Kimley»Horn

Memorandum

To: Dominium Inc.

From: Ben L. Green, P.E. – Kimley-Horn and Associates

Date: February 8, 2024

Subject: ***Technical Memo: Tower Road Drainage Improvements***

The content of this memo is based on a 15.49-acre tract of land located in City of Manor, approximately 500 feet east of the intersection of Tower Road and Suncrest Road. Kimley-Horn (KH) has prepared this memo to evaluate the existing drainage conditions of Tower Road at this location and to provide possible solutions to minimize the current flooding in this area. KH has been made aware that there is frequent flooding along Tower Road at this location which has prompted the need for this analysis.

The following summarizes the technical elements of the existing drainage problems and proposed drainage improvements on Tower Road for this location:

- Currently there is an existing 24" corrugated metal pipe storm culvert crossing under Tower Road. Per KH's analysis, this culvert is severely undersized resulting in frequent flooding during all significant storm events including the 2-year storm event.
- KH has determined that constructing four (4) - 3'X6' box culverts would allow sufficient storm water to pass under Tower Road and to prevent water from backing up and overtopping the existing roadway in the 2-year storm event and flooding in larger storm events such as the 25-year and 100-year would be reduced.

Tower Road experiences flooding in the lowest commonly analyzed rain event, the 2-year storm event, and it can be expected to flood in smaller rain events multiple times per year. This 2-year storm event is defined as approximately 4 inches of rain over 24 hours and statistically has a 50% chance to occur each year, per NOAA ATLAS 14 precipitation estimates, the latest available data from the National Weather Service.

In the existing condition, the volume of water generated by the 2-year storm can be expected to surcharge the existing undersized culvert. As the culvert fills with water, excess water will back up behind the roadway, causing water to overtop Tower Road at a depth of approximately 1.5 feet over the pavement at its deepest location. This overtopping flow spans along Tower Road for approximately 239 feet which creates an unsafe driving condition during most sustained rain events.

With the installation of the four (4) 3'X6' culverts, drainage will be improved such that water during the 2-year storm event and smaller storm events would be fully conveyed underneath the roadway and contained within underground storm infrastructure. In essence, the proposal would be to replace the

existing pipe with larger culverts, which have more flow capacity due an increased opening area which allows water to pass through instead of backing up behind the roadway. The proposed box culverts would not be conveying more flow downstream. Rather, the same amount of water that would originally be passing above the roadway would be passing underneath the roadway in the proposed box culverts. Per Texas Water Code and City of Manor regulations, the amount of flow downstream will not be allowed to increase, but the manner in which the flow will be conveyed will be safer for motorists. Since the water will no longer overtop the roadway; this will ensure Tower Road remains functional during the majority of rain events through the year.

Per standard engineering practice and in conformance with the Texas Water Code and City of Manor regulations, the proposed development will be required to ensure that the proposed development will not increase flow downstream of the development. During the course of design of the onsite civil plans, KH will perform a drainage model using Soil Conservation Service Curve Number model methodology to ensure the flow of water downstream does not increase when additional impervious cover proposed by the development is constructed. The maximum amount of impervious cover proposed onsite will be dictated by the zoning. The proposed culverts under Tower Road will not impact the amount of impervious cover allowed or designed. KH will propose a variety of storm maintenance measures, including underground pipe conduit, open channels, and detention ponds, to reduce the proposed flows generated by the additional impervious cover to be lower than the flow in existing conditions. The City of Manor will have to approve of the drainage design for the development in order for the development to receive Site Development Permits.

The Culvert Exhibit provided depicts the existing and proposed conditions described above.