



January 29, 2016

Ms. Amy Kuras
Park Planner
City of Ann Arbor
301 E. Huron Street
Ann Arbor, MI 48104

**Re: Enclosure of the Farmers Market along Detroit Street
Farmers Market Rehabilitation – 315 Detroit St. Ann Arbor, Michigan**

Dear Ms. Kuras:

Per our discussion on January 22, 2016, we understand that the City wants to explore the option of enclosing the canopy area that parallels Detroit Street with one of the following options: vinyl rollup doors, metal coiling doors, or metal overhead sectional doors. The other canopy areas will be more difficult to enclose due to the step in the canopy elevations. The vinyl rollup doors considered are similar to the metal coiling doors in that they would run along a track and rollup at the top, but they are lightweight and would have a clear window area. The overhead section doors are essentially garage doors and could have windows if desired. Electric or natural gas radiant heating is also being considered.

The existing structure consists of steel framing with aluminum panel roofing supported on concrete pedestals with an unknown foundation system. The existing structure was built sometime in the 1930's and no known copies of the original construction drawings are available. After reviewing the site and all available information, I offer the following items for consideration in the decision of whether to go forward with this project.

STRUCTURAL CONSIDERATIONS

By enclosing the structure, there are two types of loads that will be modified: wind load and dead load. With unknown foundation type and size for this structure, it is difficult to know if the weight of the new doors (especially the metal doors) would result in overstressing the soils under the foundation (which could cause the structure to settle). In order to determine this, the sidewalk around a column would have to be removed to allow for excavation to determine the type and size of the foundation. If it were then determined that the foundation is inadequate, either due to condition or structural capacity, then expensive retrofits or replacement would be required to each affected column.

The other major concern is the added wind loading to the structure. By enclosing the structure, the amount of area that is exposed to wind increases and each column has to resist a load approximately 15 times greater than the original design load. Such an increase would have to be thoroughly analyzed. It is extremely likely that the results of this analysis will result in the need for structural modifications to strengthen the columns. At a minimum, some kind of bracing would need to be added between the columns due to the wind loading. The other concern with enclosing

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a structure is that the uplift pressure on the roof will also be increased, so the attachments of the roof panels to the structural steel would need to be evaluated as well.

STALL SIZE CONSIDERATIONS

Due to the addition of the doors and the steel to support their installation, it is important to note this work will reduce the size of each stall space that is currently available. The vertical height will be reduced by the height of the door roll housing for the vinyl and metal coil door options, and by the height offset of the door tracks for the sectional door from the structural roof framing. For all options, the horizontal space will be reduced due to the addition of the tracks and their vertical supports for the doors to run on. The depth of each stall will also be limited when the doors are down to the area within the overhang of existing roof unless additional framing is added outside the roof line to mount the doors. As many of the gutters have been hit in the past, there should be some consideration made to adding bollards in the pavement to keep all trucks from getting close to the envelope of the doorway so the possibility of a vehicle hitting and then damaging the door tracks is reduced.

OPERATIONAL CONSIDERATIONS

The doors considered for this study were assumed to be powered by electric motors for ease of use, although hand operated options are also available. With the electric controls for each door, there will have to be some type of security required at the controls for the operation of these doors so that vandals will not have the ability to operate the doors. Also with the increase in power required for these doors and the heating units, additional electrical work will be required.

With the sides of the canopy being enclosed in order to allow the heating of this space, a major consideration will be how to handle the flow of people coming in from the ends or the open market areas to the east. If these areas are left open, then it allows the cold air to pass through this part of the market reducing the impact of the heaters. If these areas are closed off with walls and doors, then it could take away from the open air feel of the market during the warmer times when the door panels are not closed.

CONCLUSION

Assuming the foundations are adequate, we believe the project cost for enclosing the canopy will range from **\$275,000 to \$325,000**. The low end of this cost would be for the vinyl roll up door, and the high end would be for the metal coiling doors. Additional cost upwards of **\$150,000** could be added to this cost if foundation work is required. This work would also result in a reduced stall size for any of the enclosed stalls.

We trust this letter has addressed your inquiries about the facility.

Sincerely,

A handwritten signature in black ink that reads "Alan J. Flak, P.E.".

Alan J. Flak, P.E.
Structural Engineer

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