

Clover Fuel

Fuel the Future 2030



“Back to the Fuel-ture”

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The Clover team approached the task of “Fueling the Future” by attempting to look at it from every angle. We needed to make sure that the station would be a viable option for a business to use and expand, while also pulling profit. We needed to make sure that we could handle any sort of consumer that came in - from a trucker coming off of a 12 hour drive shift to an accountant late for work looking for a quick hydrogen fuel. We needed to make sure that we were doing what we could for the environment, both indirectly by encouraging use of environmentally friendly fuel and directly, through the plan of construction. Taking into consideration all of these factors, we created Clover Fuel.

Driving into Clover, a customer would see a split, directing trucks and trailers to one section, and pedestrians to the other. The trucks would be directed to a parking lot purely for trucks and trailers, and then have access to a charging spot for just trucks, most likely overnight parking. They would also have access to a lane behind the building to access the exit and other fueling options. The pedestrian vehicles would be directed to a fork where they could either turn into the parking lot, or could begin fueling, with options of gasoline, electric, or hydrogen fuel. If choosing electric, customers would have the option of using a Clover Seed to spend their time. Once parked, anyone could walk in and get food and drinks from Dunkin, Subway, or our wide variety of snacks and pre-made options. They could also choose to head upstairs at dinner time and visit 4Leaf Bar and Grill, Clover’s own restaurant. Also on the second floor are a dozen overnight rooms, for truckers and other overnight customers.

As our team came together to talk about the location of our gas station, we decided that with the layout and size of our gas station, we should place it on an interstate. At first, we almost went with a local gas station as that would increase the likelihood of repeat customers at Clover fueling stations. Ultimately though, the local gas station would likely exclude many truck drivers

and limit the clientele. . We decided we wanted to attract truck drivers who would utilize a place to stay while they fuel their trucks. Due to truck drivers mainly utilizing highways, and the larger space needed to accommodate their vehicles, a local fueling station would not make as much sense for our broader group of desired customers. The interstate would allow a bigger fueling station as well as a larger audience to utilize everything Clover gas has to offer.

For our gas station, our team brainstormed what would be the best option for the future. The team decided to try and include a variety of fuel types. We decided to have a mixture of regular gasoline, hydrogen, and electric fuel types for our gas station. The choice to use regular gasoline was because, in ten years' time, we believe it would not make sense to think that the human race stopped using gasoline. Hydrogen fueling is the process of taking hydrogen gas that goes into a fuel cell. Once in the fuel cell, instead of being burned off, it is transformed from chemical energy to electric energy. This emits zero emissions and the only thing expelled is pure water (Hydrogen). Lastly, we decided to use a lot more electricity in our design as we believe that in the future, there will be more of a push for electric cars (Resilience). However, the team decided it would be best to still have a small section of gasoline pumps for those who need to make quick stops and get back on the road, a small area with hydrogen fuel, and a bigger area dedicated to electric charging stations.

During our team's conversations about the overall usage of this station, we debated exactly what type of customers we would be designing our station to attract. After deciding that we were certain our station would be a larger station designated for interstate travel, likely located directly off of the highway, we needed to decide if this would be a dedicated truck stop, and trucks only, or if it would be for everyone. We consistently looked back on the rules and guidelines, and did the same when discussing this. Choosing to cater to just trucks would have

allowed us to become very specific about what amenities were available, not having to worry about car parking, high pedestrian traffic, etc. However, we chose to make the station something that anyone, whether driving a semi truck, minivan, or motorcycle, could use. Our primary goal for Clover was to design a fueling station that would be recognizable to anyone and everyone, inspiring an enjoyable stop rather than a last resort, and we wanted to make sure we stuck to that original inspiration.

Our team decided to name our fueling station Clover. We were trying to come up with a name that would be easy to say and remember but also get the point across of what kind of fuel we are mostly promoting. We decided on the name Clover by using a random word generator with the input of nature. We decided to use the key word nature in our random word generator because our station was going to be focusing more on electrical fueling and we want people to think of the environment when they see our station. We chose Clover and as we discussed what features our station would offer in addition to fueling, we decided to include a motel and restaurant to provide a more full-service and up-scale atmosphere. After choosing the name Clover for our station, we turned to creating the name of our restaurant and landed on the 4Leaf Bar & Grille. The natural connection and association between 4Leaf and Clover made it a perfect fit as well as aligning with the theme of nature.

Along with providing fuel, we wanted to make sure Clover was a place to eat. This would allow for those staying for longer periods of time to have a variety of choices. Our first choice would be a Dunkin, as it is somewhere to get a quick coffee and it is a well known establishment in the New England region. The other option would be targeted more towards a brief lunch or dinner - a Subway. This would provide visitors with a degree of customization of their meal. The final restaurant would be 4Leaf Bar & Grill, a sit-down venue targeted at providing an

experience that will bring customers away from the “on the road” feeling. 4Leaf would be targeted towards our overnight customers, allowing them an easy way to get a high quality meal without having to leave Clover.

In addition to fueling stations, the restaurant and the motel, Clover will of course include a convenience store. Outside of sold products, we want to make sure that we are ready for any type of customer. There would be a men’s and women’s multi-person bathroom, along with two family bathrooms open to any gender, both with a baby changing station, and toiletries. Within the store we decided to include a wide variety of products. After deciding Clover would include a hotel for overnight accommodations, we needed to make sure that guests would not need to leave the property to be comfortable overnight while also catering to those who are just stopping by. For food selection outside of the restaurants, we will source ingredients and food locally to the extent possible . We will include a relatively wide selection of snacks and drinks, which would target those looking to quickly get in and out. The store would also have a small pharmacy section with general pain relievers, stomach pain relief, vitamins, etc. Finally we would include a section of general needs - paper towels, pens, notepads, toiletries and even a limited selection of non-perishable grocery items. We want Clover to be an appealing destination for more than just fuel.

Designing Clover, we knew we needed to put forward a change that was brand new, was innovative and made for the future of transportation. As demonstrated by our range of fuels offered, we want to make sure that anyone using any sort of fuel is comfortable visiting Clover. In doing so, we researched the types of fuel and how to accommodate customers using each kind. We discovered that those using electric vehicles have to wait a much longer time to fuel their vehicle, opposed to the two to five minute wait for gasoline or hydrogen fuel. Following the

current trends, an increasing percentage of the general population will own an electric vehicle as their daily driver (Munoz) While there may be advancements in the speed of electric charging, it would be naive to assume those progressions would be widespread in just a decade, as “new advancements” in any technology can take decades to become mainstream. Considering all of this, the Clover team was inspired to create the Clover Seed - a small, yet relaxing area for those charging their electric vehicle to wait until they’re ready to get back on the road. To step into their own Clover Seed, an owner would simply get started on charging their vehicle like any other stop they might experience, using a screen on the power supply to begin the charge. They will come across an option to purchase - for a small price (\$3-\$5 fee) - the ability to enter the Clover Seed through the use of a 4-digit code that would change with each purchase and expire after a vehicle is unplugged from the charge cell. Within the Seed would be a small booth style seating area with indoor/outdoor cushioning, a table, styled with a “wooden” laminate, and a cord running through attached to a remote that would control a wall mounted TV. All devices - including the lighting - would be user controlled, allowing the user to customize their Seed experience. One could take a nap, watch their favorite team play in primetime, or use the charging time to work on a project they had been putting off. The Clover Seed would provide a new and more relaxing experience for those needing to charge their electric vehicle.

Throughout the design process of the Clover Station, the team ran into a multitude of personal challenges. The first and most common challenge we encountered was finding time to meet, as between extracurricular activities and other classwork, a time that all members of the team were free was a rarity. When we were able to meet, we had to commit much of that time to research, as another challenge faced was the lack of resources on the subject. Without a higher-up able to point us in the correct direction, the team had to bring in ideas from all over.

When designing the model of the station, many different softwares were taken into consideration, and in the end SolidWorks was the software of choice due to previous access to a license from a club (UConn FormulaSAE) and the inability to purchase other softwares.

From the very beginning of planning Clover, we knew we needed to make it as environmentally friendly as possible for a multitude of reasons - in our opinion, three reasons outweighed the rest. The first being Earth is one of one, and we must do what we can to respect it and allow it to thrive, in the same way it has allowed us to. The second being that, in general, it will be good for business by appealing to customer values. Younger generations tend to be more environmentally conscious than those currently making up the highest volume of drivers in the nation. When building a station for the future, we must target future generations. The last main reason for sustainability is that it will subconsciously appeal to customers of all ages. An area with more greenery and less pollution is better for the physical and mental health of people. By appealing to mental health, customers will feel better while at Clover, bringing them back.

To meet our sustainability goals, we had a variety of methods. The first few have to do with exactly how our station is designed. In terms of the building itself, we would approach construction with a “build up, not out” mindset. Rather than having a single floor building that would require an extremely large foundation, we would split our building into two floors - the first being the convenience store. Subway, and Dunkin, mainly aimed towards customers who are only stopping in for a few minutes. The upper level would be targeted towards long term customers - housing the overnight rooms - and those sitting for a meal in 4Leaf Bar & Grill. This would allow for less space being taken up by the building itself, and instead be full of greenery.

For populating the station and its surroundings with greenery, we would focus on a variety of plants and trees in any space possible. The ultimate goal is to become carbon neutral.

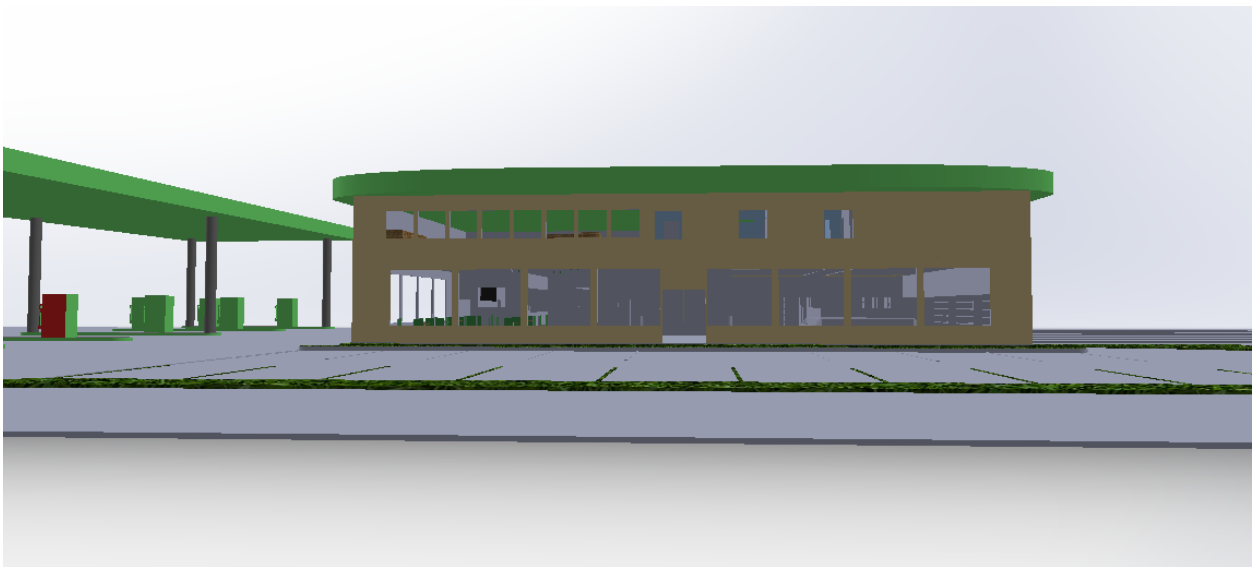
That will be extremely difficult as a fueling station, but each plant makes a difference. Rather than purely grass separating parking areas, the medians would be populated with small to medium sized trees, with occasional pathways allowing walking travel between them. The building itself would be shaped in a U-shape, with the middle being a courtyard style area so that Clover customers have an option of spending time outside. This courtyard would have a grass center - encouraging growth of community.

Our mix of fuel types would provide and encourage the use of more sustainable fuels. It would also indirectly open up possible buyers in the vehicle market to the idea of moving from gasoline-fueled vehicles to hydrogen or electric, as seeing a greater number of stations providing these fuels would provide comfort and ease worries about not finding a fuel source. We also focused on making sure that everything someone may need during a visit is within the store, as this will keep someone's carbon use while in Clover down, as they do not need to leave.

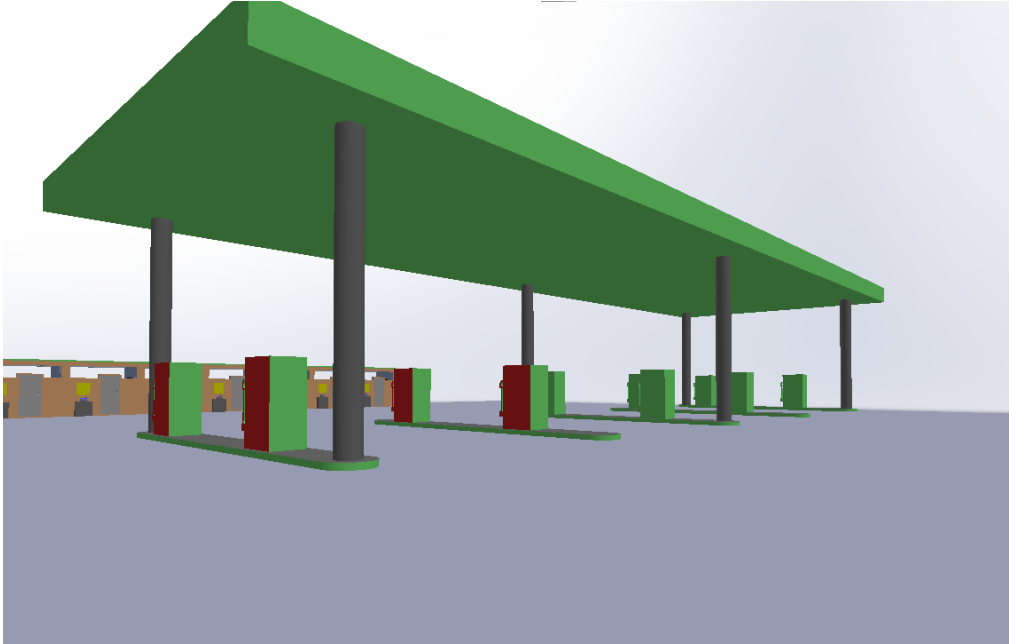
Clover Fuel provides a great experience for the business owner, the customer, and the environment. It provides a look into the future of fueling stations internationally, and customers of every demographic would be eager for a stop at Clover.



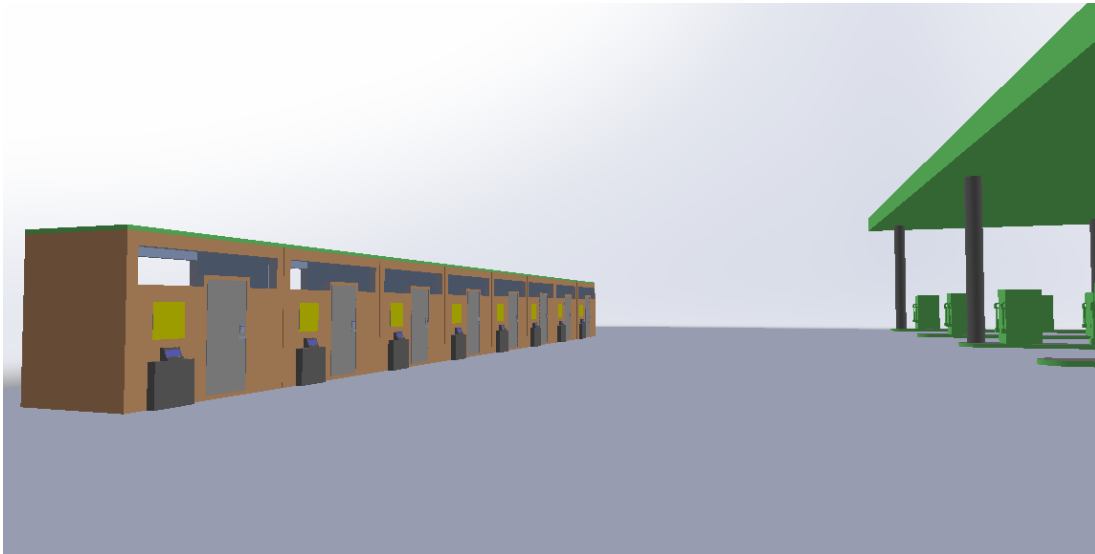
A front view of Clover Fuel, what someone may see while passing



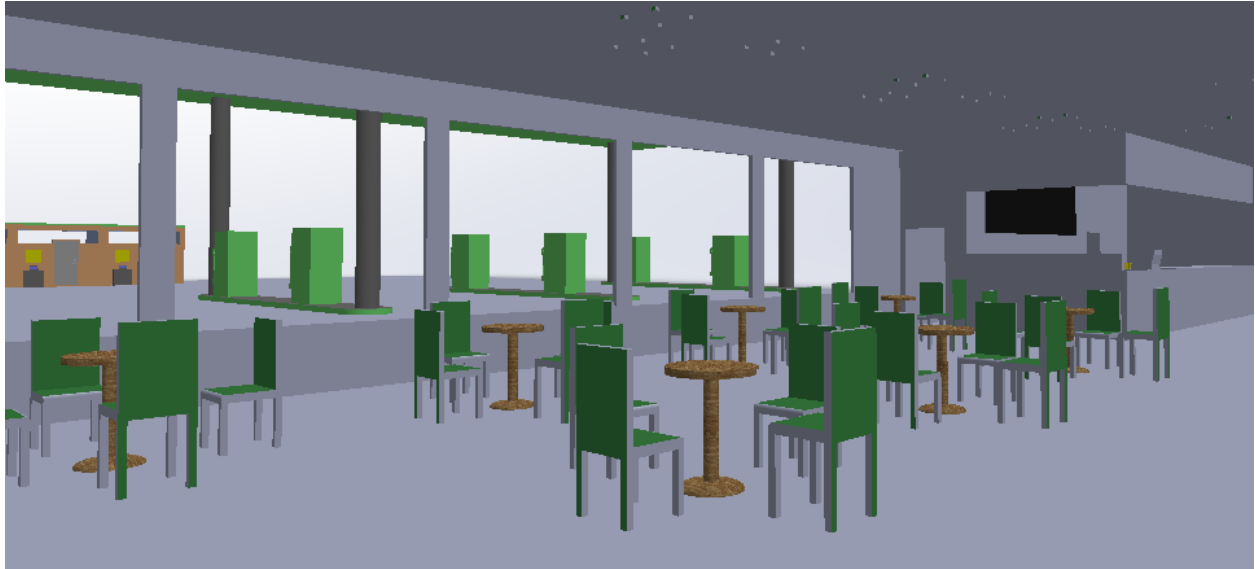
A closer look at the from of the main Clover building



Hydrogen and gasoline fuel pumps at Clover, the gasoline being designated by a red front



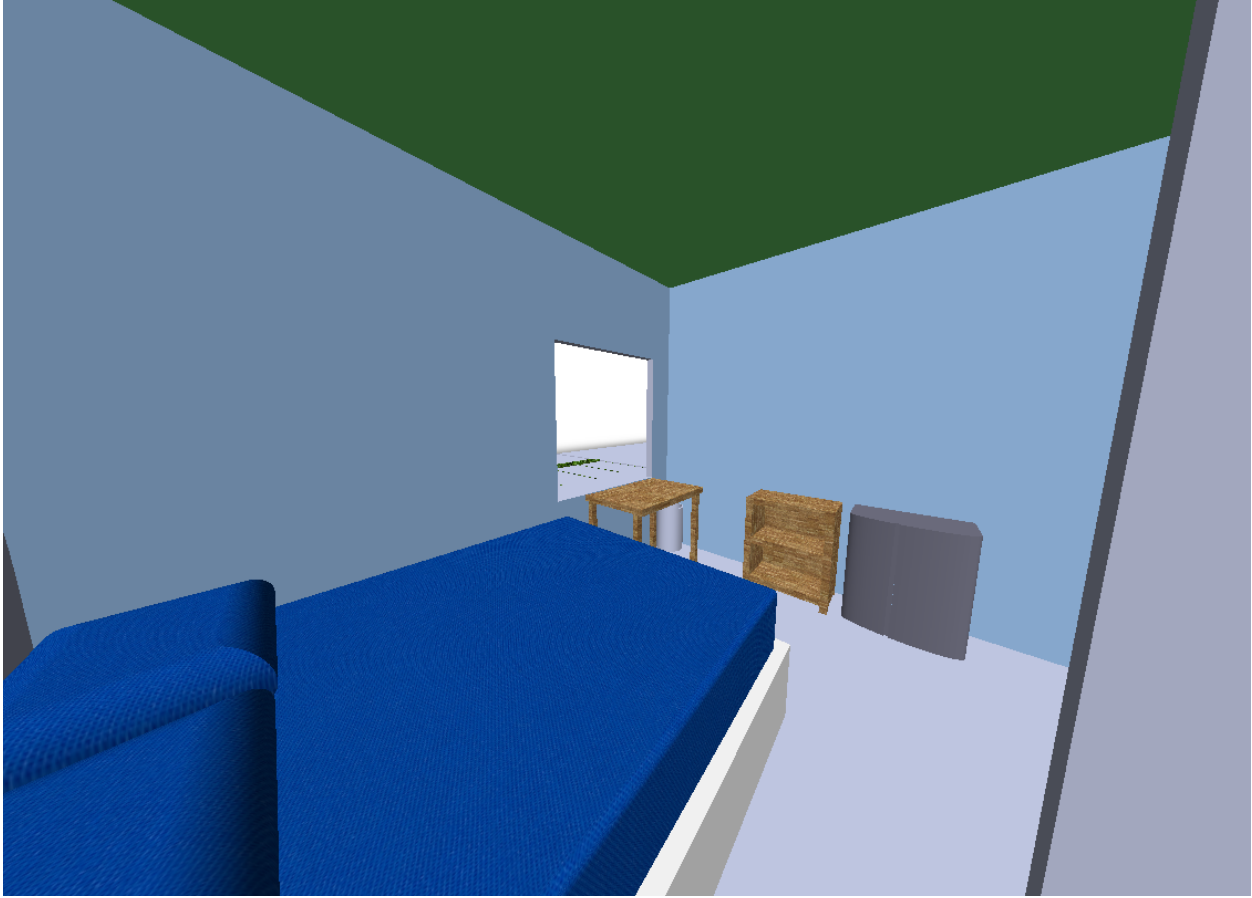
A row of Clover Seeds at Clover Fuel



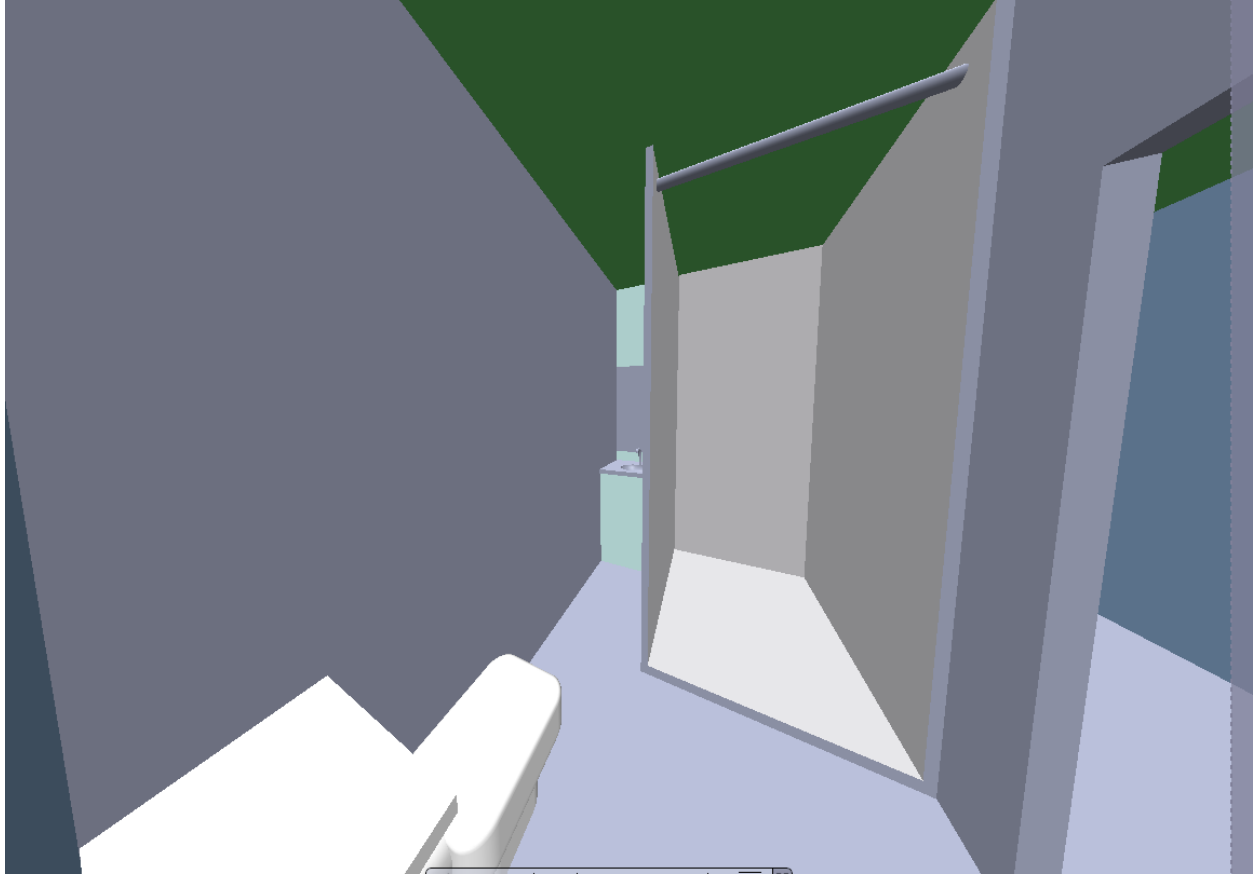
The first floor of Clover, a seating area for Dunkin and Subway



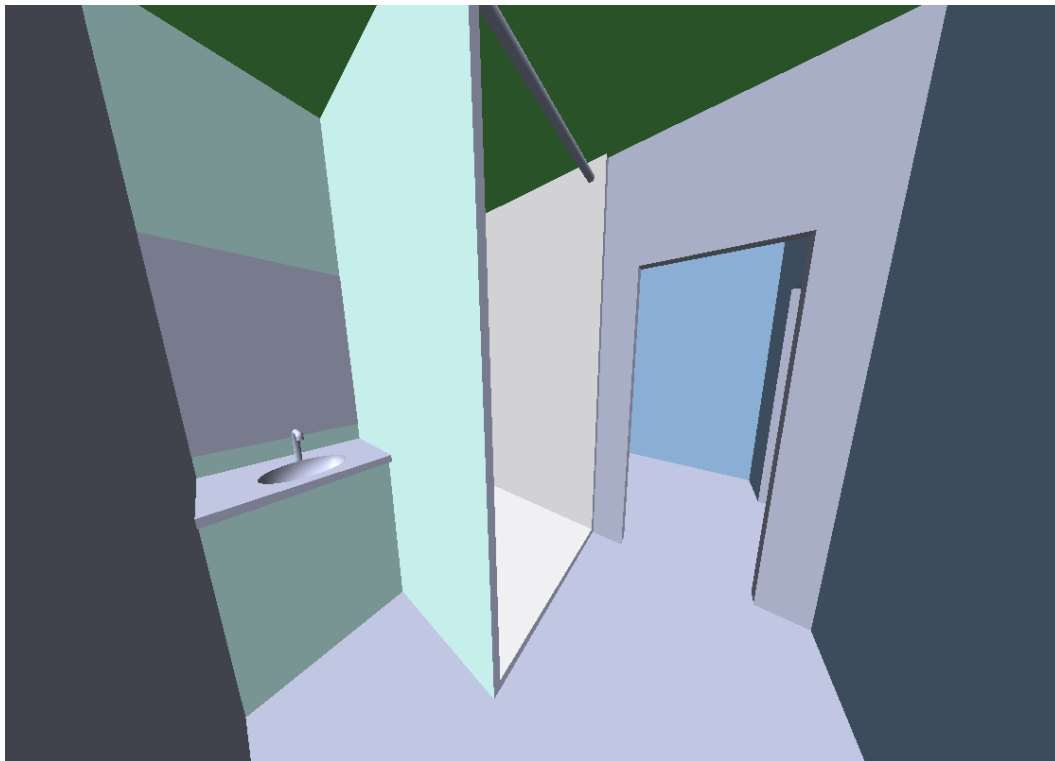
Inside one of the overnight rooms (1/2)



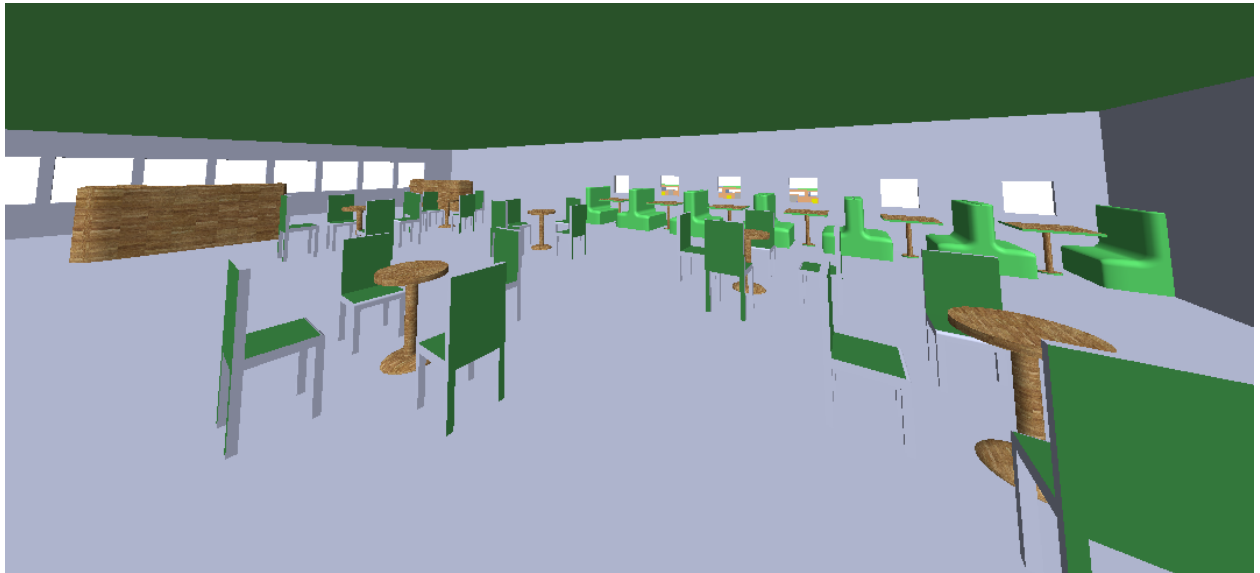
Inside one of the overnight rooms (2/2)



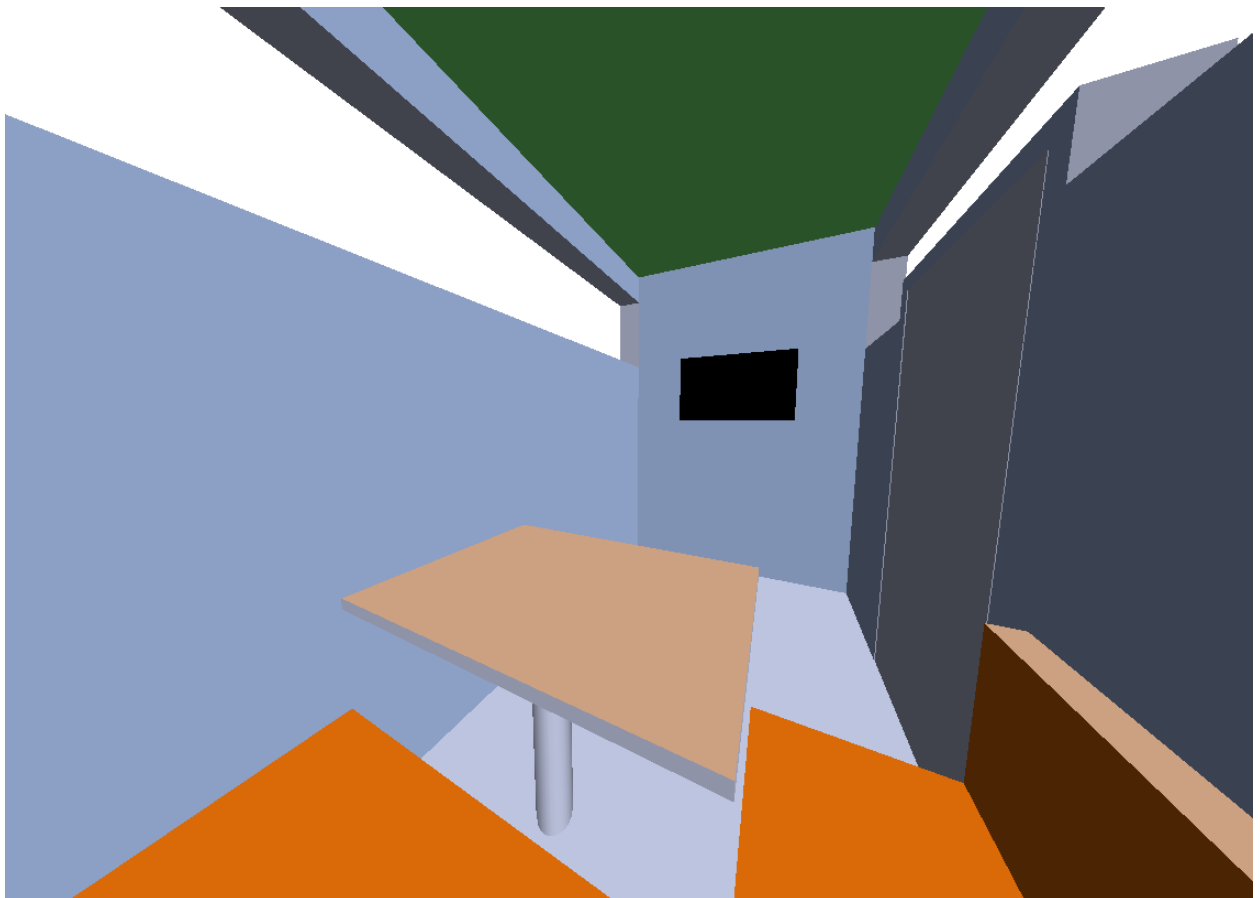
Inside the bathroom of an overnight room (1/2)



Inside the bathroom of an overnight room (2/2)



Inside 4Leaf Bar & Grill



Inside a Clover Seed



The 4Leaf Bar & Grill logo



Clover Fuel Logo 1



Clover Fuel Logo 2

Works Cited

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