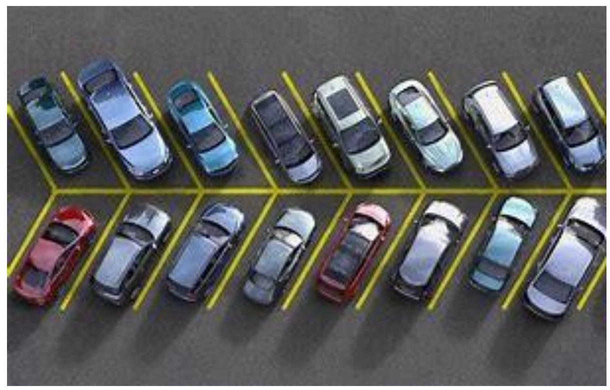


Mutchler Community Center

Bloomfield, IA

Table of Contents

Section I | Executive Summary

The Mutchler Community Center, located in Bloomfield, Iowa, serves as a versatile facility, functioning as a gymnasium, recreation room, and meeting space. It hosts numerous events designed to strengthen community bonds within Bloomfield and the surrounding area. This renovation project is led by a team of senior Civil and Environmental Engineering students from the University of Iowa, whose collective experience in sitework and design has significantly informed this project.

The design improvements were developed after a thorough review of the Request for Proposal (RFP), an initial meeting with client Taylor Sessions, and a comprehensive site visit. Constructed in 1998, the community center has aged and now requires renovations. The parking lot is landlocked between steep slopes and needs to be redesigned to improve traffic flow and potentially increase parking. There is an erosion problem on the east side of the building on the retaining wall due to drainage from multiple neighboring lands. The glass entryway of the building is not ADA accessible, and the framing of the doors has bent due to strong winds on the west side of the building. The building's interior has areas not being utilized like the game room and weight areas, which are divided by a curtain and need a more practical layout.

The parking lot, situated between steep slopes, is in need of redesign to enhance traffic flow and increase parking capacity. The proposed redesign involves reconfiguring the layout into one-way aisles with 60-degree angled parking stalls to maximize space and accommodate more vehicles during peak hours. An HMA built-up section is planned to raise the parking lot level to be flush with the building's entrance, meeting ADA accessibility standards. While a full overlay of the parking lot is not included in the current design, it is recommended as a future phase to extend the life of the lot and improve its condition. The current entrance is also inadequate, causing congestion during busy times. The redesigned entrance will be widened to allow smoother vehicle movement, which will reduce congestion and facilitate better traffic flow. During the design process, feedback from the client emphasized the importance of adding a sidewalk along the south side of the parking lot, rather than extending the existing one. The final design incorporates this feature, along with the other aspects of the parking lot renovation. The design was developed using Civil3D software and adhered to SUDAS standards, with dimensions estimated from the site visit, Google Earth, and Beacon GIS data.

The erosion issue on the east side of the building had been previously addressed with the installation of a retaining wall. However, our assessment indicated that water runoff from neighboring properties to the north and east exacerbates the problem. To mitigate this, the design involves lowering the storm drain near the northeast culvert to prevent excess water from reaching the retaining wall, which will require shortening the existing storm pipe. A small swale is also designed to manage runoff from the east side and direct it toward the stream south of the building. The swale will include crushed rock at the base to slow the water's flow, requiring minimal earthwork and ensuring cost-effectiveness while preserving existing utilities. The team used Hydraflow Express software to analyze the drainage patterns and capacity, confirming that the proposed design would effectively manage water flow and prevent further erosion.

The building's main entrance, which currently features a glass wall system with two swinging doors, is prone to damage from high winds and does not meet ADA accessibility standards. The final design is the installation of sliding glass doors, which will prevent future damage, comply with ADA requirements, and enhance accessibility. An ADA-compliant push button will be added to the interior set of doors to further meet accessibility guidelines.

The ground floor of the community center currently houses a weight room and a recreation area separated by a curtain. The final design proposes replacing the curtain with a glass partition room to give it a designated area for the recreational activities. The glass partition was selected based on client input, as it provides visibility and safety. The second floor, which features a balcony and a reception room with a kitchen, has areas that are currently underutilized. No engineering design was completed to improve this space, but adding furniture such as cocktail tables or lounge seating to create a more inviting space for gatherings outside of events is proposed. The final design for this level includes windows to be installed in the partition wall enclosing the ballroom, making the space appear more open and welcoming. None of these design changes are expected to impact the structural integrity of the building, so structural calculations were not performed. Autodesk Revit was used to complete the interior design, with all proposed changes incorporated into the final renderings.

The final cost estimate for the project includes materials, labor, and equipment, based on the RSMeans 2024 cost estimate book. Note that future construction and material costs may be subject to inflation. Estimates for the facade and partition wall were obtained from fabricators, who based their calculations on the team's understanding of the project and site visit photos. These estimates are as accurate as possible without the fabricators being present on site.

Category	**Total Cost**
Parking Lot	$17,305.00
Swale	$8,650.00
Facade	$19,000.00
Interior Layout	$35,335.00
Architectural Fees	$2,675.00
Construction Management Fees	$6,025.00
Engineering Fees	$2,000.00
Contingencies	$8,025.00
Factored Allowances	$800.00
Permits	$400.00
Total Project Cost	**$100,215.00**

Section II | Organization Qualifications and Experience

1. **Organization, Location and Contact Information**
   University of Iowa Civil and Environmental Engineering Department

   103 South Capitol Street, Iowa City, Iowa 52240
   Services will be provided from this location.

3. **Organization and Design Team Description**
   We are students in our final semester before graduating with Bachelors of Science in Engineering. With previous internships in the engineering field, we have learned how to properly manage our time to ensure the best product for our clients. We have experience clearly communicating with our coworkers and clients and value the need for clear and routine communication.

   Roberto Aguilar: Project Manager -- coordinating with clients and interior design
   Timothy Schmadeke: Design Team -- focusing on erosion control
   Kaitlynn Kimmel: Design Team -- parking lot design and front facade design

Section III | Proposed Services

1. **Scope:**
   The existing parking lot features narrow drive aisles that do not accommodate two-way traffic, and the driveway's limited width prevents vehicles from entering and exiting simultaneously. This results in traffic congestion and impedes efficient use of the parking facility. Additionally, the parking lot does not meet ADA standards due to a step between the lot and the sidewalk entrance. Along with the parking lot, the east side of the building is experiencing significant erosion, which was partially addressed with the installation of the retaining wall. However, this measure has proven ineffective. The inlet located to the northeast of the building is not aligned with the surrounding elevations, making this issue worse. The building's front facade is also non-compliant with ADA standards due to the lack of a push button to enter the building. Additionally, strong winds have caused damage to the door frames, bending them over time. Inside the building, the ground floor contains both a recreational area and a weight room, separated only by a curtain wall. The clients have indicated that this is not effective in separating the two spaces. Finally, the space in front of the upstairs balcony is currently underutilized. This area has the potential to be repurposed to better serve visitors and enhance the overall functionality of the building.

2. **Work Plan:**
   A Gantt chart (See Appendix for full sized PDF) was created to show the schedule of design throughout a 14-week period. Throughout this time the final report, design drawings, presentation, and project poster were completed.

Section IV | Constraints, Challenges and Impacts

1. **Constraints:**
   The existing parking lot is constrained by 30-40% surrounding slopes, which significantly limits the potential for expansion or the addition of new driveways. Additionally, the building's entrance is exposed to high winds, causing the doors to repeatedly slam open and closed. This has resulted in deformation of the door frame, compromising its structural integrity. Clients have been told in previous assessments that any remedial work would require replacement of the entire facade. Lastly, due to spatial

and functional constraints, the current locations of the stairs and bathrooms cannot be altered.

2. **Challenges:**
   For cost purposes, major changes to the existing conditions need to be limited. Another challenge for this design was the runoff from neighboring land, which drains to the community center. Any site work done to fix this problem is limited to the current lot and cannot be done on the other properties.

3. **Societal Impact:**
   Enhancing the parking lot will have a significant positive societal impact by reducing congestion during peak times, thereby minimizing the risk of accidents and facilitating more efficient parking for visitors. Upgrades to the facility will also ensure ADA compliance, making the building more accessible and attractive to a wider range of visitors, which could lead to increased attendance and community engagement. Reconfiguring the interior layout will create more privacy for visitors and optimize the use of the space, enhancing the overall experience of those using the facility. However, it is important to acknowledge potential negative impacts that could occur. The construction process will lead to a temporary reduction in available parking, which may inconvenience visitors. Additionally, certain interior areas will be inaccessible during this period. Despite these temporary challenges, the long-term benefits, including potential increases in revenue and attendance, will provide significant advantages for both the clients and the residents of Bloomfield.

Section V | Alternative Design Options

Parking Lot Layout:

This section describes the alternative designs for the parking lot. Each alternative was determined by each area of the parking lot, the driveway, parking layout, ADA parking, and the area south of the lot.

1) Addition of sidewalk south of the lot – This would give visitors who use the trails a safer way to get across the parking lot and back to their vehicles.
   The addition of a sidewalk would help give a clear path to the pedestrians using the parking lot and the trail. With an established crosswalk, this would also improve safety for the pedestrians going across the parking lot. Without a sidewalk, there would be more room to extend the parking lot and add parking spaces.

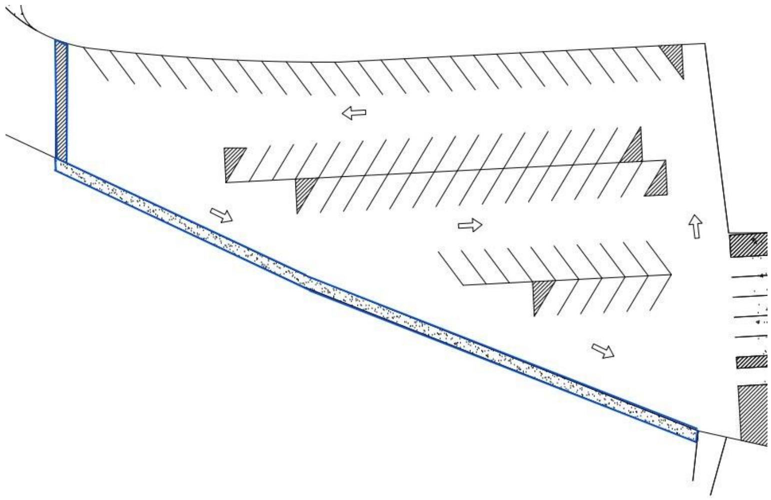


Figure A.3: Sidewalk Design

2) Improved Parking Lot Layout – Renovating existing parking lot and changing the layout to improve traffic flow.

Redoing the layout of the parking spaces and making the aisles one-way would allow for additional parking spaces. The one-way traffic would also help prevent traffic congestion during busy times. Alternative 1 of these layouts, found in Figure A.4, widens parking isles but would lower the stall count by 5 stalls. Alternative 2 in Figure 2 A.5 is a similar layout but has a different stall configuration and only lowers the stall count by 4. Alternative 3 in Figure A.6 extends the south side of the parking lot to allow for an additional 22 stalls. These configurations have parking in the south, which would make pedestrian crossing more difficult.

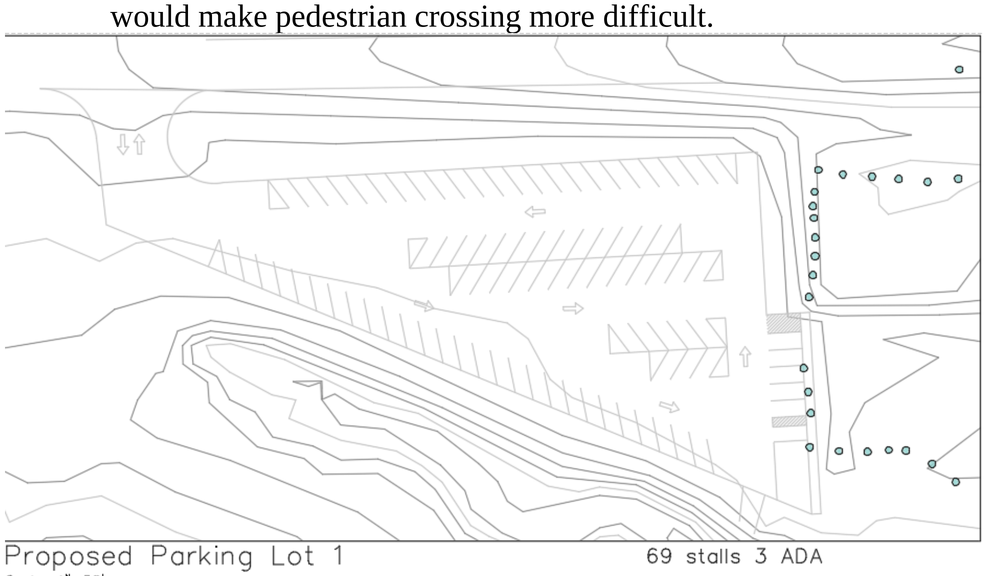


Figure A.4: Parking layout alternative 1

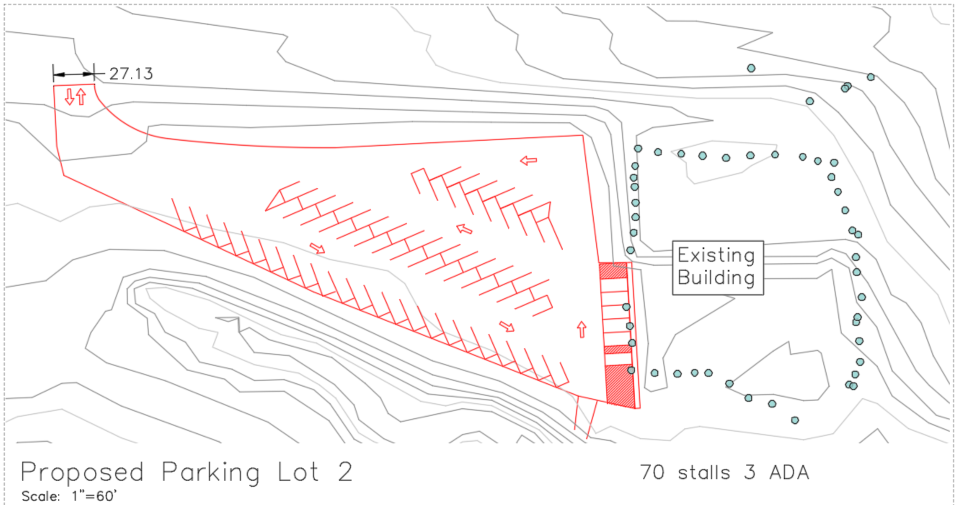


Figure A.5: Parking layout alternative 2

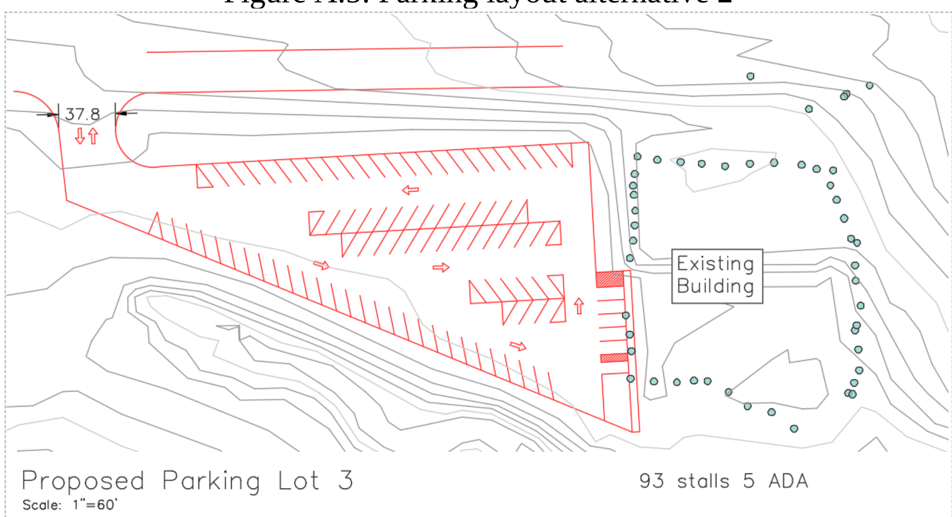


Figure A.6 Parking layout alternative 3

3) Expanding existing entrance – Widening the entrance to help give cars room to enter and exit the lot.

    The existing entrance doesn't allow enough room for cars to enter and exit the lot at the same time. The expansion of the entrance would allow cars more room to enter and exit. During heavy traffic periods, this can help prevent congestion.

4) Adding another entrance to the parking lot – Another entrance would give cars more opportunity and space to enter and exit the lot.

    This alternative was not designed due to the surrounding steep slopes which prohibit adding an entrance.

5) Improving the quality of the parking lot – A built up section of the parking lot near the entrance is needed to meet ADA requirements

    The built-up section (Figure A.7) of the lot would slope up from the existing lot to the sidewalk. Along with the built-up section of the parking lot, future phases to overlay the whole parking lot could improve the overall quality of the pavement as well as extend its life by 10-15 years.

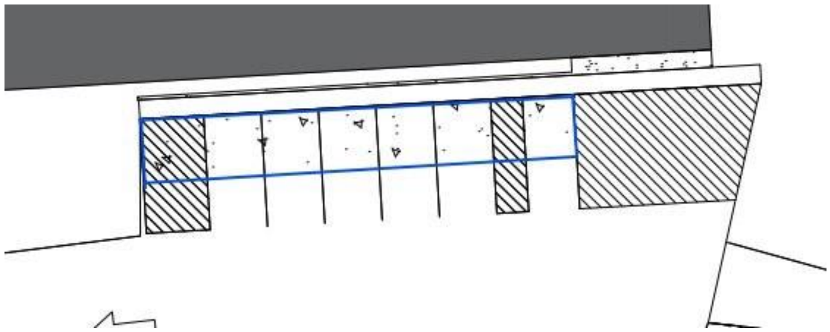


Figure A.7 Built-up section of parking lot

Erosion Prevention:

The east side of the building has long been prone to erosion due to the high volume and velocity of water flow in the area. In response, a retaining wall was previously installed to mitigate the erosion. However, this solution has since become problematic. The overland flow from the property to the east, as well as from several properties to the north of the community center, is contributing to significant erosion around the retaining wall. Below are three proposed solutions to address this ongoing issue.

1) Divert Source of Erosion – The significant amount of the overland flow of water is coming from the culvert to the north of the community center. Redirecting that flow could significantly reduce the erosion.

   Lowering the elevation of the current storm drain that is not capturing all the water through the culvert would reduce erosion. Existing grades would remain the same. This is an inexpensive alternative, but this would not account for the flow coming from neighboring properties and areas to the south of the drain so there is a possibility of erosion still occurring.

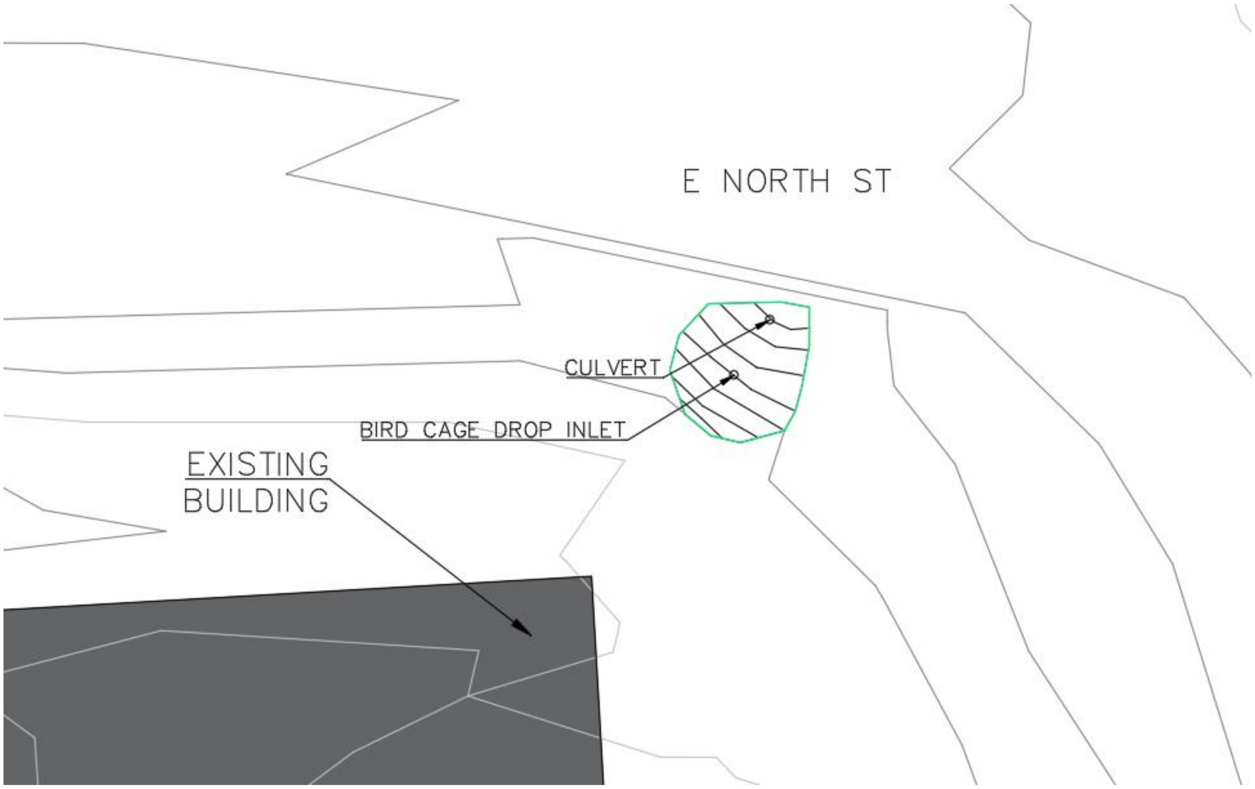


Figure B.1: Proposed Updated Drain Surface

2) Reduce Overland Flow with Underground Tiling – Divert overland flows with an underground tiling system

   The tiling system would pull water in so that it would drain to avoid erosion of the area. It would require site work and would not be the most cost-effective option but would leave existing grades the same. This may not be the most effective method since most of the flow causing the erosion is overland flow.

3) Controlling Flow with a Swale – Adding a Swale on the East Side of the Building

   A swale would give the water runoff from neighboring areas a place to collect and be sent directly to the stream at the south of the site. It would require minimal earth work on the site and gives the opportunity to redirect runoff away from the building. Erosion could occur on the southern part of the swale due to the increased flow and lack of grass in shadier areas.

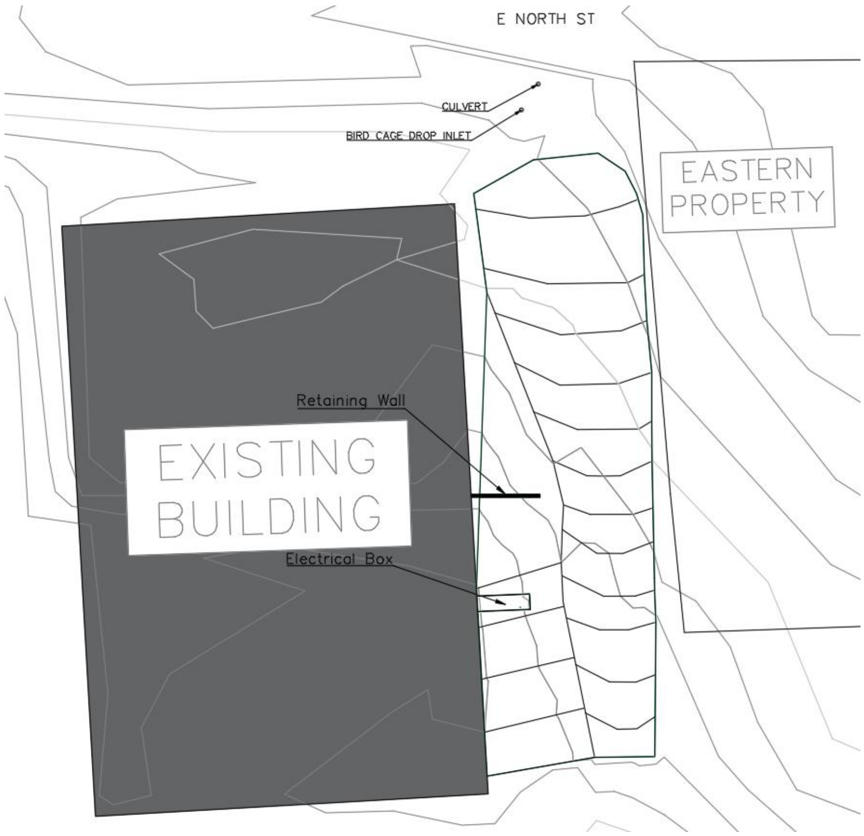


Figure B.2: Proposed Swale Surface

Façade of Building:

This section describes the various design alternatives for the front entrance facade. These alternatives were not chosen based on cost effectiveness and the clients' preferences.

1) Move Front Entrance – Moving the front entrance to the south side part of the entrance area of the building.
   Moving the door to the south side of the entrance area would prevent the wind from damaging the doors. A new sidewalk leading to the entrance would need to be added.
2) Sliding Doors with an Automatic Sensor – Removing the front entry way and replacing it with automatic sliding doors.
   Sliding doors would prevent damage to the doors from the wind and they would be ADA accessible. The cost of this alternative is more expensive than simply making the current doors swing open but would give the entrance a new and modern look.
3) Adding walls to the entrance and an ADA button – The wall would block winds from opening and closing the doors and be ADA accessible.
   The walls would be placed along the existing entrance and extend towards the parking lot. This would block the winds, but the current sidewalk and parking stalls would need to be shifted away from the building. The ADA button is still needed but would be more cost effective than putting in sliding doors.

Interior Layout:

This section describes the design alternatives for the interior layout of the building. They fulfill the project scope but were not chosen as our final design.

1) Adding Enclosed Partition Room – Separate the weight room and the game room
   Creating a partition room/ game room that separates the weightlifting area from the rest of the entertainment area. This would maintain access to the bathrooms and allow for a more obvious distinction between facility uses. Different materials like glass panels can be installed to allow for more visibility into the room. Construction of a partition wall could limit use of both areas during time of construction.
2) Addition of Partition Wall – A wall that divides the existing weight room and the game room.
   This wall would extend across to the west side of the room. The wall would not prevent any noise between the two but would give privacy for the visitors. Concerns about blocking access to the bathroom within the first floor to the gym expressed by the client prevented this design from being executed.
3) Upstairs Entrance – Adding furnishings to offer more space for visitors to congregate.
   Including furnishings on the upstairs balcony and in the open area in front of the balcony could give guests more room to enjoy. This could also take up too much space and make the room less flexible for different uses.
4) Adding Windows to the Entrance Wall of the Ballroom
   Adding windows to the wall would give guests a chance to see in and out of the room, making it feel like there is more space. Windows can be expensive, but the wall is not loading bearing, meaning that any work done to it won't affect the strength of the building.

Section VI | Final Design Details

Parking Lot

This section describes the final design for the parking lot to address the issues with traffic congestion and ADA standards described in the scope.

Re-Striping Layout

The final recommendation to improve the traffic congestion is to redo the layout of the parking stall found in Figure A.8. The new stalls will be at 60-degree angles with one-way drive aisles. The dimensions of the parking stall and drive aisles were based on SUDAS design requirements found in Appendix A: Figure A.1. One-way traffic allows for narrower aisles than two-way. This will result in an increase in parking stalls and more directed traffic in and out of the parking lot. The directed traffic aisles will help to prevent drivers from getting stuck during high traffic times. This design does not alter the original dimensions of the parking lot.

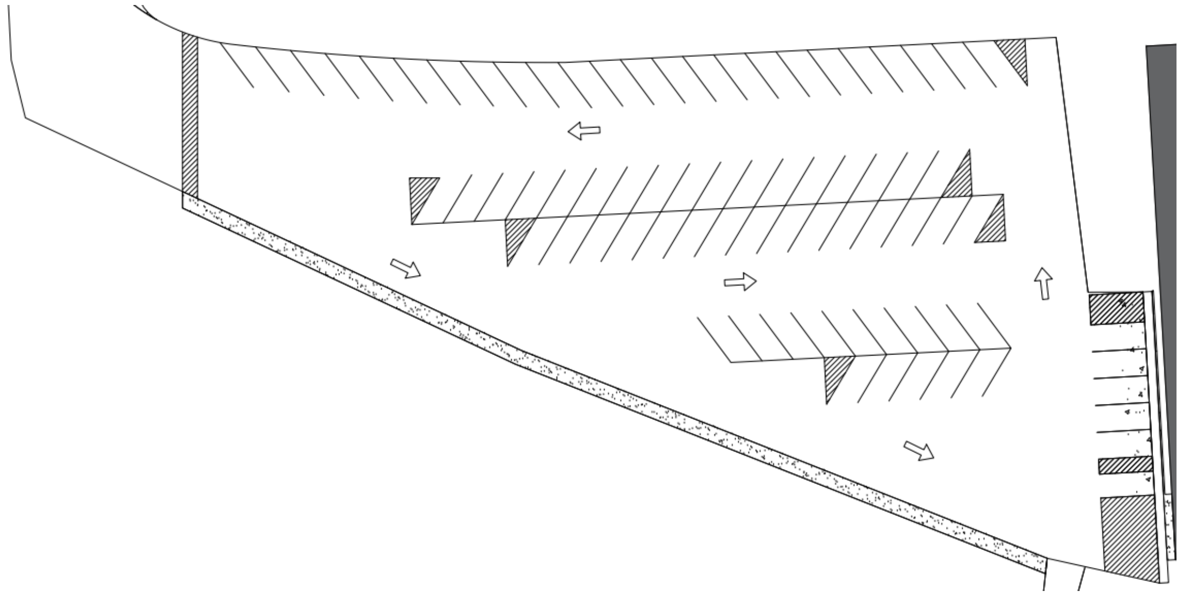


Figure A.9: Profile of built-up section

Built-Up HMA Pavement

The existing pavement is approximately 2" lower than the edge of the sidewalk next to the building. Due to ADA guidelines, the pavement needs to be flush with the sidewalk. The final design recommendation is to build up the pavement at a slope, making it flush with the edge of the sidewalk. This alternative requires minimum pavement alterations. To determine the amount of HMA overlay needed, existing elevations were taken from the IowaDNR database. The slope was determined to be 2% comply with ADA guidelines set by SUDAS Chapter 12 Section 12-A-2-3. To maintain this slope and match current elevations, a length of 6.67 feet will extend from the sidewalk out towards the parking lot. A plan and profile of this section can be found in Figure A.7 and Figure A.9. This provides a side view of what the pavement section would look like after cutting through it. The triangle on top is the overlay pavement added to be flush with the sidewalk.

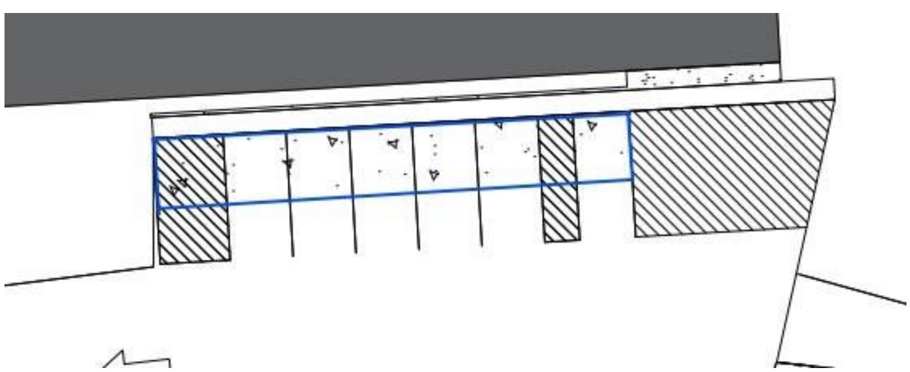


Figure A.7: Built-up section of parking lot

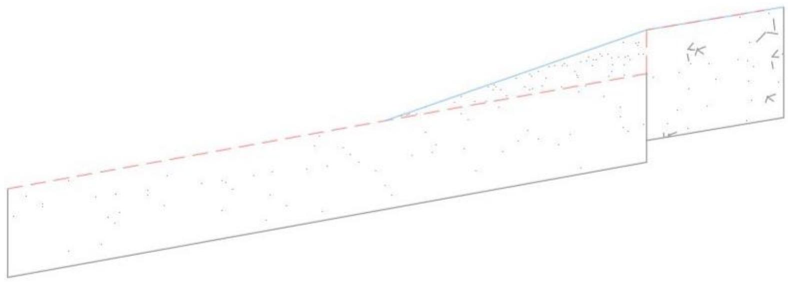


Figure A.9: Profile of built-up section

Extension of Entrance

The final design for the parking lot is to expand the entrance. The current entrance is not wide enough for cars to enter and exit simultaneously. Having a wider entrance will allow for this to happen while preventing congestion. The addition of a radius to the driveway will also allow more room for vehicles turning in and out. A minimum radius of 15 feet is common practice to allow larger vehicles enough room to turn and was chosen for this design. A closer image of the driveway can be found in Figure A.10.

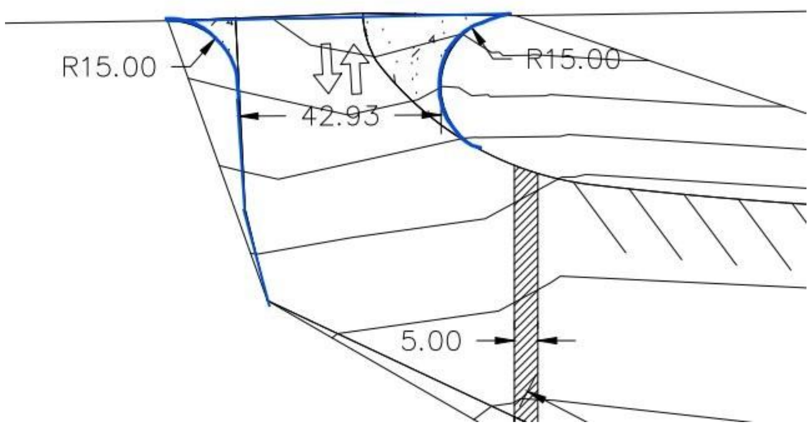


Figure A.10: Driveway design

Sidewalk

Based on client feedback, a sidewalk is also proposed to be added to the south of the parking lot, this design can be found in Figure A.11. This sidewalk will allow pedestrians using the trail to walk across the parking lot safely. The crosswalk will give pedestrians a designated place to cross, improving their safety. The width of the sidewalk was determined at 5 feet by SUDAS guidelines found in Appendix A: Figure A.2. A crosswalk at the same dimension is proposed to be placed at the end of the sidewalk to provide pedestrians a safe crossing area.

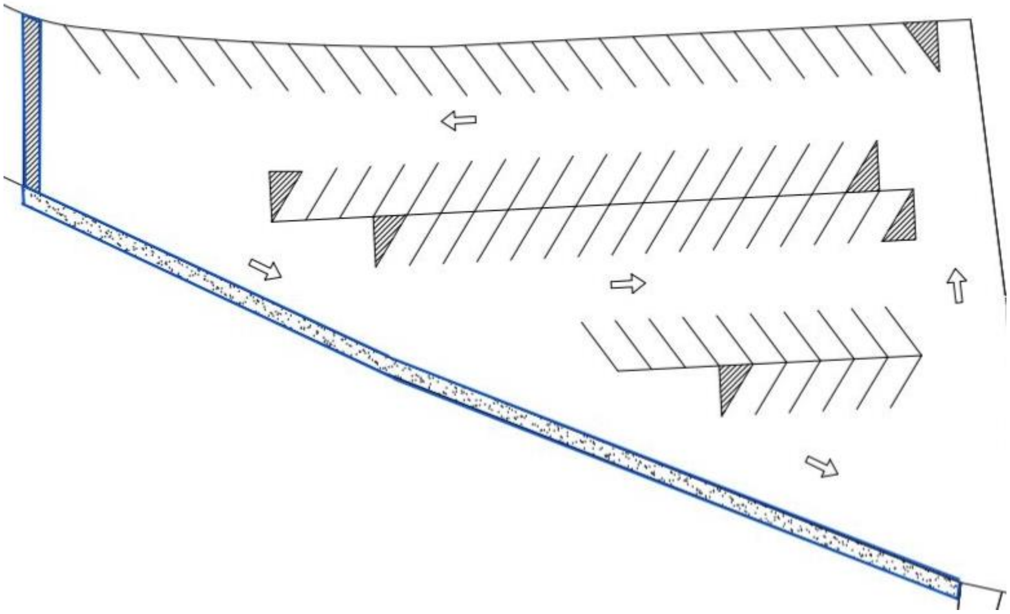


Figure A.11 Sidewalk design

Erosion Control

Swale Installation

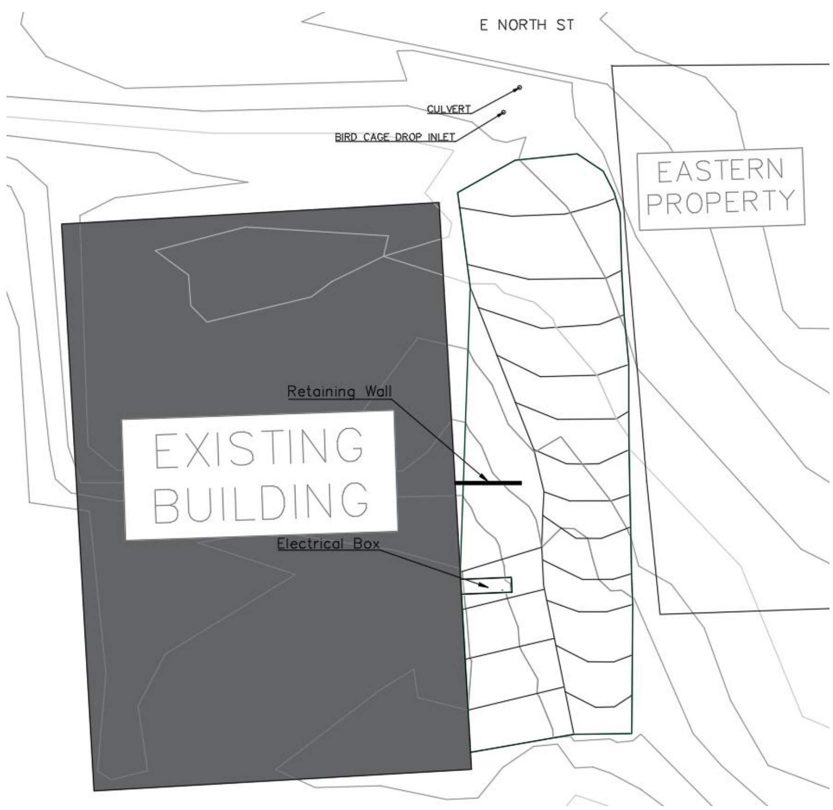


Figure B.2: Proposed swale surface

The final recommendation for controlling the erosion around the edge of the retaining wall is to create a swale to the east of the community center. A swale is similar to a ditch where a very shallow path is created so the direction of flow is controlled. The swale is designed to pull flow away from the erosion wall and move it to the south of the community center. In Figure B.2 the proposed swale surface contours are shown next to the existing building. The contours each represent an elevation above sea level and change by a height of two feet for each contour.

Original Flow Paths

An analysis of the flow paths was performed in Civil 3D as can be seen in Figure B.7 within the appendix. Analyzing the flow paths was completed in Civil 3D to determine where the overland flow will be coming from. In Figure B.7 the red crosses represent where a raindrop will hit the ground, and the blue lines represent the flow path of that raindrop. The origin of the flow was used to estimate the catchment area. The catchment area was split into two different parts: north of the culvert and south of the culvert.

Erosion Velocities

The USGS Soil Survey website was used to find the soil type of the catchment areas. Using the rational method as specified in the Iowa SUDAS manual section Chapter 2B-4 to estimate the peak flow of 3.05 cubic feet per second from a 1.31-acre drainage basin for a 5-year storm event; using the Hydraflow Express Extension for Autodesk. This was done for both the southern and the northern catchments. SUDAS recommends using a time of concentration of 15 min at a minimum. Calculation inputs can be seen below in Figures B.3, B.4, B.5, and B.6.

Areas of flow were estimated within the swale based on updated raindrop paths which showed the new overland flow route. A combination of the two flows from the north and south catchments found no flow paths with a velocity over 3 ft/s which would cause erosion. There is a concern for erosion towards the southern part of the swale where there is little vegetation. This can be solved by laying river rock that is .5-2 inches in diameter. This diameter estimation was found using the equation in Figure B.12.

The ground from the building to the East side of the swale will tie in at a constant slope as is shown in Figure B.9. The existing ground to the west of the electrical box will remain the same and will tie in on the north and south sides.

Final Flow Paths

The final flow paths from the proposed swale surface are shown in Figure B.8. The flow paths are redirected away from the retaining wall and will flow to the south of the existing building.

Swale Characteristics

The swale has been designed to be approximately 175-feet long. This length is comparable to the length of the community center. It is on average approximately 50 feet wide. The average depth of the swale is approximately 5-inches deep. The total area of the swale is roughly .195 acres. The swale has an average longitudinal slope of 5 % and an average latitudinal slope of 5.75%.

Front Facade

Automatic Sliding-Door

The current condition at the entrance is not ADA compliant and winds from the North cause repetitive opening and slamming of the existing doors. During a site visit, the wind damage to the door frames was very apparent and would not allow the left door to properly close. These conditions led to our decision to install automatic sliding doors, as they will solve both issues and eliminate the possibility of wind damage in the future. As seen in Figure C.3, the installation of the automatic sliding door will not require the entrance to be relocated and there will be minimal construction impact.

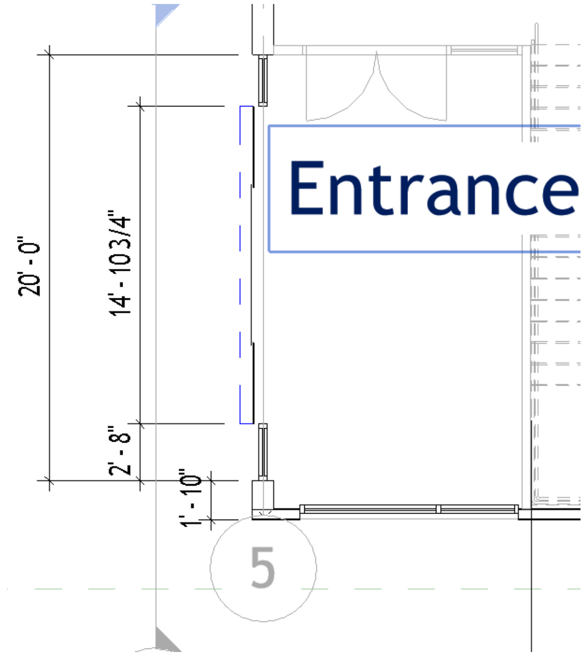


Figure C.3: Plan view of sliding door at entryway

Although the cheapest option would be to simply install an automatic push-button door system to meet ADA requirements, this would not eliminate existing wind damage. For this reason, the final design of the facade will include the addition of a 14' - 10 ¾" automatic sliding door. However, there will still need to be an additional push button installed after entering the facility for the entrance into the facility to meet ADA compliance. See Appendix C for profile views on the sliding door.

Interior Layout

Game Room

As seen in Figure D.1, the existing conditions of the first-floor layout do not provide true separation between spaces that are used for different purposes and by different populations. Although the current curtain reduces distractions between the recreational gym area and the gaming area, the client would like to better separate each space.

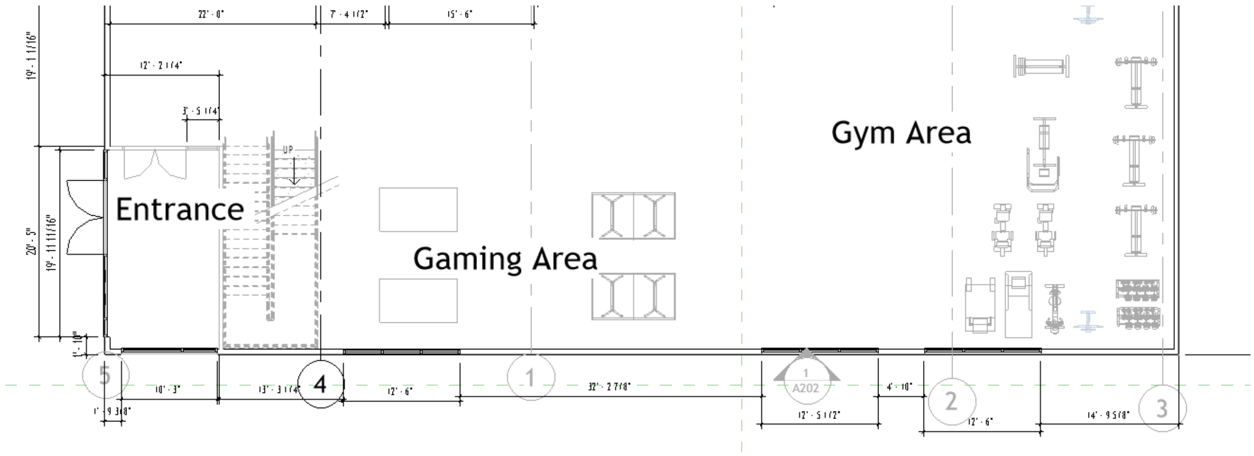


Figure D.1: Existing first floor conditions

For this reason, we recommend the installation of a game room that consists of a 2-hour fire-rated wall partition and glass panel system. The basis of this design and material selection comes from the eleventh edition of the Architectural Graphic Standards, Chapter 3, Element C, Partitions. The east and west walls will both consist of 5” interior partitions, with a 2-hour fire rating. The game room will be 40-ft long with a width of 20-ft. This will allow the room to maintain enough space for two standard-sized pool tables, as well as two standard-sized ping-pong tables. Based on initial concerns to maintain visual contact with the youth who would use the gaming room, the north and north-east corner of the gaming room will consist of a glass-panel system. This will maintain visibility from the front desk and further reduce the risk of any disturbances. See Appendix C for proposed game-room cross sections.

According to Chapter 3, occupancy Classification and Use of the International Fire Code (IFC), the game room will not be classified as a “larger room” because it does not have a square footage area that exceeds 12,000 sq ft. This prevents the need to install an automatic sprinkler system within the room, and a fire extinguisher will provide sufficient fire protection.

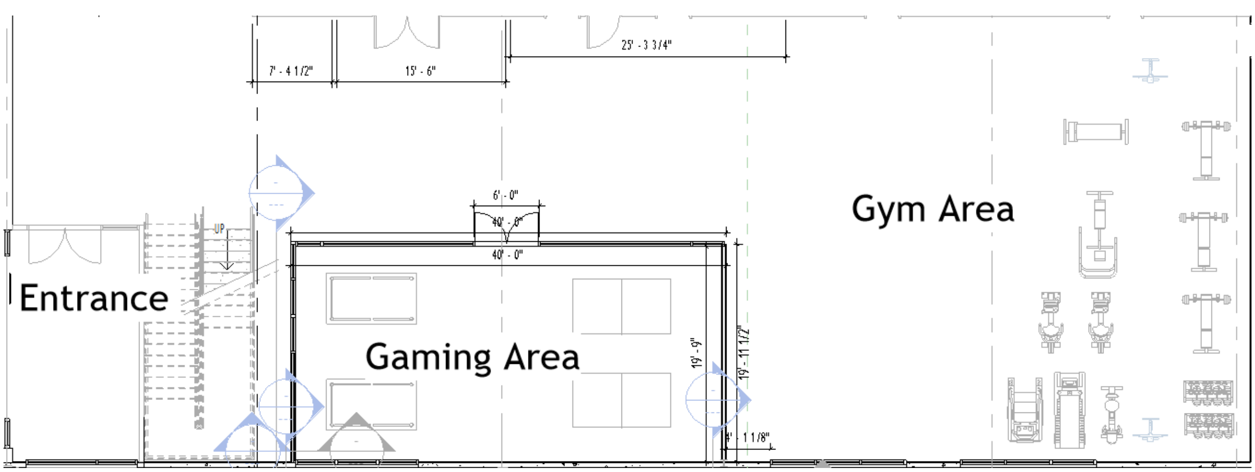


Figure D.2 Proposed Game Room Within First Floor

The existing HVAC system drove the decision to not have the room extend entirely to the second floor. Instead, the room will have a height of 10-ft, with a 5-ft clearance to avoid existing HVAC systems, as well as lighting fixtures. The game room will have vertical supports, with metal inserts for additional strength, that will run from the first floor to the ceiling. Connection details are located in sheet A7. See Appendix D for proposed gym-room cross sections.

Second-Floor interior windows

The current second floor layout has an outside deck that overlooks the parking lot, as well as an open area just before entering the main meeting area. The client expressed a desire to have more use of this entrance space and have a better connection between it and the meeting area. Based on these desires, we recommend installation of a glass-panel opening to allow better visibility into the meeting area; this will allow natural light into the meeting room and provide a sense of continuity between the two spaces.. The glass-panel system will match the existing height of the door into the meeting area at 7-ft 2-in, and will have a width of 15-ft.

The dimensions of the wall were selected after contacting manufacturers who informed us that a wall taller than 10-ft would require a metal insert for strength purposes. To avoid further expenses, it was decided to match existing door heights within the building. Figure 4D shows the location of the proposed window panel system in reference to the existing door into the general second-floor meeting area.

Section VII | Engineer's Cost Estimate

The final cost estimate includes materials, construction cost, and labor from RSMeans cost estimate book. These values are based on 2024, and costs may increase with inflation if the project is completed in the future. The facade estimate was found after coordinating with a local fabricator, BasePoint Building Automations. The estimate was only based on our knowledge of the issues and pictures from the site visit. The estimate for the interior partition for the recreation room is from Commerical Glass Partitions (CGP). The extra fees at the bottom of the estimate including the contingencies and factored allowances will account for any additional design or fees that might occur during construction. These could be due to changes in scope, risks, or other events that would require additional costs.

Fabricators Contact Information:

BasePoint Building Automations

Contact Person: Todd Lamphier

Phone Number: (319)-269-8211

Email: tlamphier@basepointba.com

Commercial Glass Partitions (CGP)

Contact Person: Alina

Phone Number: (855)-692-7860

Email: dispatch@cgp.nyc

Category	Item	Quanitity	Units	Unit Price	Total
Site Work					
	Demolish Concrete Sidewalk	32.5	SY	$28.50	$930.00
	Concrete Sidewalk (5')	94	LF	$43.50	$4,100.00
	Rubber and Paint Removal from Paving	1949.5	CLF	$3.96	$7,725.00
	Pavement Marking Arrows	177.5	SF	$10.95	$1,950.00
	Pavement Parking stall	77	Stall	$12.05	$930.00
	Handicap symbol	3	Each	$72.50	$220.00
	2 1/2" thick HMA	103.8	SY	$13.95	$1,450.00
	Fill	157.44	BCY	$28.00	$4,400.00
	Excavation	29.44	BCY	$9.25	$275.00
	Riprap	45.2	LCY	$87.50	$3,975.00
			TOTAL		**$25,955.00**
Facade Cost					
	Automatic sliding door	1	Each	$15,000.00	$15,000.00
	Automatic push-button and installation	1	Each	$1,500.00	$1,500.00
	Store-front double door and installation (southside)	1	Each	$2,500.00	$2,500.00
	Recreational Room	1	Each	$7,600.00	$7,600.00
	Material Shipping	1	Each	$1,050.00	$1,050.00
	Second-floor window system	1	Each	$2,850.00	$2,850.00
	Material Shipping	1	Each	$950.00	$950.00
	Forklift rental	1	Day	$349.00	$350.00
	Standard hollow metal frame (3'-0" - 7'-0"); labor included	1	Each	$425.50	$425.00
	Pair of 3'-0" x 7'-0" commercial alumnimum doors (flush, no glazing)	1	Each	$940.00	$940.00
	Electric swing door operator and control, single door w/sensors	1	Each	$4,521.00	$4,525.00
	Aluminum sliding glass door system - 8' wide opening biparting	1	each	$13,385.00	$13,400.00
	Fiberboard sound deadening panels, 1/2" thick	310	SF	$1.14	$350.00
	Partition wall 1/2", interior, gypsum board, std, tape and finish 2 sides Installed on and inc., 2" x 4" wood studs, 16" OC (6" wide)	310	SF	$4.93	$1,525.00
	Gypsum lath (1/2" thick)	33.5	SY	$10.42	$350.00
	Gypsum veneer plastering (3/8" thick with thin coat plaster finish)	310	SF	$1.85	$575.00
	Gym room				
	Fiberboard sound deadening panels, 1/2" thick	48	SF	$1.14	$55.00
	Partition wall 1/2", interior, gypsum board, std, tape and finish 2 sides Installed on and inc., 2" x 4" wood studs, 16" OC (6" wide)	48	SF	$4.93	$240.00
	Gypsum lath (1/2" thick)	5.5	SY	$10.42	$60.00
	Gypsum veneer plastering (3/8" thick with thin coat plaster finish)	48	SF	$1.85	$90.00
			Total		**$54,335.00**
Architectural Fees		1	Project	4.90%	$2,675.00
Construction Management Fees		1	Project	7.50%	$6,025.00
Engineering Fees		1	Contract	2.50%	$2,000.00
Contingencies		1	Project	10.00%	$8,025.00
Factors Allowances		1	Project	1.00%	$800.00
Permits		1	Project	0.50%	$400.00
			Total Project Cost		**$100,215.00**

*All cost estimation includes labor, materials, and equipment

Appendices

Appendix A: Parking Lot

Table 8B-1.02: Minimum Parking Dimensions

Parking Lot Dimension		Parking Angle (θ)				
		Two-way Aisle			One-way Aisle	
		90°	60°	45°	60°	45°
Stall Projection	SP	18’-0”	15’-7”	12’-9”	15’-7”	12’-9”
Aisle Width	A	24’-0”	25’-10”	29’-8”	20’-4”	21’-6”
Base Module	M_1	60’-0”	57’-0”	55’-2”	51’-6”	47’-0”
Single Loaded Module	M_2	42’-0”	39’-0”	37’-7”	32’-6”	29’-5”
Wall to Interlock	M_3	60’-0”	55’-10”	52’-2”	49’-4”	44’-0”
Interlock to Interlock	M_4	60’-0”	53’-8”	49’-2”	47’-2”	41’-0”
Overhang	o	2’-6”	2’-2”	1’-9”	2’-2”	1’-9”
Stall Width *8’-6”* Width Projection	WP	8’-6”	9’-10”	12’-0”	9’-10”	12’-0”
Stall Width *8’-6”* Interlock	i	0’-0”	2’-2”	3’-0”	2’-2”	3’-0”
Stall Width *9’-0”* Width Projection	WP	9’-0”	10’-5”	12’-9”	10’-5”	12’-9”
Stall Width *9’-0”* Interlock	i	0’-0”	2’-3”	3’-2”	2’-3”	3’-2”

Figure A.1: Sudas Parking stall dimensions

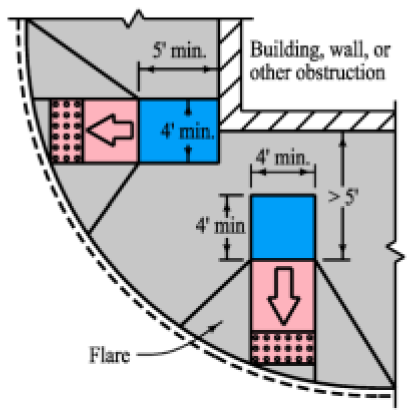


Figure A.2: Sudas sidewalk dimension requirements

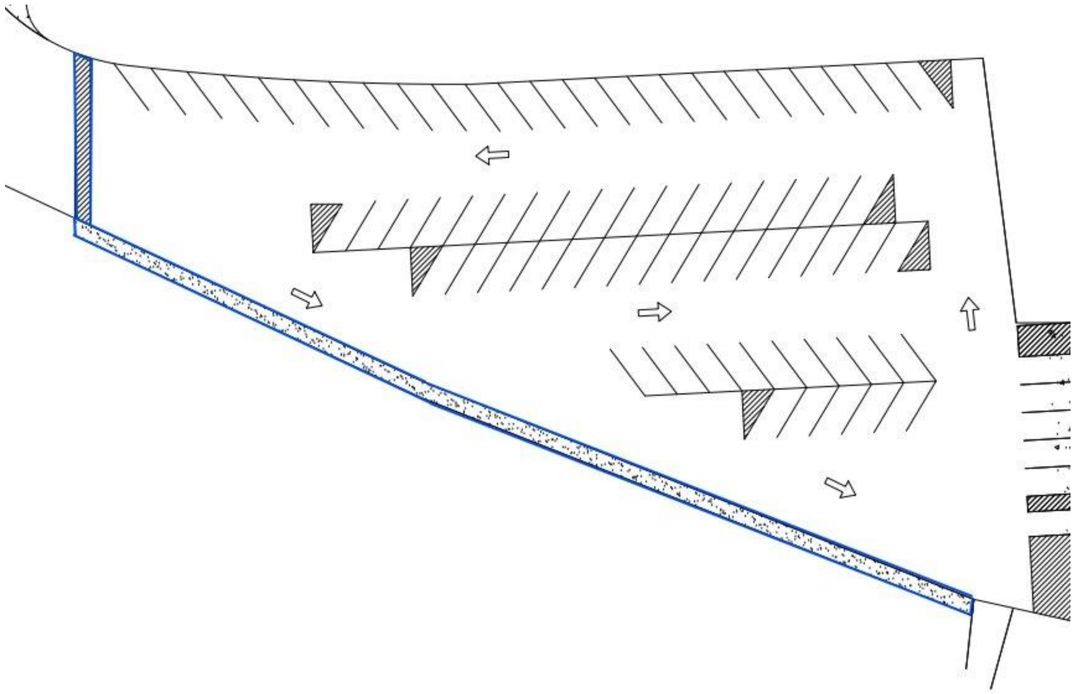


Figure A.3: Sidewalk design

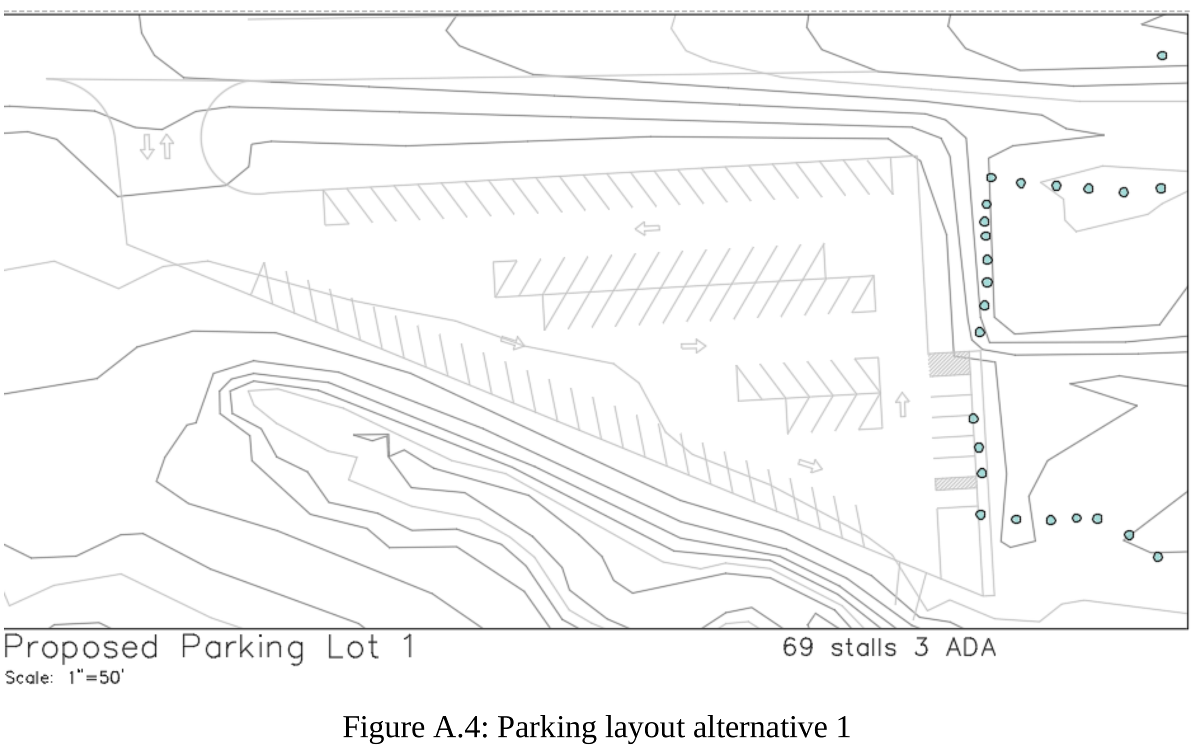


Figure A.4: Parking layout alternative 1

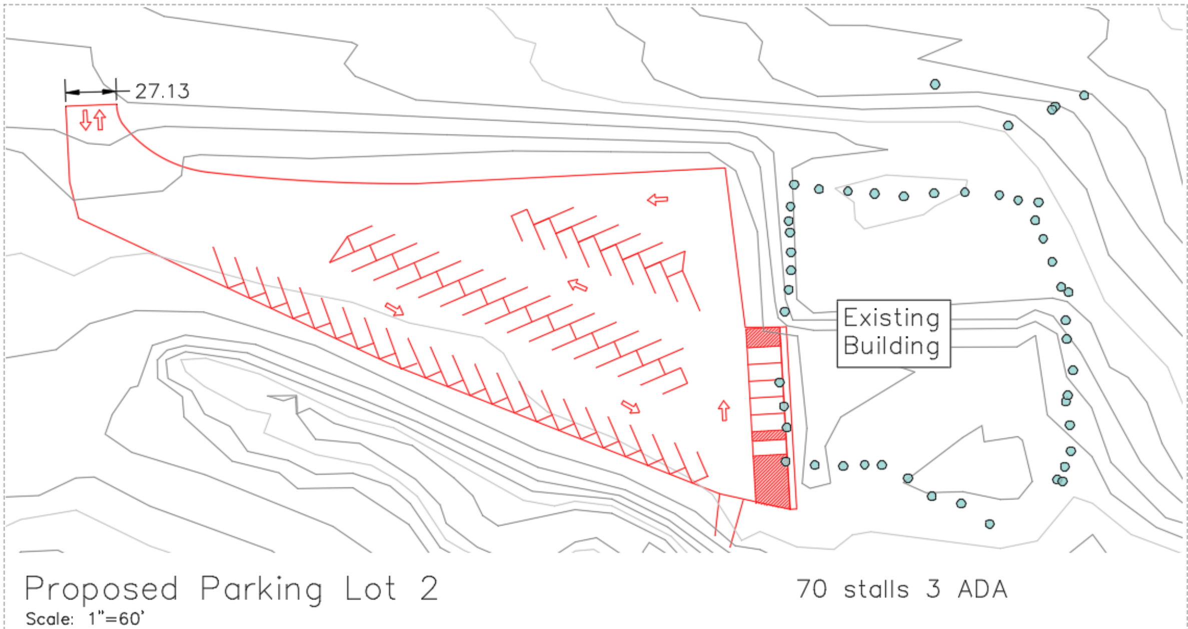


Figure A.5: Parking layout alternative 2

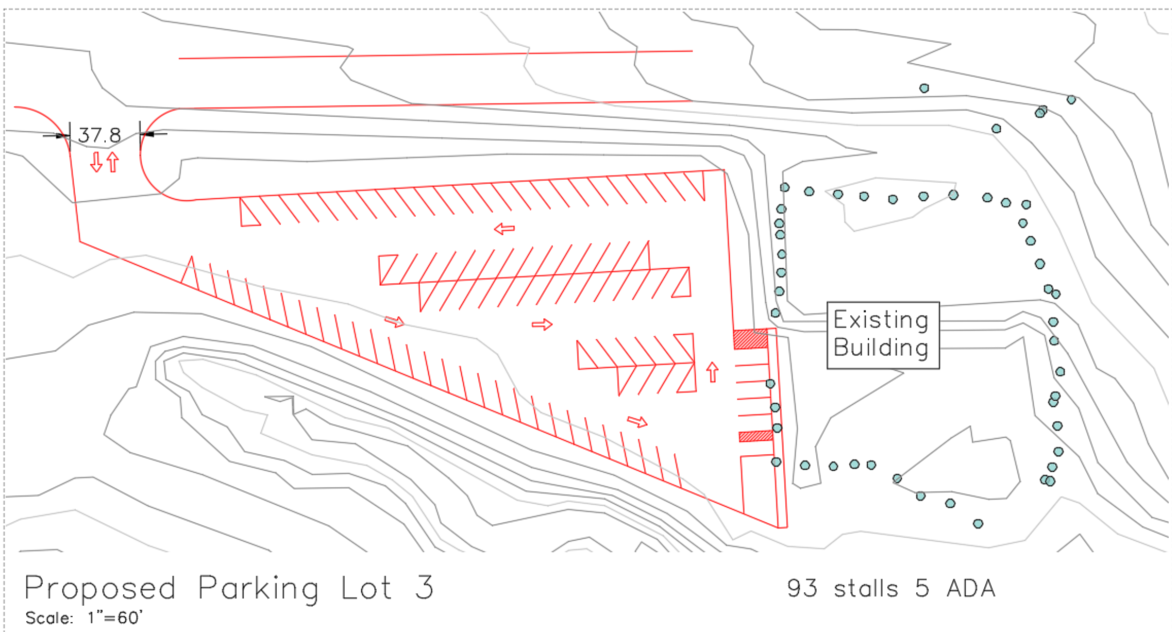


Figure A.6: Parking layout alternative 3

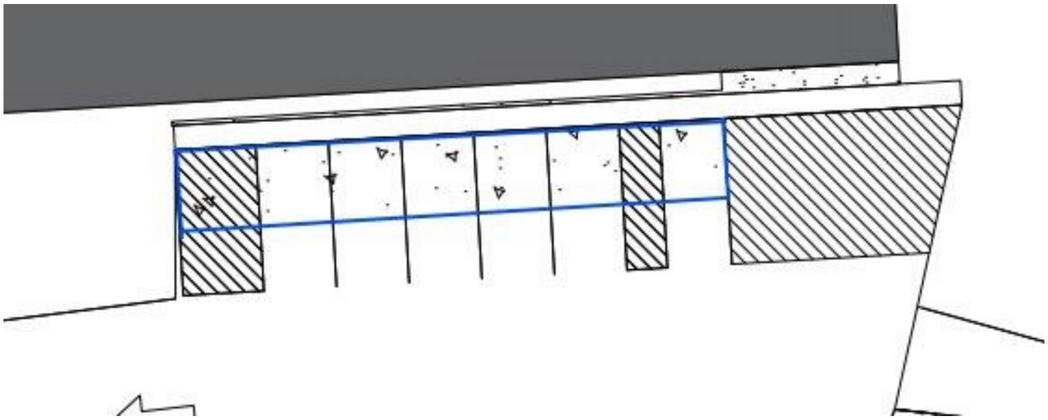


Figure A.7 Built-up section of parking lot

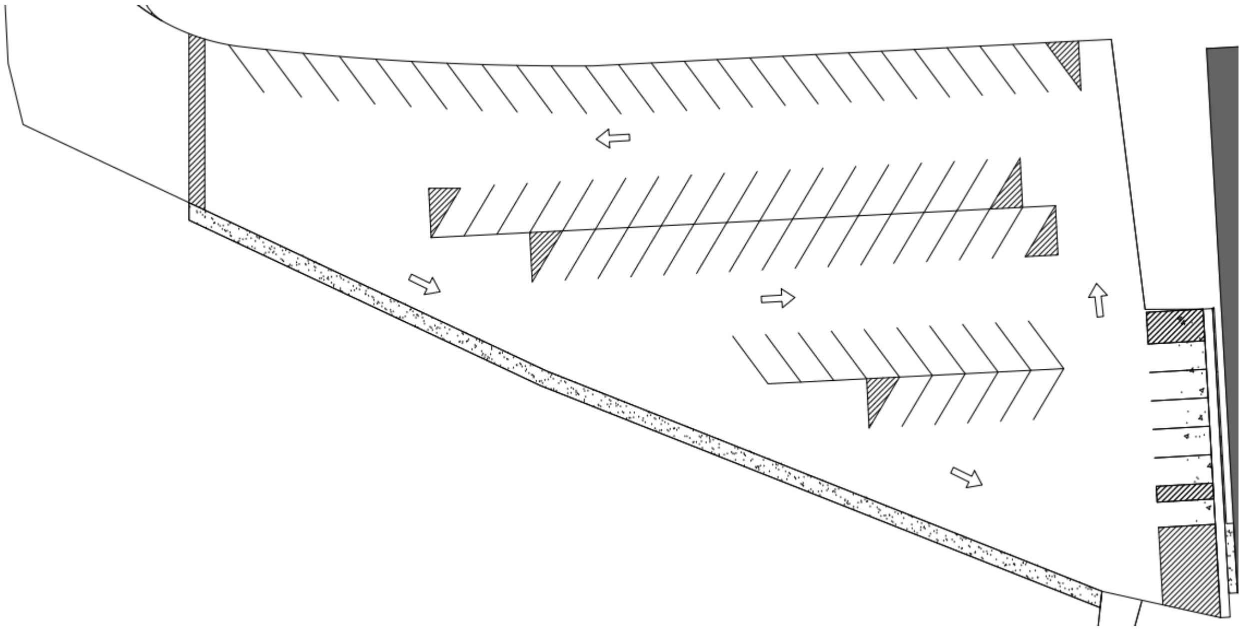


Figure A.8 Final parking layout design

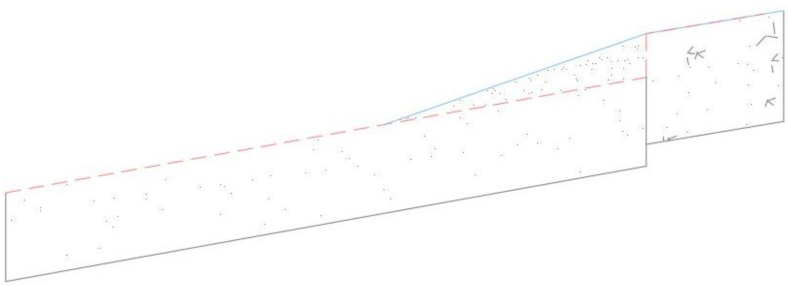


Figure A.9: Profile of built-up section

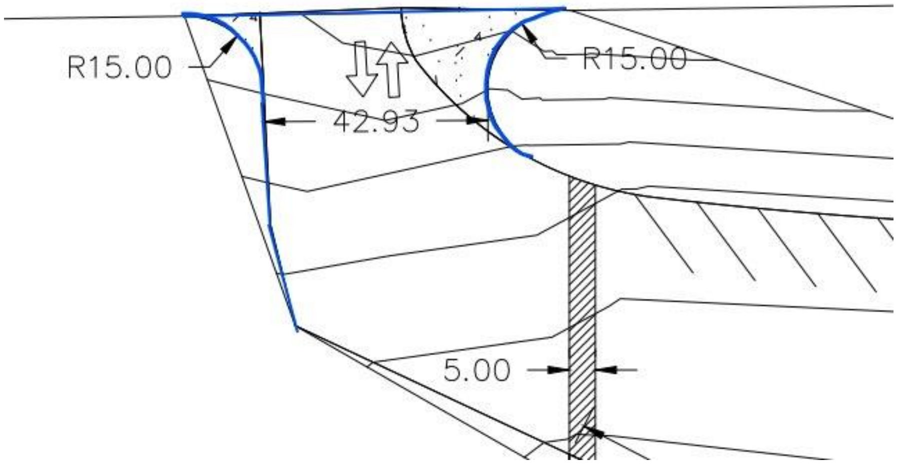


Figure A.10: Driveway design

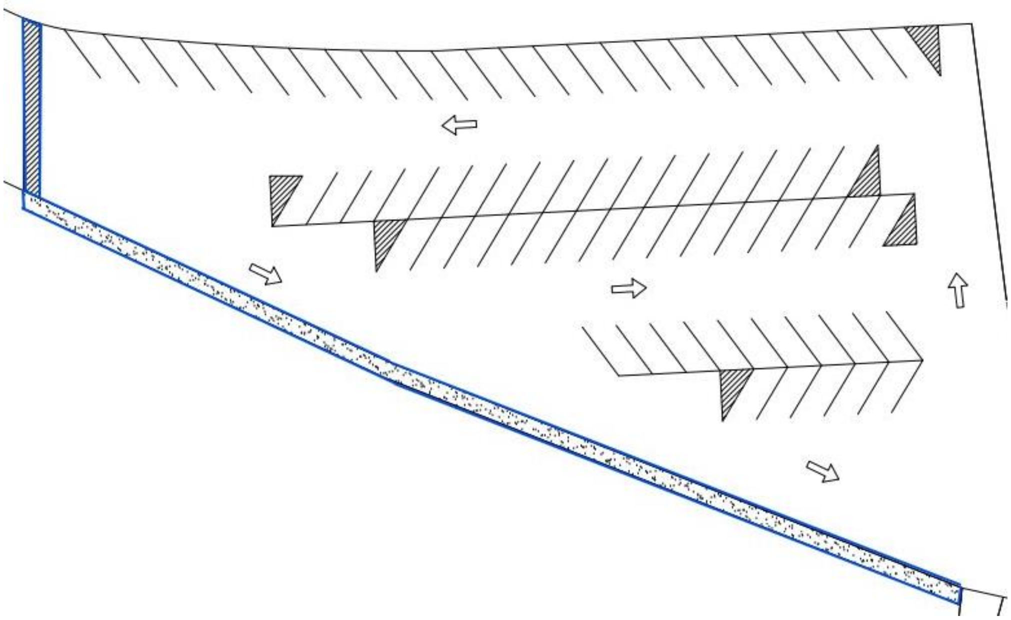


Figure A.11 Sidewalk design

Appendix B: Erosion Control

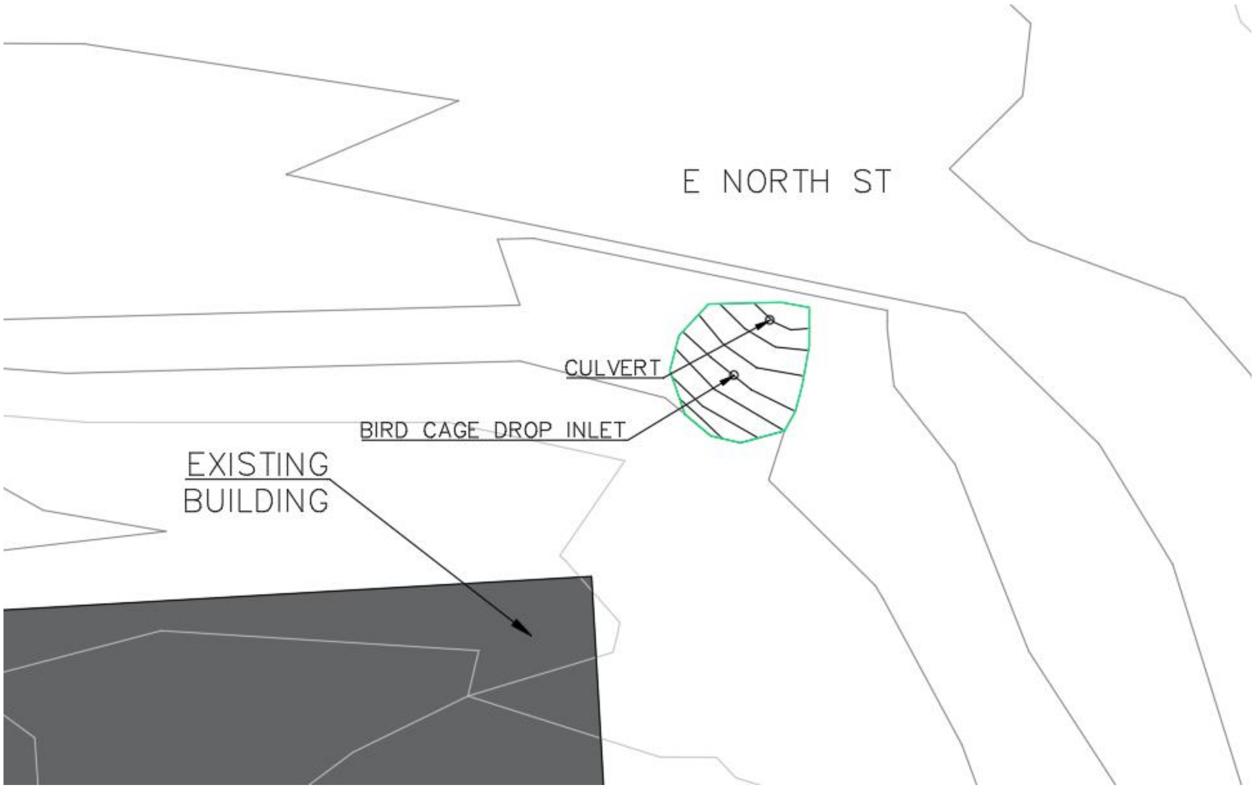


Figure B.1: Proposed drain surface

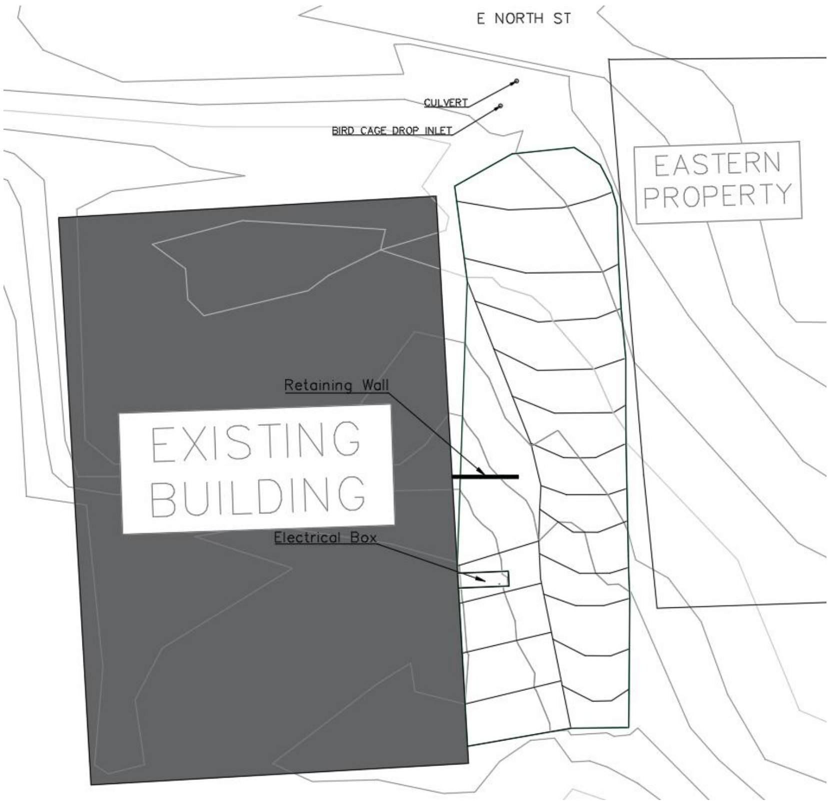
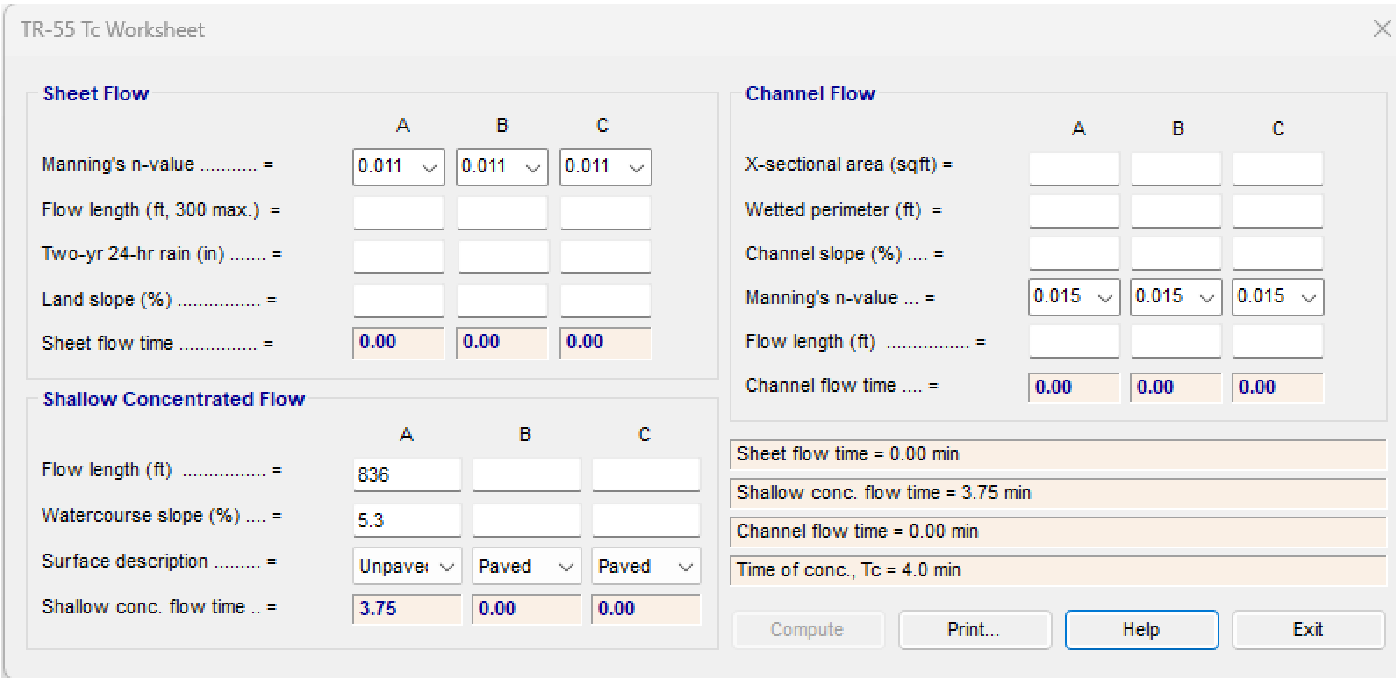


Figure B.2: Proposed swale surface

Figure B.3: Hydraflow Express southern catchment time of concentration calculation



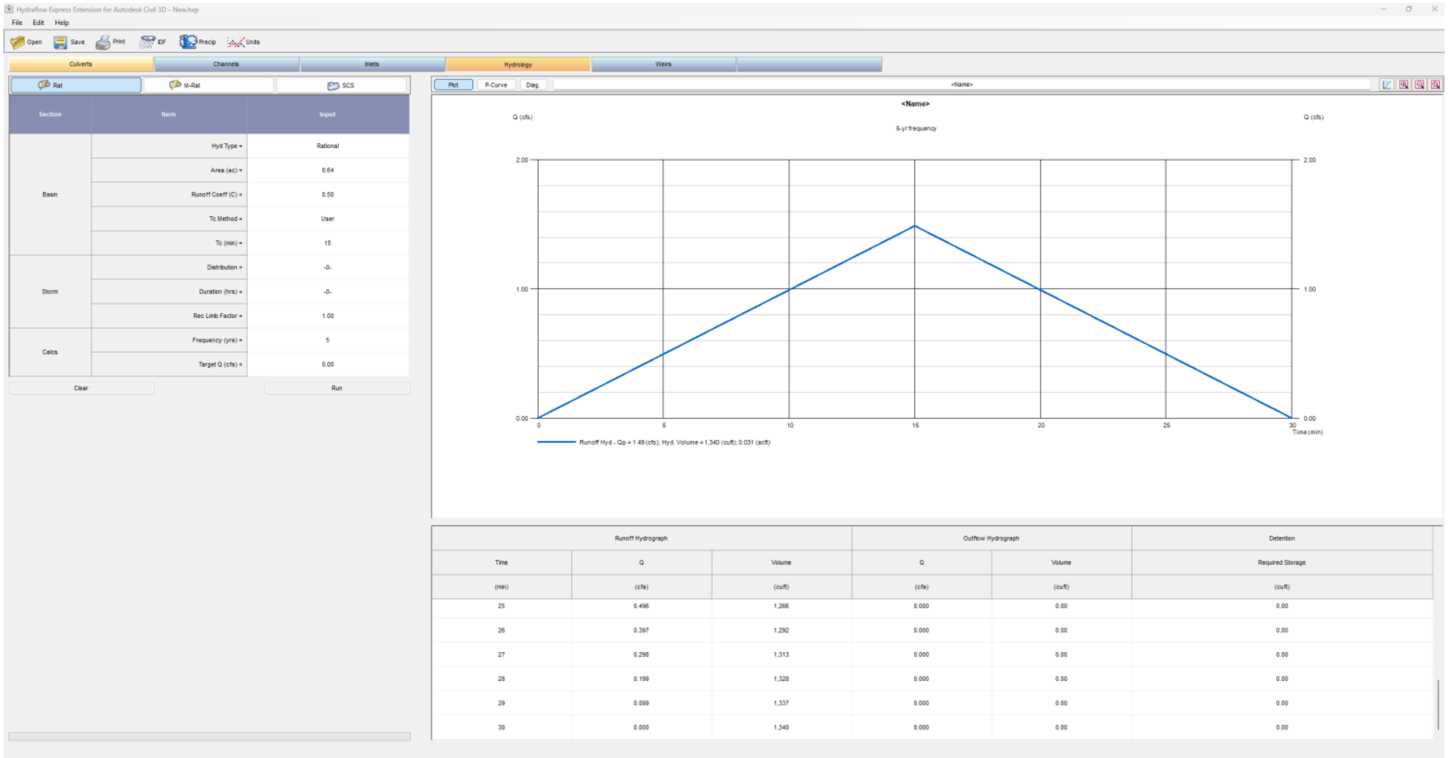


Figure B.4: Hydraflow Express southern catchment flow rate calculation

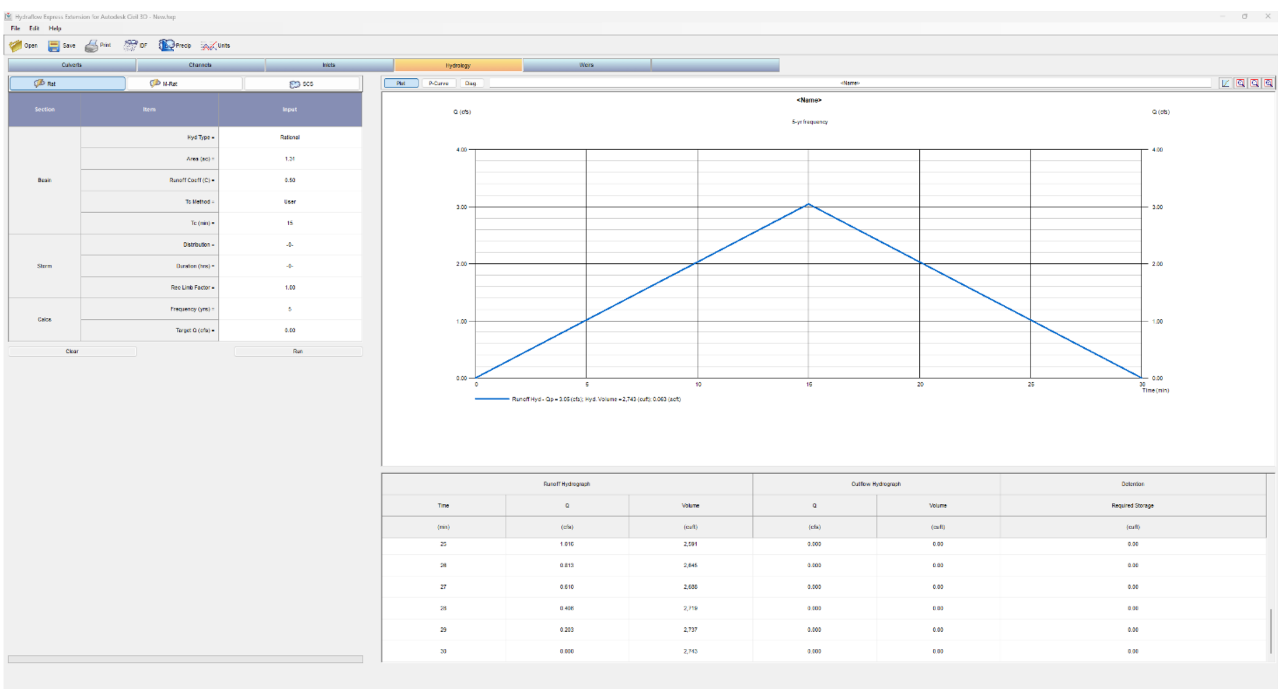


Figure B.5: Hydraflow Express northern catchment time of concentration calculation

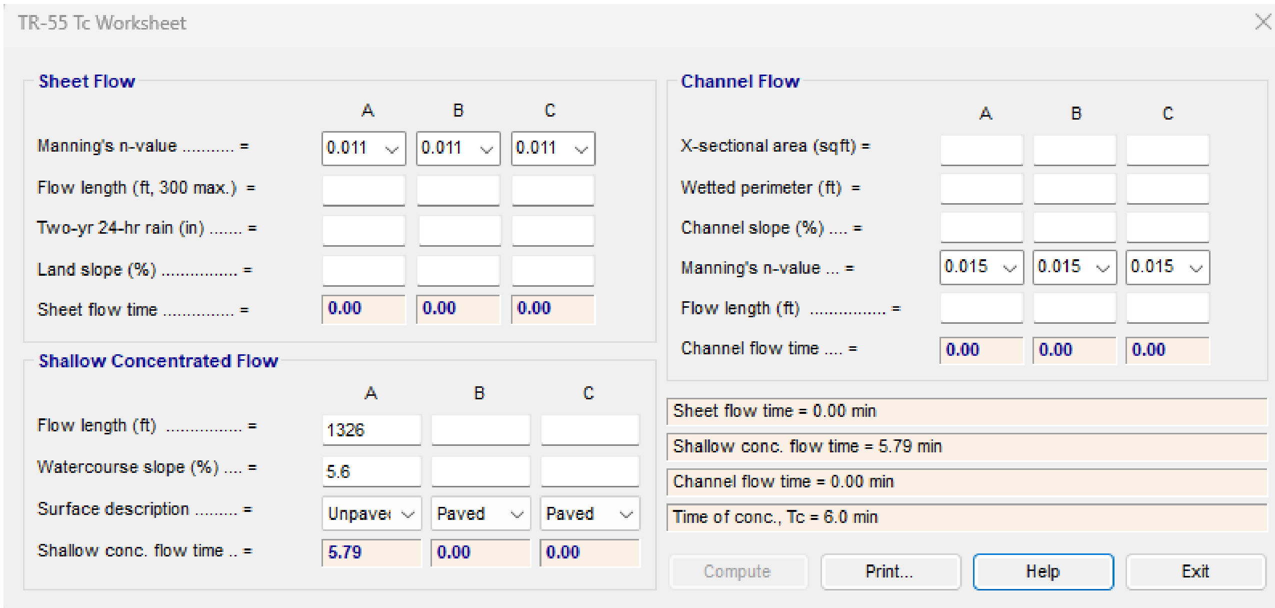


Figure B.6: Hydraflow Express northern catchment flow rate calculation

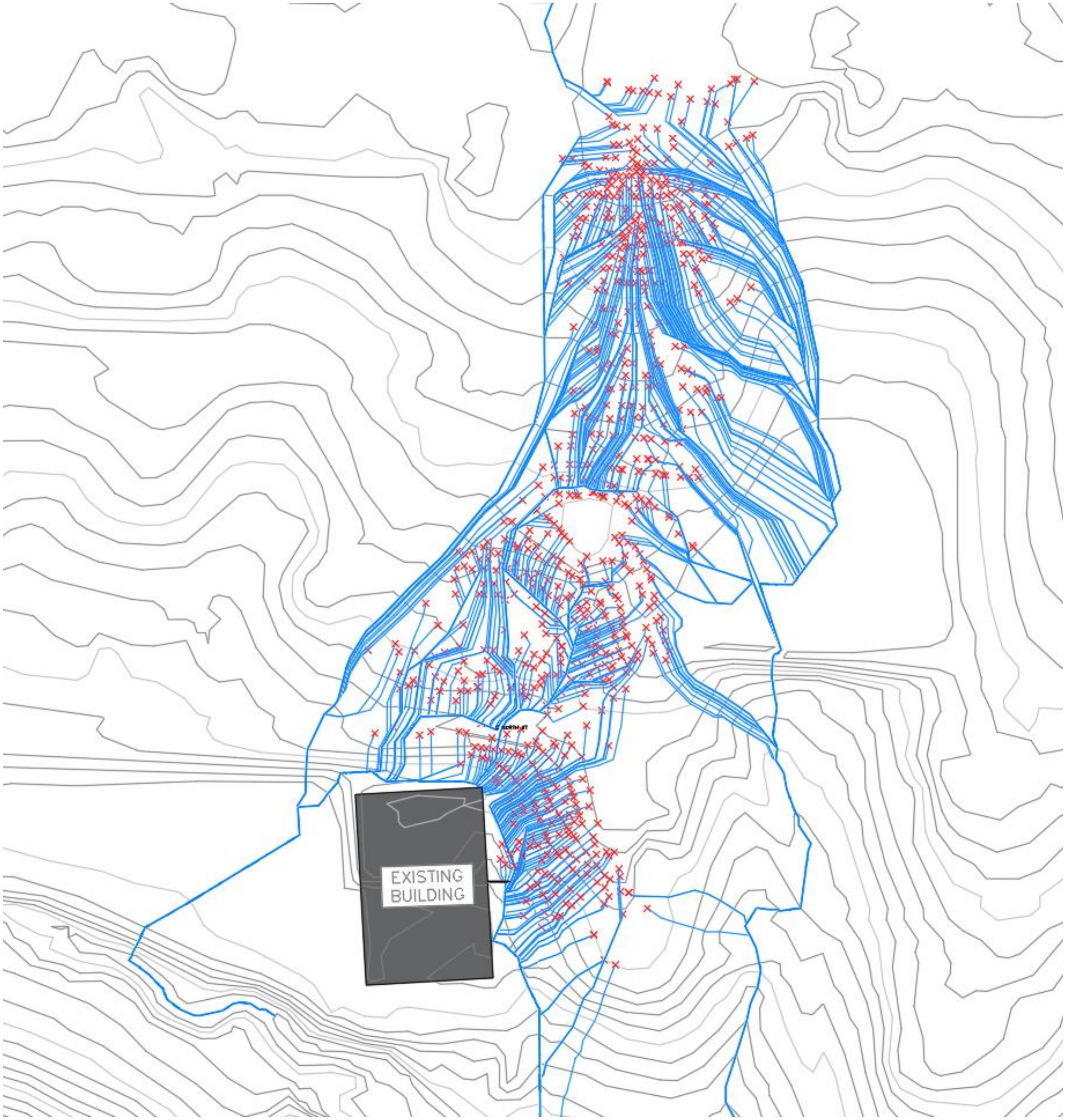


Figure B.7: Raindrops to determine flow paths

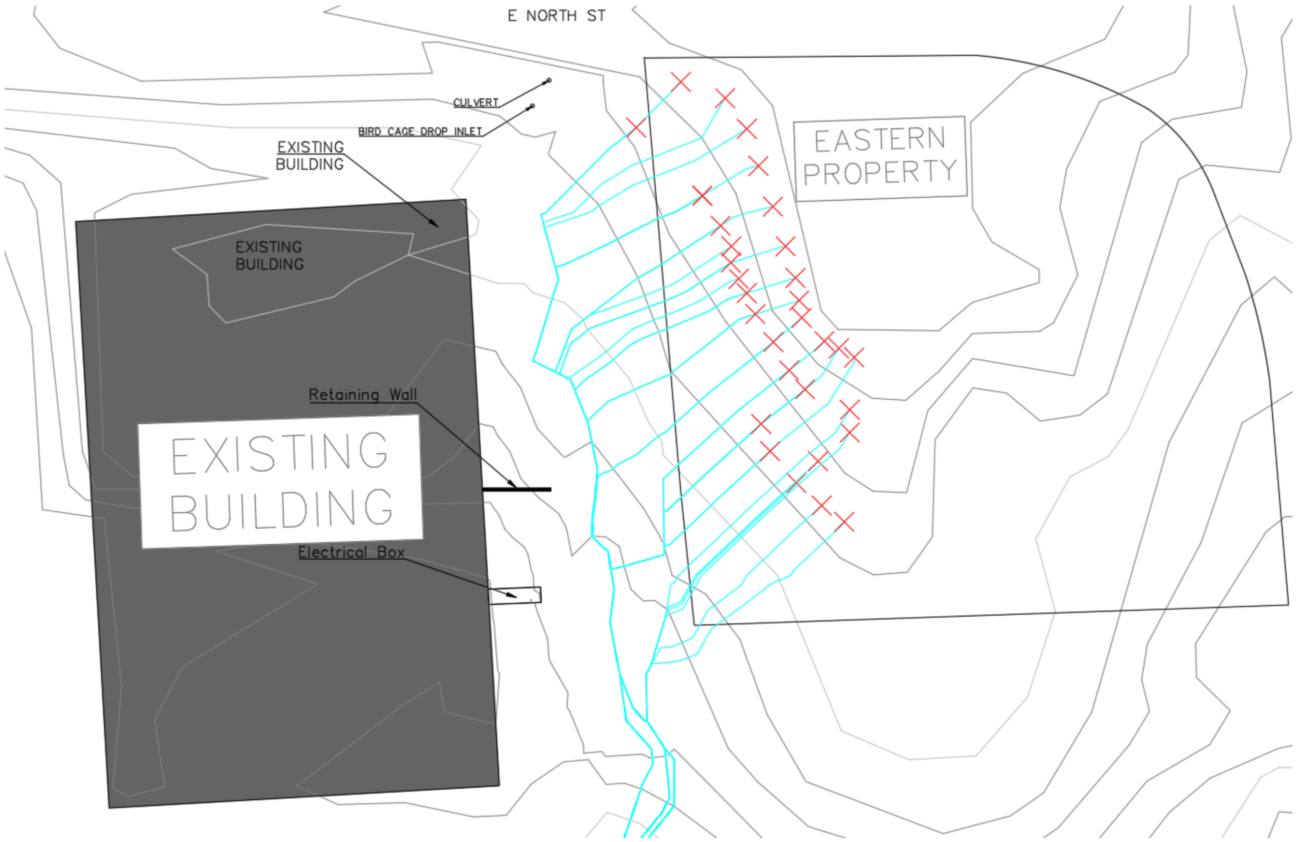


Figure B.8: Flow paths with swale

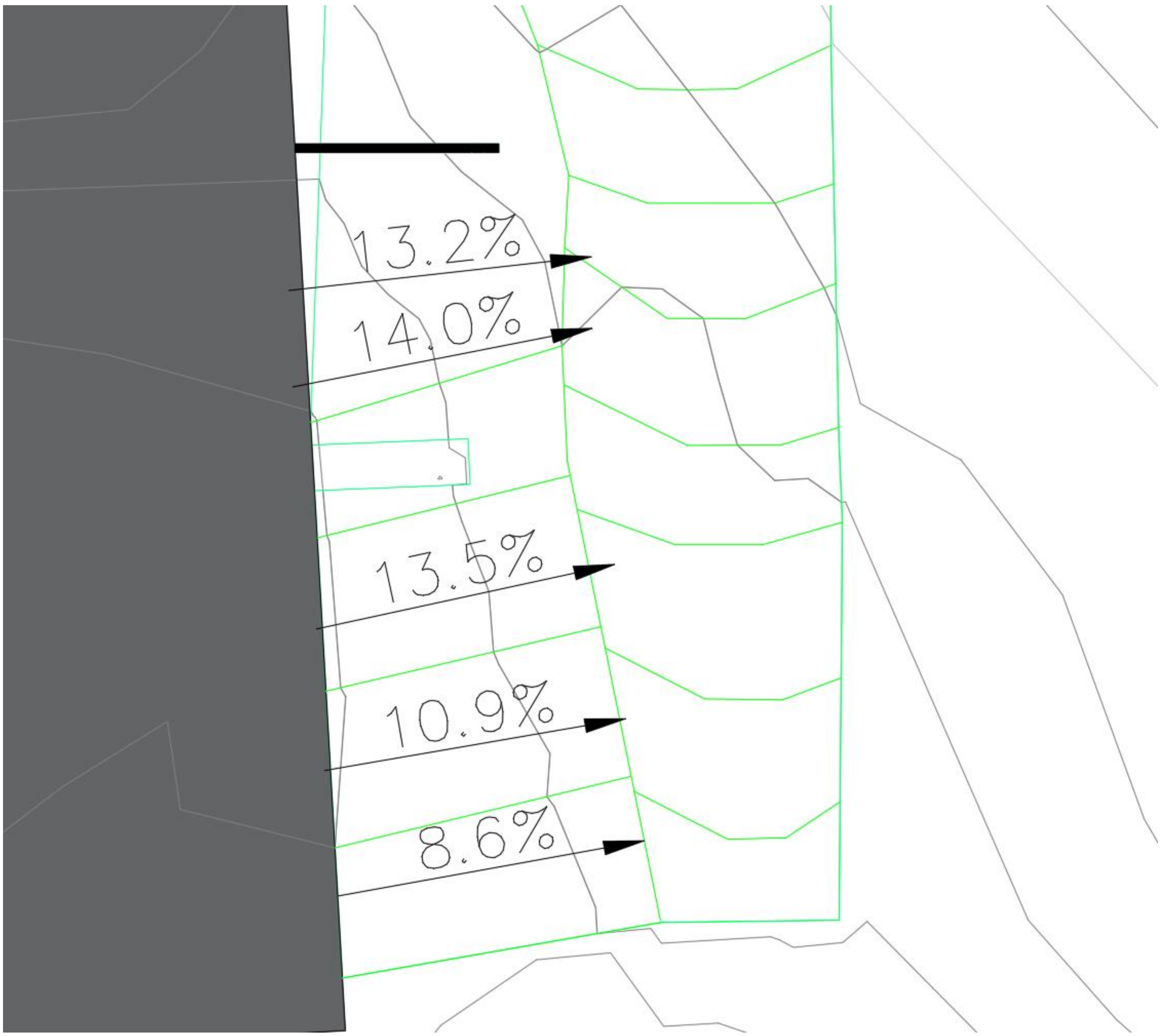


Figure B.9: Slopes up to swale from building tie in

Figure B.10: North and South catchment area

Warning: Soil Ratings Map may not be valid at this scale.

You have zoomed in beyond the scale at which the soil map for this area is intended to be used. Mapping of soils is done at a particular scale. The soil surveys that comprise your AOI were mapped at 1:15,800. The design of map units and the level of detail shown in the resulting soil map are dependent on that map scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Tables — Hydrologic Soil Group — Summary By Map Unit

Summary by Map Unit — Davis County, Iowa (IA051)

Summary by Map Unit — Davis County, Iowa (IA051)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
223C2	Rinda silty clay loam, 5 to 9 percent slopes, moderately eroded	D	1.2	74.1%
531B	Kniffin silt loam, 2 to 5 percent slopes	D	0.2	9.3%
792C2	Armstrong loam, 5 to 9 percent slopes, moderately eroded	D	0.3	16.7%
Totals for Area of Interest			**1.7**	**100.0%**

Description — Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options — Hydrologic Soil Group

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: *None Specified*

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Figure B.11: Soil type for catchment area report

$$D_{50} = \frac{V_{des}}{2g(SG-1)C^2}$$ **Isbash Equation**

Where:

$D_{50} = riprap\ size, ft$

$V_{des} = design\ velocity, ft/S$

V_{des} usually is adjusted from V_{ave} or V_{calc} by a factor of safety

$g = gravitational\ acceleration, 32.2\ ft/S^2$

$SG = Specific\ Weight\ of\ riprap, usually\ 2.50\ to\ 2.65$

$C = 1.20\ for\ low\ turbulence;\ and\ 0.86\ for\ high\ turbulence$

Figure B.12: Equation for diameter of erosion rock

Appendix C: Facade Alternatives

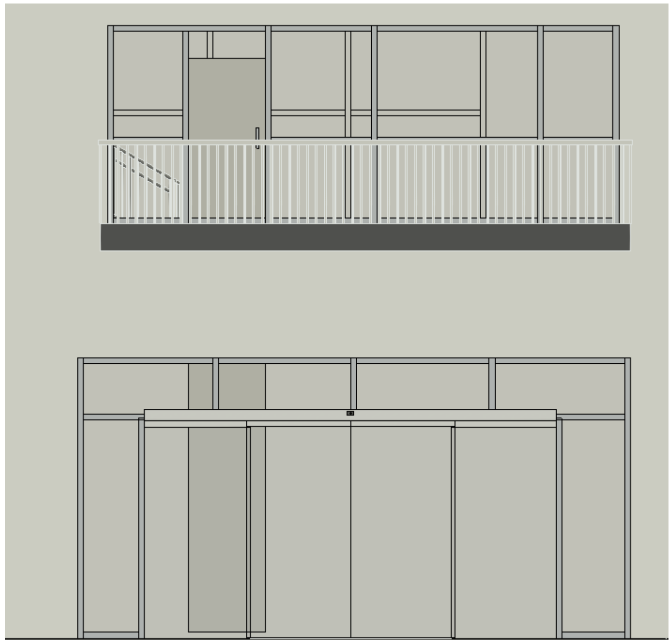


Figure C.1: West profile view of sliding door

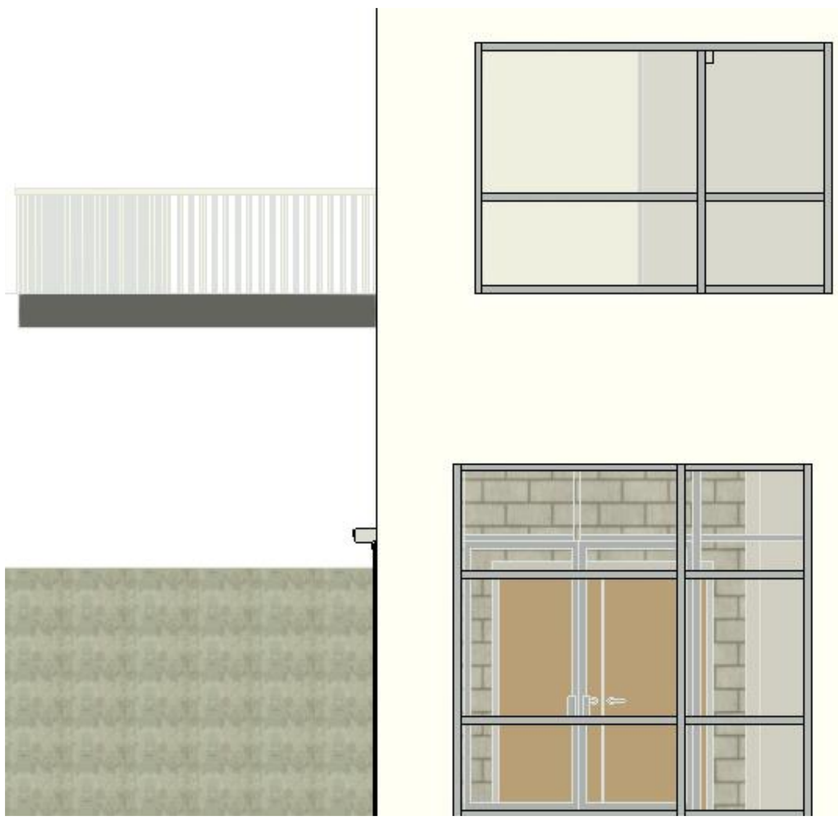


Figure C.2: South profile view of sliding door

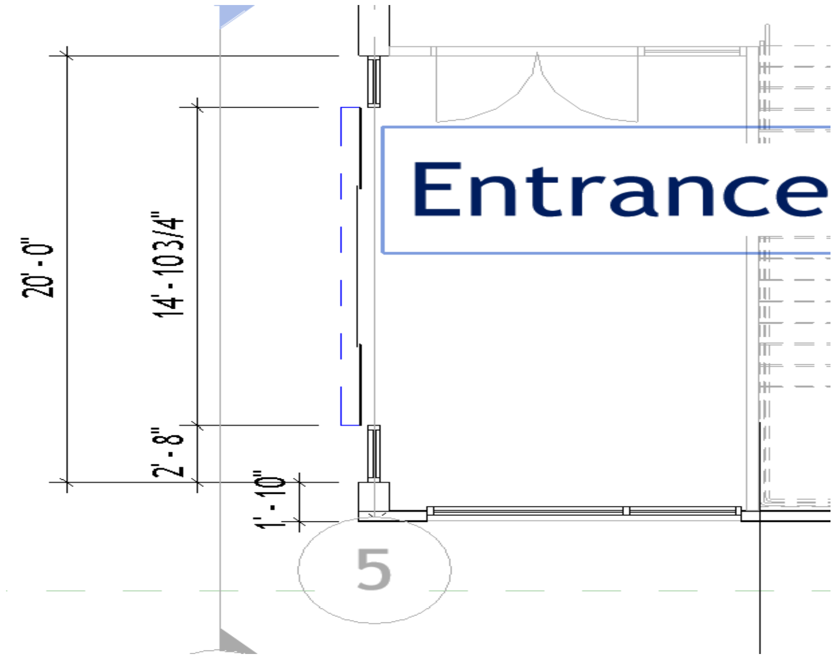


Figure C.3: Plan view of sliding door at entryway

Figure C.4: South profile view of entrance relocation

Appendix D: Existing Interior and Alternative Layout Proposals

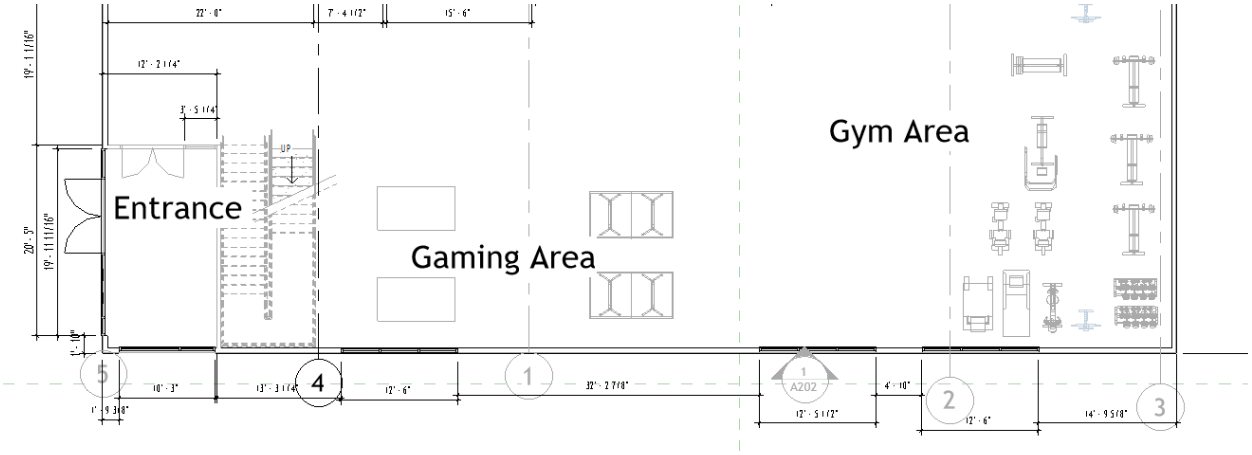


Figure D.1: Existing first floor conditions

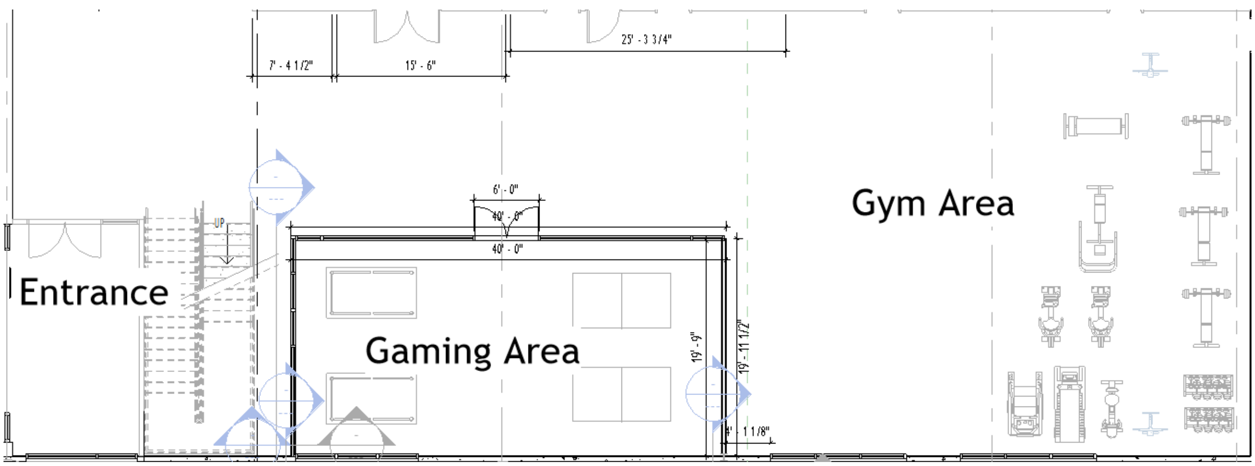


Figure D.2: Proposed game room within first floor

Figure 3D. North-South Proposed Game Room Cross Section

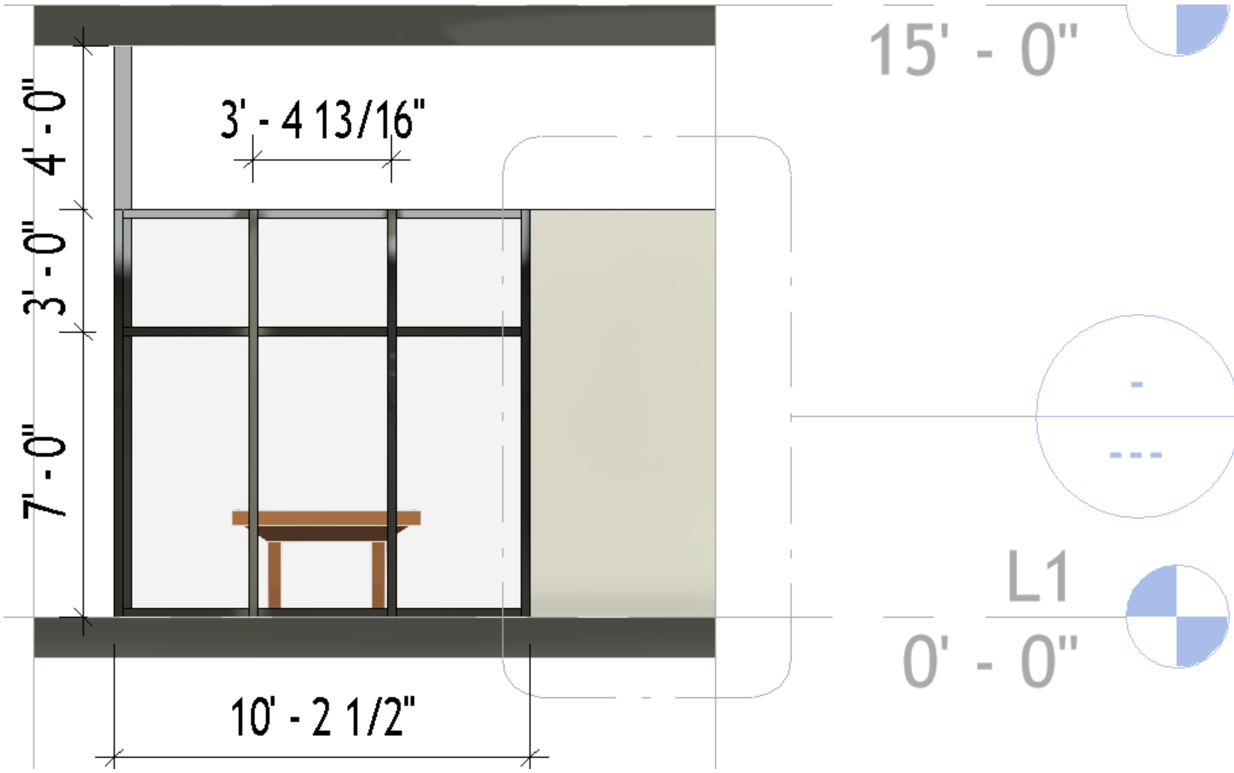


Figure 4D. West-East Proposed Game Room Cross Section

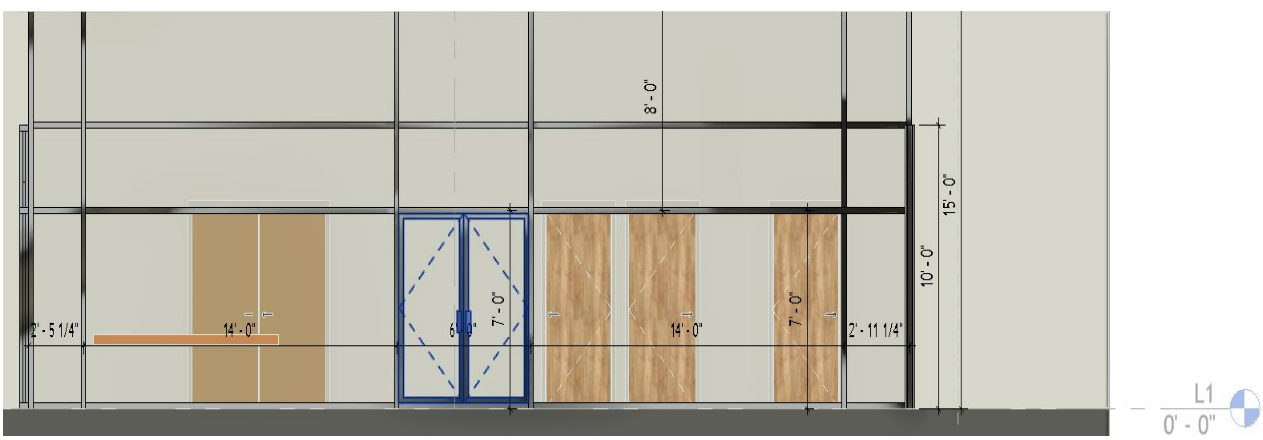


Figure 5D. West-East Proposed Gym Room Cross Section

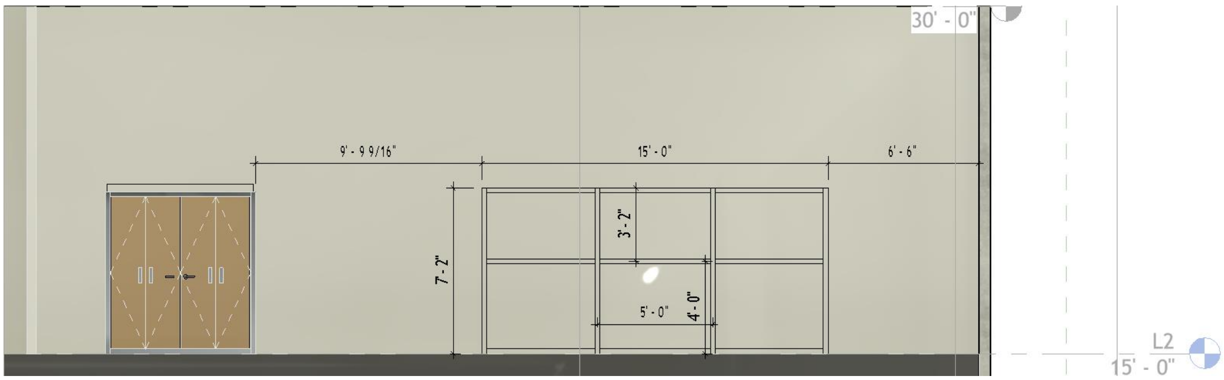


Figure 6D. West-East Proposed Second-Floor Windows Cross-Section

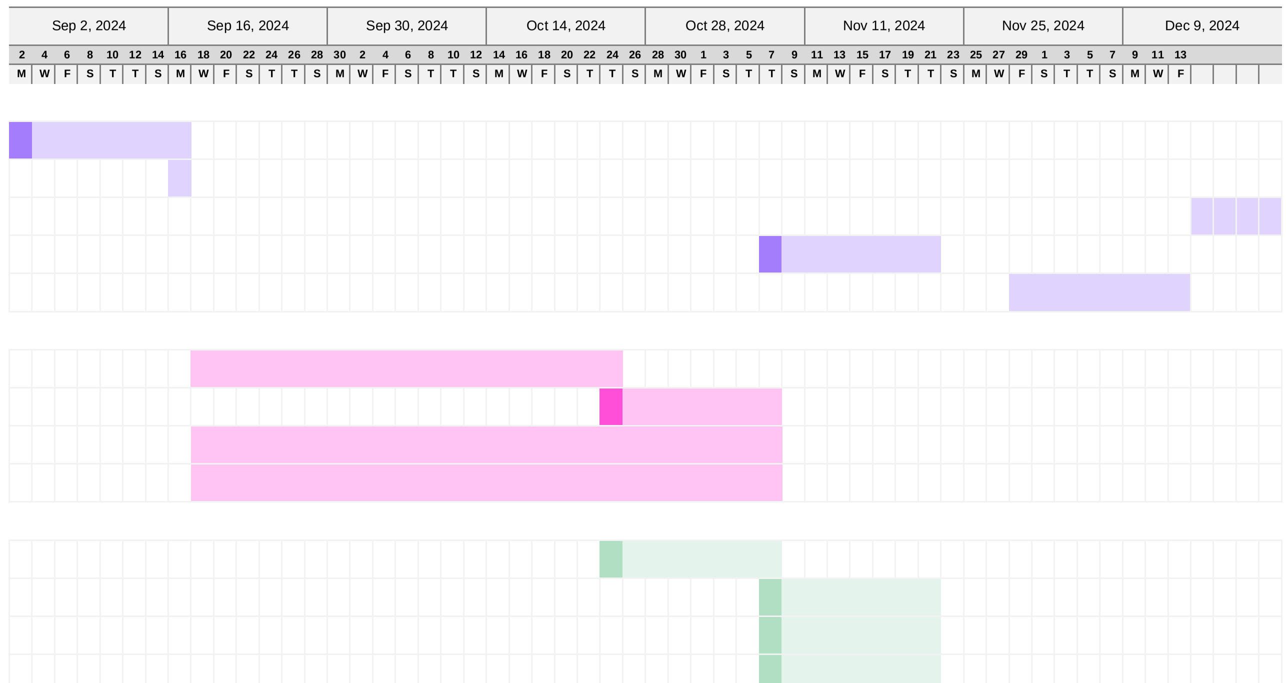
Mutchler Community Center

ASK Engineering   Roberto Aguilar

Project start: Tue, 9/3/2024

Display week: 1

TASK	ASSIGNED TO	PROGRESS	START	END
Project Management				
Project Proposal	ALL	100%	9/3/24	9/16/24
Proposal Slides	ALL	100%	9/16/24	9/16/24
Final Report	ALL	100%		
FInal Drawings	ALL	100%	11/8/24	11/22/24
Final Poster	ALL	100%	11/29/24	12/13/24
Design				
Parking Lot Design	Kaitlynn Kimmel	100%	9/18/24	10/25/24
Facade Update	Kaitlynn Kimmel	100%	10/25/24	11/7/24
Interior Layout	Roberto Aguilar	100%	9/18/24	11/7/24
Erosion Control	Timothy Schmadeke	100%	9/18/24	11/7/24
Documentation				
Parking Lot Drawing	Kaitlynn Kimmel	100%	10/25/24	11/7/24
Facade Drawings	Kaitlynn Kimmel	100%	11/8/24	11/22/24
Interior Layout Drawings	Roberto Aguilar	100%	11/8/24	11/22/24
Erosion Control Drawings	Timothy Schmadeke	100%	11/8/24	11/22/24



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