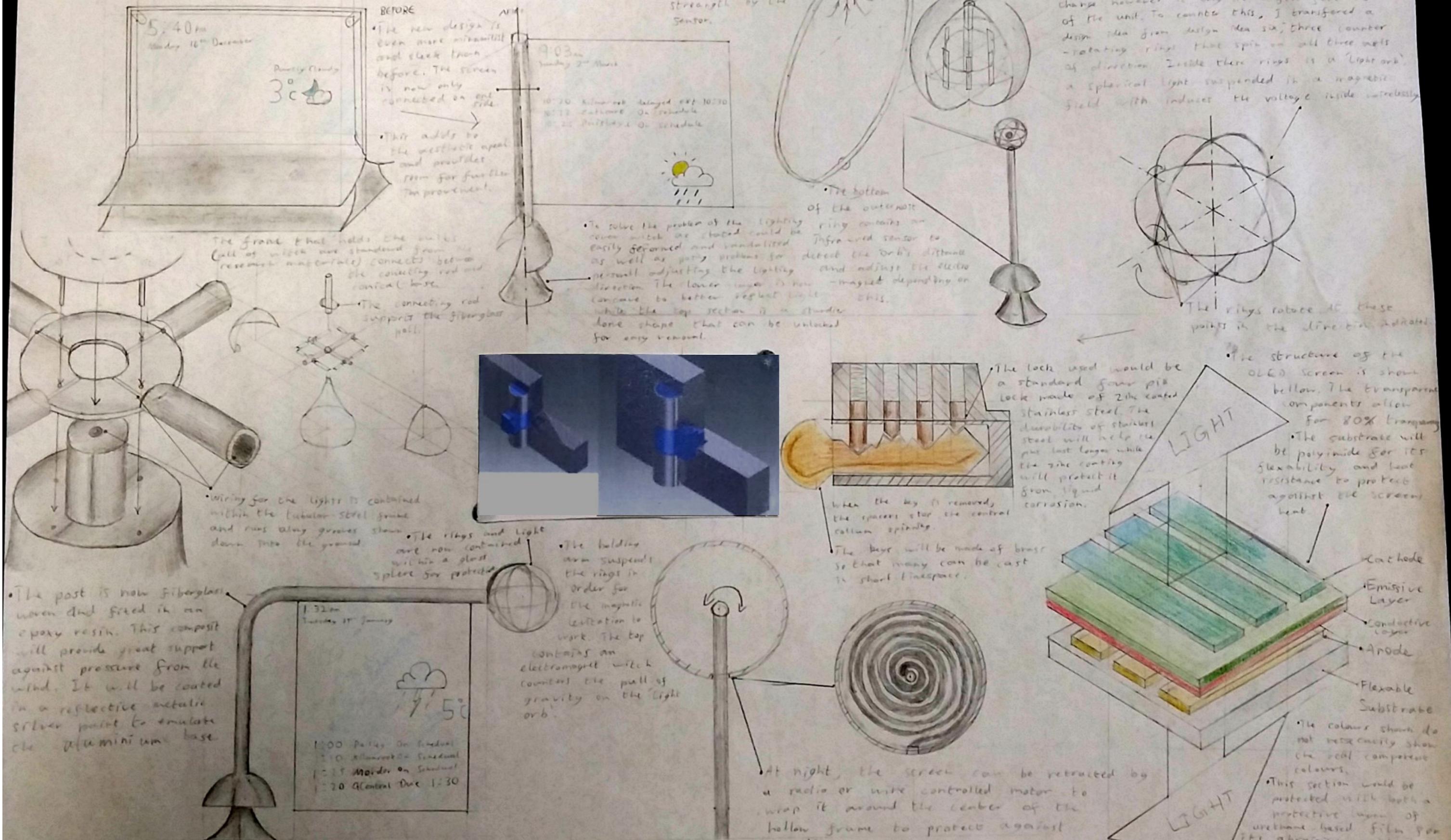
Specification

	Design Idea One	Design Idea Two	Design Idea Three
I-1 It must provide lighting suitable for illuminating a section of platform.	The direction of the light means that only a small section is illuminated. 3/5	Angled light reflection means large sections of platform can be illuminated. 4/5	The spread out ensures the platform is well-lit but hindered by the beams. 4/5
I-2 The lighting direction must be adjustable by railway personnel.	The direction cannot be adjusted in its current state. 0/5	The lighting direction can be somewhat adjusted by removing a cover but is still limited to only two sides. 3/5	The fan swirl only allows for the angle of illumination altered. 3/5
I-3 It must be permanently fixed to the ground.	The unit is firmly attached to the ground with large steel struts. 5/5	The unit is secured by large steel struts buried in the ground. 5/5	The unit is designed to hang from existing structures but is not always suitable. 5/5
I-4 It must incorporate at least one standard bulb and holder as shown in the research.	All bulbs used are standard bulbs from the research materials. 5/5	All bulbs used are standard bulbs from the research materials. 5/5	None of the bulbs used are standard. 5/5
I-5	The unit is compact	Low center of gravity and	The unit will

On the next page I put a convergence matrix to evaluate all ideas thoroughly and logically, to find two to take forward and develop. All specification points are listed down the side as the rows while each idea is set as a column and evaluated against each point. A comment is written and the idea scored out of 5 for that point only. 0 meaning the design does not satisfy the specification point in any way, 5 meaning the design satisfies the specification point fully. The scores are then totalled and a percentage is generated to gauge an impression of how successful an idea is, the comments allowing specific failings to be noticed and referenced later on.

EHS Unit 2 Developing a design proposal – Higher

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Design Task No _____

Page 3

Name Robert Irwin

Candidate No 010313458

EHS Unit 2 Developing a design proposal – Higher

I decided to remove the thin surround frame to create a more minimalist aesthetic, the previous surrounding frame detracted from the contemporary look and feel of the unit. The new single framed design allowed me to increase the width of the frame to allow for the next stage of development.

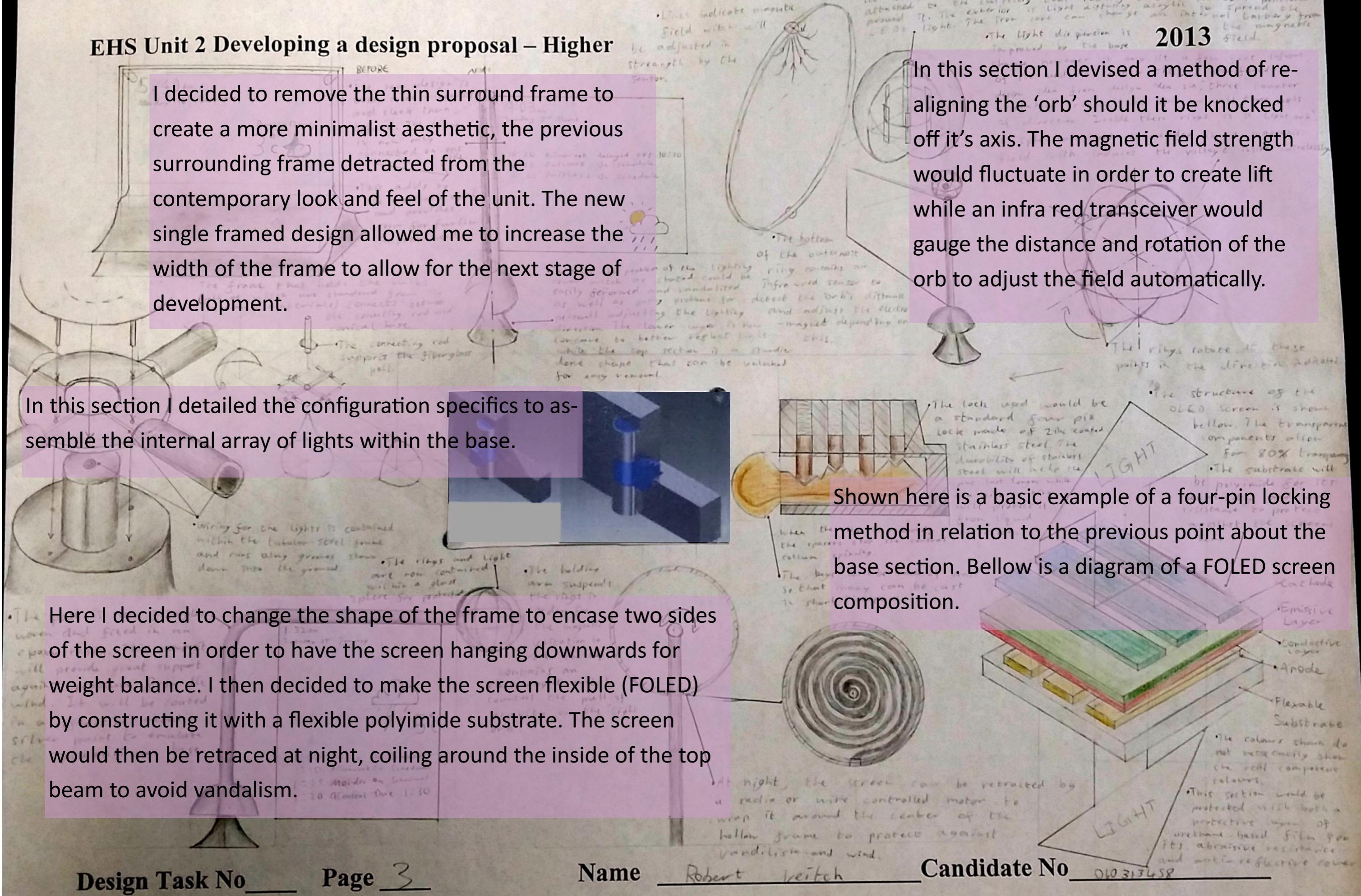
In this section I detailed the configuration specifics to assemble the internal array of lights within the base.

Here I decided to change the shape of the frame to encase two sides of the screen in order to have the screen hanging downwards for weight balance. I then decided to make the screen flexible (FOLED) by constructing it with a flexible polyimide substrate. The screen would then be retraced at night, coiling around the inside of the top beam to avoid vandalism.

Design Task No _____ Page 3

Name Robert Keitch

Candidate No 060313458



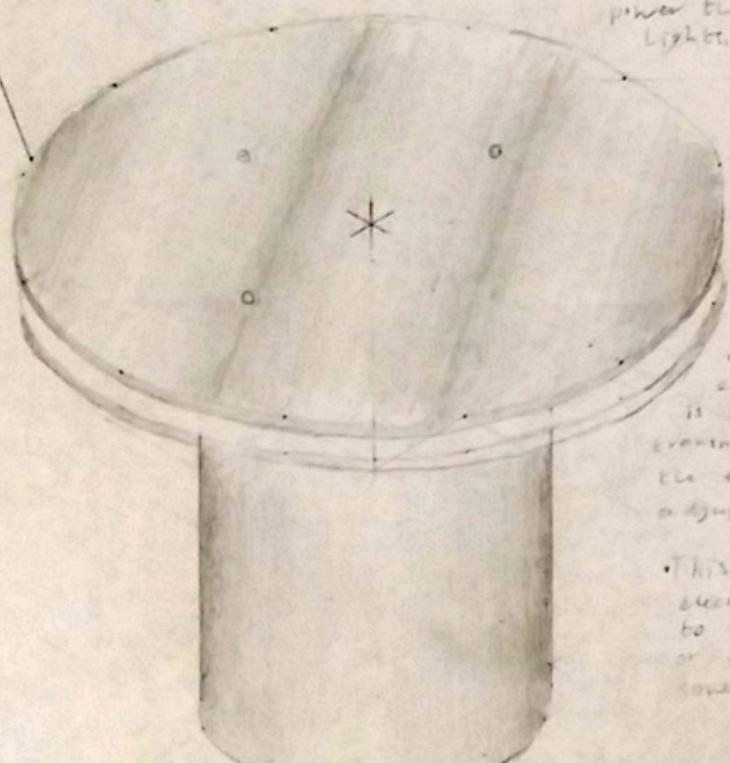
EHS Unit 2 Developing a design proposal – Higher

The interlocking ring system previously employed from design idea six had made flaws concerning the magnetic location & technology. In addition, the light dispersion was inadequate. To counter this I changed it for a vertical column elongated for better light dispersal. This new elongated shape improves the light dispersal from the imported feature to an adequate level.

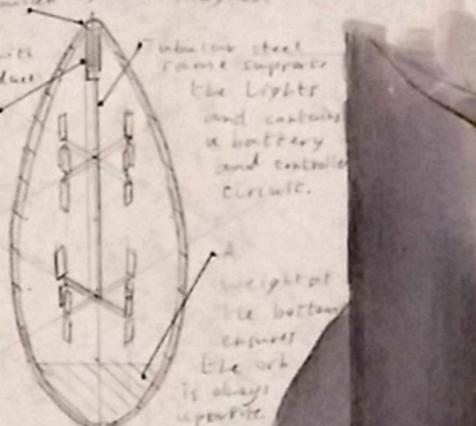
What was previously the rotary rings are now a method for controlling the dispersal of light by railway personnel.

The new arm design is as the old but elongated features are added so that it looks like this

A bracket such as this is used to fit the glass casings to the ground. Made from mild steel for its relative cheapness and strength, the bracket would use a concrete nail plug to secure the base.



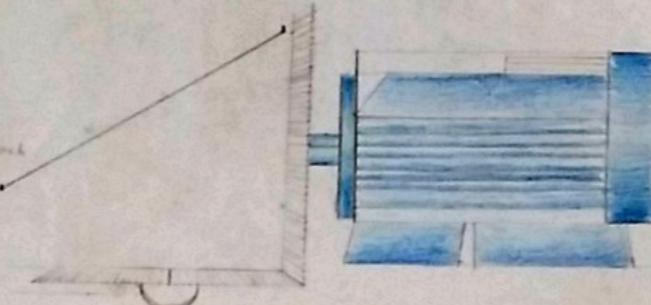
- The new orb design is the same as the old but elongated. The spin features an aluminum cap so that it looks "thingy" and can be pulled by the magnets.



The bottom also has an aluminium cap but was weighed. The innermost ring of the light has an electro-magnet and field inducer and the bottom is fitted with an improved transmitter-receiver to detect the sight of the bird and adjust the magnet accordingly.

This section also features electrochromic smart glass to regulate the light level and is controlled by burning off some sections.

- The rings interconnect as shown, so that a ring segment which is hinged, allows each to sit on a platform and be spun by a motor.

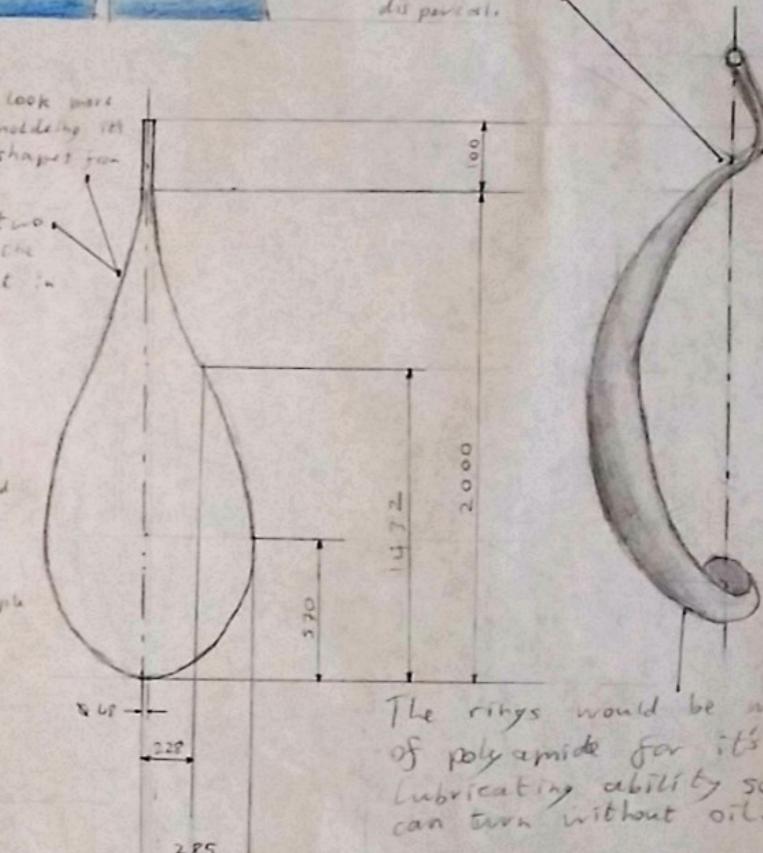


The rings have also changed shape accordingly. They are wider at the base in order to control the dispersed particles.

I changed the cylinder to look more aesthetically pleasing by molding its shape in the bent drops shapes for design idea three.

The container is glass in 3 segments which connect to the ground using the bracket at the bottom left.

The unit is now fitted with two cameras similar to Microsoft's X-Box Kinect technology. This allows the unit to identify shapes of people and touch their movements.



The rings would be made of polyamide for its self lubricating ability so they can turn without oil.

The innermost ring also features three spines shaped to like form of the 'light orb'. If at any point it should leave the magnetic field it will fall into these. The computer will then use the electromagnet to pull it back up. The weighted wire encircles it and straightens.

This ring will be solely the controller for the electromagnet. Fitted with an infra-red sensor on the bottom and electromagnet at the top.

The IR sensor feeds this chip the height of the orb so that it can adjust the magnet accordingly.

The operating system used will continuously display the apex logo whatever screen is active

Name Robert Vetsch

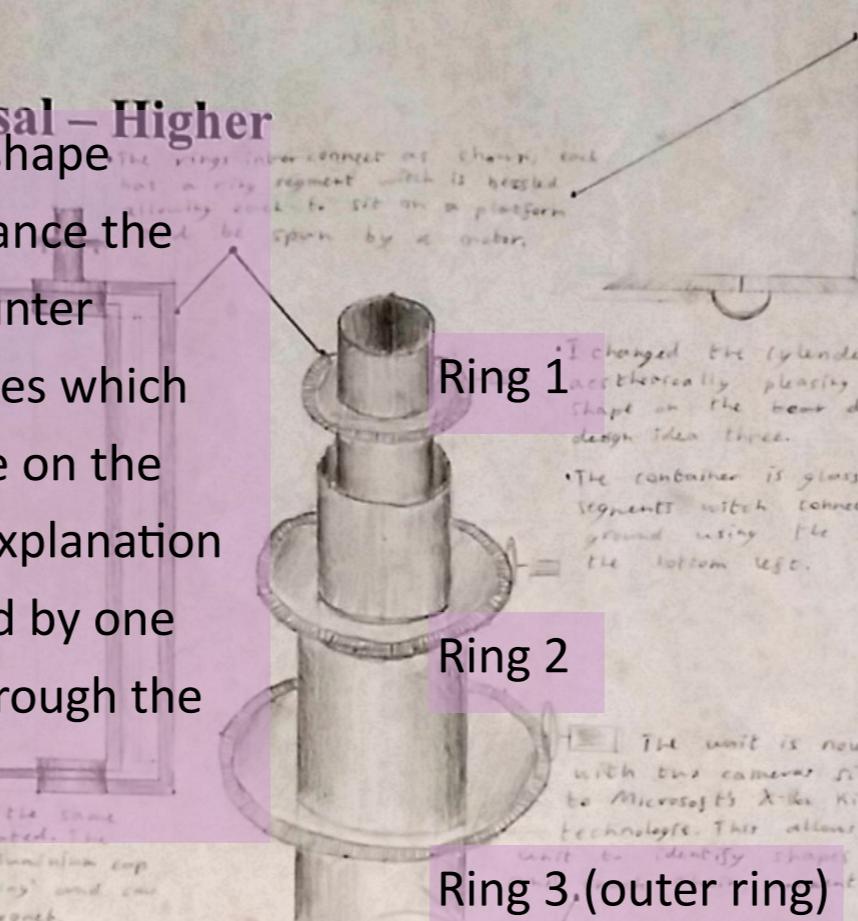
Candidate No 06 313 688

EHS Unit 2 Developing a design proposal – Higher

In this section I decided to extend the spherical shape containing the orb into a cylinder in order to balance the design aesthetically as well as physically. The counter rotating rings have been replaced with semi-circles which follow the outside of the cylinder and only rotate on the spot (two dimensions) Shown next to this is an explanation of how I intend to have all three 'rings' controlled by one control box by having their chassis extended thorough the each other.

~~what was previously the base is now a method for controlling the dispersal of light by railway personnel.~~

This section outlines how I intend to fix the teardrop to the ground by using concrete fixings and a two part clamp to allow it to be removed if necessary. In addition, I outlined how the sphere will be changed to an egg shape and adjustments necessary to allow this such as a weight in the base to keep it upright.

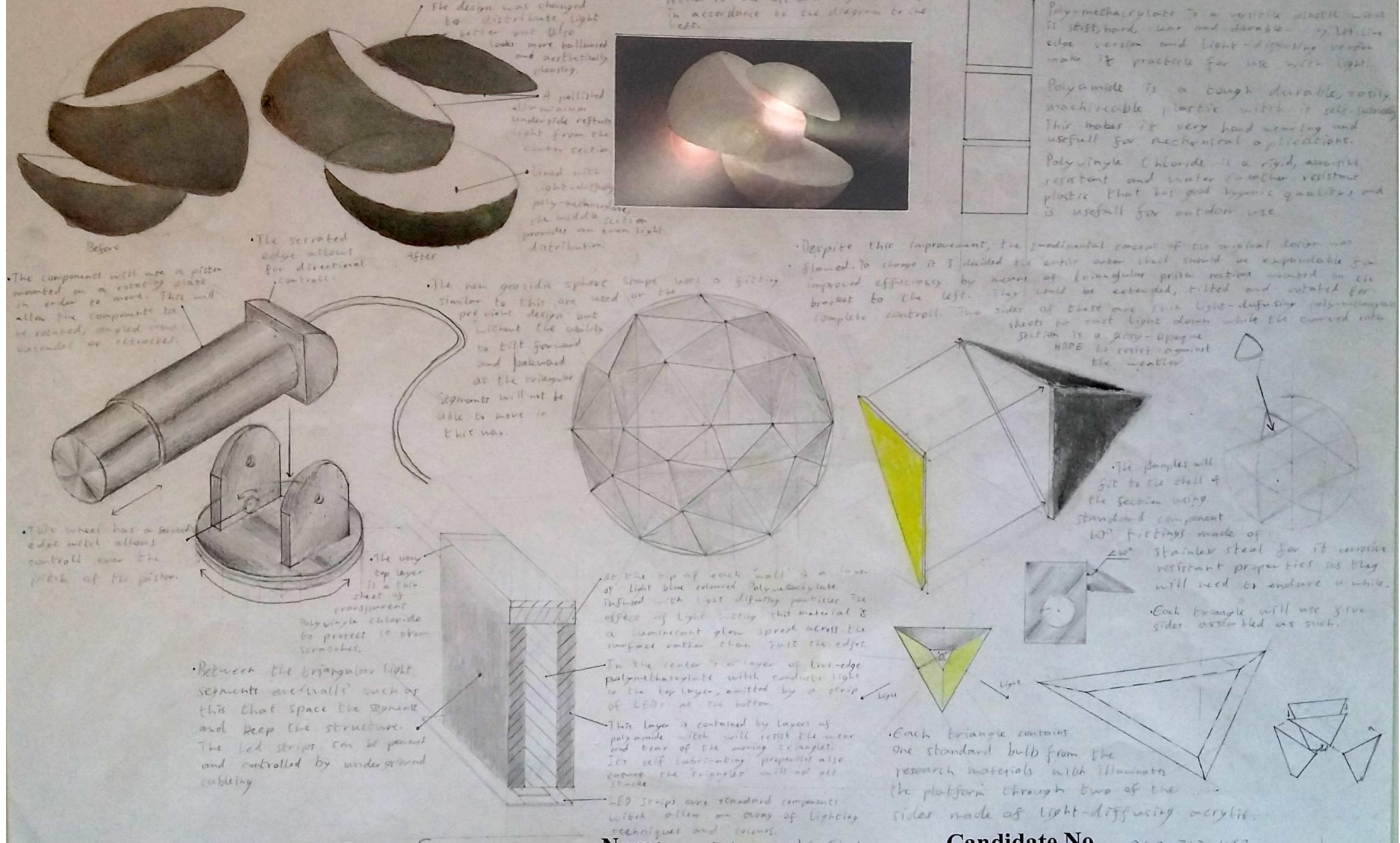


Here, I decided to change the cylinder to a teardrop shape, similar to design idea three. In addition I changed the vertical 'rings' to be undulating spirals, the result of which is the illusion of three dimensional movement. As the rings cross over each other, they will appear to be joining and splitting creating a three dimensional effect when in fact they are still only rotating.

I removed the base light and added this coil shape to the left column to improve aesthetics ensure light dispersal is even in comparison with the teardrop section.

I added an array of three dimensional cameras and tracking software similar to the technology used in the Xbox Kinect. This will track user's limbs and faces to detect what they are looking at and to interpreted hand-based gestures on a three dimensional scale. This allows users to interface with the screen using gestures to ensure users do not need to bend down to touch the screen or dirty the screen with their fingers. This means maintenance requirements are reduced and hygiene is ensured.

EHS Unit 2 Developing a design proposal – Higher

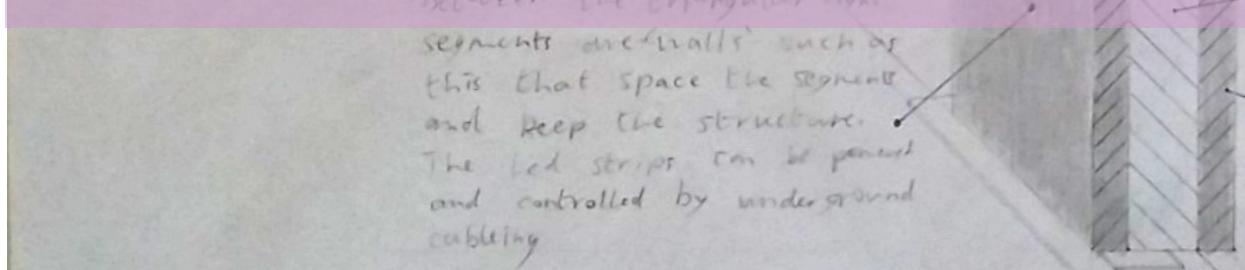


Design Task No _____ Page 5

EHS Unit 2 Developing a design proposal – Higher

I tried to resolve an error in the design wherein light distribution is un-even when the unit is open. I decided to change the way in which the segments opened and faced by creating a scale model out of a polystyrene sphere with the segments cut to the shape of the original design. I then tested the model to see if it was possible to have the segments open differently. I then demonstrated this with a Photoshop render shown here however the light distribution, while improved, was not optimal.

I decided that the light distribution could be improved by adding user control over the direction and length that they extended at. Shown here is a piston mount that would allow for movement on all three dimensions around a given point. With the inclusion of intuitive software and pre-set functions, the unit can be programmed to expand the shapes in a range of different ways depending on the user's requirements. The software would prevent the segments moving into each other by calculating the position of each segment once expanded.



Design Task No _____ Page 5

In order to visualise the mechanics of how the unit would fit together, I created a model from polystyrene and cut it accordingly. This told me that in order to improve light dispersal, I should move the middle section to the left and angle the top section in accordance to the diagram to the left.

High Density polyethylene is a rigid tough plastic with nearly chemicals and feels waxy. The surface texture could prove aesthetically pleasing.

2013

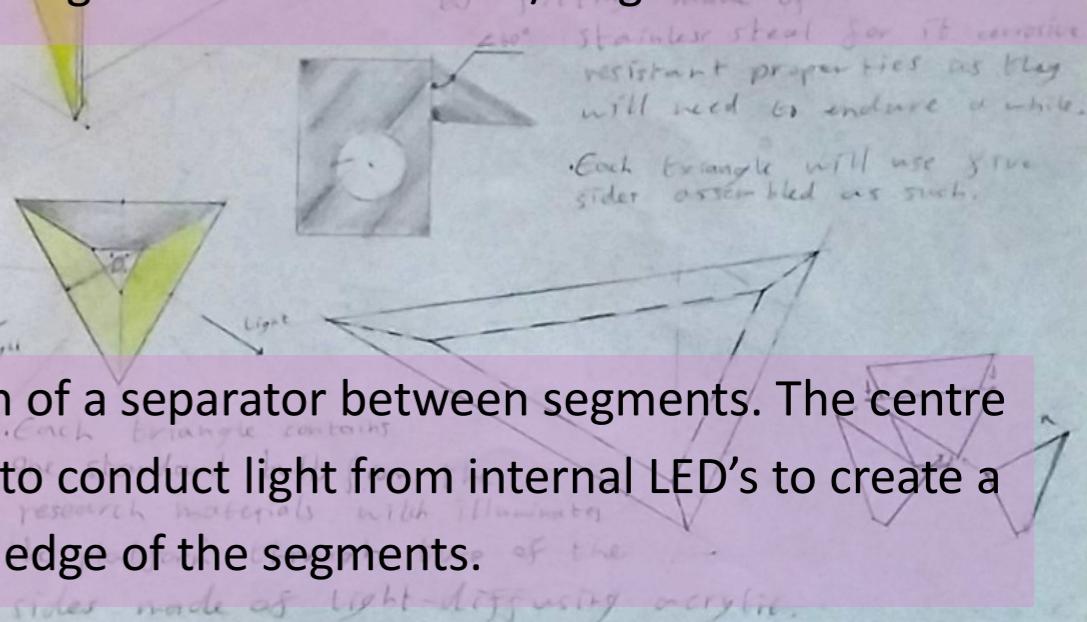
Poly-methacrylate is a versatile plastic with its stiff, hard, clear and durable. The flat edge version and light-diffusing version make it practical for use with light.

Polyamide is a tough durable, easily machinable plastic with its self-lubricating. This makes it very hard wearing and useful for mechanical applications.

Polyvinyl Chloride is a rigid, flexible resistant and water/weather resistant plastic that has good hygiene qualities and is useful for outdoor use.

Despite this improvement, the fundamental concept of the original design was flawed. To change it I decided the entire outer shell should be expandable for improved efficiency by means of triangular prism sections mounted on the bracket to the left. They could be extended, tilted and rotated for complete control. Two sides of these are thin light-diffusing poly-methacrylate sheets to cast light down while the curved outer

To make the unit suitable for all platform configurations I decided to change the shape of the casing to a geodesic sphere where triangular segments expand outwards, emitting light on one or two sides. The segments would be controlled in the same way the previous segments were so are completely customisable allowing for alterations in brightness and direction/ angle.



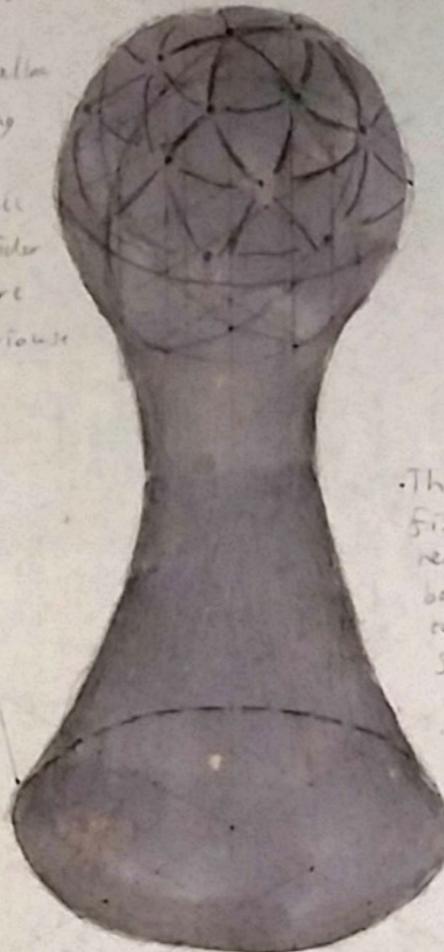
Shown here is a cross section of a separator between segments. The centre is a layer of live-edge acrylic to conduct light from internal LED's to create a shimmering effect along the edge of the segments.

Name Robert Veitch

Candidate No 060 313 458

EHS Unit 2 Developing a design proposal – Higher

To improve light dispersal to an adequate amount I raised the sphere off of the ground on a droplet shape structure. This allows light from the extending triangular sections to cover a greater distance. In addition, the new wider base provides much more stability than the previous design.

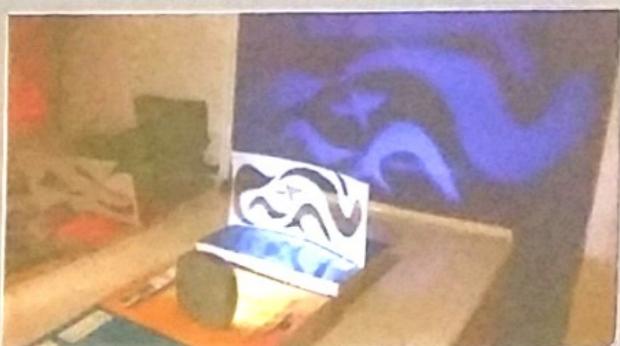


To further improve light efficiency and aesthetics, I stylised the edge of the base, making some cross-sections thinner to emit light.

The main shaft is creased in two sections, the shape above this (that looks like four annotations purpose only) will be made of electrochromic smart glass which is opaque when a voltage is applied and transparent when not.

Combined with the lighting array shown below + and the pattern disks†. This will provide the option to either have the unit completely opaque or to project coloured distorted shapes for aesthetic appeal.

In order to test and find patterns and set-ups, I made simple card cutouts and used a small light to project shapes onto a wall. This helped me decide on what sort of patterns should be used for my projection technique and where they should be in relation to the light source.



A pattern disk such as this one could be printed out of sheet stainless steel and mounted on an arm protruding from the light base.



The light from the light base would subsequently project coloured patterns onto the unit.

Name

Robert Veitch

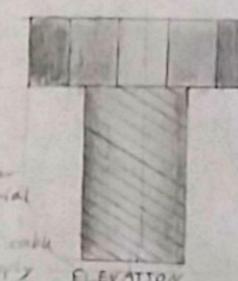
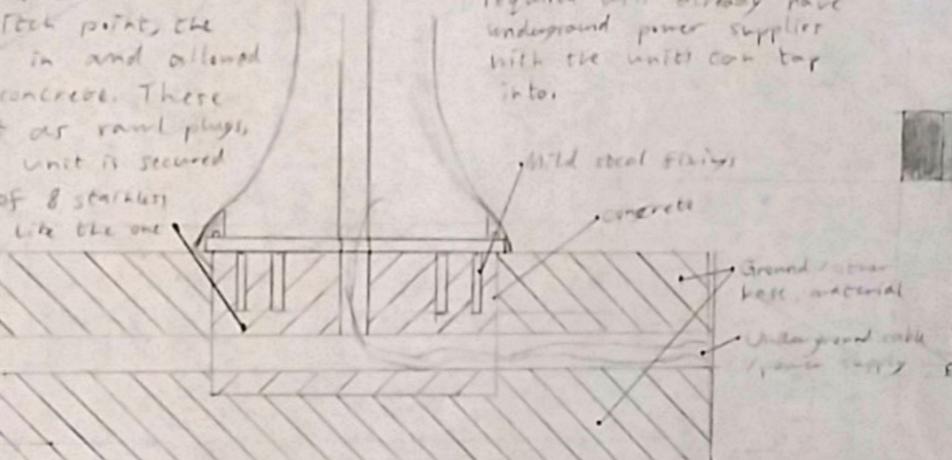
This section is the same fibreglass-Epoxy resin composite used in design idea five for resistance to wear and to resist wind while supporting the outside shape. The extending arms would be aluminium so as to not place too much weight on the structure.

Standard component bolts such as this one would be used to secure the various parts of the unit.

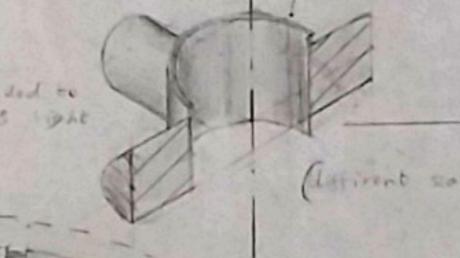
The bolts would be stainless steel for durability as they must last for 20 years and would vary in size depending on their usage.



Not areas where lighting is required will already have underground power supplier with the unit can tap into.



This diagram shows an isometric cross-section of how the light base would attach to the main shaft of the unit.



(different sides)

The maker (bottom left) told me that I needed to mount the patterns half way between the light source and the light exterior.

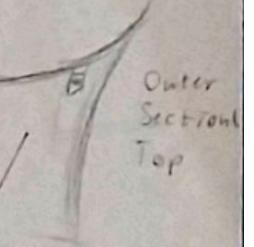
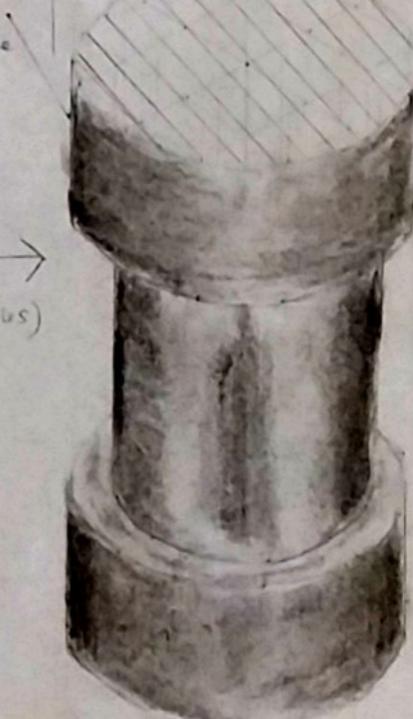
The disks would be motor controlled by underground cable and mounted with coloured filters, such as this one taken from design idea four.



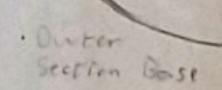
A colour blinder similar to the one used on design idea four could also be utilized.

..to create a range of colours. The disk itself would be coloured polycarbonate for partial transparency.

This dotted line shows the outline of the base of the unit.



These two detail sketches show a section of the base and top of the shaft showing where screws will connect the two together.



Design Task No _____

Page 6

Candidate No 060 313 68

EHS Unit 2 Developing a design proposal – Higher

The idea for this shape change was based on the formation which occurs when a droplet of liquid is dropped into a larger, still amount of liquid. The droplet creates a crater before apparently being expelled upwards dragging liquid behind it. I decided this change was necessary to give the unit an elevated position in order to disperse light over a greater area of the platform.

I changed the material of the shaft to electro-chromatic glass in order to allow control over its opacity. Shown bellow is an explanation of how I intend to project patterns and shapes internally onto the outside of the shaft. When activated, the glass would be transparent creating an array of intricate textures and shapes but during the day it would look opaque and solid.



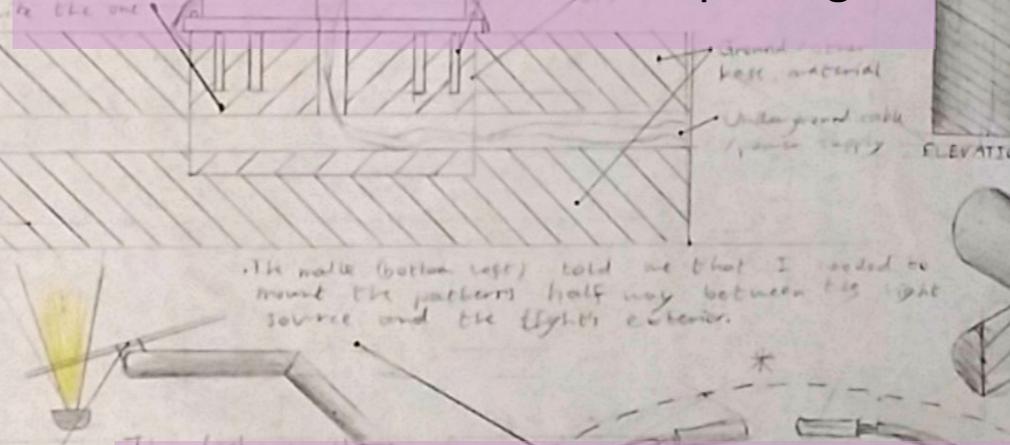
Shown here is one image from a range of models I made to test how light patterns look when projected onto a surface.

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I added a ripple effect by varying thickness on the base of the unit to create organic light patterns from internal light sources, compensating for the lack of light dispersal near the base.

Combined with the lighting array shown below* and the pattern disks†. This will provide the option to either have the unit completely opaque or to project coloured distorted shapes for mercerite appeal.

This diagram shows how steel concrete pins in four positions will hold the frame to the ground while the casing can be removed for maintenance or replacing.

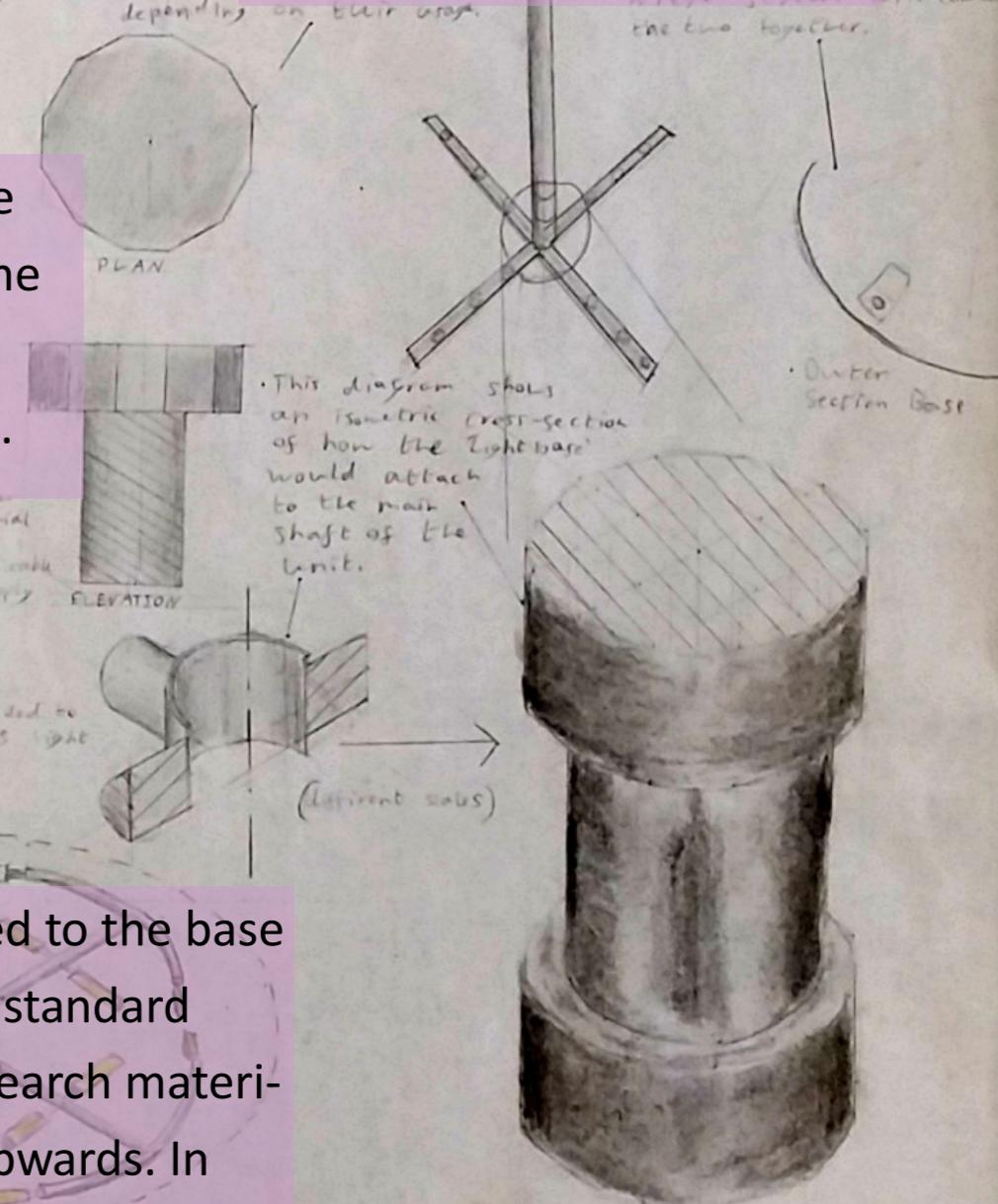


A secondary frame will be attached to the base of the first to host an array of the standard component bulbs listed in the research materials to project a gradient of light upwards. In addition, colour and shape filters allow a range of patterns to be projected onto the shaft.

This section is the same fibreglass-Epoxy resin composite used in design idea five for resistance to wear and to resist wind while supporting the outside shape. The extending arms would be aluminium so as to not place too much weight on the base.

2013

Shown here is an explanation of how a single internal frame will support the shaft casing and other features shown bellow.

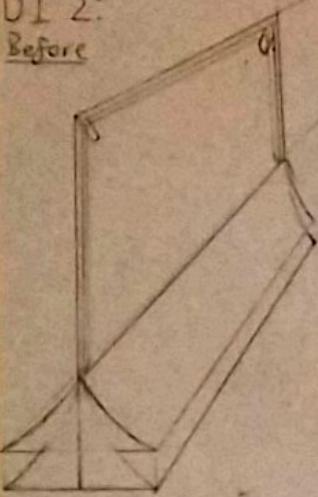


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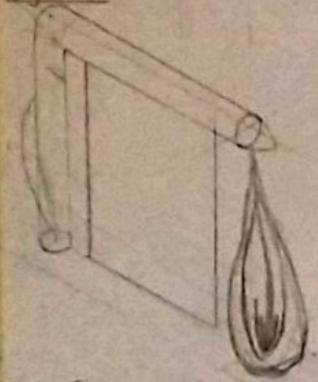
Robert Vetch

060 313 68

DI 2:
Before

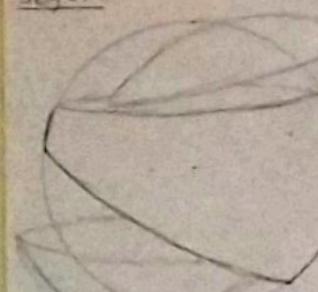


After

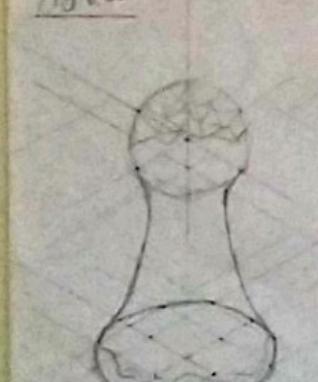


DI 5

Before



After



	DESIGN IDEA TWO	2	DESIGN IDEA FIVE	5
DI 2:				
FUNCTION	<p>The unit originally scored four out of five due to the light only being dispersed at two points. This light is emitted on all sides of the unit at two points to ensure improved light dispersal. For this reason it now scores five.</p> <p>The lighting direction was previously very limited and difficult, starting three on one side, light is controlled by smart glass and in the other, three rotating cones control the dispersal.</p> <p>Originally, two large steel struts buried in concrete secured the unit. A similar method is used, with different brackets used on either side. Long steel struts still secure the unit over ground.</p> <p>All the bolts used were standard in the previous design. This is still the case in the new design.</p> <p>The low center of gravity and concrete fixings have kept the units score at five.</p> <p>With all the changes made to the unit in terms of component and mechanical movement the unit score remains unchanged.</p> <p>The previous unit was waterproof and relatively wind-proof. Now, the screen is retractable to protect against wind.</p> <p>The previous unit was susceptible to people scratching the screen but as the screen is now retractable, it is less vulnerable.</p> <p>Previously, the unit scored five due to the materials all being weatherproof and weather resistant. As no new materials have been introduced, the score is unchanged.</p> <p>The unit previously scored five as the materials are the most resistant to wear and tear as they can be for their other properties.</p> <p>Due to the increased mechanical functionality the units durability may have more potential for malfunction.</p> <p>Previously, the unit was given four due to the fact that large components could not be extruded. This is no longer the case however the new design uses many more standard components to ensure a cleaner finish.</p> <p>The new aesthetic incorporated with features and ideas from designs three and six add to the original aesthetic, complimenting a new unit style.</p>	<p>Total: 63/65 97%</p> <p>5</p> <p>Previously the design of the unit interfaced with its own light dispersal. The new design ensures light is dispersed below the main bulk of the unit.</p> <p>With the new geodesic sphere shape features extractable triangular units which rotate to disperse light and are adjustable.</p> <p>The method with which the unit attaches and secures to the ground has not changed much.</p> <p>The previous design had unspecific brackets but now feature standard component connectors for the bulb in the recessed materials.</p> <p>Previously, the units curved base caused some stability issues but now the large flat base keeps it secured.</p> <p>The unit is now taller with more dirt pockets so scores lower than its predecessor.</p> <p>The unit was previously safe in all weather conditions. The new securing system makes it even safer.</p> <p>The previous design was vulnerable to vandalism due to its extending nature. The new unit is higher up and has a protective canopy to protect it.</p> <p>The new materials used are just as weatherproof and corrosion resistant as the previous.</p> <p>The new materials have somewhat compromised durability for the new design features.</p> <p>The new design will require as much maintenance as the previous.</p> <p>The new shape is concentric bases to produce as it is no longer a perfect sphere but individual components will be difficult to produce due to their complexity.</p> <p>The new aesthetic features make the unit more futuristic and aesthetically pleasing.</p>	<p>5</p>	
MATERIAL AND MANUFACTURE				

Design Idea 2

Design idea two originally scored 36 out of a possible 65. While this was a relatively good score, it had large pitfalls but potential. The new lighting design after development scores 63 out of 65. I developed the light dispersal by taking features from Design Ideas three and six by adding a magnetic levitation from base and a series of varying light shapes. The handset like features can be adjusted electronically while smart glass regulate the light dispersal on the adjacent side. These changes brought its score for specification 1.1 from 6 to 5 and 1.2 from 3 to five. I then changed the ground fixing method to include specially designed steel-to-concrete fixings. This raised spec 1.2 from 5 to 5. The type of bulb is unchanged keeping 2.4 at 5. The increased mechanical features has brought up the potential for a mechanical based failure resulting in specification 3.3 decreasing from 5 to 4. I changed the display to be a flexible, transparent OLED integrated by hand based gestures similar to the XBox Kinect technology to enhance the looks, feel, branding and functionality of the unit.

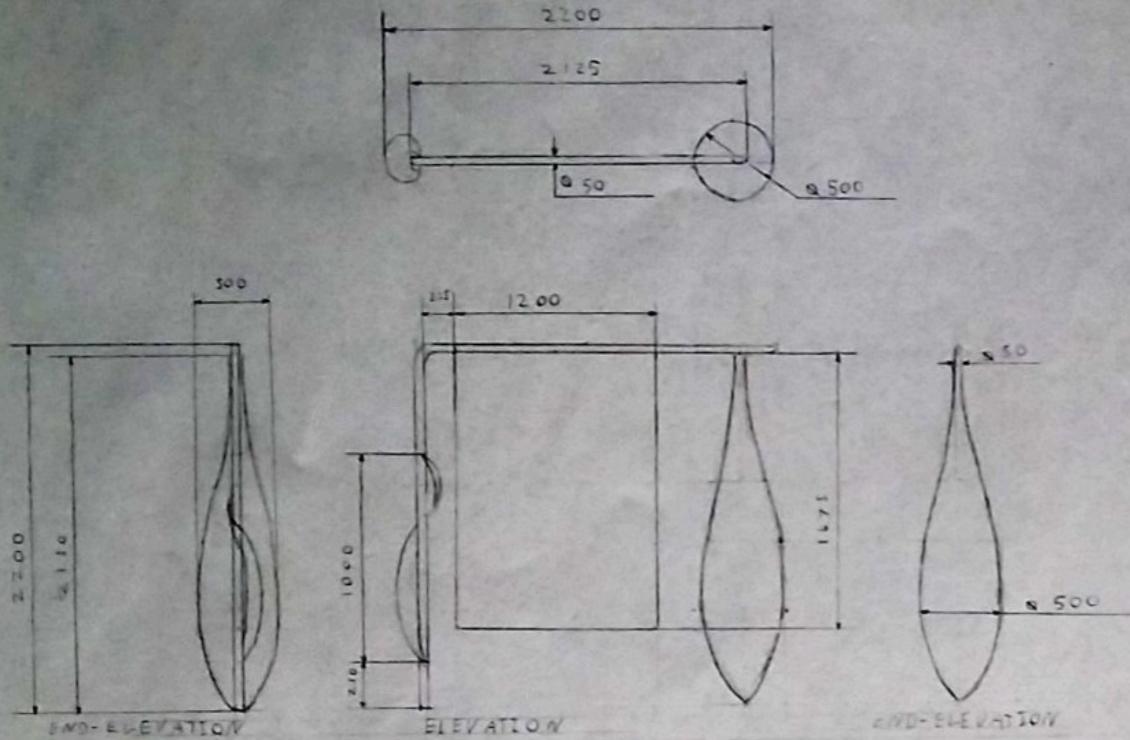
Design Idea 5

Design Idea five originally scored 59 out of a possible 65. Once developed it scored 62 out of 65. Again, I chose this unit due to its unique potential. I first changed the initial concept by making the sphere a geodesic sphere shape with extractable triangular segments mounted on plates to allow control of light dispersal. This changed both specification 1.1 and 1.2 from 6 to 5. In addition, I made aesthetic changes with light diffusing acrylic. These changes were made in tandem with the unit being raised off of the ground. I changed the stalk material to smart glass for control of transparency and made a lighting holder to simultaneously project patterns onto the glass and emit light through the shapes on the base with are thinner than the alternate sections. All of these changes have raised specifications 1.6, 2.1 and 4.1 to 5. The new wider base provides better stability as well as supporting the light fixtures raising the score of specification 2.3 to 5. Many of the components are now standard components such as stainless steel parts and bolts, raising specification 3.6 to four.

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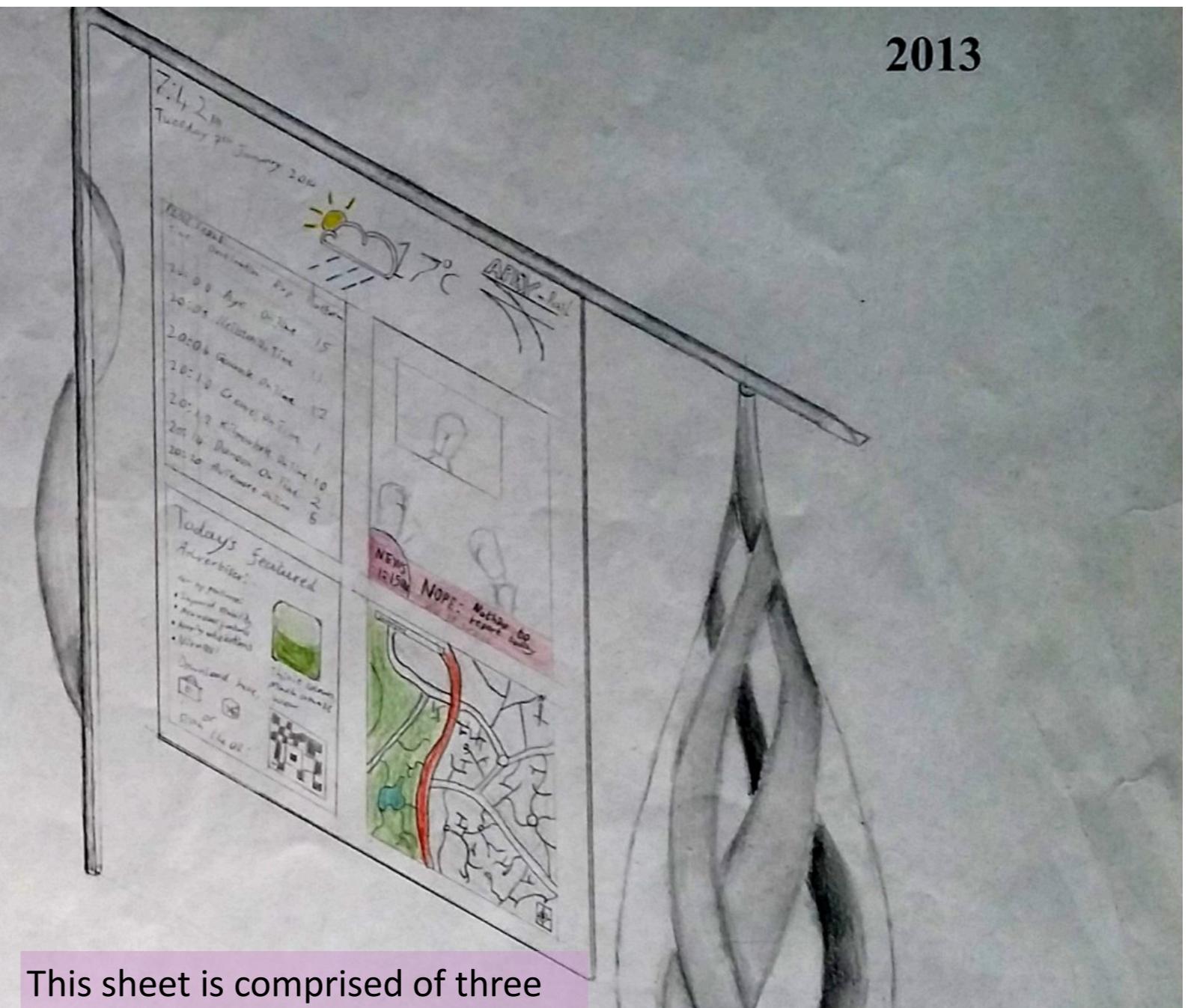
Name Robert Veitch

Candidate No 060 313 458

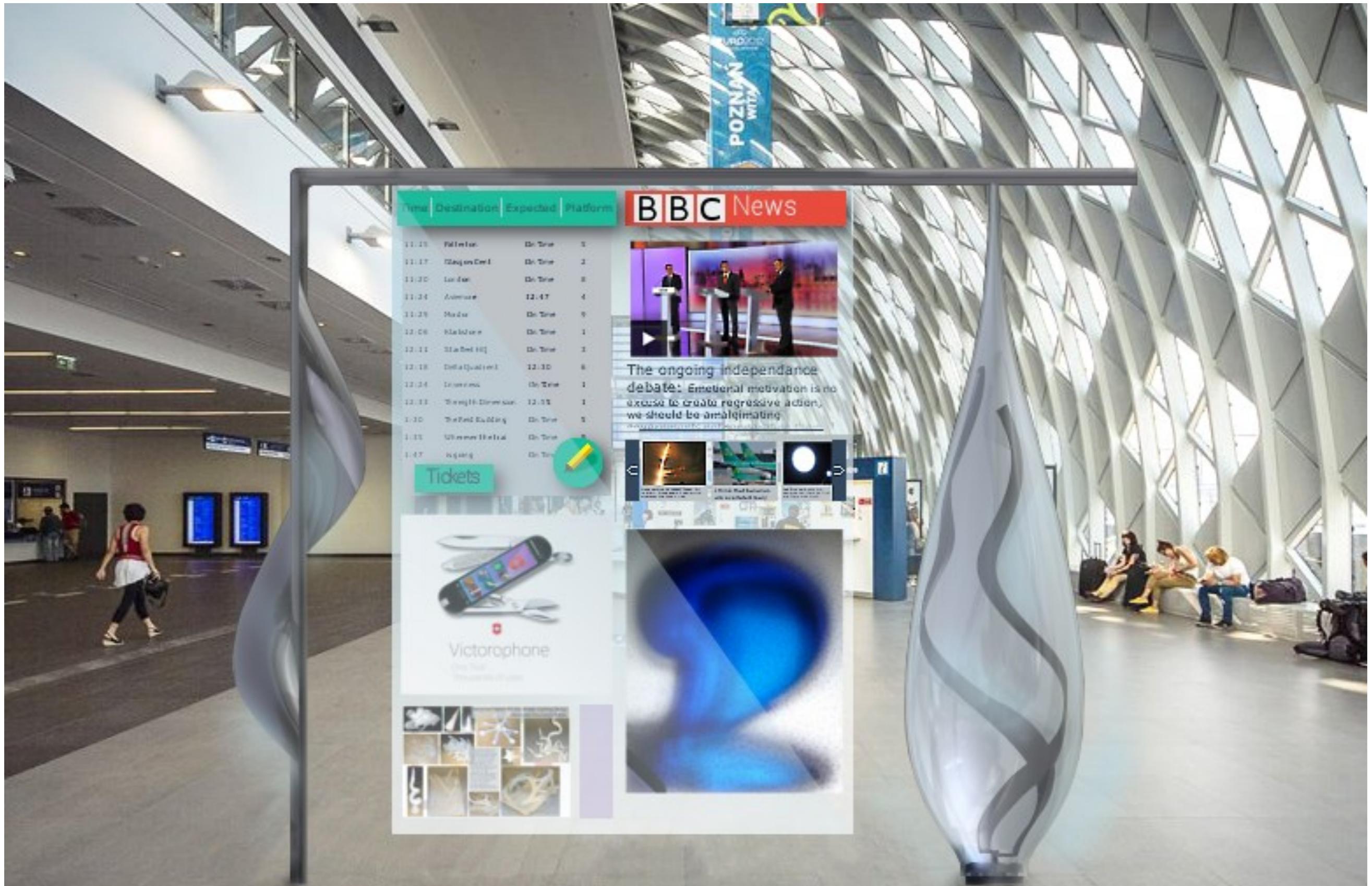


My original idea for design two scored 56 out of a possible 65, once developed it scored 63 out of 65. The shelter uses two means of light dispersal. On one side, a 'swooping' curve encompasses light bulbs and directs light downwards. The light dispersal on that side is controlled by panels of electro-chromatic smart glass. The opposite side features a glass teardrop shape containing three counter rotating panels to control light dispersal from the 'Orb' inside; a light emitting oval suspended in and charged by an electromagnetic field. The unit features a state-of-the-art transparent, flexible OLED screen and gesture interface to display any number of things from train timetables to maps to weather forecasts. All of these features make the unit sleek and modern, varying in futuristic. The 'Orb' features a battery and current-inducing circuit to power the lights. The units lighting dispersal and screen-data can all be controlled via underground cabling. The concrete fixing ensures the unit is safe and secure in all weather conditions while the ability for the screen to be retracted protects the unit against vandalism. The ground area is by meters so the unit will not take up too much space.

I think this idea has been successful as it scored 97% percent in the convergence matrix and satisfies the vast majority of the specification. This design was one of my personal favourites and how I incorporated my favourite features from three of my other ideas. The magnetic levitation technology adds an almost science-fiction effect while the array of swooping shapes and moving parts add a sense of motion and style. The interactive display uses technology only just created to turn the unit into a multifunctional advertisement for Apex rails, and exploring the boundaries of preconceptions we take for granted.



This sheet is comprised of three components, a large final render, an orthographic drawing showing major dimensions and viewpoints and a paragraph explaining the design and how it satisfies the brief.



A second render which I made after the assignment.