Tommy Hood Engineering
500 Jameson Dr
Piedmont, SC 29673

December 29, 2022

Re: 298 Bypass 123, Seneca, SC 29673

I, Thomas Hood, a registered professional engineer in the state of South Carolina, was asked to examine the structure at 298 Bypass 123 in Seneca, SC. The structure was built in approximately 1971. The structure is a metal building with a 10-inch concrete wall foundation on three sides of the building. The address has a design wind speed of 109 mph and has a design snow load of 20 psf. It is in a seismic design category C.

The building is approximately 75' by 50' and consists of four primary structural beams that span the 49' width of the building at a maximum height of approximately 21' in the center of the building. The roof is supported by the main beams and z-purlins that span approximately 24' between the beams. The z-purlins are 8" in depth and carry a tributary width of 5' of the roof. The walls of the building have c-purlins that span between the main load carrying beams and support the metal that is used on the exterior of the building. Three sides of the exterior of the building have a foundation/retaining wall that is approximately 10" in depth and 8' tall. The exterior of the building is approximately 17' tall.

The building must meet certain load requirements as a commercial building. The building must meet the load requirements for live and dead loads on the roof of the building. These loads come from snow, rain, equipment that may be placed on the roof and people that walk on the roof to maintain the roof. There are also uplift forces on the roof from wind. The other forces that impact the building are the lateral loads from wind and seismic activity.

The building is also impacted by lateral loads from the soil and surcharge loads that are on the soil adjacent to the building. The right side of the building has had additional loads on the soil in the past that impact the retaining wall on that side of the building. There have likely in the past been live and dead loads on the interior of the building as well as loads from structures on the exterior of the building. There have been other structures attached to the building in the past, on both sides and on the front. There is also a concrete patio on the front of the building that is approximately 6" thick and is carried by concrete walls and metal posts under the middle of the patio.

These loads are generally able to be carried by the existing structure – the main load carrying beams, the retaining walls and the purlins that span between the main load carrying beams. Under normal use the structure is able to carry the loads that are placed on the structure – the wind and seismic loads, the live and dead loads from the activity in the building and the activity around the building that places loads on the soil directly adjacent to the structure.

The primary areas of concern when using the building are the loads that the building codes require the structure to carry that they were not required to carry at the time of the original construction as well as the unknown parts of the structure. The loads that the building is expected to carry has changed over the past 50 years while the unknown parts of the structure include the footer and waterproofing system of the retaining wall. It also includes the strain that has been previously placed on the structure and any loads of a cyclical nature that have been placed on the building and may have caused strain in the existing metal structure. Cyclical loads of the connectors throughout the structure produce strain that weakens the connectors over time. The uplift forces on the roof produce strain in the connectors, particularly on the edges and corners of the roof structure. Modern codes recognize these factors and have required additional design elements and additional connection requirements to prevent the failure of buildings. Also additional wind and seismic data has provided information that allow for the design of modern structures that are able to resist these forces without collapse in a way that also allow for the design of the building without undue expense.

In examining this structure, it meets the requirements for typical loads. It was not built to modern seismic and wind load requirements. I recommend that the load carrying beams of the structure not have any additional weight placed on them either from additions to the interior of the building or by additions to the exterior of the structure. Any additions or renovations to the building should be done independently from the existing structure.

In order to meet existing wind and seismic requirements additional lateral bracing should be placed between the main load carrying beams. This additional lateral support can be attached to the existing load carrying beams in a way that allows the building to experience design lateral loads without collapsing. The structure, during a design earthquake or wind load, may experience lateral movement but should not collapse. These requirements are based on the likelihood of certain loads impacting the structure over the next 50 years. The details of this bracing can be designed along with the anticipated use of the building in order for it not to adversely affect the usefulness of the building and also not to be economically unviable.

If additional loads are placed on the soil to the right of the building, I recommend that the footer of the concrete wall be investigated in order to determine the size of the footer and also that the wall be examined for the reinforcing steel that may exist in the wall. It is imperative that water be prevented from gathering behind the wall. Any activity to the right of the building should be designed in a way that does not allow water to gather behind the wall.

The front patio of the building can be used for ordinary live loads from the occupancy of a structure built there. It should not be used for vehicular traffic. The patio can be used as a foundation for a structure under most circumstances with the foundation walls at the front and the back bearing the loads of the roof placed on the structure.

The particular use of the building will impact the items that are required for the safe occupancy of the structure. For example, if the building is used for storage the risk of occupancy during a event that would cause collapse is greatly diminished versus if the building is used for commercial purposes with the building being occupied more often. These factors are taken into account by the modern codes when elements of the building are design due to the economic impact that these design elements have. In its current state, the building is primarily used for storage and the potential impact if it were to collapse is minimal. Using the building for commercial purposes increases the likelihood of adverse impacts if a design wind event or earthquake occurs. Because of this, the bracing that needs to be done will be impacted by this intended use of the building but can be designed accordingly.

I can be reached at 8649081165 with any questions.

Sincerely,

Thomas Hood, PE

SOUTH CAROLINA
LICENSED PROFESSIONAL ENGINEER
No. 17321
12/29/24
THOMAS HOOD

SOUTH CAROLINA
TOMMY HOOD
ENGINEERING
6298
CERTIFICATE OF AUTHORIZATION